RESOLVING SCIENCE-INTENSIVE PUBLIC POLICY DISPUTES: LESSONS FROM THE NEW YORK EIGHT INITIATIVE

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Abstract

This dissertation analyzes the problems of resolving technically complex conflicts that arise over use and allocation of natural resources. The strengths and weaknesses of traditional mechanisms for handling science-intensive policy disputes are examined and critiqued, particularly in the areas of coastal management and marine policy. Then, I examine the potential use of assisted negotiation in resolving such disputes.

Two case studies illustrate the strengths and weaknesses of traditional legislative, administrative and judicial processes for handling science-intensive disputes over resource management. Chapter 2 considers the development of legislation in Virginia aimed at regulating development and conversion of nontidal wetlands. Key interests with a stake in the bill were on an unequal footing during in the legislative process. Even though substantive changes introduced during the bill’s revision raised significant scientific issues, the legislature made almost no use of available technical information. Chapter 3 examines a dispute over deepening of channels for the Port of Oakland, California. After port interests and regulatory agencies reached a tentative agreement to dump dredge spoils at a site off the coast of San Mateo County, local fishermen took legal action, contending that the dumping would cause severe environmental harm and create a dangerous precedent. The fishermen’s successful litigation blocked implementation of the Corps plan to dispose of dredge spoils disposal off Half Moon Bay.

Chapters 4 and 5, respectively, illustrate the use of a court-appointed master and a facilitated dialogue to supplement traditional processes for policy making. Both efforts succeeded on some counts and fell short on others. Chapter 4 shows how a court-appointed master and a team of experts prepared findings and recommendations, endorsed by the litigants, to guide initial clean up of Boston Harbor. However, subsequent monitoring meetings provided minimal scientific assistance and were characterized by rancorous exchanges. Agreement on a timeline for sewer improvements required another round of litigation. Chapter 5 shows how coastal regulators teamed with facilitators to draft a law concerning use and development of public tidelands in Massachusetts. Proponents and potential opponents of new regulation met in a workshop that yielded principles for granting licenses for new waterfront development. Two months later, legislation passed. However, efforts to draft regulations have included inadequate participation and insufficient handling of technical information. Implementation has stalled.
In Chapter 6, I describe in detail an assisted negotiation process known as the New York Bight Initiative. The Bight Initiative, carried out under the auspices of the New York Academy of Sciences (NYAS), involved face-to-face dialogue among agency staff, resource users, and scientists. The Bight Initiative represents one of the first efforts to design a collaborative process that explicitly responds to the shortcomings of traditional legislative, administrative, and judicial mechanisms for resolving science-intensive policy disputes.

Representatives of a dozen private groups—port interests, commercial fishermen, environmentalists, industry spokesmen—were literally "at the table" in face-to-face negotiation with ten agency representatives. A concerted effort was made to put stakeholders on a more equal footing with regard to access to scientific information. Over twenty experts were engaged to brief the participants and help them draft findings and recommendations to improve management of PCBs in the Hudson/Fairwind Estuary and New York Bight system. A team of nonpartisan intervenors—active mediators—assisted all phases of work. NYAS mediators played a "translator" role to clarify technical terms and served as brokers between experts and participants to present information in a useful format. When experts disagreed, participants in the Bight Initiative worked to probe the bases of disagreement by tracing it back to differences in starting assumptions, analytic methods, or interpretations of data. This enabled parties to narrow disagreement, although parties were explicit about the presence of residual disagreement. Where uncertainty or disagreement persisted, participants drafted specific recommendations for analysis or research to further narrow this uncertainty. With the help of NYAS mediators and the pool of scientific advisors, participants developed five successive drafts of a single text document, which ultimately included 120 findings and twenty-six recommendations for management action, analysis, and future research. The heads of eighteen participating organizations lent their signature to the final document, signifying their ratification of the agreement.

Based on the Bight Initiative, I conclude that efforts to resolve public policy disputes of a science-intensive nature must address six issues: 1) place three often separated groups—policy makers, scientists, and affected stakeholder groups—on a more equal footing; 2) identify and secure useable information; 3) translate technical information and present it to affected stakeholders in an appropriate format; 4) incorporate effective mechanisms for handling scientific disagreement; 5) cope with complexity and uncertainty; 6) anticipate problems that can thwart implementation, with special attention to efforts to package suitable agreements and bind parties to their agreements.

I develop prescriptions for achieving these goals. In particular, I recommend use of the negotiated single text procedure to invest disputing parties with the common purpose of stating relevant findings and capturing acceptable agreements. The sustained involvement of a team of activist mediators (as opposed to the model of passive facilitators) is needed to lead the single text negotiation procedure and holds special promise to advance the resolution of science-intensive public policy disputes.

Thesis Supervisor: Dr. Lawrence E. Susskind
Title: Professor of Urban Studies and Planning
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Many people deserve thanks for their help in seeing me through this doctoral experience. Larry Susskind has inspired by example—both in his work as a professional mediator and as a first rate scholar. His unflagging interest and optimism about the success of the Bight Initiative kept my motivation high. Larry brings new meaning to the idea of “investment in one’s work”. He’s the only one who could have persuaded me to write four more case studies after spending three years working on the Bight. Harvey Brooks’ work and his vast experience in science and public affairs provided critical insights and much-needed perspective, both through his writing and his comments on my drafts. John Ehrenfeld’s timely assistance had a definitive impact on the tone and content of the conclusions of this dissertation. In the early stages of this doctorate, James Broadus’ intellectual influence was much appreciated. Francisco Szkeley has provided collegial insights at key moments.

In a sense, this inquiry began a decade ago when I became fascinated with the question of how to better use science in stewardship of coastal and marine resources. My principal mentor in this area, and a key figure in my decision to go on for the PhD, is John Clark—biologist, raconteur and sometime philosopher. Thanks are also due to my colleagues Jens Sorensen, Bob Twiss, and the late Tom Dickert for encouraging me to embark on the doctoral path in environmental planning.

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Introduction

This dissertation reviews the problems of resolving technically complex conflicts that arise over use and allocation of natural resources. My first objective is to pinpoint some of the strengths and weaknesses of traditional mechanisms for handling science-intensive policy disputes, particularly in the areas of coastal management and marine policy. Then, the potential use of assisted negotiation in resolving such problems is examined. I describe in detail an assisted negotiation process known as the New York Bight Initiative. The Bight Initiative, carried out under the auspices of the New York Academy of Sciences, involved face-to-face dialogue among agency staff, resource users, and scientists. The Bight Initiative represents one of the first efforts to design a collaborative process that explicitly responds to the shortcomings of traditional legislative, administrative, and judicial mechanisms for resolving science intensive policy disputes. Indeed, there have been very few efforts in coastal management or other public policy fields to document mechanisms to resolve disputes of a science-intensive nature (Brooks, 1984; Ozawa, 1988).

Within the framework of dispute resolution, the technique of joint fact finding—the collaborative discovery and review of technical information by parties to a dispute—has generally been applauded, but insufficiently described. Similarly, negotiating a single text (as opposed to encouraging parties to offer competing versions of facts and recommendations) though supported as good negotiation practice, has been described only in very general terms. This dissertation aims to fill these gaps by closely reviewing the experience of the Bight Initiative. The shortcomings of traditional processes are juxtaposed against the techniques used in the Bight Initiative. Finally, I show how the experience of the Bight Initiative builds upon and pushes the frontier for research in science and public policy making.
Why Science-Intensive Conflicts Over Coastal Resource Uses Are Likely to Arise with Increasing Frequency

There are several reasons why technically intensive disputes arise over coastal and marine resources. First, the coastal zone is characterized by the complex aggregation of a number of natural and built systems. These systems, which interact in complex ways, include large scale geomorphic units (coral reefs), estuary watersheds, estuary circulation systems, ocean basins, air basins, populations of commercially important fish, viewsheds, and physical infrastructure systems (Sorensen et al., 1985). The imposition of new development or new technology on these interrelated systems is difficult to forecast.

Second, there is an exceptional degree of institutional fragmentation in the coastal zone. One study of agency responsibility in California identified 75 different agencies with some jurisdiction (Gamman et al., 1974). Hypothetically, there could be upwards of 150 sectoral and functional divisions of government in the U.S. coastal zone (Sorensen et al., 1985). These agencies invariably have competing and overlapping mandates that significantly increases the complexity of coastal decision making. More specifically, the number of government actors responsible for the coast means that myriad agencies are likely contenders in public disputes over coastal resource use.

Third, because of the availability of multiple resources and amenities, the coastal zone is the object of intense competition among multiple users. This competition may arise over the same resource (i.e. fish), for the same stretch of shoreline (i.e. fishing piers vs. condominiums), or where one resource use that has the possibility of displacing another (i.e. oil and gas replacing fishing). Moreover, with close to 85% of the population living within one hour travel time of a major ocean coast or Great Lakes shoreline, this competition is only likely to intensify (Magoon, 1987).
Fourth, proponents of different policy priorities and use schemes frequently appeal to experts to bolster their own cases—whether in the legislative arena, in public hearing testimony on environmental impact statements, or in the judicial realm as expert witnesses. While these mechanisms may allow disagreements to be aired, they seldom enable the clarification and narrowing of discord. Ozawa and Susskind (1985) aptly refer to this recurring situation as "adversary science." Sometimes scientists don’t really disagree; they simply miscommunicate. In other cases, scientists use different starting assumptions, sampling methods, or analytic techniques that lead to apparent disagreements over conclusions. Too often, lay decision makers and citizens are puzzled by the inability of the scientific community on areas within their expertise. At worst, disagreements among scientists may persuade lay people that science has no useful role to offer in shaping policy. Moreover, groups with fewer resources often cannot afford to hire scientists, or may not have access to top-caliber expertise.

Fifth, when scientific consensus is sought, it too often takes the form of elite panels that isolate marine scientists from policy makers and citizens. The Marine Board and the Board on Ocean Science and Policy of the National Academy of Sciences routinely convene experts to render advice on complex policy issues (National Academy of Sciences 1981, 1984). A variation on this model is to convene separate citizens’ advisory committee and technical advisory committees. EPA created such separate committees in its Chesapeake Bay cleanup program (Tippie, 1985), and in the last two years its Office of Marine and Estuarine Programs (OMEP) has sought to replicate this structure for major estuaries around the United States. While this model can yield valuable insights, it suffers from several disadvantages as well. One problem is that members of the marine science community, organized into numerous specialized disciplines, often cannot agree on how best to characterize or how to assess the environmental impacts one economic use imposes on another. For instance, in evaluating the impact of a waste discharge, a hydrographer might look at how current patterns disperse contaminant effluent, while a biological oceanographer would want to know how contaminants biomagnify in
the marine food web. If lay people are excluded from the deliberations, they cannot understand why two credible scientists would bring different views to the same problem.

Also, if grassroots interests and other resource users with a stake in a policy decision are denied access to the deliberations of an expert panel, valuable information may be overlooked. Still another problem arises if those affected by a decision cannot observe or understand the deliberations of scientists, they may distrust or disbelieve the advice rendered by an expert panel. A corollary result could be lack of support for a policy recommended by scientists without the involvement of citizens in the deliberations. Finally, scientists, working alone, may not produce information in a form useful to decision makers.

Let us examine how all these pressures might intersect in a hypothetical case: The waterfront of Oceanopolis, a medium-sized port city on the Big Estuary, was badly rundown, as are waterfronts in many American cities. In fact, the waterfront was symptomatic of a city-wide economic downturn. A particular eyesore was Boggs Point, the site of a delapidated fish pier on Boggs Point inlet, some scattered remnant wetlands, and the shell of a former warehouse that had been destroyed by fire sometime in the late 1970s.

Mayor Winston Douglas appointed a task force of leading business figures to recommend measures to bolster the city's sagging tax base. The task force's cornerstone policy was to urge city businesses and local administrators to stop treating the waterfront as a liability and "turn towards the water". A consortium of young developers calling itself Harbor Associates quickly put forward a daring mixed use proposal: luxury condominiums and office towers, coupled with a boutique brewery and dockside tasting bar. (The water, of course, would be piped from many miles inland). Completion of the project required removal of the dilapidated pier, filling of the remnant Boggs Point wetlands and extensive construction of pilings to support the towers and cantilevered tasting deck. Harbor Associates called their proposal Boggs Point Towers.
The Mayor, eager to have a project he could tout to other prospective investors, endorsed the Towers. But he cautioned that he could not speak for the City Council. Besides, the City was only the first stop in the permit review gauntlet.

It wasn't long before Boggs Point Towers proposal polarized planners, regulators, and users of the Big Estuary. Planning and regulatory agencies gave conflicting signals. The State Office of Economic Development expressed cautious support and suggested that with a few projects like the Towers, the City might stand to hike its municipal bond rating a few notches. They cautioned, however, that the proposed mix of land uses had never been tried before. The National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and their state counterparts expressed concerns about impacts to the nearshore benthic community and the wetland. However, they had no statistics regarding the contribution of the Boggs Point inlet and adjacent wetlands to the overall health of the Big Estuary. Moreover, in their advisory role, they were in no position to stop the project.

Based on sketchy evidence, staff of the state coastal agency, the State Waterfront Development and Conservation Commission (SWADACC) were in a quandary about whether to recommend project approval. Created during a moderate Republican administration, SWADACC had a "balancing" mandate to promote waterfront reuse and development while protecting coastal resources. Although its geographic jurisdiction was small, it did have responsibility for granting permits for any project within 100 feet of mean high water mark. Its primary objectives were to "reduce coastal use conflicts" and to promote "maximum sustainable use of coastal resources for the benefit and livelihood of commerce and the public interest".

This left great discretion in the hands of the 12 appointed members of the board, who split along geographic lines. Many of the Commission members, who were not required to demonstrate special expertise in land use planning or coastal systems, were known as "loose cannons". An original sponsor of the bill was quoted as saying "The citizen groups
don't really have the ammunition to bring to these hearings. So you have 12 political appointees with agendas of their own, meeting in the basement of some hotel deciding multi-million dollar questions".

Staff of the Regional EPA's water and marine resources division emphasized that the developers would need appropriate dredge and fill permits from the U.S. Corps of Engineers, and would have to comply with new pretreatment requirements in their brewery discharge to the municipal sewage system. But key staff in the division were bogged down reviewing proposals to allow incineration of toxic waste at sea and couldn't spend much time providing guidance to the developers or the community.

The local Chamber of Commerce, where Harbor Associate was a rising star, enthusiastically endorsed the project. More guarded support was heard from the Intercultural Civic Action League.

The Commercial Fishermen's Union pointed out that while the nearshore waters of Boggs Point were no longer an important nursery for fish and shellfish, the aging landing facilities were one of a few such facilities left around the Big Estuary. They strongly objected to replacement of the pier, and argued that it should be upgraded with the state's help.

A regional conservation group--People, Access, Coastal Ecosystems (PACE)--pointed out that the Boggs Point wetlands were one of just a dozen such remnants left around the Estuary. Further, they pointed out, the Towers would block access to the water that was now available to those who cared to venture near the rickety fishing pier. They insisted that Harbor Associates should mitigate any damage to Boggs Point wetlands in an area nearby, and guarantee public access.

An unexpected development was the entry of a somewhat militant group, Back Off Organic Toxics (BOOT). BOOT, made up of community organizers and a few professional staff, spent most of its time pressing for better pretreatment by the many industries in the City. They even tried to close down the few electroplating businesses left in Oceanopolis. (BOOT worried
about heavy metals, too.) Because of this activity, EPA its state counterparts felt that BOOT was basically an asset to environmental protection, although they sometimes made unsubstantiated allegations.

One of BOOT's student interns uncovered evidence that the lessee of the site just before the fire was Amalgamated Chemical, a conglomerate that had stored paint, fertilizer and feedstock for pharmaceuticals in the warehouse. After the fire, many the materials stored in the warehouse had found their way into the shallow, poorly mixed waters near Boggs Point. BOOT contended that this meant that the adjacent sediments were laden with contaminants. BOOT further contended that if the necessary dredging and foundation work were completed to remove the old pier and build the pilings, it would unleash a toxic stew of polycyclic aromatic hydrocarbons, chlorinated butadienes, and phthalate esters, to name just a few dangerous compounds. BOOT also took a more rigid position on the question of the Boggs Point wetlands. They suggested that destruction of any existing wetlands—no matter how degraded—was unacceptable.

Harbor Associates realized that since their proposal was a bold one, it would have to make some modest concessions. It recognized the need to deal with PACE on questions of wetlands and access, and would have to deflect the concern of Fishermen's Union. The Associates decided not to dignify BOOT's assertions and treated the organization as a lunatic fringe group.

One valid question dealt with wetlands. Harbor Associates' environmental consultant explained that EPA had recently endorsed the findings of a much-touted "National Wetlands Forum". One key recommendation was "no net loss" of wetland acreage. This sounded good on paper, but there was no clear word yet on how that would play out in a given state or community. Harbor Associates was fairly optimistic that it did not mean that wetlands could not be altered—only that damage had to be minimized and any wetland acreage lost had to be replaced. PACE's position that wetlands be replaced "on site" or close to on site had no basis in law—at least not yet.
PACE had identified some candidate restoration sites on the shoreline, but Harbor Associates envisioned the Towers as an anchor for the renaissance of the City waterfront. They intended to lead this renewal on a waterfront that would become increasingly valuable over the next decade or two. They couldn't build the Towers without filling wetlands. And they weren't about to create new wetlands in what could become their next profit center. They offered to restore wetlands on some unused pastureland in Pondsbad, a rapidly suburbanizing agricultural region 20 miles to the south. As for access, they pointed out that the brewery tasting dock would be open to the public—at least those over the drinking age. They agreed to add a one story climbing tower for children to their site plan.

To appease the commercial fishermen, the Harbor Associates offered to open a pilot aquaculture facility for culturing sea urchins adjacent to the brewery. Urchins, Harbor Associates pointed out, were a sought after delicacy in Japan, and could command high prices. And Harbor Associates pledged to use all the latest technology, so there would be no unpleasant odors to offend those who would reside in the condominiums.

The fishermen were not impressed. They countered that while they could live with some gentrification of their working waterfront, what they really needed were some decent landing facilities for the fish and shellfish they took from nearby natural waters, and maybe improved refrigeration units. Their spokesperson, a former minor league baseball star, complained to the press that Harbor Associates was "trying to cast hardworking fishermen as nursemaids to sea urchins in an overgrown aquarium". Besides, he pointed out, there was no track record of culturing urchins on a commercial scale.

Several rounds of preliminary hearings ensued before the City Council and the State Waterfront Development and Conservation Commission (SWADACC). The Harbor Associates emphasized the economic and social benefits of Boggs Point Towers. Fishermen charged that their needs were being ignored. PACE produced petitions asking for preservation of wetlands and public access.BOOT members dressed up in gas masks and manta ray suits.
The staff of the state coastal agency provided no clear guidance, and the outcome of the Commission vote was very difficult to predict. EPA’s marine resources division was preoccupied with the incinerator ship proposal, and its Regional Administrator was trying to figure out how to respond to new directives to address ozone depletion and deforestation in the Amazon. The Chair of the City Council decided that Boggs Point Towers raised too many technical questions—questions that could only be decided by experts. He asked Steve Livingston, his former professor of biology at City College, to pull together the best scientific minds and recommend a course of action.

Livingston persuaded two of his colleagues to join him on an Oceanoplis Waterfront Technical Advisory Panel. He also asked PACE and the Harbor Associates each to send a representative. PACE recruited Dr. Ingrid Johansen, a zoologist from the nearby State University who was a noted expert in the reproductive behavior of molluscs and other invertebrates. The Harbor Associates arranged to fly in Clint Summers, an environmental engineer from the National Port Action Council, based in Mobile, Alabama. Summers had published nearly 60 assessments on port and waterfront development, mostly small scale studies on the Gulf Coast. The fishermen had no expert to recruit. BOAT was not invited to participate.

The scientists met for a day-long session, but could not agree. Ingrid Johansen took a strongly risk averse posture, and told the others there was no way that Boggs Point Towers could go ahead without irreparable harm to the benthic community, the wetlands, and the overall health of the Big Estuary. She claimed that there was no data base on which to forecast the success of the proposed artificial wetlands in Pondsbad. Johansen presented a post hoc analysis of large scale waterfront development that showed declines in abundance of fish and shellfish, and reduced levels of public access and public use. The zoologist ended her presentation by urging Harbor Associates to scrap the Towers and to come up with a proposal that "celebrates the working waterfront and restores the ecosystem". A local professor of ornithology sided with her.
Summers countered that there were plenty of good examples of wetland creation and enhancement. He cast the environmental risks in a de minimus light and sought to switch the discussion to economic costs and benefits. A local geologist sided with Summers, but thought Harbor Associates would need some geotechnical advice as to how to install their pilings. In the end, two scientists favored the project, two were opposed, and Livingston felt that more research was needed—particularly on the question of resuspension of organic toxics in the sediment. More importantly, the scientists could not really agree on what issues most needed to be addressed.

The City Council chairman threw up his hands when the "battle of the whitecoats" ended in a deadlock. He had envisioned a tidy scientific consensus of scientific opinion. Instead, what he got back was even more polarization than before. The parties who had not been represented at the TAC were incensed. Fishermen complained about being excluded and explained to participate, they needed help cutting through the all technical jargon. BOOT shifted gears and went to its Legal Defense Fund, threatening to "tie up the project for years in court".

Mayor Douglas was no closer to his goal of rejuvenating the waterfront. Worse, the opposition was mobilized and forced two or three tough environmental questions onto the local political agenda. Harbor Associates began to think seriously about moving their Towers development elsewhere. The fishermen were frustrated that once again their needs had been given short shrift.

What options were left? The balance of this dissertation will probe the problems exemplified by this fictional case.
Major Issues Considered in the Dissertation

There were other options available to the participants in Oceanopolis. Most reflect self-conscious efforts to grapple with seven key questions:

- How should public agencies ensure adequate participation by affected stakeholder groups in decisions over the use and allocation of resources?

- How should these same agencies secure and take advantage of useable scientific and technical data to inform public decision making?

- How should they deal with areas of scientific disagreement?

- How should complexity and scientific uncertainty be handled?

- How should problems of implementation be handled?

- What role might nonpartisan intervenors—active mediators—play to help resolve complex disputes?

Structure of the Balance of This Dissertation

Chapters 2 and 3 evaluate the strengths and weaknesses of traditional legislative and administrative processes for handling coastal resource disputes.

Chapter 2 analyzes the development of proposed legislation in Virginia aimed at regulating development and conversion of nontidal wetlands. Key interests with a stake in nontidal wetlands management were on an unequal footing with regard to participation in the legislative process. Environmentalists who originally propounded the legislation were left behind by professional lobbyists representing developers, foresters, and others who felt threatened by the new regulations.
Each of five substantive changes introduced during the bill's revision—related to the geographic scope of the bill, the methods used to define tidal wetlands, the exemption of wetlands under one acre, the exemption of recreation ponds, and the standards for permit review—raise significant scientific issues. However, the legislature made almost no use of available technical information. University scientists, present at legislative hearings, were not asked for advice. The complex linkages between the functioning of upstream wetlands and the water quality of Chesapeake Bay were not clarified. The legislative process failed to compile and synthesize data on key subjects for which information was not readily available. Estuarine scientists forecast that excluding wetlands smaller than one full acre from the regulations would totally exclude several leave important wetlands types unprotected. Yet, there was not effort to summarize the functions and values of these wetlands, or to tabulate the size and frequency of occurrence for Virginia's nontidal wetlands.

In the end, the bill was so weakened, and important ecological concepts were so totally ignored that the original legislative proponent considered opposing the bill. With the successive paring of permit standards, agency regulators would be left with little guidance, thus greatly complicating prospects for the regulations as drafted.

Chapter 3 presents the case of a dispute over deepening of channels for the Port of Oakland. Port interests, regulatory agencies, and Bay Area environmentalists reached a tentative agreement to dump dredge spoils at a site off the coast of San Mateo County, south of San Francisco. EPA and the Corps of Engineers convened a blue ribbon panel in Port Belvoir, Virginia, and ultimately endorsed the Half Moon Bay site. Lay people and grassroots interests were not invited to participate. As a result, the agencies lost an opportunity to learn first hand about the value of the fishery from coastal resource users. Additionally, the Supplemental EIS for the project failed to adequately document of the fishery values at the site.
Half Moon Bay fishermen, convinced that the disposal of the first 500,000 cubic yards of dredged material (of 7.5 million cubic yards) would cause serious environmental harm and create a dangerous precedent, took legal action. The fishermen's successful litigation blocked implementation of the Corps' plan to dispose of dredge spoils disposal off Half Moon Bay. As a result, the Port of Oakland is seriously hobbled in its efforts to attract the largest class of container ships, and is in tough economic straits.

Chapters 4 and 5 illustrate what I call "first generation" dispute resolution techniques—use of a special master and a facilitated dialogue to supplement traditional processes for policy making. Both efforts sought to respond to some of the shortcomings documented in Chapters 2 and 3. They succeeded on some counts and fell short on others.

In Chapter 4, the involvement of a court-appointed master to help settle complex litigation in state court over the clean up of Boston Harbor is detailed. The special master recruited a team of scientific experts and prepared a detailed set of findings and recommendations in just 30 days. Plaintiffs and defendants both endorsed the report as an effective way to secure and take advantage of available scientific information. They also endorsed the recommendations for repair and improved maintenance of the aging system as appropriate and pragmatic. However, in subsequent monitoring meetings the abrasive style of the master worked against the constructive face-to-face interaction of the litigants. Moreover, minimal scientific assistance was provided in the subsequent meetings and a representative from the Conservation Law Foundation reported that he could not participate fully without help to interpret the scientific information.

The work of the master did not address the all-important question of a schedule for construction of a secondary sewage treatment plant and other quality improvements. This failure to grapple with the long term schedule probably lead to a delay in the implementation of overall Harbor clean up. The question of construction of secondary sewage treatment was deferred until action in Federal court.
In the federal venue, environmentalists, a newly created state agency, and EPA each retained experts to support competing timelines for Boston Harbor clean up. There was no explicit effort to examine and narrow the bases for disagreement. Rather, disagreement among the experts was handled by the presiding judge, who ruled in favor the timeline produced by the team with superior engineering credentials. However, the municipalities of Quincy and Winthrop objected to plans for secondary sewer treatment facilities in their communities. Their objections required still another round of negotiations before implementation could go forward.

Chapter 5 explores the use of a facilitated dialogue to assist the drafting of legislation concerning use and development of public tidelands in Massachusetts. Coastal regulatory staff worked with facilitators to hand pick a representative group of proponents and potential opponents for a day-long session. Initial technical briefings set the stage for an informed discussion of principles for granting licenses for new waterfront development. Two months later, legislation passed.

In the subsequent effort to draft regulations, agency staff convened a Tidelands Advisory Committee (TAC), comprised of many of the same members who had attended the initial meeting. However, gaps arose in the adequacy of participation. The representative for marina interests was an ineffective participant. Dockominium interests did not take part. The TAC did not have access to technical experts to further investigate the technical issues inherent in tidelands licensing in greater detail. Internal staff work continued for months after the TAC disbanded, but further efforts to directly involve affected stakeholders were abandoned. Although the tidelands regulations had great potential to deliver substantial public benefits by protecting access to the waterfront for water dependent development and for the pedestrian use, the only analysis of the proposed regulations was prepared on behalf of marina operators. No effort was made to clarify or narrow disagreement about the economic consequences of the regulations. When regulations were released for public hearings dockominium interests organized massive objections to the regulations. Once again, the result was to delay implementation.
Chapters 6 and 7 discuss the New York Bight Initiative as an example of a model process of joint fact finding and mediated negotiation using a single text procedure.

Chapter 6 summarizes the shortcomings identified in the prior case studies, and shows how a team of mediators organized by the New York Academy of Sciences used a series of experimental interventions were used to respond to these problems. Concentrated attention was devoted to recruit and sustain the participation of affected stakeholder groups. A dozen representatives of private organizations—grassroots environmental groups, industry spokesman, port interests, and commercial fishermen—were literally "at the table" with about ten agency representatives. Additionally, a concerted effort was made to put stakeholders on a more equal footing with regard to access to scientific information. Over twenty scientists and other experts were engaged to provide briefings and engage in dialogue with the assembled agency staff and other stakeholders around the question of improving management of PCBs in the New York Bight system. Where experts disagreed, participants in the Bight Initiative worked to probe the bases—tracing it back to differences in starting assumptions, analytic methods, or interpretations of data. Although there was an effort to narrow disagreement, parties were explicit about the presence of residual disagreement.

NYAS mediators used a number of techniques to help participants cope with uncertainty and complexity. They played a "translator" function, working to clarify technical terms. Additionally, NYAS mediators served as brokers between experts and participants to package information in a useful format. Where uncertainty or disagreement persisted, participants drafted specific recommendations for future analysis or research to further narrow this uncertainty.

A major innovation of the Bight Initiative was the use of a single text negotiation procedure. Rather than producing competing versions of fact and recommendations, participants agreed to jointly develop and refine a single document setting out over 120 findings (organized into five chapters) and 26 management recommendations.
In an effort to eliminate obstacles to implementation of the agreement, the NYAS sought ratification of the negotiated document from all participants. The heads of eighteen organizations ratified the informal agreement, signifying their support for the negotiated single text. The detailed review of the Bight Initiative presented in Chapter 6 offers a series of "lessons learned" for resolving disputes of a science-intensive nature.

Chapter 7 takes a step back and places the results of the Bight Initiative and the companion case studies in the larger context of scientific analysis in public policy making. The analysis in the first six chapters makes clear that there is a pressing need to look beyond the conventional wisdom regarding reliance on traditional legislative, administrative, and judicial mechanisms for better ways of handling science-intensive public policy disputes. My analysis clearly demonstrates that there is merit in the strategic use of supplementary negotiations that bring policy makers and key stakeholders into face-to-face dialogue with scientists, advance the existing research and inform a clearer conception of resolution of science-intensive disputes. Throughout the chapter, I make reference to the published literature in public policy and in negotiation and dispute resolution to show how my research validates, challenges, or clarifies current thinking.

The first major conclusion is that greater efforts are needed to ensure that three often separated groups—policy makers, scientists (and other technical experts), and representatives of major stakeholder groups—are placed on a more equal footing as players in the policy making process. In my view, putting these groups into a more proper relationship demands sustained interaction based on face-to-face dialogue. All three must participate actively in the review of relevant information and deliberations over policy alternatives. I argue that appropriate participation for resolution of science-intensive disputes must ensure both the broad involvement of affected stakeholders and immersion and commitment on the part of individual delegates.
Second, processes for public decision making need to do a better job of getting and taking advantage of useable information. This means close attention to the selection of appropriate auspices that can serve as a forum for information exchange; recruitment of credible nonpartisan scientists or other expert advisors; and selection and interpretation of relevant information.

Third, stronger efforts are needed to translate technical information and present it to all the affected stakeholders in an appropriate format. Part of this task of appropriate presentation may require that a "translator" assist parties to a negotiation. Portraying information in multiple formats (prose, tables, flow diagrams) may help communicate complex ideas to affected stakeholders. Presenting information in its most useful form may require nonpartisan intervenors who serve as a "brokers" between scientists who generate information and resource users and agency makers who must use the information.

Fourth, processes for resolving disputes over allocation of resources must incorporate mechanisms for handling scientific disagreement more effectively. Disagreements over three types of issues must be addressed: the current status of the problem being addressed, the consequences of possible actions, and the appropriate policy choices to select. Efforts to "map" scientific disputes (i.e. explore the bases for disagreement) should be incorporated in joint fact-finding efforts devoted to narrowing disagreement, stating findings and laying the foundation for recommending policy options. Merely mapping a dispute without taking steps to narrow or resolve the disagreement may be counterproductive.

Fifth, a corollary finding is that more effective efforts are needed to cope with complexity and uncertainty, particularly when the interaction of natural systems and technologies involved. Greater attention is need to clarify cause and effect relationships, and to see the linkages between the multiple components of systems. Participants in public decision making processes need a clearer understanding of the bounds of good information. Clarification of scientific uncertainty presents valuable opportunities to to avoid perpetuating the problem by conducting analysis and research to close data gaps.
Sixth, efforts to deal with science-intensive disputes must do a better job of anticipating problems that can thwart implementation: failure to secure legitimate participation, an insufficient response to the technical aspects of issues, and inadequate efforts to package suitable agreements and bind parties to their agreements. An essential strategy to meet implementation problems is to create packages of options acceptable to all parties to settle science intensive disputes. An important task in creating such agreements is to identify the important linkages that may enable trades across issues. The straightforward procedure of stating obstacles to implementation and enumerating interim steps to overcome these obstacles is constructive. Several additional strategies for packaging agreements are also identified.

Seventh, I argue that there is merit in seeking consensus through assisted negotiation. More specifically, I propose that an effective strategy for dealing with science-intensive disputes is the single text negotiation procedure, assisted by a team of active mediators. A single text is simply a document that all parties to a negotiation agree to use as the focus for collaborative development of findings and recommendations. Scientists, policy makers, and affected stakeholders can work on an equal footing in helping to build a single text. The single text can be the focal point for collection, synthesis, and presentation of information in an appropriate format. Findings incorporated in a single text can identify areas of scientific agreement, and scientific disagreement and uncertainty. Recommendations can be packaged in a single text. Seeking ratification of the single text greatly enhances the translation of an informal product of negotiation into a more formal agreement.

An activist style of mediation (as opposed to the model of a more passive facilitator) holds special promise to carry out these tasks and advance the resolution of science-intensive disputes. This activist posture must begin with efforts to carefully design a collaborative negotiation process. Active mediation must carry through the tasks for organizing participation, recruiting scientists, conducting joint fact-finding, packaging agreements, and securing ratification of agreements.
CHAPTER TWO
STRENGTHS AND WEAKNESSES OF TRADITIONAL LEGISLATIVE PROCESSES FOR RESOLVING SCIENCE-INTENSIVE CONFLICTS OVER ENVIRONMENTAL RESOURCE ALLOCATION: THE VIRGINIA NONTIDAL WETLANDS CASE STUDY

Introduction

This chapter examines the strengths and weaknesses of traditional legislative processes used to settle technically-complex questions regarding environmental resource allocation. I have used a case study of recent wetlands legislation in Virginia. The chapter begins with a brief overview of the legislative process and its role in shaping environmental policy, drawing from a review of key public policy literature. Then, the experience of other state attempts to adopt wetlands legislation is summarized.

The case study, drawing on interviews and a review of documents reviews the participation of affected groups and examines whether scientific information was used effectively to craft the legislation. I explore how a process of joint review of relevant technical information might have been used to supplement the legislative process. The chapter concludes by identifying roles that a "team of neutrals" might have played in the Virginia case, drawing on recent examples of assisted negotiation in the legislative arena.

THE LEGISLATIVE PROCESS

Many political scientists and public policy analysts have commented on the strengths and weaknesses of the American legislative process. Although few authors have focussed explicitly on environmental legislation, a brief review is useful to set the stage for an in depth analysis of the Virginia case study.
Several authors have described the legislative process in Congress (Bailey, 1946; Berman, 1962; Reid, 1980) and in state legislatures (BeVier, 1979). They all point to these steps: A bill is drafted by an originator, redrafted by a legislative counsel, and introduced in one house of the legislature by a sponsor. The bill is then referred to a policy making committee where staff screen the measure and put it forward for a committee hearing and vote. If the committee assents and the bill involves appropriations, it is referred to a fiscal committee for staff review and another round of hearings. If the draft legislation survives a vote of both committees, it goes to a vote of one house. A series of parallel steps may be required in the other legislative branch. Next, a conference committee may be required to iron out differences between the two houses. If the bill is approved by the requisite majority in both houses, it passes to the executive for approval.

Many analysts (Key, 1964; Lipset, 1959; Schattschneider, 1960; Lowi and Ripley, 1973) have considered the broad strengths of law making by elected representatives. Modern representative democracy ensures accountability between those governed and decision makers, disperses authority by providing representation for each geographic area, and offers a mechanism for orderly government transitions. Representative democracy assigns the details of law making to those with the interest and commitment to get the work done. Moreover, the system of majority vote provides a concrete expression of a balance between the minority interests and the majority. Schattschneider (1960, 1975) characterized representative democracy as the creation of a community through freedom of speech and association. He praised the continuous opportunities for the minority to seek majority status (and for the majority to win support from the minority) in putting measures before elected representatives.

Some political scientists (Schattschneider, 1960) criticized the rise of interest groups as key actors in shaping legislation, while others (Key, 1964; Ziegler, 1964) find such groups essential. Schattschneider criticized the undo influence of interest groups. He showed that Congressional procedures for giving notice and conducting hearings favored established lobbyists, and contended that pressure groups "short circuit"
the majority. For Americans to "get control of their government", Schattschneider called on political parties to accept more responsibility for putting ideas before the electorate. Since legislators no longer represent homogeneous districts, Key (1964) suggests that lobbying groups have arisen to represent specialized interests as legislatures consider ever more complex agendas.

The complexity of the electorate and the myriad steps of the legislative process itself, Key argued, create tasks beyond the performance of spokespersons for geographic areas. Ziegler (1964) also suggested that interest groups perform an essential function in shaping legislation, since many bills are too arcane to appeal to the knowledge or interest of most citizens. Pressure groups, Ziegler suggests, serve to stimulate participation and clarify issues.

Key's study of pressure group tactics showed that lobbyists help shepherd bills through the clogged channels of the legislative process. "At many stages, from committee consideration to executive approval, a bill can be killed, and an alert legislative counsel may carry the day at one step if not another." Alternatively, he noted, skilled lobbyists may effectively take advantage of legislative procedures to prevent action.

An initial conclusion may be drawn from this basic literature: At periodic intervals in the often-convoluted legislative process, representatives of organized groups seek to represent their constituents' views and influence the outcome of legislation. Continuous interaction of these lobbyists, legislative staff, and legislators characterize the process. The nature of the accommodation among these players defines the outcome.

Using the Legislative Process to Shape Environmental Policy

How well does the traditional legislative process work in formulating environmental policy? Several analysts have tried to model the politics of environmental legislation during 1970s and 1980s (Haefele, 1973;
Rosenbaum, 1976; Clark, 1978; De Grove, 1984; Sabatier and Mazmanian, 1983; Mazmanian and Sabatier, 1983; Scott and Squires, 1984; Ingram, 1985; and Stone, 1988). Some focus on the strengths and weaknesses of majoritarian decision making, others on the role of interest groups and coalitions, and a few consider the role of scientific information in shaping legislation.

Although the legislative process builds on the fundamental mechanism of representative democracy, there are questions about just how well legislators represent constituencies on specific issues. Haefele (1973) shows that the majoritarian rules of legislatures favored by Schattschneider can backfire. Legislative decisions are made by general purpose representatives whose election is seldom based on their stands on specific coastal or wetland issues. "Logrolling" or trading votes often means that legislative action on arcane coastal issues is linked to the fate of an unrelated issue. A small group of legislators wielding power in a committee hearing can block the passage of needed legislation. Of course, as Redman points out (1973), the practice of logrolling has merits, as well. Agreements to trade votes are a means by which legislatures work through lengthy agendas. Such commitments from a bipartisan or broad ideological base may dispose a key committee chairman to act favorably on a bill, and may persuade other legislators to vote for a measure.¹

The legislative process raises other problems related to representation: the variance in the capacity of groups with a stake in legislation to influence decision makers. Groups with professional lobbyists have far more access to legislators than groups with fewer resources to bring to the halls of power. Squires and Scott's (1983) study of the California Coastal Act of 1976 showed that skilled lobbyists can use several tactics to kill legislation as it passes through a series of potential "veto" points. They also showed that opponents may adopt a posture of non-negotiation in order to kill the bill. Alternatively, opponents may introduce diversionary legislation to siphon votes from the main legislative package while projecting a positive image.
Rosenbaum (1976) and DeGrove (1984) have studied the politics of land use legislation. Rosenbaum proposed the notion of transfer or "diffusion of innovation" to help explain why populous, urban states were first to use legislation to regulate land use, site facilities, and protect natural areas. Rosenbaum suggested that affluence, competitive political systems, strong communication links and a political culture that incorporates a desire for national leadership accounts for innovation. DeGrove found that land management legislation was seldom decided on partisan basis. Rather, he found that coalitions between between local government and developers consistently arose to oppose expanded state involvement in land use planning. He found that strong support of citizens and environmental groups, together with the backing of the governor, were usually needed to pass such legislation. However, Rosenbaum and DeGrove did not examine mechanisms to promote consensus among interest groups, or the ability of the legislative processes to incorporate scientific information.

Mazmanian and Sabatier (1983) identified support from constituency groups and key legislators as a precondition for successful legislation, along with a clearly stated mandate, and a sound causal theory linking policy objectives to the problem to be solved. In their study of the California Coastal Act, Sabatier and Mazmanian (1983) stressed that such a causal theory must explain the linkages between the principal factors affecting policy objectives and target group behavior needed to attain the desired goals.

Mazmanian and Sabatier's advice to incorporate a sound causal theory is especially apt for technically complex environmental issues, yet several obstacles block the effective use of scientific information in the legislative process. These grow from mismatches between the norms of science and the legislative arena; the need to proceed with legislation even though key data about environmental effects are missing; and the often conflicting advice given to legislatures by scientists on behalf of stakeholders with divergent positions on an issue.
Mismatches between the professional norms of scientists and the demands of the legislative arena may be expressed as a difficulty in communication, as when imprecise language is used to express complex ideas in legislation. Clark (1978) found that even in the California Coastal Act of 1976 (which Mazmanian and Sabatier rate as a success), there are several terms that have no real meaning in science. The Act calls for the maintenance of the "functional capacity" of wetlands. A scientifically trained Commissioner commented:

So far as I can determine, "functional capacity" is a term used by the commission to express a somewhat difficult concept and is unfamiliar to ecologists or anyone else for that matter (Frautschy, quoted in Clark).

A second problem is that when a legislature confronts an environmental problem, the data about the precise severity of this problem are often incomplete (Rosenbaum, 1985). Some cause and effect relationships may be unclear due to the lack of precise studies or the presence of latent effects that cannot be observed during the time frame of the legislative process. Most scientists would prefer not to tackle these problems without new research. But commissioning new research is a rare legislative response to scientific uncertainty. Indeed, the generally short time frames of legislative drafting seldom present an opportunity to fill data gaps even through analysis. The legislative process seldom allows time for a careful clarification of areas of scientific uncertainty, or preparation of a research agenda to better inform possible mid course corrections in public policy.

A third difficulty is that few legislators are scientists (and even fewer are wetland scientists) so they look to experts for advice (Rosenbaum, 1985). Often, competing experts may offer conflicting interpretations of the facts, and legislatures seldom have good ways to sort out competing claims. Ingram (1985), found that both the sources and receivers of technical information can complicate efficient use of such information in legislative formulation.
"A decision maker is most apt to listen to information emitting from his constituency upon which he depends for continuing support. The antennae of Congressman are directed towards picking up the preferences of individuals and groups important to their renomination and reelection. [A] Congressman hears most often from those who agree with him, and some automatically interpret what they hear to bolster their own viewpoint. [T]he background and experience of a decision maker screens his receptivity in favor of disciplines and facts with which he is comfortable.

Each of these difficulties—mismatches between the norms of science and the legislative process, incomplete data about the severity of environmental problems, and the probability that legislators will hear competing scientific claims—is relevant to wetlands legislation.

Legislative Deadlock Over Coastal and Wetland Legislation

Over the past twenty years, Congress and state legislatures have considered dozens of bills to guide the use of coastal and wetland resources. Many of these bills have encountered disarming conflict as proponents of different positions have been unable to reach workable agreements. Efforts to set standards and policy priorities for coastal and wetland management have been thwarted by legislative stalemate in at least ten states.

New Hampshire, Minnesota and Ohio failed to qualify for federal funds to manage their ocean or Great Lakes coasts due to opposition from local governments and developers. This opposition in turn translated into legislative deadlock. In Indiana, bills to protect inland wetlands have been introduced in each of the last seven years, but none have survived the joint Assembly-Senate Natural Resources Committee due to opposition from homebuilders and agricultural interests. Wetlands legislation was blocked in Wisconsin for fifteen years before a stopgap administrative arrangement extended protection to 60% of the state’s wetlands.

Some states passed sound laws only after grueling battles. Michigan’s wetlands legislation passed "after two years of bitter legislative debate." New Jersey took four years and 35 versions and an executive moratorium on new development before it’s wetlands law finally satisfied
real estate and environmental interests and passed. In Florida, intense local government opposition to state involvement in coastal land use planning led to passage of a weak coastal statute derisively labeled the "no new nothing law." Disagreements between environmentalists, state regulators, local governments, developers, and farm interests have also generated controversy over state wetlands legislation in Florida, Maryland, and Virginia. Table 2.1 lists some of these examples of legislative deadlock.

Why have so many bills failed? After all, the professional community of environmentalists, regulators, and wetlands scientists broadly supports wetlands protection. These groups often cite extensive evidence on the functions of wetlands in providing nursery areas for fish and wildlife, flood storage, nutrient removal, filtration of pollutants and aquifer recharge. Protection advocates point out that half of the nation's historic wetlands endowment has been lost. Preservation of remaining wetlands, they argue, should no longer be a subject for debate.

However, new wetlands regulations are consistently resisted by developers, transportation agencies, farm and forestry interests whose activities would be subject to added scrutiny. Some opponents of wetlands regulation are convinced that any state restriction of wetlands represents a regulatory "taking"—an unconstitutional deprivation of a property owner's to use his land without just compensation. In fact, landmark cases such as Just vs. Marinette County and Sibson vs. State establish that wetland regulation is a proper exercise of the police power to protect the public health, safety and welfare. These cases held that even where regulation limits the use of land to its natural use and reduces possible speculative value of the property, it is not a taking unless it extinguishes all reasonable use of land and is arbitrary and capricious.

A review recent of the Supreme Court cases First English Evangelical Lutheran Church of Glendale vs. County of Los Angeles and Nollan vs. the Coastal Commission relative to wetlands concluded that regulations adopted for a valid public purpose may substantially reduce land value without constituting a taking (Kusler and Myers, 1987). However the authors cautioned that "these cases put [government] on notice that they must
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<td>New Hampshire</td>
<td>Leg opposition led to weak program</td>
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<td>New Jersey</td>
<td>Bill killed to create Coastal Commission; Governor resorted to Executive Order</td>
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<td>Virginia</td>
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<td>South Carolina</td>
<td>Bill died in 1987; three competing bills slated for next session</td>
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<td>Georgia</td>
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<td>Texas</td>
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<td>California</td>
<td>Freshwater Wetland bill SB 2629 killed in Assembly in 1988; opposed by developers; water agencies</td>
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regulate with greater precision and care." These cases note that there should be a "nexus" between the public policy being served and the corresponding regulation. The court also held that when all uses of a property are eliminated (as opposed to a diminution of uses), then compensation may be awarded to the landowner. These new developments argue for a more thorough analysis of wetlands functions and values in the legislative process.

Aside from the taking issue, other disputes arise over the details of the proposed legislation. The appropriate definition of regulated wetland is a contentious subject. Should regulatory jurisdiction be defined by the presence of certain vegetation only or should inundation and soil type also be considered? How should these factors be weighted? Should wetlands under a certain size be exempted? Other controversial issues relate to appropriate standards to judge whether to permit new development. Should the impacts on wildlife be considered? Should cumulative impacts be factored into permit review? Procedures to mitigate for unavoidable damage may also be controversial. Should developers complete mitigation tasks in advance? Should off site mitigation be allowed? Questions also arise over the appropriate institutional home to administer statewide wetlands regulation. Some states house wetlands regulation in the natural resources agency, others group this function under an EPA-like permitting agency, and certain coastal states create new agencies to regulate land use including wetlands alteration. Each of these details of wetlands legislation is likely to spark dissent among the groups with a stake in the use and management of wetlands.

The foregoing discussion suggests that despite the considerable strengths of the legislative process, significant weaknesses are also present when the process is used to shape environmental policy on complex issues. One difficulty is ensuring that the views of all stakeholders are truly represented. Several obstacles also prevent the legislative process from making the best possible use of available scientific information. The previous discussion of legislative deadlock over wetlands legislation also suggests that the traditional legislative process includes insufficient mechanisms to forge consensus among groups with a stake in the legislation. Each of these points will be illustrated in the Virginia case study.
In Virginia, activities such as leveeing, draining, and filling that could alter tidal wetlands (those subject to daily tidal action) are regulated. A 1972 law assigns responsibility for regulating tidal vegetated wetlands to the Virginia Marine Resources Council (VMRC). The area subject to regulation by this law includes areas contiguous to mean low water. The law's inland jurisdiction extends only to an elevation 1.5 times the mean tide range. Additionally, non-vegetated wetlands within the tidal range are covered by a 1981 amendment that severely restricted the alteration of these wetlands without a permit. All other wetlands, both on the coast and in the interior, are broadly grouped as nontidal wetlands and not currently regulated by the state.

The Chesapeake Bay Foundation's Initial Proposal

In early 1987, the Chesapeake Bay Foundation (CBF) suggested that legislative protection be extended to Virginia's non tidal wetlands, including both in coastal zone and inland wetlands. CBF was motivated by several considerations. The Foundation's review of the 1972 tidal wetlands law suggested that important wetland resources were not being adequately protected. Between the mid 1950s and the mid 1970, 57,000 acres of nontidal wetlands were lost in the state, or about 2600 acres per year. Evidence extrapolated from studies of the mid-Atlantic region suggested that nontidal wetlands continued to be lost on a piecemeal basis after 1970 (Tiner, 1987). CBF believed that reduction of nutrient inputs to Chesapeake Bay could best be achieved by protecting both tidal and nontidal wetlands in the Bay's watershed. Additionally, CBF pointed out that the the Chesapeake Bay agreement—an informal accord signed by the governors of Maryland and Virginia—pledged protection of nontidal wetlands.

CBF's initial draft legislation called for mapping nontidal wetlands, tougher statewide standards for reviewing permits, adverse impacts to be avoided, a broad list of regulated uses, and stiff penalties for
The initial intent was to amend the existing law to include nontidal wetlands and assign the VMRC added responsibility as lead agency. In this way, CBF reasoned, the management of Virginia wetlands would be strengthened by unified jurisdiction. During the 1987-88 session, the legislation evolved through four successive versions: a revised version by CBF, a January administration version, a February House version, and version carried over in March by the Senate for a series of subcommittee hearings. Between CBF's initial draft and the Senate Committee's version of the bill, several significant changes were introduced. These relate to the designated lead agency, the geographic scope of the bill, the methods used to define tidal wetlands, the exemption of wetlands under one acre, the exemption of recreational ponds, and the standards for permit review (including the definition of "adverse impact").

**CBF Modifies Bill in Response to Comments**

When preparing its initial draft, CBF had almost no communication with other environmental groups or other affected interests. This proposal was "much criticized". Other environmental groups and agencies disagreed with the proposed lead agency, while developers, forestry, farm and homebuilders objected to the number and scope of activities and the geographic area that would be subject to new regulation. CBF moved to respond. First, it met with other environmental groups such as the the Piedmont Environmental Council, the Conservation Council of Virginia, and the Izaak Walton League. These groups charged that VMRC had been a poor steward of tidal wetlands.

Next, John Daniels, Virginia's Secretary for Resources, asked the Virginia Council on the Environment to call a meeting with agencies that indirectly managed nontidal wetlands or would be affected by the proposed regulations. The Council, a 13-member coordinating body, brought CBF together with agencies that had a stake in wetlands management. Virginia's Department of Conservation and Natural Resources privately agreed with the environmental groups that the VMRC should not be given
added responsibility. Other agencies consulted about the draft legislation included the Virginia Institute of Marine Sciences (VIMS), the Department of Game and Freshwater Fish, and the Department of Conservation and Forestry.

CBF also met individually with developers, forestry interests, the farm bureau, and manufacturing representatives. As the environmental community’s main spokesperson, CBF adopted an informal, informational tone,

"Here’s what we want to accomplish, here’s why it’s important, we’re here to get your comments."25

A revised bill emerged that would vest regulatory authority in the Department of Conservation and Historic Resources, Division of Soil and Water Conservation. Despite CBF’s willingness to modify the initial bill, some groups made further efforts to reduce the type of wetlands subject to regulation and the geographic jurisdiction of the regulations.

DNR Assumes Lead Responsibility for the Bill

CBF agreed that it would be appropriate to pass responsibility for developing the legislation to the Department of Conservation and Natural Resources in December, 1987. In this way, a state agency would carry responsibility, rather than a private advocate for wetland preservation. Barbara Wrenn, the Deputy Secretary for Natural Resources took the lead. According to CFB staff biologist Leo Snead,

the unwritten agreement was that after we ‘handed the bill over’ we would have input, but not control.26

DNR cut the jurisdiction from the entire state to the 46 municipalities in Virginia’s upper coastal plain. The administration argued that regulating nontidal wetlands nearest the Chesapeake would have the greatest beneficial impact on the Bay and arouse the least political controversy. The administration bill also designated the Soil and Water Conservation Division as the lead agency to respond to the objections of delegating this duty to VMRC. Other changes were made to make the bill more
acceptable to forestry, farm, and homebuilders interests. Permit review standards were weakened considerably. Under the prior draft, regulatory were to protect the public interest in wetlands. This charge was revised to protecting the public interest generally. Considerations of cumulative impact, water dependency and existence of alternatives were dropped.²⁷

**Virginia House of Delegates Considers the Bill**

Despite the revisions, homebuilder and forestry interests still viewed the bill as a controversial extension of state power into local land use issues.²⁸ Administrative staff had difficulty identifying a sponsor. Finally, V. Thomas Forehan, Jr. agreed to serve as the bill's patron. According to CBF, Forehan represents the town of Chesapeake in Tidewater Virginia and is typically recognized as a 'friend of the developer' but was willing to tackle a controversial issue.

The bill attracted some 40 co-sponsors. CBF's attorney observed.

There were a great number of co-patrons, which shocked us. Everyone wanted to sign on, even though no one had wanted to carry it.²⁹

The House of Delegates Committee on Conservation and Natural Resources modified language regarding allowable uses, and reported the bill favorably to the full House. The bill's patron agreed to significant last-minute compromises, covering exempted uses, and definitions. The House also amended the penalty for altering a wetland without a permit from a civil penalty of $10,000 to a harder-to-prove criminal penalty. The compromise easily passed the House 92-5.³⁰

**Senate Agriculture, Conservation, and Natural Resources Committee Considers the Bill**

After passage by the House, the bill was referred to a Senate Committee with a mixed mandate to promote agriculture and preserve natural resources—goals that may conflict, since many nontidal wetlands are interspersed on agricultural land. CBF analysts believe that referring the bill to a committee concerned with agriculture "was the kicker" in its
failure to clear the Senate during the 1987-88 term, because farm interests, already suffering a deep recession, feared that the legislation would impose a severe burden on routine farm operations. The first day the bill went before the committee it was referred to a subcommittee. Developers and agricultural interests continued to seek additional concessions such as exemptions for farm ponds and recreational ponds.

Senator William Fears, representing the Eastern Shore, expressed 'violent opposition' to the bill. Fears' position reflected Chincoteague's long-standing opposition to wetlands regulation. Recently, its town attorney filed a novel claim that federal wetlands regulation under the Federal Clean Water Act represents a "taking" and thus petitioned for the entire town to be exempt from Section 404 of the act. Fears holds a long tenure in the Senate and sits on the Finance Committee. His Chincoteague constituents felt that non-tidal wetlands (about 50% of the wetlands in the community) should remain unregulated by the state.

The Senate Agriculture, Conservation, and Natural Resources Committee chose neither to support the bill nor to kill it. Rather, a subcommittee was appointed to study the matter. Senator Fears' opposition was cited as one reason to hold up a vote. Other observers suggest that the Senate was still reeling from the Governor's aggressive advocacy of the Chesapeake Bay Restoration Act, which requires local governments in Tidewater Virginia to enact restrictions to protect the Bay, and was unwilling to consider another strong natural resources bill in the same session.
THE USE OF SCIENTIFIC INFORMATION IN REVISING THE BILL

Each of the five substantive changes introduced during the bill’s revision—related to the geographic scope of the bill, the methods used to define nontidal wetlands, the exemption of wetlands under one acre, the exemption of recreational ponds, and the standards for permit review—raise significant scientific questions. Reducing the geographic scope of the bill to Tidewater Virginia may undermine efforts to reduce nutrient inputs to Chesapeake Bay. Exemption of wetlands under one acre excludes wetlands with unique ecological functions and biota from protection, while exemption of recreational ponds may lead to removal of the natural filtering functions of shoreline vegetation. Revision in permit review makes it difficult to protect the functions inherent in the natural functioning of wetlands. The weakened standards would allow regulators to look for public benefit in the developments or uses that replace wetlands. The scientific questions raised by these five substantive changes are explained in the following discussion.

Geographic Scope of Legislation Reduced

Although CBF proposed legislation that would apply statewide, the administration’s bill restricted jurisdiction to the region known as Tidewater Virginia (Figure 2.1). Tidewater is defined to encompass seventeen cities and twenty-nine counties in the eastern part of Virginia. The bill excludes about 60% of Virginia’s watershed lands that drain into Chesapeake Bay. As a result, two-thirds of the state’s nontidal wetlands are excluded. (Among the regions excluded is the entire Chowan River drainage basin, which includes 20% of the state’s nontidal wetlands.)

Barb Wrenn, Assistant Secretary for Natural Resources, explained the administration’s strategy:

We had a sense that wetlands in Virginia’s eastern corridor were most threatened. The administration believed that our commitment to wetlands legislation would be most successful if we framed the bill as a Chesapeake Bay water quality issue. There was a sense that wetlands nearest the Bay have the most direct influence on water quality, although no one produced specific documentation on this.35
The unspoken political argument is that a bill embracing only wetlands in Tidewater Virginia stood a much greater chance of passage.

There is considerable evidence that the ecological functions of upstream wetlands and watercourses are vitally tied to estuarine systems downstream. Sophisticated computer models commissioned by EPA strongly indicate that 50% or more of nitrogen and phosphorus entering the Bay originate in areas far upstream. In the view of the CBF’s staff scientist,

"the administration’s approach [didn’t] come close to addressing water quality upstream of the fall line, which is equally important to the Bay."

VIMS scientist Carl Hershner concurred:

The argument for limiting jurisdiction to Tidewater Virginia is at best pseudoscientific. The States of Virginia and Maryland have agreed to reduce nutrient inputs to Chesapeake Bay by 40% by the year 2000. We know that areas well inland contribute major inputs of nutrients to the bay, and we know that nontidal wetlands remove nutrients. Clearly, anything that can be done to preserve these wetlands is constructive.

The evolution of the definition of nontidal wetlands underscores the shortcomings of the traditional legislative process in recruiting and using scientific information. Clearly, the information on the importance of protecting inland wetlands relative to the nutrient budget for Chesapeake Bay did not receive adequate consideration.

**Methods Used to Delineate Nontidal Wetlands Boundaries**

Wetlands have historically been defined by scientists working in specialized disciplines such as botany, hydrology, or soil science. A botanical definition of a wetland boundary would focus on plants adapted to flooding or saturated soil conditions. An hydrologist’s definition would emphasize the position of the water table relative to the ground surface. A soil scientist would look for saturated hydric soils. However, looking at a single indicator may mislead an analyst as to whether an area is a functional wetland. A more complete approach involves looking at the combination of the three factors: soil, hydrology, and vegetation.
FIGURE 2.1 VIRGINIA WATERSHEDS DRAINING INTO CHESAPEAKE BAY AND LIMIT OF PROPOSED NON-TIDAL WETLANDS LEGISLATION

Chesapeake Bay Watershed Lands Subject to Pending Non-Tidal Wetlands Legislation

- Forty-six Municipalities

This "three parameter" approach is well established nationally. Variations on this three parameter approach are used by federal agencies including EPA, the Army Corps of Engineers, and the U.S. Fish and Wildlife Service (Huffman and Yocum, 1985). However, until January, 1989, federal agencies gave slightly different emphasis to the respective parameters (U.S. Corps of Engineers et al., 1989). For instance, the Army Corps definition placed greater weight on soil saturation and hydrology, while the EPA definition enabled an areas to be classified a wetland if it was periodically inundated, provided that it was also characterized by hydrophytic vegetation and hydric soils. This difference could be especially significant for a seasonal wetland where standing water is present only during a few weeks a year. States regulating wetlands had to explicitly choose whether to emulate one federal agency's definition, or whether to create a definition based on some amagamation of federal definitions.

CBF's draft bill called for wetlands to be delineated according to soil, inundation, and indicator vegetation. As the Virginia legislation evolved, scientists representing state agencies and private developers offered competing views about the proper way to delineate wetlands.

The January bill provided that such wetlands should

have hydric soils as defined by the U.S. Soil Conservation Service for Virginia; [be] inundated or saturated with surface or ground water; and supports a prevalence of vegetation identified as wetland plants in Virginia by the U.S. Fish and Wildlife Service.

The Homebuilders Association retained Dr. Howard Matthews to critique the bill's boundary definitions. Matthews did not suggest a specific method for delineating wetlands. Instead he cast doubt on the possibility of rational wetlands delineation. He argued that the existence of multiple methods by EPA, the Army Corps, and the Fish and Wildlife Service greatly complicated the delineation process and abridged the right of private property owners to develop their land. According to Snead,

He waved his arms and said that the methods for defining wetlands using soils and hydrology are so complicated that I don't even understand them, and I'm and expert in this field.
Virginia's legislative process provided for little if any discussion on the relative merits of wetland delineation methods used by other states. Although the committee agreed to take a fresh look at various methods available, they did not delete the three-parameter approach. Instead, the committee hired a consultant recommended by development interests to revise the language. The consultant, an ex-Corps of Engineers staffer, favored clearer definitions. He modified the definitions slightly using the Corps' standards:

have hydric soils as defined by the U.S. Soil Conservation Service for Virginia; is recurrently inundated or saturated with surface or ground water and exhibits hydrology as expressed in the U.S. Army Corps of Engineers Wetlands Delineation Manual; and supports a prevalence of vegetation identified as wetland plants in Virginia by the U.S. Fish and Wildlife Service.

Embedded in the larger argument about wetlands delineation was a concern as to how new rules would affect development in local communities. Senator William Fears, representing Chincoteague was incensed because he felt that a virtually all landowners with wetlands on their property would be subject to "another layer of regulation". In fact, nontidal wetlands account for just 50% of Chincoteague wetlands. However

Fears would not have been amenable to hearing this. His attitude was 'damn the facts; full speed ahead'.

Exemption of Wetlands Under One Acre

CBF's initial draft exempted no wetlands based on their size. Early in the process, CBF agreed to a half acre exemption in response to its critics. Snead recalled that this was an imprecise attempt to exclude wetlands inadvertently created during construction. The January 26, 1988 administration bill included the one half acre exemption. The House of Delegates February 14th version increased the exemption to wetlands under a full acre in size. The Virginia Senate's March 3 bill retained the one acre exemption.
Estuarine scientists forecast that exempting isolated nontidal wetlands smaller than one acre will totally exclude interdunal pools, limestone sinkholes, and bogs from regulatory protection. On the coast, natural interdunal pools (which are not tidally connected) support unique species. Such pools also perform valuable groundwater recharge and nutrient retention functions. Similarly, small limestone sinkholes support unique biota adapted to alkaline conditions. Small bogs that occur on peaks in eastern Virginia also have unusual habitat values. The functions and values of these wetlands are only generally known from a few site-specific studies and anecdotal information.

For instance, a colleague told Snead:

You wouldn’t believe how many half acre wetlands I saw in the field yesterday. And there were all on a single parcel of land.

Thus the one acre or even the half acre exemption failed to take account of the scientifically sustainable concern that motivated the call for the legislation in the first place. No reliable data was compiled to tabulate the size and frequency of occurrence for Virginia’s nontidal wetlands, nor was there a credible effort to summarize the values of these wetlands on a statewide basis. Carl Hershner noted,

in the absence of size-frequency data, it’s not clear what significant habitat values have been written off. Most scientific literature derives from midwestern wetlands. There, many small wetlands seem more productive than a few large wetlands as a result of ecotonal and edge effects.

Exemption of Recreational Ponds

The CBF draft and January administration bill did exempt farm ponds smaller than one acre. Farm ponds, most participants agreed, are an unavoidable necessity. The general feeling among parties to the bill was that Virginia’s agricultural community, faced with a long depression, should not be burdened with new regulation. In hearings the Senate Agriculture, Natural Resources, and Committee quickly added another exemption. According to a VIMS scientist,
Carl Bomar, the homebuilders' lobbyist "wore down" the committee with a book of amendments. As the committee debated a tiered approach to exempting farm ponds up to five acres, the phrase exempting recreational ponds got stuck in without any debate. As VIMS' designated scientific advisor to the state, I was present, but my professional opinion wasn't asked. There was no consideration of what's scientifically reasonable. This exemption is potentially sweeping in its ecological impact.51

Snead corroborated this account:

The committee just agreed. There was no debate whatsoever on the merits or consequences of the idea.52

For coastal developers, the ability to create ponds presents an opportunity to increase property values by enhancing amenities. Since controlling runoff in land adjacent to the bay is a priority in Virginia, developers argue that recreational ponds double as detention basins. (Hershner). Natural wetlands apparently perform this filtering function more effectively. Snead cited a recent article in Ecology showing that on Maryland's western shore, a 20 meter-wide band of vegetated wetlands removed up to 90% of sediment and 80-89% of phosphorus and nitrogen. In Hershner's view,

Trading a natural non-tidal wetland for a manmade pond/detention basin represents a net loss of ecological value. That's the bottom line.53

The bill enabled such trades in most cases. Ironically, the homebuilders lobbyist who introduced the proposal regarded it as one of the least important amendments for his constituents.54 Thus the scientific justification for preserving natural nontidal wetlands for their superior stormwater detention functions were overlooked in the legislative process.
Permit Review Standards/Defining "Adverse Impact"

The standards for reviewing permits evolved. A central component of the standards, the basis for a finding of "adverse impact", was made much harder to achieve. CBF's original language provided for consideration of practicable alternatives, cumulative impacts, and the need for water access—in addition to adverse effects. The December draft sent to the administration provided that a permit should be issued if the Department found:

that there will be no significant impact or that granting of a permit is clearly necessary to protect the public interest in wetlands and water quality [in light of the four factors listed above].

The administration's January bill deleted consideration of cumulative impacts, water dependency, and practicable alternatives. According to CBF staff, key natural resources staff told them that the bill had no chance of passage unless these standards were trimmed. However, "adverse impact" was broadly defined:

means to impair the ability of a wetland to function for water quality, flood protection, aquifer recharge or wildlife habitat.

The language provided that a permit should be granted if:

there will be not significant impact on public health and the granting of a permit is necessary to protect the public interest.

In the February bill, "wildlife habitat" was narrowly defined, as follows:

adversely affect means to impair the ability of a wetland to function for water quality, flood protection, aquifer recharge or unique and significant wildlife habitat.

Lobbyists representing the homebuilders, the forestry association, and the lumber manufacturers persuaded the Senate committee to delete language on wildlife habitat values altogether. Developers in particular worried that the "snail darter syndrome" could block new projects. In other words, they did not want the presence of a particular plant or animal to be the only obstacle standing between them and a permit for new construction.
After deletion of wildlife habitat considerations, the definition of adverse affect read as follows:

adverse affect means to substantially impair the ability of a wetland to function for water quality protection, flood protection, or aquifer recharge. 60

Carl Bomer of the homebuilders noted:

If it's a water quality bill, which is how the administration represented it, then it's got nothing to do with bugs and bunnies. 61

John Keeling explained the Farm Bureau's position:

Farmers maintain 80% of the state's wildlife habitat on private property and are glad to do it. We were troubled by the "or" construction in the statutory language; we didn't want to get into a situation where a beaver dam would be the only thing blocking use of a farmer's land. If habitat had been one of several considerations, we probably wouldn't have objected. When we considered the other protected functions of wetlands, we felt habitat would be protected "through the back door". 62

The Virginia Council on the Environment disputes the contention that wildlife habitat values will be incidentally protected along with water quality and aquifer recharge functions.

Nothing in the bill would prevent creation of huge loblobby pine plantations. Such plantations meet the three-part test [of wetland plants, inundation, and hydric soils.] Yet, they have very little wildlife value. Similarly, reservoirs could replace natural wetlands if you don't factor in wildlife values. 63

A more far-reaching change in the February bill was redefined the public interest to include the universe of "all material factors." 64

A permit shall be granted if there is no significant impact on public health or environment particularly considering the protected functions of wetlands or the granting of a permit is clearly necessary and consistent with the public interest considering all material factors.

The March bill relaxed the standards still further:

A permit shall be granted if there will be no significant adverse impact to the public health or environment, particularly considering the protected functions of wetlands; or the granting of a permit is necessary and consistent with the public interest considering all material factors. 65
This change represented a fairly dramatic revision of the notion of "public interest" in wetlands. Carried to its logical conclusion, it meant that regulators could look for "public interest" in the form of pine plantations, reservoirs, or shopping centers constructed on the sites of former wetlands, rather than protecting the public interest inherent in the natural functioning of wetlands.

With the successive paring of the standards, the legislation gave little guidance as to what projects should be considered acceptable. Wildlife habitat values, cumulative impacts, water dependency, and existence of alternatives were excluded from the criteria for permit review. The Soil and Conservation Commission, charged with weighing the "public interest considering all material factors" faces a tough challenge. It seems that only under narrow circumstances can staff find "significant impairment" using the handful of factors that remain. The scientific basis for this final conception of changes is very weak. In fact, it overlooks considerable scientific evidence, and avoids the choice of some fairly precise concepts that could help to guide permit review.

CONCLUDING OBSERVATIONS

The parties with a stake in the management of nontidal wetlands were on an unequal footing during the legislative process. At no time was there an effort to bring all affected interests together in face-to-face discussions. Barb Wrenn observed:

As a rule, the legislative process doesn’t provide for getting divergent groups together. With a 60 day legislative session and subcommittees of three legislators there just isn’t time for a roundtable format.66

There was no mechanism to determine whether changes proposed by various lobbyists would be acceptable to the environmental community. Rather, proponents presented testimony in public hearings and lobbied legislators individually.
The Natural Resources secretariat credits CBF with "developing the concept in the pure sense" and "being very influential in testing the waters". However, when CBF staff "shopped the draft bill around", they offered a series of concessions without exacting a quid pro quo, such as promise to back the bill. Once CBF turned the draft bill over to the administration, the Foundation had a tough time competing with professional lobbyists for legislators' attention.

In the view of VIMS biologist Carl Hershner:

Carl Bomer (the homebuilders lobbyist) was much more tenacious than the environmental representatives. While the environmental groups provided almost no counter-lobbying, the homebuilders put forward over 20 amendments in a single hearing. When the hearing ended, the committee chair met individually and agreed to more changes. The next day, over the committee chair's objections, Bomer sought even more changes.67

As an early proponent of the legislation, CBF had to negotiate with several opponents, including the farm interests, the highway department, developers, and certain local governments. After the draft language was passed to the administration and the legislature, CBF was not really "at the table". Meanwhile, forestry, agriculture, and development interests continued to seek concessions.

CBF staff believe they bargained in good faith to produce an acceptable bill before it was introduced in January. In CBF's view, it appeared that the Farm Bureau did not bargain in good faith:

We met with them several times. They told us they had no time to reach a formal position, but a week later the bureau issued a position paper opposed to the legislation. The farm bureau opposed any regulatory approach to nontidal wetlands, yet we could not ignore the 45% of nontidal wetlands historically lost to agricultural conversion.68

However, the Farm Bureau's lobbyist tells a different story:

CBF may have thought we were hard to deal with, but the fact was I was probably out in front of my members on this. Virginia's gone from two thirds rural and one third urban to one-third rural and two-thirds urban in just ten years. Farmers feel disenfranchised and a bit paranoid.69
According to Watson, the homebuilders were more conciliatory:

They realize that some regulations are coming. They wanted to whittle the standards down, and narrow the wetland definition. They also wanted to exclude wetlands incidentally created by construction.\(^7\)

Snead concurs:

The developers sought some consistency between local, state, and federal rules. They also sought to weaken the standards to determine whether to issue a permit (they favored deletion of consideration of practicability, necessity, water dependency, minimization of impacts).\(^1\)

Local governments, represented by the Virginia Municipal League, were successful proponents of exemptions for wetlands under one acre and public works projects.

In hindsight, Snead observes:

We bargained away our chips too early. We should have gone out with a bill we thought was sound, and announced our willingness to negotiate in exchange for some commitments of support.\(^2\)

Part of the difficulty CBF had was the lack of a strong coalition in support of tough regulations. For instance, the director of the Virginia Marine Resources Commission supported the bill privately but adopted a noncommittal public posture. CBF staff observed:

The environmental community was not well organized around this issue. The bill came up late in the session (December), and most other environmental groups were pursuing other agendas.\(^3\)

The Executive Director of the Virginia Council on Environment agreed:

The environmentalists just weren’t there—they don’t have paid lobbyists to hang on the phone with legislator’s aides and get to a hearing with fifteen minutes notice.\(^4\)
The ironic result of Virginia’s traditional legislative process is that CBF—the bill’s original proponent—may shift to an opponent of the bill:

In our opinion, most of these amendments (especially the most recent ones) were accepted in an attempt to pass the bill. The ultimate result as been to substantially alter the bill from its original form; however CBF still offers support in its current form. We are taking the position that any further amendments in an attempt to weaken the bill, particularly to the standards section, would cause us to reconsider our position and oppose the legislation.73

The traditional legislative process used to develop nontidal wetlands legislation in Virginia did not make the best possible use of available scientific information. Important cause and effect relationships such as linkages between upstream wetlands and watercourses and the water quality of Cheasapeake Bay were underemphasized. There was no effort to ensure what was known about the functions of wetlands was taken into account or that what was not known was adequately clarified.

Readily available expertise from area universities was not tapped. Although the Natural Resources Secretariat praised VIMS’ contributions, Carl Hershner, co-director of the Institute’s Center for Estuarine Research and Policy, believed his skills were underused.76 Legislators rarely sought his views on controversial scientific matters, even though Hershner attended most legislative hearings.

Other scientists were also underused. According to the Director of the Virginia Council on Environment,

Bill Odum’s whole field is wetlands, and he wasn’t invited to come down from the University of Virginia and speak to the legislature.77

The legislature has taken little advantage of the data gathering capability of the Council on Environment. Director Catherine Harold explains,

"If they don’t ask, we don’t do."78

Little effort has been made to forecast the impact of the legislation. Catherine Harold noted:
There need[ed] to be a real study of impacts on nontidal wetlands to help make a case for this bill.\textsuperscript{79}

Both proponents and opponents of the bill lacked access to information showing the extent of wetland resources that would be subject to regulation.

John Keeling noted:

\begin{quote}
We were arguing about all these language changes and nobody really knew what the implications were. How can you get people to support regulation when nobody knows what wetlands are covered?\textsuperscript{80}
\end{quote}

Similarly, the ecological implications of exemptions for wetlands under one acre and for recreational ponds were not assessed. One possible information source was the U.S. Fish and Wildlife Service’s National Wetlands Inventory, which combines air photographs with detailed interpretation. The inventory, however, is incomplete for Virginia, and some categories mapped by the Service would not be regulated under Virginia’s bill. Virginia could share the costs for completion of the inventory. Then, the data could be subject to computer scanning and analysis (an available cartographic technique) to better define the areas subject to regulation.\textsuperscript{81}

An effort could also have been made to summarize and apply available information from other states. For instance, data on such relevant subjects as nutrient removal by shoreline vegetation in comparable Maryland ecosystems might have strengthened the basis for regulations in Virginia.

Alternately, Virginia could have sought help from professional organizations such as the Society of Wetlands Scientists, the Estuarine Research Federation, or the Association of State Wetlands Managers. These groups all have a track record of providing advice on scientific dimensions of legislative policy. Such groups could have formed a panel to brief legislators.

Several of the participants in the Virginia case have responded favorably to the idea of a supplemental process to jointly review and increase understanding of technical data relevant to proposed legislation. Some have also voiced support for the idea of convening key parties face-to-face to negotiate the terms of legislation.

John Keeling of the farm bureau noted in my interview with him:

From a negotiation point of view, you know all of us weren’t communicating well enough when the bill pitted (John) Keeling and (Carl) Bomer against the administration. Somehow that’s missing a possible coalition between farmers and conservationists.

Keeling continued:

The administration made a mistake by letting an advocate group run the bill. It wasn’t fair to the Chesapeake Bay Foundation.

We should have gone through a consensus building process. The Natural Resources Secretariat should have managed the effort. I’m not saying that would have solved all the problems. But if we could have gotten some reliable information, and if the administration and the other groups had considered our changes on the merits, at the very least we might have remained silent [and adopted a position of tacit support].

When asked if such a supplemental process would have helped, Carl Hersher of VIMS felt that a joint fact-finding effort might have raised the level of understanding. Leo Snead of the Chesapeake Bay Foundation and Catherine Harold also responded favorably, while the homebuilders lobbyist was noncomittal.

There are a number of tasks that a team of neutral scientists might have undertaken to assist the parties in joint review of relevant information. Several prospective tasks are descriptive in nature. These could have included inventory and evaluation of nontidal wetland resources. Specifically, the acreage of these wetlands could be enumerated using a time series analysis of aerial photographs, LANDSAT imagery, or images compiled by
the National Wetlands Inventory. Scientists could tabulate size-frequency data for wetlands. Additionally, wetlands science advisors could have clarified the biological, recreational, and aesthetic values of wetlands, and briefed legislators on their findings.

In a more diagnostic mode, a team of experts could have analyzed past environmental damage, present condition, and current threats to wetlands in the "Eastern corridor" of the state and other reaches of Chesapeake watershed. They could characterize condition of particular wetland types including coastal interdunal pools and limestone sinks. Again, scientists could brief legislators on findings.

Scientists could have contributed important predictions, as well. Wetlands advisors could have clarified important cause-and-effect relationships such as the impact of the loss of inland wetlands on the Chesapeake Bay. Neutral scientists might also forecast the effect of wetlands removal on filtering and nutrient reduction. Another useful step would have been to forecast the number and location of landowners affected by alternate versions of wetland regulations.

To help inform the selection of regulatory standards, scientists could have forecasted the ecological implications of alternate wetland definitions, permit review standards, and exemptions. Neutral scientists might have been asked to evaluate and summarize the experience of other states in their wetland regulatory schemes, emphasizing wetland definition, exempted uses, and permit review standards. Such a team of neutrals could then have briefed legislators on their findings and responded to questions.

Scientific advisors could also help set the stage for well-informed implementation by suggesting protocols for monitoring and mid course correction and by building an issue-based research agenda for regional universities.
Beyond joint fact-finding, the participants might have employed techniques of assisted negotiation to generate a consensus on the proposed legislation. Of course, there is no guarantee that the use of a team to assist parties in negotiating an agreement would have produced a better outcome in the Virginia tidelands case, but there is ample evidence that assisted negotiation has helped resolve similar complex legislative disputes. Gordon Weeks of the National Council of State Legislatures (NCSL) characterizes legislative mediation as rare, yet finds it a fairly reasonable extension of legislative process if certain preconditions are present.\textsuperscript{84}

In Weeks' experience, the principal precondition is a political environment conducive to open discussion. Other preconditions include identification of reasonable, community-minded representatives ("not fanatics and not necessarily the most dominant personalities in an interest group"), a legislator or legislative proponent of mediation with standing and leverage, a broad consensus that some new legislation is needed, and reasonable balance among interest groups. Some of these preconditions were present in Virginia. In the Virginia case, most respondents see the Administration (not the legislature) as the logical convenor and host for an informal dialogue.

Weeks, an active proponent of dispute resolution in the legislative arena, secured foundation funding to educate legislators about the merits of these techniques. The NCSL never secured funding to launch pilot projects to test the use of legislative mediation, but Weeks continued to informally monitor mediation efforts in state legislatures. In some cases, legislators played a quasi-mediator role. This occurred in the development of groundwater legislation in Wisconsin and Arizona, where representatives Mary Lou Munz and Tom Hawke, respectively, helped bring disparate groups to consensus around a legislative package.\textsuperscript{85}

In other cases an informal partnership between an elected official and an outside team of neutrals was essential to create supplements to the traditional legislative process. One of the most successful examples was organized in Hawaii to assist the passage of a state water code that had been stalled for fourteen years.\textsuperscript{86} Although a 1978 constitutional provision required the state legislature to protect, control, and manage the state's surface and groundwater, proposals to translate this goal into state law ran
into opposition. Native Hawaiians, developers, farmers, and county officials who disagreed with aspects of the draft legislation pressured their lawmakers into rejecting a series of proposals. In 1986, Kauai County councilwoman JoAnn Yukimura was instrumental in recruiting help from the state Judiciary’s Program on Alternate Dispute Resolution (ADR).

ADR Program Director Peter Adler teamed with Leland Chang, executive director of Honolulu Neighborhood Justice Center, with the initial goal of creating an ad hoc forum. The neutrals recruited key players in the water dispute to meet in informal dialogue. The group began with informal discussions and became known as the "Water Code Roundtable". The roundtable developed a series of substantive proposals and issued a 75-page water code proposal in February, 1987. Several key provisions have been adopted by the legislature. An independent state water agency was established, and a system of water use permits enacted.

In New Mexico, Don Silva, Chairman of the Energy and Natural Resources Committee recruited neutral staff from Western Network to assist deliberations on groundwater management. The result of this partnership was a final report by the New Mexico Governor’s Groundwater Quality Advisory Committee, which is expected to be treated as the basis for legislation.87

In Virginia, Delegate Tayloe Murphy and Senator Joe Gartlan joined with colleagues to recruit conflict resolution professional from the Institute of Environmental Negotiation to help with Chesapeake Bay issues. Staff members Rich Collins and Elizabeth Waters worked with the Chesapeake Bay Land Use Round Table. The group’s final report was translated fairly directly to the Chesapeake Bay Preservation Areas Act of 1988.88

In still other cases, agencies approached mediators and asked for help in developing legislation. The Gulf Coast Waste Disposal Authority approached the Keystone Center for help in developing guidelines for hazardous waste. Keystone mediators continued working with what became know as the Keystone Siting Process Group to craft the Texas Hazardous Waste Siting Act of 1985.89 Table 2.2 summarizes these examples of assisted negotiation in the legislative arena.
<table>
<thead>
<tr>
<th>State/Issue</th>
<th>Legislative Proponent of Neutral Assistance</th>
<th>Outside Neutral</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hawaii/Water Allocation</td>
<td>JoAnn Yukimura</td>
<td>Peter Adler State Judiciary Program on Alternative Dispute Resolution</td>
<td>Final Report of the Water Code Roundtable; February 1987; key provisions enacted into legislation</td>
</tr>
<tr>
<td>Virginia/Chesapeake Bay Water Quality/Land Use</td>
<td>Sen. Joseph Gartlan</td>
<td>Rich Collins Elizabeth Waters Institute for Environmental</td>
<td>Chesapeake Bay Land Use Round Table Final Report; led to Chesapeake Bay Preservation Areas Act of 1988</td>
</tr>
</tbody>
</table>
While by no means a rigorous sample, this short list presented in Table 2.2 clearly establishes that assisted negotiation has worked to help settle a number of legislative disputes over complex issues.

In the case of non tidal wetlands in Virginia, a major contribution of neutral assistance could have included helping to ensure that environmental groups, forestry interests, homebuilders, environmental management agencies, and farm interests are adequately and fairly represented in final deliberations. A more active form of help might have included development of tentative legislative packages. Neutral advisors might have suggested contingent agreements, such as the agreement to support particular exemptions in exchange for specific permit review standards. To ensure that the legislation proceed, such helpers might have circulate tentative legislative packages to all key stakeholder groups to secure confirmation of support.

The foregoing discussion suggests a number of measures that could have been taken to supplement the traditional legislative process. Important steps can be taken to ensure that key stakeholders are represented, that major obstacles to effective use of information are overcome, and ample opportunities are presented for competing interest groups to arrive at workable agreements which they are willing to convey to lawmakers. Chapter 5 documents exactly such an effort to engage the skills of a professional mediator and convene a face-to-face dialogue of key interests to help prepare tidelands legislation in Massachusetts.
CHAPTER THREE
STRENGTHS AND WEAKNESSES OF TRADITIONAL ADMINISTRATIVE PROCESSES
FOR RESOLVING SCIENCE-INTENSIVE COASTAL RESOURCE DISPUTES:
The Port of Oakland Case Study

Introduction

This chapter examines the strengths and weaknesses of traditional administrative processes in resolving complex questions over the allocation of coastal resources. The format of this chapter is parallel to the previous discussion of legislative processes. The chapter begins with a brief review of some of the major problems that have arisen when administrative agencies are settling complex resource disputes.

The strengths and weaknesses of agency decision making are explored through a case study of a dispute over dredging the Port of Oakland. The national context of the dredge disposal problem is presented, followed by a chronology of the Oakland case. The case study, based on interviews with key disputants and agency documents, tracks the Environmental Impact Assessment\(^1\) process through preparation of draft and final documents, and into contentious litigation. Then, the case study pinpoints problems that arose related to participation and effective use of scientific information. Based on the results of interviews with disputants, the case study explores prospects for the use of supplemental processes aimed at improving the joint review of relevant information and the collaborative negotiation of key disputants, and identifies some possible roles for neutrals.

CRITIQUES OF TRADITIONAL ADMINISTRATIVE PROCESSES

The work of environmental management agencies is arguably most complex in the coastal zone. There, the boundaries of many natural systems intersect and multiple constituencies compete for scarce resources. Moreover, the jurisdictions of dozens of agencies and units of government overlap in a state’s coastal zone.\(^2\) Congress has delegated agencies authority to implement laws such as the National Environmental Protection Act (NEPA),\(^3\) the Clean Water Act,\(^4\) the Coastal Zone Management Act (CZMA),\(^5\) and the Marine Protection, Research, and Sanctuaries Act
Legislatures in most coastal states have delegated authority to a variety of bureaus to implement parallel laws to guide and allocate use of waterfront land, nearshore waters, and other coastal resources. How well do these agencies handle the work of setting standards and guiding policy priorities? A number of approaches have been used to analyze administrative decision making in the coastal zone. Greenwood (1984) points out that agency decision making often suffers from inadequate expertise and from selection of regulatory strategies before relevant knowledge is examined. Mazmanian and Sabatier (1983) argue that in successful agencies, staff expertise is essential, along with a clear conception of cause-and-effect relationships such as the linkage between proposed regulation and the protection of a critical natural resource.

Theorists of public dispute resolution, notably Harter (1985), Susskind and McMahon (1985) and Susskind and Cruickshank (1987), focus on the inevitable disputes that arise when the interests of stakeholders are in conflict. These analysts suggest that resource agencies are often asked to respond to political crises and render decisions in inordinately short timeframes. In the face of this complexity, agencies often "decide, announce, and defend" their positions in a fashion that excludes legitimate participation and fails to generate the technical information needed to reach wise decisions. 7

Harter (1985) and Stewart (1975) argue that during the New Deal era, legislatures typically decided "value" questions and incorporated them in the goals of policy, which were then implemented by neutral experts in administrative agencies. Stewart wrote of "the delegation by New Deal Congresses of sweeping powers to a host of new agencies under legislative directives cast in the more general terms." He explained that delegation to agency staff was valued in the same way a doctor was called in to diagnose an illness: the expertise of the staff was seen as essential to keep the government in check. Stewart (1975) and Jaffe (1973) cite the Federal Communications Commission and the Interstate Commerce Commission as two agencies created during the New Deal who were delegated broad powers. The FCC, for example was empowered to "license [i.e. originally license, renew, or revoke a license] in the "public convenience, interest, or necessity.'
However, Harter argues, since legislatures have tended to sidestep value conflicts in crafting environmental laws, agencies have been transformed from expert guardians of the public interest to umpires. Whether in rulemaking or preparation of an Environmental Impact Statement, agencies receive data from competing parties, and like umpires, they decide which data are appropriate, and how competing values should be ordered.

Each side typically recruits experts and marshalls uata to bolster its own position (e.g. self interest). Agencies often lack the expertise to broker competing scientific claims. Moreover, traditional administrative processes seldom enable consideration of ways to reach tradeoffs among competing sets of values. Members of the public are typically limited to a "review and comment" role, often forcing parties to take "all or nothing" stands because they lack direct access to administrative decision making. Parties with limited access to technical and financial resources therefore may not be able to represent their views effectively. The resulting process is largely an adversarial one, pitting regulators, would-be regulatees, and beneficiaries against each other.

Implementation of agency decisions may be undermined if dialogue, information sharing, and mutual accommodation are not achieved. Parties who disagree with the agency decisions often go to court. In 1985, about 80% of EPA's rulemaking efforts were challenged legally.\(^8\) There is strong evidence that this pattern plays out repeatedly among agencies charged with managing coastal resources. Hundreds of administrative decisions have been litigated involving dredging, wetlands management, and offshore oil and gas development.\(^9\)

Dispute resolution theorists urge closer attention to the reasons that affected stakeholders are dissatisfied, the degree to which an outcome makes best use of technical information, the "efficiency" of an outcome expressed as the "maximization of joint gains", and the durability and implementability of decisions reached. The dispute resolution framework is a useful way to organize an analysis of the strengths and weaknesses of
traditional administrative processes in a case involving dredged material disposal. The Port of Oakland case is especially appropriate since parties tried using unassisted negotiation, failed, and some are now considering assisted negotiation, even as litigation proceeds.

THE NATIONAL CONTEXT OF THE DREDGED MATERIAL DISPOSAL PROBLEM

Finding a disposal site for dredged material is a vexing problem for urban harbors such as Puget Sound, New York Harbor, and San Francisco Bay. Economic pressure to dredge and deepen port channels is mounting. The depth of a port has a direct bearing on its ability to compete with other ports in a region for discretionary cargo. Unless natural scouring is present, routine dredging is required every few years in many harbors to keep channels at current "design depths". Channel deepening requires even more extensive dredging of bottom sediments. A port with a channels 35 feet deep may lose business to a port with 42 foot channels needed to accommodate the larger ocean-going container ships.¹¹

But environmental regulatory agencies and private environmental groups have raised some tough questions, stalling dredging projects and throwing strategic planning into diasarray. A major concern is that the presence of potentially toxic constituents in dredged material can contribute to marine life include fisheries, rendering such fish unfit for human consumption. Of course, sediment from dredging or channel deepening is not the original source of these contaminants. Prior to passage of key environmental laws, industrial waste was routinely discharged into urban water bodies. Some constituents of this discharge, including heavy metals and some organic compounds, are highly persistent. Some contaminants become adsorbed or bound to the sediments, and are gradually covered by cleaner sediments. Dredging resuspends contaminants previously "locked up" under layers of sediment, rendering them biologically available to important bottom-dwelling marine life.¹²

Dredging can cause other environmental problems. Excessive rates of spoil deposition can smother important fishery and wetland wildlife resources including food chain organisms and important habitat areas. In
addition, dredging and spoil disposal can cause temporary excessive turbidity which can unduly interfere with sport and commercial fishing and the life history stages of certain fisheries.¹²

The Complex Statutory and Regulatory Framework Complicates Dredge Material Disposal

In a recent survey of its members, the American Association of Port Authorities found that about two-thirds of respondents forecast that they would have difficulty securing agency approval for new dredge material disposal sites (O’ Malley, 1988). There is no question that the multifaceted regulatory system complicates dredge material disposal.

Decades ago, the U.S. Corps of Engineers had sole authority to regulate dredging and spoil disposal under the Rivers and Harbors Act of 1899.¹³ But in the early 1970’s, several new environmental statutes entered the picture. The National Environmental Policy Act (NEPA) was enacted in 1969. In response to the Council on Environmental Quality’s advice to create a national policy on ocean dumping, Congress enacted the Marine Protection, Research, and Sanctuaries Act (MRPSA) in 1972.¹⁴ The Clean Water Act ¹⁵ and the Coastal Zone Management Act (CZMA) ¹⁶ were also passed in 1972.

Today, the interlocking requirements of the MPRSA, NEPA, the Clean Water Act, the CZMA and associated regulations comprise the procedural and substantive guidance for dredge spoil disposal, summarized in Table 3.1. The roster of players in dredged material disposal includes the Corps, EPA, the National Marine Fisheries Service, and their state counterparts.¹⁷

Under Section 102 of the MPRSA, EPA has lead responsibility for designating permanent ocean disposal sites for dredged material.¹⁸ If there is no permanent disposal site in a region, Section 103 of the MPRSA assigns lead responsibility to the Corps of Engineers for designating interim disposal sites for dredged materials on a project by project basis. EPA must concur with designations of these "103 sites" before dredging can proceed.¹⁹
Besides designation of a site, the actual dredging and disposal of dredged material requires separate approval. Often, the Corps joins with a local sponsor (such as a Port Authority) in proposing an actual dredging project. Designation of Section 103 sites and specific dredging projects are typically considered in a single EIS. Standards set forth under the MPRSA and the Clean Water Act are routinely considered in such EIS documents.

NEPA directs project proponents to evaluate the environmental impact of a proposed projects by an preparing Environmental Impact Statements (EIS). The scoping stage begins the NEPA process for dredged material disposal. The lead agency meets with other agencies and interested parties to identify significant issues and a preliminary range of alternatives. The NEPA process continues with the filing of a notice of intent to prepare an EIS. A Draft EIS is prepared and a notice of its availability is circulated.20

An EIS must explain the purpose and need of dredging projects, available alternatives, and the preferred alternative. The EIS must describe the affected environment and the environmental consequences of alternatives. NEPA procedures require that affected parties receive adequate public notice of proposed actions and have an opportunity to comment on draft EIS documents at public hearings. Public notice may be provided by publication in local newspapers, notice to potentially interested community organizations, publications in newsletters, and posting of notice in the area where the action is to take place.21

Federal agencies with jurisdiction or special expertise must comment on the Draft EIS. The Fish and Wildlife Coordination Act requires the Corps to coordinate its activities so that effects on wildlife will be minimized.22 Here, the U.S. Fish and Wildlife Service and the National Marine Fisheries Service offer comments on the proposed dredging.
### TABLE 3.1 SOME KEY PROCEDURAL AND SUBSTANTIVE REQUIREMENTS OF THE ADMINISTRATIVE PROCESS GUIDING OCEAN DISPOSAL OF DREDGED MATERIAL

**PROCEDURAL REQUIREMENTS OF NEPA, MPRSA, FWPCA, CZMA**

Project Proponents Must Prepare an Environmental Impact Statement (EIS):
- Notice of Intent to Prepare an EIS; Scoping to Determine Issues to be Addressed
- Preparation of Draft EIS (DEIS); Public Hearings on DEIS
- Respond to Comments; Prepare Final EIS (FEIS)
- Public Notice Regarding Proposed Action; Notice of Availability of FEIS
- Preparation of Supplemental EIS (SEIS) if Proposed Action Changes
- Agencies with Expertise Offer Comments; EPA Must Concur with Site Designation

Section 404 Clean Water Act Permits Required; Lead Coastal Agency Must Determine Consistency with State CMPs

Lead Agency Must Issue Record of Decision (ROD) to Affected Parties

**SUBSTANTIVE REQUIREMENTS OF MPRSA, FWPCA, CZMA**

**Criteria for Selecting Ocean Disposal Sites (MPRSA):**
- Geographic position, depth, topography; dispersal, mixing, and currents; cumulative effects of dumping
- Location relative to breeding, feeding areas; proximity to beaches; existing water quality and ecology
- Types/quantities of wastes; feasibility of surveillance/monitoring; interference with fishing, shipping

**Criteria for Evaluating Permit Applications for Ocean Disposal (MPRSA):**
- Environmental impact including prohibited materials and limits on toxic wastes, and quantities of wastes; hazards to fishing, navigation
  - Need for ocean dumping, including relative environmental risks, impacts, and costs for ocean dumping
  - Impact of dumping on other uses, including commercial fishing and recreational fishing in open ocean, coasts, and estuaries
  - Impact of dumping on esthetic, recreational, and economic values, presence of chemicals that may be bioaccumulated; express impacts in quantitative terms

**Section 404 Requirements (Clean Water Act):**
- Potential impacts on physical, chemical, and biological characteristics of the aquatic ecosystem: turbidity, currents, water fluctuations; threatened species; food web organisms
- Potential impacts on sanctuaries, wetlands, mudflats; potential impacts on human uses: water supplies, fishing and recreation
  - Evaluation and testing; actions to minimize adverse effects

**Consistency with State Coastal Management Plan Policies (CZMA):**
- California requirements: Maintain, enhance, and restore marine resources and the quality of coastal waters; protect commercial fishing facilities

Possible responses to comments are to modify alternatives, develop and evaluate new alternatives, modify analyses, make corrections, or explain why comments require no response. If the lead agency makes substantial changes in the proposed actions or if significant new information comes to light, supplements to draft or final EIS documents must be prepared and circulated. Thirty days after a final EIS is prepared, a Record of Decision (ROD) must be prepared and circulated. The ROD must identify the decision, discuss alternatives considered, and explain how environmental impacts will be mitigated.23

To implement the MPRSA, (known as the Ocean Dumping Act), EPA developed criteria to address both disposal sites and the content of dredging permits. Factors to be considered in designating an ocean disposal site are the site's position offshore, its location relative to breeding and nursery areas and proximity to beaches.24

Dispersal and mixing properties of the site must be considered, as well as cumulative effects of dumping. Monitoring and surveillance must be addressed. Interference with fishing, shipping and other uses must be considered, along with existing water quality and ecology.25

MPRSA regulations spell out criteria for evaluating permit applications for ocean disposal. Applications must address environmental impact including limits on toxic waste and quantities of waste. The need for dumping must be established, including a discussion of relative environmental risks. Impacts of dumping on other uses must be considered, including fishing coastal waters. Impacts on economic values are to be expressed in economic terms wherever possible.26

Under Section 404 of the Clean Water Act, the Corps of Engineers has authority to grant permits for dredging and filling in navigable waters. The Corps has delegated authority to states for issuing Section 404 permits. For instance, in California the Regional Water Quality Control Boards carry out this responsibility. Applicants for Section 404 permits must discuss potential impacts on physical, chemical, and biological
characteristics of the aquatic ecosystem, including threatened and endangered species and food web organisms. Impacts on human uses must be described. Requirements for evaluation and testing focus on chemical-biological interactions, water column effects, and effects on benthos. Permits must also describe actions to minimize adverse effects, such as confining the discharge of dredged material, and matching the material dumped to the local substrate.27

Under the Coastal Zone Management Act (CZMA), if the dredging action significantly affects the coastal zone area and the State has an approved coastal management plan (CMP), a consistency determination must be sought. If the lead coastal management agency find these projects are in accord with state policies, it must issue such a consistency determination. Policies vary from state to state, but they typically call for protection of coastal water quality and marine resources, and preservation of commercial and recreational fishing uses. If the state coastal agency finds that dredging is inconsistent with its CMP, the project cannot go forward.28

Many states also operate NEPA-like processes for reviewing environmental impacts of proposed actions, and may require that Environmental Impact Reports (EIRs) be prepared. State environmental review processes typically allow for preparation of joint EIS/EIR documents to satisfy both state and federal requirements. Often, procedures associated with state impact assessment processes require that state fish and wildlife agencies also offer comments.

When the regulatory process under NEPA, the Ocean Dumping Act, the Clean Water Act, or the Coastal Zone Management Act, fails to produce satisfactory outcomes, parties frequently resort to litigation. Over 100 dredging cases have been litigated in federal court. A brief review of these litigated outcomes shows that the Corps or counterpart state regulatory agencies are most often the defendants in these cases, with significant litigation brought by environmental groups. Issues related to loss of productive shallow benthic and wetland habitat are often raised, along with periodic assertions that regulation to prevent harm to these habitats constitute a taking.29
Scientific Disagreement and Uncertainty Complicates Dredged Material Disposal

The quest to achieve cost effective, environmentally sound disposal of dredged material raises complex technical questions. What effect does increased turbidity have on fish and other food web organisms? Does dredging resuspend contaminants and render them biologically available? How should levels of contaminants be measured in sediments? What analytical techniques can best measure impacts of contaminants on individual organisms? What are the effects of contaminants on the marine food web? What is the assimilative capacity of the ocean to absorb waste? How can material dumped in the ocean be rendered immobile? All of the issues have been the subject of scientific disagreement and uncertainty.

Appropriate testing of contaminants in dredged material has been the subject of ongoing debate. The Army Corps methods of studying impacts of dredged material has been traditionally based on standard laboratory bioassay techniques using elutriate samples from material to be dredged. In these tests successive dilutions are made of the dredged material, enabling analysts to study the effect of these diluted contaminants on laboratory animals. The major criterion used to determine an organism’s response to a toxicant stress is the concentration of a pollutant that results in 50 percent mortality of test organisms during a designated exposure period known as a lethal concentration (LC) 50 value. Such bioassay data can be used to detect the sensitivity of an organism to a particular pollutant and to compare toxicities of various pollutants.30

However, bioassays do not measure important physiological, behavioral, and ecological changes (Capuzzo, 1981). New analytic techniques, such as atomic spectroscopy and capillary chromatography can accurately reveal quantities of contaminants that were previously undetectable, and more accurately identify individual contaminants (New York Academy of Sciences, 1988). Not only are the analytic techniques better, but stronger evidence
linking low levels of contaminants with damage in marine organisms has recently been presented. Critics of bioassay methods urge the Corps to study the effects of bulk sediments on ecosystems.\textsuperscript{31}

Intense disagreement has also surfaced over the assimilative capacity of the ocean to absorb waste, including dredging material. Dr. Edward Goldberg, a respected marine chemist based at Scripps University, believes the oceans have considerable capacity to absorb waste, and that sufficient data is available to weigh ocean disposal against other alternatives. Biologist Judith Capuzzo (1981) of Woods Hole Oceanographic Institution and biochemist Ken Kamlett (1981), argue that the information base is too limited to forecast the ecological impact of ocean dumping.

Not surprisingly, opponents and proponents of alternate dredging proposals selectively invoke one or more of these arguments to bolster their case. Too often, the result neither eliminates nor clarifies scientific disagreement, and instead leads to delay and litigation.

**CHRONOLOGY OF THE PORT OF OAKLAND DREDGE DISPOSAL DISPUTE**

**Early EIS Work for the Port of Oakland**

This case examines the controversy that has arisen from the need to find a suitable long-term disposal site for materials to be dredged from ship channels in the harbors of San Francisco Bay. Major dredging projects are slated in conjunction with the "home porting" of the Battleship Missouri near Hunter's Point in San Francisco and expansion of the Port of Richmond in the East Bay. Altogether, close to 50 million cubic yards of material must be dredged and deposited over the next 5-10 years. The most pressing problem is finding a suitable disposal site for spoils to be dredged from the Port of Oakland. Congress has already appropriated the 75% matching funds to the Corps to join with the Port in deepening ship channels to 42 feet, sufficient to accommodate a larger class of freighters.\textsuperscript{32}
Since the Port of Oakland Project was first approved by Congress, both the proposed scope of dredging and the proposed disposal site for dredged spoils have evolved considerably. NEPA activity dates back to the early 1980s when separate EISs were begun for dredging the Port's Inner Harbor and its Outer Harbor (Figure 3.1). Both projects assumed that spoil disposal would occur at the dumpsite adjacent to Alcatraz Island (Figure 3.2).

Use of the Alcatraz dumpsite—a 2000 foot diameter circle between Alcatraz Island and San Francisco—began at least 90 years ago. Its historical use led to continued dumping in more recent decades when dredged sediments were generally thought to be clean. Most ocean dumpsites for dredged material are chosen because environmental assessments show that dumped material will remain immobile. Alcatraz does not fit this generalization. Material dumped at the Alcatraz site mimics the natural dispersion of sediments up the San Joaquin-Sacramento River Delta and out through the Golden Gate.

Alcatraz has some capacity to accommodate routine maintenance dredging for a few more years. However, serious questions have been raised about the appropriateness of handling new dredging projects at the Alcatraz site. Three major problems are mounding of sediments, increased turbidity, and dispersal of toxic materials. Corps studies show that sediment is accumulating in mounds, and could pose a future hazard to navigation.

In light of evidence that the Alcatraz site could be nearing its capacity, the Corps filed a notice of intent to designate an ocean site in September 1986 to accommodate Oakland spoils. The following spring, the Corps combined the Inner and Outer Harbor dredging projects with an ocean disposal site designation in a single supplement EIS (SEIS). By this time, the scope of the dredging project had been scaled back from 12 million cubic yards to 7 million cubic yards. The Corps still envisioned that disposal would proceed at Alcatraz, but recognized that some of the 7 million cubic yards would accumulate and not disperse.
### Figure 3.1: Administrative Process Fails to Designate Disposal Site for Oakland Harbor Dredge Spoils

<table>
<thead>
<tr>
<th>Stage of the EIS Process</th>
<th>Date</th>
<th>Action</th>
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<tbody>
<tr>
<td>Initial Scoping of EIS for Ocean Disposal</td>
<td>11/84</td>
<td>NOI to prepare EIS on ocean disposal</td>
</tr>
<tr>
<td>Inner Harbor Site Feasibility; Designation</td>
<td>9/86</td>
<td>NOI to prepare EIS on inner &amp; outer harbor &amp; dredging &amp; ocean disposal</td>
</tr>
<tr>
<td>DSEIS Released</td>
<td>4/87</td>
<td>Public hearing on DSEIS</td>
</tr>
<tr>
<td></td>
<td>9/87</td>
<td>3/4: Joint Technical Review Panel meets; recom. mend B-1</td>
</tr>
<tr>
<td></td>
<td>10/87</td>
<td>3/18: Notice of availability of FSEIS</td>
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<tr>
<td></td>
<td>11/87</td>
<td>5/3: EPA concurrence</td>
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<tr>
<td></td>
<td>2/88</td>
<td>5/5: Corps Record of decision choosing B-1 site for first 500,000 CY</td>
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<tr>
<td></td>
<td>3/88</td>
<td>Phasing</td>
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<td>6/88</td>
<td>Phasing</td>
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<table>
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<tr>
<th>Area and Volume of Sediments to Be Dredged; Phasing</th>
<th>Date</th>
<th>Action</th>
</tr>
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<tbody>
<tr>
<td>Total 12 million CY; 7 million from inner harbor, 5 million from outer harbor</td>
<td>11/84</td>
<td>NOI to prepare EIS on ocean disposal</td>
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<tr>
<td></td>
<td>9/86</td>
<td>Public hearing on DSEIS</td>
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<td>6/88</td>
<td>Phasing</td>
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<thead>
<tr>
<th>Disposal Site Preferred by Corps/Port of Oakland</th>
<th>Date</th>
<th>Action</th>
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<tbody>
<tr>
<td>ALCATRAZ ISLAND DUMPSITE WITH REDREDGING &amp; OCEAN DISPOSAL OF 3 MILLION CY</td>
<td>11/84</td>
<td>NOI to prepare EIS on ocean disposal</td>
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<td>9/86</td>
<td>Public hearing on DSEIS</td>
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<thead>
<tr>
<th>Major Project Opponents</th>
<th>Date</th>
<th>Action</th>
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<tbody>
<tr>
<td>Citizens for a Better Environment (CBE), Sierra Club, Oceanic Society, EPA, California Department of Fish and Game</td>
<td>11/84</td>
<td>NOI to prepare EIS on ocean disposal</td>
</tr>
<tr>
<td></td>
<td>9/86</td>
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Source: Synthesis of Interview Data and Review of Documents
Accordingly, the Corps proposed to redredge 3 million cubic yards from the Alcatraz site and deposit the spoil at an ocean site to be identified. This strategy was favored in part because it was least costly.  

Environmental Groups and Management Agencies Oppose Spoil Disposal at Alcatraz

When a public hearing was convened in November 1987 to receive comments on the DSEIS, the Corps plan drew broad criticism. Citizens for a Better Environment (CBE), a San Francisco-based environmental group, pressed the Corps to close down the Alcatraz dumpsite, charging that dumping dredged spoil increases turbidity and distribution of toxic sediments in San Francisco Bay. CBE claimed that chronic toxicity harms Bay life, and that disbursed silt smothers important shellfish and other filter-feeding organisms. Accordingly, CBE argued, depositing spoil at Alcatraz and then dredging sediments from the site merely to create room for new sediments would be highly illogical. The environmentalists urged rejection of the Alcatraz site. CBE was joined in its opposition by the Bay Chapter of the Oceanic Society, the San Francisco office of the Sierra Club, and other groups.

Several agencies also supported "getting out of the Bay." California's Department of Fish and Game (DFG) reports that commercial and recreational fishermen operating near Alcatraz have experienced catch declines in recent years. Turbidity is increased and dissolved oxygen is depressed in the vicinity of the dumpsite. The agency reasons that contaminants probably bioaccumulate, since marine worms feed in the spoil deposits, and are in turn consumed by flatfish. EPA biologists agreed that increased toxics availability and smothering are correlated with dredge spoil disposal near Alcatraz. In light of this evidence, DFG and EPA inferred that dredge disposal at the Alcatraz site harms important Bay fisheries, and urged that ocean disposal be reviewed as an alternative.

By early, 1988 the opposition of environmental agencies and private groups to the Alcatraz disposal and redredging plan was clear. At the
same time, the Port urged immediate action on dredging 500,000 cubic yards of materials to deepen the Inner Harbor to 38 feet. The Port insisted this move was necessary to accommodate the first of a new class of 900-foot ships, slated to arrive on June 10, 1988. The Port reported that American President Lines threatened to direct its shipment to Long Beach, Los Angeles, or Seattle unless the channel could be deepened promptly. 37

CBE and others floated the idea of direct ocean disposal for the first 500,000 cubic yards of Inner Harbor sediments and pressed the Corps to evaluate sites off the Continental Shelf for long term disposal. This appeared to open the door to a strategy to avert a deadlock. CBE indicated that if EPA and the fisheries agencies could support an ocean disposal site for the first 500,000 cubic yards of sediment, then CBE would support this move, provided another EIS was completed before a site was chosen for the remaining 6.5 million cubic yards of spoil. 38

The Corps, with an explicit mandate to weigh the costs and benefits of disposal alternatives, reluctantly agreed to considered two sites on the continental shelf as alternatives to Alcatraz. These were sites 1-M off Pacifica and B-1, off Half Moon Bay (Figure 2.2). Thus, the EIS/EIR was rescoped to permit interim designation of one of three alternative disposal sites: Alcatraz, 1-M near Pacifica, or B-1 off Half Moon Bay. Although the channel deepening project had been in the planning stages for 10 years, most environmental reconnaissance activity had been directed toward the Alcatraz site. Sites 1-M received less scrutiny, while site B-1 received even lighter treatment.

Between January and March, 1988, work progressed on the Final SEIS/EIR. Bay environmentalists, agencies, and port interests met several times to seek a solution to the dredging problem. Participants included CBE, the Oceanic Society, the Pacific Coast Federation of Fishermen’s Associations (PCFFA), the Department of Fish and Game, the National Marine Fisheries Service, the Port, the Corps, and EPA. Although the meetings were not assisted by a neutral, the tone was generally consensual. In retrospect, these meetings marked the most constructive and conciliatory phase of the EIS process. 39
During the course of these meetings, the Port and the Corps expressed a strong preference for the 1-M site off Pacifica as a second choice to continued dumping at Alcatraz. The Corps argued that the haul distance for 1-M was significantly shorter, translating into significant cost savings for the Oakland project. Accordingly, the bulk of EIS work was directed to supporting ocean disposal at the 1-M site. However, EPA’s staff biologists had strong misgivings about possible environmental and fisheries impacts at the 1-M site. EPA indicated that it would not concur if the Corps insisted on using the 1-M site.

Based on EPA’s support for the B-1 site that emerged at these meetings, seven environmental groups signed a letter to Army Corps on March 2, 1988:

The environmental and sport and commercial fishing organizations listed below urge the Corps of Engineers to endorse the scientific and regulatory consensus supporting direct disposal of dredged material for the Port of Oakland project to Ocean Site B-1...Your continued insistence on either in-Bay disposal or an inappropriate site such as the closer-in 1-M location ...would only doom the entire Port of Oakland project.

CBE and others staked out a position that amounted to a contingent agreement: If the Corps and EPA could agree that the B-1 site represented a smaller environmental risk than dumping at the 1-M site, then the environmental community would support ocean disposal of the first 500,000 cubic yards, provided a separate SEIS was done for the remaining spoils. Among the signatories to this letter was Zeke Grader, Executive Director of the Pacific Coast Federation of Fishermen’s Associations (PCFFA), a consortium of marketing and fisheries protection groups. However, Grader did not explicitly check back with PCFFA members from the Half Moon Bay region—an oversight that proved crucial.
The Corps needed EPA's concurrence before they could designate an ocean site. The Corps preferred 1-M, while EPA preferred B-1. To break the deadlock, top staff of EPA's Office of Marine and Estuarine Protection teamed with their counterparts in the Corps to convene a "blue ribbon" panel of regulators and scientists. On March 10-11, 1988, ten panelists, five each from EPA and the Corps met in Ft. Belvoir, Virginia. Their charge was to review available information to develop findings and conclusions relevant to the ocean disposal of material dredged from the Oakland Harbor. The panel used the first day to review data and hear presentations from experts from state and federal fish and wildlife agencies. The panel found:

an absence of site specific quantitative information on the physical, chemical and biological oceanography and uncertainties resulting from annual fluctuations in fishery catches.45

The second day was devoted to drafting recommendations. Given the major data gap, the panel could find no compelling environmental reasons to choose between Site 1-M or a site in the vicinity of B-1:

However the fishery interest appear to be more substantial at site 1-M than in the vicinity of sites near B-1....Given that information available suggests the potential for greater conflict with fishery interests at Site 1-M, the panel believes the most prudent approach is to utilize a site in the vicinity of B-1.46

**Corps Agrees to Propose B-1 Site and Amends EIS**

By March 12, it appeared that Corps would opt for B-1 site endorsed by the panel. Most parties interviewed agreed that the Corps chose the disposal at the B-1 site over the less costly disposal at the 1-M site only reluctantly, and with some opposition from Corps headquarters in Washington. Said one participant in the Washington meeting "The Corps had to be dragged along." Once the Corps determined that B1 was the site they accepted, "the Corps was still a reluctant bridegroom." DFG staff observed:

"The San Francisco Corps District gets heat in Washington for any moves that we consider environmentally sensible. The resource agencies may think of them as dinosaurs, but Corps headquarters sees them as Bolsheviks".47
By aligning with its EPA counterparts, the Corps earned EPA concurrence, as required by the Ocean Dumping Act. However, the decision to rank site B-1 as the preferred site created major problems that undermined the success of the project and stalled the Oakland dredging project. The Draft EIS had devoted scant attention to the B-1 site, and release of the Final SEIS was imminently—slated for March 18. After the technical review panel met, and under intense time pressure, the Corps decided to "retrofit" the EIS in order to meet the deadline. Portions of the SEIS concerning potential impacts at the B-1 site were hastily beefed up. For instance, several sections were added commenting on the physical oceanography, marine resources and ecological impacts of dredge disposal at the site. The Final SEIS, recommending designation of the B-1 site as an ocean disposal site, was released without fanfare and with little public notice.48

Half Moon Bay Interests Pursue Litigation and Direct Action

The Corps’ decision to choose the Half Moon Bay site came as a surprise to Half Moon Bay fishermen, the Pillar Point Harbor District, and San Mateo coastal communities. Days after the decision was announced in a local paper, opponents of disposal at the B-1 site retaliated with legal challenges, direct action, and skillful use of the media. The Half Moon Bay Fishermen’s Marketing Association (HMBFMA), a group of sixty San Mateo County fishermen, decided to initiate litigation.49

The Half Moon Bay groups had several concerns: ecological damage due to spoil disposal including water column impacts and dispersal of contaminants, and associated impacts on bottom trawler fisheries were especially worrisome. Half Moon Bay interests felt that potential ecological damage associated with spoil disposal could discourage some of the transient fishermen who use Pillar Point Harbor during the peak summer season. Fisherman were also concerned about the precedential impacts of designating B-1 as the site to receive the first 500,000 cubic yards of Oakland’s dredge spoil. They feared that if the first increment of spoil
were placed at B-1, this would pave the way for disposal of the additional 6 million cubic yards slated to be part of the Oakland dredging project. 50

With three days left in the EIS/EIR process under NEPA and the California Environmental Quality Act (CEQA), the HMBFMA retained the Law Office of Roger Beers. The Pacific Coast Federation of Fishermen’s Association contributed $10,000 to the HMBFMA for legal fees. Federation President Zeke Grader, HMBFMA’s parent organization, realized he had erred in endorsing dumping at B-1 without checking with local fishermen. 51

HMBFMA’s attorneys filed suit on April 15 in federal district court, charging that the Corps had violated its substantive and procedural requirements under CEQA, NEPA, and the Ocean Dumping Act. A key basis of their claim was that the Corps did not follow its own regulations requiring notice of some kind to affected parties and posted notice in the vicinity of the site. 52 Therefore, the attorneys argued, the Corps failed to provide proper public notice as part of the NEPA regulations and state EIR procedures. As shown in Figure 2.3, bringing suit was the first of a series of legal maneuvers by opponents and advocates of the dredging project.

The Corps and the Port won the first round. Judge Schwarzer of the Federal District Court for the Northern District of California denied the HMBFMA’s motion for a temporary restraining order (TRO) on the dredging on May 5, 1988. On May 6, the litigants obtained an emergency injunction from the U.S. Court of Appeals. The injunction was dissolved by a panel of the U.S. Court of Appeals on May 12, clearing the way for disposal of the material at the B-1 site. As the first load of dredged material headed to the B-1 dumpsite on May 13, a flotilla of 18 fishing boats attempted to blockade the barge. Fishermen played "dodg’em" with the tug for several hours and exchanged profanities with the tugboat operators. One boat threw down its net but the tug and barge rode over it and finally dumped its load at 2 a.m. 53
Spokesman for the fishermen forecast dire consequences from the dredging, earning generous media attention. As the first barge dumped 4,000 cubic yards of spoils, Steve Fitz called it "the end of a way of life". Another HMBFMA spokesman claimed that dredging "would severely damage our industry, whose 1987 catch was valued at $5 million." 

In retaliation, another Half Moon Bay fisherman dumped a ton of ripe fish heads in Oakland Harbor, arguing:

They're dumping on us, so we figured it wouldn't hurt to dump on them.

Disposal at the B-1 site proved to be short lived. The day after dredging began, San Mateo County filed a separate suit in San Mateo Superior Court. The County charged that the proposed spoil disposal should have been reviewed by the Coastal Commission for consistency with its state coastal management plan, as required by the Coastal Zone Management Act. Applicable state policies require that actions in the coastal zone "protect commercial fishing" and "maintain and enhance the biological productivity of coastal and ocean waters". San Mateo Superior Court Judge Thomas Smith issued a temporary restraining order on May 16, 1988, halting dredging until a full hearing on May 26. The fishermen were ebullient:

We've been so down and so disheartened and so utterly defeated—we're just completely ecstatic about this support we have received from the court.

Dredging proponents worked to overturn the TRO. Two days later, the Port of Oakland removed the case to Federal court, contending that only federal issues were at stake. On May 25, U.S. District Judge Henderson heard the case, and ruled that a State Superior Court judge and not a federal judge should decide on the case. In rejecting the Port's arguments that federal law totally controls the case, Judge Henderson remanded the case to state Superior Court.
Once the case was back in state Superior Court, the HMBFMA intervened in support of the County. A Santa Clara County judge, Superior Court Judge Donald Chapman, was assigned to the case to insure impartiality. After briefings and a lengthy hearing, he granted a preliminary injunction until the Commission could review the Port’s dumping plan.59

The Port fought back, seeking a stay on the state court preliminary injunction ordered by Judge Chapman. On June 13, the California Court of Appeals denied the stay and on July 15 the same court denied the balance of the petition. The California Court of Appeals upheld the lower court’s decision and ruled that a consistency determination from the Coastal Commission was a prerequisite for the dredging, citing potentially disastrous impacts on fishing and possible migration of toxic constituents of dredged material through the water column. Commission staff forecast a 60 to 90 day review period assuming no further delays caused by litigation. However, the Port chose not to file consistency documents with the Commission, and elected to petition the California Supreme Court for review of the lower court’s decision. The Supreme Court denied the appellant’s petition on September 15, 1988, and let the lower court decision stand, thus requiring the Port to secure a consistency determination before dredging can proceed.60

In the federal NEPA case, attorney Beers submitted a petition for rehearing to the 9th Circuit with a suggestion for rehearing en banc (the full court), arguing that the 9th Circuit panel had erred in dismissing the case on its merits when plaintiffs had sought only a preliminary injunction. The court ordered the Port and the Corps to respond to the petition. On November 11, 1988, the Court denied the HMBFMA’s petition to rehear the case and let the lower court decision stand.61

Meanwhile, the alarm of the fishing community and the presentation of new evidence regarding the importance of the B-1 site as a fishery persuaded the San Francisco environmental groups to drop their support for the B-1 site and join with the Half Moon Bay interests in pushing for designation of a site off the continental shelf. CBE wrote to the Corps:
We believe new information requires a new disposal plan. We call for a new review of the Oakland Harbor dredging project. EPA, the Corps, and the fishery agencies [should] respond to the new fishery and economic data and designate a more appropriate site beyond the shelf.\textsuperscript{62}

CAR tied its revised position almost entirely to new information, and criticized the agency's shortcomings:\textsuperscript{63}

\textbf{[F]actors that led us to take this position include sworn statements filed by the...fishermen and the data they submitted....[T]heir crab catch was not anticipated from the ten year old data that was evaluated. DFG has recent data on computer cards which have not been able to be evaluated due to lack of resources. Also, sworn expert testimony supports the fishermen's claim that the area is an important spawning and breeding area.}

San Francisco Bay Area legislators joined the fray. While agreeing that the Port must deepen its channels to remain competitive, legislators endorsed an "off-the-shelf" disposal site. State Senator Quentin Kopp introduced a nonbinding resolution calling for federal authorities to stop dumping at the B-1 site and relocate the spoils off the Continental Shelf. In a May 24 news release, Bay Congressional representatives wrote to Comptroller General of the United States,

San Francisco Bay is the largest west coast inland estuary and we must do everything possible to protect this valuable coastal resource.\textsuperscript{[C]oncerns have arisen relating to Bay dredging and disposal of dredged materials under the Clean Water Act and the Ocean Dumping Act which indicate that a more comprehensive review of the sources and the impact of disposing of dredge spoils be undertaken.}\textsuperscript{64}

Congressman Tom Lantos introduced a bill that, while silent on the 500,000 cubic yards to be dredged from the Inner Harbor, would require future ocean dumping to be done off the continental shelf.

The administrative process operated by the Corps and EPA has not yielded strong, definitive guidance on a disposal program for Port of Oakland dredge spoils. Relying on the legal system has also not decided the matter. As shown in Figure 3.3, no less than five levels of the judicial system (three state, two federal) have considered aspects of the case. The litigation has settled only the narrow question of whether the first 500,000 cubic yards of dredged material may be dumped at B-1 without a consistency determination.\textsuperscript{65}
None of the disputants believes that a durable solution to the long term disposal question is in sight. The Corps still favors the 1-M site, while the Port believes it will win its litigation and dump at the B-1 site. The coalition composed of the HMBFMA, San Mateo County and environmental groups believes it will prevail and force the designation of an alternative disposal site off the continental shelf.66

EVALUATION OF STRENGTHS AND WEAKNESSES OF THE REGULATORY PROCESS

As the previous discussion clearly establishes, the administrative process operated by the Corps did not meet the needs of parties in the Oakland case. The following discussion looks more closely at what worked and what went awry. The key issues considered are public notice and participation in the regulatory process, the adequacy of the technical information developed by the Corps, mechanisms for handling scientific disagreement, and prospects for timely implementation of the dredging project. The discussion is based on structured interviews with key participants.

Comment on Public Notice and Participation of Affected Parties in the Regulatory Process

Affected groups participated in the regulatory process in scoping the EIS, reviewing the draft EIS, and commenting on the final EIS. The purpose of scoping is to identify concerns and legal obligations that may be associated with the designation of an ocean disposal site so that these concerns and obligations can be dealt with in the EIS. Scoping typically entails meetings with interested private individuals and with Federal, state and local agencies that have responsibility for environmental protection or resource management. In this instance, it appears that no specific effort was made to recruit Half Moon Bay interests to the early scoping meetings.67

Moreover, in evaluating the adequacy of public participation in reviewing EIS documents, the question of which site was identified as the preferred site and the timing of the the EIS process are central.
Overall, those interviewed felt that the NEPA/MPRSA process had worked relatively well to involve parties concerned about the Alcatraz site, but did not work well to involve parties concerned about the B-1 site. The fact that B-1 was chosen late in the EIS process, just before the final SEIS was completed, caused major problems.

From a legal standpoint, the concept of timely "notice" is crucial. Regulations enacted pursuant to NEPA and MPRSA clearly require the Corps to provide adequate notice of proposed dredging projects to affected groups and to post notice in the area where spoils will be dumped. Disputants in this case disagree sharply over whether adequate notice was given when the Corps chose B-1 as the preferred site. Mel Wax, the Port spokesman, observed "Notices were put up in libraries in San Mateo County", while the Corps observed:

"The Half Moon Bay fishermen met with the Corps 10 days before the end of the comment period. We gave adequate notice. How could they have met with us if the process wasn't adequate? I wish the fishermen had been involved earlier. Their parent organization was involved. PCFFA's newsletter had references to the process. We were sandbagged by the local fishermen. If you want to oppose something, you don't comment early."

Cynthia Koehler, attorney for the HMBFMA, sharply rejected these claims. She insisted that adequate notice not been given, and that fishermen only learned about the spoil disposal from a newspaper story 10 days before the end of the comment period. Koehler pointed out that the Port's attorneys had not refuted the fishermen's charge that provision of notice was inadequate. She stressed that the Port spokesman's comments suggest that the HMBFMA simply failed to act out of laziness or malice--"a charge totally without evidence." Koehler summed up participation of affected groups as "just adequate" with regard to the Alcatraz and 1-M sites, but "woefully inadequate" when it came to the B-1 site off Half Moon Bay.

CBE agreed, arguing that the Corps had curtailed participation opportunities for their Half Moon Bay counterparts by failing to provide adequate notice.
We do not believe [coastal public official and citizens of the Pillar Point fishing port who depend on the B-1 areas] received notice in time to effectively participate in the decision making on this project.\textsuperscript{71}

On the broader question of participation throughout the EIS process, the Corps and the Port praised the level of participation enabled by the EIS process while fishing interests, environmental groups and resource agencies criticized the efforts to involve fishermen. The Corps spokesman observed "overall, the effort to involve groups has been very adequate",\textsuperscript{72} while the Port spokesman called the participation effort "moderately adequate".\textsuperscript{73} DFG's representative characterized overall participation as "moderately adequate". He observed that fishermen as a group—and not just Half Moon Bay fishermen—were not adequately involved. DFG and other resource agencies urged that fishermen be contacted. "As agency staff we didn't feel that we could adequately represent the fishermen's interests". Tasto believed the Corps and the Port should have recruited fishermen. "The Corps could have avoided a lot of the heartache by including fishermen groups early on."\textsuperscript{74}

The evidence is persuasive that participation of affected groups in the regulatory process was inadequate. Early in the process, the Half Moon Bay/San Mateo communities had no reason to participate actively because the 1-M site and B-1 sites were not under serious consideration. When agencies switched their preferred site from Alcatraz to 1-M and then to B-1, a whole new set of interests became stakeholders. But involvement of these affected interests did not keep pace with the new preferred site.

The Port and the Corps may have incorrectly assumed that the Bay Area environmental groups, the Pacific Coast Federation of Fishermen, or the fishing agencies could speak for the San Mateo coastal interests. In fact, Koehler and CBE agreed that communication among fishing groups could have been better. Zeke Grader, Executive Director of the Pacific Coast Federation of Fishermen's Association "made many mea culpa statements, saying he basically just didn't communicate with the Half Moon Bay Fishermen."\textsuperscript{75} But ultimate responsibility for involving affected groups
rests with the Corps, not with the environmental community. Similarly, project proponents may have assumed that a general discussion of the project in a newsletter, or posting of notices in public libraries, was sufficient to engage all affected interests. This was not the case.

Recent history suggests that failure to engage affected groups risks litigation, revenge, and major impediments to implementation of public decisions. Every one these tactics has played out in the Oakland case. Ensuring adequate participation means identifying affected groups, identifying legitimate spokespersons, ensuring that the representative attends meetings, and assisting representatives in reporting back to their constituencies.

It is doubtful that any of these tasks were accomplished with regard to the Half Moon Bay Fishermen. Many fishermen choose their occupation to work independently, to spend a lot of time outdoors, and to be left alone. Since the major channels to reach fishermen are likely to be trade associations, unions, and the marketplace, passive posting of notices in the newspaper and in libraries hardly reflects an effective effort to solicit the involvement of this pivotal affected group. In hindsight, it is clear that the Corps needed a much more activist posture to recruit and sustain adequate participation.

Handling Scientific and Technical Issues

Even if the Corps had chosen Alcatraz or 1-M as the preferred site, it appears that serious questions would have been raised about the adequacy of technical information presented in the Final SEIS. Selection of the B-1 site late in the process complicated these difficulties. Treatment of the B-1 site was scant in the Draft SEIS. After the Technical Review Panel issued its recommendation to choose B-1 on March 11, there wasn’t time to gather and synthesize sufficient information to forecast impacts in a compelling fashion. Moreover, it appears that the Corps did not have in place a network for information exchange with other agencies such as the U.S. Geological Survey or the National Marine Fisheries Service which could have aided the information gathering and synthesis task.76
As illustrated by Table 3.2, the regulatory process left many technical questions unresolved. Parties disagreed sharply about the adequacy of environmental data and their interpretation, although most agreed that data were weakest for site B-1. The following discussion shows how parties differed in their appraisal of the information generated by the EIR process. The adequacy of the data is discussed with regard to the ecological consequences of dredge disposal, the urgency of inner harbor dredging, the economic consequences of dredged material options, and safety and risks assessed with alternative sites. Environmental groups, fisheries agencies, and commercial fisheries representatives were generally more critical of the quality of data than the Port or the Corps.

Ecological Consequences of Dredged Material Disposal

The Corps believes:

The quality of information has been very adequate regarding ecological impacts. People in the business have complemented the EIS. The critics have not read the EIS thoroughly. They attribute ecological consequences to dredging that exceed documented evidence of effects elsewhere. 77

DFG and EPA took a harsher view. The DFG representative observed:

Much of the ecological data was inadequate. Data on evaluating impacts on the Bay from dumping at Alcatraz was deficient. Characterizations of sites 1-M and B-1 were inappropriately based on 3 year old data from different seasons. 78

EPA's lead staff characterized the data on ecological consequences as:

very inadequate. EPA rates EISs as 1 adequate; 2 insufficient; and 3 inadequate. The EIS got a 3; a rating that allows the possibility for referral to the Council on Environmental Quality. We don't make these ratings lightly, we only issue a 3 rating for those that are really bad news. 79

HMBFMA attorneys characterized the quality of information about the ecological consequences of dumping dredge spoils at the B-1 site as:

shockingly bad...as inadequate as it could get...only 1976-77 data was included as an attachment. A lot has changed in 12 years. 81
# TABLE 3.2: MAJOR AREAS OF TECHNICAL DISAGREEMENT AND UNCERTAINTY UNRESOLVED BY THE REGULATORY PROCESS IN SELECTING A DISPOSAL SITE FOR MATERIAL DREDGED FROM THE PORT OF OAKLAND

## Unresolved Issues Related to Ecological Consequences of Dredged Material Disposal

Does dredge material disposal at the Alcatraz site significantly increase turbidity in San Francisco Bay? Is increased turbidity responsible for reported declines in Bay fish stocks?

Does dredge material disposal at Alcatraz significantly increase the biological availability of toxins in the Bay?

Will dredge material disposal significantly increase the biological availability of toxins at the B-1 site near Half Moon Bay? How do currents affect dispersal of dredged material?

How important is the B-1 site as a fishery? Are the fish landings accurately tallied in fishermen's logs?

Do the biological characteristics of the B-1 Half Moon Bay site vary from season to season? If so, how do these fluctuations affect the vulnerability to dredge disposal?

If dredge spoil is dumped at B-1, would toxins migrate through the water column? What is the probable longevity and persistence of ecological impacts of dumping at the B-1 site?

What is the probable areal extent of ecological impacts of dumping at the B-1 site?

If an "off the shelf" site is chosen, how should off the shelf be defined?

Were bioassays performed correctly using appropriate reference material? Should bulk sediment analysis be required as a complement to elutriate tests of contaminated sediments?

## Unresolved Issues Related to Economic Costs and Benefits

What is the urgency of dredging the Inner Harbor to maintain Oakland's status as a major West Coast port?

What is the net cost difference between hauling Inner Harbor sediments to sites 1-M vs. B-1 vs. a site off the continental shelf?

What are the socioeconomic impacts of dumping the first 500,000 cubic yards of dredged material at the B-1 site on the Half Moon Bay fishing community? Will the possibility of contamination affect the marketability of fish caught in the Half Moon Bay region? How would dumping of this volume affect future decisions on dumping 6.5 million CY from Oakland and designation of the 50 million CY site?

Will net benefits exceed net costs if an off-the-shelf site is chosen?

If an off-the-shelf disposal site for is chosen for Oakland sediments, what are the implications for other ports?

## Unresolved Issues Related to Safety

How constraining is the radar surveillance net? How many vessels now operate outside the net? Are there feasible supplements to traditional radar surveillance? What is the relationship between addition exposure time in congested sea lanes and increased risk of accidents?

Source: Interviews Conducted with Parties to the Dispute
She added:

The decision to chose the B-1 site was made March 11, and the EIS was made public March 18. The Corps should have ditched the EIS, because it was about a totally different site. It came down to inserting paragraphs that said 'everything we said about the 1-M site also applies to B-1'.

Sharp disagreement persists about the interpretation of findings as well as the adequacy of data regarding the ecological consequences of dumping spoil (Table 3.2). Parties are at odds about the starting assumptions for measuring impacts and the adequacy of data collected. They also disagree with interpretations on the physical extent, degree and longevity of these effects. The Corps conceded "We [the parties] don't agree on any aspect of ecological impacts".

CBE asserts that dumping of dredge material at the Alcatraz site increases turbidity and the distribution of toxics in San Francisco Bay, while DFG and EPA agree that these effects may be inferred from available data. But the Port spokesman "disagrees strongly; there is no evidence that turbidity in the Bay has any harmful effects at all." "We dispose of 5 million cubic yards of material per year; it has all been tested and found suitable for disposal."

Necessity and Urgency of Inner Harbor Dredging

The parties generally agreed that the Port of Oakland must deepen its channels to maintain its status as a major West Coast port. Both Bay area environmental groups and Half Moon Bay fishermen "pretty much accept that the Port needs to deepen its channels". DFG lead staff agreed, although the agency took no position. However, parties disagreed about the urgency of dredging. CBE and the HMBFMA point out that since large container ships can use existing Port channels by making strategic use of high tides, the Port and the Corp should take the time to properly investigate off the shelf sites. HMBFMA attorneys charged that the Port concealed its ability to float the large ships in at high tide. That is, the Port could prolong use of the inner harbor at its current depth by
carefully timing the arriving of large ships to correspond at the highest tides. This option was not revealed in the Port’s brief to federal district court.

Economic Consequences of Dredged Material Disposal Options

Parties reported moderate to serious disagreement about the economic data that was produced. Both sides also felt that the regulatory process should have produced better economic data. Fishermen felt that better data should have been developed to quantify the risks to their industry. Conversely, the Port and the Corps felt that better information could have been developed to show why the deepwater disposal options would be difficult to justify.

For instance, the Corps thought the EIS should have better emphasized the costs of deepwater disposal. Brian Wall, lead Corps staffer observed:

We need to do a better job of presenting how much dredging will cost. Oakland’s Port has a very good benefit to cost ratio. We didn’t point out the precedential effect of going to a deepwater. It’s unfair to other ports to use Oakland’s ratio for whole Bay region. It would be much more expensive to use an off the shelf site over the next 20 years.

Opponents of disposal at B-1 discounted the Corps estimate, and stressed that consequences for recreational and commercial fisheries should have been tallied much more accurately. HMBPMA’s attorney was especially critical, characterizing the quality of information on economic costs of dumping at the B-1 site as "less than not adequate at all."

DFG expressed similar views:

Overall the information gathered about economic costs and consequences was moderately adequate. The Port deserves credit for quantifying dredging costs. But no socioeconomic consequences were considered for the recreational and commercial fisheries near the B-1 site, so there was no way to factor these into the Corps’ cost-benefit analysis.
Safety and Risks of Alternative Sites

Two types of risk were relevant to the selection of a dredge disposal site: navigation-related risk as a consequence of spoil disposal, and risk to local fisheries as a result of dredge disposal. Not suprisingly, opponents and proponents and of dumping at B-1 ranked these risks differently.

The Corps and the Port point out that conventional radar is effective only within a 28 mile radius of Point Bonita, a radar installation within the San Francisco Bay. The Port spokesman argues that going off the shelf brings its own set of pitfalls.

Safety problems are enormous in traveling along one of the most congested channels in the world. 87

DFG agreed that sites beyond the radar surveillance net might be marginally riskier, but faults the Corps for not considering more modern surveillance techniques. "The data on safety and risks was fair at best." 88 EPA and the Pillar Point Harbor District point out that many ships routinely ply waters outside the radar net, and doubt that an incremental increase in ship traffic will lead to increased accidents. 89

The the Port spokesman casts the fishing population in de minimus fashion,

One little group of fishermen is worried about 1 square mile in a 100 square mile area where pure, clean, suitable material is being dumped. 90

Half Moon Bay interests point out that much larger interests are at stake. These include San Mateo County, the Harbor District, and the largely unorganized constituency of fishermen who use Pillar Point Harbor during the peak salmon season.
Opportunities for Affected Groups to Review and Jointly Understand Scientific Information

Parties to the dredge disposal dispute disagreed as to whether the EIS process provided adequate opportunities for affected groups to review and jointly understand scientific information. Choosing the B-1 site late in the process complicated the information exchange process. DFG, CBE, and HMBRMA had their sharpest criticism for data related to B-1.

The Corps spokesman felt that making information public and providing copies of decision documents was an adequate method of joint information review.

Overall the opportunity to review and jointly understand scientific information was good; the information was public. Everyone who wanted the EIS got copies or could look at it.91

The Corps acknowledged dissatisfaction with the data it produced to support designation of the B-1 site. While applicable statutes assign lead responsibility to the Corps for completing studies, the Corps criticized the resource agencies for failing to treat the regulatory process as a collaborative opportunity. The Corps regards fisheries agencies as being principally responsible for assessing impacts on these resources, and observed "NMFS, USFWS, and DFG were not 'real good; they provided opinions with little hard data; they recommended the B-1 site and since changed their minds."59 The Corps also criticized the Half Moon Bay litigants for failing to produce alternative data.

DFG and CBE believe that the Corps should take lead responsibility for characterizing socioeconomic impacts on fisheries, assisted by the Coastal Commission, the DFG, USGWS, the Regional Water Quality Board, and the Bay Conservation and Development Commission.93 EPA reported that the Corps declined offers to use NMFS to sample ocean sites, and failed to tap the expertise of the U.S. Geological Survey with headquarters in nearby Menlo Park.61 Thus, the Corps as the lead agency did not work as effectively as it might have to recruit peer agencies to help synthesize information for the EIS process.
The work of the Technical Review Panel (TRP) represented a potentially useful supplement to the EIS process. The meeting represented a more concentrated effort to review and analyze scientific information. Its purpose, to overcome an impasse between EPA and the Corps about which site ought to be designated, was constructive because it offered some opportunities for joint review of information and face-to-face bargaining.

The constitution of and methods used by the panel however, were flawed. First, the panel was faced with in some cases with significant information gaps and and in other cases with outdated information. For instance, fisheries data considered by the panel was over 10 years old. The panel had no opportunity to close these gaps during the two day life of the panel. Accordingly, there were a large number of issues that the panel did not resolve. Second, the meeting was closed to all but EPA and Army Corps panelists and selected resource agency staff. A lead EPA staffer from the San Francisco office was excluded. Moreover, the meeting’s Ft. Belvoir Virginia venue would have made travel burdensome for representatives of most Bay Area groups. Local interests who had more up-to-date fisheries information had no way to introduce them into the decision making process.

Third, although resource agency speakers may have attempted to advocate the fishermen’s interests, they could not speak for fishermen directly. Since they were not party to the expert deliberations, Half Moon Bay interests lost an opportunity to appreciate the rationale behind the panel’s conclusions. In hindsight, limiting the review to agency staff and existing agency data proved to be an undesirable exclusionary strategy. Fourth, the meeting was held very late in the EIS process, literally days before the Final SEIS was released. Panel members had no opportunity to recommend research that could have closed the data gaps they identified.

Well after the TRP finished its work, important new information was introduced as in the cause of litigation. Half Moon Bay fishermen presented their log books to illustrate the richness of the fishing
grounds off Pillar Point Harbor. DFG's representative cast doubt on the accuracy of both the "Type 1" trawler logs and the "Type 2" personal logs. By law, Type 1 trawler logs must report the type, poundage, and point of landing for landed fish and shellfish to DFG to comply with federal bottom fishing quotas. Type 1 logs, often completed by wholesalers, lack details about where fish are landed. Since many reports were inaccurate, the requirement to specify the location caught has been dropped.

The accuracy of Type 2 logs was also questioned. Since fishermen are not eager to share the location of rich nursery grounds, their logs may be incomplete. Such personal records are sometimes "table top logs" recreated from memory when a fishermen sits down at his kitchen table to catch up with his paperwork. But HMBRMA's attorney counters that while some logs may be reconstructed, they were not made up for the convenience of litigation.

The Corps was predictably critical of both the quality of data produced by fishermen and their refusal to share it:

"They never allowed me to see the log book data. I have commercial and recreational trawl records. That's scientific data. The logs that the fishermen produced shouldn't be considered additional scientific data. Scientific studies shouldn't be relegated to lower position in the media that these fishermen's logs."

It seems clear that a cooler, more illuminating discussion of fishery productivity at the B-1 site could have been accomplished during the preparation of the EIS. Instead, the adversarial nature of litigation that followed caused each side to conceal or refuse to share information.
CONCLUDING OBSERVATIONS ON THIS CASE

The traditional administrative process did not produce a disposal site for Oakland's dredged materials. The Corps SEIS and Record of Decision engendered contentious litigation in both state and federal court. In fact, none of the key parties believe that a solution to the dredging problem is in sight. This case study has traced this failure of the regulatory process to a series of problems related to securing adequate participation, gathering and packaging of adequate information, resolving areas of scientific uncertainty and disagreement, and translating informal negotiated agreements into binding commitments.

The regulatory process did not not succeed in recruiting adequate participation from affected stakeholders. At least three major groups I interviewed—the Half Moon Bay fishermen, the San Francisco-based Citizens for a Better Environment, and the representative of the State Department of Fish and Game—believed that participation in the regulatory process was inadequate. The process broke down when the B-1 site was chosen as the preferred location for Oakland's dredge spoils and the Corps and the Port made what appeared to be de minimus efforts to notify parties in the Half Moon Bay region.

The regulatory process also did not adequately gather and package the information needed to reach a sound decision. My interviews showed that several significant parties believed that portions of the EIS on ecological consequences of dredged material disposal were insufficiently developed. The Department of Fish and Game representative found information on Alcatraz deficient, and suggested that characterizations of the 1-M and B-1 sites were based on inappropriate data. EPA went further, designating the document as inadequate (a lower ranking than insufficient), while the fishermen's legal advocate called ecological information "shockingly bad...as bad as it could get" for the B-1 site. Since all the major statutes that guide dredged material disposal require that ecological impacts must be avoided, the lack of adequate ecological information seriously undermined the ability of the regulatory process to deliver a sound recommendation.
Extensive scientific uncertainty and disagreement remained after the process of regulatory review was complete. Almost all parties I interviewed concurred with the view that serious scientific disagreement persisted after the Final SEIS and Record of Decision were filed. Parties disagreed over ecological impacts, relative costs and benefits of disposal at alternative sites, socioeconomic impacts of dredge disposal on fishery resources, and the safety consequences of choosing a site off the continental shelf.

A rocky relationship between the Corps and its peer agencies is an important basis for these problems with adequacy of information and failure to resolve major areas of scientific disagreement. The Corps criticized the fisheries agencies, and was in turn criticized by EPA and others for failure to develop a solid collaborative relationship that could have promoted better information sharing and joint development of protocols for data collection and analysis.

A blue ribbon panel (the Technical Review Panel) was convened to assist the regulatory process but ultimately failed to deliver the needed scientific information. Perhaps more importantly, the Technical Review Panel did not deliver a consensus of all affected stakeholders, although it brought EPA and the Corps closer to agreement. The membership and methods used by the panel were deficient. Members were drawn from EPA and Corps staff only. Although some fisheries agency staff were invited, my interviews indicate that a local EPA staffer was explicitly excluded. Local interests who had more up to date information on fisheries productivity near the B-1 site had no way to introduce this information into the deliberations of the panel. Moreover, parties excluded from the meeting lost an important opportunity to understand the panel’s deliberations and recommendations.

This case also sheds light on the need to translate informal negotiated agreements into binding commitments. Well before the final SEIS was issued, the Port and the Corps reached an informal agreement with the Pacific Coast Federation of Fishermen’s Associations (PCFFA) to the
effect that the B-1 site was preferred over Alcatraz in the Bay, or the 1-M site near Pacifica. It appears that the dredging proponents incorrectly assumed that by reaching an early informal agreement they had also secured an agreement from PCFFA’s Half Moon Bay membership.

In fact, PCFFA is itself a small organization with two full time members and many volunteers. Communication between PCFFA and their Half Moon Bay counterparts was weak. When the Half Moon Bay fishermen learned that the agencies had chosen the B-1 site for Oakland’s dredge spoils, they objected emphatically. These events underscore the point that while advocates of natural resource protection are often skilled coalition builders, they are not a monolithic interest group. This communication lapse between PCFFA and the Half Moon Bay Fishermen also underscores the critical importance of "selling" an informal agreement back home. That is, it is not enough to have a representative of an organization agree to a negotiated outcome. There must be a mechanism in place to ensure that representatives check with their constituency and to enable them to deliver on pledges to support negotiated agreements. Otherwise, it is extremely difficult to bind parties to their informal agreements.

As judged against the goal of designating a suitable site for dredge spoil, the regulatory process has failed. Yet, in some ways, parties did better than they often do in contentious resource disputes. The Corps was flexible, up to a point, in considering alternative disposal site. Environmentalists were willing to negotiate and identify suitable compromise sites. Moreover the Corps was willing to sit down with EPA using the mechanism of the Technical Review Panel. These represent marginal improvements over traditional methods of site selection, but they were just not sufficient to achieve the goal.

**Implications of Breakdown in the Regulatory Process**

The failure of the regulatory process to produce a suitable site for Oakland’s dredged materials has far-reaching implications. A March, 1989 news account stated:
The Port of Oakland, once hailed as a trend-setting leader among the world’s container ports, now faces a host of problems that could cost it millions of dollars in lost business with the Pacific Rim. At a time when Pacific Rim trade is growing, the port has sustained a sharp decline in its share of the lucrative West Coast container business. Its net income is down and it faces serious environmental challenges to its plans for dredging to accommodate today’s larger ships.98

An expert interviewed for the Chronicle story asserted:

In recent years Oakland has developed a reputation for being asleep at the switch...their lack of attention to the dredging problem has been bewildering."99

A political scientist who has studied the shipping industry noted,

[I]f dredging is blocked by fishermen and environmentalists, the "port’s entire market strategy (to lure more Pacific Rim trade) will sink in the mud."100

Although not all of the Port’s problems revolve around the dredging issue, it is clear that failure to secure a dredging site can only exacerbate a shaky financial picture. Oakland’s share of West Coast container cargo has declined from 47.6% in 1971 to 16.8% in 1988. Net income taken in by the port has fallen by 43 percent since 1985. The port has the highest ratio of debts to equity of any major container port on the West Coast. Port spokesman Mel Wax asserted:101

[T]housands of jobs and millions of dollars will be lost to the Bay Area if the Port of Oakland is unable to provide deep water access to the shipping industry.102

The implications of the Oakland case extend far beyond the Bay Area. Close to two-thirds of the nation’s port authorities predict that they will run into trouble when they seek their next major round of regulatory permits.103 Even if the Port of Oakland was less than diligent in using the regulatory process and the Corps was not fully efficient in its interpretation of statutory responsibility, the Port did spend close to a decade seeking a disposal site for dredged material. It is apparent that significant adjustments to the traditional process may be needed if the nation’s ports are to complete the dredging they need to maintain their competitive position in a manner that protects productive marine resources.
Supplements to the Traditional Regulatory Process Explored in Interviews with Parties

Could these problems that arose in the traditional regulatory process have been avoided? In the following discussion, I summarize how several forms of neutral assistance may have helped avoid or overcome the deadlocks that emerged. This discussion is based on my interviews with the parties. I used an interview guide, consisting of both open-ended and close-ended questions, to structure my conversations with participants in the Oakland dispute. The interview guide addressed respondents' views on the urgency of dredging, the adequacy of information, handling scientific disagreement and uncertainty, and the adequacy of participation in the regulatory process. A fourth portion of the interview guide investigated parties' willingness to negotiate an informal written agreement. The following discussion of possible alternatives and supplements to the regulatory process is based on specific responses I received in my interview with the parties.

Prospects for a Joint Effort to Review Information or Frame a Research Agenda

One portion of the survey instrument touched on the use of a supplemental process to jointly review technical information. Interviewees were asked to respond to this statement:

a supplemental effort to give parties a chance to jointly present and review scientific information would have helped resolve this issue.104

Interviewees were also asked to respond to this statement:

Parties in this case should have a chance to jointly devised a research agenda that would help address questions that can't be answered with existing information.105
Respondents were prompted with this followup:

Topics to be addressed in such a research agenda might include: a synthesis of information on Half Moon Bay fisheries, evaluation of the safety issues involved in moving dredge materials to off-the-continental shelf dump sites.  

Environmentalists and fisheries interests were relatively more enthusiastic of about the prospects for joint review and consideration of relevant information than the Ports or the Corps. In my interviews, Koehler was "intrigued" with jointly inventing a research agenda to address unanswered questions.  

The Corps portrays the job of studying off-the-shelf sites as so onerous that the press will view the fishermen and environmentalists as irrational extremists.

DFG believed such an effort could help guide an evaluation of the oceanographic characteristics of a potential off-the-shelf site.

We don’t have to do much fisheries work if we go into deep water (1000 fathoms), but oceanographic research is needed. I don’t want to see specific studies that would delay Oakland’s ability to dredge without providing useful information. Why conduct a study if it’s not ultimately going to be useful?  

The Corps criticized the idea of providing additional opportunities for parties to jointly review technical information. "It would not have helped. The parties can’t agree on anything." The Corps equated a joint fact-finding effort with letting each party dictate a research agenda.

It could be very expensive to do every study that everyone wants to do. I’m not sure how open the process should be, but at least representatives of all interests should be involved.

Prospects for Negotiated Settlements and Involvement of Neutrals to Facilitate or Mediate an Agreement

In my interviews, I also tried to ascertain the willingness of parties to engage in informal negotiation, and to learn whether parties believed a team of neutral facilitators or mediators would be helpful. Interviewees were asked to respond to this statement:
Some observers suggest that it may have been or still may be useful to bring parties together and negotiate an informal written agreement that could then be translated into a formal document.110

Additionally, respondents were asked which groups were most willing to negotiate an informal agreement and which groups were least willing to take part in informal negotiation. Participants were asked why they believed specific groups be willing to come to the table. Then, they were asked why some groups would not come to the table. Respondents were prompted with several possible reasons: parties lack the resources to participate on an equal footing; they are unwilling to share their own agency responsibility; parties prefer to let the agencies decide; parties would rather litigate until they win; or they believed a negotiated outcome would be too expensive. I also asked for responses to this statement:

A team of neutral mediators/or facilitators would have helped/would help resolve this issue.111

Most respondents believed that the disposal of the first 500,000 cubic yards will be adjudicated in an "all or nothing" fashion, since both sides are willing to litigate until they win. Koehler stressed that the HMBFMA would not budge in their opposition to dumping the first 500,000 cubic yards off Half Moon Bay, since her clients are concerned with both precedent and momentum.112

On the narrow question of disposal of the first 500,000 cubic yards of dredged material, respondents forecast that the Half Moon Bay interests had little incentive to negotiate, since they appear to be prevailing in court. However, the longer term disposal of the 6.5 million cubic yards may be a fruitful subject for negotiation. Based on responses to specific interview questions, there is evidence that fishermen are willing to negotiate, as are state and federal resource agencies, CBE, and other environmentalists, and the Port.113
Port and the DFG staff were relatively optimistic about prospects for a negotiated settlement over the disposal of the 6.5 million cubic yards. Wax commented that the Port "is open to anything that will let us get on with our channel deepening." Despite this expression of interest, the case has been hurt by miscommunication. The San Francisco-based environmental groups abandoned their support for B-1 once the opposition of the Half Moon Bay groups emerged. The Port distrusts the ability of the environmental community to deliver on negotiated commitments.¹¹⁴

The environmental groups already made one 180 degree turn. Who's to say if we go off the shelf that the guardians of the Pt. Reyes-Farallons Marine Sanctuary won't get up in arms? And what about the Save the Whale people? The barge would have to pass through a known Gray Whale migration corridor. Similarly, the Corps commented that the NEPA process was going along just fine, the Corps observed, until the introduction of another party—the Half Moon Bay fishermen.

The Port spokesman added:

We came to a solution with environmental groups and it unraveled. This boils down to a dispute involving one commercial use versus another. My basic feeling is that the B-1 site is not owned by the fishermen; if there is an owner it is the public or the government. We should choose the option that most benefits the national economy. That's not something that can be easily negotiated.¹¹⁵

Respondents differ as to the Corps' willingness to negotiate a solution. NMFS's attorney and CBE characterize the Corps as "very resistant" to considering a new site off the continental shelf. However, the Corps representative indicated that the agency is willing to consider such a site and is gearing up for the requisite two-to-three year study. DFG observed:

The local Corps staff are willing to consider anything under the regulations. But they've been burned by the courts and won't take on new site unless they get a guarantee that they won't be burned again.¹¹⁶
DFG staff observed that parties took rigid positions that needed to be disentangled.

Now the dispute is between the fishing industry and the Port and the Corps. HMB fishermen claims that dumping at B-1 will destroy their livelihood. The Port and the Corps says that the consequences won’t be that severe. DFG sees that the truth lies in between. There is also disagreement about the effect of the inference of toxics on the marketability of the fish. Both sides are taking pretty extreme positions. It’s all or nothing in the regulatory process.¹¹⁷

DFG staff forecast that other parties would be willing negotiators, although they have so far taken rigid positions. The basis for this prediction appears to be that face to face negotiations would open up opportunities to redefine the dredging problem and present useful tradeoffs.

Fishermen are willing to negotiate as they would see a compromise of an off the shelf site as victory for them. The Port would be willing to compromise because they have a profit margin to work with. Environmentalists are willing because a compromise agreement could minimize potential impacts. Most parties would be willing to negotiate because they feel they have something to win.¹¹⁸

The Corps is pessimistic about prospects for a negotiated agreement. DFG’s representative observed that the Corps is least willing to negotiate. The Corps spokesman was "unsure" about the overall willingness of groups to sit down and negotiate and was doubtful that the requisite level of mutual trust and sincerity existed. "Basically, no one is willing to negotiate. However, the NEPA process is a form of negotiation."¹¹⁹

Some parties favored the involvement of a nonpartisan mediator to assist the group. EPA’s staffer observed:

A team of neutrals would have helped. There is definitely room for a mediation group to come in and help. We’ve got to find some kind of solution to this problem.
DFG believes that facilitation or mediation might be worth trying, although the chances of failure are fairly high. 120

The dispute "is so convoluted by now that it’s difficult to unravel." Intervention would be more useful with respect to related to evaluating an off the shelf alternative and making long range plans. 121

The Corps spokesman observed: "at this stage, I don’t see what could be compromised; we can’t commit to dumping at a site we we haven’t studied." Similarly, the Port observed: "no one can figure out how to shorten the mandatory timeline, much as they’d like to try." 122

California Environmental Trust Intervention

The California Environmental Trust, headed by Joseph Bodovitz (the former Executive Director of two major coastal agencies in California) was approached by representatives of the Port of Oakland and by representatives of Bay Area environmental groups (including the Citizens for a Better Environment and and the Oceanic Society) to provide neutral assistance. In June, 1988, Bodovitz convened a meeting in the Board Room at the San Francisco Foundation in downtown San Francisco. This venue was chosen for two reasons: it was perceived as "neutral territory", and it was conveniently located to public transportation. 123

Bodovitz recruited his colleague Melvin Lane (formerly Chairman of the California Coastal Commission) to run the meeting. Bodovitz did not regard the meeting as a negotiating session. Rather, in Bodovitz’ view the principal objectives were to provide a forum to "let everyone hear everyone else’s version of where we were and how we got there" with regard to the dredged material dispute. 124
Invited participants included all the dredging proponents, major environmental agencies, and private groups. They included the Port, the Army Corps, EPA, the Half Moon Bay Fishermen, state and federal fisheries agencies, several Bay environmental groups (including Citizens for a Better Environment and the Oceanic Society), the San Mateo County Counsel. Also present were representatives of five Bay Area Congressional representatives (Nancy Pelosi, Barbara Boxer, Ronald Dellums, George Miller, and Thomas Lantos). According to Bodovitz, the meeting was open to the press, and "everyone was on good behavior."\[125\]

The most vocal groups were the Port, which reinforced the urgency of finding a disposal site for the first 500,000 cubic yards, and Attorney Beers representing the Half Moon Bay fishermen. Beers restated their concerns about disruption of fishing, possible toxic impacts, and the precedential implications of dumping the first major load of sediment near Half Moon Bay. The environmental groups, according to Bodovitz, were more circumspect "because everyone pretty much knew what their concerns were."\[126\]

The meeting had several conclusions. The Port made clear that it would seek an alternative site in the Sacramento-San Joaquin River Delta to dispose of the first 500,000 cubic yards of sediment. The Corps and EPA expressed their plans to begin organizing the studies needed to investigate a deepwater disposal site. Bodovitz was asked to meet individually with the parties to "probe issues and opportunities that people may not have wanted to advertise". Bodovitz did complete the follow up steps in the late summer of 1988, but then "suspended" activity for several reasons. There was a desire on the part of the assembled group not to interfere with the Port's efforts to secure a disposal site in the Delta, and additional uncertainty that arose after shake ups in the top leadership of the Port. Bodovitz has not convened another meeting since June, 1988.\[127\]
Other Observations: Extrapolation from Interviews

The willingness of parties to engage the California Environmental Trust, together with the results of my structured interviews suggest a number of possible roles that neutrals may have may (or may still fulfill) in this dispute. These roles may include help in joint fact-finding; recruiting participation; and developing contingent agreements through shuttle diplomacy.

Neutrals could help recruit agencies to coordinate sample designs, research agendas, and data synthesis. A related task might have been to organize joint fact-finding sessions at which parties to the dispute have an opportunity to jointly review and consider relevant information. In this regard, a neutral could help organize a resource pool of experts jointly available to all sides to clarify and reduce areas of scientific disagreement. Alternately, a team of neutral scientists could be recruited to serve as an expert to help answer specific questions. Clearly, joint information review or jointly developing a research agenda does not mean than every participant gets everything they want. A mediator could help parties lay down realistic groundrules for shaping a consensus on a research agenda.

The Corps could have used help in recruiting and sustaining participation of affected organizations. The Corps complaints about being sandbagged could have been avoided by a more aggressive effort to identify the affected stakeholders. Second, a facilitation team could have organized and run joint negotiation sessions between dredging proponents, natural resource agencies, and environmentalists. It seems clear that although there were obstacles to negotiation, the overall willingness of the parties to negotiate was high.
Another possible form of neutral intervention may be to serve as an active mediator, perhaps shuttling among the parties to develop proposals that could be endorsed by all sides. In fact, there may be opportunities to link the timelines of two or more regulatory processes. For example, the documentation and public review required for a "Section 102" sites could be linked with those required for "Section 103" sites to serve both the short term needs of both the Port of Oakland and the long term disposal needs for other ports in San Francisco Bay.\textsuperscript{128} An active mediator could make possible such innovations by helping parties see where their common interests lie. A mediator could help parties fashion contingent agreements. For example, parties might agree if expert \( a \) is retained to conduct study \( b \) which shows result \( c \), then we'll agree to support actions \( x \) and \( y \). Alternatively, a mediator could help parties develop guarantees coupled with compensation formulas to protect the interests of environmental groups and fishermen.

Apart from the speculative advantages of dispute resolution techniques to this case, there are several hopeful signs that the Corps of Engineers, a major player in such disputes, might adopt a more aggressive posture towards the use of mediation and and other dispute resolution techniques. Priscolli (1987) documented the use of facilitation and mediation in Section 404 general permit decisions in Sanibel Island and Vicksburg, and Sobel (1988) documented opportunities for greater use of ADR by the Corps. Similarly, Hall (1986) documented the use of negotiation techniques in resolving other matters under the Corps jurisdiction.

Dispute resolution is receiving favorable attention in Corps headquarters. An internal Corps Guidance Letter titled "Use of ADR in Regulatory Actions" circulated in 1987 encourages the use of dispute resolution techniques.\textsuperscript{129} Les Edelman, the Chief Counsel had spoken favorably on the use of dispute resolution techniques.\textsuperscript{130}
According to Charles Lancaster, a Deputy Consel for the Corps of Engineers specializing in alternative dispute resolution (ADR), although the Corps has no formal across-the-board policy on use of ADR, there are several important efforts underway in 1989.\textsuperscript{131} Perhaps the most important initiative is a two-year program funded at the level of $300,000 to promote greater use of ADR techniques within the organization. The program has three components: 1) training programs for senior executives; 2) a networking effort to give field assistance to district Corps offices and put them in touch with sources of mediation expertise; 3) a research and evaluation component to share "success stories" on fruitful uses of ADR in Corps projects. Additionally, the Corps is producing a series of pamphlets to acquaint staff with ADR techniques. The stated objectives of these efforts are to internalize ADR techniques as part of the Corps culture.\textsuperscript{132}

This chapter has attempted to reveal some of the causes and consequences of the breakdown in the regulatory process with particular emphasis on shortcomings in securing adequate participation and recruitment and use of scientific information. The summary of my interviews revealed that parties have a generally favorable view of the potential value of assisted negotiation to help in this case, and indicated some possible roles that neutrals might play. These findings will inform the discussion of the New York Bight Initiative in Chapter 6.
CHAPTER FOUR
STRENGTHS AND WEAKNESSES OF A COURT-APPOINTED SPECIAL MASTER FOR RESOLVING SCIENCE INTENSIVE MARINE RESOURCE CONFLICTS: THE BOSTON HARBOR CASE STUDY

Introduction

This chapter examines the strengths and weaknesses of a court-appointed special master to settle technically complex disputes regarding environmental resource allocation. I have used a case involving complex litigation over the clean up of Boston Harbor. The chapter begins with a brief overview of the mechanism of the special master and its role in resolving complex litigation, drawing from a review of the key literature. Then, the Boston Harbor case study is presented.

The case study, drawing on interviews with parties to the litigation and a review of documents, begins with an overview of the problem context, a summary of previous efforts to correct water quality problems in Boston Harbor, and an overview of the litigation and negotiation. I next examine what roles the Master played, with special attention to joint review of technical information. The chapter concludes by evaluating the work of the special master, drawing from previously published post hoc analyses together with a synthesis of interviews and literature review.

COURT-APPOINTED MASTERS

Several authors have written about the use of special masters, although few have focused specifically on their role in resolving-science intensive disputes. Brazil (1983, 1986), Goldberg (1985), McGovern (1986), Susskind (1985, 1987), Lewis (1988), and Tractenberg (1988) have raised important issues. Brazil (1986) defines a special master as a private attorney, law professor, or retired judge appointed with or without the parties’ consent to assist the adjudicative process. Non-lawyers who are skilled in negotiation and mediation are also sometimes appointed as masters (Susskind, 1985). Special masters are appointed as private citizens (as opposed to full-time court employees) to serve on an ad hoc, case-specific basis. As described in Levine (1984)
and Brazil (1983), there are several legal bases for the appointment for such masters including rule 53 of the Federal Rules of Civil Procedure and analogous provisions in most state rules of civil procedure.

Three major problems facing the courts have motivated the appointment of special masters: judicial limitations, shortcomings of the traditional adjudicatory system, and shortcomings of counsel and their clients. McGovern (1986) presents evidence of judicial system overload with overworked judges, attorneys compelled to make unjustified demands, and parties paying for costly, slower and less wise decisions. Among the most important judicial constraints is lack of expertise in areas of science and technology. Oakes (1977) cites Judge Bazelon's argument that "substantive review of mathematical and scientific evidence by technically illiterate judges is dangerously unreliable."\(^1\) Lack of skill in the facilitation of settlement negotiations is another important judicial constraint. Brazil identifies the adversary nature of the traditional adjudicatory process as still another reason for the appointment of special masters. The formal nature of both pre-trial discovery and pleadings can block substantive communication. Those who resort to litigation, argues Brazil, may also behave inappropriately. Parties in complex litigation may proffer masses of irrelevant information. Misunderstanding and distrust may serve to insulate parties rather than getting to the bottom of their disagreements.

Special masters are appointed by courts to circumvent these obstacles. McGovern (1986) reports that the above-mentioned factors led to his appointment as a special master in five cases over a span of three years. The presiding judge believed each case was complex and likely to require a lengthy trial, yet appeared to him to be amenable to settlement. Moreover, he was convinced that the case would consume more time and substantive expertise than he could bring to bear.

Brazil (1983, 1986), Goldberg (1985), Susskind (1985), and McGovern (1986) and have identified several roles that a master might play, spanning case development (including discovery), assisting parties with settlement, and administration of damages. The more narrow, traditional
roles of masters are ministerial in nature, including accounting, calculation of damages using court-approved formulae, and the administration of funds (Brazil, 1986).

More recent, interventionist roles for masters often combine fact-finding, invention of options, and working to overcome barriers to implementation of agreements (Goldberg, 1985; Susskind, 1985). Some masters have provided expert legal advice to the appointing judge both in screening documents in the discovery phase and in later phases of negotiation (Brazil, 1986; McGovern, 1986). Still other masters have taken on quasi-arbitrator tasks (Goldberg, 1985). The contributions of special masters in several complex cases involving public health and environmental management questions are briefly described below.

Professor Francis McGovern played multiple roles to develop an Alabama case involving 4,000 claimants, alleging DDT injuries against users and manufacturers of DDT (McGovern, 1986; Brazil, 1986). As master, McGovern served as a "court of first resort" for discovery. His "first track" duty was to choose 20 representative cases to probe the basis for common legal issues such as causation and standards of care. In his "second track" he designed an innovative system to streamline the acquisition of basic factual information from the claimants. He encouraged opposing counsel to work jointly to design a suitable questionnaire, and trained assistants to gather the information in personal interviews. (Counsel were excluded although parties could have other observers present to spot deviations from standard procedures.) The questionnaire and interviews worked so well that 2,500 cases were screened out and all parties agreed to use the method to evaluate future claims. In his "third track" role McGovern screened pre-trial motions and, with the parties knowledge, submitted memoranda to the judge on legal issues.

In the Ohio Asbestos Litigation (IAL), a mass torts case, special masters Eric Green and Francis McGovern played an important role in streamlining case development (McGovern, 1986; Brazil, 1986). Using a data collection protocol, the masters hired neutral third parties to
gather data for each completely resolved case, organized around 300 variables that could have affected the valuation of individual asbestos cases. These data were entered into a computer for analysis. Next, the masters developed a case matching system to enable users to identify which settled cases most closely matched the claims they were litigating. Parties met in conference to consider the values identified by the matching system. Results from this system were positive: all 112 cases were settled within 27 months of the implementation of the plan.

In Alabama, the state Supreme Court found that parties in utility ratemaking cases presented only that economic and accounting evidence that reinforced their political positions (Brazil, 1986). The parties rarely came to agreement on the data, and the court felt it was not receiving data from the center of the evidence spectrum. Since parties had invested substantial capital to prepare and present their cases, appointment of a neutral expert to decide on the evidence was not a feasible option. The Supreme Court asked Professor McGovern to create incentives for the parties to present clear and comprehensive testimony in the center of the evidence spectrum, and then join issue on that evidence. He drafted rule 33A to govern the use of an appellate expert in the ratemaking case. The theory was that the expert’s mere presence would encourage parties to present more digestible information and alter their testimony to make it more clear and comprehensive. The rule was accepted in large part for two reasons: parties with a stake in the issue had a hand in reviewing early drafts, and the expert’s function was sharply constrained.

Despite the important literature on special masters, relatively little has been written on the role of masters or the techniques they should use to settle complex disputes of a science-intensive nature. Lewis (1988) offers very general advice as to whether a court-appointed master should be an expert in the subject matter at hand. He argues that the master must "be a process expert" and "must be able to help all parties to understand the discussions taking place". Tractenburg (1988) reports that a panel convened at Center for Public Dispute Resolution discussed a master’s authority to employ experts and staff, endorsing the notion of a
mediation team. The panel found that special masters functioning as mediators need three types of skills: subject matter expertise, mediation/settlement skills, and legal/judicial process skills.

The Michigan fishing rights case described by McGovern (1986) is one of a handful of cases involving special masters where efforts to handle scientific and technical questions are explicitly documented. After the Department of Interior ceased regulating Great Lakes fishing, this left the Ottawa and Chippewa peoples to compete unregulated, resulting in significant resource depletion and violence among competing users. The tribes brought suit. The case was politically volatile; the named parties to the litigation involved almost all citizens of Michigan. The tribes, the state, and the federal government each put forward data to bolster their case and sought to undermine the credibility of the other parties' scientists and data. Judge Richard Enslen, recognizing that parties were intensely hostile, and litigation would require vast amounts of economic and scientific data, appointed Professor Frances McGovern as a master to prepare the case for trial and assist settlement efforts.

The initial conception was that the master would meet with parties ex parte, receive their recommended or proposed allocation plans, and recommend a final allocation plan. Instead, he shifted the focus to assist parties to work collaboratively to develop their own alternate allocation plans. The master teamed with the Harvard Program on Negotiation to develop a scorable game to mimic the actual dispute. He worked to identify parties' fundamental interests and get parties to broaden their vision to seek ways to create net gains for both sides. Resource allocation was narrowed to five variables: species of fish, quantity of fish, fishing gear, geography, and time. Parties were asked to prepare management plans that addressed the parties' priorities for each issue, and thus represented a package of options.

Some thought was given to appointing an expert to resolve the disagreement about the quality of information each side had brought to the litigation. Instead, a tripartite group of biologists from the tribes (the Chippewa/Ottawa Treaty Fishery Management Authority), the state
(Fisheries Division of the Michigan Department of Natural Resources), and
the federal government (Great Lakes Fishery Laboratory of the United
States Fish and Wildlife Service) agreed to pool their data.

The biologists were asked to develop a joint computer model of the
five critical variables, assisted by a neutral expert in modeling. With
the data pooled and a team assembled, each suggested management plan was
analyzed to determine the effects on each of the five critical variables.
In this way, the experts cooperated in developing consensus
recommendations using shared information. Negotiations over building
the model quickly revealed that the biologists agreed in several important
areas. Only in areas of massive uncertainty or where basic policy choices
were raised did they disagree. After three weeks of negotiation, the
parties reached a settlement, four weeks before the scheduled trial.
After one tribe overruled its negotiator and voted to litigate, the Judge
ultimately ruled in favor of the negotiated outcome.

Strengths and Weaknesses of Special Masters

Several authors (Brazil, 1983; Susskind, 1985) have summarized the
broad strengths of the special master approach. Discovery phase
delegation to masters may yield several benefits. Decisions may be of
higher quality based on familiarity with the circumstances. A master’s
understanding may contribute to more consistent rulings. A knowledgeable
master, suggests Brazil, is better able to suggest cost-effective methods
for sharing information. Brazil suggests that the presence of a master as
a sophisticated neutral party can restrain counsel’s tendency towards
posturing and exaggeration. A master who obtains detailed knowledge about
a complex case can be a valuable asset to the court during discovery.
Such masters may be able to assist the court in understanding the
technical dimensions of the evidence. Susskind (1985) points out that
masters, rather than imposing solutions, can help parties jointly invent
options that integrate multiple objectives.
Potential drawbacks of the use of masters have also been identified. Special masters, cautioned Brazil (1983), may cause parties to lose control over their case, particularly where masters have great discretion. Rubin (1980), although not writing specifically about masters, expressed concern that "bureaucratization" of the legal system could stifle due process and undermine procedural safeguards that protect fairness. Brazil (1983) identified other risks inherent in referring cases to special masters. Masters, attracted by other lucrative work, may not schedule timely hearings. Without judicial trappings (robe, rostrum, gavel), masters may be accorded less respect that judges receive. Assignment of multiple masters in exceptionally complex cases might lead litigants to play one off against another. Although any of these developments could pose real problems, there is little evidence to suggest that such problems have materialized in actual cases.

The foregoing discussion shows that increasingly broader functions are being delegated to masters. Masters are now cast as organizers of fact-finding processes and mediators of complex disputes. These roles have important implications for environmental policy. In complex environmental litigation, the appointment of a special master can help parties and the presiding judge break a courtroom deadlock. The cases also suggest that masters can take steps to reduce cases to their key elements. A special master can provide information that the judge may lack to review and summarize technical information. Based on such an assessment, a master can identify possible remedies. Moreover, a master can suggest allocating responsibility for implementation in a way that integrates the interests of both sides. In some cases, as in the Michigan fishing rights dispute, a master functioning as a mediator can defuse litigation that rises to the level of a major political battle. The result is often a more timely, better-informed outcome.
Despite these success stories, several issues related to the appointment and conduct of special masters remain very much in debate. One cluster of issues concerns the role of a special master. Initially, the role of the master is set by the court's order of reference. Analysts disagree as to how strict or narrow a master's order of reference should be. Brazil (1983) suggested that an order of reference should precisely describe the master's assigned tasks, list deadlines for task completion, circumscribe the master's authority to exercise discipline, spell out the procedures for appeal review of rulings, summarize the standards the court will use when rulings are appealed, and explain the system through which the master must make status reports to the court. Goldberg (1985) took a contrary view, arguing that at least when masters act as mediators, an absence of procedural direction is important because the mediator does not know what approach will be conducive to settlement.

A related consideration in discussing a master's role concerns the merits of a "mixed assignment" which includes overseeing both fact finding and assisting with the mediation of a dispute versus a "pure" assignment that includes only mediation, or only fact finding, or only providing recommendations. Among practitioners experienced with the special master approach, Tractenburg (1988) reported some support for the "pure" role but a more pragmatic view was that masters should appropriately have a mix of functions. Goldberg (1985) argued that a master's role must necessarily evolve with the case, and cites examples in which his mediation role translated into a quasi-arbitrator role in which he suggested settlements after he had won the trust of the parties.
A second cluster of issues concerns how the special master should best acquire, package and communicate information relevant to a case. One dimension of this issue is the nature of communication with the parties and the court. Lewis (1988) suggests that if the special master makes recommendations to the court, then parties deserve an opportunity to comment on the report and examine its findings. Tractenburg found broad support for some ex parte communication as an essential feature of shuttle diplomacy. (Used in this sense, ex parte communications are off the record contacts between the master and parties to litigation.) However, he cautions that parties may be less forthcoming if they sense the master is communicating with the court.

A second critical dimension of this question is how the master should bring expertise to bear on a case. The suggestion that a master be expert in the subject matter, the legal procedure and mediation is useful general advice, but is not very prescriptive. Should a master serve as the principal substantive expert? Alternately, should a master be expected to recruit experts to decide which side’s expert is right? Or, should a master try to get opposing experts to work together, as in the fishing rights case? Still another option would be for a master to design an ongoing system to gather and synthesize information. Each of these questions will be examined in the following case which discusses cleanup of Boston Harbor.
Problem Context: Boston Harbor's Water Quality Problems

Boston Harbor (Figure 4.1) has an unfortunate but well-deserved reputation as one of the dirtiest urban estuaries in the world. On an average day in the 1980's, 450 million gallons of wastewater and 100,000 pounds of sludge entered the harbor. The Metropolitan District Commission (MDC) operated the antiquated sewage system which served forty-three communities in the Boston region. In the City of Boston, accounting for 30% of sewage treated by the MDC, over seventy percent of Boston's sewer pipelines in use in 1980 were installed before 1900. During the 1960s and 1970s, the MDC's reputation as a wasteful agency led the legislature to cut the Commission's budget. The result was deferred maintenance on already-aging facilities.

Treatment facilities at Deer Island and Nut Island in Boston Harbor serve metropolitan Boston. Both plants provide only primary treatment: solids and floating grease are removed, but nutrients remained. Sewage flows have exceeded the capacity of Deer Island for many years, causing sewage to be shunted to a third facility at Moon Island and discharged without treatment. Bottom sludge is drawn off from settling tanks and digested. But after chlorination, sewage effluent and digested sludge are discharged through submerged outfalls into Boston Harbor. A significant portion of the sewage receives no treatment. Storm conditions, design flaws, and operational breakdowns together contribute to substantial overflow of untreated sewage into the harbor. Because stormwater and wastewater treatment are combined, sewage overflows into the harbor at more than 100 different points on rainy days. Additionally, sewage discharged into the harbor's tributaries—the Mystic, Neponset, Charles, and Rivers—has an impact on the harbor's water quality (Dolin, 1989b).

Domestic wastes introduce excessive nutrients, stimulating algal growth. When algae die and decompose, they deplete dissolved oxygen. This reduced dissolved oxygen in turn impairs the productivity of harbor waters for fish and other biota. Algal blooms also cause visual and olfactory problems.
Nutrients and low dissolved oxygen are not the only problems with harbor water quality. High bacterial counts—partly the result of discharge of untreated sewage—may cause problems. Outbreaks of hepatitis and gastroenteritis have been associated with contaminated shellfish taken from the harbor. Concern about disease carried by viruses and bacteria present in domestic wastes had led to beach closings and restrictions on shellfishing. Of 4,600 acres of shellfish beds, 1,826 acres are closed on a given day. The economic loss of shellfish beds closures was calculated at $1.5 million during 1988.

The harbor is a major recreational resource for metropolitan Boston. Roughly 160,000 visitors each year use the thirty three beaches ringing the harbor, and another 150,000 visitors use the Harbor Islands. But the safety and the recreational and aesthetic values of these beaches are impaired by floating feces, tampon applicators, and other floatables. High bacterial counts led to closure of public beaches on many occasions. The MDC reports the number and duration of closures at each beach during the summer bathing season. A tally of these closures shows that in 1988 there were 106 "closed beach days", mostly when combined sewers discharged waste into the Harbor during rainy periods.

Toxic chemicals and heavy metals are another key of harbor pollution (Hoffman, 1986). Industrial wastes are commonly found in sewage, since many industries are allowed to discharge their wastes, directly after pretreatment, directly into sewage pipes. Some proportion of these wastes pass through sewage treatment plants largely unaltered. Other sources of toxic wastes and heavy metals include direct industry discharges, runoff, and fallout of airborne contaminants. A 1987 study by Greenpeace asserted that more than 3900 pounds of toxic pollutants enter the harbor daily. One scientist asserts that "[t]he limited data on organic contaminants establish Boston Harbor as one of the most grossly polluted contaminated estuaries in the world". When discussing the fate of industrial pollutants in the marine environment, scientists speak of these contaminants being "partitioned into different compartments"—in this case the waters, sediment, and biota of Boston Harbor. Some pollutants remain dissolved; others becomes adsorbed to sediments. In fact, high levels of
toxics have been documented in the waters, bottoms silts, and tissues of organisms inhabiting the harbor. Among the more persistent compounds, polychlorinated biphenyls (PCBs) have been found in elevated levels in the flesh of flounder, lobster, and soft-shelled clams in the harbor. 17

Although it is difficult to trace biological effects to specific contaminants due to the synergistic interaction of multiple contaminants and disease, 18 it is clear that contaminants present in sewage and combined sewer overflow are causing serious impacts on biota. Pin rot and cancerous tumors are widespread in the bottom-dwelling winter flounder that inhabit the harbor. 19 A 1988 health advisory issued by the Massachusetts Department of Public Health, citing studies indicating that seafood in the harbor was contaminated, recommended that pregnant women and children under 12 should avoid eating lobster, flounder, clams, and other bivalves caught in the harbor. 20

**HISTORICAL BACKGROUND ON BOSTON HARBOR CLEANUP EFFORT**

Despite the fact that problems with Boston Harbor persisted well into the late 1980's, efforts to deal with the Harbor's poor water quality had been on the Commonwealth's political agenda for at least 75 years. Several authors including Kolb (1980), Haar (1984), Doneski (1985), Dumanowski (1985), Little (1985) and Dolin (1989a, 1989b) have traced portions of the history of attempts to clean up Boston Harbor. During the early years, the Harbor was treated more as a sink for waste than a water body in need of protection, maintenance, and restoration. In 1820, Boston residents were first allowed to dispose of human wastes in the city's storm sewers which carried rain and snow melt to the shoreline of the harbor. 21
Three separate sewage systems were built to serve Boston and the surrounding communities between 1876 and 1904 (Dolin 1989a, Kolb, 1980). The Boston Main System, completed in 1884, collected sewage from Boston and conveyed it to Moon Island where it was discharged in the Harbor, untreated, to take advantage of outgoing tides. By 1894, the northern Metropolitan Sewerage system was completed to collect sewage from communities north of the Charles River. Sewage was transported to Deer Island where solids were screened and the remaining sewage was discharged into the Harbor. A parallel system was created in 1904 to collect sewage to the south of Boston, and discharge screened wastes off Nut Island. To build, maintain, and operate these systems, the state established the Metropolitan Sewerage District in 1899. By 1919 these duties were given to the newly-created Metropolitan District Commission (MDC).22

The volume of waste discharged into the harbor grew in proportion with the population. Pollution motivated no less than six investigations of the harbor between 1900 and 1939. A 1915 report found that

the sanitary condition of South Bay [a part of the inner harbor] has always been a grievance with the people living around it; protests against odors and alarms concerning its dangers to the public health have bombarded the ears of legislation for three quarters of a century; and there has hardly been a year since 1837 that some committee, commission or board has not investigated its condition and reported remedial plans to the legislature.23

A 1931 Senate report found "notable evidence of pollution... in the Inner Harbor...[and that] the general condition of the Harbor waters...[has shown] a gradual but very slight deterioration in recent years.24 Another Special Commission, whose findings were published in 1930

was repeatedly told [during hearings] that conditions in the Boston Harbor are revolting to the esthetic sensibilities and violate all public health requirements. ...when mothers, physicians, and health officers—all of whom testified before us—believe disease can be traced to polluted water, then steps must be taken to stop pollution. We are aware of the opinion the public is entitled to correction of this nuisance.25

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A 1939 "Report of the Special Commission Investigating Systems of Sewerage and Sewage Disposal in the North and South Metropolitan Sewerage Districts of the City of Boston" recommended that treatment works be constructed on Deer, Nut, and Moon Islands. In 1952 and 1968 respectively, sewage treatment plants were built on Nut and Deer Islands. The Nut Island plant was built to handle an average flow of 112 million gallons per day and a peak flow of 300 mgd. Plant effluent is normally discharged through two outfalls, but in times of peak flow, two additional outfalls may be used. The Deer Island plant was originally slated for completion in 1958, then 1965, and 1968. The plant, with an average capacity of 343 mgd and a peak flow of 848 mgd, normally discharges through two outfalls equipped with diffusers. Three other outfalls are used under stressed (i.e. high flow) conditions. Moon Island's aging facilities were used only to hold untreated sewage through 1968, when the Boston Main Drainage System was re-routed to feed into the northern Metropolitan Sewerage system.

In 1948 the Federal Water Pollution Control Act (FWPCA) passed which authorized the Surgeon General to loan funds to construct sewage treatment plants, to study pollution and conduct research on new control technologies. The 1956 FWPCA amendments expanded this aid significantly by authorizing federal program grants to states and sewage treatment construction funds to municipalities for new wastewater treatment facilities. Although the Act also increased federal research and development and gave the federal government limited regulatory authority over interstate waters, it did not result in significant water pollution control (Lieber and Rosinoff, 1974).

Sweeping amendments passed in 1965 created the Federal Pollution Control Administration (the predecessor to EPA) and required states to develop standards for interstate, navigable waters. Massachusetts responded in 1966 to pass the Clean Waters Act and establish the Division of Water Pollution Control (DWPC) with a mandate to enhance water quality and abate water pollution. The DWPC established three classifications: "SC" waters for protection and propagation of aquatic life,
and for secondary contact recreation; SB waters for primary contact and shellfish harvesting (subject to depuration); and SA waters for the same uses as SB waters without the requirement to depurate shellfish (Kolb, 1980).

Massachusetts made limited progress towards meeting these standards in Boston Harbor. Between 1968 and 1971, three Enforcement Conferences were convened among representatives from state and federal water pollution control agencies to review the situation, gauge progress, and plan future action. The conferences recommended minor changes in the configuration of the Metropolitan Sewerage System and commissioned several studies to model harbor water quality and prepare pollution abatement plans (Kolb, 1980).

The Massachusetts experience was typical. Although standards were logically appealing, the complex relationship between pollutants and water uses greatly complicated sound measurement and rational efforts to craft standards. As a result, standards were often hastily set and poorly informed. Enforcement was also a problem, requiring a lengthy three-stage sequence of enforcement conferences, public hearings, and court action. Fifty-three enforcement conferences met between 1956 and 1971; four reached the hearing phase and just one went to court (Lieber and Rosinoff, 1974).

In 1972, Congress passed the Federal Water Pollution Control Act, embodying two tough goals: "discharge of [all] pollutants into the navigable waters be eliminated by 1985" and "wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish and wildlife and provides for recreation in and on the water be achieved by July, 1983". To achieve these ambitious goals, the FWPCA shifted the emphasis from water quality standards to uniform technology-based effluent standards for each type of discharge. The Act provided that all publicly owned treatment works (POTWs) were to install secondary treatment by 1977, regardless of the nature of the water receiving treated waste or the size of the discharge. By 1983, municipal dischargers were required to use the "best practicable waste treatment technology over the life of the works." Additionally, the 1972 Act
required municipal dischargers to secure National Pollution Discharge Elimination System permits. Even though uniform technology-based standards produced different results, they were much easier to implement than water quality standards which had required EPA and the states to set standards on a case by case basis (Susskind et al., 1983).

Secondary treatment differs from primary treatment in several important ways. Primary treatment removes large floating objects by passing waste through a screen. Sewage then passes into a settling chamber where sand and grit sink to the bottom. The third step is to pass sewage into a sedimentation tank which can remove up to fifty percent of suspended solids and thirty percent of organic matter in sewage. Secondary treatment uses additional steps to further purify waste. Primary treated waste is aerated in the presence of bacteria that break down the organic matter. Sewage discharge that contains a large amount of organic matter has a high oxygen demand; that is, a large amount of oxygen is needed to break down the organic waste. This leaves less dissolved oxygen for fish and plants. Efficient waste treatment leaves few suspended solids and low levels of oxygen demand (Susskind et al., 1983).

Despite the general lack of progress in tackling the problems of Boston Harbor prior to 1972, the 1971 enforcement conferences did yield one significant product: a three-party agreement between the MDC, the Division of Water Pollution Control, and the EPA. The agreement in turn led to initiation of a major study of the Metropolitan Sewerage System. The 1972 Federal Water Pollution Control Act provided impetus, as well. Between 1973 and 1976, the MDC developed a massive Wastewater Engineering and Management Study for the Boston Harbor and Eastern Massachusetts Metropolitan Area (known as the EMMA study). The study, funded by the MDC and the U.S. Corps of Engineers, was undertaken by Metcalf and Eddy as the principal consultant. The study’s objectives were to determine what repair, replacement, relief, extension, and expansion of facilities was needed to handle sewage treatment in the region over the next 50 years. Among the issues considered were the optimal size and
configuration for the Metropolitan Sewage District, siting of treatment works, priority and costs for construction, and management structure needed to carry out the recommendations (Kolb, 1980).

The EMMA study was published in March, 1976 as a twenty five volume report consisting of a summary, a main report, and 23 technical data volumes (Metcalf and Eddy, 1976). The EMMA study recommended a list of 52 separate projects to be constructed over the next 20 years, ranked by priority. Total capital costs were $855 million in 1975 dollars. Its main recommendations were to upgrade the Nut Island and Deer Island treatment plants to secondary treatment, to dispose of sludge by incineration, to eliminate combined sewer overflows, to build additional advanced treatment plants on the Charles and Neponset Rivers and to extend and improve the interceptor system. None of these recommendations were implemented.

Meanwhile, in January, 1974, the MDC applied for a National Pollution Discharge Elimination System (NPDES) permit, pursuant to the Clean Water Act. In August, 1976, the MDC and the Commonwealth’s Division of Water Pollution Control signed an Enforcement Compliance Schedule Letter. The MDC, under the terms of the agreement, was to expand primary treatment at Nut Island and Deer Island, upgrade to secondary treatment by May, 1985, and halt sludge discharge by May, 1980. The next day, EPA issued a NPDES permit, which went into effect in September, 1976. The permit required the Deer and Nut Island plants to switch to secondary treatment and cease sludge discharge by July 1, 1977.

National events affected wastewater planning for the harbor region in significant ways. Pressure began to mount to amend the 1972 act almost as soon as it was enacted. The secondary treatment requirement drew enormous attention. West coast municipalities argued that tidal movements and currents could sufficiently dilute sewage effluent so as to make secondary treatment unnecessary. After hearing from a variety of task forces, Congress agreed in 1977 to amend the 1972 Act to respond to the problem of secondary treatment and respond to other alleged deficiencies. Although most Congresssional representatives believed that technology-based
standards worked better than their predecessor water quality standards to compel better sewage treatment, they agreed that some flexibility was needed. A major result was Section 301(h) of the 1977 Clean Water Act, which allows publicly owned wastewater treatment works that discharge materials into the marine waters to apply to EPA for a waiver; such a variance would permit them to discharge wastewater that had undergone less than secondary treatment (Susskind, et al., 1983).

During the rulemaking phase for Section 301(h) waivers, representatives of the MDC argued strenuously to preserve the waiver option (i.e. primary treatment) for discharges into Boston Harbor. In a statement prepared for public hearings to the MDC on the National Pollution Discharge Elimination System (NPDES), John Snedeker, a former commissioner stated that there was no evidence that secondary treatment would benefit the marine environment of Boston Harbor. Snedeker asserted that the construction of combined sewer facilities and the expansion of primary treatment with extended outfalls would provide acceptable water quality in the harbor for at least two or three decades. Then, when EPA issued its preliminary concept paper (i.e. draft regulations), the MDC's Chief Engineer expressed fears that EPA's reference to 301(h) amendments as "a narrow opportunity for certain dischargers to obtain a waiver" would prohibit East Coast communities from qualifying.

Ultimately, EPA did not preclude East Coast communities from seeking waiver, but did require that communities contemplating a waiver file a preliminary application. Accordingly, on September 18, 1978 the MDC submitted its preliminary waiver application (Susskind et al, 1983). EPA then issued its final regulations, which restricted eligibility to communities that had filed preliminary applications. Since the MDC had qualified, the agency followed with a final waiver application on September 13, 1979. The application called for upgrading the primary treatment facilities at both Deer and Nut Island and constructing one, combined deep ocean outfall to discharge effluent in 100 feet of water, about 7.5 miles out into Massachusetts Bay.
According to 301(h) regulations, the Administrator of EPA, in concurrence with the state, can issue an NPDES permit that modifies the secondary sewage treatment requirements only if the waiver applicant demonstrates to the satisfaction of the Administrator that a number of conditions will be met. The applicant must prove that the permit will not interfere with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife, and allows recreational use of the water. The applicant must have established a system to monitor impacts of their discharge upon biota and establish a schedule to eliminate the entrance of toxic pollutants from non-industrial sources into such treatment works.\(^{35}\)

During 1980 and 1981 evidence continued to mount that not enough was being done to remedy water quality problems in the harbor. A consultant’s report prepared for the MDC (O’ Brien and Gere, 1980) found that water quality in the inner harbor failed to meet state and federal standards. The study found accumulation of organic silt three meters deep, very low levels of dissolved oxygen and concentrations of trace metals ten times higher than in the adjacent ocean.\(^{36}\) EPA issued two administrative orders. One cited the MDC’s failure to achieve secondary treatment as the reason why both plants violated CWA standards and ordered compliance schedules.\(^{37}\) A year later (August 12, 1981) EPA issued another administrative order citing violations of the Act.\(^{38}\) Also during 1981, a Task Force met to review the MDC’s waiver application and the EPA and MDC jointly agreed on supplementary information the latter would need to reach a decision on the waiver.\(^{39}\)

In 1982, in keeping with its earlier posture, the MDC published an options paper finding that primary treatment at both Nut and Deer Island are environmentally sound and economically preferable. On June 28, 1982, the MDC submitted addenda to the original waiver application filed in 1979. Two days later, EPA issued an order to MDC directing the Commission to cure or mitigate specified violations of the Act.
OVERVIEW OF LITIGATION AND SUBSEQUENT NEGOTIATIONS

While the MDC was considering its next move in its submission and resubmission of waivers, the picture changed dramatically in December, 1982. The City of Quincy, a member municipality, initiated state litigation against the the Metropolitan District Commission (MDC) and the Boston Sewer and Water Commission (BSWC) alleging several violations of state environmental law. At about the same time, the Conservation Law Foundation (CLF) filed suit in federal court against EPA and the MDC, charging violation of federal discharge standards. The suits, though separate, were politically and substantively linked. The presiding judge in the federal case issued a memorandum and order putting aside action until the state could act. The litigation and subsequent negotiation that helped begin to resolve these problems marked a watershed in Massachusetts politics.

The state court action lead to the appointment of a special master and his recruitment of supporting experts. The master’s team prepared a report presenting detailed findings and recommending a series of remedies. Next, the parties negotiated a procedural order, setting forth a sequence of 23 discrete remedies. However, the procedural order was not a legally binding document. It was referred to as a "voluntary moral commitment", setting out the parties intention to work together in good faith.

By agreement with the state litigants, the additional parties in the federal suit (CLF and EPA) had a role in the remedies. Fourteen months of meetings followed to monitor compliance. Concurrently, the master’s report and the state court action catalyzed state legislation to create a new Metropolitan Water Resources Authority (MWRA).
When the federal suit was reactivated, the MWRA became a defendant with the MDC, while the EPA switched sides and became CLF's co-plaintiff. The parties negotiated a scheduling order for construction of new sewer facilities that forms the basis for continuing judicial involvement in the Boston Harbor Cleanup. The MWRA has since used various negotiation techniques to settle litigation over contentious harbor cleanup issues.

Five key issues arose during the litigation. An initial need was to bolster the capacity of the MDC by replacing or filling staff positions. This was necessary to accomplish the second task--make immediate repairs to the antiquated sewer treatment plants, such as relining deteriorated outfalls. Third, reductions were needed in the volume of inflow and infiltration, or clean water leaking into the system. This goal has been partially accomplished. Fourth, a joint funding commitment had to be secured for long term harbor cleanup and to create the needed institutional capacity. Finally, and most important, a construction timeline to build needed facilities had to be agreed upon.

Implicit in this fifth issue was the need for EPA to act on the state's application for a waiver enabling ocean discharge of waste having only primary treatment. Ultimately, EPA declined the waiver, and the state chose not to appeal, setting the stage for plans for a secondary treatment system. Although the state court action helped promote long term planning, an enforceable construction timeline was not accomplished until the federal court acted. Thus, as the negotiations progressed, the focus shifted from near-term corrective actions to long-term strategic plans.

This case study describes several important stages of events: the filing of the state litigation and initial exchanges of litigants; the appointment of a special master, the preparation and delivery of a report; a series of "monitoring meeting"; a shift in venue to the federal court where a court order was imposed setting out a long term schedule; and a phase I call "implementation" that follows creation of the Massachusetts Water Resources Authority as a separate agency.
There were several significant players in the litigation and subsequent activity. The plaintiff in the case, the City of Quincy, was represented by William Golden and Peter Koff. One of the defendants was the Boston Water and Sewer Commission, which played a relatively minor represented by Laura Steinberg. The principal defendant was the Metropolitan District Commission. Representing the MDC were Michael Sloman for the Attorney General's Office and William Lahey for the Executive Office of Environmental Affairs. Noel Barrata, Senior Engineer was also involved on behalf of the MDC. Judge Paul Garrity appointed Charles Haar to act as special master. During the steps to create the Massachusetts Water Resources Authority, Attorney Douglas McDonald became an important player in shaping the legislation.

The Conservation Law Foundation, represented by Peter Shelley, filed a separate suit in federal court. EPA Regional Administrator Michael Deland and General Counsel Patrick Parento were key participants on behalf of EPA. Here, presiding District Court Judge David Mazzone became an important player. When the MWRA was created, Director Paul Levy took on an important role. Hence, the special master was only one phase in a long and continuing cleanup effort, but an important one.

CITY OF QUINCY LITIGATION

In December 1982, the City of Quincy filed suit against the MDC, seeking a variety of remedies for pollution of Quincy Bay, Boston Harbor, and adjacent waters. Six causes of action were named, each representing a violation of state law.49

William Golden, Quincy’s principal attorney, was motivated by the harbor’s condition as one of the worst in the nation due in large part to the region’s antiquated sewage system; the lack of leadership to set and meet clean up objectives; and the fact that the MDC’s institutional arrangements seemed incapable of sustaining the effort needed50. Golden recalled, "filing suit was the last thing I wanted to do" 51. He and his colleague Peter Koff pursued an out-of-court settlement with the MDC, but found massive legislative resistance to funding a serious harbor clean
up effort. Although there was no organized coalition opposed to the harbor clean up on its face, many in the legislature viewed the MDC as a wasteful and historically graft-ridden agency. The MDC’s budget was constantly cut, forcing delays in maintenance and eliminating the possibility of major new capital programs.52

Quincy’s litigation strategy set the stage for the negotiations that followed. Golden and Koff, acknowledging that the federal bench was "chilled to judicial activism",53 alleged no violation of federal law and did not name EPA as a defendant. Instead, they chose a state court as the appropriate venue. They wanted to effect change in the prevailing state institutional arrangements in which agencies lacked adequate financial resources and adequate coordination to seek solutions.

Plaintiff’s attorneys wanted an activist judge to hear the case. They brought the suit before Judge Paul Garrity in Dedham District Court who had earlier demonstrated his activist posture by putting the Boston Housing Authority into receivership. That is, with Garrity as presiding judge, the Court has assumed control of the day-to-day financial management of the Authority to correct the agency’s flagrant omissions and violations in carrying out its duties. Golden and Koff believed that Garrity would be sympathetic to environmental problems, unafraid to take on state agencies, and willing to tackle the complex policy and political problems inherent in the case.54

Quincy’s attorneys secured the MDC’s records and took affidavits from a local lobstermen, a diver, public health officials, and a local engineer to document the problems caused by sewage effluent. To generate momentum, Quincy made modest requests designed to illustrate the gravity of the situation while imposing minimal burdens on the MDC. For example, Quincy sought an order requiring the agency to promptly notify the City of Quincy of Nut Island discharges.55 Quincy also asked for the appointment of a special master in the case, a move Golden56 viewed

as absolutely critical because Quincy had to run the case on a shoestring and we wanted to avoid a protracted and costly court battle, yet the case had complex scientific, legal, governmental, and political dimensions.
With the summer bathing season approaching, the court heard Quincy's motion on June 15, 1983, for a preliminary injunction, and for referral of the case to a master. That morning, MDC Commissioner William Geary agreed to Golden's requests to notify the City of discharges. This left appointment of a Special Master as the point of contention.

Golden recalled that Garriott first responded with a sweeping rejection: "Special Masters are appointed in one of a million cases, and this isn't the case." Golden pressed on, donning a pair of rubber gloves and hoisting two jars of muck-laden Harbor water onto the bench to make his point. Golden further suggested that cleaning up Boston Harbor would require "taking the MDC apart" and imposing a ban on new sewer hookups.

In hearings a few days later, the court found that MDC was violating the Massachusetts Clean Water Act by discharging pollutants in violation of permits the agency had been granted by the EPA and the Department of Environmental Quality Engineering's Department of Water Pollution Control. The court also found violations of state law in connection with discharges into coastal waters and in the vicinity of shellfish beds. Judge Garriott wrote:

Boston Harbor is significantly and visibly polluted primarily because of the discharge of inadequately treated sewage and untreated sewage into it and adjoining waters. The current and potential impact of that pollution upon the health, welfare and safety of persons who live and work near-by Boston Harbor and who use it for commercial, recreational and other purposes is staggering...[T]he damage to that environment and to the creatures who live in it may very well soon become irreversible unless measures are taken to control and at some point preclude the pollution and consequent destruction of that very valuable resource.
APPOINTMENT OF CHARLES HAAR AS SPECIAL MASTER

On July 8, 1983, Judge Garrity granted Quincy’s motion for reference to a special master. 61 Garrity 62 recalled that once convinced of the need for judicial involvement, he considered no mechanism other than appointment of a special master. He was motivated by MDC’s request for "obviously delay-causing evidentiary hearings to resolve disputed issues of fact" and their claim that "much of Boston Harbor’s pollution comes from sources beyond their control".

His decision was informed by the experience of placing the Boston Housing Authority in receivership—a process he regarded as "fundamentally flawed". 63 Rather than taking control of the MDC, Garrity preferred to work with parties to build a consensus around the political solution he envisioned would be necessary to marshall the necessary resources for a harbor cleanup.

Garrity chose Charles Haar, a Harvard Law School professor specializing in land use and environmental law as Special Master and "didn’t consider anyone else." 64 Haar had been Garrity’s mentor and colleague at Harvard Law School. "I needed Haar’s credentials, his access to the highest level of politics, and his critical analytic skills. I needed someone to find out the facts and cut a political solution." 65 He ordered the Special Master to report with proposed injunctive relief no than than thirty days from the date of the order.

TEAM OF EXPERTS ASSISTS SPECIAL MASTER

To enhance his capacity to deal with complex technical issues, Professor Haar secured the appointment of a Deputy Special Master, along with a battery of professors and research assistants. The Special Master consulted Professor Eric Adams of MIT; Joseph Harrington, Chairman of the Department of Environmental Science and Physiology at Harvard University’s School of Public Health; and Allan Robinson, a Harvard Professor of Oceanography. Seven graduate students also staffed the effort. 66
Professor Haar viewed this technical team as essential to understand as fully as possible the current and historical operation of the metropolitan Boston sewerage system, considering its technical components, the administrative and regulatory context in which it operates, and its physical, biological, economic impacts.67

Haar and his team in turn consulted a wide variety of experts and public officials. He also met privately with disputants in the case. While he did not include the exact comments of these parties in his report, he used numerous ex parte communications. That is, he engaged in several private, off the record conversations with knowledgeable parties to enhance his understanding of the issues. However, his findings of fact were derived exclusively from the public record. He acted on Golden's suggestion68 that that affidavits and counter-affidavits be reviewed before he heard testimony. This enabled the Special Master to compress the testimony of the thirteen witnesses into just two and a half days. Additionally, Haar and his team reviewed over 65 studies and reports, books, and articles.69

**THE SPECIAL MASTER’S REPORT**

**Structure of the Special Master’s Report**

The Special Master’s 196-page report opened with a John Adams quotation on "the fishing frolick and the Water frolick" on Boston Harbor, and then reviewed the Boston Sewage System, and historical efforts to address water quality problems. The heart of the report was 303 discrete findings, organized under eight major headings. Next the report offered 12 major groupings of remedies. One chapter sets forth legal arguments as to why judicial intervention is appropriate and necessary. An appendix proposed a schedule of 22 tasks, plus the all-important 23rd task—developing a timeline for additional remedial measures, including upgrading the existing primary treatment works.
The Master’s Findings and Recommendations

The special master’s findings and recommendations were direct and pragmatic. They emphasized reducing the sewage flow in the system as a whole; improving the performance of facilities at Deer Island, Nut Island, and Moon Island; staffing and administration; and financial arrangements.

Excess flows, according the report, cause significant discharge of partially treated or untreated sewage into the harbor. For instance, the Moon Island outfall was used 95 times in 1982 and 1983 to discharge 3.1 billion gallons of untreated sewage that could not be treated at Deer Island. Problems related to infiltration and inflow (I/I) were primary causes of these excess flows. Infiltration refers to surface water or groundwater that enters the sewage system through defective pipes; inflow is water discharged from roofs, foundations, streams and catch basins. Fifty to sixty percent of peak flows at Nut Island and Deer Island can be attributed to I/I, despite the fact that the MDC and DWPC have sufficient authority to control I/I. 70

Professor Haar recommended a timeline of enforcement, penalties, awards, and grants for I/I removal. An interim step recommended by the Special Master was that each community reduce system influent by two gallons for every one gallon of untreated sewage added through new sewer connections. To enhance the equitability of this scheme, he proposed an arrangement wherein communities would receive credits in a central registry for future and past reductions of I/I. He further recommended that the MDC join with the Executive Office of Environmental Affairs (EOEA) to encourage voluntary reduction of sewer influent through conservation. 71

The Master found that both design and maintenance problems and operation difficulties hampered the capacity of the Nut Island treatment plants. His were mostly MDC-proposed remedies the agency had failed to implement, notably the cleaning and relining of two large outfalls. He asked the Court to require the MDC to evaluate adding pumping facilities,
lengthening two other outfalls to move discharges farther from shore, and evaluate the acceptability 25 other design improvements proposed by the plaintiffs.\textsuperscript{72}

The Special Master found that major breakdowns in the Deer Island pumping facilities had cut plant performance to just half its design capacity. He found undersized or inoperable sedimentation tanks and sludge thickeners. At Moon Island, he found that both wet weather and dry weather flows contained a wide variety of dissolved, suspended, and floating contaminants. Professor Haar called on the MDC to prepare a plan outlining physical improvements to Deer Island, in order to reduce effluent to Moon Island.\textsuperscript{73}

To correct the "woefully understaffed" work force at Deer Island and Nut Island, the Master called for the MDC to seek supplemental funding from the legislature. He also recommended that the agency submit its staffing and operations plan for court review.\textsuperscript{74}

The master’s report called for preparation of preliminary and final financial plans to introduce flexibility into existing rigid institutional arrangements. He noted "without the resources in hand, no plan—personal or public—can be taken seriously."\textsuperscript{75} Accordingly, defendants were to retain a municipal bond expert to prepare a preliminary plan outlining "a specific timetable of steps required for bonding, levying tax or users charges, or other sources of funding."\textsuperscript{76} After court review of the preliminary financial plan, defendants would prepare a final plan to consider whether to create an independent authority; whether general obligation bonds were needed; and whether the current system of charges should be revised.

Reactions to the Special Master’s Findings of Fact

Given the short time allotted for the Master to prepare his report (thirty days), there was no opportunity for parties to review the findings in advance. The Special Master’s report earned high marks from most
participants. The MDC did not "challenge the factual underpinnings of the report", while Quincy "strongly support[ed] the findings of fact...of the Special Master." In restrospective interviews, plaintiff's attorneys characterized the report as "extraordinary for a 30 day report"; "well founded, very comprehensive...the crown jewel of the Special Master's work.

The AG's lawyer felt the findings were "very accurate, very well done at that level; Haar recruited very good people from Harvard and MIT. The MDC's top engineer characterized the report as "not 100% correct, but 70 or 80% correct and that gave it an awful lot of credibility; the experts were excellent. EPA's attorney characterized the report as "a clarion call to action...broad but not deep: enough to make some plans but not enough to build a sewer plant." Another attorney observed "the report rewards rereading" as a reference.

Only minor criticisms of the report surfaced during the litigation. MDC's engineer faulted the report's silence on recent corrective steps undertaken by the agency. Plaintiffs urged the addition of findings on upgrading Deer Island and Moon Island facilities, discharge reporting, and MDC construction grants.

Reactions to the Special Master's Proposed Remedies

During the litigation, the plaintiff "strongly supported" the remedies of the Special Master as "a comprehensive analysis of recommended solutions to the chronic problems caused by discharges into Boston Harbor," while the defendant wrote that it did not challenge the remedies. Retrospective interviews reinforced the acceptance of the remedies: "there was pretty broad agreement on the remedies", "the remedies were mostly legitimate sewage treatment actions", "the remedies were not controversial since they were mainly MDC goals anyway."
State defendants criticized the failure to explicitly include EPA in carrying out the remedies:

The absence of EPA as a party is particularly disturbing... Without the guarantee of the agency's concurrence...the state defendants may be pinned between inconsistent court orders and regulatory mandates.

Reactions to Scope of the Report

Opinion was divided as to the scope of the masters report. While several respondents felt the master's report was appropriate in scope, others criticized it as too broad or too narrow. The Attorney General argued that the report focussed too narrowly on Quincy:

"Missing from the analysis are such issues as combined sewer overflows, the secondary treatment waiver, and sludge management. The Master's inability to address comprehensively the Harbor situation as a whole dooms to failure judicial intervention now suggested."

In contrast, an attorney for one of the plaintiffs argued that the report was "totally overreaching" and should have focussed more narrowly on the causes of pollution in Quincy. CLF's attorney observed: "Haar didn't reduce the case to its elements. The historic explanation was useful but totally unnecessary to what had to be done."

THE PROCEDURAL ORDER: A 'VOLUNTARY MORAL COMMITMENT'

Quincy initially endorsed the Special Master's proposed preliminary injunction, while the state objected strenuously. It was the policy of then-Attorney General Bilotti to fight the "judicial usurpation" inherent in a formal court order which he believed would involve the courts unreasonably in the work of administrative agencies.

Instead, the parties agreed to Judge Garrity's suggestion to call the agreement a procedural order. In contrast to a consent decree, a procedural order is more flexible: it lacks the force of law, it is not binding on future decisions, and can be modified. "Since everyone (including the MDC) wanted to meet these goals, there was no reason why
MDC should immediately be held in contempt without an opportunity to explain why a milestone was missed.\textsuperscript{100} Garrity wanted action\textsuperscript{101}: "The attorneys were hellbent on preventing what they needed to do."

Since the parties agreed to comply with the proposed remedies, Judge Garrity never ruled on the plaintiff’s motion for temporary injunctive relief on the merits of the case. On September 9, 1983, Judge Garrity signed a procedural order approving the settlement, appointing Professor Haar to monitor the harbor clean-up.\textsuperscript{102} Concurrently, at the parties’ mutual suggestion, EPA agreed to participate in the monitoring meetings.\textsuperscript{103}

Garrity concluded:\textsuperscript{104}

a massive and expeditious effort to clean up Boston Harbor pollution and remove its causes is desired by all parties and that further adversarial litigation may be counterproductive....Accordingly, in view of the express voluntary moral commitment of the state defendants and the willingness of the remaining parties to participate fully in the process outlined herein, further proceedings in this action are hereby suspended with ...provisos.

Garrity retained the option to resume proceedings if the accord collapsed. Defendants were to develop a supplemental schedule addressing the problems of combined sewer overflows, sludge management, and achievement of secondary treatment standards. Haar was appointed to monitor the schedule of compliance and parties were to inform professor Haar if milestones were reached or missed.\textsuperscript{105} This set the stage for a 14-month long sequence of meetings.

**Comments on the Procedural Order**

Peter Koff \textsuperscript{106} recalled the agreement to sign a procedural order as "sort of a dance,. Garrity said ‘let’s call it \(X\); just don’t call it a court order.’ The procedural order "gave us what we wanted: it had teeth but it recognized the AG’s objection." Golden agreed:\textsuperscript{107}

"The case had the potential to burgeon with appeals and ancillary suits costing million of dollars, and not one penny would go to clean up Boston Harbor. We wanted to find common ground that would lead to action, and keep the court involved. There’s no question that the procedural order was the best we could do."
While state litigants were satisfied with the the procedural order, parties to the federal suit criticized this voluntary mechanism. CLF’s attorney characterized the voluntary moral agreement as "just a restatement of the commitment the state had already failed to meet" 108. Pat Parento, then EPA’s General Counsel recalled:109

The process was about 10% judicial and 90% political. As a political process, it lacked important parties; as a judicial process, it lacked the force of adjudication. You can either run with the rabbits or bark with the hounds; the procedural order and the monitoring meetings that followed tried to be a barking rabbit.

A few months prior to the issuance of the procedural order, on June 30, 1983 the EPA tentatively denied the MDC waiver application.110 EPA found that MDC’s proposed discharge would violate Massachusetts’ water quality standard for dissolved oxygen and interfere with protection and propagation of a balanced, indigenous population of shellfish, fish and wildlife. The agency found circulation at the proposed discharge site is restricted because of a topographic depression. EPA also found deficiencies in that MDC’s monitoring program and its proposed schedule to eliminate toxics entering treatment works to be deficient. The MDC continued to press to keep the waiver option open.111

**MONITORING MEETINGS AND INTRODUCTION OF MWRA LEGISLATION**

Monitoring meetings were held every two weeks over a 16-month period from September 1983 to March 1985. Most were attended by Charles Haar. Other participants included attorneys (and sometimes technical experts) for the plaintiffs and the defendants, EPA, the Conservation Law Foundation, and a representative of Massachusetts Local Government. 112

**Comments on Participation in the Monitoring Meetings**

Most respondents did not feel that major parties were missing from the monitoring meetings. One recalled that "Haar didn’t try to exclude parties, but he didn’t actively recruit them, either. CLF’s role was
fuzzy; the group agreed to let them 'kind of' participate." EPA's attorney felt that a greater effort to involve local governments might have advanced the discussions: "More local governments, such as Winthrop, should be involved. The courts should bring in parties who can block projects."

Comments on Agenda for the Monitoring Meetings

The overall agenda for the monitoring meetings was to check progress on the 23 items agreed to in the procedural order and adjust the sequence of tasks as necessary. Attorneys for the Commonwealth recalled that the list of tasks was treated as a "punchlist". Some elements of this "punchlist" were discussed at most meetings, though individual tasks were not treated in great detail.

The monitoring meetings coincided with legislative efforts to develop an authority separate from the MDC to handle sewage—one of the Master's key recommendations. Four different versions of the bill were heard introduced between April and September, 1984. Accordingly, by early 1984, the monitoring meetings included frequent discussions of the legislation's progress. Several parties to the monitoring meetings had a hand in drafting the legislation, but the actual drafting took place in other forums.

Although Garrity did not attend the monitoring meetings, he regarded a major agenda item as building support for the new authority. He recalled "We knew within a month that was the answer. We psyched it out; we knew it was going to come down. I gave Charlie a year to work it out."

Despite the broad goals of implementing the "punchlist" and spurring creation of a new authority, participants were dissatisfied with the agenda of biweekly meetings. Attorneys on both sides agreed that the agenda "was not clear". Parento commented: "It was a sort of a rolling ad hoc agenda; there was no clear objective or mandate." Others concurred: "A sort of romance became attached to the process"; "It
was as though having a meeting was more important than reaching a particular outcome."\textsuperscript{122} Respondents suggested that a more regular, formal agenda would have enhanced the productivity of the proceedings.

**Comments on the Tone of the Meetings**

The MDC came in for the brunt of the criticism. One attorney observed:\textsuperscript{123}

It was 'open season' on the MDC. The Boston Sewer and Water Commission liked the fact that MDC was getting blamed. EPA was posturing before CLF hoping to avoid being dragged into court.

Overall, participants felt that the meetings engendered conciliation, but criticized Haar's acerbic style. "Haar was the last person in the world to convey encouragement; he was badgering and critical."\textsuperscript{124} "Every two weeks it was a scolding".\textsuperscript{125} He "tried to hector people into behaving better, as if they were in family court."\textsuperscript{126} Attorneys on both sides agreed that the result was missed opportunities for building trust and advancing productive working relationships among parties:

Haar acted like he thought he was running a Roman galley: if he pounded harder and shouted louder he thought the boat would move faster. But the oars weren't lined up and people rowed in seven directions at once.\textsuperscript{127}

The whole tenor of the meetings would have changed if Haar had viewed the group as a team of which he was the leader. Rather, (in my perception) it was the court 'making the MDC do something.\textsuperscript{128}

Instead "Haar's berating people built up resistance to the special master; they were waiting for the boom to fall".\textsuperscript{129}

**Use of Scientific Information in Monitoring Meetings**

Sessions were dominated by lawyers, with technical experts taking a back seat. None of the experts retained to help prepare the report took part in the monitoring meetings. An EOB\textsuperscript{A} attorney recalled that "since the attorneys didn't know about the technical issues, and there was a lot of table banging to get things moving".\textsuperscript{130} MDC's attorney felt that the MDC had adequate expertise, but:
"the lawyers had too much say in running the meetings. I would have left the room to let the technical people talk if all the other lawyers—including Haar—also left the room.\textsuperscript{131}

Plaintiff’s attorney called the expertise available "marginally adequate" \textsuperscript{132}. CLF’s attorney agreed:\textsuperscript{133} "There was no real expertise at these meetings. The technical people kept saying to the lawyers, ‘tell us what to do and we’ll do it’. He recalled:\textsuperscript{134}

"We were fish out of water at these proceedings. We had no scientific staff to verify the MDC’s proposed milestones. To do well at this kind of process, we needed to invest more resources to play the game. I wasn’t able to educate myself on the technical issues, so I wasn’t really participating on those questions".

The lack of a central role for experts meant missed opportunities to clarify technical issues. One negative result was that participants could put a "spin" on their progress reports, leaving other parties unable to verify these assertions.\textsuperscript{135} On balance, there is strong evidence that greater scientific expertise might have enhanced the outcome of the the monitoring meetings.

Comments on Failure to Develop a Construction Timeline

The final item of the Procedural Order’s "punchlist" was to develop a long term plan for other remedial measures. Respondents agreed that this was not fully implemented, but disagreed as to whether a construction timeline was an appropriate focus for the monitoring group.

Four commentators criticized Haar’s failure to lead the group in developing a specific construction timeline.\textsuperscript{136} CLF’s attorney observed:\textsuperscript{137}

"There seemed to be no clear idea of what outcome was sought. We devoted a lot of time to short-term band aids instead of putting together a construction plan for the new sewer plant."

Another attorney agreed that Haar could have forced a serious planning process rather than on focussing on the failed minutiae of the punchlist. Despite good will, eighteen months were lost. The quality of Haar’s plan and timeline was a flunk.\textsuperscript{138}
EPA’s Regional Counsel and DEQE’s attorney also agreed that more time should have been devoted to preparing a construction timeline.

A former MDC engineer argued that the Special Master’s focus on overcoming short term obstacles was appropriate. Garrity conceded that more strategic planning could have been accomplished, but observed:

A long term plan wouldn’t have been taken seriously at that time. A fresh start was needed (in the form of the MWRA). Besides, if the monitoring group had functioned as a planning agency, that would have undermined the argument that a new agency was needed.

While not disagreeing with the missed opportunity to complete a timeline, Quincy’s attorney noted "we were in a transition between making a plan and getting someone to implement it".

SEWER BAN AND RECEIVERSHIP THREAT MOTIVATE LEGISLATION

Legislation to create a separate sewer authority was introduced in the spring of 1984 and was amended four times. In hearings before Judge Garrity on October 9, 1984, lawyers for Quincy and the MDC volunteered their approval of an independent water and sewer authority. But the issue lacked urgency among legislators on Beacon Hill, and the bill stalled. Additionally, legislation was sidetracked by a divisive battle over the Speakership of the Massachusetts House.

Frustrated by legislative inaction, Garrity convened trial hearings in November and December, 1984. On November 29, 1984, Garrity imposed a ban on new sewer connections in the MDC’s 43 communities and announced that a receivership trial would begin in one week. Although the ban was quickly overturned on appeal to the Supreme Judicial Court, Michael Deland, EPA’s new Regional Administrator threatened a similar ban the next day.
The receivership trial began on December 6 and continued the following week. On December 12, 1984, the House passed a bill to create an independent sewer and water authority. Two days later, Garrity threatened to put the MDC in receivership if the legislature did not act by December 20—a move he repeatedly said he did not want to make. In a retrospective interview, Garrity recalled that his widely-publicized intention to step down from the bench gave him great flexibility at this crucial juncture. Finally, faced with a deadline, the House and Senate produced a compromise bill two days later and the Governor signed it on December 19, 1988.

Respondents credit Garrity's tactics with forcing the legislature to act before adjournment in 1984. One observed: "Garrity changed the course of history of Boston Harbor with his ban and receivership threat."

**GARRITY STEPS DOWN/ THE FEDERAL CASE ASCENDS**

Judge Garrity retired in late December, 1984, after the MWRA legislation was signed into law. Judge Morris took over the case. Monitoring meetings continued through February, 1985, but participants reported that the pace slowed and the emphasis shifted to launching the MWRA. Several commentators believe that momentum was lost when Garrity stepped down: "The MWRA legislation was the swan song of the state court action; nothing happened in the last meetings; the air was going out of the balloon." The CLF respondent observed "there had been no obvious thread to the course of events until the federal case ascended."

The suit, filed June 7, 1983, had alleged that "the MDC systematically and illegally discharged billions of gallons of improperly treated and raw sewage into Boston Harbor for more than a decade" in violation of the Clean Water Act. The CLF respondent recalled: "EPA had memos in its files dating back to 1978 suggesting that legal action should be taken against the MDC."
In another interview, Shelley recalled:

"we assumed that everything was working at the sewage treatment plant and if it wasn’t we’d be hearing a large outcry. Then, in early 1983, the Quincy suit came to our attention. The allegations were so extraordinary that we looked at federal and state files, and, well, we were shocked into action."\(^{158}\)

CLF sought declaratory and injunctive relief requiring defendants to agree on a plan for halting MDC’s pollution of Boston Harbor, and establishing a judicially enforceable schedule to implement such a plan.\(^{159}\)

Previously, in March 1984, Federal Judge David Mazzone had stayed action on CLF’s suit against EPA and the MDC for failing to implement the Clean Water Act. In early 1984, he felt that the special master-led process in state court was working. He agreed with Haar that adversary litigation could undermine the cause of cleaning the up Harbor.\(^{160}\)

When Michael Deland took over as Regional Administrator in 1984, CLF asked whether EPA wanted to continue to be named as a defendant or to switch to a plaintiff in the suit. Recalled CLF’s attorney: "It really didn’t matter. We wanted to embarrass EPA into action. Deland responded, 'No way I want to be a defendant' "\(^{161}\) Deland filed suit in federal court (January 31, 1985) against the new authority, the MDC and others alleging numerous violations of the Clean Water Act.\(^{162}\) CLF released EPA as a plaintiff in the case. In March, 1985 CLF petitioned Judge Mazzone to lift his stay and act on their case.\(^{163}\) Judge Mazzone had become convinced that the parties in the state case would fail to set a construction schedule for Boston Harbor improvements.

Also in March, 1985, EPA issued a "Tentative Decision" denying the MDC’s most recent waiver application.\(^{164}\) Under the revised application, the MDC had proposed to upgrade facilities located on Deer and Nut Islands and construct a combined, deep ocean outfall, equipped with a defuser, located 9.2 miles into Massachusetts Bay. The waiver also called for a cessation of sludge discharge into coastal waters and correction of a variety of problems associated with combined sewer overflows into the Boston Harbor.
Despite these "improvements" the EPA tentatively denied the second waiver application on March 29, 1985. EPA found that the proposed discharge would violate the state's DO standard and interfere with the "propagation of a balanced, indigenous population of shellfish, fish, and wildlife." EPA found deficiencies in the schedule for eliminating non-industrial sources of toxics entering the treatment works.\textsuperscript{165} The MWRA Board of Directors (sworn in February 27, 1985) instructed attorneys to look into appeal procedures.\textsuperscript{166}

On May 22, 1985, Judge Mazzone lifted the stay and consolidated CLF's and EPA's case into one proceeding (United States vs. Metropolitan District Commission).\textsuperscript{167} Rather than appoint a master, Mazzone chose to personally oversee the case. Several commentators noted that when Judge Mazzone took over, Haar was eager to continue as a Federal Special Master. One observed: "When the venue shifted to Judge Mazzone's Court, everyone got on the train, but there was no seat for Haar."\textsuperscript{168} However, while several respondents felt a loss of momentum occurred when Garrity's involvement ended, most suggested that Mazzone acted appropriately by not reappointing Haar.

The MWRA assumed ownership and control of the sewer systems from the MDC on July 1, 1985. During the summer, plaintiffs and defendants presented their arguments. After EPA filed a motion for partial summary judgement to decide the merits of the case, Judge Mazzone found that as MDC's successor, the MWRA was liable for the MDC's acts because it is basically a continuation of the agency. Moreover, Judge Mazzone found the MWRA responsible for remedying the numerous violations to the CWA that were identified by the plaintiffs.\textsuperscript{169}

In September 1985, the MWRA Board of Directors, reversing a position long held by the Commonwealth, voted not to pursue legal action to appeal EPA's tentative denial of the second section 301(h) waiver.\textsuperscript{170} Judge Mazzone's December 23, 1985 order directed parties to prepare an enforceable agreement setting up a definite schedule for cleanup of Boston Harbor:

the court finds that there is a need for expedition to resolve the ongoing discharges of sludge and inadequately treated sewage and that an interim order is necessary to ensure that initial steps are undertaken expeditiously to address these discharges.\textsuperscript{171}
The order established a schedule of interim planning steps to be taken by the MWRA to achieve compliance with the Act. The order also noted that "While this order does not impose obligations on any party other than the MWRA, the parties are encouraged and expected to cooperate fully in assisting the MWRA." The order specifically identified "Matters Set Down for Further Negotiation". By February 17, 1986, the parties were to agree on starting and completion dates for construction of primary treatment plants, outfalls, and secondary treatment elements of the new plants. Next, by March 14, 1986, parties were to agree on interim limits for existing treatment plants and long term schedules for sludge maintenance. Then, by May 30, 1986, parties were to attempt to reach agreement on implementation of projects to halt Combined Sewer Overflow. Judge Mazzone retained jurisdiction over all of these issues in the event parties could not come to agreement.

By early 1986, the parties negotiated several elements of the short term timeline, but they disagreed about the completion date for the project. The MWRA initially proposed a completion date of 2004, a target CLF rejected as much too distant. The MWRA, EPA, and CLF each retained experts to support their preferred timeline. CLF proposed a completion date of 1996. Recalled Shelley "We basically let the early milestones go; our focus was on the end of the timeline". MWRA hired the firm of Camp, Dresser, McKee (CDM) to prepare a critical path analysis. Peter Shelley reported:

In developing a response to CDM's first critical path, we faced the issue of affording expertise. CLF had to arrange to pay a consultant on a contingency basis. [That is, the organization would only pay if it won the suit.] Everyone we talked to said there was fluff in the schedule, but none of the top firms wanted to work against the MWRA. We had to retain a consultant of lesser reputation [compared to the expertise of CDM] from the 'farm leagues'.
Negotiations continued, with each party appealing to its respective technical experts to bolster its case. EPA retained Joseph F. Lagnese, Jr., a professor of engineering with extensive experience in sewage and waste treatment engineering. CLF retained James J. Colantonio and Dr. Ressi. Colantonio, though long experienced in waste treatment projects, had never overseen construction of a plant on the scale needed for Boston Harbor. Mr. Ressi, an expert in construction on confined sites, argued that construction could go forward on Deer Island faster than CDM contended it could. The MWRA's consultant, Mr. Richard Fox, was a national expert in constructing large wastewater treatment plants.176

The parties initially filed proposed long term schedules in February, 1986. At that time, the MWRA proposed a completion date for the secondary treatment facility in the year 2002, CLF proposed a completion date in 1996, while EPA proposed a 1998 completion date. The MWRA's initial schedule was based on an analysis prepared by CDM. CDM, as part of its duties, had previously prepared a (computerized) "critical path method" (CPM) flow chart, which scheduled the myriad steps necessary to complete the project in the shortest possible time. While the parties disagreed as to the assumptions about the duration and sequencing of tasks as proposed by CDM, CDM's critical path method was the yardstick against which the other schedules were measured.177

Basically, the CPM shows the starting date and completion date for activities to be performed on a project. It depicts (1) activities which precede other activities; (2) activities which must be performed concurrently; and (3) activities which must succeed other activities. It usually assigns four dates for each activity: early start, early finish, late start, late finish. The CPM is also important once work begins because it will provide, with continuous updates, early warnings on impending problems and delays.178

When parties could not agree on all milestones, Mazzone ordered a hearing in May, 1986. Judge Mazzone reviewed the evidence, including the
qualifications of the respective experts. Mazzone found Richard Fox best qualified to speak to the intricate nature of the construction projects. The court noted that two weeks before the hearing, the MWRA filed a revised schedule which accelerated construction. He settled on MWRA’s revised timeline, which called for completion of all outfalls and primary and secondary treatment works by 1999. His order noted:

Specific dates must be established for each major step of this long and complex construction process. The parties must be held to a clear, understandable, and rational schedule. The Court and the public must be able to hold specific individuals and agencies responsible for accomplishing specific tasks within given time periods.”179

Primary components would be completed in 1994 and fully operational in 1995. In the end, Judge Mazzone substantially accepted the schedule called for by the MWRA, and reiterated that they were important target dates but not fixed deadlines. His Long Term Scheduling Order180 is a stronger mechanism than the "voluntary moral commitment" embodied in the state court’s procedural order. Among the major deadlines encompassed in his order were to initiate construction on new primary treatment facilities by December 1990, complete construction of new primary treatment facilities by July, 1995. Construction of outfalls was to begin July, 1991, with construction complete by July, 1994. Construction of the secondary treatment plant was to be completed by 1999.

In restrospective interviews, most participants conceded that this was a necessary move. Garrity observed:181

"At the time, I was really peeved; I didn’t want the federal courts involved in the case. But in retrospect, I’ve become convinced that sad as it is, the court is needed behind the construction schedule."

Several respondents suggested that the voluntary agreement reached in state court was a necessary precursor to the scheduling order possible.

Mazzone appointed his former clerk Anne Crocker Phillips as compliance monitor. In this capacity, she filed and circulated monthly reports to all parties summarizing the discussions of compliance hearings.182 Additionally,
Judge Mazzone filed monthly compliance orders. Respondents contrasted the styles of Mazzone and Haar as "a temperate judge rather than a centurion for speed" or "someone with an intellectual interest in the subject versus someone who has a job to do." Most participants commented favorably on the system of compliance reports as a more organized scheme than used in the special master process.

NEGLIGENCE OF MITIGATION PACKAGES/BOSTON HARBOR TRUST

After Professor Haar completed his work and Judge Mazzone issued his long term scheduling order, controversy surfaced again in the Boston Harbor cleanup. The MWRA, in pursuing timely harbor cleanup, encountered massive opposition from Quincy and Winthrop, the host communities for a regional sewage plant and sludge storage facility, respectively. Just ten days after the agency was created, the MWRA Board selected Deer Island as the preferred site for the new sewer treatment plant, based on data presented in the DEIS/DEIR. Residents of Winthrop (the community nearest Deer Island) objected to the dust, noise and traffic impacts they felt would be associated with construction of a regional sewer treatment plant. They pointed out that Winthrop already has two regional facilities: an airport and a prison. On July 31, Winthrop filed suit in Suffolk Superior Court against the MWRA alleging that the July 10 vote had violated the Massachusetts Environmental Policy Act.

At about the same time, the MWRA targeted the Quincy shipyard as either a staging area for construction materials, or as a site to store and process sludge on an interim basis. Quincy residents raised concerns about lost tax revenues, local traffic impacts, and objectionable odors.

During the early stages of the MWRA's negotiations with the two municipalities, the agency received strategic counsel from Professor Lawrence Bacow of MIT, an attorney who is an expert in mediation and land use planning. Bacow had conducted research on the merits of offering compensation packages as part of an overall effort to site regionally
important but locally troublesome land uses (Bacow and Milkey, 1982). Bacow offered advice informally to MWRA Director Paul Levy, a friend since their undergraduate days at MIT.\textsuperscript{189}

Bacow's advice was well received. The MWRA spent months negotiating mitigation and compensation arrangements with Winthrop and Quincy. A major concession to Winthrop was that most of the construction materials would be barged to the site, eliminating traffic impacts. In addition, the MWRA offered Winthrop a $24 million mitigation package which will be used to soundproof houses in affected neighborhoods, fund parks and open space, and beef up fire and police protection.\textsuperscript{190}

The settlement with Quincy included a pledge that sludge would be moved by barge or rail. In return for accepting the plant, Quincy will reap $300,000 annually in tax revenues, payments by the MWRA for police, fire and other services that could reach $1.7 million per year, and a promise that the plant will be an odor-free good neighbor.\textsuperscript{191} To finalize the agreements, MWRA Executive Director signed Memoranda of Understanding with the Winthrop Board of Selectman and the Mayor of Quincy. Similar negotiations are now underway with the Boston neighborhood of Charlestown.\textsuperscript{192} Doug Foy, President of the Conservation Law Foundation praised the MWRA/Quincy agreement as:

\begin{quote}
 a real stroke of genius by Paul Levy and a very diplomatic and important gesture by the City of Quincy.\textsuperscript{193}
\end{quote}

Most respondents credit the MWRA's new Executive Director, Paul Levy with pressing ahead on negotiated solutions, although several felt that Haar and Garrity had helped "set the tone" in the state court action.\textsuperscript{194}

A third negotiated agreement concerns the Commonwealth's obligation to pay federal fines for violating the Clean Water Act as a result of suits brought by EPA and CLF. Under a settlement announced in April, 1988, EPA and the Department of Justice agreed that the Commonwealth must pay $400,000 of a $2.4 million infraction in fines, while the balance will endow a Massachusetts Bay/Boston Harbor trust.\textsuperscript{195} The $2 million
endowment will be divided equally between scientific research, habitat restoration, and public education projects. All three recent agreements—the Quincy and Winthrop agreement and the settlement creating the harbor trust—represent a substantial departure from the "decide, announce, defend" mode of coastal and marine resource management.

EVALUATION OF THE SPECIAL MASTER MECHANISM IN THE BOSTON HARBOR CASE

The techniques used in the Boston Harbor case departed substantially from traditional judicial methods of handling coastal resource disputes. The lessons to be drawn from the case have substantial implications for the design of supplemental processes to assist in the resolution of disputes. Several analysts have commented on the role of the special master in the Boston Harbor case (Little, 1985; Haar, 1986; Seward, 1986). My conclusions draw from the literature on the harbor cleanup, together with the findings of my interviews and the literature on special masters (Brazil, 1983; McGovern, 1986; Goldberg, 1985).

Need for Judicial Intervention/Special Master Appointment

Professor Haar's comments on his own role provide a useful commentary on the need for judicial intervention. He wrote in his Special Master's report that after reviewing the record in City of Quincy, he was convinced

that it was both appropriate and necessary for the court to fashion judicial remedies to clean up the Bay and the Harbor. By appropriate, it is meant that the Court is neither overstepping its authority nor improperly impinging on the perogatives of our other two branches of government. By necessary, it is meant that, without judicial intervention, the problem in this case will remain with us for the foreseeable future.

Haar observed that one advantage of the Special Master as an ad hoc employee of the court is that he is less likely to be captured by special interests, and less likely to become complacent in the performance of his or her task. In his Master's Report he observes:
in matters concerning the environment and health, where present-day activities may result in long-term, potentially irreversible, and frequently incalculable harms, the court—as the most politically insulated branch of our democratic system—can act the most forcefully as guardian for the future.\textsuperscript{198}

The Special Master’s report indicated that two factors led him to conclude that judicial remedies were undeniably necessary: no party would take the necessary action without judicial intervention, and no agency before the court had the authority or the capacity to clean up the harbor.

Little (1985) found that:

The use of a special master in the City of Quincy litigation was successful. The Master’s work and eventual report led to increased agency cooperation and communication, an agreement that will guide both parties and the court in the future, and significant action that could produce a cleaner Boston Harbor. Much of the responsibility for this success can be attributed to two qualities that Professor Haar brought to the role of Special Master: technical expertise and political awareness.\textsuperscript{199}

Each of these issues—agency cooperation, expertise, and political awareness will be discussed in turn.

\textbf{Role of the Master in Promoting Interagency Cooperation and Communication}

While Haar deserves credit for some level of agency cooperation, his abrasive style worked against the best possible inter-agency communication. With respondents reporting that Haar "hectored people as though they were in family court”\textsuperscript{200} and "every week it was a scolding”,\textsuperscript{201} it is hard to give Haar a ringing endorsement as a master who catalyzed effective communication. The involvement of a special master in contentious litigation provided significant opportunities to build trust among parties. Unfortunately, many such opportunities were missed. Haar did not use many of the tools commonly employed by facilitators, such as separating interests from individuals, or meeting privately with parties to assess their satisfaction with the process.\textsuperscript{203} The contentious and adversarial tone of the monitoring meetings probably dissipated as much energy as it focussed.
Role of the Special Master in Bringing Expertise to the Case

Little (1985) credits Haar with accumulating a pool of expertise and raising his own level of understanding, thus "enabling him to concentrate on the immense volume of technical data before him". In Little’s view, Haar’s "departure from the strictly judicial model of the Special Master [to] take on a more investigative role." 204 Looking back over the sequence of litigation and negotiations, it is apparent that Judge Garrity’s initial choice to appoint Charles Haar as master rather than holding lengthy evidentiary hearings was a wise decision.

Haar’s recruitment of a team of experts and his preparation of the master’s report was a major factor in averting deadlock and illuminating the technical issues in the case. The report clearly identified several causes for regular contamination in Boston Harbor. Neither plaintiffs nor defendants contested the reports’ findings. In fact, both sides praised the contribution of the experts and the overall quality of the analysis. Moreover, the consensus among those interviewed was that the remedies were well-informed and appropriate. In the words of one respondent, the report was the "crown jewel" of the Master’s work. Given the 30-day time frame in which the Master’s report was prepared, this represents a major gain for the approach used by Garrity and Haar.

When contrasted with several recent uses of the special master model, it appears that Haar’s approach may not have been sufficiently investigative. While Haar did a credible job of assembling an expert team and writing a comprehensive report in record time, this expertise was unavailable during the lengthy monitoring meeting phase of Haar’s involvement. After the success of the Master’s Report, the monitoring phase represented a partial retreat to "adversary science". The expert team that that assisted in preparing the Master’s Report did not participate in monitoring meetings. Instead, each side had its own (staff) experts. Moreover, it is telling that CLF’s attorney lacked the resources to hire experts and "wasn’t really participating" in the substance of the monitoring meetings. This hampered the ability of the
group to jointly review relevant information and come to some informed understanding as a prelude to reaching an agreement.

Furthermore, it is clear from both the interviews and the subsequent federal litigation that much more expertise had to be brought to bear to develop a "critical path" for construction of needed Boston Harbor improvements. EPA's attorney called the report "a clarion call to action...broad but not deep." In the other cases summarized at the beginning of this chapter, masters created a mechanism to organize ongoing collection and analysis of information. The master's work in the Alabama ratesetting case included creating an ongoing role for the involvement of an appellate expert. In the Michigan fishing rights case, the master created a mechanism whereby competing scientists pooled data and jointly developed a model. In the asbestos litigation, the master engaged third party neutrals to gather data and created a data base that could be used to evaluate future claims. Also absent from the master's work and monitoring meetings was any explicit role for the organized scientific community, such as the Massachusetts Marine Sciences consortium, which is both a source of expertise and a major stakeholder in harbor cleanup. Hence, with respect to involving the scientific community and organizing ongoing collection and analysis of critical data, Haar might have gone further.

It was not until the venue shifted to federal court and the MWRA hired Camp Dresser McKee to complete their critical path analysis that another strong team was assembled to inform harbor cleanup. But CDM was recruited in part to provide analysis, and partly to bolster the agency's position relative to CLF, which sought a shorter construction schedule. Even by their own account, CLF went to "the farm leagues" to find a less expensive consultant of lesser stature than CDM to support their push for a shorter construction timeline. These events suggest that a resource pool of scientists, available equally to all sides, might have been beneficial. In this way, the parties could have engaged in sharing information and joint analysis of data. Carrying out these steps in direct face-to-face talks among CLF, MWRA, EPA and their supporting
experts might have allowed the parties to reach consensus sooner on a
construction timeline.

Upon selecting a contractor for sludge processing, some four and a
half years after Quincy first brought its litigation, the MWRA’s
Executive Director observed:

Considerable progress has been made in creating a cleanup bureaucracy,
but this is the first major step in actually cleaning up the
harbor.

Thus, the failure to develop a serious construction timeline (or to create
a mechanism capable of inventing such a timeline) under the state court’s
venue may have delayed harbor cleanup unnecessarily.

Role of the Master in Reducing Case to its Elements

The literature on special masters repeatedly cites a key role as
working to streamline case preparation and reduce cases to their
essential elements. There are also questions as to how effective Haar was
in reducing the case to manageable elements. Two commentators—the
attorney for the Conservation Law Foundation and one attorney involved in
creating the MWRA—specifically asserted that Haar did not really
accomplish the analytic tasks that stood before him.

A related concern is whether Haar did the best possible job in setting
a clear agenda. Several respondents criticized the monitoring meetings
for their lack of focus. In this case, the agenda for ongoing negotiation
in the monitoring meetings was not sufficiently clear to enable progress
to be made. Parties criticized the agenda for lack of clarity, and
commented on lack of overall objectives. The efficiency of the process
bogged down in the later monitoring meetings, which impaired the group’s
ability to agree on a long term harbor cleanup schedule. These criticisms
stand in contrast to Francis McGovern’s work in the Lake Michigan case
where he helped parties to reduce the fishing allocation question to five
key variable and persuaded disputants to build a model that would test
different assumptions.
Role of the Master in Securing Political Action

Little’s analysis suggests that Haar had a "strong sense of political reality" and sought to draft his report in a way that would arouse public opinion.

Although Haar’s involvement did not lead to immediate or even imminent cleanup of the harbor, it did lead to more action and potential action than would have been possible without court intervention...the results achieved by Professor Haar strongly illustrate that when courts attempt to fashion remedies for such problems, they must acquire the technical expertise to do so comprehensively and must retain the political awareness to focus pressure on relevant institutions yet assure that remedies create minimal substantive intrusions on other branches of government. The remedies proposed by Professor Haar demonstrate that the use of a court-appointed master can assist the court in achieving this balance. 206

In this respect, Haar and Garrity’s involvement in promoting creation of a major new institution (MWRA) seems to go beyond what is documented for the work of other special masters. Although there were many factors at work (especially Governor Dukakis’ support for the creation of the MWRA), it is fair to say that Haar and Garrity moved the traditional politicians further than they might have gone without such dynamic intervention.

Masters as Mediators in Science-Intensive Marine Policy Disputes

In another post hoc analysis, Seward (1986) contrasts the special master’s approach used by Haar with a narrow conception of informal (i.e. not court-appointed) mediation.

Mediators aim only to produce harmony between the parties. They are disinterested in the outcome of a dispute in a way that differs from the disinterestedness of a judge. A judge may be disinterested as to who prevails, but not as to the result of the dispute. The disputants desires are measured against the law in court. But in mediation, the disputants desires are all that is at issue. 207

Seward’s assumption that mediators are passive "process experts", with no concern for the quality or implementability of outcomes is at odds with
analysts such as Goldberg (1985), Susskind (1985), and Lewis (1988) who see masters as mediators. Seward observes that in mediation, parties are freer to discuss a broader range of issues than in court. He identifies three reasons why mediation may not have worked: he doubts that the Commonwealth would have had an incentive to participate; parties have unequal power; and disadvantaged parties need assistance developing resources to present their case.

There is no intrinsic reason why a mediated process could not have addressed all of these outcomes. Indeed, Haar may have benefitted by taking a cue from the mediation literature: the emphasis on involving affected stakeholders (Susskind and Cruikshank, 1987). Although probably less important than the master’s handling of technical issues, several respondents did comment that a larger, more explicit role of EPA and CLF earlier in the proceedings may have been useful. There was also some sentiment that a greater effort to involve affected local communities (such as Quincy and Winthrop) earlier in monitoring meetings may have avoided later controversy. Moreover, there were strong concerns about the absence of the marine science community—which is both an important source of expertise and a major stakeholder in harbor cleanup.

Additional lessons are illustrated by this case. The case highlights the value of seeking remedies that integrate the interests of the parties rather than choosing winners and losers. The procedural order, though criticized by EPA and CLF respondents, did serve as a creative step to intergrate the interests of both Quincy and the MDC. The order as a "voluntary moral commitment" satisfied the plaintiffs and overcame the Attorney General’s fundamental objection to judicial usurpation in a formal court order that he felt would unreasonably involve the judiciary in the work of administrative agencies. The MWRA’s agreements with Winthrop and Quincy and the settlement that created the Massachusetts Bay/Boston Harbor Trust also represent integrative solutions. This is precisely the approach that Goldberg (1985) and Susskind (1985) described in their work as special masters.
Another important lesson underscored by this case is the critical importance of translating informal agreements into binding agreements. Most respondents agreed that the state court's procedural order with its "voluntary moral commitment" necessarily evolved to the federal court's scheduling order which holds that "parties must be held to a clear, understandable, and rationale schedule." Again, the MWRA's agreements also represent binding commitments. Such binding agreements are essential for actual harbor cleanup to be implemented.

The special master's work in the Boston Harbor case showed the value of departing from the traditional judicial mechanisms. Most of the hypothetical weaknesses in the special master approach identified by Brazil (i.e. lack of respect, lack of timely hearings, competition among multiple masters) did not materialize. Though the work of Special Master Haar was largely successful, this analysis has compared his work with other uses of special masters to suggest that there may have been room for improvement. The few shortcomings identified here will be used to inform the discussion of the New York Bight Initiative.
CHAPTER FIVE
A FACILITATED DIALOGUE TO SUPPLEMENT THE LEGISLATIVE PROCESS:
TIDELANDS AND THE PUBLIC TRUST IN MASSACHUSETTS

Introduction

Very often, the process of enacting environmental legislation results in a standoff between the proponents of natural resource protection and development or industrial interests who contend that regulations would pose unreasonable burdens. For example, the first version of California's coastal legislation had the support of most environmental groups, but was opposed by an unusual coalition of the building trade unions and advocates of low income housing and public access. The bill died in the Senate Finance committee. Then-Governor Brown threatened to convene a special session of the legislature unless a compromise was struck. The governor's staff promoted a four-way agreement among local government, proponents of low income housing, environmentalists, and the unionized construction industry. The language was revised, inserted in another bill, and passed.¹

Similarly, an initial version of New Jersey’s Freshwater Wetlands Act of 1987 passed the state Assembly with a coalition of labor, environmental, and commercial support. However, real estate interests weakened and eventually killed the bill in the New Jersey Senate. Aided by environmental constituencies, Assemblywoman Maureen Ogden redrafted the bill without concessions to construction interests. The bill which became law was a strengthened version, given greater impetus when Governor Kean imposed a one-month moratorium on all wetlands permitting.²

In both cases, there is evidence that an acceptable compromise could have been worked out before the 11th hour. Bringing parties together in face-to-face discussions would have presented an opportunity to understand the fundamental interests of all sides. Each Governor’s political clout was helpful in these cases, but part of their role could have been filled by a qualified nonpartisan convenor working under suitable auspices. Of course, such an arrangement would require that the intervenor earn the
trust of contending parties, but there are numerous examples of this activity. Some of these efforts were summarized in Chapter 2 of this dissertation. Facilitated dialogues have been used to assist the legislative process in several other settings. The Keystone Center convened a policy dialogue to define appropriate groundwater standards for the State of Texas that were ultimately translated into state law. The Keystone Center and the Conservation Foundation have both sponsored policy dialogues to assist the passage of state or federal regulations.

Massachusetts resource managers, like their counterparts in California and New Jersey, sought legislation to establish clear standards for allowable use of the state's rapidly redeveloping coastline. The disposition of the state's tidelands—the area below mean low water—was especially pressing. Piecemeal granting and revocation of tidelands licenses was increasingly viewed as outmoded and inappropriate.

The response to this haphazard granting of tidelands licenses—an effort to craft legislation and regulations to guide tidelands licensing—presents an opportunity to consider contrasting styles of public policy making. A policy dialogue was used to assist the legislative process. Then, the agencies fell back on more traditional models of "public review and comment" to translate the legislation into implementing regulations.

The case involves several phases. An initial problem assessment by the state coastal agency (Massachusetts Coastal Zone Management—MCZM) convinced staff to recruit two expert facilitators. Together, they designed and executed a facilitated workshop. The meeting clarified a number of key issues and established sufficient consensus to smooth the path for enactment of legislation.

Next, the agencies responsible for implementation convened a Tidelands Advisory Committee (TAC) to offer advice and help build support for the new regulations. Although the TAC's advice enabled staff to prepare seven successively more precise drafts of the regulations, it did not carry
through to release of the regulations. A 14-month period of internal work followed, while staff clarified key regulatory concepts and worked to eliminate inconsistencies in the way coastal uses were treated. In three public hearings, the chorus of opposing voices drowned out the support of environmental leaders. Another round of workshops followed to clarify the concerns of marina operators. Yet another phase of internal staff revision is now underway, intended to produce revised regulations for public review by mid 1989.

This discussion reviews each major phase of activity and concludes with observations and lessons that may help inform the design of other efforts to supplement legislative and administrative processes.

**PROBLEM CONTEXT**

Since at least 1647 Massachusetts has granted private interests the right to use tidelands—the flats and submerged lands just seaward of the high water mark. Many such grants, made to promote harbor development have been in conflict with the public’s rights in these lands which include fishing, fouling (i.e. hunting for waterfowl), and navigation. For the most part, tidelands licenses were granted by state regulatory agencies, although the legislature made irrevocable grants to individual applicants from time to time. In this century, over 100 such grants were made, and in years preceding the move to create legislation, about 10 grants were made each year.⁵

Two court decisions in Massachusetts, one in 1940 upholding the revocation of a license without compensation (Commissioner of Public Works vs. Cities Service Oil) and the 1979 Lewis Wharf decision (Boston Waterfront Development Corp. v. Commonwealth) that emphasized the permanence of the public right’s in tidelands provoked substantial concern in financial and legal circles.⁶ Although the revocation was unusual, growing interest in the ongoing revitalization of waterfronts in a number of Massachusetts cities focused attention on the issue. Attorneys for numerous developers, seeking to give lending institutions a greater sense of security, requested special acts of the legislature to ensure the
irrevocability of the licenses they obtained. About forty-five irrevocable licenses (allocating free use of public land in perpetuity) were enacted between 1959 and 1969. The legislature continued to consider such bills through the 1970s.

After the Supreme Judicial Court decision in *Boston Waterfront Development Corp. v. Commonwealth* 1979, virtually all interested parties called for a complete overhaul of the tidelands licensing process. The Massachusetts Coastal Zone Management (MCZM) office claimed that licenses were being granted by the legislature with little regard for the resulting land uses, impacts on coastal ecology, or their relationship to the broader public interest in Massachusetts. The state Attorney General and the Massachusetts Environmental Lobby pointed out that other states offered fixed-term licenses that generated millions of dollars in revenue. Local officials noted that legislative action on individual license requests afforded no opportunity for public review or comment.\(^7\)

In 1982 the Massachusetts State Senate began work on amendments to Chapter 91 of the General Laws to address these and other concerns. A variety of amendments were floated by both representatives of the Attorney General’s office and representatives of real estate conveyancers. The version propounded by the Attorney General would have placed limits on the nature and duration of waterfront licenses and special restrictions to protect the public interest in tidelands. Developers and land conveyancers fought back, arguing that the amendments proposed by the Senate would be too strict, undercutting their chances of securing financing and causing costly delays. The version preferred by the conveyancers contained relatively little language to protect the public trust in tidelands. Environmentalists worried that such language, if enacted, could sanction a massive giveaway of public lands.\(^8\)

The MCZM leadership proposed direct dialogue among the contending interests to break the deadlock and build a constituency for legislative change. William Lahey, staff counsel for the MCZM office, took the lead in bringing all the key parties together for a historical and technical briefing and a discussion of the underlying interests.\(^9\)
Lahey recommended two facilitators to head the discussion: Lawrence Susskind, Executive Director of the Program on Negotiation at Harvard Law School, and Robert Knecht, Senior Fellow at Woods Hole Oceanographic Institution. According to Lahey, he wanted facilitators with expertise in dispute resolution, familiarity with the issues, and nonpartisan status in the eyes of all the participants.10

The MCZM staff prepared a list of stakeholding interests and people who might represent each group most effectively. The list was given to the facilitators for review. Finally, the staff prepared a series of short memoranda summarizing the contents of various popular and scholarly articles on the subject of tidelands development (including court opinions regarding tidelands protection in Massachusetts).11

Prior to the dialogue, then-state Senator Chester Atkins, Chair of the Ways of Means Committee played a key role. Each year, the Ways and Mean Committee addresses a special issue as part of the budget package it presents to the legislature. In 1983, the issue addressed was irrevocable licenses of tidelands. Atkins’ report concluded that issuance of additional licenses on a case by case basis was inappropriate, as this would subject the outcome to the lobbying skill of individual developers. Atkins’ report was viewed as objective and comprehensive by both public agencies and waterfront developers. The document made the case that a change was needed in tidelands licensing, and served as an important catalyst for new action.12

OCTOBER 1983 FACILITATED DIALOGUE13

The discussion took the form of a by-invitation-only workshop. The session began with an overview by Carl Dierker, Counsel to the Department of Environmental Quality Engineering and Howard Palmer, of the Eminent Domain Division of the Attorney General’s office. They based their presentation in part on the Special Report of the Senate Ways and Means Committee. The report reviewed the issue of tidelands licensing and concluded that issuance of additional licenses on a case by case basis was
inappropriate, as this would subject the outcome to the lobbying skill of
an individual developer. Palmer and Dierker emphasized the state's
obligation to protect the public rights in tidelands. They also pointed
out that once the need to change the current system of case-by-case
issuance of permits was recognized, a new system was needed to make
decisions as to how tidelands were to be used.\textsuperscript{14}

Norman Byrnes of the law firm Gaston Snow and Ely Bartlett reviewed
the concerns of waterfront developers. He indicated that his clients
agreed with DEQE and the Attorney General that it was not in their
interest to have a politicized decision every time a license was issued.
Leaving the decision to the legislature, he reported, created too much
uncertainty for his clients. At the same time, he stressed that his
clients worried that without an irrevocable license passed by the
legislature, the title to the property itself would be uncertain. This in
turn would inhibit developers' ability to secure title insurance and long
term bank financing.\textsuperscript{15}

The facilitators asked the fifty participants to imagine that they had
responsibility for defining the "public interest in tidelands". One
overarching consideration emerged almost immediately: the interests of
the public would be best served by limiting licenses in certain areas to
water-dependent projects. Other criteria for gauging the public interest
in specific cases were proposed: a net benefit-detriment test,
limitations on changes in land use near the water, consistency with
locally adopted master plans, and financial compensation (paid to the
state) for any environmental or economic loss attributable to new
development in the coastal zone.

The participants focussed on the definition of "irreversible impacts",
the notion of "once-and-for-all permits," and allowable changes in land
use. They agreed, after a day of discussion, on five needs (1) to map
tidelands in a more detailed fashion; (2) to limit specific activities in
certain tidelands; (3) to insist that developers demonstrate how proposed
projects would provide for continued navigation; (4) to create a process for evaluating net benefits; and (5) to exclude certain nonmaritime uses from all tidelands.

The group spent a great deal of time exploring various administrative processes by which those five objectives could be met. The participants recommended that the calculation of net benefits should take account of long-term economic and ecological value of unique coastal ecosystems, the social benefit of water-dependent activities and land uses, the ecological compatibility of proposed development, and the prospect of relocating specific water-dependent activities elsewhere. Toward the end of the workshop the discussion turned to the design of an agency (or agencies) that would be designated to negotiate the terms of individual tideland leases.

The workshop participants discussed issues of mutual concern and identified overlapping interests. By the end of the workshop they had reached consensus on a number of issues, including the overarching importance of water dependency in screening new uses of tidelands or proposed activities in the coastal zone. They also agreed that substantial fees should be charged for any license to site new development in the coastal zone and that revenues from those fees should be used to purchase and protect the most ecologically sensitive portions of the coastal zone. Some of the participants believed it would be appropriate to collect rent on a continuing basis or to calculate the expected value of the rent over the life of the lease and set the initial license fee at that level.

Finally, all the parties agreed that no further development should be permitted in some ecologically sensitive portions of the coastal zone. They called for a map designating areas that should be excluded from further development.
LEGISLATION

On December 17, 1983—less than two months after the workshop, the Legislature amended chapter 91, revising the process for tidelands licensing.\textsuperscript{16} As the MCZM staff and others negotiated the final version of the bill, the discussions reflected both the substance and the tone of the workshop.

The bill passed easily for several reasons. The MCZM strategy of averting opposition succeeded. Several groups were persuaded by the information presented and the principles developed at the workshop to put aside their objections. Other groups were satisfied by the agency's pledge to convene a Tidelands Advisory Committee to work out the final language of the regulations. Still other private parties were not yet focussed on how the proposed regulations might affect their interests, so there was no organized opposition.\textsuperscript{17} Although some coastal legislators had found it advantageous to confer direct benefits on individual constituents, most legislators welcomed the chance to eliminate case-by-case review of licenses from their workload. Legislators seemed favorably impressed by William Lahey's testimony before the House/Senate Joint Natural Resources Committee in which he cited the consensus that emerged from the October, 1983 event.\textsuperscript{18}

THE TIDELANDS ADVISORY COMMITTEE

The statute took effect immediately, overriding prior statutes. The law established new standards but did not specify how they were to be implemented. In particular, the statute was silent on the amount of the license fees to be collected. Accordingly the agencies embarked on a dual path of promulgating regulations and implementing the statute based on interim standards. In developing the regulations, the key players agreed to work together, and the model of facilitated dialogue they used earlier proved helpful.
Again, CZM and DEQE recruited a small hand-picked group "as a surrogate for the public" in drafting the regulations. This Tidelands Advisory Committee included one representative drawn from each of the major interest groups present at the October workshop. Lahey notes that he and DEQE staff including his legal counterpart, Carl Dierker, "spent a lot of time" identifying stakeholding interests that should be represented.19

Since the staff wanted to ensure that the group was balanced, no more than one individual was recruited to represent each interest group on the 24-member Tidelands Advisory Committee (TAC). Thus, there was one banker, one local government representative, one representative of title insurance interests, one environmentalist, and one representative of marina interests.20

Attorneys and staff for CZM and DEQE convened fortnightly meetings with the TAC to develop the regulations beginning in March, 1984 and continuing through the fall of 1985. Responsibility for moderating these sessions alternated between the directors of the CZM and the Division of Wetlands and Waterways, the DEQE division with licensing authority. Prior to each session, staff prepared and mailed a briefing memo regarding one of the elements of the tidelands regulations. Then, at each meeting, the staff sought consensus among the group. Although staff did not prepare formal minutes, during this period of time staff lawyers drafted seven complete versions of the regulations.21

According to Lahey, "a culture of 'good citizenship' prevailed at TAC meetings. There was generally a feeling that much more needed to be done to protect the public's interest." Lahey attributes part of this attitude to the fact that he and fellow attorneys Carl Dierker and Renee Robin convinced the TAC that the Commonwealth had been burdened with bad public policy for a long time, and public property was essentially being given away. "The encouragement and support of the TAC," said Lahey "allowed us (DEQE and CZM attorneys) to develop very restrictive regulations with the complete belief that we had the full support of the community. This is the first place where DEQE and CZM may have been misled."22
Before the regulations could be completed, several key agency staff left or shifted positions. In the second half of 1985, before the regulations were made public, attorneys Lahey and Robin left the employ of CZM. Gary Clayton and Carl Dierker convened a final session in September of 1985. CZM hired Dennis Ducsik, who had attended some TAC meetings as an observer, to serve as senior consultant for public access and tidelands issues. By that time, the agencies decided to conclude the TAC meetings, in part because the TAC members felt that "things had started to drag, and that it was time for the agencies to finish the job". Gary Clayton moved from CZM to become Chief of the Waterways Division for DEQE.

STAFF REVISES REGULATIONS/REFINES CONCEPT OF "PROPER PUBLIC PURPOSE"

Although the TAC was not disbanded, the group stopped meeting by the end of the summer of 1985. Ducsik, Clayton, and DEQE attorney Carl Dierker spent the period between September, 1985 and January, 1987 working intensively to revise the regulations. They relied heavily on comments received at the TAC meetings, but convened no formal workshops to present revised versions of the regulations or to seek additional comments.

A major focus of the staff effort was to clarify regulations guiding non-water dependent use to ensure that uses requiring water access would not be crowded out. CZM realized that carrying out the full intent of the legislation would bring about a dramatic shift in public policy towards coastal resources. In the view of CZM staff, the regulations would consistently involve the State in local land use planning decisions for the first time in Massachusetts history. By implication, waterfront developers who were accustomed to modest review of their projects by local communities would have to meet new, tougher standards.

Ducsik devoted fulltime to implementing the tidelands program, mostly in "making a fresh evaluation of the regulations". He devoted special attention to clarifying the concepts of the "public interest in tidelands" and "proper public purpose", which he viewed as underdeveloped in earlier drafts of the regulations. What began as half a page of vague language
was transformed into ten pages of detailed regulations. Other staff worked on the regulations on an "as available" basis when they could defer other pressing duties.\textsuperscript{24}

The portions of the regulations dealing with marinas and combined residential units and boat slips ("dockominiums") received far less staff time and attention.\textsuperscript{26} As a result, there was little explicit effort to define how the regulations would affect marinas. Altogether, DBQE and CZM staff spent fourteen months in "in-house development of concepts" with very little interaction with key stakeholding interests.\textsuperscript{27}

The Tideland Statute was amended slightly in July 1986 principally to provide additional security for real estate interests.\textsuperscript{28} During the period of in-house revision, leaders of the Massachusetts Audubon Society, the Conservation Law Foundation, and the Sierra Club became concerned because they had not received progress reports on the status of the regulations. They requested and were granted a meeting with Executive Office of Environmental Affairs Secretary James Hoyte, and key staff involved in drafting the regulations. The environmental leaders left reassured that the regulations were on the right track.\textsuperscript{29}

The TAC was briefed on the regulations in November, 1986. Aside from the meeting with environmental leaders, there was no other advance strategy to release the regulations to other waterfront interests. A draft of the regulations was made public in December, 1986 and formally published January 12, 1987—about two years after the legislation was passed.\textsuperscript{30} Ducsi\textsuperscript{31} recalled that agency staff identified the lack of an advance strategy as a problem. "But given acute pressure to complete the regulations, the difficulty of even securing internal review, and severe staff shortages," he "didn't see how it would have been possible to meet with major interest groups."
PUBLIC HEARINGS PRODUCE SHARPLY CRITICAL RESPONSE; WATERWAYS ACTION COMMITTEE FORMS

Three public information meetings were scheduled for January, 1987, followed by three public hearings in February, 1987. In Lahey's words, the agencies "got clobbered on the regulations". Several hundred people attended the hearings. While leaders of the environmental groups supported the regulations, they did not recruit a strong showing from their membership. Marina owners and operators, the most numerous interest group in attendance, were very critical.

The marina operators contended that the state was taking away their business by requiring that berths be offered on a "fair and equitable basis". They were particularly alarmed about one of the options for allocation—a lottery. Such a mechanism would thwart the ability of marina operators to determine who would use their berth space, and they argued, could displace longtime users who had been loyal customers. "A stone wall of opposition" arose in response to proposals to do away with "permanent" licenses (which usually took the form of 99 year leases). Altogether, over 1000 pages of comments were gathered.

Three major groups expressed concern: marina interests, the Commonwealth's transportation agencies, and a lawyer's committee representing real estate interests. The marina interests were by far the most vocal.

The catalyst in organizing the marina interests was Ed Doherty, President of Marina Consult, a national marketing firm that specializes in converting marinas to mixed marina/residential "dockominiums". Doherty's interests were threatened because the proposed regulations would have prohibited such dockominiums by insisting on fair and equitable allocation of berth space. He viewed the permissible methods to allocate berth space—a waiting list or a lottery—as too restrictive. By late January of 1987, just a few weeks after draft regulations were circulated for public hearing, a coalition of marina owners, consultants, and
investment advisors formed in opposition, calling itself the Waterways Action Committee (WAC). None of the WAC members had participated in the October, 1983 meeting. Except for Andy Dominic, none had been involved in the Tidelands Advisory Committee.37

The WAC quickly raised substantial funds and assembled a team that included attorney Stan Wallerstein of Posternak, Blankstein, and Blum; the Arthur D. Little company as economic consultants; and Hill/Knolton, a Boston public relations firm, to fight the proposed tidelands regulations.38

Marina interests were upset about several sections of the proposed regulations aside from the provisions dealing with allocation of berth space. The regulations would have allowed marina parking lots up to 10% of the marina itself. Wallerstein noted "we couldn’t live with this restrictive definition of water dependent use", which would have excluded many marina parking lots or bait shops.39 (Ducsi argued that the draft regulations would permit bait shops in conjunction with marinas.)40 Instead, the WAC propounded the idea of a "full service marina" which would allow swimming pools and a host of other ancillary facilities.

Other issues of concern were provisions about voiding of licensing, limitations on leases to one year "when everyone else on the waterfront can have leases for as long as they like", and fee schedules "which would have represented a doubling or quadrupling of costs to marina owners". They also criticized requirements to provide showers and toilets as "utopian but impractical" for small marinas.41

According to Clayton, the Committee proved very effective on "all fronts".42 Wallerstein produced detailed line-by-line comments on the draft regulations. This first set of comments took a hard line and in Wallerstein’s view, were meant to avert immediate enactment of "unacceptable" regulations.43 Arthur D. Little analyzed the economic impact of the proposed regulations, concluding that it would pose a severe economic impact on marina owners.44 Hill and Knowlton produced a newsletter and arranged for TV and radio coverage of the public hearings.
Clayton believes that the comments did "point out problems and flaws of the draft regulations", but at the same time they inflamed legislators on Beacon Hill, a trend the regulator characterized as "unhelpful."

In Wallerstein's view, the function of lobbyist Dennis Newman was to "inform" legislators. Ducsik reported that some of the lobbying activity overstated the scope and intent of the proposed regulations, a tactic which backfired among some legislators.

The other two groups who expressed opposition worked more quietly. According to Ducsik, the lawyers committee for real estate interests prepared a detailed memo suggesting that the regulations were overreaching. State transportation agencies, accustomed to carrying out their projects with minimal oversight, expressed their concerns internally.

SECOND ROUND OF WORKSHOPS: SPECIAL ADVISORY COMMITTEE ON RECREATIONAL BOATING

CZM and DEQF set out to respond to the criticism of the draft regulations by convening six meetings of a Special Advisory Committee on Recreational Boating during July and August of 1987. Participants included marina operators, environmentalists, and other waterfront users. The composition and agenda of the Special Advisory Committee differed from its predecessor TAC. Membership was narrower, and the agenda for discussion focused on issues related to water-dependent use, assignment of slips and moorings, and public access.

Each meeting was preceded by a position paper which described the agencies' rationale for a particular element of the draft regulations, and summarized public comments (including line-by-line comments offered by the WAC). The briefing packets also included alternate formulations of regulations as discussion points. During this phase, Wallerstein produced a second set of line-by-line comments on behalf of the WAC which he regarded as more conciliatory, indicating possible compromise language.
In the view of the agencies, the purpose of the meetings was to provide an occasion for the agencies to present their rationale for the regulation, and for marina interests to explain the basis of their concern and learn what other commentators had to say. This process of mutual education led participants to drop some of their objections on minor points of the regulations. Although the meetings provided an opportunity to "test the waters about proposed revisions to the regulations, they were not intended to be regulatory negotiations". Rather, the Special Advisory Committee was cast in a review and comment role.

By the end of August, 1987, DEQE/CZM made another joint commitment to complete the regulations by the end of the year. Wallerstein thought there would be a final session in October, 1987 to discuss how the comments might be incorporated in the revised regulations. For DEQE's key attorney and Division Director, completing the regulations competed with many other tough assignments.

In September 1987, DEQE was inundated with a workload related to Boston Harbor improvements, and was directed to put aside work on the tidelands regulations. In addition, DEQE had to process permits for a series of specific tidelands licenses under proposed regulations. This task also took staff time away from completing the regulations.

Chapter 91 is being implemented on a piecemeal basis. Some marina operators and other tidelands users are frustrated about DEQE's failure to complete the regulations. However, Wallerstein believes that the content of current regulations "works well enough although 'mom and pop' marinas go through the ringer while big projects seem to get through more easily." Clayton believes that the requirement for DEQE to implement the law has provided invaluable experience that will make the regulations more realistic over the long run.

Acute staff shortages currently hinder review of tidelands applications such that each DEQE line staff member is responsible for
over 100 license applications apiece. Each license must now be negotiated individually, a time-consuming process in the absence of specific regulations. Even with more thorough regulations in place, some degree of negotiation must follow license applications to work out design, access, and phasing of waterfront development.58

NEXT STEPS

DEQE and CZM are staffing the effort to implement the tidelands law and finalize the 94-page regulations with four staff. This probably amounts to the equivalent of just two full time staff—fewer staff resources than were available 3 or 4 years ago. The complexity of the regulations is due to sweeping geographic scope, past legislative action (both Chapter 91 legislation and ad hoc issuance of licenses), along with a series of sometimes conflicting legal precedents.59

Key staff (Ducsiik, Dierker, and Clayton) worked intensively during the fall 1988 and winter of 1989 to complete the next draft of the regulations.60 The current goal is to complete the draft by June, 1989. Before the new regulations can be promulgated, the agencies plan to undertake meetings with additional interest groups and transportation agencies to hear their specific concerns.

Then, they will prepare another full set of revisions to present for comment in public hearing. Next, final revisions will be made to account for the key issues raised in the public hearing, and the document will be submitted to the legislature for a sixty day review period. DEQE expects this sequence of steps to carry well into 1989.61

EVALUATION OF SUPPLEMENTAL PROCESSES USED TO DEVELOP TIDELANDS LEGISLATION AND REGULATION

The Massachusetts tidelands case suggests that the normal procedure for settling policy disputes through the legislative process can be supplemented effectively by facilitated face-to-face dialogue among the
contending parties. Interactions among carefully selected representatives of key stakeholding interests can help create a constituency and mandate for legislative action.

While there is ample evidence in this case that the facilitated dialogue materially assisted the speed and quality of the legislation, the translation of broad statutory language into specific regulations has proved much more problematic. From start to finish, the tidelands process will require at least five-and-a-half years, from policy dialogue to legislation, to full implementing regulations. Several additional lessons are illustrated by this case. The evidence suggests that closer attention to four sets of process design considerations may have produced a more timely and satisfactory outcome. These issues relate to effective participation, joint collection and synthesis of information, clarity of the agenda and the need to "sell an informal agreement back home".

Comments on Participation of Affected Stakeholders in Shaping the Tideland Regulations

Experience shows that full and effective representation of stakeholder interests is essential to negotiating solutions to coastal resource management issues. CZM and DEQE conceived of the TAC's purposes as threefold: to provide information to agency staff, gauge the acceptability of proposed regulations, and help to build consensus. If these were indeed the goals, the agencies may have erred in their design of the TAC process. In hindsight, issues arose as to the appropriateness of individual participants, the clarity of their roles, and the continuity of their involvement.

Lahey observed that just one representative of marina interests was recruited to the TAC. Moreover, the TAC had no representatives of dockominium developers—a constituency that proved to be highly motivated and perseverant. The marine operators' designee, Andy Dominick, owner of the Cape Ann marina, missed several meetings. Wallerstein characterized Dominick as "not terribly sophisticated" and agreed that "he was asleep at
the switch". Ironically, it was a concern about fairness that gave rise to this problem. Limiting representation to a single individual per interest group is much less necessary and appropriate where the decision rule is consensus (as opposed to majority rule). When Dominick failed to attend meetings, the TAC was deprived of the marine operators’ perspective.

Moreover, no mechanism was in place to ensure that Dominic or other TAC participants reflected their constituents’ concerns during the committee deliberations. There was no mechanism to ensure that they communicated Committee’s progress and implications of the draft regulations to their constituents. Although Lahey characterized the TAC as "a surrogate for the public", Ducisk questioned whether the TAC was really conceived as a "modern constituency building mechanism with a support structure fanning out, or whether it was a more traditional advice-getting mechanism."

For representation to be effective, it must have continuity throughout the policy development process. Continuity was undermined in this case when the TAC stopped meeting regularly. Over a year passed from the last TAC meeting to the briefing before the regulations were released. Given this hiatus in communication, it is not surprising that the TAC did not back the regulations more aggressively.

Comments on "Selling the Agreement Back Home"

When a group of negotiators reaches an informal agreement, there is a critical need for participants to "sell the agreement back home". Moreover, a collaborative mechanism is needed to translate the general agreement reached in a policy dialogue into a form that can be implemented. Broad principles established in the dialogue must be translated into operational terms. Notions such as "water dependency" and "tests of net public benefits" must be applied in actual sites to have meaning. General assent of stakeholders working in an advisory mode needs to be translated into support for concrete regulatory language.
In this instance, the agencies lacked the wherewithal to "sell the agreement" to four major groups with a stake in implementing the regulations: the TAC as a whole, environmental groups, real estate interests, and legislators.

DEQE and CZM lacked a strategy to carry the support of the TAC forward into the public hearing arena. Whatever the TAC's flaws, continuity was lost when the agencies stopped convening the group regularly. This problem was exacerbated when the final revisions of the regulations were made with no interaction aside from a briefing in late 1986. The TAC was briefed on the regulations in November, 1986, but no specific effort was made to line up favorable comments by TAC members. Ducisik observed "We didn't have the people who were our friends up to speed."

Massachusetts' environmental groups have long embraced the concepts of public access and protection of the public trust. Given this posture, their failure to rally their members to support the regulations was striking. The Massachusetts Environmental Lobby participated actively in TAC meetings, but did not have a major presence in the public hearings. Similarly, The Conservation Law Foundation and Massachusetts Audubon, two of the most powerful environmental groups in the State, were not influential in their support of the regulations. The environmental groups' low profile on tidelands can be traced to their absence as a direct party to the internal agency discussions that preceded issuance of the draft regulations.

Real estate interests represent a third key constituency that wavered. The agencies were taken by surprise by the public posture of Donald Connors, a prominent Boston land use lawyer and TAC member. Connors had given his support for the tidelands regulations throughout the TAC meetings, yet he offered very negative testimony to lead off one of the public hearings.

The agencies had no systematic effort to brief the legislature as the regulations were being finalized. This information vacuum no doubt left
legislators more susceptible to the arguments of WAC lobbyists than might otherwise have been the case. A corollary problem was the lack of a complementary strategy for publicity and public relations.67

Comment on Joint Development of Information

Often, joint fact-finding and analysis can lay the foundation for development of policies acceptable to all sides. Complex economic, scientific and site planning issues are inherent in tidelands licensing. Despite the technical nature of the issue, the TAC spent little effort in joint development of information to support the need for the regulation, or to forecast its specific effects. Basic economic and land use data would have illuminated several issues related to costs of licenses versus leases, bank financing, and impacts of regulations on water dependent uses.

In many cases, an area of tideland sufficient to support an entire marina has been licensed at a fraction of the cost of a single boat slip.68 Yet, the TAC did not compile detailed financial information on the costs developers historically paid for tidelands licenses versus the fees they charge users for "long term" 99 year lease.

The relationship between lease duration and the ability to attract bank financing is a key issue which could have been illuminated by greater attention to information gathering. The WAC contended that its members could not secure bank financing with a lease shorter than 99 years. Contrary to WAC's assertions, banks have been willing to lend to developers with 20 to 40 year leases in most other coastal states with licensing requirements.69

Additional information gathering to evaluate the effects of key provisions of the regulations might have been useful. A crucial oversight was the failure to forecast precisely how the language on water dependent uses would affect marinas. For example, the TAC did not forecast the effects of the provisions to ensure equal access to boat slips envisioned by the regulations.70
Instead, the only analysis on the effects of the tidelands licenses was undertaken by Arthur D. Little on behalf of the marina interests.\textsuperscript{65} The ADL report emphasized economic harm to private interests by showing how licenses and regulatory requirements would impose added costs on marina developers and operators. However, the ADL report did not compare the regulations with those used in other states, nor did it show how the regulations would serve the public interest.

Joint fact-finding may be politically wiser than relying on "neutral staff" to analyze controversial issues without regular review and consultation with affected stakeholders. DEQE and CZM consulted stakeholders in waterfront development in 1984 and 1985 during the work of the TAC, and again in 1987. However, as the agencies worked to complete the regulations, they worked for several months without direct interaction with key stakeholders. The risk is that agencies can get into the mode of "analyze, decide, announce, defend".

**Comment on Narrowing the Agenda to Enhance Timely Completion**

The issue of timeliness has arisen throughout the process. The agencies have fallen short in meeting a series of pledges to prepare revised regulations by a specific date. The difficulty of allocating sufficient staff and the difficulty of securing some measure of consensus from affected interests have worked against this goal. Ironically, a preoccupation about the need for quick closure also works against the interactive approach to negotiating the regulations.

In this case, the regulations amount to a comprehensive overhaul of the way land use planning is conducted for the Massachusetts coast. According to Ducsik, the final language for over 20 major issues remains unfinished due to the sheer size of the workload.\textsuperscript{71} If the regulations are to be issued within the next few months, additional steps must be taken to narrow the agenda.
A strategy that may hold promise is to identify a handful of priority issues, work towards a negotiated agreement on those, and defer specific regulations on others for a year or two. This would bound the task of reaching the next milestone, and would provide additional experience on which to base regulations.

Besides producing a better informed outcome, a joint fact-finding process can help narrow the agenda of contentious issues. A process of joint fact-finding may have reinforced both the broad scope of issues and helped parties assign some hierarchy of priority to the highest issues.

Some analysts are beginning to talk favorably about paring down the scope of tidelands regulations. One concept would be to finalize only a few of the most contentious and important elements of the regulations within the next six to eight months, while leaving the rest with only broad guidance. Within this context, the agencies could agree to negotiate portions of the regulations on a contingent basis. In other words, if the process (in terms of staff investment required) and the substance of the outcome were both acceptable to the agencies, the agencies might agree to negotiate other portions of the regulations.

Comment on Allocation of Staff Resources to the Tidelands Regulations

Although there was executive leadership from Governor Dukakis' top deputies to pressured line agencies to "get the regulations done", there was no commitment of extra resources to get the job done. Similarly, there was no recognition that while the regulations were envisioned as a comprehensive approach to dozens of issues, it might have been wiser to concentrate on a few priority areas and defer action on secondary issues.

Such leadership could have encouraged contending stakeholders to come to consensus around a smaller number of issues and push the regulations through in a timely fashion. For instance James Hoyte, former Secretary for Environmental Affairs, Alden Raine, Director of the Governor's Office of Economic Development, or Governor Dukakis could have pushed the regulations through more quickly.
Comment on Prospects for Use of a Single Negotiated Text

This case may present an excellent opportunity to finalize the regulations using the technique of single text negotiation. Thus far, DEQE and CZM have thus far chosen to treat the TAC and the Special Advisory Committee in a "review and comment role". But the stakeholding interests could be invited to help the agencies hammer out final (or near-final) language of the regulations. Several factors suggest that this may be a timely and strategic course of action. Wallerstein believes the WAC will stay active "until acceptable regulations are passed".

The work of the Special Advisory Committee on Recreational Boating provided an occasion for substantial joint learning, and revealed that with regard to many issues, the agencies and marina interests are really not that far apart. To protect the agencies in their job of upholding the public trust, it should be understood that DEQE and CZM would retain veto power over unacceptable formulations. If the agencies could come to terms with key interest groups around a single formulation, the legislature would be hard pressed to turn aside the regulations.
CHAPTER SIX
RESPONDING TO THE SHORTCOMINGS OF TRADITIONAL PROCESSES
FOR HANDLING SCIENCE-INTENSIVE COASTAL RESOURCE DISPUTES:
LESSONS FROM THE NEW YORK BIGHT INITIATIVE

Introduction

The previous chapters identified a series of shortcomings that arise in traditional processes for handling coastal resource disputes of a science-intensive nature. First, there was insufficient attention to ensuring that affected stakeholder groups participated effectively. Second, there was a lack of access to scientists and scientific information. Third, there were insufficient mechanisms to handle areas of scientific disagreement and uncertainty. Fourth, although informal face-to-face negotiation was attempted in several cases, there were inadequate mechanisms to package agreements. Fifth, there was a failure to seek ratification of informal agreements by "selling them back home." This chapter is organized to review each of these shortcomings for the four cases previously discussed, and to describe how an experimental process known as the New York Bight Initiative sought to respond to each of these difficulties. A sixth issue examined in this chapter is the role of a mediation team in assisting the resolution of complex disputes.

OVERVIEW OF THE NEW YORK BIGHT INITIATIVE

The New York Bight Initiative is one of the first collaborative decision making processes to take account of the shortcomings in the way traditional administrative, legislative, and judicial processes handle scientific issues. The Initiative was built on three key features:

- direct dialogue among scientists, decision makers, resource users and other interested parties;
- extensive joint fact-finding to review and present relevant technical information;
- mediated negotiation of a 80-page single text document through five successive drafts, including five chapters of findings and a chapter of management strategies.

Careful attention was devoted to design of the process, recruitment of participants, setting the agenda, recruitment of technical experts,
carrying out joint fact-finding, negotiating management recommendations, and securing ratification of the final document.

The Bight Initiative began as the result of a convergence of interests on the part of the New York Academy of Sciences and members of the MIT-Harvard Public Disputes Program. In 1984, the Academy created a Science and Decision Making Project. The Program recognized that traditional forums for resolving technically complex problems often fail to generate scientific information for decision makers in a timely fashion. Accordingly, the Program's mission was to develop and test supplements to traditional decision making processes premised on direct dialogue among policy makers, representatives of key interest groups and appropriate scientists. Concurrently, members of the MIT-Harvard Public Disputes Program were investigating techniques for resolving disputes of a science-intensive nature as part of their larger theory-building efforts. The author was studying the application of dispute resolution techniques to marine use conflicts involving the myriad interest groups and agencies that contend over management of large, complex water bodies. He suggested a collaborative effort to develop and test processes to help address an actual marine policy dispute in the New York metropolitan region. Mr. McCreary, then-director Janice Perlman, and Co-Director Marc David Block agreed to work together.

After reviewing a range of documents on environmental quality in the New York area and speaking to knowledgeable observers, by the spring of 1985, the NYAS team identified issues related to restoration and management of the Bight as logical candidate for the Academy's involvement. Lying over the middle Atlantic continental shelf, the Bight is a vast and productive ocean region that borders the coast from Cape May, New York to Montauk Point, New York (Figure 6.1). It encompasses 11,310 square nautical miles (an area larger than the state of New Jersey) and borders on the most densely populated areas of the United States. The Bight is an important fishery and recreational area for the 18 million people living around it. The House Merchant Marine and Fishery Committee estimates the value of commercial seafood landings at close to $50 million annually.
The area of greatest concern is the New York Bight Apex—the northwest corner of the Bight bounded by the southwestern coast of Long Island and Manasquan, New Jersey. The Bight Apex is shallow, only moderately well mixed and a sink for several pollutant sources. Historically, point discharges of waste included raw sewage and industrial waste.\textsuperscript{4}

The waters of the Bight continue to serve as a sink for pollutants from municipal wastewater, industrial wastewaters, leachate from landfills, urban stormwater and combined sewer overflows, and accidental spillage from transport of materials. Some Southern New Jersey facilities discharged untreated as recently as 1987. Additional wastes are sequestered in terrestrial deposits of uncertain stability (such as landfills and storage areas) and contribute contaminants on a regular basis.\textsuperscript{5} The documented impacts of pollution are numerous: FDA closure of shellfish beds, fin rot, declining fishery catch, decline of biological abundance and diversity, bioaccumulation of heavy metals and pesticides, and an oceanographic phenomena known as anoxia (absence of oxygen in the water column).\textsuperscript{6}

The NYAS recognized the New York Bight as the focus of two important resource policy debates. The core problem is the polluted nature of the Bight and resulting decline in biological, economic, and recreational values. One dimension of the problem was the question of whether sewage sludge from New York City and New Jersey suburbs ought to be move to a deepwater dumpsite, 106 miles offshore.\textsuperscript{7} A second related issue is how best to restore the environmental productivity and economic value of the Bight. Corollary concerns were how responsibility for carrying out and paying for these efforts ought to allocated, and which problems ought to be attacked first.

Backed by indications of support from the Port Authority and the William and Flora Hewlett Foundation the Academy convened an initial meeting to explore prospects for playing a role in a collaborative process to improve management of the Bight. This meeting marked the initial step in the Academy’s efforts to gain credibility as a convenor and mediator.
Invitees included port interests, state and federal agencies, staff to regional legislators, environmental groups, fishing interests, and directors of regional scientific institutions. Invitations stated:

We write to invite you to an important meeting concerning the future of the New York Bight. The meeting will explore processes to facilitate a comprehensive strategy of Bight management and restoration. The Academy hopes to help clarify the scientific bases of the divergent views and assumptions underlying Bight issues.

The National Oceanographic and Atmospheric Administration describes the Bight as "one of the most stressed marine ecosystems in the United States". Citizen groups and resource agencies are already developing specific proposals to cope with management and restoration in the Bight.

Unless these proposals address the strong competing interests at stake and are based on the best available science, chances for wise decision making will be slim. If concerted action is to take place, the following issues must be addressed: Is the Bight stressed? What are the criteria? Is there a need for a Bight restoration and management strategy? Which issues should be addressed first? How can consensus be developed to propose and implement a Bight strategy?

The meeting would be...an initial forum to focus on these important issues. We hope to pinpoint...those issues in which differences of scientific fact and interpretation hinder consensus. The Academy does not presuppose what processes or models for action might be developed. Our interest is to improve communication and cooperation among scientists, policy makers, and the general public, and to facilitate a holistic view of Bight management and its scientific underpinnings. You are in a position to make a significant contribution to the process we hope will be developed.

The meeting was attended by about 35 people representing ports, wastewater managers, fishermen, environmental groups, and scientific organizations. The meeting had several major outcomes. Participants confirmed that there was a high level of conflict, and a good deal of scientific disagreement and uncertainty inherent in Bight management. Participants agreed that management of the Bight should be approached in a way that goes beyond single issues, single disciplines, single interest groups, and single political jurisdictions. Participants also agreed that there is support for an effort to work towards consensus on the underpinnings of a Bight management strategy. Another major outcome was a general consensus that the Academy could fulfill a useful role in meeting these needs. Participants agreed with the Academy’s suggestion to undertake a series of structured interviews as a way to get a better handle on
participation and to narrow the issues for investigation. Participants endorsed the idea of direct dialogue between scientists, policy makers and citizens.

By the fall of 1985, the Academy had strong indications of financial support from the Hewlett Foundation and the grant was awarded in December, 1985, giving the Academy added credibility. During the startup phase, the Academy team worked towards a clearer conception of the style of intervention they should bring to public disputes. The Academy had credible standing with the scientific community and a nonpartisan reputation with respect to public issues. The Academy’s headquarters also represented a neutral forum where diverse groups could meet. But unlike such organizations as the MIT-Harvard Public Disputes Program, the Keystone Center, or the Conservation Foundation, the New York Academy of Sciences did not have a substantial track record in resolving environmental disputes. Hence, in a very large sense, the Program had to build its identity at much the same time that the Bight Initiative was being launched. After several months of internal debate, the team concluded that the Program could provide its most valuable service when both fact-finding and negotiation of recommendations were elements of the Bight Initiative.

**Design of the Single Text Negotiation Process**

Process design, initial recruitment of participants, and initial problem definition proved to be an iterative process. By the fall of 1985 the State Coastal Programs of New York and New Jersey expressed interest in helping to underwrite the Bight Initiative. With funds in hand to conduct the interviews, and with an understanding that the Academy would focus on a single issue with a carefully picked group of stakeholders, the heads of the two coastal programs offered their cooperation. They jointly sought funds under the federal coastal program.
After a lengthy review of the published literature on dispute resolution and consideration of recent experiences with regulatory negotiation, the NYAS team opted to make negotiation of a single text document the centerpiece of their proposal. In this way, participants could come to some shared conception of a problem statement, clearly identify areas of agreement, pinpoint areas of uncertainty, and propose research and policy action to respond to the jointly understood problem. Such a single text would stand in contrast to myriad competing versions of facts and recommendations typically associated with management of the Bight.

Building negotiation of a single text into the process design offered several advantages. First, a single text, the team felt, would respond to an often-heard complaint about the seemingly endless meetings on aspects of Bight management: that they seldom produced a tangible product. Second, the Academy team felt that carrying the process of fact-finding and dialogue through to a single final text would be a significant contribution to the evolving contribution of resolving science-intensive disputes. Third, creating such a final document was congruent with the routine experience of the Academy in producing its Annals and The Sciences. Fourth, a dialogue leading to a final product was more likely to present an incentive for scientists to participate. Fifth, a text negotiated and ratified by all parties was more likely to create an impetus for action than a report authored solely by the Academy. And sixth, identifying the single text as a product would clearly distinguish the Academy’s work from the efforts of other groups working on aspects of Bight management.

The Academy’s funding proposal emphasized its intent to improve the use of scientific information in decision making; facilitate politically legitimate and scientifically credible solutions that address the multiple uses and ecological stress characterizing the Bight; and to formulate a model for future Bight decision making. The proposal also expressed the Academy’s intent to address three major problems that cut across the full array of Bight management issues: the difficulty of efficiently using
scientific information in the policy making process; the absence of a forum in which Bight stakeholders can debate the full range of Bight issues; and the obstacles which adversarial relationships among stakeholders have posed for constructive Bight management. The proposal explicitly explained the Academy team's goal to work as facilitators to guide the group through problem definition, joint fact-finding, collaborative problem solving, and development of constructive policy solutions. The Academy forecast that the work products would be an issue-based research agenda, and a published single text to serve as a written agreement, a summary of proceedings, and a guide for future action.\(^{15}\)

The NYAS team felt it was essential for the group to choose the issue.\(^{16}\) Facilitated policy dialogues, the proposal explained, were needed to place participants on a more equal footing in understanding the scientific dimensions of the problems at stake. The negotiation of a single text was the centerpiece of the Bight Initiative proposal, and the most novel aspect of the procedure. The NYAS pointed out that many conferences and seminars had been convened on the Bight, but had not produced a definitive final product. The single text, the NYAS explained, would identify and clarify the areas of scientific agreement, pinpoint the areas of scientific disagreement and uncertainty, suggest research to help alleviate this disagreement, and propose policy recommendations to deal with the issues at hand.

July, 1986 Meeting to Ratify Design of the Experimental Process

With interviews complete,\(^{17}\) several funding commitments in hand and others pending\(^{18}\) the NYAS convened a meeting in the summer of 1986 with key stakeholders. Participants included EPA, the coastal programs of New York and New Jersey, New York State DEC, the Interstate Sanitation Commission, Long Island Regional Planning Board, Clean Ocean Action, the American Littoral Society, the Port Authority of New York and New Jersey, the New York City Environmental Policy Forum, and the Environmental Defense Fund. Again, the overarching consideration the Academy team used
in recruiting participation was to engage users and managers of the Bight with a stake in the question of overall management of the Bight. The Academy considered the mandate and jurisdiction of environmental management agencies. For private groups, the Academy considered public positions or well-publicized missions regarding Bight management. Other considerations included seeking a geographic balance among organizations based in New York and New Jersey, and between groups with a parochial focus and those with a broader view. (These considerations are described in more detail later in the chapter.)

This meeting represented an effort to ratify the Academy’s process design, and to handle the early stages of recruitment of participation and setting the agenda. The team reviewed the proposed Bight Initiative sequence of problem definition, joint fact-finding, and single text negotiation. The notion of joint review of scientific information and negotiation of a single text was generally agreeable. Participants and funders expressed a strong desire to see the Academy, in consultation with key agencies, to better define the problem focus.

After consulting with the two coastal programs and OCRM, the NYAS team determined that focusing on the sources, fates, and effects of a single class of contaminants was a reasonable way to bound the agenda for fact-finding and negotiation. The New York Coastal Program proposed a focus on PCBs. Then, the Academy team conducted a telephone "straw poll" of the stakeholders they had assembled for the July, 1986 meeting and confirmed that better managing PCBs was indeed a compelling focus for investigation. In early November, 1986, a steering committee of key agencies (EPA, New York State Coastal Program, New York State Department of Environmental Conservation, New York City Department of Environmental Protection, New Jersey Department of Environmental Protection) met to consider the proposal and agreed to move forward. In retrospect, it appears that the Academy’s willingness to be flexible, yet to provide clear leadership in the design of the Bight Initiative process was essential to launching the project.
The Bight Initiative focused on the question of how to better manage polychlorinated biphenyls (PCBs) in the waters, sediment, and biota of the estuarine and ocean system known as the Hudson/Raritan Estuary and the New York Bight. A portion of this system, the New York Bight Apex, has been described as "one of the most stressed marine ecosystems in the United States". PCBs, though only one of many contaminants present in the Bight ecosystem, have been the focus of attention due to a variety of factors, including evidence showing their persistence in the environment, carcinogenicity in animals, and health effects in humans. Additionally, PCBs appear to be detrimental at low concentrations to some species of fish, birds, and mammals—particularly with regard to reproductive ability.

Among the key issues considered were 1) whether it is sensible management policy to seek reduction of biologically available PCBs; 2) what specific steps might accomplish this goal with regard to "reservoirs" of PCBs thought to exist in discarded appliances, sediments, and waste streams passing through sewage treatment plants and entering the Bight through combined sewer overflow; 3) how to improve monitoring of the status and trends; 4) whether and how to achieve more unified sampling of PCBs in edible fish, coupled with issuance of public health advisories; 5) whether emerging PCB decontamination technologies (such using UV/Ozone or naturally adapted microbes to break down PCBs) hold promise as alternatives to traditional remedial measures such as incineration.

As proposed, the Bight Initiative was carried out under the auspices of the New York Academy of Sciences, a nonprofit educational and scientific organization based in Manhattan. Twenty-two organizations participated. The total effort took about two years, including nine months of startup, ten months of meetings (during which the negotiation took place during the last five months), and a six month ratification phase. Additional months were needed to prepare the final report for publication. (Due to funding gaps and staff changes the actual elapsed time was closer to three years). The costs for the Initiative totalled about $220,000. Of that amount, foundations contributed about $60,000, an
equal amount was contributed by government agencies and trade associations; and the Academy dedicated about $100,000 of in-kind services to the effort. An additional $20,000 was raised to cover preparation and distribution of the final agreement.

The process accomplished a synthesis of scientific information. With the help of Academy mediators, the negotiators were able to fashion a concise summary of PCB sources, fates, effects on human health and biota, applicable regulations, and socioeconomic considerations. The group consulted over 20 experts and considered or cited over 150 references on these subjects and drafted 122 specific findings.22

More importantly, the process produced an unusually high degree of consensus given the complexity of the issues involved and the historic contentiousness of interest groups and agencies in the New York metropolitan area. Negotiators representing port interests, local and state environmental management agencies, environmental groups, EPA, federal fish and wildlife interests, and wastewater utility managers reached consensus on 26 management recommendations. These included agreements on strategies to reduce overall levels of biologically available PCBs; improved source reduction; a consensus to investigate emerging decontamination technologies; more efficient sampling of environmental status and trends; and an agreement on an agenda for short-term and long-term research.23

The heads of eighteen participating organizations ratified the final document in writing. In their letters of ratification, several participating organizations commented favorably on the fairness of the process, the scientific and technical quality of the final document, and the value of having a team of active mediators assist the group. Several organizations expressed the opinion that the joint fact-finding and single text negotiation procedure exemplified by the Bight Initiative could help untangle other contentious public policy issues. Implementation of the recommendations is uncertain, but is expected to go forward when the final report is distributed in early 1989.24
Additionally, the process yielded at least two important spinoff benefits in the form of shifts in agency policy. Based on the exchange of scientific information in meetings convened and facilitated by the Academy, EPA clarified and refined the way it presents the still-controversial evidence linking PCBs to cancer in humans. Second, New York State DEC reversed its decision to curtail testing of PCBs in important fish stocks after nearly all relevant stakeholders (fishermen, environmentalists, industry representatives) protested that consistent information had to be the cornerstone of sound policy for managing PCBs.

Two overarching lessons emerged from this process. First, the Bight Initiative clearly demonstrated the value of direct dialogue among scientists, decision makers, and citizens. These benefits included improved relations, establishment of a common language among groups that normally talk past each other, and creation of a "more even playing field" with regard to access to technical information. Second, an active mediator posture in which the mediator is concerned about both the quality of the proceedings and the quality of the outcome was absolutely essential to keep the process on track. A more passive facilitator style would have failed to achieve the same degree of synthesis of information and consensus on management recommendations. Several more specific lessons can also be drawn from each step in the Bight Initiative process, as will be detailed in the succeeding sections of the chapter.

Organization of the Balance of This Chapter

This balance of this chapter examines five critical issues central to handling coastal and marine policy conflicts of a science-intensive nature. The issues are participation of stakeholder groups; access to scientists and scientific information; handling areas of scientific disagreement and uncertainty; packaging agreements; and ratification of informal agreements by "selling them back home." For each issue, the
shortcomings in traditional administrative, legislative and judicial processes identified in the preceding four case studies are summarized. Then, the experimental interventions used in the New York Bight Initiative are described in some detail, along with a summary of the results of these supplemental processes. A sixth issue examined is the role of a team of active mediators in helping to resolve a complex dispute. For each of the six major issues, the discussion summarizes lessons learned from the New York Bight Initiative.
SHORTCOMINGS IN PARTICIPATION IDENTIFIED IN THE OTHER CASE STUDIES

The Virginia nontidal wetlands case study showed that key parties with a stake in the management of nontidal wetlands were on an unequal footing during the legislative process. The Chesapeake Bay Foundation (CBF) prepared an initial draft, negotiated informally with several potential opponents of the bill, and then turned the draft over to the administration. However, the 60 day legislative session did not afford sufficient time to bring diverse affected groups together in face-to-face discussions to determine whether changes proposed by various lobbyists would be acceptable to the environmental community. Rather, proponents presented testimony in public hearings and lobbied legislators individually. The Foundation had a tough time competing with professional lobbyists for legislators’ attention. CBF and other environmentalists were not "at the table" when the key decisions were made—many of which took place in hearings called on short notice. Meanwhile, developers put forward twenty weakening amendments in a single hearing and forestry and agriculture interests tenaciously sought concessions. In the face of this pressure and the resulting weakening of standards, CBF—the bill’s original proponent—considered opposing the bill.27

For the Oakland case study the evidence is persuasive that participation of affected groups in the regulatory process was inadequate. Half Moon Bay interests were not recruited to early meetings where the EIS was scoped; in fact, these groups had little incentive to participate since disposal sites in their region were not under active consideration. When agencies switched their preferred site from Alcatraz to 1-M and then to B-1, a whole new set of interests became stakeholders. The involvement of affected interests did not keep pace with the new preferred site. Significant parties in the NEPA/MPRSA process felt that coastal public officials and citizens of the Pillar Point fishing port did not receive notice in time to effectively participate in the decision making on this project.28
The case study shows that groups with similar interests cannot always speak for one another. The Port and the Corps apparently assumed that the Bay Area environmental groups, the Pacific Coast Federation of Fishermen, or the fishing agencies could represent the interests of the San Mateo coastal interests. But the Director of the statewide fishermen’s association did not communicate effectively with his Half Moon Bay counterparts and San Francisco environmental groups were not well linked with groups to the south. Agency staff also felt that they could not adequately represent the fishermen’s interests. In the end, no group spoke for the Half Moon Bay fishermen.29

Third, the case study points up the drawbacks of passively seeking participation of affected stakeholders. Regulations enacted pursuant to NEPA and MPRSA require the Corps to provide adequate notice of proposed dredging projects to affected groups and to post notice in the area where spoils will be dumped. The major channels of communication for Half Moon Bay fishermen are trade associations, unions, and small markets at Pillar Point Harbor. Project proponents assumed that posting of notices in public libraries or a general discussion of the project in a newsletter or was sufficient to engage this pivotal affected groups. Since these methods were insufficient, it appears that a much more activist posture to recruit and sustain adequate participation.30

Fourth, this case documented wide disagreement as to what constitutes fair and effective participation. The Corps contended that it gave adequate notice and suggested they were "sandbagged" by the local fishermen who chose not to comment early. But the fishermen’s attorney insisted that participation was "woefully inadequate" for parties with a stake in the B-1 site off Half Moon Bay.31 Thus, clarifying the groundrules for participation is important.

Fewer problems with regard to participation were evident from the special master and the work of facilitators in tidelands legislation, but some problems did crop up. In the special master case, most respondents
felt that no major parties were missing from the monitoring meetings and agreed that Special Master Haar didn’t try to exclude parties, but he didn’t actively recruit them, either.\textsuperscript{32} The Conservation Law Foundation, a party to the parallel federal suit had an ambiguous role as the "the group (plaintiffs, defendants, and the Special Master) let them 'kind of' participate."\textsuperscript{33}

No specific criticisms surfaced with regard to participation during the work of the special facilitators in the tidelands case. Perhaps this satisfaction was due to the fact that the "handpicked" roster of participants was thoughtfully revised through several iterations in a give and take between the meeting convenors and the professional facilitators they hired. To help develop implementing regulations, agency staff convened a 24-member Tidelands Advisory Committee (TAC). In deference to perceived principles of fairness just one delegate was recruited to represent each major constituency.\textsuperscript{34} Prior to each session, staff prepared and mailed a briefing memo regarding one of the elements of the tidelands regulations. Then, at each meeting, the staff sought consensus among the group. No minutes of these sessions were prepared during this period but staff incorporated comments received in seven complete versions of the document. Although the TAC was well intentioned, important problems arose with the its work.

First, the sole representative of the marine operators was insufficiently committed to participation and missed several meetings. His absence deprived the TAC of his group’s perspective. No mechanism was in place to ensure that the marina operator’s delegate (or other TAC participants) reflected their constituents’ concerns during the committee deliberations. And since no meeting summaries were routinely distributed, there was no way to communicate the Committee’s progress and implications of the draft regulations to his constituency. Second, in organizing the TAC, agency regulators overlooked representatives of dockominium developers—a constituency that proved to be highly motivated, perserverent, and capable of organizing a blocking coalition.\textsuperscript{35}
Third, there was insufficient continuity in efforts to involve interested parties. Over a year passed from the final meeting of the TAC to the briefing before regulations were released. Aside from an additional briefing with environmental leaders, there was no advance strategy to release the regulations to waterfront interests. Given this hiatus in communication, it is not surprising that the TAC did not back the regulations more aggressively. Short-handed agency regulators, facing internal pressure to complete the regulations, concluded they had no time to meet with major interest groups. The result was a light turnout from environmental groups at the public hearings, while marina owners and operators, organized by the dockominium interests, were numerous and forceful in their opposition. Thus, an important source of continuity was undermined in this case when the TAC stopped meeting regularly and no broad-based group was convened to replace it.36

Two overarching conclusions may be drawn from the review of participation problems documented in the previous case studies. First, in each case there was at least one pivotal group that was not fully involved in the policy formulation process. Second, in none of these cases was there a consistent, activist approach to recruiting and sustaining participation.

SECURING APPROPRIATE PARTICIPATION FOR THE NEW YORK BIGHT INITIATIVE37

The New York Bight Initiative sought to overcome each of the problems related to participation identified in the previous case studies. Special efforts were made to identify affected groups, identify legitimate spokespersons, ensure that representatives attend meetings, and assist representatives in reporting back to their constituencies. Steps were taken to ensure continuity of participation throughout the policy development process and to ensure communication between representatives and their constituencies. Representation in the Bight Initiative evolved concurrent with the refinement of an agenda for collaborative problem solving and negotiation. This discussion explains several criteria the
Academy mediators used at each stage to arrive at appropriate representation. Participation began with a core group of key stakeholders interested broadly in improving management of the Bight. Then, when the focus was revised to include management of contaminants, four or five additional groups were added. Next, when key stakeholders chose to focus specifically on managing PCBs, two other organizations were added. This chapter show how important participation challenges arose and were met.

Selecting Representation for an Initial Meeting on Bight Management

The Academy’s initial goal with regard to participation was to engage organizations with a legitimate stake in the issue under discussion: improving management of the Hudson/Raritan Estuary and the New York Bight. To achieve appropriate participation from environmental management agencies, the Academy considered the mandates of the agencies to formulate and implement management programs for the Bight. It was evident that EPA, New Jersey Department of Environmental Protection, New York State Department of Environmental Conservation, and the New York and New Jersey Coastal Programs were clearly key players.

Among private users of the Bight, several factors helped the Academy team determine whether an organization had a stake in improved Bight management. These considerations included publicly stated positions; a well-publicized mission with regard to use or management of the Bight; or a constructive track record in public forums related to water quality issues. With these ideas in mind, the Academy determined that port interests, led by the Port Authority of New York and New Jersey were clearly key participants for an initial meeting. Another important player was the New York City Department of Environmental Protection. Vocal grassroots environmental groups included Clean Ocean Action, along with the Citizens’ Union Foundation, and the New York City Environmental Policy Forum. The National Wildlife Federation, a Washington, D.C.-based environmental group with a longstanding commitment to ocean issues, was also invited.
Another objective in recruiting participation for the initial meeting was to engage individuals who could help ease future access to the marine science community. Accordingly, the directors of the respective Sea Grant programs from New York and New Jersey were invited.

The Appropriate Size for a Facilitated Dialogue

The Academy team debated the question of what constitutes a manageable size for a group of parties taking part in a facilitated dialogue. NYAS mediators took a cue from EPA's experiments in regulatory negotiation, which appeared to be relatively analogous process. The regulatory negotiations typically involved eighteen to twenty two negotiators. Several agency staff and other major organizations counseled the Academy to keep the group under 30 people. Marc David Block's work as a trainer for personnel development convinced him that a group of 25 was about the maximum for sustained interactive dialogue. Thus, the Academy team informally arrived at the objective of keeping participation to about 25-30 stakeholders.

With these considerations in mind, the Academy hand picked representatives. The goal was to convene a manageable number of participants who could broadly represent the community concerned about management of the Bight.

In rounding out the list of invitees for the initial dialogue, the Academy's prior experience with the solid waste dialogue provided valuable insights about some of the major players in environmental management in the New York metropolitan regions. Additionally, the experience of staff from the Citizens' Union Foundation helped the Academy identify participants. The Academy came to refer to this set of players as a "core group of Bight stakeholders" or "key stakeholders".
Reconnaissance to Clarify the Scope of Issues and Parties Concerned About Improved Bight Management

In a major outcome of the initial meeting, the Academy was encouraged to undertake a series of interviews to get a clearer picture of interests at stake in the Bight and to clarify the scope of Bight management issues.38 A major component of the interviews was to compile an expanded list of organizations with a stake in management of the Bight.

The list was organized into nine broad categories totalling 225 organizations with the cumulative suggestions of interviewees.39 The NYAS accomplished four important goals by preparing this expanded list of stakeholders. First, this task helped clarify major clusters of interests. In this way, the Academy confirmed that commercial fishermen and recreational users would need a seat at the bargaining table. Second, building the list helped the NYAS identify important coalitions among multiple interest groups.40 Third, preparing the list helped the Academy understand the broader pool of organizations from which the stakeholders would be drawn for the single text negotiation. The Academy team envisioned that once the negotiations got underway, members of this broader pool of stakeholders would be invited as observers, or would receive summaries of the Academy’s meetings. Fourth, the fact that the NYAS asked interviewees for their suggestions helped build the credibility of the team.41

The interviews and surveys indicated that the general issue of greatest concern was to better understand the sources and risks posed by contaminants in the Bight.42 This framework for negotiation was confirmed at a meeting of key Bight stakeholders.

Important Considerations in Recruiting Participants for Single Text Negotiation

Once the core group of stakeholders agreed to meet in joint fact finding and single text negotiation to focus on managing contaminants in
the Bight, the Academy continued its objective to engage organizations with a legitimate stake in the issue under discussion. At this point, Academy mediators identified several secondary considerations that needed to be factored into the process of securing participation. These included: a desire for geographic balance in representation; a desire to recruit representatives with a serious interest in collaborative decision making; and access to the top decision makers in an organization. The Academy also worked to get information as to whether a proposed participant was welcomed by others, or engendered strong objections from other stakeholders. Two other considerations were the desirable size of a group of negotiators (discussed above) and the question of dealing with discrepancies in the scientific background of participants.

Dealing with Differences in the Scientific Background of Participants

The NYAS team, in desiring the Bight Initiative, considered how best to address differences in the scientific background of participants. The NYAS did not set a minimum threshold of expertise for participation, nor did they ask that organizations specifically appoint their top scientists. The NYAS team reasoned that such requirements were not only unnecessary, but perhaps undesirable, as the objective was to promote a dialogue among scientists, policy makers, and other stakeholders. The Academy envisioned that the Bight Initiative would feature the assistance of scientific advisors at each step of the way. In this way, organizations that did not have their own staff scientists could tap the expertise of panelists during the workshops convened at the Academy. Additionally, the Academy mediators intended to serve as "translators" during the scientific briefings and question and answer sessions to help scientists clarify unfamiliar technical terms and concepts.
Building a Tentative Roster of Stakeholders to Focus on Managing Contaminants

Clearly, the question managing PCBs touched on agency jurisdictions at the local, state, and federal level. The NYAS team recognized that EPA, with lead responsibility for implementing several major statutes and programs, had to be a participant. Chris Daggett, then EPA's Regional Administrator, agreed that the Academy's work was important, and decided to send his chief for marine programs. Two other federal environmental agencies were also logical participants: the National Marine Fisheries Service was concerned with use and management of fish stocks, while the U.S. Fish and Wildlife Service had a broader mission to protect biota. The U.S. Fish and Wildlife Service readily agreed to send the chief scientist from its district field office.

However, the Academy encountered initial resistance from the National Marine Fisheries Service (NMFS). District staff complained that they were too short handed to spare a staff member. The Academy approached a senior analyst at the Office of Ocean and Coastal Resources Management, a peer agency under NOAA, and asked for help. This tactic proved successful. As the Regional Program Manager for North Atlantic states, the Academy's contact had access to the highest possible levels of the agency. She was able to persuade NMFS of the importance of their participation. As a result, NMFS appointed a statesman-like scientist based at its Sandy Hook, New Jersey Laboratory.

The Academy team recognized that state environmental management agencies had to be key participants. In New York, the Department of Environmental Conservation has a broad mandate that includes water quality, fish and wildlife management, and oversight of toxics cleanup. A separate New York agency, the Bureau of Coastal Management and Waterfront Revitalization in the Department of State, coordinates policy for the coast. In New Jersey, the management of water quality, fish and wildlife, and coastal resources is grouped under the umbrella of the Department of
Environmental Protection. Again, the Academy met with the heads of each respective agency to secure participation. New Jersey DEP appointed a senior planner and a chief scientist from its special Office of Science and Research. DEC appointed a special assistant to the Commissioner. The New York Coastal Program director agreed to be the principal representative, and designated his deputy as the alternate.

Port and navigation interests were another key cluster of stakeholders. In the early stages of recruitment of participation, ports were more cohesive than other coalitions. Led by the Port Authority of New York and New Jersey, they met informally meeting to discuss participation in the Academy's Initiative. As a result, three organizations took part. These were the Port Authority—a public agency and one of the most important users of the Bight; the Towboat and Harbor Carriers—an industry trade association; and the Maritime Port Council—a labor group.

Despite this success with the Port Authority and private port interests, the Academy failed to persuade the Corps of Engineers to send a representative to its meetings. Corps staff determined that they were too burdened by the task of developing a disposal plan for dredged material, and could not spare the staff for the Academy's Initiative. (They also expressed reservations that the process could backfire by "reopening old wounds" and predicted that the Academy would fail to commit the environmental community to work in good faith.)

To secure appropriate industry representation, the Academy approached two trade associations—the Chemical Manufacturers Association (CMA) and the Small Organic Chemical Manufacturers Association (SOCMIA). CMA agreed to send a senior Vice President, while SOCMIA declined but asked to be kept informed.

Wastewater treatment agencies were approached as another key group of stakeholders. The most important organization in this group was New York
City DEP, then the principal utility still dumping sludge into the New York Bight as of late 1986. New York City DEP staff, convinced that they had done much to improve their image when the City agreed to terminate sludge dumping at the 12-mile site, were eager to participate. Similarly, the Interstate Sanitation Commission, an agency charged with improving regional coordination for water quality improvement, readily agreed to send a representative.

The mediation team took the question of geographic balance extremely seriously. First, as a Manhattan-based host, the New York Academy of Sciences had to reassure New Jersey-based organizations that it did not "tilt" towards New York. Here it was useful to point out that NYAS was a neutral, nonpartisan organization with many members from New Jersey (and indeed from all 50 states). Second, having reassured participants of its geographic neutrality, great care care had to be taken to recruit strong participation from New Jersey-based organizations.

In light of this objective, the Academy sought a representative of New Jersey wastewater utilities. The Academy worked out an arrangement whereby a staff analyst at the Rahway Valley Sewage Authority (an ocean-discharging municipality) agreed to serve on behalf of New Jersey municipalities.44

The Academy also sought to seek representation from both groups with both a local perspective and those with a regional or national perspective. Several organizations which agreed to participate were based in Manhattan, Albany, New York, and Trenton, New Jersey. However, stronger representation was needed from the shore communities in the region. The Long Island Regional Planning Board agreed to represent Long Island. The Board also suggested a representative of the sometimes difficult to reach commercial fishermen: Robert Gabrielson, President of the New York State Commercial Fishermen’s Association. The environmental concerns of the New Jersey Shore interests were represented by two environmental organizations (Clean Ocean Action and the American Littoral Society) and one "chamber of commerce"—the Monmouth–Ocean Development Council. (Both Monmouth and Ocean Counties border the New York Bight).
With CAC, CUF, Clean Ocean Action, and the American Littoral Society as probable participants, the Academy had strong local environmental group participation. Still missing was representation from a national environmental organization. Recognizing that this goal could be difficult to achieve, the Academy approached several organizations. First the Academy contacted the National Wildlife Federation whose staff attorney, Ken Kamlett, was widely recognized for his constructive work on ocean dumping issues. However, Kamlett had moved on to private consulting, and his replacement was not an expert in ocean management issues.45

The next fallback was to approach the Natural Resources Defense Council (NRDC) and the Environmental Defense Fund (EDF). NRDC had an especially strong track record in issues related to offshore oil development, but their chief staff expert was about to go on maternity leave, and could not send a replacement. This left EDF as the logical representative of the national environmental community. The Academy extended an invitation to the organization’s senior toxicologist in Washington, D.C. and to its senior water quality litigator based in New York. Both determined they could not spare the time, so a relatively junior scientist was assigned.46

Finalizing a Roster for Negotiations Over Managing PCBs

To complete the work of securing appropriate participation for a series of meetings on managing PCBs in the Bight, the Academy prepared a tentative roster of about 25 participants for review by key stakeholders. This action proceeded concurrently with the decision of stakeholders to narrow the focus for investigation from "managing contaminants" to "managing PCBs".47

The Academy "shopped the list around" to key agencies, port interests, industry representatives, and environmental groups. Most parties who reviewed the roster agreed that it represented the full spectrum of interests and at the same time represented a manageable number of
participants. However, circulating a draft roster did uncover two important omissions in the Academy’s preparation. The Academy identified a particularly controversial individual who led a Staten-Island based environmental group. The NYAS team met with that individual and reached an agreement: if certain other environmental groups were present, he would not insist on participating. Then, the Chemical Manufacturers Association helped the Academy identify an important addition to the roster of participants. CMA urged that the General Electric Company, a principal user of PCBs for manufacture of electrical equipment in years past, be invited to take part. Since GE was a party to litigation over cleanup of PCBs in the Upper Hudson, the Academy and other parties readily agreed to the logic of this suggestion. The conclusion of this process was to arrive at a final group of stakeholders (Table 6.1).

The Question of Resources to Assist the Participation of Selected Groups

Another important question was whether certain groups (i.e. grassroots community or environmental groups with few resources) would need financial assistance to participate. Such groups could find that travel, meal, and lodging costs associated with taking part in a series of workshops might work a financial hardship on their organizations. The Academy took modest steps to minimize costs. No overnight meetings were scheduled, and workshops started at 10:00 AM, so there was no need for groups traveling from Washington or the New Jersey shore to arrive in Manhattan the prior night. Additionally, the Academy provided breakfast and lunch at all workshops. Thus, financial burdens were particularly light for the Manhattan-based organizations, but could pose a slight problems for organizations traveling some distance.
TABLE 6.1: ORGANIZATIONS PARTICIPATING IN THE NEW YORK BIGHT INITIATIVE

<table>
<thead>
<tr>
<th>Environmental Management Agencies</th>
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<tr>
<td>U.S. EPA</td>
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<tr>
<td>New Jersey Department of Environmental Protection</td>
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<tr>
<td>Long Island Regional Planning Board</td>
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<tr>
<td>New York State Department of Environmental Conservation</td>
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<td>New York State Coastal Program</td>
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<tr>
<th>Wastewater Treatment and Management Agencies</th>
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<tr>
<td>Interstate Sanitation Commission</td>
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<tr>
<td>City of New York Department of Environmental Protection</td>
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<tr>
<td>Rahway Valley Sewerage Authority</td>
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<tr>
<th>Private Fishing Interests and Fishery Management Agencies</th>
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<tbody>
<tr>
<td>National Marine Fisheries Service/NOAA</td>
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<tr>
<td>U.S. Fish and Wildlife Service</td>
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<tr>
<td>New York State Commercial Fishermen’s Association</td>
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<table>
<thead>
<tr>
<th>Environmental Organizations</th>
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<tbody>
<tr>
<td>Clean Ocean Action</td>
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<td>American Littoral Society</td>
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<tr>
<td>Environmental Defense Fund</td>
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<tr>
<td>Coalition for the Bight</td>
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<tr>
<td>New York City Environmental Policy Forum</td>
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<td>Monmouth-Ocean Development Council</td>
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<tr>
<th>Electrical Equipment and Chemical Manufacturers</th>
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<tbody>
<tr>
<td>Chemical Manufacturers Association</td>
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<tr>
<td>Monsanto Corporation</td>
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<td>General Electric Company</td>
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<tr>
<th>Port Interests</th>
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<tr>
<td>Port Authority of New York and New Jersey</td>
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<tr>
<td>Towboat and Harbor Carriers Association</td>
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<td>Maritime Port Council</td>
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The question of appropriate funding participation and funding assistance arose in two ways. Port interests asked, as a condition of their participation, that the Academy seek funding from environmental groups. Port interests reasoned that some modest financial contribution would signify a serious commitment to the process on the part of environmental groups. The Academy sought minimal funding ($100–$500) from two New Jersey based environmental groups, Clean Ocean Action and the American Littoral Society. The Littoral Society flatly declined, saying "we don’t have that kind of money". Clean Ocean Action, a coalition of shore businesses and fishermen’s groups, agreed to poll its members for a slight contribution. The organizations’ coordinator determined that such a contribution was infeasible. Then, she countered that as an important form of in-kind service to the Bight Initiative, the organization would "close its doors for the day" each time she attended a meeting at the Academy.

The NYAS team, though experiencing its own budget shortfall, explored whether funding assistance could help eliminate obstacles to the participation of the Washington, D.C.-based Oceanic Society. The Society was interested in the Bight Initiative, but was strapped for funds and short of staff. The mediation team asked the Society to participate and agreed to propose to other parties that a small portion of the overall budget be allocated to help the Oceanic Society cover its travel costs. However the Oceanic Society notified the Academy that staff constraints were a more formidable constraint that its financial limitations and declined to participate. Thus, the Academy’s willingness to explore funding assistance was moot. In the end, no organization received financial assistance, and the lack of financial resources did not appear to preclude the involvement of any organization that otherwise would have participated.
Establishing the Credibility of NVAS Mediators and Ratification of the Mediation Team

Still another relevant question is how a team of mediator builds credibility and is ratified by a group of negotiators. In this case, the Academy team (Janice Perlman, Marc David Block, Scott McCreary and Marlene Mallner) represented itself as the prospective facilitators and mediators. The backing of the Academy of Sciences, a well recognized scientific organization, conveyed an initial presumption of credibility. The team took a number of steps to build credibility with Bight stakeholders. First, they convened an initial meeting which created the opportunity to demonstrate their skills in group facilitation. Next they conducted an extensive series of interviews. These interviews, scheduled in advance, reconfirmed, and carried out according to a detailed interview guide with a mix of open ended and close ended questions, helped demonstrate the Academy’s seriousness of purpose. Additionally, the interviews helped build the capacity to understand Bight issues. The Academy team thus had an opportunity to demonstrate their familiarity with the issues as the interviews went ahead. During the interviews, the Academy team members explained their objectives to convene a collaborative process to improve Bight management. They asked respondents whether they would consider participating in and helping to fund such an effort. This line of questioning provided the mediators with the opportunity to describe their respective backgrounds. In a few instance, they offered to share accounts of their prior work, and copies of their published articles.

The third phase of establishing credibility was to develop a formal proposal which was mailed individually to key potential funders. The proposed process was also presented for ratification to the group of stakeholders in July, 1986. Again, the NVAS team had an opportunity to demonstrate its facilitation skills. Thus, the Academy took a series of steps to build its credibility. At several junctures participants had an implicit choice to whether ratify the team, although there was never a formal request to ratify the team as such, or to invite suggestions of
additional mediators. Thus, ratification by participants of the Academy team was implicit in the agreement of parties to participate in the Bight Initiative. (The question of the selection, composition, and dynamics of the mediation team is described in more detail later in the chapter)

Meeting Ongoing Participation Challenges

Even after key stakeholders agreed to focus on PCBs and a "final" roster of participants was established, NYAS mediators had to meet a series of participation challenges as the joint fact-finding sessions went forward. Although the Academy had urged all organizations to appoint a principal representative and one alternate, the continuity of participation was broken in a few instances. One way the NYAS dealt with this issue was to prepare detailed summaries of each meeting, which were mailed to all participants and key observers. In other cases, the mediation team kept in close telephone contact with participants.

For some organizations, missing a few meetings did not seem to undermine the effectiveness of their overall participation. For instance, the Maritime Port Council missed several meetings, but deferred to two more active port representatives—the Towboat and Harbor Carriers and the Port Authority. Similarly, the New York State Coastal Program missed several meetings, but kept in close touch with the NYAS. The New York State Commercial Fishermen's representative also missed several meetings, and had no ready replacement. Again, the NYAS took special steps to keep him apprised of developments in each meeting.49

Serious problems arose regarding the Environmental Defense Fund's continuity of the participation. The initial designate, a reliable participant left her job and her successor left the process, then returned. Much later in the series of meetings, this second EDF representative deferred to the organization's senior toxicologist (the same individual whom the Academy initially sought to recruit). Near the end of the process, the Academy team met directly with the toxicologist in Washington in an attempt to secure EDF's views and keep this important national environmental organization in the process.50
A different challenge arose among industry representatives. Several meetings into the process, the principal GE designate and his alternate got bogged down in preparing for litigation, and were unable to attend meetings at the Academy. CMA urged that Monsanto, the principal manufacturer of PCBs, should be invited to participate. Although this move was outside the basic groundrules of consistent participation, the group of negotiators agreed that Monsanto should be seated at the negotiating table.

There is no question that it would have been preferable for all organizations to be represented consistently. However, the fact that the Bight Initiative continued through several fact-finding sessions, produced detailed meeting summaries, and produced four draft documents prior to the final agreement helped mitigate these problems to a large degree. The active mediator posture of the NYAS team also helped keep the lines of communication open and kept the single text process moving forward.

Lessons Learned Regarding Securing Appropriate Participation in Negotiations Over Science-Intensive Disputes

This discussion has revealed a number of strategies to ensure that participation is tailored to case. The group of stakeholders may have to evolve as the focus for negotiation is sharpened. The Bight Initiative shows that an active mediator posture may be necessary to secure appropriate representation. In some cases this may involve seeking assistance from "higher ups" and peer organizations. In other cases, the mediators may have to approach multiple organizations to ensure that a particular stakeholder group is represented.

The literature on negotiation theory advises mediators to ensure that parties with a legitimate stake in the issue have a seat at the bargaining table. This advice proved to be a useful organizing principle throughout the Bight Initiative process. The Academy considered several factors to help gauge whether an organization had a stake in the issue under discussion. For public agencies, the agencies' mandate and
jurisdiction provided important guidance as to whether they should be participants. For private interest, the first indications were public positions or well publicized missions regarding the issue under discussion.

Aside from the question of securing parties with a stake in the issue, the Academy considered several other factors in seeking to recruit appropriate participation. An important concerns was to seek a balance in geographic representation. This had two dimensions. One concern was seeking balance among organizations based respectively both in New York and New Jersey. Another objective was to recruit both community and grassroots representation as well as representation from organizations with a state or national policy orientation.

The Academy team also was cognizant of the obvious question of securing a rough balance in approximate numbers among the major clusters of interests (ports, environmentalists, industry, fishing, wastewater utilities, environmental management agencies). However this question took care of itself to a large degree as the other criteria for representation were achieved. Save for the early exclusion of a particularly controversial representative of a grassroots organization, the Academy and core group never excluded any group that asked to participate.

Beyond the goals of securing appropriate organizational participation, other important considerations went into the selection of designated representatives. One goal was to secure representatives with the interest and commitment to work the through complex problems raised by the single text negotiation. This commitment was deemed more important than seeking scientifically trained representatives, since scientists were present to assist negotiators at each step of the way. Differences in scientific background did not seem as important as preparation, attentiveness to the issues under discussion, and continuity of representation.
Consistent participation is important, since negotiators with apparently opposing views develop an esprit de corps during a sequence of collaborative meetings. Still another consideration was to recruit representatives who could either speak for their organization or would have access to top decision makers therein. The team tried to achieve this objective by meeting with senior officers of participating organizations, and asking them to designate a representative. Finally, the Academy worked to ensure that each participant in the Bight Initiative was willing to work in a collaborative style, and would not engender hostility from other participants. In one instance, this meant working diplomatically to exclude a potentially difficult individual.

Another lesson of the Bight Initiative is that in recruiting participation, it may be useful to encourage members of a coalition to caucus. Such caucuses may help clusters of interests to choose representatives and to reinforce the value of organizational participation.

The Bight Initiative also shows that in managing negotiations over complex public policy issues, mediators should anticipate a series of ongoing participation challenges. Representatives may be detained in litigation (GE); leave their jobs (EDF and Rahway Valley Sewerage Authority), otherwise miss meetings (several) or seek to recruit other coalition members after the collaborative process has begun (CMA). The Academy found that one useful way to help strengthen continuity in representation was to prepare and distribute detailed summaries of each meeting. Maintaining close contact by telephone or through personal meetings is another way to dealing with organizations who miss important meetings. With the basic criteria in for recruiting appropriate representation, mediators should exercise limited flexibility in allowing replacement of representatives, or to involve new participants who seek a seat at the bargaining table.

The Bight Initiative reinforces the lesson that while consistent participation from all key stakeholder groups is preferable, an active
mediator can ensure that some gaps in participation do not undermine the process. The fact that the Bight Initiative "took on a life of its own" through several fact-finding sessions, produced detailed meeting summaries, and produced four draft documents prior to the final agreement helped mitigate these problems to a large degree. The active mediator posture of the NYAS team also helped keep the lines of communication open and kept the single text process moving forward.

The size of the negotiating group (twenty two) was readily manageable by the team of mediators. The need for funding assistance for groups with less resources did not come into play in this instance, but could have been an issue if a Washington-D.C. based environmental group had taken part.

Access to relevant information and technical expertise must complement aggressive efforts to recruit affected stakeholders to participate in efforts to resolve complex disputes. The following section of the chapter will detail the technical resources made available to participants in the New York Bight Initiative.
The Virginia case study showed that the traditional legislative process was deficient in recruitment and use of scientific information to handle each of the key issues addressed in the wetlands bill. First, the legislative process did not use readily-available data when the decision was made to exclude 60% of Virginia’s watershed lands that drain into Chesapeake Bay, (two thirds of the state’s nontidal wetlands). Although the Chesapeake Bay Foundation had proposed legislation that would apply statewide, the administration’s bill restricted jurisdiction to the region known as Tidewater Virginia. The decision was based on "a sense that wetlands nearest the Bay were most threatened and have the most direct influence on water quality"—arguments that an estuarine scientist characterized as "at best pseudoscientific". This hunch overlooks strong evidence of the ecological linkage between the functions of upstream wetlands and watercourses and estuarine systems downstream.

When the legislative process considered exceptions to the types of wetlands to be regulated, readily-available expertise was not tapped to advise on the merits of the idea. An estuarine scientist who was present when the legislature exempted recreational ponds was not consulted, nor was there any debate on the merits of the idea. Thus, the legislature overlooked the scientific justification for preserving natural non-tidal wetlands for their superior stormwater detention functions.

Third, the legislative process failed to compile and synthesize data on key subjects for which information was not readily available. This problem arose when the legislature increased an exemption for small wetlands from those under a half acre to wetlands smaller than one full acre. Estuarine scientists forecast that exempting isolated nontidal wetlands smaller than one acre will totally exclude several important wetland types. Yet, there was no effort to summarize the functions and values of these wetlands, or to tabulate the size and frequency of occurrence for Virginia’s nontidal wetlands. The exemption for half acre
and one acre wetlands failed to take account of the scientifically sustainable concern that motivated the call for the legislation in the first place.

The administrative process exemplified by the Oakland dredge disposal case was deficient in organizing and synthesizing information needed to evaluate alternative disposal sites. Several major parties found the data on ecological impacts insufficient. EPA formally rated the EIS inadequate because of poor documentation of ecological impacts. Attorneys for the fishermen characterized the information about the ecological consequences of dumping spoils at the B-1 site "shockingly bad". Economic data produced by the regulatory process was also criticized. An attorney for the fishermen characterized the information on economic costs of dumping at the B-1 site as "less than not adequate at all," while state resources managers pointed out that the Corps' cost-benefit analysis failed to consider socioeconomic consequences for fisheries near the B-1 site. Conversely, the Port and the Corps would have preferred that data be developed to show the high cost of deepwater disposal. Parties were also dissatisfied with the data produced on safety and risks. No effort was made to correlate increased exposure in congested sea lanes with increased risks of accidents, nor were the limitations of conventional radar clearly established. The Corps acknowledged dissatisfaction with the data it produced to support designation of the B-1 site.

The lack of a solid working relationship among the agencies was another obstacle in compiling good information. This rocky relationship extended to disagreement about protocols for data collection and analysis. The Corps criticized the resource agencies' failure to treat the regulatory process as a collaborative opportunity, and complained that fisheries agencies "provided opinions with little hard data". EPA in turn criticized the Corps for declining offers of help from NMFS to sample ocean sites, and failing to tap the expertise of the U.S. Geological Survey. Clearly, the regulatory process did not create a partnership among peer agencies to help synthesize information for the EIS.
The work of the Technical Review Panel (TRP) represented a potentially useful supplement to the EIS process. While the meeting offered some opportunities for joint review of information and face-to-face bargaining, the constitution and methods used by the panel were flawed. First, the panel was faced with in some cases with significant information gaps and with outdated information (10-year-old fisheries data). The panel had no opportunity to close these gaps during its two-day existence.

Accordingly, there were many issues that the panel did not resolve. Second, the meeting was closed to all but EPA and Army Corps panelists and selected resource agency staff. A lead EPA staffer from the San Francisco was excluded. The meeting’s Ft. Belvoir Virginia venue would have made travel burdensome for most Bay Area groups. Third, although resource agency speakers may have attempted to advocate the fishermen’s interests, they could not speak for fishermen directly. Since they were not party to the expert deliberations, Half Moon Bay interests lost an opportunity to appreciate the rationale behind the panel’s conclusions. Fourth, the meeting was held very late in the EIS process, literally days before the Final SEIS was released. Panel members had no opportunity to recommend research that could have closed the data gaps they identified.

In hindsight, limiting the review to agency staff and existing agency data proved to be an undesirable exclusionary strategy. Local interests which had more up-to-date fisheries information had no way no introduce them into the decision making process. After the Panel finished its work, Half Moon Bay fishermen presented their log books in the cause of litigation. Important information was withheld by both sides. The Port did not reveal the prospects for prolonging use of the inner harbor at its current depth by carefully timing the arrival of large ships to correspond with highest tides. Fishermen introduced their log books in legal hearings to bolster their arguments on the productivity of fisheries at the B-1 site, but did not allow the Corps to see their data.

In the Boston Harbor case, parties praised the expertise used to prepare the Master’s report. However, the involvement of scientists ceased with the report was issued. Parties criticized the subsequent lack
of technical resources. Monitoring meetings were dominated by lawyers, and none of the experts retained to help prepare the report took part. Defendants’ lawyers recalled that "since the attorneys didn’t know about the technical issues, there was a lot of table banging to get things moving."68

The Conservation Law Foundation (CLF), a key environmental group, had difficulty gaining access to adequate expertise throughout both the state and federal litigation. In the state court action, the CLF attorney explained that "he wasn’t really participating" because he couldn’t educate himself on technical issues quickly enough, while in the federal court action the CLF had to retain a consultant of lesser reputation [compared to the expertise of the other hired experts] from the ‘farm leagues’ to take part in the deliberations over the timeline for construction of water quality improvements.69

In the Tidelands licensing case, the facilitated dialogue that set the stage for the legislation was informed by initial briefings and a day-long give-and-take among regulators, developers, and others with expertise. The initial meeting underscored the complex economic, scientific, and site planning issues inherent in tidelands licensing, yet the successor Technical Advisory Committee (TAC) spent little time to synthesize relevant information. Such an effort could have illuminated issues such as the relationship between costs of licenses versus leases, or compared the costs developers historically charge users for "long term" 99 year leases. The relationship between lease duration and the ability to attract bank financing was also not investigated.70

Additional information gathering to evaluate the effects of key provisions of the regulations might have been useful. No specific information was assembled to predict how regulations favoring water dependent uses would affect marinas. The only analysis on the effects of the tidelands licenses, undertaken by Arthur D. Little on behalf of the marina interests, emphasized economic harm to private interests but did not compare the regulations with those used in other states, or examine how the regulations would serve the public interest.71

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RECRUITMENT AND INVOLVEMENT OF SCIENTISTS AND TECHNICAL EXPERTS IN THE
NEW YORK BIGHT INITIATIVE\(^{72}\)

The foregoing review of the traditional legislative and administrative processes, and the "first generation" dispute resolution techniques revealed several breakdowns in providing decision makers and affected stakeholders with timely access to scientific information. In contrast, the New York Bight Initiative was explicitly designed to make possible the direct face-to-face interaction of policy makers, resource users, and scientists. The Bight Initiative sought to overcome the problems identified in the previous case studies by providing several roles for scientists to assist in the development of well-informed policy. One was to identify relevant information and comment on its validity. A second was to explain cause and effect relationships. This was crucial to the Bight Initiative, since the causal sequence of sources\(\rightarrow\)fates\(\rightarrow\)effects of PCBs was chosen as the frame for analysis.\(^{73}\) Still another important role of scientists was to help forecast the consequences of alternate policy recommendations.

Scientists accomplished these task in a variety of ways. One mechanism was to offer scientific briefings and then participate in subsequent question and answer sessions in which participants were invited to "cross examine" scientists. Another was to invite scientists to draft initial versions of portions of the negotiated text. A related task was to comment on interim drafts and to join policy makers in deliberating the merits of policy alternatives. In a few instances, scientific advisors also represented their agency. This was true for the designate from the National Marine Fisheries Service, a scientist whose portfolio of duties included policy analysis. Thomas Belton of New Jersey Department of Environmental Protection's Office of Science and Research also served as a second negotiator behind Lawrence Schmidt, head of the Department's Planning Office.

An excerpt of a roster of panelists (Table 6.2) shows that many scientists performed two or more of these roles. Of twenty three
TABLE 6.2 ROLES OF SCIENTISTS AND TECHNICAL EXPERTS IN BUILDING THE NEGOTIATED SINGLE TEXT

<table>
<thead>
<tr>
<th>Expert/Affiliation</th>
<th>Area of Expertise</th>
<th>Contribution to Text</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Brief Negotiators</td>
</tr>
<tr>
<td>Thomas Belton Office of Science and Research</td>
<td>Biological Effects Fates of Contaminants</td>
<td>X</td>
</tr>
<tr>
<td>Thomas Bopp Columbia University</td>
<td>Sedimentology</td>
<td></td>
</tr>
<tr>
<td>Ann Cali Rutgers University</td>
<td>Vertebrate and Invertebrate Pathology</td>
<td>X</td>
</tr>
<tr>
<td>Judith Capuzzo Woods Hole Oceanographic</td>
<td>Biological Oceanography</td>
<td>X</td>
</tr>
<tr>
<td>Ben Carpenter Research Triangle Inc.</td>
<td>Environmental Engineering</td>
<td>X</td>
</tr>
<tr>
<td>James Cogliano EPA Cancer Assessment Group</td>
<td>Risk Assessment</td>
<td>X</td>
</tr>
<tr>
<td>Michael Connor Battelle Ocean System</td>
<td>Risk Assessment/Public Health</td>
<td>X</td>
</tr>
<tr>
<td>Thomas Englert LMS Engineers</td>
<td>Sedimentology/Contaminant Flux</td>
<td></td>
</tr>
<tr>
<td>Leo Hetling New York StateDept. Health</td>
<td>Contaminant Fates/Public Health Risks</td>
<td></td>
</tr>
<tr>
<td>Karl Kieninger Consultant</td>
<td>Hydrography</td>
<td></td>
</tr>
<tr>
<td>G. Fred Lee New Jersey Institute of Technology</td>
<td>Marine Chemistry and Biological Oceanography</td>
<td></td>
</tr>
<tr>
<td>Expert/Affiliation</td>
<td>Area of Expertise</td>
<td>Contribution to Text</td>
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</tr>
<tr>
<td></td>
<td>Brief Negotiators Draft Portions of Text Assist Deliberation Serve as Negotiator</td>
<td></td>
</tr>
<tr>
<td>Kevin Mayer NYAS</td>
<td>Chemistry/Technical Illustration</td>
<td>X</td>
</tr>
<tr>
<td>Wallace McClain Environmental Law Reporter</td>
<td>Environmental Statutes and Regulations</td>
<td>X</td>
</tr>
<tr>
<td>Gerhard Mueller Columbia University</td>
<td>Hydrogeology/Contaminant Movement</td>
<td>X</td>
</tr>
<tr>
<td>Joel O' Connor NOAA -Office of Marine Pollution Assessment</td>
<td>Contaminant Effects/ Sources/Ecosystem Models</td>
<td>X X X</td>
</tr>
<tr>
<td>Joseph O' Connor New York University Medical School</td>
<td>Contaminant Fates/ Physiological Effects</td>
<td>X X X</td>
</tr>
<tr>
<td>Donald Phelps EPA Narragansett Laboratories</td>
<td>Contaminant Management</td>
<td>X X</td>
</tr>
<tr>
<td>Stephen Safe Texas A&amp;M University</td>
<td>Synergistic Effects of Contaminants</td>
<td>X</td>
</tr>
<tr>
<td>John Sanders Columbia University</td>
<td>Sedimentology</td>
<td>X X</td>
</tr>
<tr>
<td>Lawrence Skinner New York State DEC</td>
<td>Contaminant Monitoring</td>
<td>X X</td>
</tr>
<tr>
<td>Judith Weis Rutgers University</td>
<td>Environmental Toxicology</td>
<td>X X X</td>
</tr>
<tr>
<td>Stuart Wilk NMFS</td>
<td>Fisheries Management</td>
<td>X X X X</td>
</tr>
<tr>
<td>Usha Varanasi NMFS</td>
<td>Contaminant Effects</td>
<td>X X</td>
</tr>
</tbody>
</table>
participating scientists, fourteen provided briefings, twelve helped prepare initial drafts of portions of the text, fourteen assisted panelists in their deliberations and two served as negotiators for their organizations.

Recruitment of Scientists

How did the Academy recruit scientists as part of the resource pool for negotiators? Recruitment of these experts panelists took place in two phases. Very early in the Bight Initiative, the Academy used the interviews with stakeholders to compile a roster of scientists whose expertise could conceivably help illuminate technical aspects of major Bight issues. This roster included about 80 individuals with diverse specialties. About 40 were academics and 40 were either agency staff or consultants. This roster was circulated, and several iterations were prepared, presenting a ready-made pool of candidates.

Once PCBs were chosen as the focus for attention, the Academy began its recruitment efforts with scientists with expertise in toxicology, human health effects, and sedimentology. Review of the literature and the recommendations of other scientists were two ways the Academy identified candidate panelists. Often, one scientist in a particular speciality was able to lead the Academy to colleagues whose expertise was also useful. Because the scope of the single text was so broad—sources, fates, and effects of PCBs—the Academy quickly realized that significantly more scientists would be needed than could reasonably give briefings in a given day.

The Academy also determined it would be infeasible to offer panelists "veto power" over which experts were recruited, although several panelists—both industry officials and environmentalists—did recommend experts whom were tapped. For instance, GE and CMA suggested Stephen Safe, a scientist whose recent work shows that PCBs are often linked to the presence of polychlorinated dibenzofurans. Environmentalists

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suggested Judith Weis, a toxicologist at Rutgers University. The Academy used some rather general guidelines to confirm that panelists would be suitable. The team looked for people with advanced degrees (all but two had PhDs) who had worked and published for several years on their respective subjects. The views of other scientists were also taken into account.

The Academy’s neutral, nonpartisan standing and its strong scientific reputation helped immeasurably in recruiting panelists for the Bight Initiative. Initial contacts were made by phone, and followed up with a letter explaining the overall purpose of the Bight Initiative and the approximate agenda for the particular meeting for which panelists were invited. In one instance, a key scientific panelist, Joel O’Connor, suggested the names of about a dozen scientists who had published work on PCB sources. Although the Academy made the formal contact, it was clear that O’Connor’s involvement was helpful in ensuring the participation of the other scientists.

In a few cases, the Academy offered to pay a modest per diem and travel expenses, but this was seldom necessary. Nearly all scientists contacted expressed willingness to participate, although in a few cases scheduling conflicts made this impossible. Most scientists had home institutions in the New York metropolitan region, although the NYAS also tapped experts from Woods Hole Oceanographic Institution and Battelle Laboratories in Massachusetts, Texas A&M University, and EPA headquarters in Washington, D.C.

Finalizing Recruitment of Scientists: Letters of Invitation

Once a scientist agreed to serve as a panelist, the NYAS team offered brief instructions in writing. Each letter to scientific panelists explained the meeting goals, the goals of the overall Bight Initiative, and mentioned other speakers or panelists and their affiliations. These instructions evolved as the focus shifted from initial briefings to in depth fact-finding and later to revision of negotiated language.
Instructions became more explicit as the Academy worked to overcome some problems (discussed below) that surfaced in early meetings. An invitation for the first meeting explained the "your charge will be to give a 20-30 minute overview of current scientific information on sources of PCBs in the marine environment. Your presentation should cover your own work as well as your knowledge of current scientific information." Instructions for the third workshop, which emphasized in-depth fact finding stated: "...your charge would be...to make a 20 minute presentation [that should] begin with major findings of your research...[and] suggest what your findings reveal about management of PCBs in the Hudson-Raritan-Bight system." An invitation for the eighth workshop explained "Your greatest contribution will be to help the group refine and critique management options."

Some Minor Obstacles to Effective Involvement of Scientists in Negotiating a Single Text

As will be demonstrated in the following section of this chapter, (which details the accomplishments of the joint fact-finding activity), direct involvement of scientists clearly elevated the quality of information for the parties. Nevertheless, several pitfalls were apparent in bringing about this direct dialogue: 1) overly complex presentations; 2) unnecessary caveats about expertise; 3) lack of tolerance; 4) an inability to focus on policy actions other than more research.

Overly Complex Presentations: The mediation team found that scientists often present themselves as though they were addressing a scientific conference of their peers. This is no surprise, since this is the professional norm for most scientists. A recurring problem in the early briefings was that scientists tried to be overly comprehensive, swamping the participants with more information than they could readily handle. Some experts provided overly detailed presentations. One scientist, when asked for a concise 20 minute overview of PCB fates, presented 45 slides in 45 minutes. Another scientist, speaking on synergistic effects of PCBs and other contaminants, tried for conciseness
by packing his remarks with technical terms. At times this resulted in presentations that clarified some issues but left others unclear.

**Unnecessary Caveats About Preparation or Expertise:** In other cases, scientists' self presentation cast doubts on their expertise or preparation. For example, the NYAS team recruited an aquatic toxicologist to summarize reported effects of PCBs on marine organisms. She prepared an excellent summary in advance, as requested. But she preceded her professional review of 25 scientific articles by noting "I didn’t really do a literature search". Even though she had a very thorough grasp of her subject, the apparent effect was to undermine her credibility with the group. The mediator hoped that after hearing her presentation, the panelists would elect to incorporate a summary of her findings in tabular form, listing effects of PCBs in different aquatic organisms at specific concentrations. But, on the contrary, the panelists leaned towards including none of her material until the mediator intervened and urged that the groups adopt at least several paragraphs of text on aquatic toxicology.

**Lack of Tolerance for Non Scientists:** Some scientists, accustomed to communicating with their peers, lack tolerance for laypersons who "ask questions with obvious answers". One scientist, while eager to ensure the scientific accuracy of the discussions, treated a young environmental representative in a condescending style. "I hate it when my students interrupt me before I finish". The unfortunate result was to alienate the negotiator. Two other scientists went further an questioned the credentials of other scientific panelists.

**Preoccupation with Research Over Policy Action:** Several scientists displayed a tendency to recommend more research rather than commenting on more tangible management options. Scientists varied in their willingness to consider policy actions in the face of scientific uncertainty.
As the series of meetings progressed, the mediation team learned that at least some of these problems could be avoided by providing more explicit instructions. Another helpful tactic was to secure outlines of scientists' remarks in advance, and include them in the packet for the day's deliberations.

The Role of a Mediation Team in Facilitating the Interaction of Negotiators and Scientific Advisors

What role can a mediation team playing in facilitating the involvement of scientists and technical advisors? Some of these tasks have already been mentioned: recruiting scientists and providing scientists with clear "terms of reference" for the briefing or dialogue tasks expected of them.

Some other tasks were those of a secretariat. Preparation of a packet for each day's workshops included drawing up short biographies for scientists. Facilitators introduced scientists, and related their expertise to the task at hand.

Moderating the deliberation was a major task of the mediation team. In some instances, the mediation team broke into the scientific briefings and asked the experts to clarify their terms: "In other words, "X". Or so that means "Y". The mediators quickly learned that it was necessary to allow scientists to "vent"—perhaps by indulging a five or ten minute monologue on an arcane subject, before they were able to focus clearly on policy alternatives. Giving scientists "air time" enabled the dual benefits of establishing the legitimacy of their expertise, and "thinking out loud" to summarize the key implications of a complex idea. Sometimes, this venting took place in writing: scientists prepared lengthy briefing papers which were modified to fit the needs of the participants in completing the text. For instance, Dr. Joseph O'Connor prepared a three page memo summarizing why PCBs were a good model for studying other contaminants. Similarly, Dr. John Sanders wrote three or four pages on the physical features of the Bight that were boiled down to one and a half pages.
Moreover, there seems to be a "learning curve" among scientific panelists who serve at multiple deliberations of the negotiating group. Overall, scientific panelists exhibited a high level of investment.

In a few cases the mediation team reminded scientists that their task was not only to pursue a research agenda, but also to help forge consensus on policy alternatives. In instances where scientists appeared to be talking down to negotiators, the mediator tried to get scientists to adopt a more conciliatory, collaborative posture.

The task of recording and preparing meeting summaries also assisted the exchange of information. The mediation team used both personal computers and large sheets of wall paper to summarize the deliberations. Because participants knew they could count on receiving detailed meeting summaries, they were able to focus on the dynamics of the discussion without taking copious notes.
Several important areas of scientific disagreement and uncertainty went unresolved in the Virginia wetlands legislation. One important question was how to rationally define the boundaries of wetlands. The existence of multiple delineation methods complicated the deliberations, but there was no explicit effort to sort out the bases for the different definitions, or to look at how other states had handled this apparent ambiguity. As the legislation evolved, scientists representing state agencies and private developers offered competing views about the proper way to delineate wetlands. An expert hired by the developers argued that the existence of multiple methods (and hence a disagreement among experts) by EPA, the Army Corps, and the Fish and Wildlife Service cast doubt on the possibility of rational wetlands delineation.77

Disagreements also arose in forecasting the effects of the legislation. After wildlife habitat considerations were deleted from the criteria for permit review, parties disagreed as to whether the legislation would protect wildlife values. A Farm Bureau representative predicted that habitat would be protected "through the back door"78 while the Virginia Council on the Environment disagreed and argued that if wildlife values were excluded from the criteria, then nothing in the bill would prevent pine plantations or reservoirs from replacing natural wetlands.79

The administrative process in the Oakland case was generally insufficient to handle areas of scientific disagreement and uncertainty. The Corps believed the quality of information was very adequate regarding ecological impacts of disposal at the respective sites, while EPA found it inadequate. Parties were at odds about the starting assumptions for measuring impacts and the adequacy of the data collected. They also disagreed with the interpretations on the areal extent, degree and longevity of these effects. The Corps conceded "We [the parties] don’t
agree on any aspect of ecological impact. Parties also disagreed about the economic data that was produced. Additionally, proponents and opponents of dumping at B-1 ordered risks associated with the site differently. The Corps and the Port argued that conventional radar is effective only within a short radius of an installation in San Francisco Bay and forecast "enormous safety problems" in traveling one of the most congested channels in the world. Opponents of disposal at B-1 discounted these risks and contended that the Corps understated the ecological risks that would accrue to San Mateo County, the local Harbor District, and the fishermen who use Pillar Point during the peak salmon season.

Parties to the dredge disposal dispute also disagreed as to whether the EIS process provided adequate opportunities for affected groups to review and jointly understand scientific information. In the Corps' view, making information public and providing copies of decision documents was a sufficient method of joint information review, while other parties characterized this approach as too little, too late.

The work of the Technical Review Panel (TRP) represented a concentrated effort to review and analyze scientific information and reach some level of scientific consensus between EPA and the Corps. However, because the Panel met for two days and then disbanded, members had no way to correct the significant data gaps they uncovered in their deliberations over alternate disposal sites. After the TRP finished its work, important new information was introduced in the cause of litigation. Although Half Moon Bay fishermen presented their log books to illustrate the richness of the fishing groups off Pillar Point Harbor, other parties cast doubts on their accuracy. Some logbooks lack details about where fish are landed because fishermen were unwilling to lead others to fishing grounds, or because they were created during times devoted to "catching up on paperwork". A cooler, more illuminating discussion of fishery productivity at the B-1 site could have been accomplished during preparation of the EIS. Instead, the adversarial nature of litigation that followed caused each side to conceal or refuse to share information.
In the Boston Harbor case, scientific disagreement during the Special Master’s tenure was minimal. Parties praised the work of the Master’s experts, and all sides complimented the quality of the Master’s report. Although parties complained about the lack of expertise available during monitoring meetings, none of the respondents recalled any specific instances of scientific disagreement. However, the Master’s involvement did leave unanswered major technical questions as to when major water quality improvements could be completed. These uncertainties persisted when the case shifted to federal court. In the federal venue, "adversary science" arose when the MWRA, EPA, and CLF each retained different experts to support their preferred timeline for construction of sewer treatment plants and other water quality improvements.85

To his credit, Judge Mazzone encouraged parties to continue to negotiate but they disagreed widely as to when construction of the secondary treatment facility should be finished. The MWRA proposed a completion date of the year 2002, CLF proposed a completion dated in 1996, while EPA proposed a 1998 completion date. Judge Mazzone handled the disagreement in an even-handed fashion but could offer no resources to put the parties on a more equal footing or to get to the bottom of the technical disagreements. In the end, he was the sole arbiter of qualifications of the experts and the information each side presented. Judge Mazzone reviewed the evidence, found the MWRA’s consultant most qualified to advise on complex construction projects, and settled on MWRA’s revised timeline in his court order.86

Perhaps because the Technical Advisory Committee in the tidelands case spent little effort in joint development of information, important areas of uncertainty and disagreement surfaced. Parties disagreed about the critical relationship between lease duration and the ability to attract bank financing. The WAC contended that its members could not secure bank financing with a lease shorter than 99 years, yet banks have lent to developers based on 20 to 40 year leases in most other coastal states with licensing requirements. Another oversight was the failure to forecast precisely how language on water-dependent uses would affect marinas. This
information vacuum was filled only by Arthur D. Little, hired by the
dockominium and marina lobby to analyze potential economic harm caused by
regulatory requirements. Additional information gathering might have put
these predicted economic burdens into a more complete context, by, for
example, comparing costs developers historically paid for tidelands with
fees they charged users.\textsuperscript{87}

\textbf{USING JOINT FACT-FINDING TO HANDLE AREAS OF SCIENTIFIC DISAGREEMENT
AND UNCERTAINTY IN THE NEW YORK BIGHT INITIATIVE}\textsuperscript{84}

\textit{Introduction}

To help overcome the persistent problems of scientific disagreement
and uncertainty documented in the other cases, the Bight Initiative
brought scientists into a direct, sustained dialogue with negotiators to
enable joint discovery and review of relevant information. The experience
of the Initiative showed that the format in which information is presented
is as important as the information itself. Organizing information in an
appropriate format is crucial to the development of joint understanding of
a problem. The NYAS found that scientists can help provide the basic
frame of information, but "packaging" information in a clear, appropriate
format required the iterative efforts of scientists, the mediation team,
and negotiators. Appropriate packaging of information in a single text
required careful attention to the creation of tables, figures, and the
phrasing and sequence of prose. Although the fact-finding provided the
basis for negotiating over policy recommendations, the way information was
presented was also negotiated.

\textit{Documenting and Illustrating PCB Movement Through the Ecosystem}

A major focus of the joint fact-finding phase of the Bight Initiative
was to document PCB sources and movement through the ecosystem. At the
initial workshop, Dr. Joel O’Connor delivered a briefing in which he
described approximate quantities of PCBs in the Upper Hudson, the Lower
Hudson, and the Estuary, and the changes in these volumes over time.
After fielding questions at the initial workshop, Dr. O’ Conner augmented his figures over the next few weeks and circulated his draft table to about a dozen scientists who had published articles on PCB sources in the peer-reviewed literature. Then, the NYAS and Dr. O’ Conner invited comments and corrections from these experts and compiled a third version of the table. The scientists were invited to attend a "Sources Subcommittee" of negotiators and scientific advisors.

The focal point of this meeting was to further revise the table and prepare an up-to-date synthesis, while answering the questions of the non-scientist negotiators. Several groundrules assisted the work of the Sources Subcommittee. The group agreed to 1) focus specifically on sources; 2) treat scientific experts as nonpartisan advisors; they would not represent one particular view over another; 3) encourage dynamic interaction between scientists and stakeholders; and 4) work towards full consensus. The Subcommittee agreed that all data included in the summary table must be backed up by a specific published article or personal communication of data.  

In structured dialogue, the PCB Subcommittee (negotiators and scientific panelists) jointly developed working definitions of key terms to describe movement of PCBs through the system: source, flux, loss, volitilization, General Electric discharges, and PCBs. Reaching agreement on these and other working definitions gave the committee a common language as well as an important a sense of momentum. The Subcommittee further determined that information should be listed for two time periods, 1959-1979 and 1980 to the present. The negotiators deemed this appropriate because flux of PCBs declined markedly after 1980. The Subcommittee also agreed that each possible source of PCBs should be listed for each segment of the river, even if some data were missing. The result was a 12-page table with many gaps.

At the negotiators’ request, Dr. O’ Connor joined with Dr. John Sanders, a sedimentologist based at Columbia University, to prepare a more
concise version of the table, and boiled it down to four pages. Appendix A shows excerpts from the table. Negotiators agreed that the four-page table should be included in the single text, but wanted to present information on PCB sources in other formats. They also summarized key findings in prose:

- Land disposal sites and electrical equipment are almost certainly the largest PCB reservoirs. Sediments of the Hudson River and Estuary system are probably the next largest reservoirs.

- PCB levels in the system are dynamic. Available information indicates that PCB transport in sediment down the Hudson River has delcined considerably between 1970 and the early 1980’s and has since levelled off.

- The most obvious features of PCB flux in the region are that they are dominated by historic discharges of the General Electric Company. Although GE discharges of PCBs declined dramatically and have virtually ceased, flux of PCBs continued.

Negotiators called for a figure to show how PCBs move through the system to complement the findings. The first idea was to create a flow diagram. To make a flow diagram geographically precise, negotiators suggested keying a series of block diagrams to specific reaches of the river and estuary, but they lacked the patience and skills to implement their suggestions. The NYAS team summarized the groups’ guidance and passed it on to a technical illustrator. The illustrator simplified the figure to better convey the concept. Then, another round of revision by the mediation team in collaboration with scientists was needed to arrive at the best format. Appendix B shows excerpts of the figure.

**Summarizing the Existing Regulatory Framework for PCBs**

The NYAS team and the negotiators completed a similar sequence of tasks to put information on PCB regulations in a useful format. In brainstorming text on PCB management, negotiators suggested that a matrix be prepared to summarize regulations that pertain to each PCB source. The NYAS team sought help from the attorneys who edit *Environmental Regulation Reporter*—an authoritative periodical of the Bureau of National Affairs (BNA). The editors produced a detailed 12-page manuscript and obligingly attended an Academy workshop to describe it. Despite the
mediators' efforts to portray the work in a favorable light, the BNA editors met a rather rude reception. Negotiators rejected the lengthy prose format as inappropriate, and restated their need to see information summarized in a tabular format.

The editors of BNA were put off by the brusque reception, especially after putting considerable work into the document and sending a senior staffer to New York. Academy mediators thanked them for their time and efforts and reassured them of the importance of the overall single text negotiation. Then, they asked that the BNA editors revise their presentation and put it in tabular form.

After the NYAS team presented the negotiators' needs to the BNA attorneys, they received an approximately correct matrix. The Academy team asked BNA for a few more revisions in writing. The next version met the needs of negotiators. Four different tables were needed: "General Regulatory Framework", "Restrictions on Industry Discharge", "Control on Specific PCB Inputs and Reservoirs", and "Spill Notification Requirements". Each table described the PCB source, the applicable regulation, its federal code of regulation citation, and its effective date. Appendix C presents an excerpt from this figure.

**Dealing with the Burden of Proof**

In the Oakland Harbor case, fishermen sought to argue that the Ports needed to show that ecological impacts were negligible at their proposed dumpsite, while dredging proponents challenged their opponents for failing to produce definitive information as to how their purportedly important fisheries would be harmed by dredge disposal. Expressed more broadly, the outcomes of many technically-intensive disputes hinge on the question of which side should bear the burden of proof as has Brooks (1984) pointed out. In the context of the Bight Initiative, the question arose as to whether environmentalists needed to produce a "smoking gun" linking PCBs to effects observed in the ecosystem, or is "circumstantial evidence" sufficient to motivate action. The burden of proof arose repeatedly in
fact-finding phase of the Bight Initiative. Port and chemical industry representatives (nominally on one side) and environmental agency and interests groups struggled mightily, but neither cluster of interests succeeded in shifting the burden wholly to the "other side". Through the work of scientific advisors and the active mediation of the NYAS team, the tone of the final text reflected an even-handed approach.

The burden of proof was important when negotiators considered whether laboratory studies of biological effects of PCBs are relevant to real effects in the field. Negotiators recognized that in the urban water bodies such as the Estuary and the Bight, isolating the effects PCBs from other contaminants is almost impossible. In the absence of such a figurative cause-and-effect map, negotiators faced a choice: How should the text summarize laboratory studies that show damage caused by PCBs at very low concentrations and may mirror the effects thought to exist in the field? NYAS mediators asked Dr. Judith Weis of Rutgers University to summarize several articles she had compiled on the subject, and to brief negotiators on her findings. Weis, an aquatic toxicologist, also drafted about fifteen paragraphs on the results of 25 studies. In preparing the briefing packet for the day's dialogue, the NYAS posed the question to negotiators as to whether to include some version of her summary.

Some negotiators demanded a higher standard of proof to include findings in the text that ran contrary to their closely-held values and interests. Geraldine Cox of CMA and Dan Curll of Towboat and Harbor Carriers Association took a strong position against including any version of Weis's summary. They argued that if the studies did not show a causal linkage between PCBs and damage to fish in the Hudson River and the Bight, then no version of the material should be included. George Lutzic of New York City DEP argued that excluding the material would constitute suppressing information. It appeared that parties were at an impasse. However, as a result of the face-to-face dialogue among parties and scientific advisors enabled by the format of the Bight Initiative, a compromise position was achieved. Weis proposed language for a summary of her findings, and Dr. Joseph O'Connor, another scientific advisor,
assisted by asking the group to consider alternate language excerpted from a recent NOAA report on PCBs in Atlantic Bluefish:

Despite laboratory evidence describing PCBs as highly toxic at low concentrations there are few published data showing evidence of ecological effects due to PCBs in natural systems. However, some studies provide evidence that PCB effects in natural systems may be subtle and difficult to isolate from the effects of other environmental contaminants. We know of no data demonstrating that PCBs in natural environments are the direct cause of chronic or acute toxicity.93

Weis argued that fair, even-handed treatment must summarize the effects documented in European studies, and then explain that these effects were not shown in the Hudson. As a result of this exchange, parties agreed to include a shortened version of Weis’s summary, citing the most important studies and listing the major biological effects. This portion of the dialogue showed that an important aspect of joint fact-finding is joint selection and reporting of evidence.

Characterizing Plausible Effects Without Conclusive Evidence

Joel O’Connor, a systems ecologist with NOAA, clarified how biotic effects of PCBs in the Hudson River and nearby waters may well exist without exhibiting clear evidence.94 Unless effects become catastrophic, he explained, the likelihood of harm caused by PCBs is best judged (with much less rigor) from synthesis of laboratory experiments and measured effects in environments with extreme PCB exposures. O’Connor explained that adequate studies have not been conducted in the Hudson to rigorously assess whether such effects as population declines in mink (a fish eating carnivore), reproductive impairment in fish-eating birds, or tumors in finfishes were caused by pollution. Other plausible effects may include reproductive impairment and increased juvenile mortality in both fish and shellfish. Studies cited by Weis, he noted, provide plausible evidence of similar effects in nature. Moreover, it is even more difficult to link most observed effects to a specific pollutant because pollutants interact with other pollutants and with natural stresses.

As a result of O’Connor’s comments, negotiators insisted that the findings about harm caused by PCBs must be documented by specific references to
laboratory effects or field effects. Negotiators agreed with O’ Connor’s view that unless these distinctions are made, the only information we have (however circumstantial) would be suppressed. Parties agreed to incorporate part of O’ Connor’s proposed language in the text:

Lack of evidence conclusively linking adverse environmental or ecological impacts with PCBs is not proof that PCBs are toxicologically benign. Adequate studies have not been conducted in the Hudson/Raritan-Bight to rigorously establish whether observed ecological effects can be specifically attributed to PCBs, or to synergistic effects of PCBs with other contaminants, or to other causes.95

Characterizing Prospects for Using New Technologies

In many environmental disputes, environmentalists are skeptical of new technologies; business and development interests are less risk-averse and more optimistic of new technology. Environmentalists ask developers to prove that a new technology can work; developers would have their opponents prove that a new technology is harmful. But in the Bight Initiative, environmentalists and agency representatives were generally optimistic about emerging PCB decontamination technologies. Conversely, certain chemical and port interests were skeptical of new technologies.96 Some opposed mentioning cleanup technologies in the single text document at all. They feared that such information would overstate PCB contamination problems; be distorted by the press; or impose additional costs on small business.

Parties articulated positions similar to those expressed in the debate over biological effects of PCBs.97 Geraldine Cox and Dan Curll initially opposed including the information. George Lutzic of New York City DEP, Judith Weis of Rutgers University, John Sanders of Columbia University, and Donald Phelps of EPA argued for a summary of emerging PCB cleanup technology. Another team of negotiators argued that a clear summary of decontamination technologies should appear in the text. NYAS mediators and scientific advisors suggested that decontamination technologies be described in an appendix to the report, and that the text should be explicit about not endorsing or rejecting the technologies. In the end, this formulation was agreeable to all negotiators.
Characterizing Controversial Health Risks

The most controversial subject for the joint fact-finding effort addressed the evidence linking PCBs and health effects in humans, a subject of broad scientific disagreement. The NYAS, recognizing the dozens of books and hundreds of scientific articles in print, did not expect to settle this high-stakes public health debate in the context of a dialogue on coastal water quality. Nevertheless, the NYAS was determined that the text should accurately portray existing information and the specific extent and basis of scientific disagreement over the interpretation of available data. Among the subjects tackled were carcinogenicity of PCBs and pathways to humans, mechanisms of carcinogenic action, developmental toxicity, epidemiology, and accidental poisoning.

The NYAS and negotiators handled the problem by arranging for briefings from three scientific panelists who could offer different perspectives on the issue. Stephen Safe of Texas A&M University discussed non-cancer health effects and commented on some of the uncertainties inherent in attributing health effects to PCBs. James Cogliano of EPA’s Cancer Assessment Group discussed cancer risk assessment. Michael Connor of Battelle Laboratories helped place PCBs in the larger context of environmental contaminants. Geraldine Cox of the Chemical Manufacturers Association and Ellen Silbergeld of the Environmental Defense Fund, though not formal scientific advisors, also had a major impact on this section of the document.

Stephen Safe summarized some of the non-cancerous health effects of direct ingestion or contact of PCBs, including chloracne, changes in liver functions, and impairment of visual functions. This information was fairly uncontroversial. Safe’s briefing also explained that one basis of existing PCB regulations is the Yusho poisoning incident, in which Japanese families ate rice oil accidentally contaminated with PCBs and dibenzofurans, another suspected carcinogen. In addressing the links between PCBs and cancer, Safe emphasized the synergistic effects of PCBs
and dibenzofurans, and suggested that dibenzofurans, and not PCBs may have been the true "bad actor". He made the provocative assertion that the 2ppm FDA standard was based on a "fallacy".98

Cogliano’s talk and associated briefing paper explained that EPA ranks potential carcinogens according to the quality of evidence linking PCBs and cancer. He emphasized that the Yusho incident was only one piece of evidence considered. Cogliano explained that PCBs are classified by EPA as probable human carcinogens based on a series of key studies on animals; they are not classified as known human carcinogens.

Cogliano explained EPA’s rationale for cancer assessment and worked out his calculations of cancer risk in step-by-step fashion for all negotiators to see.99 Cogliano discussed how EPA’s cancer assessment group evaluates suspect carcinogens. For each compound, the agency establishes the sufficiency of data indicating carcinogenicity in humans and animals and then groups the compound’s grouping based on the level of human and animal evidence. He outlined the hierarchy of carcinogen groupings:

- **A**: known human carcinogens (sufficient data in humans)
- **B1**: probable human carcinogens (limited human data)
- **B2**: probable human carcinogens (insufficient human data; sufficient animal data)
- **C**: possible human carcinogen

Cogliano explained that three key animals studies involving similar strains of rats demonstrate the induction of liver tumors (hepatocellular carcinoma) after exposure to PCBs.100 Thus, PCBs are classified in Group B2, a probable human carcinogen based on sufficient animal data but insufficient human data. Several parties pointed out that many press accounts characterize PCBs as a "known" human carcinogen, and urged that EPA’s classification be properly explained in the single text.

A third parameter expresses the compound’s cancer potency—a measure of the strength of a particular carcinogen, which forecasts the number of cancers that would result from a particular exposure. He explained that
potency is the slope of a line fitted to a cluster of points. Each point represents the proportion of cancers observed in response to a specific dose of a compound. Since data is often clustered as high doses, it is necessary to fit a line to the point that projects cancer rates at low doses. EPA uses what is called a "plausible upper bound slope", which takes the highest straight line consistent with the data. The result, according to the agency "is a cautious, prudent, and protective forecast of effects at low doses." Cogliano also explained that the use of this slope estimate in risk evaluation requires an appreciation for the implication of the upper bound concept as well as the "weight of evidence for the likelihood" of a substance as a human carcinogen.\textsuperscript{101}

Cogliano explained that using the method described, EPA has established the carcinogenic potency of PCBs as 7.7 per mg of PCBs per kg of body weight per day. He reminded participants that risk = potency X dose. Since risk is dimensionless, this could be expressed as

\[
\text{Risk} = 7.7 \\
\text{mg/kg/day}.
\]

Therefore, a way is needed to scale the 7.7. He asked participants to consider that consumption of 6.5 grams of fish per day containing 2 ppm of PCBs would yield 13 micrograms of PCBs per day. If this is divided by the body weight of a 70 kilogram person, the dose would be .2 microgram per kilogram per day. Thus, using the formula:

\[
\text{Risk} = \frac{7.7 \times 0.002 \text{ mg/kilogram/day}}{\text{mg/kg/day}} = .00154.
\]

In other words, the increased risk of cancer is 1.5 per thousand population, assuming a daily consumption of 6.5 grams of fish containing PCB concentrations of 2 parts per million.\textsuperscript{102}
Geraldine Cox characterized EPA's use of an upper bound slope to forecast cancer risk as an exceptionally conservative approach. She pointed out that the upper bound is only an approximation of the true value. The true value may be much lower, with a lower bound approaching zero. She was adamant that the conservative assumptions embedded in EPA’s methods must be clearly expressed in the single text.

Port interests appreciated Cogliano’s presentation but wanted the relative cancer causing risks of PCBs put into a larger context. Cogliano responded that 58 air and water contaminants had been evaluated by EPA’s Cancer Assessment Group as suspect carcinogens, and that PCBs emerged in the middle of the list, about 20th from the top. Academy mediators suggested that the single text could include an appendix that presents relative carcinogenic potencies. This suggestion was endorsed by all parties. For each compound, the table lists the level of evidence linking PCBs to human and animals; the grouping based on EPA’s criteria; and the slope.103

The dialogue over health effects of PCBs in humans differed from less controversial discussions of PCB sources and regulations in several ways. Negotiators sought to introduce material not summarized by the scientific advisors. Another difference in the tone of this dialogue is that no amount of discussion was able to produce a single version of the "facts".

The give-and-take in the briefings and deliberations of negotiators revealed the presence of substantial technical disagreement and uncertainty on the question of health effects of PCBs. Several strategies proved useful to cope with this disagreement and uncertainty without freezing development of the single text in its tracks. Negotiators agreed that findings had to be documented in published literature (preferably peer-reviewed journals) in order to be included in the negotiated text. (Participants agreed to make an exception to this ground rule for the comments of two scientifically trained negotiators, Geraldine Cox and Ellen Silbergeld.)
Three other drafting strategies were effective. The NYAS sought to craft language that would express the assumptions or rationales used to support a particular forecast of health risk; identify specific uncertainties inherent in health risk assessment; and express the range of interpretations associated with specific data sets. Judicious use of each drafting technique helped produce a balanced and technically sound discussion of human health effects. For example,

Express Assumptions Used to Support of an Estimate of Health Risk

The U.S. Food and Drug Administration currently limits total PCB levels to 2 ppm in fish intended for interstate commerce. Based on a daily average consumption of 6 grams per day of fish with this level of PCBs, EPA's risk assessment model forecasts 1 additional case of cancer per 1000 people during their lifetime (Cogliano, 1987).104

Express the Range of Interpretations Associated with Observations

A range of professional opinion exists as to appropriate interpretation of published data on occupational exposure, additional poisonings and animals studies. In a recent article (1987) Renate Kimbrough when at the Centers for Disease Control, reviewed about 120 published articles on occupational exposure, accidental poisonings, and animal studies. She concluded that "no conclusive evidence thus far reported shows that occupational exposure to PCBs causes an increased incidence of cancer."

Staff of EPA's Cancer Assessment Group generally concurs with this finding but also note that existing human data are not sufficient to allow conclusions to be drawn about the presence or absence of carcinogenic effects of PCBs (James Cogliano, personal communication). EDF's staff toxicologist Ellen Silbergeld (personal communication) dissents from Kimbrough's conclusion. In her view, existing evidence strongly suggests a link between PCBs and cancer in humans. Moreover, she believes that since PCBs and dibenzofurans are the empirical mix, they should be considered together in health risk assessment.105

Benefits of Joint Fact-Finding

The previous examples of joint fact-finding help to illustrate several benefits this approach has to offer. In contrast to the adversary science model106 of injecting scientific information into policy making, the collaborative approach used in the Bight Initiative helped bridge the gap between participants' initial knowledge of the problem and a more reasoned approach to framing policy recommendations.
Joint fact-finding helped create a more "even playing field" for participants who ordinarily have unequal access to technical experts or scientific information. However, it should be stressed that while an available pool of scientists enables stakeholders to get up to speed on technical issues by providing ready access to scientific expertise, it cannot erase broad differences in professional training, preparation, or access to staff assistants. Joint fact-finding creates a common language. As one team worked to build a "budget" showing PCB reservoirs, inputs, and losses, simply defining these terms (and about 10 others) developed a sense of shared purpose among participants.

Joint fact-finding helps participants build their understanding of complex issues in manageable, stepwise fashion. In the example mentioned above, once participants agreed on a dozen definitions, they were comfortable working with scientists to build a detailed table of PCB reservoirs, inputs, and losses. Additionally, the Bight Initiative shows that joint fact-finding helps frame the contents of a single text. After an initial briefing on sources, fates, and effects, participants were adamant that the text include sections on all three subjects, as a prelude to developing well-informed management options.

Joint fact-finding can map the bounds of good information and clarify the bases for technical disagreements. Sometimes simple miscommunication is at fault. In other cases, different starting assumptions may be the cause for apparent disagreement. Joint fact-finding enables competing assumptions to be compared and juxtaposed. One analysis need not be totally discarded simply because it conflicts with a "preferred" analysis. For example, the states of New York and New Jersey use different sampling methods when testing for PCBs in fish because the respective mandates of their agencies differ.
Still other bases for technical disagreement may be use of different data sets and interpretive methods. This is the basis for the apparently conflicting information in the table on PCB sources and losses.

Information presented in scientific briefings constitutes raw material for a negotiated single text. For example, a table showing PCB levels in fish was included almost verbatim, while an an outline on PCB risk to human health was substantially modified. In this way, joint fact-finding set the stage for negotiation over policy options. Time and again, negotiators made reference to key findings in framing their arguments about management options.
SHORTCOMINGS IN PACKAGING ACCEPTABLE AGREEMENTS DOCUMENTED IN THE OTHER CASE STUDIES

The Virginia wetlands case showed that the legislative process did not present a suitable mechanism for parties to work together to package an acceptable agreement. CBF staff bargained away some of the resource protection language contained in early drafts without exacting a quid pro quo, such as a promise to back the bill. In the end the legislative process failed to produce a sound agreement that could win the support of the environmental community.

In the Oakland dredging case, the EIS process did not provide a way for fishing interests, environmentalists, regulatory agencies, the Corps and the Port to hammer out an agreement that all sides could support. Instead, after the Corps announced its decision, disgruntled fishermen pursued litigation and effectively blocked the dredging. The result is that the Port of Oakland stands to lose substantial cargo to other deep draft Ports.

In the Boston Harbor case, the work of the special master was instrumental in bringing parties to agreement about appropriate minor repairs and staffing adjustments to bolster the metropolitan region's aging sewer system. However, the Master did not create a mechanism for parties to come to agreement on the long term construction schedule for major water quality improvements. This task was deferred to the federal court, where Judge Mazzone ultimately chose the MWRA's timeline while rejecting alternative schedules proposed by CLF and the EPA.

In the tidelands case opposing parties worked together in a facilitated dialogue to hammer out the basic terms and principles for a revised system of tidelands licensing. Then, during work to develop implementing regulations, the efforts of a broad-based Tidelands Advisory Committee provided regulators with useful insights, but did not carry forward to crafting actual regulations. Public involvement came to a halt during a lengthy period of internal staff review and revision of the draft.
regulations, which provided no opportunity for face-to-face bargaining over the licensing rules. Instead, waterfront developers and small marina operators organizations posed substantial opposition, sending the regulators back for yet another round of internal revision.

DEVELOPING AND PACKAGING MANAGEMENT RECOMMENDATIONS IN THE NEW YORK BIGHT INITIATIVE

The New York Bight Initiative sought to address the problems related to "packaging" acceptable agreements which arose in the other cases reviewed. With substantial fact-finding completed, Bight stakeholders developed, evaluated, and eventually endorsed management recommendations. This discussion emphasizes the role of the mediation team in helping parties to develop, evaluate, and revise recommendations. The final part of this section explains specific strategies the mediation team used in packaging recommendations in a form that could earn broad support.

Invention of Options

Invention of options, a critical prerequisite to negotiation of agreements, began at workshops in July and August, 1987. NYAS neutrals organized stakeholders into mixed teams, or subcommittees, to focus on a bounded set of options. Each team included representatives of the port interests, the environmental community, environmental management agencies, wastewater treatment agencies, fishing interests, and electrical equipment or chemical manufacturers. The NYAS team, as active mediators, prepared a tentative list of management options in advance. Synthesized from meeting summaries, relevant literature, and conversations with stakeholders and advisors, these prospective recommendations were a "strawman" for discussion. Accordingly, the meeting packet for the July workshop listed ten management options and twelve research topics. Mediators asked each team to discuss seven management options and six research ideas.
Recommended management principles included finding strategies to reduce PCB content below 2ppm [the FDA standard] in edible fish so that these fisheries can be reopened. Another principle emphasized work to understand and reduce the harmful synergistic interaction of PCBs, other chemical compounds, and other causes of disease. Among the proposed management actions were to buy out electrical equipment and white goods; dredge "hot spots" in the harbor or estuary; seek adoption of unified testing protocols to measure PCBs in edible fish; and to seek adoption of unified health advisories restricting the consumption of contaminated fish. Still other management actions included investigation of reduction of PCBs from sewage plant effluent using new PCB decontamination technologies such as ozone, UV light, and reverse emissability. Prospective research topics were to monitor potentially large inputs of PCBs; study PCB pathways and health effects; conduct congener-specific research; and model changes in PCB levels as a result of alternate management actions.\textsuperscript{117}

NYAS neutrals played an active role in structuring and leading the discussion of management alternatives. They asked negotiators to identify the major strengths and weaknesses of each option and to consider whether each management option warranted further attention. Additionally, the NYAS team asked parties to identify specific details that might make the option more workable, and to identify additional information that might make the option workable. Recognizing that some options might be more acceptable if they could be traded against others, mediators asked stakeholders to consider whether a particular management solution might be more acceptable if packaged with another one. NYAS mediators also pressed negotiators to identify specific obstacles to implementation of each proposed management solution, and to identify interim steps that might overcome these obstacles.

NYAS mediators provided additional resources to assist each teams’ work. They recruited two or three scientific advisors to work with each team in their review of management options. The NYAS team also provided negotiators were also provided with a carefully organized set of meeting
summaries and briefing papers to use as a reference during their deliberations. This approach served to distance the mediators from any particular management recommendation by investing negotiators with the responsibility to evaluate the options.\textsuperscript{118} This effort was deemed necessary to preserve the neutrality of the mediator, and to avoid the appearance that the New York Academy of Sciences wanted to endorse one management recommendation over another. At the same time, the NYAS mediators did not want negotiators to dismiss promising options without reasoned discussion.

At each step of the way, NYAS mediators played an active role in helping negotiators clarify their thinking about management recommendations. At key junctures during the meetings, the NYAS team served as "translators" to help scientists put technical terms in clear language. NYAS team members alternated recording key points on butcher paper taped to the wall, and working interactively with parties to draft preliminary findings using two personal computers. Using a laser printer, the NYAS team was able to distribute preliminary drafts almost instantaneously after parties worked over a particular phrase or paragraph. NYAS mediators posed questions to scientific panelists, and assisted negotiators in restating the outcomes of discussions team deliberation when the full group of negotiators reconvened. One outcome of the July workshop was to endorse the principle: "Find strategies to reduce PCBs levels in fish and other biota." Two specific management strategies were endorsed:

1. Encourage adoption of uniform techniques for sampling, measuring, and interpreting PCB levels. Use uniform archive procedures.

2. Develop an effective mechanism for collection, secure temporary storage, and reliable destruction of PCBs in white goods (such as old appliances) and electrical equipment.\textsuperscript{119}

When the negotiators began to identify drawbacks of highly contaminated areas, NYAS mediators worked with parties to clearly define these obstacles: First, there was a need to define hot spots. Second, hot spots needed to be mapped. Third, massive volumes of sediment would be involved. Fourth, the
actual destruction of PCBs is a very difficult problem. Fifth, dredging PCB-contaminated sediments may make PCBs more biologically available. Similarly, seeking removal of residual PCBs from sewage treatment plants and combined overflow was identified as an idea that needed significant development. The mechanism of introducing "strawman" language succeeded as teams took draft language and reworked it to suit their needs.

Development of management recommendations continued at the August workshop. To sustain the momentum of the previous meeting, mediators crafted the meeting agenda to refine the discussion of management options and to fill in sections of the document. Several scientific advisors were recruited to provide insights and help teams with their deliberations. One had authored an extensive report evaluating emerging PCB decontamination technologies. Others were expert in contaminant measurement of fish, and effects of contaminants on aquatic life. Again, NYAS mediators played an active role in structuring and leading the discussion. Since representatives from CMA and port interests were especially vocal, the mediator called on more reticent parties to ensure that their views were given equal weight. At this session, negotiators reached several important agreements. They agreed to include a summary of the information on PCB decontamination strategies as an appendix. They refined their thinking on the relative weight of management recommendations. Negotiators also agreed on the appropriate tone and content for a summary of effects of PCBs on biota. Additionally, they took some time to refine an initial chapter of the text characterizing use conflicts in the Bight and the historical manufacturing use of PCBs.

Second Round of Drafts Prepared and Discussed in Caucuses

Next, the NYAS team prepared a second draft of the full synthesis text for distribution to all negotiators. Then, the Academy organized a series of caucuses with each major cluster of interest groups to receive their comments. The NYAS organized the caucuses to mirror the composition of coalitions and to deal with pragmatic time constraints. The Academy convened nine caucuses: EPA; New Jersey DEP; Fisheries and Wildlife
The Academy envisioned that the caucuses help deflect frustration of negotiators who wanted to offer detailed comments but just did not have enough time to do so in the workshop meetings. Second, the caucuses provide the Academy with an opportunity to receive detailed editorial corrections to improve the quality of the document. Third, the caucuses gave the Academy insights into the willingness of respective groups to sign onto the document. Fourth, the Academy was able to communicate the major concerns of the other coalitions without breaching confidentiality. Fifth, the caucuses provided an opportunity of members of coalitions to compare notes and arrive at unified positions.

EPA staff suggested reorganizing recommendations and stressed the need to incorporate recommendations for action and for new research where it was most needed. EPA also stressed that although the question of dredging highly contaminated reaches of the Upper Hudson was not the focus of the Bight Initiative, the single text must include such dredging as a possible management strategy. New Jersey DEP concurred with this suggestion, and helped clarify the presentation on sampling of PCBs in bluefish. Both caucuses produced strong indications of an intention to ratify.

New York State Coastal Program representatives urged the Academy to further clarify the presentation of health risks to humans. Coastal planners identified counterparts in DEC who could clarify the findings on PCB levels in fish and PCBs-related mortality in fish-eating birds and mammals. The NMFS representative supported recommendations for better environmental sampling and more specific steps for source reduction. Commercial fishermen supported the recommendation to continue monitoring PCB levels in striped bass ought to continue. They urged that the document endorse congener-specific testing. Such testing, they predicted,
would show that the chemical forms of PCBs shown to cause cancer in rats were not present in striped bass.\textsuperscript{126}

New York City DEP urged that the text clearly state that sludge dumping was slated to be phased out dumping at the 12-mile site in the Bight Apex in December, 1987.\textsuperscript{127} The Long Island Regional Planning Board urged that investigation of new PCB decontamination technologies be recommended. Environmental groups were adamant that the tone of the document not cast the risk from PCBs in an inappropriately de minimus light.\textsuperscript{128} Environmentalists pressed for a commitment to update the Interim Guidance Matrix, which helps regulators determine if dredged sediment is safe for ocean disposal. In a subsequent caucus, port interests agreed to this change, but interests asked for minor clarifications in the way the document explained how PCBs may be adsorbed to sediments.\textsuperscript{129}

CMA and Monsanto approved of the regulatory matrix as an accurate and concise way to present information. They stressed a strong desire to see the discussion of EPA's methods for assessing cancer risk balanced with their own critique of the agency's methods. Industry representatives urged that the document include the findings of a study of New Bedford residents which showed that despite heavy pollution of the nearby Harbor, residents did not have elevated PCB levels in their bodies.\textsuperscript{130}

\textbf{Securing Support for the Penultimate Draft Agreement}\textsuperscript{131}

Over the next 10 days, the Academy team synthesized the comments received in the caucuses and prepared a third draft of the single text. This draft was distributed to all negotiators in advance of a final meeting on October 12, 1987. The Academy explained that the document reflected the advice received in the caucuses, and asked participants to identify specific changes they would need in order to recommend ratification.
The NYAS began the October 12 meeting by summarizing the key changes, and asking representative to indicate whether they were prepared to recommend ratification to their organizations. This enabled the Academy to gauge inclinations, to track movement during the meeting and to identify members of coalitions that might help advance ratification of the final document. Roughly half of those present indicated that they felt comfortable doing so, and about half expressed reservations. The meeting focussed on two key sections of the report: the recommendations and the presentation of effects of PCBs on human health and biota. Review and revision of the recommendations generally proceeded smoothly. (Specific drafting techniques that helped secure support for language of the final recommendations are discussed later.)

Mediators worked hard to ensure that the interests of EDF were represented. Mediators spoke with EDF's chief toxicologist the day before the final meeting to identify changes that they needed before offering support. Then, the mediation team integrated these ideas into the discussion leading to revision of the document. There are several reasons why the mediation team took these steps to incorporate EDF's views at the final meeting. The fundamental motivation was to secure an agreement that could win the support of all parties. EDF represented a key touchstone for some organizations. Representatives of the New Jersey Department of Environmental Protection explained that they could not recommend ratification unless an effort was made to take EDF's views into account. Similarly, two environmental groups—Clean Ocean Action and the American Littoral Society—looked to EDF for guidance on public health issues. Two more moderate environmental groups the Coalition for the Bight and the Citizens' Union Foundation also pressed the Academy to work to incorporate EDF's views. Thus, although EDF had been a problematic participant, the NYAS team felt that making an effort to incorporate the group's views had important implications for bringing other less polarized groups on board.
By the end of the meeting, the negotiators’ overall disposition towards ratification shifted favorably. Some representatives who had hedged explained that they now expected to be able to recommend ratification. Others who had been sharply critical at the beginning of the meeting, such as CMA and Monsanto, were somewhat equivocal.

The specific strategies the Academy used to help negotiators arrive at the specific wording of management recommendations are described below. (The very final stages of ratification, including a special EDF-Industry caucus are described in the final section of the chapter.)

**Strategies Used by NVAS Mediators to Package Acceptable Recommendations**

By working through the successive versions of the single text, NVAS mediators helped negotiators to reach agreement on the precise wording of twenty six recommendations. These covered strategies to reduce overall levels of biologically available PCBs; improved source reduction; a consensus to investigate emerging decontamination technologies; more efficient sampling of environmental status and trends; and agreement on an agenda for short-term and long-term research.

The management recommendations began to take shape based on a compilation of idea developed at brain storming sessions and at workshops in the summer of 1987. Once recommendations were drafted, the mediation team prepared several successive drafts and presented them for consideration by negotiators. The mediators used several specific strategies to package recommendations to make them acceptable to all ratifying parties.

The key concept they applied, developed in the negotiation literature, was that since parties to a dispute value issues differently, trades across issues are possible. The essential point is
that when issues are handled one at a time the only possible outcomes are
distributive bargains where one party wins and another loses. On the
other hand, if multiple issues are considered, bargains are possible that
integrate the interests of multiple parties.

Thus, the NYAS team recognized that the idea of linkage is crucial to
allow trades and packages. In some instances, NYAS mediators helped
create a linkage across multiple recommendations. In other cases, the
NYAS mediators worked with negotiators to sort out the various issues
embedded in a single draft recommendation, thus creating the possibility
that language of individual recommendations could integrate the interests
of multiple interests. Specific strategies used by the mediators to
develop the packages are describe below.

Sort Recommendations Into Management, Research, and Education

EPA and the New Jersey DEP wanted the overall list of recommendations
developed in the text to reflect a logical structure. The NYAS team
responded to this suggestion by proposing that options be sorted into
recommendations for management, research, and education. By creating this
framework, parties were able to transform an unsorted list into a more
coherent management strategy. This structure explicitly responded to a
concern expressed by both port interests and the coastal agencies that
they did not want the recommendations to be a scientists’ "wish list" for
new research. At the same time, this structure left room to recommend
more scientific investigation to clear up areas of uncertainty—an
opportunity preferred by environmentalists, commercial fishermen, and
industry representatives who all backed different research tasks.

Establish Priorities for Recommendations

Concurrently, the NYAS team recognized that assigning relative
priorities to recommendations might facilitate trades across
recommendations in light these relative weights. Initially management
options were ranked as high, medium or low priority. Then, an across the board change was recommended by an environmental representative: management options that face major obstacles should not automatically ranked as low priority. Rather, they were treated with the heading "Management Options Which Face Major Obstacles." This recommendation was accepted by the full group of negotiators.

This structure in fact facilitated one trade that was very significant to the ultimate ratification of port interests and environmental interests. In several rounds of private conversations, NYAS mediators developed a package around dredging issues that satisfied both port interests and environmentalists. At issue was the relative ranking of two recommendations. One concerned the Interim Matrix, a table listing acceptable concentrations of contaminants (including PCBs) for ocean disposal of dredged sediments. Another concerned how to handle the speculative options of dredging contaminated hot spots in the Lower Estuary and the Bight. The language of the recommendation regarding the Interim Matrix was as follows:

Assess the appropriateness of updating the Interim Guidance Matrix for PCBs to take account of recently obtained data and studies in progress on the bioavailability of PCBs in dredged material.  

Although port interests were not eager to see the restrictions tightened for ocean disposal of dredged material, they agreed that the "Interim" Guidance Matrix was several years old, and conceded that the regulations should be based on the most up to date information. Port interests agreed that the recommendation to update the interim regulatory matrix that guides disposal of dredged material should be listed as a high priority. This concession was made with the understanding that environmental groups would agree that the recommendation to dredge highly contaminated hot spots in the lower Hudson and the Estuary should be listed as a management option that faces major obstacles. Environmental groups and environmental regulatory agencies in turn insisted that the single text should list interim steps to make the option of dredging hot spots more workable. Port interests agreed to this approach.
NYAS mediators helped find a solution to a disagreement among fisheries agencies by sorting out the components of a problem. The National Marine Fisheries Service (NMFS) had recently completed a major study of PCBs in Atlantic Coast Bluefish and found a lack of coordination among the state fishery agencies. NMFS pressed hard for an early draft recommendation that called for states to adopt uniform protocols for sampling, analysis, and interpretation of PCBs in bluefish, striped bass, and other migratory species. Port interests and environmentalists endorsed this as a logical move. However, state regulators resisted. The representative from New York State DEC explained that truly uniform protocols would hinder innovation. Besides, he pointed out that DEC’s mandate focuses much more on impacts of PCBs on biota, while New Jersey DEP has a role in issuing health advisories to protect recreational fishermen. He explained that these different mandates in turn require some divergence in sample design.

The NYAS mediation team worked to clarify the issue by helping parties list each step of the sampling and interpretation sequence. Then, the NYAS team asked each state representative to characterize the methods it uses at each step. The result is presented as a table in the negotiated text.\textsuperscript{136} Next, the mediation team caucused with the representative from New York State DEC. Together, they proposed that states could use more unified (meaning closely coordinated and compatible) methods in choosing where to sample and in reporting their findings:

Encourage agencies to adopt unified protocols for sampling, analysis, and interpretation of PCBs in bluefish, striped bass and other migratory species. (As used here, "unified means closely coordinated and compatible; it does not necessarily mean identical.\textsuperscript{137}

\textbf{Link Recommendations to Contingent Findings}\textsuperscript{138}

An important strategy used by the NYAS mediators was to link potentially controversial or speculative recommendations to contingent
findings. The first four drafts of the text carried a recommendation to this effect:

Create a mechanism for effective collection, secure interim storage, and destruction of PCBs contained in discarded appliances.139

GE argued that such a recommendation should was precipitous until it was determined whether discarded appliances indeed represent a significant reservoir of PCBs. EPA agreed that a preliminary assessment step was needed. With these two comments in mind, NYAS mediators suggested that the recommendation be revised to allow a sequencing of analysis and action:

Assess the extent of PCBs in discarded appliances. If it is determined that significant PCBs are present, create a mechanism for effective collection, secure interim storage, and destruction of PCBs contained in discarded appliances.140

Develop Management Principles That Integrate Interests of the Parties

Negotiators in the Bight Initiative agreed that their discussion of management recommendations should lead off with management principles. Though the principles were in some ways less controversial than some of the more substantive recommendations, the experience of the Bight Initiative provides several insights as to how a mediation team can assist parties to arrive at "good principles" in developing a single text. One observation is that the mediator should help parties strike a balance between a principle that is worded too broadly and one that is worded too narrowly. More importantly, mediators should help negotiators revise the language of a principle to integrate the interests of multiple parties. A draft principle stated:

Find management strategies to reduce the PCB content below 2ppm (the FDA standard) in edible fish so that these fisheries can be reopened.141
This initial language, which had a narrow relation to public health issues, met the interests of striped bass fishermen (whose fisheries were closed) and environmental organizations with a special concern about public health.

Environmental groups wanted the principle to reinforce protection of all biota. Moreover, industry and port interests suggested that new evidence may someday lead to revision of the FDA standard, and proposed deleting reference to the standard. Thus, the group bought into the broad virtues of reducing environmental contaminants, without pegging this reduction to specific standards or portions of the food chain:

Reduce PCB levels in fish and other biota in the Estuary and the Bight. Recommended management actions should be practicable within the context of protecting human health and environmental integrity.142

The second sentence reflected the interests of still more organizations—two moderate environmental groups (Coalition for the Bight and New York City Environmental Policy Forum) who favored some mention of practicality.

Moreover, the Bight Initiative showed that while the language of a principle itself should be quite concise, mediators may assist parties by adding an explanation of the rationale for a principle, which can convey an understanding of the important cause and effect relationships at work:

Rationale: Reducing available PCBs in the ecosystem will lead to reduced PCB levels in fish food and other biota. The resultant lowering of PCBs in fish will help achieve the goal of reopening fisheries by bringing PCBs levels in fish below the 2ppm level. Moreover, reducing PCB levels in fish will reduce possible risks to human consumers. Achieving this goal will require that environmental managers join with private interests to seek specific implementation strategies.143

Another lesson is that principles should be drafted to set the stage for action in multiple arenas. Moreover, a principle can reinforce the negotiators' conceptions of what represents a good decision making process, as well as what represents a good outcome:
Key agencies should join with private interests to develop a strategic plan to implement the regulations that follow. Set cost-effective priorities for analysis, research, and management actions within the larger context of managing contaminants in the Estuary and the Bight. Any plan developed should be integrated across local and state and federal agencies and created with the full participation of other affected interests.144

Still another lesson is that the language of principle can help convey the idea that negotiators recognize the larger context of their inquiry. A critical point that came out in the joint fact finding process was that PCBs are just one of many significant contaminants in the Bight, and they may interact with other compounds to produce observed effects. Two environmental groups, the Coalition for the Bight and the New York City Environmental Forum, reminded parties of this point on numerous occasions. Similarly, industry representatives were anxious not to have PCBs singled out as the sole contaminant of concern. The NYAS mediators helped parties arrive at a principle that addressed this idea:

Seek to understand the interaction of PCBs with other chemical contaminants and causes of disease in marine biota.

Rationale: PCBs exist with dozens of other contaminants. Observed effects cannot be traced specifically to PCBs. Further study of PCBs along with other priority contaminants would enhance the identification of causes of particular environmental events.145

Inject Added Clarification of Terms and Conditions

An initial draft of a management recommendation called for investigation of reduction in several possibly significant sources including sewage treatment plant effluent, dredging, and downriver transport. Representatives of wastewater management utilities insisted that grouping of possible sources was misleading and not sufficiently differentiated. NYAS mediators suggested that the recommendation could be reworked to call out combined sewer overflow and industrial discharge as other important sources, and to stress the need to distinguish among these potential sources. This suggestion was accepted:
Explore the reduction of bioavailable PCBs in the Hudson-Raritan Bight system from several possibly significant sources. This investigation should clearly distinguish the following possible sources: sewage treatment plant effluent, industrial discharge, combined sewer overflow, dredging and downriver transport.\textsuperscript{146}

Identify Specific Obstacles to Implementation of Recommendations and and Propose Specific Interim Steps

Several management options which otherwise would have been excluded from the recommended responses to PCB contamination were accepted when major obstacles were clearly spelled out, fully revealing the difficulty of the management option. For example, port and industry representatives agreed to list dredging highly contaminated areas in the lower estuary as potential management strategy, so long as major obstacles were clearly enumerated. Environmentalists complained that a recitation of obstacles conveyed the impression that no action was possible to reduce PCBs.

NYAS mediators proposed that the text could include both specific obstacles and specific interim steps. The NYAS team suggested that listing obstacles in a clear, concise fashion could lay the foundation for constructive interim steps. These obstacles included the following:

First, there is no formal definition of "highly contaminated areas" or hot spots. Second, managers lack good information about PCB levels in most of the Estuary and the Bight. Currently, PCBs are only measured in the areas subject to regulatory review; channels and berthing areas. Third, the volume of material that would require treatment is massive. Fourth, the destruction technology remains a major hurdle. Fifth, dredging hot spots may increase the bioavailable PCBs in some areas.\textsuperscript{147}

One of these interim steps was in fact framed as a contingent recommendation. That is, if after hot spots are defined, and if such highly contaminated areas are detected, then more in depth mapping is called for. The interim steps associated with the dredging of hot spots in the lower Hudson and the Estuary were stated as follows:

States—in conjunction with other interested parties—should develop standard definitions of "highly contaminated areas" or hot spots. Documentation of existing PCBs levels in the Bight and estuary is needed. A tiered approach is appropriate, in which areas that exceed the threshold for "hot spot" are mapped in more detail. Whether remedial dredging is appropriate must then be decided.\textsuperscript{148}
Frame Selected Recommendations as Research Tasks Rather than Management Steps that Demand Fast Action

Several recommendations were deemed more acceptable to industry, ports, and wastewater managers when they were framed as research tasks rather than as high priority management steps that demand fast action. For example, the question of whether contaminated material moves from dredge disposal and sludge dumpsite was particularly controversial. A staff scientist from New Jersey DEP presented evidence that contaminated material moves from disposal sites for dredged material and sewage sludge. However, other negotiators pointed to conflicting evidence, indicating that ocean-dumped contaminants remain immobile. Since the evidence conflicted, parties were unwilling to recommend management action and opted instead for research to settle the question.

The recommendation explicitly acknowledged the apparent scientific disagreement over this question, and sought to clarify the uncertainty with more precise research methods:

Determine the movement of contaminated sediment— including material deposited at disposal sites—in the Bight. Specifically examine whether material moves back into bays and the estuary.

Comment: Existing studies seem to conflict on the movement of sediments—which may include adsorbed PCBs and other contaminants—from the Bight back into Bays and estuaries. Studies sponsored by the Army Corps of Engineers and others seem to indicate that PCBs remain at the dredge material dump site. Investigations by Young et al. (1985) and Boehm et al. (1983) suggest dispersion of sediment particles from the Bight back into bays and estuaries. However, these studies are confounded by the failure to use a tracer unique to the material dumped. Accordingly, a careful study is needed, using a tracer unique to the material dumped.
Lessons Learned About Developing and Packaging Agreements

The Bight Initiative shows that active mediators can perform a series of roles in assisting negotiators to develop and package management recommendations. Mediators can perform a useful contribution in assisting stakeholders to develop policy recommendations by drafting initial "strawman" management recommendations for consideration by negotiators. The Bight Initiative also shows that investing parties with the responsibility of evaluating policy alternatives serves to distance the mediator from any particular policy prescription. This in turn helps preserve the neutral standing of the mediator, and in this case, served to reconfirm that the Academy of Sciences was not endorsing any particular management option. NYAS mediators asked negotiators to list the strengths and weaknesses of each policy option, and to identify information needed to make the option workable. This helped create a useful structure for deliberations.

The mediators also recruited scientific panelists to assist negotiators in their deliberations over management options. Mediators can take the lead in preparing an iterative series of draft recommendations may be needed to develop recommendations and incorporate necessary refinements. Convening small group caucuses was another useful contribution of the mediation team, since it enabled the mediation team to receive in-depth comments and deflected the frustration of those who wanted to work in more depth.

Aside from these interventions, NYAS mediators recognized the possibilities for linkages across issues to help negotiators write recommendations agreeable to the multiple parties. Some of these linkages enabled trades across issues—as illustrated in the discussion of dredging issues. Here, it was particularly useful to sort recommendations into options for action, research, and management; and to assign relative
priorities to management recommendations. In other cases, NYAS mediators helped parties sort out the components of individual recommendations to write recommendations that integrated the interests of multiple negotiators. Writing recommendations that were contingent on certain research or assessment findings was also a useful strategy. Still another useful strategy was to inject added clarification of terms and conditions; and to pair discussions of obstacles to implementation of management recommendations with specific interim steps to help overcome these obstacles. Another helpful approach was to frame recommendations as a research task rather than a management step that demands fast action. Used in combination, these drafting techniques helped lay the foundation for ratification of the final negotiated single text, described in the next section.
SHORTCOMINGS IN SELLING AGREEMENTS BACK HOME IDENTIFIED IN THE OTHER CASE STUDIES

In the previously presented case studies, significant shortcomings were evident in the manner in which informal agreements were "sold back home". The Virginia wetlands case provided no opportunity for key constituency groups to gain the concurrence of their membership on the final provisions of the bill. In the dredging case, an apparent agreement broke down when none of the parties ensured that the local Half Moon Bay fishermen could accept the agreement to dump spoils at the B-1 site. In the tidelands case, there was no mechanism to ensure that the members of the Tidelands Advisory Committee reported back to their constituencies and garnered support for the proposed regulations. And in the Boston Harbor case, the municipalities of Quincy and Winthrop objected to the plans for secondary sewer treatment facilities in their communities. In each case, it appears that a mechanism for "selling the agreement back home" might have produced a more agreeable outcome.

STEPS TAKEN TO RATIFY THE SINGLE TEXT IN THE BIGHT INITIATIVE

The Importance of Ratification

In contrast to the case studies previously reviewed, a central premise of the Bight Initiative was that the final single text document had to be "sold back home". From the very first discussions of the process, Academy staff were explicit about their intent to seek ratification of the negotiated document. That is, representatives of organizations who came to the table had to demonstrate that they were truly speaking for their organizations when they acceded to the document. Rather than leaving a group of negotiators with a vague sense of the consensus they did or did not reach, a ratified document brings the single text negotiation to a logical closure. Moreover, asking for ratification gets the attention of senior decision makers in participating organizations. Typically, ratification is confirmed by a signature of a responsible person in the participating organization. Mediators in the Bight
Initiative mailed the fifth and final draft with a letter requesting that the parties review and ratify the final text, and sign a signature page.

Ratification is a familiar term in international treaty negotiation. In the international arena, ratification has a legalistic meaning. When the U.S. Senate ratifies a treaty, this signifies that the treaty becomes binding on the United States. Ratification is an important concept in the theory and practice of alternative dispute resolution. However, the term "ratification" is not often incorporated in in traditional judicial, legislative, or administrative mechanisms. When the term is used in conjunction with consensual environmental policy, ratification takes on a slightly different meaning. While it may lay the foundation for translation an informal agreement to a more formal one, ratification does not connote the intent to legally bind an organization.

This section reviews the status of ratification, including some important challenges that arose and were met by the mediation team. The discussion also summarizes the concerns raised by recalcitrant parties and the mediators’ efforts to deal with them. Next, the participants’ commentary contained in their letters of ratification is summarized. The discussion concludes with lessons learned about ratification in single text negotiation.

**Status of Ratification**

When the NYAS team mailed out the final text for review and ratification in December 1987, they envisioned a definitive response within 90 days, and were confident they would hear from most groups within 45 days. In fact, the ratification phase was far more time consuming and exhaustive than the NYAS team had anticipated. Between November 1987 and September 1988 eighteen of the twenty two participating organizations ratified the single text document. By April 1, 1988, over half the groups had ratified the document, and by the end of April, there were sixteen ratifiers.
Table 6.3 presents the status of ratification. All five environmental management agencies ratified the document: U.S. EPA, New Jersey Department of Environmental Protection, New York State DEC, the New York Coastal Program, and the Long Island Regional Planning Board. The three fishing interests ratified the document: the National Marine Fisheries Service—NOAA; the U.S. Fish and Wildlife Service and NMFS. Both major wastewater treatment agencies ratified the document: the Interstate Sanitation Commission and the New York City Department of Environmental Protection. Six of seven environmental organizations ratified the document, including Clean Ocean Action, the American Littoral Society, and the Coalition for the Bight. All three port interests were also ratifiers, lead by the Port Authority of New York and New Jersey. Non-ratifiers included the Environmental Defense Fund and the three chemical and electrical equipment manufacturing representatives.

The 82% "ratification ratio" (18/22) falls short of the goal of full consensus, but it has to be considered a significant accomplishment in the context of contentious New York—New Jersey politics. The next section describes a series of ratification challenges that were successfully met by the mediation team. Then, the mediators’ efforts to deal with the nonratifiers (the Environmental Defense Fund, the Chemical Manufacturers Association, General Electric Company and Monsanto Corporation) are discussed.

Ratification Challenges

Several challenges had to be overcome during the ratification process. First, before most agencies could ratify the document, approval had to be sought up the chain of command. All ten of the participating public agencies required the review and approval of the supervisors of the staff who actually participated in the negotiation. The National Marine Fisheries Service representative from Sandy Hook, New Jersey sent his recommendation for ratification up through the chain of command in his own office, then to NMFS headquarters in Washington. Since the mechanism of a negotiated single text was a novel one, most agencies had to invent procedures to review and ratify the text. In New York State Department of
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<tr>
<th>Organization</th>
<th>Ratification Posture</th>
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<tr>
<td><strong>Environmental Management Agencies</strong></td>
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<tr>
<td>U.S. EPA</td>
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<td>April 4, 1988</td>
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<td>Ratified</td>
<td>Nov 12, 1987</td>
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<td>New York State Department of Environmental Conservation</td>
<td>Ratified</td>
<td>July 26, 1988</td>
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<td>New York State Coastal Program</td>
<td>Ratified</td>
<td>April 19, 1988</td>
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<td><strong>Wastewater Treatment/Management Agencies</strong></td>
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<td>New York City Department of Environmental Protection</td>
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<td>Jan. 5, 1988</td>
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<td>Interstate Sanitation Commission</td>
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<td>Jan. 22, 1988</td>
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<td><strong>Private Fisheries Interest/Fisheries Management Agencies</strong></td>
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<td>Feb 16, 1988</td>
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<td>March 12, 1988</td>
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<td><strong>Environmental Organizations</strong></td>
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<td>Clean Ocean Action</td>
<td>Ratified</td>
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<td>American Littoral Society</td>
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<td>March 24, 1988</td>
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<td>Environmental Defense Fund</td>
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<td>April 29, 1988</td>
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<td><strong>Port Interests</strong></td>
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<td>Towboat and Harbor Carriers Association</td>
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<td>Maritime Port Council</td>
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<td><strong>Electrical Equipment/Chemical Manufacturers</strong></td>
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<td>18 Ratifications</td>
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<td>4 Decline to Ratify</td>
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Environmental Conservation, the staff representative had to ask in his staff transmittal letter who should actually write the letter of ratification.

Second, several participants had to seek approval from peer divisions or members of their organizations. EPA's Water Division sent the text to the agency's Edison New Jersey Laboratory for review. Then, Regional Administrator Chris Daggett signed on. Participants representing the New Jersey Department of Environmental Protection—the head of the planning division and the deputy director of science and research—were strong advocates of the Bight process and the single text document. However, ratification by the Department was stalled for weeks by the Director of the Office of Science and Research. After all division heads concurred that the document was agreeable, Commissioner Dewling signed on. A dozen Port Authority staff representing three divisions reviewed the document. First the port planning department that had represented the Port Authority in the negotiations reviewed the document. Next, the engineering department reviewed the document for technical quality. Finally, public affairs considered the larger implications of the Port Authority's ratification, and concluded they were positive. The director of Port Planning signed the letter of ratification. Parallel situations arose in membership organizations. The leaders of the New York State Commercial Fishermen's Association, the Towboat and Harbor Carriers, and the Monmouth-Ocean Development Council all checked backed with key members before going ahead with ratification.

Third, coordination with peer agencies or members of a coalition was needed in some cases. The U.S. Fish and Wildlife Service placed considerable weight in the decision of the National Marine Fisheries Service to ratify the document. Port interests caucused as a group before agreeing to sign on to the document. The environmental groups met in two caucuses. One was composed of the Coalition for the Bight and the New York City Environmental Policy Forum. The second included the American Littoral Society, Clean Ocean Action, and the Monmouth-Ocean Development
Council. All five of the ratifiers broke with the Environmental Defense Fund, which they concluded had raised unrealistic points late in the negotiation. (These are discussed later in this chapter.)

Fourth, concerns of staff attorneys had to be addressed. Although attorneys were not immediately troubled by the findings or recommendations, they worried that opponents in future litigation could use passages from the document against their clients. Some felt that the term "ratify" connoted a legally binding agreement that could tie their hands in the future. To overcome these objections, the NYAS drafted a caveat and shared it with attorneys to New Jersey DEP, New York State DEC, the New York Coastal Program, as well as the industrial participants. This caveat explained that ratification did not connote endorsement of every single conclusion of every cited report. Further, the caveat left open the possibility to conduct future information gathering, analysis, and policy development to resolve PCB-related problems. Three of the ten public agencies used some form of the caveat in their letters of ratification.

The mediation team used several tactics in an attempt to accelerate the ratification process and increase the ratio of ratifiers. They placed dozens of phone calls to track the status of ratification and "keep it on the agenda" of participants. When a letter of ratification was received, the NYAS immediately mailed copies to other groups closely allied with the ratifiers. To bring the key environmental groups on board, the NYAS travelled to the Sandy Hook offices of the American Littoral Society to "meet them on their own turf". The team reviewed the ratification letters received to date and explained the evolution of important passages of text. Then, the NYAS asked the NMFS representative, Stuart Wilk, to join the discussions and explain why the fisheries agency had endorsed the document. Wilk's response, that the text "was well documented and even handed", helped earn the environmentalists' endorsement.
Some participants had substantive objections, despite the fact that five successive versions of the document were negotiated with representatives of the parties. New York State DEC was the last party to ratify the single text. DEC felt that toxic effects of PCBs were understated. (As will be discussed later, industry representatives felt that the document overstated the severity of the PCB problem.)

DEC was ultimately brought on board. The teamwork of the NYAS together and two peer agencies, the New York Department of State and its subordinate Bureau of Coastal Management and Waterfront Redevelopment, were instrumental in bringing about DEC’s ratification of the document. The NYAS worked closely with New York State coastal program to develop some points that might be covered in a letter from the Secretary of State to the Commissioner of DEC urging ratification. This letter stressed the effort spent developing the text, the work of scientific panelists to help package information in a useful format, and favorable comments of other ratifiers. The letter also expressed the New York Coastal Program’s intent to ratify the document, and stressed that every other public agency had already ratified the document. The coastal program director forwarded this letter to the Secretary of State, who signed it, and sent it to the Deputy Commissioner for DEC. The Department ratified the document in August, 1988.

The agency’s principal concern seemed to relate to their proposed remedial dredging project to reduce contamination from hot spots in the Upper Hudson. The Department’s unease stemmed from the fact that the single text document listed the benefits of dredging contaminated hot spots, but also pointed up obstacles in the management options of dredging contaminated hot spots in the Upper Hudson River. The text explained that:

Dredging hot spots in the Upper Hudson River has been actively proposed by NYS DEC and EPA as a method to reduce available PCBs in fish (EPA and NYS DEC, 1987). The agencies intend to undertake a pilot demonstration project.
The Upper Hudson has not been an explicit focus of this single text document. For this reason, the participants in the single text process did not examine the option of dredging the Upper Hudson in depth. However, the information developed on sources of PCBs from the Upper Hudson showed that PCBs are indeed transported to the Lower Hudson and to the Estuary. Accordingly, remedial dredging could be expected to reduce some portion of bioavailable PCBs. Currently, there is no reliable model available to forecast 1) the effect of remedial action on the total volume of available PCBs in the Lower Hudson and the Estuary; 2) the effect of PCB removal on edible fish.

However, several major obstacles would need to be overcome.

Major Obstacles: First, as dredging proceeds, substantial amounts of sediment will be resuspended. This could increase the bioavailable PCBs in some areas. Second, a considerable volume of material must be treated. Third, interim storage of contaminated material is likely to evoke considerable local opposition.

The text went on to suggest constructive interim steps. These included exploring methods to reduce the resuspension and capture of contaminated sediments. Other steps were to track the emergence of new technologies capable of destroying PCBs without high temperature incineration. Another interim suggestion was to construct a model to forecast the effects of remedial action on the total volume of available PCBs in the Lower Hudson and the Estuary; and the corresponding effect on PCB levels in edible fish.

Overview of NYAS Efforts to Cope with Recalcitrant Parties

Over a six month period from October 1987 to April 1988, the mediation team took extraordinary steps in an attempt to bring the recalcitrant parties (EDF, GE, CMA, and Monsanto) on board. These steps included special efforts to represent the views of EDF in the final meeting, an EDF-industry caucus in December 1987, and several additional rounds of correspondence and phone conversations. These efforts, which ultimately did not succeed, are described below. Reflections on this phase of the single text are discussed later under "Lessons Learned".
EDF was exceptionally difficult to deal with. After the initial EDF designee left the organization to pursue her PhD, her successor attended just one meeting at the Academy. She expressed her intent to participate actively, but then backed away.\textsuperscript{162} Just before the crucial final meeting in October, 1987, she sent a short note explaining that she was just too busy to attend. The Academy spoke to Ellen Silbergeld, the organization's Chief Toxicologist in Washington, and attempted to convey her major concerns at the October meeting. Although negotiators were peeved that EDF failed to send a representative, they agreed to include the group's views in the final consensus text. In response to these concerns, the NYAS team met with the group's toxicologist in Washington on October 26, 1987, to receive her detailed comments on the human health portion of the text.

There are several reasons why the mediation team made an explicit effort to incorporate EDF's views at the final meeting. Beyond the fundamental motivation to secure an agreement that could win the support of all parties, EDF represented a key touchstone for some organizations. Representatives of the New Jersey Department of Environmental Protection explained that they could not recommend ratification unless an effort was made to take EDF's views into account. Similarly, two environmental groups--Clean Ocean Action and the American Littoral Society--looked to EDF for guidance on public health issues. Two more moderate environmental groups the Coalition for the Bight and the Citizens' Union Foundation also pressed the Academy to work to incorporate EDF's views. Academy mediators met with Silbergeld for several hours to receive her comments. These were quickly synthesized with the outcome of the final meeting and incorporated in the fourth draft of the text, completed October 27, 1987.\textsuperscript{163} But the Academy's effort to incorporate Silbergeld's recommended changes caused the three industry representatives to balk.\textsuperscript{164}
The Joint EDF-Industry Caucus

The Academy responded by proposing a follow up meeting to revise the human health section of the document. The mediation team was motivated by several considerations to propose this joint EDF-Industry caucus. The primary reason was that the industry representatives, while having agreed at the October 12 meeting that the NYAS should make an effort to accommodate EDF's views on issues related to human health, objected to the specific language revisions that were crafted by NYAS mediators in response to suggestions proposed by Ellen Silbergeld. Moreover, some industry representatives suggested that EDF had intentionally stayed away from the final meeting of the full group to have more influence "at the last minute." Several organizations that had taken a moderate and conciliatory stance during preparation of the document—including New York City DEP and the Interstate Sanitation Commission—agreed that EDF's views were important but expressed anger and frustration at their failure to send a representative to the final meeting. They also objected to EDF's last-minute influence on what was the fourth draft of the document.

Thus, the principal antagonists were EDF on one side and industry representatives on the other. No other parties expressed such a fierce concern about the treatment of public health issues in the text, but important coalitions were obvious. Port interests asked the NYAS mediators to ensure that the document did not "tilt" too much towards EDF. As noted above, representatives of the New Jersey Department of Environmental Protection made their support for the final agreement contingent on an effort to take EDF's views into account, although they did not insist that EDF ultimately had to be satisfied. Clean Ocean Action and the American Littoral Society were heavily influenced by EDF's posture on the issues. The Coalition for the Bight and the Citizens' Union Foundation, two more moderate environmental groups, also pressed the Academy to work to incorporate EDF's views, but also stressed that the organization should not have the "last word".

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The NYAS team convened a special meeting with EDF, CMA, GE, and Monsanto on December 3, 1987 at CMA headquarters in Washington—a location deemed acceptable by the four principal parties. The team's objective was to secure an agreement in principle—an agreement to support the text if certain specified changes were made.165

The mediation team would have much preferred to convene the meeting in New York to make it more accessible to all participants in developing the single text. However, the two parties with the tightest schedules, Ellen Silbergeld of EDF and Geraldine Cox of CMA could not find a time to travel to New York within any reasonable time frame. The mediation team phoned all parties to the Bight Initiative, explained the purpose of the meeting, and invited them to attend the meeting in Washington. None of the parties chose to attend, although the Port Authority representative gave serious consideration to attending. In the mediation team's conversations with the other participants, participants endorsed the team's efforts at a final round of mediation to settle remaining differences and wished the Academy good luck. In hindsight, another option may have been to convene parties inclined to ratify along with EDF and CMA and the others. However, by early December, 1987, only one letter of ratification was in hand. As it turned out, ratification proved to be a six month process. Thus, it was just too early to ask ratifiers to "lean on" the nonratifiers.

The tone of the EDF-Industry meeting was generally cordial. The mediation team brought copies of a half dozen key articles on PCBs and health risk in humans for the parties to use in their deliberations, which seemed to be appreciated. The NYAS team also proposed an agenda to enable the parties to focus on points which had been identified as most controversial in earlier telephone conversations. However, the four parties present decided that a more useful approach would be to work through the human health section in sequence, beginning with the first paragraph of text.
Thus, the section on human health effects contained in the fourth draft of the text provided a very explicit agenda for the meeting. In three hours of give and take, the mediator, Ellen Silbergeld, Geraldine Cox, Paul Michael, and Steve Hamilton reached agreement on precise language revisions for the the vast majority of the chapter.

A debate choosing between the terms "evidence" and "indicators" in this summary statement regarding PCBs illustrates the discussion over tone and nuance:

PCBs are the focus of longstanding attention for a variety of reasons including [evidence/indications] reported in the peer-reviewed literature showing their persistence in the environment and biota, carcinogenicity in animals, and health effects in humans.  

Ellen Silbergeld favored using the word "evidence". Cox argued that "evidence" had an undesirable legal connotation and proposed "indications". Silbergeld felt this was too soft. The mediators suggested a compromise phrase: "findings reported in peer-reviewed literature". This language was agreeable to all sides.

In several instances, the mediator suggested language that would take account of remaining disagreement, which was then adopted or modified by the parties. A handful of outstanding items were handled in telephone conversations over the next two weeks. All four representatives said they were more optimisitic that they could recommend ratification, but wanted to see the final text and would need time to consult internally. In mid December of 1987, the mediation team felt optimistic that they had achieved an agreement in principle. Their information indicated that the extra caucus had settled remaining differences and would bring the four recalcitrant parties on board.

Next, the mediators prepared a detailed (11 page) memorandum describing all the changes in the text agreed to by the parties. Concurrently, the mediation team prepared a fifth and final draft on December, 10, 1988 incorporating the results of the EDF-Industry caucus,
and mailed the document to all participants. These were incorporated in the fifth and final draft of the single text. A cover letter asked parties for swift action on the document and noted "Since this is the fifth draft of the text, it contains no suprises." 

Communications with CMA Regarding Ratification

The mediation team’s most intensive efforts to deal with a recalcitrant party involved CMA. In early 1988, the mediation team engaged in several rounds of correspondence and phone calls to bring the trade association on board, an effort that ultimately proved futile.

After the December 3 EDF-Industry caucus and the preparation of the fifth and final draft of the single text, Heinz Pagels, the Executive Director of the NYAS instructed mediators to cease preparing additional revisions to suit the parties, since funds were exhausted for the mediation phase of work. The understanding was that the team would complete a final round of technical editing after learning the (hopefully positive) outcome of the several proposals then outstanding to fund preparation of the final single text. In a letter to the Academy dated January 13, 1988, CMA Vice President Geraldine Cox asked for more editorial and substantive revisions:

After a week of intense editing, I think I have finished with the New York Bight document. The document is much improved over the last version, but is still needs much work if it will bear the imprimatur of the New York Academy of Sciences.

At this time, I am unprepared to recommend "ratification" of the document unless a minimum of these corrections are made. The document would substantially benefit from a major purge of the passive voice...[and indeterminate subjects] should be changed so the subject of the sentence is clear.

The changes I made of substance are: deletion of terms from the glossary if they were not used in the text; elimination of backflow [a research recommendation to examine possible movement of contaminants into]; and the conclusion of "good work" [a comment on past research on the Bight].

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The vast majority of Dr. Cox's specific suggestions in her mid January correspondence were editorial. She sent back a copy that had been marked in red pen, with minor changes and corrections suggested on nearly every page. Characteristic comments were to point out that some of the references listed were incomplete, or that some references listed in the text were missing. She observed a minor omission in a table of cancer potency that arose due to a problem with the Academy's printer commands. She also recommended deleting an observation that prior research on contaminants in the Bight constituted good work: "Most studies have been well conceived and well executed". The mediation team deemed this to be a noncontentious point, and was prepared to modify the document accordingly. Although Cox did not any specific objections to the sections on sources of PCBs, or the effects on humans, she had a broad suggestion regarding the text on effects of PCBs on biota:

While I feel that the environmental effects discussion could be improved significantly, I could still recommend ratification if I see that that the changes I have suggested are made. However, if we want to make a "fair" document into a "good" document, I think additional effort to improve the environmental section would be well spent. 171

However, Cox did not say what specific changes she thought were needed "to improve the environmental section".

A more substantive suggestion was to delete a research recommendation that had earned wide support at the final meeting of Bight negotiators. The recommendation was intended to help settle whether sediments—possibly containing adsorbed contaminants—move from the Bight back into bays and estuaries. Because Dr. Cox and others had pointed up flaws in the studies suggesting such movement, negotiators had earlier agreed that no mention of the studies should be made in the findings portion of the document.

Rather, the scientific controversy was 'introduced in the text of a research recommendation. The precise language of the recommendation had been hotly debated during the final meeting in October, 1987 and all participants (save for Cox) had agreed to include the recommendation.
New York City DEP and New Jersey DEP were particularly adamant that the recommendation was an important part of the text. NJDEP felt the results of the research were significant enough to include in the findings of the text. They had earlier consented to shift the whole question to the research portion of the recommendations.

NYCDEP, while not anxious to be accused of dumping sludge that found its way back to nearshore areas, believed the question was sufficiently important to merit further investigation. Thus, the NYAS team viewed Cox's request as one that would require concurrence from the parties that strongly backed the recommendation. The Academy team contacted New York City DEP and New Jersey DEP and described Dr. Cox's proposed deletion. Both organizations were adamant that the research recommendation should be retained. Since the research recommendation did not appear to be the sole point keeping CMA from ratifying, the Academy wrote back to Dr. Cox and explained that unless she could garner the approval of the two agencies who backed the recommendation, the NYAS would have to let the recommendation stand.

What the NYAS team found most compelling was this statement in Dr. Cox's January letter:

I will forward a corrected copy of the New York Bight document to the lawyers with my recommendation that we sign on to the document. I would also ask that any changes recommended by Drs. Hamilton and Michael [representatives of GE and Monsanto, respectively] be made in the final document as being endorsed as if they were my own. I await the corrections before I circulate the final document for sign off.172

This statement appeared to constitute a contingent agreement to ratify the text if specified changes were made. With the prospect of CMA's ratification in mind, the Academy team incorporated approximately 80-85% of Dr. Cox's technical editorial comments. Then, the NYAS team completed several tasks to convey to CMA the extent of the revisions accomplished. They highlighted changes in yellow, and sent her excerpts of the revised pages by express courier. The NYAS expected to receive some confirmation
that the changes had been received and that the recommendation for ratification was going forward.

Instead, the Academy received another critical letter from Geraldine Cox dated February 13, 1988, suggesting still more revisions.

Her letter began:

Now that I have had some time to put some distance between me and the edited version of the New York Bight single text, I have had some second thoughts. I told you...that I had various reservations about the document which I shared with you, but that I hoped to be able to recommend ratification. Upon reflection, I still have several problems.173

She again alluded broadly to the document's failure to meet "technical standards" she imputed to the Academy:

The document does not meet the technical standards that I would expect from a document bearing the imprimatur of the New York Academy of Sciences. Some areas of the text are so general that I think they are misleading. Other areas of the text are so technical, I feel that a lay person would be unable to understand the text.174

Although Cox had not proposed any specific changes in the text on effects of human health or biota in her January letter, she did propose one such change in her February, 1988 letter.

Additionally, I feel that the environmental section gives undue emphasis to mink, while more issues are not discussed, such as significant environmental aspects that the group discussed, such as microbial degradation of PCBs which are very important in the removal of PCBs from the ecosystem.175

(In fact, the impacts of PCBs on mink populations were treated in two or three sentences.) Cox suggested that the NYAS discard the format of the text which had been agreed upon by all parties and proposed a major reworking of the report:

My recommendation is to prepare a brief report outlining only the management options a statement that the group reviewed the science of the PCBs in the New York Bight and recommends these management options based on our review. In a review of the management options section, I feel that what is presented is very superficial and...needs clarification.176
Also in her February letter, Cox expressed new reservations about the use of the term "ratify". Cox suggested that the Academy issue a report that included only recommendations, and drop the "science sections" (five of six chapters). Ironically, in many previous workshops Dr. Cox been a major proponent of developing and refining the multiple "science sections" of the single text. But even if they were reworked she would only "acknowledge" having participated in its preparation. By this time, many letters of ratification of the full document were in hand after various periods of internal review. The mediator conferred with other negotiators and found no support for Cox’s proposal to transform the document.

Executive Director Pagels and the mediation team discussed how to proceed. Pagels was becoming exasperated with still more requests for changes he regarded as "last minute, and after the fact". Dr. Pagels was unwavering in his decision not to fund any further work on the text. Pagels expressed his support for the work of the mediation team and the quality of the document. He concluded that that CMA was acting in an obstructionist manner. He also instructed the mediators not to put any more work into dealing with CMA. Pagels speculated that perhaps Dr. Cox had overstepped her instructions and perhaps "had her string pulled" by higher ups.

Communication With EDF Regarding Ratification

A few weeks after the December 3 EDF-Industry Caucus and shortly after mailing of the final text, Leslie Mooney, an administrative assistant at the New York Academy of Sciences apparently received a phone message from EDF. On December 22, 1987, she wrote this memorandum to the mediation team and Executive Director Heinz Pagels:

Lucy from Ellen Silbergeld’s office called to say that EDF will sign on to the NY Bight Initiative. (202) 387-3550 [EDF’s Washington phone].
The mediation team immediately followed up with a letter explaining that the Academy needed confirmation of ratification in writing. After attempting several follow up telephone calls, the NYAS received a letter from EDF on February 16, 1988, signed by Ellen Silbergeld and Diane Fisher:

EDF has decided not to sign on to the NYAS report...I am concerned about the scientific quality of the document. While you have worked to accommodate the specific concerns of many parties, particularly the relatively late comments from EDF, the final report is still not acceptable in style or organization in comparison to scientific and policy articles I have coauthored or otherwise been associated with...Part of the problem derives from its origin as a committee report, and I sympathize with you — I have served as rapporteur for Dahlem Conference reports and for the proceedings of NAS workgroups, so I know it can be difficult to distill the corporate thoughts of a group into a stylistically reasonable document. However, too often the PCB report is overly repetitive and irrelevant. While it is mostly factually correct, it still reads as if it was written by someone unfamiliar with the field, who has heroically attempted to accommodate the views of others. 181

EDF also took issue with the treatment of dredging hot spots in the Upper Hudson, which was characterized as a management option that faced major obstacles.

With respect to management options, Diane Fisher is concerned that the process did not adequately consider the upper Hudson vs. lower Hudson/Bight. The issues related to dredging the upper Hudson are very complex and require specific discussion. EDF is concerned that the document incorporates without appropriate process some recommendations which imply acceptance of certain actions in the Upper Hudson with respect to PCBs. 182

This statement was troubling. As described in the discussion of New York State DEC's posture on ratification, the text did not state a position on upper Hudson dredging. Rather, the document described the benefits, obstacles, and interim steps associated with this management strategy. All parties attending the October, 1987 had agreed to the text.
Communication With Monsanto Corporation Regarding Ratification

In January, 1988, Monsanto representative Paul Michael asked for a few more changes but noted that the document was "more acceptable than earlier drafts" and expressed optimism that the document could be ratified. The mediator felt that he had a contingent agreement, and asked Michael to express in writing that he would recommend ratification if the changes he sought were made. This position did not materialize. In subsequent phone conversations, Paul Michael indicated that his corporate counsel felt that elements of the document might be used against his client in future litigation. Monsanto's letter declining to ratify the document followed a few days later on April 6, 1988, several weeks after the Academy's efforts to incorporate the technical comments proposed by CMA. The criticisms contained in their April 6 letter are quite general.

The letter stated:

Monsanto will not ratify the document...because we do not agree with several of the major concepts or with numerous specific technical points in the report.

For example, PCBs are not good model compounds for studying "sources, biological effects, and humans health effects of contaminants". PCBs are a class of 209 different compounds with different biological and physical properties. Yet, except for a brief discussion on pages 9-10, PCBs are treated as if they are all identical. Even if PCBs were adequately addressed, there is no consensus in the scientific community that they present a major problem to the New York Bight or that they can serve as models for whatever compounds or materials may pose a problem there, such as heavy metals, raw sewage, etc. 183

This discussion of the relative to the value of PCBs as model compounds had been introduced by Joseph O'Connor of SUNY, a biochemist with long experience advising on the Bight and other waterways. Michael's letter continued:

The sections on the environment and human health effects attempt to summarize in a few pages what appears in the scientific literature as literally thousands of articles. In doing so, some key areas have been omitted and others have been overly emphasized. Unfortunately, the document is not limited to the peer-reviewed scientific literature, but contains many opinions and personal communications as well. 184
Michael's commentary was troubling on this point. Michael and his colleague Geraldine Cox had repeatedly pressed for inclusion of the results of the New Bedford health effects study—a non peer reviewed document. Michael had also supported inclusion of the comments of a non peer reviewed article prepared by Geraldine Cox. Michael had also agreed to include the personal views of parties, including EDF's Ellen Silbergeld, in the text. His letter continued:

The title, "Managing PCBs..." implies that the principal thrust of the document is to recommend management options to deal with PCBs in the New York Bight and Hudson/Raritan Estuary. However, a quick review of the text reveals that management options are relegated to the last part of the Executive Summary and that less than 10% of the text deals with management options. This part of the document needs extensive development. 185

While Michael is correct about the length of the section on management options, his letter overlooked the agreement by all parties to first develop the findings and then use these to inform the management recommendations. 186

Michael's letter concluded as follows:

The above examples are not meant to be a comprehensive list, but merely representative of the deficiencies we see in the document. I do not believe that minor editorial changes can correct them. Any effort to corrections would probably require an additional meeting(s) at which all of the organizations are represented.

In any event, the document has come a long way since the first version I saw in July of 1987. Should you decide to reopen technical study and discussions, we would be willing to attend and make technical contributions. 187

Although the NYAS team appreciated Michael's willingness to continue meeting, the point was to move to closure. Several other ratifiers counseled the NYAS team not to reopen the document, but rather to "declare victory and move forward". 187
Communication with General Electric Company Regarding Ratification

Communication between GE and the mediation team regarding ratification was cordial. GE was more conciliatory than CMA. Steve Hamilton, GE's representative worked with the mediator on additional minor language changes. However, GE decided that it could not ratify the text. 150

Hamilton's April 21, 1988 letter stated:

After carefully reviewing the document...we have decided that we cannot ratify the document. This decision is based on, among other things, our fundamental disagreements with conclusions in the document about the sources of PCBs in the New York Harbor area and the economic impact relative to other purposes, such as fishing bans promulgated to conservation purposes. 188

The letter alluded to unspecified disagreements on human health issues (which the mediation team had thought were resolved), as well as environmental effects:

In addition, there are a number of problems with the treatment of the scientific literature on health and environmental effects of PCBs. Based on recent discussions with [the NYAS team], I feel many of these scientific problems could be resolved as part of the continuing negotiating process, but it appears that the conclusions on PCB sources and impacts with which we disagree are not realistically open to reconsideration at this point. Therefore, I do not feel that we should prolong this process, now that we have decided not to ratify the document. 189

GE commented favorably on the process embodied by the Initiative:

However, we commend the process that was used to bring diverse groups together to discuss a subject of such considerable common interest.
GE continued:

The meetings were informative, interactive and challenging, and I am sure that almost every participant left the meetings with a different view of subjects on which they already had strong opinions. Unfortunately, the document does not seem to capture or adequately reflect the openness of participants to the diversity of new information or ideas presented.\textsuperscript{190}

Asked in a later phone conversation what he meant by "openness", Hamilton explained that he felt some negotiators had concluded that PCBs are a lesser problem that they had earlier believed, and he wanted the text to reflect this learning.

GE’s letter continued with endorsement for two research recommendations: those calling for congener-specific analysis of PCBs and additional research to augment and update information on sources of PCBs to the lower estuary and the Bight.

Having concluded that GE would not ratify the document, the Academy’s fallback position was to attempt to secure a letter that expressed only narrow disagreement with the text. The NYAS team offered to meet at the company’s Connecticut headquarters to continue the conversations. Steve Hamilton responded, and declined this proposal.\textsuperscript{191} Finally, Roger Strelow, Vice President for Corporate Environmental Programs wrote:

The [final efforts of the mediation team] has certainly served to improve the clarity of the document and to narrow the differences of opinion that we have with statements in the document. However, significant differences of opinion remain that prevent us from ratifying the it. In addition to concerns pointed out in Steve’s letter of April 21, we have problems with the document’s treatment of certain generic issues, such as EPA’s approach to risk assessment and relative carcinogenic potential, and PCB levels in possible effect in fish and other biota.\textsuperscript{192}

Strelow also expressed the opinion, somewhat parallel to what Geraldine Cox suggested, that the single text should have been limited to recommendations and should not have included the several chapters of findings. Of course, the format of the single text had been negotiated and agreed upon by all parties (including GE’s representative) much
earlier in the process. Strelow also stated that disagreement with the text, and non-litigation concerns were the basis for GE’s decision to ratify.¹⁹³

Thus, by April, 1988, it was clear that no amount of effort by the mediation team could bring any of the four recalcitrant parties on board. Moreover after several conversations with ratifying parties (then 16, ultimately 18), the team concluded that there was no willingness to reconvene and negotiate further changes in the text. The NYAS team and Executive Director Heinz Pagels discussed the matter and concluded that the document should be published, with a clear list of ratifiers.¹⁹⁴

Commentary Contained in Letters of Ratification

Although the previous commentary reported from the correspondence with recalcitrant parties was harsh, it was significantly at variance with positive commentary contained in correspondence with the eighteen ratifying parties. Letters of ratification provided important insights into the reactions of participants to the Bight Initiative. The unsolicited commentary in these letters covers a range of issues, including scientific quality of the document, fairness of the process, value of the recommendations, and well as commentary on the mediation team. Participants commented on five issues: 1) scientific accuracy and the handling of uncertainty and disagreement; 2) the value of the process; 3) the fairness of the process and the outcome; 4) the value of the recommendations; and 5) the performance of the mediation team. Each issue is discussed below.

Ratification Commentary on Scientific Accuracy and Handling of Scientific Disagreement and Uncertainty

Eleven participants commented on this question. A representative comment was that the of National Marine Fisheries Service who found the document "scientifically sound and representative of the findings of
participants. EPA's Regional Administrator found the document to be "a good synthesis of available technical information on PCB sources, fates, effects, and regulation of PCBs in the New York Bight system." New York State DEC's Deputy Director echoed these words in his ratification letter, while New Jersey DEP characterized the document as a succinct statement of the problem and realistic solutions. Lee Koppelman of the Long Island Regional Planning agency characterized the negotiated text as "a comprehensive summary of all facets of the PCB problem." New York City DEP found that "the process resulted in a sound document...while recognizing the present limitations of scientific information."

Several agencies, though supporting the usefulness of the synthesis, noted that they specifically retain the right to conduct other analyses and reach other findings to resolve PCB-related problems. DEC found that in several areas the document was at variance with previously reached conclusions, but named only their plans to dredge contaminated sediments as the Upper Hudson the only specific example. GE, while noting that the process narrowed scientific disagreement, disagreed with certain findings regarding PCB sources. Monsanto had similar comments. Significantly, the four non-ratifiers had the sharpest criticisms in this area. As described above, EDF's was especially tough, and was significantly at variance with the others.

Ratification Commentary on Fairness and Representativeness

Perhaps because of the extensive attention given to securing appropriate representation, there were few comments on representativeness, although there were general comments about the fairness of the document and the process. In line with NMFS finding that the document was "representative of the findings of participants", the Long Island
Regional Planning Board found it to be a "fair accommodation of divergent views of participants",\textsuperscript{206} and the Port Authority called it a "fair and impartial representation of facts".\textsuperscript{207} New Jersey DEP observed that the "document is a bit uneven in places, possibly due to the influence of divergent interest groups at inserting variant positions."\textsuperscript{208} A more indirect comment came from Clean Ocean Action "the document is clearly a consensus of many divergent interests."\textsuperscript{209}

**Ratification Commentary on Value of the Recommendations**

DEP found that the document contains "constructive recommendations for management and research"\textsuperscript{210}; while EPA found that the document "will be a useful tool in making future management recommendations regarding PCBs".\textsuperscript{211} The Long Island Regional Planning Board found "the strategies posed in the report provide realistic paths than can be used to address this difficult problem."\textsuperscript{212} The USFWS regional director wrote "we agree with the recommended management strategies since their implementation will help to preserve and protect important fish and wildlife resources in the study area."\textsuperscript{213}

In his letter of ratification, EPA's Regional Administrator expressed reservations about one specific research recommendation: "EPA will not consider implementation of the high priority research recommendation to conduct congener-specific research or monitoring of the movement of PCBs through the Estuary/Bight system. Such analysis is too costly in light of evidence that ambient PCB levels are slowly decreasing, and because the possibility of regulating sources on a congener-specific basis is extremely remote."\textsuperscript{214} The point here is that analysis of specific chemical forms of PCBs is likely to remain a research task, but is not likely to become a part of the systematic environmental monitoring for the New York Bight system. Moreover, it means that the congener-specific regulation endorsed by both commercial fisherman and General Electric company is unlikely to materialize any time soon.
EDF expressed concern about the discussion of dredging hot spots in the Upper Hudson River, which was intended to fairly set forth the obstacles to this strategy and appropriate interim steps. Again, EDF's position was troublesome. The discussion of dredging highly contaminated sediments in the Upper Hudson sought to acknowledge both the potential advantages of the approach, as well as major obstacles that would have to be overcome. The discussion of Upper Hudson issues had been endorsed by all present at the final meeting in October, and had won praise from the Science Officer of the Hudson River Foundation for its even treatment of the issues. GE endorsed the recommendations to update information on PCBs to the lower estuary and the Bight and congener-specific analysis of PCBs in fish, sediments.

Ratification Commentary on the Utility of the Process

Langdon Marsh, Deputy Commissioner of New York DEC, wrote that his agency "applauds the use of a process that is directed toward achieving consensus on recommendations for future policy making," while the Port Authority found that the Bight Initiative "demonstrat(ed) the role that science should and can have in public policy decision making." New York City DEP characterized the Initiative as "a unique opportunity to work collaboratively with representatives of groups with a wide diversity of programs and objectives which built greater understanding and respect among the participants." Similarly, ISC found that the process improved the understanding of Bight issues.

The Coalition for the Bight and the New York City Environmental Policy Forum offered congratulations and "expressed pleasure at witnessing the forging of a consensus." New York State's Secretary of State writing on behalf of New York State's Coastal Program noted: I suspect there may be other opportunities for applying this approach to other complex issues.
GE observed: The meetings were informative, interactive, and challenging, and I am sure that almost every participant left the meetings with a different view of subjects on which they already had strong opinions. EDF wrote that the scope of the document should have focussed more narrowly on management issues related to the New York Bight, handling the details of epidemiology by reference to other documents.

**Ratification Commentary on the Mediation Effort**

The largest number of comments related to the work of the NYAS mediation team. Sixteen of twenty two participants commented favorably on the team’s work. One of these, EDF, also had critical comments. Among the desirable mediation team traits identified in the letters were perserverance, diplomatic yet firm handling of the process, the considerable level of effort, and the focus on leading the group to a significant final product.

**Lessons Learned About Ratification**

The step of ratification elevates the product of a collaborative negotiation above the level of a conference proceeding or informal statement. But "selling the agreement back home", a step referred to in the negotiation literature, can be time consuming and difficult. The foregoing discussion illustrates that a mediation team should anticipate and be prepared to meet a series of ratification challenges. Approvals may be needed from one of several routes including up the chain of command, from peer divisions, or from members of coalitions. Staff attorneys may also raise concerns that ratification may tie their hands. Alternately, lawyers may raise fears that information contained in the findings of a ratified single text may be used against their client in the future.

The mediation team found that these obstacles could be overcome in part by appealing to members of coalitions who had ratified the document.
Another useful tack was to meet with key members of organizations and recount the give and take that went into crafting the document. In the end, four organizations declined to ratify the document, although the continued work of the mediation team led all four to drop the majority of their objections.

The Role of the Mediator in Securing Ratification

A final lesson regarding ratification is that mediators need to think seriously about the level of effort and appropriate tactics involved in the final ratification step. Assisting a group of disparate parties to work through a negotiated single text is not completed with the production of a "final" draft. Indeed, what the Academy team thought was the final draft was actually the penultimate agreement. Selling the agreement back home—up the organizational hierarchy, across peer divisions, and among members of coalitions—is likely to require a substantial investment of resources. Special efforts are likely to be needed to deal with recalcitrant parties. Although the objective of mediated negotiations is to produce outcomes perceived as better informed, more fair, and more likely to be implemented than other ways of reaching policy decisions, no two parties are likely to have exactly the same view as to whether these goals were reached. Indeed, mediators should encourage participants to comment on the qualities of a mediation process, in order to help design still better processes in the future.

Reflections on Dealing with Recalcitrant Parties

The experience in dealing with recalcitrant parties was time consuming and ultimately not very productive. A fundamental question is whether the fact that there were four nonratifiers undermines the document. In this case, the product of the text was principally policy advice for agencies and scientific organizations. Thus, it appears that the failure of EDF and three industry representative to subscribe to the text is not crucial. None of the recommendations are likely to evoke litigation that
could block or delay their implementation. Indeed, several recommendations are worded in such a way as to reduce the likelihood of litigation.

In hindsight, several other strategies might have been employed to cope with the nonratifiers. One would have been to make more extensive use of ratifying organizations. As discussed above, the time lag between mailing of the final document and the decisions of the eighteen cooperating organizations to ratify the text made this difficult. A second tactic might have been to place the Officers of the Academy in direct touch with the CEOs of the nonratifiers.

Additionally, it is apparent that the Academy team could have benefitted from clearer groundrules explaining the terms under which additional changes to the text could be requested. The mediation did ask that all comments for revisions to the text be received by early December, before preparation of the final document. They also asked parties to describe what precise changes they would need in order to ratify the document. This tactic is consistent with the notion that a single text should be "improved" until it are agreeable to the parties. All the ratifying parties complied with these requests. However, it appears that EDF and the industry participants did not take seriously the Academy’s decision to terminate funding of development of the single text in late 1987, nor did they adhere to the concurrent deadline for submitting substantive comments and requests for revisions. If the mediation team and other parties had up drawn up groundrules governing ratification in advance, the team could have proceeded to finalize the document without the need for drawn out efforts with non ratifiers.
THE ROLE OF A TEAM OF ACTIVE MEDIATORS IN THE NEW YORK BIGHT INITIATIVE

This section of the chapter focusses on the involvement of a team of active mediators in the New York Bight Initiative. The discussion begins by describing the composition, background and ratification of the NYAS team of mediators. Then, the team’s organization and its relationship to the parent Academy of Sciences is discussed. Next, the role of mediation team at each stage of the Bight Initiative is summarized. The section concludes with lessons learned about the role of mediators in resolving technically complex disputes.

Composition and Professional Background of the NYAS Mediation Team

As described earlier in this chapter, the mediation team that carried out the Bight Initiative came together largely because of a convergence of interests. The mission of the Science and Decision Making Project (later upgraded to a Program) was to improve the use of scientific information in public policy decision making, and to assist in the resolution of technically intensive disputes. The Bight Initiative was the major project of the Program during the period from the spring of 1985 through the fall of 1987.

Four principal members comprised the team: Janice Perlman, Marc David Block, Scott McCreary, and Marlene Mallner. Janice Perlman had been a tenured professor of City Planning at the University of California at Berkeley. She had agreed to head up the Science and Public Policy Program both because of the challenge of launching a new program and a strong desire to return to New York. Marc David Block, who had a master’s degree from the London School of Economics in international conflict resolution, had been working professionally in communications and dispute resolution for several years. He joined the Program as Co-Director of the Science and Decision Making Project. Scott McCreary was a PhD candidate at the Department of Urban Studies and Planning at MIT, and was seeking to test
alternate dispute resolution principles on a real world marine policy dispute. He served as a consultant to the Academy throughout the development of the New York Bight Initiative. Marlene Mallner, a fourth team member, had advanced degrees in languages and prior experience in administration and volunteer coordination for environmental groups.

Team members Perlman, Block, and McCleary each had a significant level of background in dispute resolution practice. Together, they were well acquainted with the literature on negotiation, alternate dispute resolution, community politics, and environmental management. Janice Perlman had taught courses in public participation at UC Berkeley, and was well versed in community politics. Marc Block had experience in group facilitation and hands on experience in intergovernmental relations. Scott McCleary had worked as a coastal planner at the local, state, and federal levels, and was well versed in water quality issues. Since joining the PhD program at MIT, he had studied much of the literature on negotiation and dispute resolution.

In December, 1984, Marc David Block and Janice Perlman had teamed with Professor Lawrence Susskind to carry out a successful facilitated dialogue at the Academy of Sciences over dioxin emissions from waste to energy facilities in December, 1984 (Konkel, 1987; Susskind and Cruikshank, 1987). Then in June, 1986, early in the development of the Bight Initiative, team members Janice Perlman and Marc David Block enrolled in an MIT summer course "Mediation of Science-Intensive Disputes" taught by Professor Lawrence Susskind to further enhance their skills. Team member Scott McCleary was the teaching assistant for the course. Thus, although none of the team had managed a process as complex as the Bight Initiative, the team had relevant and complementary backgrounds for the task at hand.

Building the Credibility and Securing the Ratification of the NYAS Team

The team carried out a series of tasks to build its credibility. These steps including facilitating workshops, conducting interviews,
reporting on the findings of these interviews, and preparing proposals for
the joint fact-finding and single text negotiation sessions. There was no
formal process to select mediators. Rather, ratification of the team of
Perlman, Block, McCreaary and Mallner as the mediators for the New York
Bight Initiative was implicit in the agreement of parties to in the joint
fact finding and single text negotiation process.

Organization of the Mediation Team

In the early stages of the Bight Initiative, Janice Perlman had final
authority for the Bight Initiative as Director of the Science and Public
Policy Program. As a practical matter, Block and McCreaary were
responsible for day-to-day development of the Bight Initiative. The full
team met frequently. In the early stages they worked together four or
five days per month, and communicated the rest of the time by telephone
and mail. Once the interviews with stakeholders got underway in January,
1986, team members Block, McCreaary, and Mallner worked together three days
per week in a shared office at the Academy.

The team adopted a collegial style of planning and decision making.
This style of operation suited the team and was reinforced by the cramped
quarters to which they were assigned. (The NYAS is situated in the old
Woolworth family mansion, comprised of many small rooms in a rabbit warren
layout. The team worked in what had been the laundry room, and sometimes
branched out into a playroom turned conference room.)

Donald Straus, the retired President of the American Arbitration
Association and an active member of the Academy’s Science and Public
Policy Section, served as an informal advisor to the mediation team. The
team met with Straus in his Manhattan offices about once a month to
discuss the progress of the Initiative, and possible strategies for next
steps. Straus was a source of ideas for the team of which some were
incorporated in the design of the Bight Initiative, and others were
rejected. His most useful function was to serve as a sounding board.
Straus was a key discussant along with Perlman, Block, and McCreary in shaping the style of intervention the NYAS team brought to the Bight Initiative. Straus, though not a computer expert, urged the Academy team to use computer modelling as the cornerstone of its intervention in the Bight. At one time he suggested that the Academy should attempt to create a model showing what would happen if the Bight were not managed more thoughtfully. Additionally, Mr. Straus had arrived at the professional conclusion that "collaborating to understand" was a sufficiently ambitious goal for the Science and Decision Making Program. Straus had strong reservations about the Academy’s functioning as an active mediator, and was clearly more comfortable with a passive facilitator role. These suggestions provided a useful metaphor for discussion, but they were not a pragmatic response to the challenges facing the NYAS.

The team realized that Straus’s idea of building a model to portray the entire Bight was clearly beyond the realm of available knowledge, and would have to incorporate literally scores of assumptions. As for Straus’ conviction that the Academy could help a good deal by providing a forum for joint fact-finding, McCreary’s research and professional experience convinced him that the Program had a responsibility to carry its work forward into policy recommendations. He felt strongly that a process of fact-finding and information review was insufficient. McCreary also felt that inertia among the players in Bight management was so great that an active mediator role was absolutely essential. These debates continued through the fall of 1985 and well into 1986. Gradually, the NYAS team came to the conclusion that an active mediator posture was essentially for getting the job done. The many tasks implied by this active style of mediation are described later in this section.

**Division Of Responsibility And Continuity Among Team Members**

Perlman, Block, and McCreary co-facilitated the first exploratory meeting in the summer of 1985. During the winter of 1986, Block and McCreary conducted nearly 100 interviews with Bight stakeholders, most of which were scheduled and confirmed by Mallner. A year later, at a
workshop to present the interview findings, present the Bight Initiative proposal and answer questions, Perlman introduced Block and McCrea, who facilitated the meeting. Between January, 1987 and May, 1987, Block and McCrea served as co-facilitators for each meeting. They worked out a compatible style, wherein one would handle the duties of leading the discussion while the other recorded key points on a flip chart in front of the group. Marlene Mallner filled a crucial administrative function, and typically recorded the highlights of conversations on a personal computer as part the task of recording meetings and preparing meeting summaries.

During the joint fact-finding and single text negotiation (January to October, 1987) there was a great deal of communication between Block, McCrea, and Mallner. There was no special effort to "divide up" contact among the various stakeholders. Block and Mallner typically handled administrative duties and internal contacts with Academy staff, although McCrea coauthored memoranda summarizing the substantive progress of the negotiations. Since McCrea had more scientific background than the other team members he handled contacts with scientific panelists and reviewed the briefing memoranda or scientific literature they submitted.

Some significant problems with continuity of the team arose during the Bight Initiative, but they did not derail the process. Janice Perlman left the employ of the Academy in the fall of 1986, before the joint fact finding process got underway. Several months later, a prolonged illness forced Marc David Block to miss five of the ten sessions (those held between June and August, 1987), including several crucial workshops where much of the text was developed. He was able to return for the final caucuses and the final meeting in October, 1987.

During Mr. Block's absence, McCrea arranged for help from John Gamman, a colleague from the MIT-Harvard Public Disputes Program. Gamman, a PhD candidate with long experience in community planning, was able to get up to speed quickly and assist the smooth running of the proceedings. Also during Block's absence, Marlene Mallner took on a number of facilitator functions. For instance, at two key workshops in July and
August, 1987, Mallner guided teams of negotiators through a series of questions intended to facilitate group discussion which McCrery had drafted in advance. Mallner also took on many additional administrative duties during Block’s absence. These strategies to compensate for Block’s absence were mostly successful. However, it was clear that greater continuity of the full mediation team and more staff resources might have eased the completion of the final report.

Relations Between the Mediation Team and Academy Officers and Board

Institutional relations between the mediation team and Academy Officers and Board were uneven over the life of the Bight Initiative, though they generally improved as the single text was nearing completion. At first, during 1985 and early 1986, almost all contacts with the Executive Director and the Board were handled by Janice Perlman in her capacity as Program Director. Dr. Perlman reported on the Bight Initiative to the full Board as part of her duties for the overall Science and Public Policy Program. This parent Program began with a great deal of Board support, but this withered after several months. Dr. Perlman was frequently at odds with the Academy administration regarding fiscal issues and the direction of the overall Science and Public Policy Program. (The Program’s two other Projects were "Science City", devoted to explaining scientific principles using everyday objects in New York; and MegaCities, devoted to exploring strategic use of technologies to help manage in the world’s largest cities.). Board members expressed skepticism about her promises to deliver on a series of difficult assignments. The mediators had relatively little contact with the top officers of the Academy until later in the process.

During 1986, the mediation team drafted several briefing memos to the full Academy Board on progress of the Bight Initiative. However, in line with Academy protocol, only Perlman was invited to present these in person. On one occasion in the spring of 1986, the mediation team (Perlman, Block, and McCrery) had chance to present a lengthy briefing to
Executive Director Heinz Pagels, then President William Cain, and Administrative Director Mort Meyers, and to answer their questions. This seemed to address some of the concerns the top administrators had about the progress of the project. The team also made occasional presentations to the Science and Public Policy Section and the Ad Hoc Committee on Science and Public Policy (created in part to oversee the Science and Public Policy Program.) At one such meeting, after Perlman had deflected a series of tough questions, Pagels called Block and McCrery aside and explained that the Academy would "strongly support the Bight project for a long time."

By the fall of 1986, Janice Perlman left her position as head of the Science and Public Policy Program. The Science and Decision Making Project was upgraded to a Program and Marc David Block was promoted to Program Director. (The Science City and Megacities projects were parcelled out to other cooperating organizations). The relationship of the mediation team with the Officers improved as direct contact increased. At the first workshop devoted to managing PCBs, convened in January, 1987, Heinz Pagels welcomed participants and reinforced the Academy’s strong commitment to the project. Although he attended few other sessions, Pagels was eager to be kept informed once the joint fact finding and single text process progressed.

Pagels also provided occasional guidance to the team. One piece of advice was to ensure that "polluters" (i.e. waste dischargers and industry) were part of the roster of participants. Pagels also admonished the team to ensure that the recommendations developed were those of the full group, and not the Academy’s views. This guidance was readily accepted, particularly since it was entirely consistent with the mediation team’s conception of the Bight Initiative process.

In late 1987 and early 1988, during the ratification phase of the Bight Initiative, McCrery had frequent conversations with Heinz Pagels to keep him informed of the project’s status. After Pagels’ untimely death in July, 1988, he kept in close touch with Acting Director William Bruce.
The Academy’s Financial Commitment to the Bight Initiative

In 1986 and most of 1987, the NYAS provided a substantial financial contribution to the Bight Initiative in the form of salaries for Block and Mallner, offices, meeting space, and utilities. However, in early 1987 critical cash flow problems forced across-the-board cuts at the Academy. As the most recently created program, and one that had earlier promised "self funding", the Science and Decision Making Program was slated for termination at the end of October, 1987. This date corresponded to the time at which the Bight Initiative budget would be exhausted and coincided with the team’s forecast for the completion date of the single text. The mediation team reached an understanding with Heinz Pagels that the Academy would continue to sponsor the preparation of the final document, but would not contribute any of its own resources. Thus, the team had to raise additional resources to prepare and distribute the final report.

Retrospective Comments on the Academy’s Sponsorship

In hindsight, it appears that early, consistent access to top decision makers would have aided the work of the mediation team. Additionally, it was clear the Block’s absence during much of the important development of text—though mitigated to a large extent by John Gamman’s help—was detrimental to the overall continuity of the effort. Of course, the Academy’s decision to terminate the Science and Decision Making Program due to organization-wide cash flow problems was also most untimely. Besides complicating the ratification process, this decision also placed added burdens on the mediation team to find outside sources of funding to complete and publish the single text—tasks that took many additional months. It may also have been strategic for the mediation team to line up external support for the Bight Initiative from established figures in science and public affairs and the fields of negotiation and alternate dispute resolution. In this way, the Bight Initiative and the Science and Decision Making Project may have fared better when the Science and Public
Policy Program was dismantled, and perhaps could have secured additional NYAS financial support to the see project through ratification and printing of the final report.

Retrospective Comments on the Expertise of the Team

An important question that arises in technically complex disputes is the degree of substantive expertise a mediation team needs to help contending parties. The Bight Initiative strongly suggests that at a minimum, familiarity with key terms and concepts is needed. (The mediators, like the other participants in the Initiative became much more conversant with these terms as negotiations progressed.)

In the letters of ratification, the mediation team received generally strong reviews from participants. Many letters praised the team's skills in diplomacy and the scientific quality of the document. The mediation team had a good knowledge of intergovernmental relations, water quality issues, and marine ecology. The team did not have specific training in issues related to public health, nor were they knowledgeable in molecular or developmental biology. It probably would have been impossible to assemble a mediation team with expertise in all the divergent fields touched upon by the Initiative. Some of the non-ratifiers criticized the team for insufficient expertise to moderate the public health aspects of the issue under discussion. Of course, some of this criticism may be nothing more than organizational posturing on the part of CMA and EDF. But in hindsight, it may have been desirable to add a member to the team with greater expertise in public health issues. Alternately, it may have been useful to assign a student intern or postdoctoral fellow to the task of reviewing and screening relevant technical literature.

Overview of the Roles of NYAS Mediators

One view of appropriate process assistance is that nonpartisan intervenors should attend only to the smooth running of a meeting, or should care only that parties are satisfied with an outcome. Another view
is that nonpartisan intervenors should be active mediators. As described above, the Academy team had a variation on this debate in shaping its intervention in the Bight. What does such an "activist" posture entail? Does it mean merely an energetic commitment to productive group interaction? "Activist", as other analysts (Susskind and Cruikshank, 1987) have conceived of the term means that the nonpartisan helper is concerned about the wisdom, efficiency, fairness, and implementability of the outcome and should help create outcomes that set good precedents. I adopt that meaning here, and attempt to fill out a clearer conception of some of the roles of an activist mediator.

In the Bight Initiative, an activist mediator posture was absolutely essential at every stage, from conducting exploratory interviews to designing the collaborative process, recruiting participation, engaging scientists, leading parties through the joint fact-finding procedure, drafting interim versions of the text, and securing ratification of the final document. At any of these stages, the process could easily have broken down without the strategic intervention by the mediation team. In short the mediation team had to provide leadership to the group of assembled negotiators to keep the procedure on track. A passive posture would have utterly failed to deliver substantive results.

The Role of the Mediation Team in Securing Appropriate Participation

The NYAS mediation team carried out a series of tasks to recruit and sustain appropriate participation. The overarching goal was to engage affected groups with a stake in the question of how to better manage PCBs in the Hudson Raritan Estuary and the New York Bight. Academy mediators found that they could get a handle on logical agency participants by mapping their respective mandates and jurisdictions. In some cases, the NYAS team had to "go over the heads" of reluctant participants. This was true in recruiting participation from the National Marine Fisheries Service. To secure appropriate participation from private groups, the
NYAS paid close attention to the publicly stated positions or prior track of groups in forums on Bight use or water quality management.

In the Bight Initiative, it was useful for the mediation team to recruit both locally-oriented groups and those with a broader state or national policy focus, regardless of their views on specific issues. Thus, the Academy tried to recruit local Bight users (such as a local trade association) and national level manufacturing interests. Additionally, the NYAS team sought to recruit environmental groups with a Manhattan focus, those with a New Jersey shore focus, and groups with a broader national outlook. In this way, the expertise of local groups can be tapped. This local knowledge can be comingle with the knowledge of innovative solutions or analogous cases that nationally oriented groups might bring to a negotiation.

Beyond their efforts to secure commitments of participation from key organizations, NYAS mediators worked to ensure that individual representatives were appointed who had the commitment and endurance to see their way through joint fact-finding and creation of successive drafts of a negotiated text. Ideally, the designated representative should be able to speak for their organization, or at least have access to top decision makers or governing councils. The mediators tried to nail down such commitments by meeting with the executive officers of each organization.

With these considerations in mind, the NYAS drew up a draft roster. The Bight Initiative showed that circulating such a draft roster to a few key people can help spot errors in preparation. A related task was to ensure that possibly disruptive individuals did not derail the proceedings. In the Bight Initiative, this involved meeting with a potentially difficult person for four hours on his home turf and striking an agreement wherein if other allied environmental groups participated, and the NYAS provided meeting summaries, then the controversial individual would not insist on attending the Academy’s sessions.
As active mediators, the NYAS team did everything they could to secure a guarantee of consistent participation. But they found they needed to anticipate and be prepared to meet a series of participation challenges. Despite the Academy's urgings, the continuity of participation was broken for several organization. There were at least three major problems: some participants left their jobs and suitable replacement could not be found; participants were detained in litigation; or participants otherwise missed meetings. In such instances, the mediation team had several options. One was to make sure that every participant received a detailed summary of each meeting, and every draft of the single text. A second strategy was to stay in touch by phone. Another option was to ask an affiliated organizations to review the progress of the Initiative with absent stakeholders. Fourth, the Academy scheduled small caucuses to review the interim draft of the text.

The Role of the Mediation Team in Setting an Agenda for Negotiation

When a group is attempting to frame an agenda for negotiation for a complex problem domain (such as management of the Bight), the role of an active mediator is also important. This task of agenda setting requires that mediators help parties strike a balance between a narrow set of issues and a dishearteningly broad list of concerns. How can such a balance be achieved as parties struggle to cope with a complex public policy issue?

Achieving these goals in the Bight Initiative required that the mediation team complete several tasks, beginning with an analytic role for the mediation team. They conducted interviews with about 100 Bight users and managers, in which respondents were asked to rank order the most pressing Bight issues (from a carefully drawn list of 23 issues). The mediation team encouraged the development of objective criteria on which to rank the issues. Respondents were asked to consider whether 1) the issue was pressing; 2) the issue was characterized by elements of scientific or technical disagreement; or 3) the issue might be clarified or resolved through dialogue among decision makers, scientists and representatives of key interest groups.
Over 70 responses were sorted and tallied using the software program dBASEIII to arrive at a list of five top issues, three of which related to dealing with sources and risks posed by contaminants in the Bight. These findings were presented at a meeting of stakeholders in July, 1986 at which participants confirmed that management of contaminants in the Bight was a top priority.

Then, another round of meetings and caucuses with key stakeholders was needed to narrow the problem from "managing contaminants" to "managing PCBs" during the fall of 1986. At a meeting in January, 1987, the group agreed to investigate the full causal sequence of sources, fates, and effects of PCBs to lay the foundation for their policy recommendations. After two fact-finding sessions, the mediation team drafted a provisional table of contents for the single text. Then, three mixed teams of negotiators reworked the table of contents. Next, with the help of the NYAS mediator, negotiators hammered out a single negotiated Table of Contents for the text at a meeting in May, 1987. This synthesis Table of Contents effectively represented the final agenda for single text negotiation. Achieving this step also provided negotiators with the sense that they could come to consensus around a single document. It is apparent that without the mediation team's extensive and sustained involvement in agenda setting, the stakeholders would not have been able to meet around a sufficiently bounded issue.

The Role of the Mediation Team in Facilitating the Interaction of Scientists, Policy Makers, and Other Stakeholders

The Bight Initiative also showed that in mechanisms to resolve disputes of a science-intensive nature, mediators must take steps to facilitate productive interaction among scientists and negotiators. This task begins with recruitment of credible scientists, which may involve building a preliminary roster, scanning the scientific literature, and discussing the credentials of potential panelists with their peers in the scientific community. It may also involve asking leading scientists for help in recruiting panelists. (Most scientists donated their time to the Bight Initiative, though several did ask for travel compensation.)
Another aspect of this responsibility to smooth the relationship between scientists and stakeholders is to give detailed instructions as to precisely what contributions are expected. Among the roles scientists played were to give technical briefings, participate in question and answer sessions, or to assist negotiators in their deliberations of management alternatives. Mediators also handled the task of preparing detailed "packets" for each days' working sessions. These packets typically included an agenda, briefing memos, biographies of scientists, and questions to be investigated. Moderating the deliberations was a major task of facilitating the interaction between stakeholders and scientists. Over a period of ten months, the mediation team served as convenors and facilitators of ten meetings. The mediation team sometimes interrupted the presentations to ask scientists to clarify technical jargon. In other cases, the mediators allowed scientists time to "vent". In still other instances, the mediator had to remind the scientists of the overall objective of the group, namely to work through joint fact finding in order to lay the foundation for policy prescriptions. Additionally, the mediation team kept scientists focussed on their task—whether it was to describe cause and effect relationships, illuminate the implications of policy options, or help the group invent prescriptions for policy action.

The task of recording meeting highlights and preparing meeting summaries also assisted the exchange of information. The Academy team used flipcharts, supplemented with a personal computer to create a record that approximated a real time transcript. This reduced the turnaround time for producing meeting summaries and enabled mediators to double check the points they had recorded. Second, they sent excerpts from the meeting summaries to scientific panelists to enable them to phone in corrections before the final meeting summaries were produced. Third, they prepared a glossary of terms and definitions that was continuously updated and distributed over the course of the ten meetings.
The Role of the Mediation Team in Leading Joint Fact-Finding

Some of the "housekeeping" chores of facilitating the interaction of scientists, decision makers, and other stakeholders were described above. The NYAS mediation team handled several substantive tasks as part of the joint fact finding process.

The team worked closely with scientists, lawyers, and technical illustrators to help put information in a form that would be most useful to negotiators. NYAS mediators convened a "Sources Subcommittee", devoted to summarizing existing information about reservoirs of PCBs in the Hudson-Raritan system and movement of PCBs through the system. As a first step in building this table, they led negotiators and scientists in a discussion to define key key terms, such as source, flux, volitilization, and GE discharges. This effectively created a common language from which negotiators could develop findings. The Sources subcommittee also found they could build a "budget" for PCBs in the system, organized according to two time periods and three major reaches of the river. The task of building this budget, with clear data entries for every source of PCBs for each time period, helped reveal data gaps and enabled participants to map the bounds of good information.

The mediation team also helped negotiators realize their objective to express the data contained in the table in a graphic format. They worked with a technical illustrator to key the information on the volume of PCB to block diagrams representing each major reach of the Hudson-Raritan/ Bight system.

NYAS mediators also used several drafting strategies to express findings in a way that brought the group towards consensus while taking account of residual disagreement or uncertainty. One useful strategy was to work with scientific panelists to clearly express the assumptions embedded in a particular estimate of health risk. For example, the mediation team worked with a representative of the National Marine
Fisheries Service to clearly present the assumptions and calculations linking consumption of bluefish to exposure to PCBs. They also worked with a scientist from EPA's Cancer Assessment unit to explain the various types of evidence the agency uses in characterizing compounds as probable carcinogens.

In some cases, no amount of discussion was sufficient to enable negotiations to arrive at a single version of the facts. Rather than forcing consensus where none could be achieved, NVAS mediators helped parties draft text that characterized specific data sets, then expressed the range of interpretations associated with this data. This was especially necessary to take account of divergent views on the evidence linking exposure to PCBs and cancer in humans.

Still another task in the joint fact finding effort was to help parties learn about and characterize emerging technologies for PCB decontamination without leaping to premature endorsement of these new processes. The team arranged a briefing from an analyst who had evaluated the most promising technologies under a contract from EPA. Then, the mediators suggested that negotiators could include an appendix in the single text document summarizing the technical components and projected test and application costs. At the same time, the NVAS mediators suggested that the text could explain that the parties chose neither to endorse nor reject any specific technologies.

The Role of the Mediation Team in Developing and Packaging Recommendations

The Bight Initiative shows that active mediators can perform a series of roles in assisting negotiators to develop and package management recommendation. Mediators can perform a useful contribution in assisting stakeholders to develop policy recommendations by drafting initial "strawman" management recommendations for consideration by negotiators. The Bight Initiative also shows that investing parties with the
responsibility of evaluating policy alternatives serves to distance the mediator from any particular policy prescription. This in turn helps preserve the neutral standing of the mediator, and in this case, served to reconfirm that the Academy of Sciences was not endorsing any particular management option. NYAS mediators asked negotiators to list the strengths and weaknesses of each policy option, and to identify information needed to make the option workable. This helped create a useful structure for deliberations.

The mediators also recruited scientific panelists to assist negotiators in their deliberations over management options. Mediators can take the lead in preparing an iterative series of draft recommendations may be needed to develop recommendations and incorporate necessary refinements. Convening small group caucuses was another useful contribution of the mediation team, since it enabled the mediation team to receive in-depth comments and deflected the frustration of those who wanted to work in more depth.

Aside from these interventions, NYAS mediators recognized the possibilities for linkages across issues to help negotiators write recommendations agreeable to the multiple parties. Some of these linkages enabled trades across issues—as illustrated in the discussion of dredging issues. Here, it was particularly useful to sort recommendations into options for action, research, and management; and to assign relative priorities to management recommendations. In other cases, NYAS mediators helped parties sort out the components of individual recommendations to write recommendations that integrated the interests of multiple negotiators. Writing recommendations that were contingent on certain research or assessment findings was also a useful strategy. Still another useful strategy was to were to inject added clarification of terms and conditions; and to pair discussions of obstacles to implementation of management recommendations with specific interim steps to help overcome these obstacles. Another helpful approach was to frame recommendations as
research tasks rather than as management steps that require an immediate response. Used in combination, these drafting techniques helped lay the foundation for ratification of the final negotiated single text.

The Role of the Mediation Team in Securing Ratification of the Text

An activist posture does not end with preparation of a final text. It was apparent the final negotiated text simply would not "sell itself". A first step in the ratification process was to mail out the final drafts and ask each participant for a definitive ratification response—either a letter of ratification or a precise list of changes needed before the organization would sign on. It was also useful to summarize the key changes that had been incorporated in the penultimate draft and the final text.

The Bight Initiative showed that the mediation team must be willing to keep working for several weeks, even several months to nail down the signatures of participating organizations. The NYAS team place dozens of phone calls. They worked to find coalitions where one member that had already ratified the document could help bring along a more hesitant party. NYAS mediators offered to meet mildly recalcitrant parties on their home turf. For instance, the Academy team met with Clean Ocean Action and the American Littoral Society in Sandy Hook, New Jersey. At this meeting, the informal comments of the National Marine Fisheries Service representative (whose Washington office had already ratified the document) were most helpful. The NMFS represented the document as a fair and even handed approach. The Academy found it useful to send out each letter of ratification to other parties. This tactic served the dual purpose of keeping everyone apprised of the status of ratification and helping to build momentum for the final agreement.

A mediation team should work to eliminate obstacles to ratification. In the Bight Initiative, it was helpful to draft a caveat explaining that ratification is informal, and that ratification did not necessarily mean that parties agreed with all conclusions expressed in the 150 articles cited in the text.
The Bight Initiative also showed that the ratification of one party may be contingent on the effort of a mediation team to address (but not necessarily fully satisfy) the concerns of an allied organization. Representatives of New Jersey DEP, Clean Ocean Action, and the American Littoral Society each asked NYAS mediators to make an effort to deal with the concerns EDF had expressed.

Asking for a precise list of changes an organization needs to ratify the document is a useful strategy. As suggested above, the Bight Initiative suggests that mediators and negotiators alike would benefit from clear ground rules explaining under what timeframe revisions in the negotiated text would be considered. The ongoing last minute requests for revisions by CMA and others drew out the ratification process, but in the end did not change the final tally of ratifiers.

Concluding Observations

While the details of mediator involvement will no doubt vary from case to case, the important message here is that an activist posture is an all-pervasive ingredient for successful resolution of science-intensive disputes. At no step of the process did the group of assembled negotiators speak with one voice and tell the NYAS team precisely what it wanted to do next. An active mediator posture is not limited to the actual facilitation of meetings. It has many implications for meeting preparation, development of multiple draft agreements, and sustained effort during the ratification phase. It is doubtful that the Bight Initiative would have been brought to successful closure without a commitment to the quality of the outcome, as well as the satisfaction of the participants.
CHAPTER SEVEN
CONCLUSIONS: IMPLICATIONS FOR RESOLUTION OF SCIENCE-INTENSIVE PUBLIC POLICY DISPUTES

Introduction

The purpose of this chapter is to step back and place the results of the Bight Initiative and the companion case studies in the larger context of scientific analysis in public policy making. One implication is that there is a pressing need to look beyond the conventional wisdom regarding reliance on traditional legislative, administrative, and judicial mechanisms for better ways of handling science-intensive public policy disputes. My analysis clearly demonstrates that there is merit in the strategic use of supplementary negotiations that bring policy makers and key stakeholders into face-to-face dialogue with scientists. The first part of this chapter looks specifically at the ways in which these kinds of interactions can improve. I also want to show how the New York Bight Initiative and the analysis of the companion case studies can extend the prevailing theory in the field of alternative dispute resolution. The set of concepts I will present represent a strategic framework for resolving science-intensive public policy disputes.

HOW THE BIGHT INITIATIVE INFORMS THE DESIGN OF PROCESSES TO RESOLVE DISPUTES OF A SCIENCE-INTENSIVE NATURE

Disputes of a science-intensive nature are a fact of life in the public policy arena. Based on the Bight Initiative I have identified seven conclusions regarding the resolution of science-intensive disputes:

First, greater efforts are needed to ensure that three often separated groups—policy makers, scientists and technical experts, and representatives of major stakeholder groups—are placed on a more equal footing as players in the policy making process. In my view, putting these groups into a more proper relationship demands sustained interaction based on face-to-face dialogue. Second, processes for public decision making need to do a better job of getting and taking advantage of useable
information. Third, stronger efforts are needed to translate technical information and present it to all the affected stakeholders in an appropriate format. Fourth, processes for handling disputes over the allocation of resources must incorporate mechanisms for handling scientific disagreement more effectively. In my view, effective handling of disagreements between experts involves probing the bases of disagreement, working to reduce this disagreement, and stating findings to lay the foundation for recommending policy options. Fifth, more effective means are needed to cope with complexity and uncertainty, particularly when the interaction of natural systems and technologies is involved. Greater attention is need to map cause and effect relationships, to present complex phenomena, and to foster joint learning to clear up uncertainty.

Sixth, efforts to deal with science-intensive disputes must do a better job of anticipating problems that can thwart implementation: failure to secure legitimate participation, an insufficient response to the technical aspects of issues, and inadequate efforts to package suitable agreements and bind parties to their agreements. Seventh, I recommend use of the negotiated single text procedure to invest disputing parties with the common purpose of stating relevant findings and capturing acceptable agreements. The single text procedure involves joint efforts to draft and improve findings and recommendations, a ratification phase to assist the task of translating the informal product of negotiation into a more formal agreement. My findings show that the sustained involvement of a team of activist mediators is needed to lead the single text negotiation procedure, including the tasks of organizing participation, recruiting scientists, conducting joint fact-finding, packaging agreements, and securing ratification. An activist style of mediation (as opposed to the model of a more passive facilitator) holds special promise to advance the resolution of science-intensive disputes.
PARTICIPATION IN EFFORTS TO RESOLVE SCIENCE-INTENSIVE DISPUTES:
PUTTING POLICY MAKERS, SCIENTISTS, AND OTHER STAKEHOLDERS ON A MORE
EQUAL FOOTING

There are two dominant views about the proper relationship among
policy makers, scientists, and other stakeholders in decision making over
complex public problems. One is what Ozawa and Susskind (1985) have
called the "adversary science" model in which disputants recruit
scientists to bolster their respective cases. The other is the peer elite
panel of scientists.

Under the adversary science model, experts argue on behalf of one
policy position (or litigant), usually by presenting testimony at public
hearings or in judicial proceedings. Direct interaction among experts, or
between experts and affected stakeholders is minimal. Alternately,
scientists are called on only as expert witnesses on behalf of one
disputant. Often the result neither narrows nor clarifies the scientific
disagreement.

Another conventional view of the proper way to shape public policy
over technical issues is to assign a group of scientists to meet
separately to render policy advice. This model is prevalent in the work
of panels convened by the National Academy of Sciences and the National
Research Council (NRC), the Academy's operating arm for providing advice
to the federal government. Grobstein (1983) describes an NRC study as a
three-stage process beginning with an external request from Congress,
followed by negotiation of a contract and selection of appropriate experts
to prepare and carry out the report. One potential drawback of this
approach is that policy makers and other affected interests do not take
part in such deliberations, they may fail to appreciate the logic or
rationales behind a particular policy choice recommended by the panel.
The absence of policy makers may lead peer elite panels to make
recommendations that are not sufficiently grounded in the realistic
constraints and opportunities facing the legislature or government agency.
If peer elite panels reach an impasse, this may lead lay people to the
unfortunate conclusion that science has no useful role to play in shaping
public policy. As was documented in the Oakland harbor case, exclusion of affected stakeholders from the deliberations of scientists may deprive scientists of information that would have a crucial bearing on the policy choice they recommend.

Neither the adversary science model nor the peer elite panels call for direct interaction of policy makers, scientists, and other stakeholders. On the contrary, both involve substantial separation of the three groups.

Holling’s conception of a system for "adaptive environmental assessment" (1978) begins to challenge the notion of separation. Holling’s model is built around intensive team work of scientists and analysts, with guidance from policy makers interjected at appropriate intervals. For instance, Holling’s notion of a "core group" for such a project is a set of experts—analysts skilled in computer analysis and one or two "subject matter specialists". He notes:

The workshop is attended by the core group and all the specialists. In addition, it is critically important that the higher level decision makers and managers be involved as much as possible. Frequently, they will be able to attend only the first day, or even only the first hour, but it is of critical importance that they be there even for that hour, and at least two or three should attend the whole workshop....A group of biologists left alone might produce a very interesting model of a game population, but one irrelevant to the management of the species. The presence of decision makers thus provides needed guidance in the early stages of the program. 1

Holling’s model points up the importance of close contact between modellers, scientists, and decision makers, but does not speak to the involvement of affected stakeholder groups. I would join those who advocate the opposite of separation—ongoing face-to-face dialogue. This view is representable by the literature on public dispute resolution (Susskind and Weinstein, 1981; Ozawa and Susskind, 1985; Susskind and Cruikshank 1987). This view emphasizes inclusion of all affected stakeholder groups—both those that may have the resources to block implementation of a decision and those affected by the decision. For example, Ozawa and Susskind (1985) explain:
The first requirements for success [for mediation of science-intensive disputes] is appropriate representation. Mediation should only proceed if all the key interests are adequately represented. Without the participation of every party that has the political or economic power to block resolution, the process will not succeed.²

A related theme in the negotiation literature is that representatives must check back with their constituencies, possibly using multiple tiers of delegates (Susskind and Cruikshank, 1987; Carpenter and Kennedy, 1987).

Analysts such as Brooks (1984) and Roberts et al. (1985) who focus on science advising for policy, agree that broad representation is important, but emphasize the need to ensure clarity, selectivity, immersion and commitment. Roberts et al. (1984) suggest that "direct bargaining or mediation efforts are worthwhile only when it is clear who should participate." Brooks (1984) has suggested that:

[When a representative "jury" is deeply exposed to issues and has an opportunity to hear the experts representing all points of view, they will usually make sensible decisions. The key, however, is a willingness to learn and a format that enables a group to study an issue intensively. Casual exposure based on random contacts or on exposure to media presentations is insufficient foundation for intelligent conclusions on complex issues...Citizen commissions, which are analogous to juries, have a fairly good record in dealing with complex technical issues when they have adequate access to experts and when there are ample opportunities for questioning and dialogue...public participation must be conducted on a highly selective basis, thereby promoting experts as the principal actors in most public policy decisions involving technical information. When appeal from the experts becomes necessary, it is essential that those who are chosen to represent the public interest have the time and are willing to devote the necessary effort to become immersed thoroughly in the issues.³]

The Bight Initiative represents a concrete example of an effort to meet all of the prescriptions suggested by both Brooks and by Ozawa and Susskind. Representation was designed to incorporate all major stakeholder groups as suggested by Ozawa and Susskind (1985). At the same time, participation was, as Brooks recommends, highly selective in terms of the continuity and commitment of individual participants. Additionally, the joint fact-finding effort central to the Bight Initiative represented a format that enabled the group to study the issue intensively. Fourth, there were ample opportunities
for questioning and dialogue. (This discourse is clearly reflected in the 200 pages of meeting summaries prepared for the ten meetings). Fifth, as the 150+ findings drafted by the group show, there was an opportunity for participants to become thoroughly immersed in the issues.

The overall conclusion is that it is valuable to promote informed face-to-face dialogue among policy makers, scientists, and affected stakeholders that puts these groups on an equal footing. In my view, each of these groups should have direct access to the policy development process. Active participation of all three groups should span the tasks of setting an agenda for items to be discussed, jointly reviewing relevant information, and invention of policy options. Face-to-face dialogue should continue to enable participants to critique and refine management recommendations. All three major groups should have a role in monitoring and implementation of agreements. "Putting groups on an equal footing" may mean that groups with lesser economic and technical resources receive assistance, either in the form of travel expenses, or perhaps in the form of additional briefings to bring them up to speed on technical issues inherent in the case. Steps are also needed to "translate" technical terms and to present technical information in a readily understandable fashion.

This model of face-to-face interaction avoids several of the problems inherent in separation of the three groups and offers a more constructive style of communication. Such a dialogue enables policy makers to ensure that available scientific data is brought to the policy making process, that sources of scientific disagreement can be probed, and that steps be taken to clear up scientific uncertainty. The result is a better-informed outcome. If grassroots interests are empowered to participate in such deliberations, and can pose questions to scientific advisors, they can more readily appreciate the logic or rationales behind a particular recommendation.

Through the mechanism of direct dialogue, affected stakeholders can clearly articulate their views to policy makers in person, rather than relying on hired advocates. Moreover, non-scientist participants may have access to important information that could better inform the policy making
process. If affected interests have a direct role in shaping policy responses to technically-intensive issues, they are much more likely to be invested in seeing the recommendations implemented. Indeed, such groups should be charged with helping to monitor and implement policy recommendations.

The model of direct interaction provides secondary advantages to scientific participants. Scientists can benefit from face-to-face discussion with their peers in the context of a structured dialogue. Such a dialogue can assist rapid diffusion of new ideas and allow a more free-wheeling discussion than is possible through published debates in scholarly journals. Scientists can also benefit from gaining a clearer picture of the policy implications of their research.

Concluding Observations Regarding Placing Policy Makers, Scientists, and Affected Stakeholders on an Equal Footing

The Bight Initiative represents an explicit effort to place three often separated groups—scientists, policy makers, and affected stakeholders—on a more equal footing. The key feature in creating a more appropriate relationship among these groups was to engage them in face-to-face dialogue, and invest them with the joint responsibility of framing a problem, investigating relevant information, and recommending policy outcomes. I have argued that this joint dialogue can offer several benefits, and avoid the problems associated with isolation of scientists associated with more traditional models of adversary science and peer elite panels.

The experience of the Bight Initiative shows that recruitment of stakeholders in mechanisms to resolve science-intensive disputes should emphasize broad participation of stakeholder groups, continuity and commitment from individual representatives, a format that enables intensive study and immersion, and opportunities for extensive joint inquiry and questioning.
Additionally, the Bight Initiative showed that the direct participation of scientific experts is integral to these goals of successful study, immersion, and questioning. A central element of the notion of "equal footing" relates to access to presentation of scientific information in a form understandable to policy makers and affected stakeholders. This is the subject of the next section of the chapter.

GETTING AND TAKING ADVANTAGE OF USEABLE INFORMATION: SECURING APPROPRIATE AUSPICES, RECRUITING CREDIBLE SOURCES OF EXPERTISE AND PRESENTING RELEVANT INFORMATION

Harter (1985) has suggested that in traditional public policy making processes parties recruit experts to bolster their own views and that parties with limited resources lack access to information. Greenwood (1985) finds that agencies often make choices without having adequate information in hand. The case studies I presented in Chapters 2 through 5 reinforce the observations of Harter and Greenwood.

An alternative view as to how useable information should be secured is to promote joint fact-finding—the joint discovery and review of relevant information by parties to a dispute. The literature on alternate dispute resolution has generally applauded joint fact-finding but has not described the process in sufficient detail. For example, Ozawa and Susskind (1985) briefly describe joint fact-finding:

The participants can jointly frame the research questions, specify the method of inquiry, selected the researchers, and monitor the work, injecting their concerns at every appropriate point. If parties to a dispute make these decisions collectively and debate the possible alternatives before an analysis is completed, they are less likely to reject the technical findings that emerge. Their understanding of technical aspects of the issue is also likely to improve through such an exercise.
In describing the provision of technical analysis for the negotiated rulemaking on non conformance penalties for failure to meet air quality standards, Susskind and McMahon (1985) report:

The NCP negotiating committee used over $10,000 to fund an independent study of a proposed engine testing plan. Other collaborative technical work was done by committee members who designed a micro-computer-based spreadsheet model to test the impacts of parameter changes in the penalty formula.

Thus, the dispute resolution literature recognizes joint fact-finding as a process of joint learning, and suggests that outside experts may be needed to assist a team of negotiators. Greater clarity is needed to understand more precisely what types of technical assistance must be provided to help parties get and take advantage of available scientific information. This is absolutely essential in efforts to steer through a tightly knotted, highly scientific technical dispute. The experience of the Bright Initiative shows that mediators and intervenors who seek to provide technical assistance to disputing parties must pay close attention to three interrelated considerations:

- provision of **suitable neutral auspices** for the problem solving process;
- recruitment of **credible sources of expertise** (i.e. credible scientists);
- close attention to the **substance of the technical information** (which in turn involves selection, packaging, and presentation of information, as well as assistance in interpretation).

**Suitable Neutral Auspices**

Why are neutral auspices important for efforts to resolve science-intensive disputes? In introducing its proposal for the New York Bright Initiative, the New York Academy of Sciences observed that debating technical issues using traditional processes typically "generates more heat than light". Instead, what is needed to sort through scientific uncertainty, disagreement, and complexity is to take the discussion for a time out of a charged political arena and offer a cool, dispassionate look at the issue. Sebenius (1984) in his exhaustive documentation of the Law
of the Sea negotiations, explained that a suitable neutral auspices was needed to introduce a model of seabed mining economics, prepared by an MIT-based team, that ultimately proved pivotal in the negotiations:

[an] important seminar was held under Quaker and Methodist auspices, away from the United Nations. [Ambassador] Koh actively encouraged the seminar sponsors and buttonholed many delegates about attending. This seminar was held on neutral ground that seemed generally remote from the ideological issues that were latent in the seabed mining negotiations. The two sponsoring groups were generally interested in promoting world peace and had taken an early interest in the seabed mining negotiations.

As suggested by Sebenius, convening a group of disputants at a neutral organization can get participants to step out of the positions they adopt in day to day activities. Beyond the quality of discourse that might be expected on neutral ground, the identity of the host institution has important implications for the participation of both affected stakeholders and citizens. Parties with limited financial and technical resources may refuse to participate in face-to-face negotiations if they feel the "deck is stacked against them" or the meeting is being held on what they deem to be "unfriendly turf". For instance, environmentalists may distrust that a forum held at the headquarters of an industry trade association is truly nonpartisan. Selection of a neutral host can effectively do away with such concerns. Additionally, many scientists are more likely to invest their time to organizations seen as neutral and credible. The experience of the Bight Initiative at the New York Academy of Sciences shows that many scientists may even donate their services to meetings convened under such a credible host auspices.

What makes an organization a suitable auspices for resolving science intensive disputes? Based on the Bight Initiative and review of other efforts to mediate science intensive disputes, it appears that three considerations distinguish a suitable host institution: a nonpartisan stance with respect to the issues, strong credibility with and access to the scientific community, and organizational support for the goals of resolving science-intensive disputes.
A suitable auspices should be seen as nonpartisan with respect to the issue under discussion. Thus, it would not be seen as aligned with any one disputant or preferred policy outcome. In the New York City Dioxin Dialogue (the forerunner of the Bight Initiative) the New York Academy of Sciences was asked by the Board of Estimate (the City’s decision making body) to clarify the bases of scientific disagreement over different estimates of health risks from dioxin emissions by proposed trash to energy facilities (Ozawa and Susskind, 1985; Konkel, 1987; and Susskind and Cruikshank 1987). The Academy, created in 1831, had a longstanding track record of convening scientific conferences, and a more recent interest in mediation of scientific issues, developed through its informal Science and Public Policy committee. Since the Academy was seen as a scientific organization with no pre-existing position on the issue, it was seen by all sides as a credible convener. Similarly, the Academy was seen a credible neutral auspices for the Bight Initiative, since the organization had strong scientific credentials and had never taken a stand on controversial issues related to management of the Bight (such as ocean dumping of sewage sludge).

Second, the sponsoring organization should be seen as credible within the scientific community. This was certainly true for the Academy of Sciences, which had members in all 50 states and 80 nations worldwide. The credibility of the organization was enhanced by its long track record in hosting scientific conferences and publishing a series of Annals and The Sciences, a highly regarded periodical. This presumption of credibility helped the NYAS mediators arrange broad participation of scientists. Moreover, most of the twenty two scientific advisors involved in the Bight Initiative willingly volunteered their time. Similarly, in a one-day facilitated dialogue devoted to evaluating the risks to the marine environment posed by tributyltin (TBT), the Bodega Lab was accepted as a credible host based on its track record in long term ecological research on the structure and function of marine communities (McCreary, 1987).
A third attribute of a suitable host is that its officers and program leadership should understand and support the objective of resolving science-intensive disputes. The Methodist and Quaker organizations mentioned in Sebenius' account of the "MIT seminars" had a long track record in informal peacemaking. In the TBT dialogue, key staff of the Bodega Marine Laboratory had been briefed beforehand on the principles of negotiation, and were fully supportive of the facilitator's goals. Similarly, the facilitation of the New York City dioxin dispute and the Bight Initiative were hosted by the Science and Decision Making Program, which grew out of a standing interest in scientific mediation. The Philadelphia Academy of Natural Sciences, convened in Philadelphia also convened a dialogue on mass burn incineration modeled loosely after the successful New York event. However, the convenors of the Philadelphia event had no special expertise or background in conflict resolution. The dialogue perpetuated scientific disagreement and did not bring opposing groups closer to consensus. Susskind and Nash (1987) found that this lack of shared background contributed to the failure of the Philadelphia meeting. Thus, institutional support for dispute resolution reinforces the other desired qualities for an appropriate auspices.

Credible Nonpartisan Sources of Expertise

Complementary to the availability of a suitable neutral auspices is the availability of credible nonpartisan sources of experts. What qualities characterize a suitable expert? In his commentary on the role of the MIT model in the Law of the Sea Negotiations, Sebenius explains that MIT analysts were already at work on the model before the U.N. delegates expressed interest in their analysis. He also stresses that the model which incorporated over 150 parameters, was far more sophisticated than the other pre-existing model, known as the European baseline model. Thus, the MIT team drew credibility both for its independence and for the analytical rigor of its analysis. Sebenius (1984) describes a meeting devoted to explaining the MIT model of seabed mining economics, which had the backing of the Ambassador Tommy Koh of Singapore, the Chairman of the UN Law of the Sea Conference:
Delegates of all political persuasions packed the politically timely and visibly Koh-supported "MIT seminar", which featured the principal members of the MIT team. Over the course of the day they explained the model and discussed factors affecting future seabed profitability. Listeners questioned many of the models assumptions, in particular its baseline values. The team's usual response to queries and challenges was to explain the source of the relevant assumption and to demonstrate the model's sensitivity to the factor in question. This technique highlighted the underlying technical and economic uncertainty, but it also served to enhance the credibility of the effort.

Thus, another important attribute of credible experts are those who have the ability to explain their research in terms understandable to the general public.

In the Bight Initiative, the NYAS team looked for academicians (or consultants or agency staff) who had an existing track record of research and publication in peer reviewed journals related to the issue under discussion. For example, Judith Capuzzo, a biological oceanographer at Woods Hole Oceanographic Institution had been researching effects of contaminants on marine ecosystems and had published dozens of papers on the subject. Alternatively, scientists who have access to relevant technical information might be considered credible experts. Joel O'Connor of the National Oceanographic and Atmospheric Administration had been compiling data on marine contaminants for an effort to build "indices of degradation". As a result of this activity, he had access to a wealth of published and unpublished data on sources, losses, and movements of PCBs in the Hudson/Raritan Estuary, and was able to compile the first "PCB budget" for the ecosystem. In addition to seeking advisors with a track record of research and analysis, the NYAS sought to recruit scientists with strong academic credentials. About eighteen of the scientific panelists held PhDs, while the others had master's degrees.

A related question is whether experts can be truly nonpartisan. Some commentators have suggested that if scientists hold expertise in a subject, then they are bound to carry some sympathy or affiliation with a policy position and thus cannot really be classified as neutral. The NYAS
team sought to check the reputations of scientists among their peers and with participating stakeholders. The conception of a "nonpartisan expert" is that the scientist is independent from any particular negotiator or their stated position. I would argue that there is a fundamental difference in the "terms of reference" for a scientist hired to back a particular position as an expert witness and one hired "at large" to provide advice to a diverse group of negotiators. The allegiance of the hired expert is clear; the "expert at large" has no explicit allegiance to any one disputant's position. Moreover, the overt allegiance of a scientist can be confirmed much more readily in a format that enables interactive dialogue, as opposed to the more rigid style of discourse in legal hearings. In a few instances where scientists were known to hold views friendly to one side or another, the NYAS took some steps to "balance" the presentation.

In the Bight Initiative, there was no analogous pre-existing team of analysts capable of speaking to the full range of sources, fates, and effects of PCBs. Thus, more additional steps were needed to recruit appropriate expertise. The Academy prepared a "Roster of Scientists" to create a potential pool of experts from which to draw. Then, scientists were drawn depending on the expertise needed to address a particular problem. One useful approach was to ask each scientist who had published a peer-reviewed article on PCB sources and movement through the ecosystem to take part in building a "PCB budget" for the system.

The emerging literature on resolution of science intensive disputes (Ozawa and Susskind, 1985) conceives of three distinct clusters of actors: scientists, policy makers, and other stakeholders. When the NYAS team designed the Bight Initiative, they too intended to promote interaction among these three groups.

In practice, some ambiguity arose in the Bight Initiative as to precisely who is a scientist and who is a policy maker or a stakeholder member of the public. Some negotiators were in fact trained as
scientists, notably the three industry representatives and several agency staff. Moreover, three of the scientific advisors who provided detailed briefings to the core group of stakeholders also doubled as lead or backup representatives of their agency. One individual, Stuart Wilk, of the National Marine Fisheries Service was the primary representative of his agency. Two other scientific advisors, Lawrence Skinner of New York State DEC and Thomas Belton of New Jersey DEP, were secondary representatives of their agency. When these scientists presented briefings, NYAS mediators were careful to probe the technical basis for their comments. To the extent possible, they asked presenters to place the scientific information they are presenting at "arm's length" from their organization's mission. Whenever one of these advisors made a comment about his respective agency's views in the context of a scientific briefing or in group deliberations, NYAS mediators asked follow up questions to determine whether that view comported with others in the field. The mediation team was prepared to push this goal of distancing scientists from policy positions even further by asking how their presentation might change if they represented another organization, or if they were a private consultant whose client was the group of assembled negotiators. However, this was not necessary, since the three scientific advisors with dual roles were able to make explicit their organization's views and how they might color their analyses.

Another important lesson of the Bight Initiative is that a scientist's self presentation exerts considerable influence as to how his or her expertise is regarded by a group of negotiators. The NYAS team learned that clear, direct presentations were most useful. Scientists who explained the implications of their work for improved management of PCBs also made strong contributions. Lengthy expositions on research methodology were less effective.

NYAS mediators worked to present each advisor's credentials and prospective contributions in a positive light. The team prepared short biographies of each expert, listing their areas of specialization and major accomplishments. Before each advisor's briefing or participation in
facilitated dialogue, the NYAS mediators introduced each party and explained the relevance of his or her respective expertise to the issues under discussion.

Despite these preparations, not all advisors were viewed as credibly as the NYAS team had hoped. For instance, the NYAS arranged for a briefing from an aquatic toxicologist to summarize reported effects of PCBs on marine organisms. She prepared an excellent five page summary in advance, reviewing laboratory and field studies of the effects of PCBs on reproduction, growth and mortality in fish and invertebrates. However, the credibility of this advisor was undermined by her own choice of words. She preceded her professional review of 25 scientific articles by noting "I didn’t really do a literature search". Even though she had a very thorough grasp of her subject, the apparent effect of her comment was to undermine her credibility with the group. Negotiators were inclined not to include any of her material in drafting their findings until the mediator intervened and urged that the groups adopt at least several paragraphs of text on aquatic toxicology. The lesson here is that scientific advisors, without distorting their level of expertise and preparation, should present themselves in an organized, confident manner. This will increase the likelihood that negotiators will listen closely to what advisors have to say.

Thus, the Bight Initiative shows that credible experts should save serious standing involvement in research on the issue under discussion. Preferably, such advisors should also have an advanced degree and a demonstrated record of rigorous analysis or scholarly publications. To be viewed as effectively nonpartisan, scientific advisors should not hold allegiance to the positions or mission of any one negotiating party. The credibility of scientific advisors is further enhanced with clear, well-organized presentations.
Joint Fact-Finding Includes Selection, Interpretation, and Appropriate Presentation of Information

As was shown above, the dispute resolution literature provides fairly general accounts of what is involved in joint fact-finding. This account of the Bight Initiative serves to fill that gap by explaining some of the dimensions of joint review and consideration of relevant information.

The Bight Initiative focussed on the question of how to better manage PCBs—an issue for which there was a large body of potentially relevant scientific literature. The Bight Initiative teaches that in such a case, one dimension of joint fact-finding must be joint selection of information to be discussed or summarized. Thus, convenors of efforts to settle complex disputes must devise a strategy to gain access to and "boil down" large quantities of information for presentation in a series of few workshop sessions. This need is especially pressing in cases such as the Bight Initiative where a group of negotiators agrees to prepare written findings to back up its recommendations.

Mediators may need to assist negotiators to set certain standards or guidelines for information to include in their written findings. These guidelines may even vary with the subject being considered, depending on the quality of information available and the nature of scientific disagreement and uncertainty. For example, in the Bight Initiative, a subcommittee assigned to develop information on PCB sources agreed that all data entries in a "PCB budget" had to be backed up with peer-reviewed articles or personal communications of data. Negotiators used a different standard when trying to take account of divergent views of the links between exposure to PCBs and cancer and humans. Here, negotiators agreed to include personal communications and non peer-reviewed papers.

Once relevant information is identified, efforts are needed to translate technical information and present it to all the affected stakeholders in an appropriate format. This point has been touched on in
the published literature but merits further development. Ozawa (1988) also documented how the facilitator worked to keep the dialogue accessible to lay people in EPA's negotiated rulemaking on wood stoves:

the presence of experts and nonexperts in both legal and regulatory aspects and combustion chemistry and physics aspects of the woods stoves issues translated into a language that was relatively clean of rhetoric and deceptive manipulations. In addition to the fact that many participants indicated that they were not shy about revealing ignorance, the facilitator also made deliberate efforts to pull in the reins on any speaker who rambled on in technical jargon or without clear explanations. 8

The Bight Initiative offers additional insights into the tasks of translation and presentation of information and how they work. The NYAS mediation team periodically interrupted the briefing of scientific panelists and asked them to clarify technical terms. NYAS mediators carried their "translation" role into the preparation of the single negotiating text. For example, in building the "budget" for PCB sources and movement, the NYAS team assisted scientists and negotiators in first reaching agreement on about a dozen important definitions for terms such as "source", "flux", "Upper Hudson", and "GE discharges". This created a common language from which to build an accounting of PCB movement and also fostered a sense of momentum among scientific panelists and negotiators. The NYAS mediators incorporated these and other terms in a glossary, which was continuously updated and distributed throughout the Bight Initiative. This "Glossary of Important Terms Pertaining to the Management of PCBs", which ultimately included about 100 terms, was referred to frequently and was eventually published as an appendix to the negotiated single text.

For example, negotiators in the Bight Initiative identified the need for a figure to show how PCBs move through the waters and sediments of the system. The first idea was to create a flow diagram. To make a flow diagram geographically precise, negotiators suggested keying a series of block diagrams to specific reaches of the river and estuary, but they lacked the patience and skills to implement their suggestions. The NYAS team summarized the groups' guidance and passed it on to a technical
illustrator. The illustrator simplified the figure to better convey the concept. Then, another round of revision by the mediation team in collaboration with scientists was needed to arrive at a clearer format for presenting the information. Appendix B shows excerpts of the figure.

NYAS mediators assisted negotiators and technical experts to complete a similar sequence of tasks to put information on PCB regulations in a useful format. NYAS mediators essentially served as brokers between the negotiators and the legal experts. The technical advisors in this instance were the attorneys who edit Environmental Regulation Reporter—an authoritative periodical of the Bureau of National Affairs (BNA). The editors first produced a detailed 12-page manuscript. Negotiators insisted that they needed information summarized in a tabular format. NYAS mediators conveyed these needs to the attorneys, and reinforced the importance of their contribution to the Bight Initiative. After two or three iterations, the editors delivered the information in an appropriate format to the Academy. Four different tables were needed: "General Regulatory Framework", "Restrictions on Industry Discharge", "Control on Specific PCB Inputs and Reservoirs", and "Spill Notification Requirements". Each table described the PCB source, the applicable regulation, its federal code of regulation citation, its effective date.

The experience of the Bight Initiative, viewed in context with the work of Holling (1978), suggests that the presentation and packaging of information could be pushed further in a process devoted to joint fact-finding. Holling suggests that there is a continuum of ways to organize and present information, ranging from lengthy workshops to condensed slide presentations.

Holling’s work on issues such as the spruce budworm which attacks Canadian conifer forests typically involved building complex mathematical models to forecast outcomes of alternative policy actions. He found two techniques especially useful to simplify the presentation of such models to policy makers who lack special mathematical skills: manifolds (which
reveal essential inner workings of the model) and nomograms or isopleth diagrams (which condense simulation model outputs). Manifold diagrams are pictorial representations of models. For instance, a graph showing the relationship between budworm density and forest maturity represents a system with a number of stable equilibrium points, unstable budworm densities, and epidemic densities of the budworm. Holling calls the collection of equilibrium points an equilibrium manifold. Analysts and policy makers can track how the manifold changes in response to alternative management strategies. Nomograms furthermore permit "gaming" through manipulation of possible alternatives.

Greater use can be made of computers to assist in this task of translation and presentation of information. User-friendly computer software is now available that could help establish a consensual data base or represent cause and effect relationships (Nyhart and Samarsan, 1989). Readily available spreadsheet programs can enable joint forecasting of the impacts of policy alternatives (Susskind and Cruikshank, 1987). Such techniques were used to develop alternative formulas for allocating costs among various clusters of residential and commercial users of the Camden sewer system. Through an interactive process that involved tinkering with model parameters and reviewing outputs, the mediator was able to lead parties to an acceptable allocation formula.

The Bight Initiative offers some practical examples of an effort to guide selection, translation, and presentation of information in a process devoted to joint fact-finding. The techniques cited by Holling, Nyhart and Samarsan, and Susskind and Cruikshank could make joint fact-finding even more powerful.

Concluding Observations Regarding Getting and Taking Advantage of Useable Information

In this section, I have suggested a number of prescriptions to get and take advantage of useable information in the policy making process. A
first consideration is to secure credible auspices to host the joint review of relevant information by parties to a science-intensive dispute. I have argued that such auspices should meet three characteristics: they should have a nonpartisan stance with respect to the issues; possess access to and credibility among scientists; and hold a basic understanding and support for the goal of dispute resolution.

The next question that arises is how to secure neutral sources of expertise. I have suggested that one of the most important attributes a candidate scientific advisor should have is a serious standing involvement in research on the issue under discussion. Preferably, such advisors should also have an advanced degree and a demonstrated record of rigorous analysis or scholarly publications. To be viewed as effectively nonpartisan, scientific advisors should not hold allegiance to the positions or mission of any one negotiating party. The credibility of scientific advisors is further enhanced with clear, well-organized presentations.

Some ambiguity may also arise as to just who is a scientist, and who is a policy maker or other stakeholder in efforts to bring these groups into direct dialogue. Agency staff and stakeholders may have important expertise to share with the group of negotiators. Such negotiator/experts may provide a scientific briefing or participate actively in deliberations over policy alternatives. If so, they should be asked to place the scientific information they are presenting at "arm's length" from their organization's mission. Mediators should probe as to whether their view comports with others in the scientific discipline.

The tasks of translation and presentation of relevant of information also has several dimensions. I have argued that where there is a substantial body of literature, part of the task of joint information review must be joint selection of information. Translation tasks may include asking scientists to clarify technical terms. Alternately, a nonpartisan team may need to serve as a broker between technical experts
and negotiators. The task of putting information in its most useful form may require several iterations between a team of neutrals and supporting scientific advisors.

**HANDLING OF DISAGREEMENT AMONG EXPERTS**

Several analysts of public policy have critiqued the way traditional decision making processes deal with scientific disagreement. Harter (1985) suggests observes that whether in rulemaking or preparation of Environmental Impact Statements, agencies receive data from competing parties, and like umpires, decide which data are appropriate, and how competing values are entertained. Similarly, Stone (1988) observes:

These institutions [legislature, agencies, courts] or rather the people within them, make numerous choices in developing information; there is nothing automatic about the process. Legislatures decide whom to invite to testify at hearings and how much time to give each witness. Agencies decide what sort of what sort of data to collect, how vigorously to pursue nonrespondents about missing information, and how to categorize the information they do receive. Courts attempt to determine the facts of a case in order to decide which rules of law apply...They bring in expert witnesses as well as ordinary people. Still the two parties present different versions of the past or they wouldn't be in court in the first place. They are engaged in a contest to provide the most convincing representation of reality to the judge.  

Other analysts have variously described general categories of scientific disagreements (Mazur, 1973), suggested how to "map" specific scientific disputes (Roberts et al., 1984), and sketched ways to resolve disputes of a scientific nature (Brooks, 1984; Ozawa and Susskind, 1985). Mazur finds that experts may appear to disagree because they argue about different problems, they use different starting assumptions, errors arise in one or more sets of competing analyses, or because they draw different interpretations from the same data set. Roberts et al. (1984) reviewed ten scientific disputes that affect public policy and suggested that such disputes can be characterized based on their intellectual, institutional, and interest group aspects. Roberts and his colleagues found that the degree of coercion for handling conflicts a useful way to characterize
mechanisms to address scientific disputes. In their typology, these mechanisms range from those that merely report disagreement (such as staff reports) to those that impose solutions (such as the courts). They are most intrigued by the "middle of the coercion spectrum":

Active mediation and direct bargaining involve significant, albeit limited coercion. Only slightly less coercive are committees which have substantial informal pressures for consensus...Less coercive still is a process we call "deep mapping" which goes beyond the mere reporting of contending positions to the exploration, by the disputants themselves of the nature and sources of scientific disagreement.  

They concluded their 1985 article with this suggestion:

By devising institutional experiments to discover how best to undertake "deep mapping" of scientific controversies, we might enhance our understanding of the role of ethical, methodological, and technical disagreements in scientific disputes. Such exercises would encourage a process of open dialogue and searching self-criticism which would clarify who accepts which views and why. In such a process, there would be little or no pressure to agree, and no direct discussion of policy options.

The proposal for deep mapping of conflict has intriguing heuristic value. Certainly mapping scientific disagreements is preferable to glossing over technical differences as occurred to a large extent in the Virginia wetlands case and the Oakland dredging dispute. However, the experience of the Bight Initiative suggests that such "deep mapping" (i.e. exploring the bases for disagreement) can complement a larger process designed to narrow differences and produce consensus among a group of disputants. The Bight Initiative was, as Roberts et al. suggested, built on a process of open dialogue.
Other mechanisms have been suggested to handle scientific disagreement that has a bearing on tough policy choices. One such mechanism is the "consensus conference" created to evaluate the evidence linking exposure to chemical substances to cancer in humans (Nyhart and Carrow, 1983). In a recent study, Roberts and colleagues (Graham et al., 1988) endorsed some aspects of this mechanism, particularly face-to-face dialogue among experts:

[Scientists working on a problem in different settings and from different disciplinary backgrounds will both contribute to and gain from a meeting with others working on related problems. Different scientific perspectives on a chemical can provide useful correctives, highlighting unexamined bias, wishful thinking, and new analytic methods or sources of data. Face-to-face communication can also speed the diffusion of new ideas, methods, and results—without the lengthy time lag associated with scientific publication. As a result, scientific conferences can be expected to achieve a rapid, dispassionate, and wide-ranging understanding of a chemical's toxicological properties than would otherwise be possible.]

Graham et al. (1988) criticized consensus conferences for their failure to make explicit the valid disagreements.

The more lofty ambitions for such meetings, the pursuit of consensus about answers to key questions posed by regulators, is from our perspective misguided. For consensus is often sought in the hopes of reducing policy conflict precisely in those cases where it is least justified—that is, in the presence of real technical disagreements...When consensus is defined as the goal, a superficial outcome can be expected. In their attempts to be cooperative, scientists may report only their centrist beliefs and avoid emphasizing uncertainties and sources of conflict.

In their generally positive review of negotiated rulemaking as a strategy for setting standards Graham et al. (1988) suggest:

Negotiators should understand the sources of technical disagreement about a chemical's risk of causing cancer in humans, even if this awareness complicates negotiations. In many cases presenting various scientists' beliefs about what is known, unknown, and suspected about a chemical's adverse effects could facilitate the negotiation process.

It seems that Roberts and colleagues had perceived of a hard barrier between mapping disagreement on the one hand and seeking consensus on the other hand, as though the two were mutually exclusive. The more recent study (1988) seems to suggest that they have softened their view of this separation.
Disagreement in the Bight Initiative arose with regard to several issues: various interpretations of the linkage between PCBs and cancer in humans, different procedures and methods for measuring PCBs in fish, different methods for tracing and measuring movement of contaminant containing particles from the Bight back into bays and estuaries, and impacts of PCBs on the Hudson/Raritan ecosystem. But having explored and established the bases for disagreement, with the mediators' help, the parties found it possible to clarify and narrow the disagreement. Moreover, having narrowed the disagreement, the disputants were in a better position to offer recommendations—including recommendations for new research that could further eliminate scientific uncertainty.

The Bight Initiative suggests that appropriate efforts to deal with uncertainty try to make clear the bases of disagreement and seek some measure of consensus. Disagreement of three types ought to be clarified. First, there is the question of disagreement about the current situation, such as what current information tells us about the levels of PCBs in sediments and biota of the Bight. Second, there are disagreements about the probable outcomes of policy alternatives, such as the reduction in bioavailable PCBs that would be achieved by dredging hot spots in the lower estuary and the Bight. Third, there are disagreements about which policy choice to make. A secondary issue implicit in these three sets of disagreements is the question of how to represent disagreement.

The experience of a failed facilitation effort in Philadelphia suggests that there are substantial pitfalls for policy making in not moving past illumination of the bases of scientific disagreement. The Philadelphia workshop focussed on dioxin emissions from waste to energy facilities. The meeting was organized in such a fashion as to pit scientific proponents and opponents of mass burn incineration with well known rigid positions in a large public forum. No mediation procedures were woven into the structure of the meeting; that is there was no concerted effort to clarify and narrow the bases for disagreement. The result was an even greater schism between supporters and opponents of the mass burn facilities.
A post hoc analysis, which identified several causes for the failure of the workshop, suggested that the organizers of the meeting erred substantially in designing the event (Nash and Susskind, 1987). Rather than resolving the conflict, it became more polarized. Moreover, some decision makers, seeing that the scientific community was divided, may have concluded that there was no role for scientific expertise in this important public policy question. Again, the outcomes of the Philadelphia meeting reinforce the conclusion that appropriate handling of scientific disagreement involves mapping the bases for disagreement in the context of a process devoted to stating findings and recommending options.

Concluding Observations on Handling Scientific Disagreement

To sum up this discussion, how does knowing the bases for disagreement differ in important ways from merely observing the existence of disagreement? The experience in the Bight Initiative shows that it is different in four ways: First, by exploring the bases of disagreement, a group of negotiators may trace an apparent disagreement to lack of clarity in self expression, rather than any fundamental difference. Second, probing the basis of disagreement may "unpack" the disagreement, enabling disputants to learn that they agree on some parts of analysis and disagree on others. (For instance, they may agree that data are valid, but disagree on their interpretation). Third, disputants may learn that regardless of their disagreement on current conditions or the precise outcomes of policy alternatives, it has no bearing on which policy is the best choice. Fourth, pinpointing disagreement can enable parties to a dispute to design research to eliminate or narrow disagreement about important cause and effect relationships.

DEALING WITH COMPLEXITY AND UNCERTAINTY

A closely related concern in policy making over technically intensive issues is how to deal effectively with complexity and uncertainty. In public policy disputes involving the imposition of new technologies on natural systems or the evaluation of health risks posed by chemicals in
the environment, uncertainty and complexity are bound to arise. The state of scientific knowledge just cannot advance fast enough to predict and quantify the myriad interactions with certainty.

The evidence is persuasive that traditional decision making processes are often not well equipped to handle complexity and uncertainty. Nyhart and Carrow (1983) report that scientists in traditional processes feel compelled to tailor scientific facts to an advocate's case. Alternately, Nyhart and Carrow suggest that scientists may feel that their only role in providing advice to a regulatory hearing is to state what is known, assuming that a regulator will not take a position that is inconsistent with what is known. Stone (1988) finds that agencies often use numerical data as a screen for incomplete or imprecise knowledge. Sabatier and Mazmanian (1983), in their review of several agency programs, found that those that incorporated a sound causal theory were more apt to succeed. However, they did not explain how an such a causal theory could best be incorporated in formulation of regulatory policy.

Holling (1978) argues that environmental problem solving "must meet the requirements of reliable representation and credibility by using an adequate degree of realistic complexity." Holling's finding that complex models can be portrayed pictorially shows that decision makers and concerned stakeholders do not have to be shielded from complexity. Similarly, Nyhart and Samarsan's report (1989) on a new generation of user-friendly software to assist negotiations suggests that disputants need not shy away from complexity.

Rather, convenors of collaborative processes should make use of new tools to manage complexity inherent in science-intensive disputes. The Bight Initiative offers several lessons about how to deal appropriately with uncertainty and complexity:
First, the complexity of the problem being addressed must be explicitly acknowledged. An overall theme of the Bight Initiative was to frame the problem of managing PCBs as an investigation of a causal sequence: sources --> fates --> effects. (Fates refers to the final disposition of a chemical in the environment after its transformation by physical, chemical, or biological processes. With PCBs, these processes can include dechlorination, and decomposition by photochemical, aerobic and anaerobic means). This treatment of a complex subject offers a richness and a fuller understanding of the problem context that would have been absent if negotiators had sought to tackle only a subissue, such as how states could better coordinate PCB sampling in fish. Thus, negotiators sought to understand the linkages that make up the system they were seeking to manage.

The Bight Initiative also provided some insight as to how to deal with the question of plausible cause and effect relationships without conclusive evidence. During the joint fact-finding effort, Joel O’ Connor a systems ecologist with NOAA, clarified how biotic effects of PCBs in the Hudson River and nearby waters may well exist without exhibiting clear evidence. Unless effects become catastrophic, he explained, the likelihood of harm caused by PCBs is best judged (with much less rigor) from synthesis of laboratory experiments and measured effects in environments with extreme PCB exposures. O’Connor explained that adequate studies have not been conducted in the Hudson to rigorously assess whether such pollution is the cause of effects such as population declines in mink, reproductive impairment in fish-eating birds, tumors in finfishes, reproductive impairment or increased juvenile mortality in fish and shellfish.

He noted that several published studies provide plausible evidence of similar effects in nature. Moreover, it is even more difficult to link most observed effects to a specific pollutant because pollutants interact
with other pollutants and with natural stresses. After O'Connor's briefing and a spirited question and answer session negotiators agreed to include these findings in the text:

Lack of evidence conclusively linking adverse environmental or ecological impacts with PCBs is not proof that PCBs are toxically benign. Adequate studies have not been conducted in the Hudson/Raritan-Bight to rigorously establish whether observed ecological effects can be specifically attributed to PCBs, or to synergistic effects of PCBs with other contaminants, or to other causes.16

Another finding, alluded to in the discussion of presenting information, is that complex relationships can be portrayed by presenting information in multiple formats. For instance, data on PCB movement in the system were summarized in prose, presented in a tabular format, and also displayed in a series of linked block diagrams.

Additional lessons regarding handling complexity can be derived from the section of the single negotiating text on health risks. For instance, a process of joint fact-finding can express the rationales or assumptions in support of an estimate of a health risk.

[Finding #3 Carcinogenicity and Pathways to Humans]
The U.S. Food and Drug Administration currently limits total PCB levels to 2 ppm in fish. Based on a daily average consumption of 6 gram per day of fish with this level of PCBs, EPA's risk assessment model forecasts 1 additional case of cancer per 1000 people during their lifetime (Cogliano, 1987).17

Additionally, the findings make reference to specific guidelines for making forecasts in the face of uncertainty:

EPA's methods reflect the consensus view of several respected scientists in the regulatory and scientific communities. They are consistent with recent findings of the Office of Science and Technology which stated that when the precise mechanism of cancer induction is not known--as with PCBs--then a straight line projection is a reasonable and prudent method to use. The rationale--that it is reasonable, for practical purposes, to regard an agent for which there is sufficient evidence of carcinogenicity in animals as presenting a cancer risk to humans--reflects the view of the International Agency for research on cancer.18
Having identified important areas of uncertainty, negotiators in the Bight Initiative were able to recommend several steps to clarify and narrow this disagreement. The Bight Initiative produced several recommendations to resolve or avoid scientific uncertainty in the future.

Some recommendations addressed the need to clarify assumptions in the way data is presented, and where possible, to use common assumptions. For instance, with regard to sampling, analysis and interpretation of PCBs in fish, one recommendation stated:

In the risk assessment elements of sample interpretations, all assumptions should be clearly stated, and agencies should coordinate the factors and assumptions used.  

Another recommendation to address scientific uncertainty was to close gaps in existing information, to provide a better data base for future decision making. For instance, the negotiators recognized that the data base to track trends in levels of PCBs in the waters and sediments of the Hudson/Raritan-Bight system is inadequate, and recommended that additional analysis be completed to fill data gaps in the table of PCB reservoirs, inputs, and losses. They also recommended a tiered study of PCB movement through the water and sediment of the system.

A third step they took was to recommend the use of more accurate, systematic analytic techniques for tracking and measuring PCBs:

Archiving samples for PCBs and other contaminants in recommended, to enable trends analysis and congener-specific analysis. Convene a working group of qualified agency analysts to develop the idea of a unified archive for samples containing PCBs and other contaminants. Since current preparation and storage methods may result in some loss of contaminants over time, other techniques which can render contaminants stable—such as liquid nitrogen storage and/or ampule storage—merit investigation.

A fourth step for dealing with uncertainty is to build predictive models that forecast the implications of policy alternatives. With regard to dredging highly contaminated hot spots in the Upper Hudson, negotiators in the Bight Initiative recommended the construction of a model to
illuminat the effects of dredging on the total volume on available PCBs in the Lower Hudson and the Estuary; and the corresponding effect on PCB levels in edible fish.

Thus, these examples show that a strategy for dealing appropriately with scientific uncertainty is to recommend analysis or research to clear up or prevent future uncertainty.

**Concluding Observations on Dealing with Uncertainty and Complexity**

The Bight Initiative shows that public policy making need not ignore uncertainty or pretend that complexity does not exist. Several useful strategies were identified to help deal with complexity and uncertainty. A basic objective in resolving disputes of a science-intensive nature ought to be to illuminate important cause and effect relationships. The Bight Initiative handled this by framing the joint fact-finding process to trace through the causal sequence: sources→fates→effects of PCBs. Another useful way to increase the understanding of stakeholders is to portray complex relationships by presenting information in multiple formats. (This strategy also advances the objective of putting parties on a more equal footing with respect to access to information).

An important task in clarifying uncertainty is to express the rationales or assumptions implicit in forecasts. For instance, the Bight Initiative sought to help negotiators deal with uncertainty in forecasts of cancers arising from exposure to PCBs. Sometimes, established procedures are in place to compensate for data gaps by extrapolating from existing data. It may assist disputants to know of such specific guidelines for handling data gaps. Another way to help parties deal with uncertainty is to provide clear explanations as to how environmental effects (or other cause and effect relationships) may exist without the presence of definitive evidence. All above, uncertainty should not induce policy making paralysis. Negotiators in the Bight Initiative did their able best to reduce uncertainty and then proceeded to make the most informed recommendations they could in the face of imperfect data.
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ANTICIPATING PROBLEMS OF IMPLEMENTATION: EMPHASIZE PACKAGING OF SUITABLE AGREEMENTS

Efforts to implement solutions to science-intensive public policy problems can be thwarted for several reasons. For purposes of this discussion these obstacles to implementation can be grouped as: failure to secure legitimate participation; an insufficient response to the technical aspects of issues; inadequate efforts to package suitable agreements; and failure to bind parties to their informal agreements.

One set of implementation obstacles arises when the decision making process excludes participation from major groups affected by the decision. In such instances, the legitimacy of the decision may be attacked. The final promulgation of tidelands regulations in Massachusetts (discussed in Chapter 5), was hampered by insufficient participation on the part of marina and dockominium interests. Similarly, in events leading to the Boston Harbor cleanup (discussed in Chapter 4), the municipalities of Winthrop and Quincy were identified as host communities for major sewer treatment improvements, but were not parties to the state or federal litigation and thus had no way to gain an entre into the deliberations over sewer improvements. They too registered objections that had to be handled in a separate round of tough negotiations. The Bight Initiative sought to anticipate these problems through an active effort to recruit and sustain participation from affected stakeholder groups. Some important considerations for recruiting participation were addressed in the first section of this chapter.

A second cluster of implementation obstacles may arise if the decision making process does not deal effectively with the scientific issues inherent in a policy decision. Problems may arise if available scientific information is not used, or if scientific disagreement and uncertainty is not handled appropriately. In such cases, the policy recommendation may lack a clear technical foundation. Moreover, implementation can be thwarted if conditions change, and the policy making process does not take account of new information. This sequence of events occurred in the Oakland dredging case when the tasks of information gathering and synthesis could not keep pace with the preferred site for dredged material
disposal. Alternately, implementation may fail if the sequence of actions fails to take account of important cause and effect relationships. Such shortcomings were evident in the Virginia wetlands legislation where important linkages between inland wetlands and the water quality of the Chesapeake Bay were ignored. Several detailed strategies for getting and taking advantage of adequate scientific information were addressed earlier in this chapter.

A third set of obstacles to implementation may arise if steps are not taken to ensure that organizations in the policy making process endorse, or at least tacitly support the recommended actions. This is a crucial point, for if parties are not bound to their agreement, then there is no foundation for enforcement and monitoring of the agreed-upon policy actions. Several of the case studies documented shortcomings in the way traditional decision making processes try to bind parties to their agreements. This need to "sell the agreement back home" is addressed in the following section of the chapter on the single text negotiation procedure.

A critical determinant in the implementation of policy solutions is that they be "packaged" in a way to be acceptable to all participants in shaping the policy decision. Of course, this does not mean that each party gets his or her "first choice". But if the solution is created in such a way as to place a disproportionate share of the burden on a narrow group of stakeholders, they may move to block or postpone the action. As was highlighted in the Oakland case study, litigation is familiar resort, as when fishermen blocked dredge disposal off Half Moon Bay. It is not enough to define a good solution to a science-intensive policy dispute as one in which the "gains to the gainers outweigh the losses to the losers". Rather, the recommended policy choice must be "packaged" in a way that offers the prospect of joint gains to all key parties.
The question of how best to package management options to address science-intensive disputes merits a closer look. The balance of this section of the chapter will examine ways to anticipate and respond to implementation obstacles related to inadequate efforts to develop and "package" suitable policy solutions.

**Developing Policy Options**

How can a "menu" of policy options be generated from which parties to a science-intensive dispute can capture an agreement? One suggestion is that mediators can help negotiators invent options. Moreover, mediators can help negotiators learn about "inventing without committing." Susskind and Cruickshank (1987) point out:

Inventing options requires a process of brainstorming and intensive committee work. The neutral can be the one to declare a period of "inventing without committing". He or she can also be the compiler of good ideas. The helper may even put forward options that participants want considered but feel uneasy about suggesting themselves...So, for example, one or another group might approach the helper and ask that he or she mention an option without revealing its source.

The Academy team used precisely this approach in the Bight Initiative. To "seed" the discussion of recommendations, the NYAS prepared a set of "strawman" management options, gleaned from meeting summaries, comments of individual participants, and the suggestions of scientific advisors. In all, ten management recommendations and twelve research ideas were debated by mixed teams of negotiators. The fact that the negotiators had responsibility for evaluating the options, with the advice and guidance of the scientific advisors, worked effectively to distance the mediation team from specific options.

**The Importance of Linkage in Packaging Acceptable Agreements**

A second essential insight offered by negotiation theorists (Fisher and Ury, 1981; Raiffa, 1982; Susskind and Cruikshank, 1987) is that since parties to a dispute value issues differently, trades across these issues
are possible. Some analysts prefer to cast this discussion in terms of the "utility" different parties assign to a particular outcome. The key point is that the classic "zero sum" situation arises when issues are handled one at a time: the only possible outcomes are distributive bargains where one party wins and another loses. On the other hand, if multiple issues are considered, integrative bargains are possible. Raiffa (1983) illustrates this point with reference to the Law of the Sea negotiations:

Compromise looked dim for each issue separately. The developed countries could not accept a rigid financial-arrangement system; the developing states opposed a flexible system...Linkage between contractual arrangements with the Authority and the financing of the [Seabed mining] Enterprise became a central feature of the negotiations....the potential of finding joint win-win situations depends on the exploitation of differences between beliefs, between probablistic projections, between tradeoffs, between discount rates...between risk preferences.22

Thus, in the Law of the Sea negotiations, parties attached different weights to various components of the procedure for allocating revenue from deep seabed mining. Similarly, in the Bight Initiative, parties placed different values on particular uses of the Bight, management recommendations, and research items. Some environmental groups focussed more attention on fish and supporting portions of the food chain, while others worried about human exposure to PCBs through bluefish. Port interests were concerned that dredging continue. Wastewater utility managers worried about publicly owned sewer treatment works and about their image as dumpers of sludge into the Bight. Recognizing that participants valued issues differently, the NVAS team was able to work with parties to hammer out language that responded to their major concerns.
In some instances, NYAS mediators helped create a linkage across multiple recommendations. In other cases, the NYAS mediators worked with negotiators to sort out the various issues embedded in a single draft recommendation, thus creating the possibility that language of individual recommendations could integrate the interests of multiple interests. Specific strategies used by the mediators to develop the packages are described below.

**Assign Priorities to Recommendations to Facilitate Trades**

With the help of the NYAS team, negotiators created a framework for organizing their recommendations into logical groupings. In one dimension, they sorted management options into high priority, medium priority and lower priority actions—"management options that face major obstacles". The NYAS team recognized that assigning priorities to recommendations might facilitate trades in light of their relative importance. Recommendations were also sorted into categories for management, research, and education. This structure responded to the concern (voiced by port and environmental groups) that the recommendations must be more than a research agenda. At the same time, this structure left room to recommend research and analysis to clear up areas of scientific uncertainty and disagreement.

Organizing the recommendations in a way that recognized their relative importance enabled a trade that was helpful in securing the support of both port interests and environmental groups. The environmental groups were concerned about updating regulatory guidance for ocean disposal of sediments containing trace amounts of PCBs. They wanted this guidance (known as the "Interim Matrix") upgraded with the best available information. Port interests, though not anxious for additional regulatory scrutiny, conceded that the Interim Matrix should be based on up to date technical data. They made this concession in exchange for an agreement by
the environmental organizations that the recommendation to dredged highly contaminated hot spots in the lower Hudson and Estuary—a very speculative idea—should be listed as a management option that faces major obstacles. Environmental groups and environmental regulatory agencies in turn insisted that the single text should list interim steps to make the option of dredging hot spots more workable. Port interests agreed.

Thus, the Bight Initiative validated two concepts suggested by dispute resolution theory: the development of management options by a team of mediators, and the importance of linkage in creating trades across management recommendations. What other steps can be taken in "packaging" recommendations in a way that anticipates obstacles to implementation? The experience of the Bight Initiative suggests three or four additional strategies.

Other Strategies for Packaging Acceptable Agreements

Where a causal relationship is uncertain, a recommendation can be written to be contingent on a particular research finding. This is a particular class of what Fisher and Ury (1983) have called contingent agreements. In the Bight Initiative, a preliminary draft of a recommendation suggested creation of a mechanism for effective collection, secure interim storage, and destruction of PCBs contained in discarded appliances. Industry argued that this recommendation was precipitous until it was was determined whether discarded appliances indeed represent a significant reservoir of PCBs. EPA agreed that a preliminary assessment step was needed:

Assess the extent of PCBs in discarded appliances. If it is determined that significant PCBs are present, create a mechanism for effective collection, secure interim storage, and destruction of PCBs contained in discarded appliances.

Tactics along these lines were employed in the New York City dioxin mediation, as described by Konkel (1987). There, a formal monitoring program, connected to targetted performance standards, was proposed to
allow assessment of operating conditions at the Brooklyn facility. It was suggested that the facility be automatically closed down in the event it exceeded preset performance standards. In both cases, making management action contingent on technical findings enhances the technical quality of the decision and rendered the recommendation more acceptable to a key party.

NYAS mediators helped find a solution to a disagreement among fisheries agencies by sorting out the components of a problem. The National Marine Fisheries Service (NMFS) had recently completed a major study of PCBs in Atlantic Coast Bluefish and found a lack of coordination among the state fishery agencies. NMFS pressed hard for an early draft recommendation that called for states to adopt uniform protocols for sampling, analysis, and interpretation of PCBs in bluefish, striped bass, and other migratory species. Port interests and environmentalists endorsed this as a logical move. However, state regulators resisted. The representative from New York State DEC explained that truly uniform protocols would hinder innovation. Besides, he pointed out that DEC’s mandate focusses much more on impacts of PCBs on biota, while New Jersey DEP has a role in issuing health advisories to protect recreational fishermen. He explained that these different mandates in turn require some divergence in sample design.

The NYAS mediation team worked to clarify the issue by helping parties list each step of the sampling and interpretation sequence. Then, the NYAS team asked each state representative to characterize the methods it uses at each step. Next, the mediation team caucused with the representative from New York State DEC. Together, they proposed that states could use more unified (meaning closely coordinated and compatible) methods in choosing where to sample and in reporting their findings.

Encourage agencies to adopt unified protocols for sampling, analysis, and interpretation of PCBs in bluefish, striped bass and other migratory species. (As used here, "unified means closely coordinated and compatible; it does not necessarily mean identical."
Explicitly List Obstacles to Implementation and Interim Steps to Overcome Obstacles

The experience of the Bight Initiative suggests that where policy recommendations are likely to face obstacles to implementation, these obstacles should be acknowledged head on. Thus, a constructive strategy is to identify obstacles to implementation and list appropriate interim steps to overcome the obstacles. Several management options which otherwise would have been excluded from the recommended responses to PCB contamination were accepted when major obstacles were clearly spelled out, fully revealing the difficulty of the management option. For example, port and industry representatives agreed to list dredging highly contaminated areas in the lower estuary as potential management strategy, so long as major obstacles were clearly enumerated. Environmentalists complained that a recitation of obstacles conveyed the impression that no action was possible to reduce PCBs.

NYAS mediators proposed that the text could include both specific obstacles and specific interim steps. The NYAS team suggested that listing obstacles in a clear, concise fashion could lay the foundation for constructive interim steps. These obstacles included the following:

First, there is no formal definition of "highly contaminated areas" or hot spots. Second, managers lack good information about PCB levels in most of the Estuary and the Bight. Currently, PCBs are only measured in the areas subject to regulatory review; channels and berthing areas. Third, the volume of material that would require treatment is massive. Fourth, the destruction technology remains a major hurdle. Fifth, dredging hot spots may increase the bioavailable PCBs in some areas.

One of these interim steps was in fact framed as a contingent recommendation. That is, if after hot spots are defined, and if such highly contaminated areas are detected, then more in depth mapping is called for. The interim steps associated with the dredging of hot spots in the lower Hudson and the Estuary were stated as follows:
States—in conjunction with other interested parties—should develop standard definitions of "highly contaminated areas" or hot spots. Documentation of existing PCBs levels in the Bight and estuary is needed. A tiered approach is appropriate, in which areas that exceed the threshold for "hot spot" are mapped in more detail. Whether remedial dredging is appropriate must then be decided.26

The tactic of stating both obstacles and interim steps present a pragmatic symmetry: the more pessimistic focus on barriers to implementation is balanced by the more optimistic next steps.

Inject Added Clarification of Terms and Conditions

Another problem is that lack of clarity in framing recommendations can undermine their implementation if parties are not vigilant. In several cases, NYAS mediators helped parties inject added clarification of terms and conditions. For example, in writing recommendations regarding investigation of opportunities to reduce PCBs in several possibly significant sources, managers of wastewater utilities did not want effluent from their plants to be grouped with industrial discharge and combined sewer overflow. Parties agreed to clearly distinguish sewage treatment plant effluent, combined sewer overflow, and industrial discharge.

Several recommendations were deemed more acceptable to industry, ports, and wastewater managers when they were framed as research tasks rather than as high priority management steps that demand fast action. For example, the question of whether contaminated material moves from dredge disposal and sludge dumpsites was particularly controversial. A staff scientist from New Jersey DEP presented evidence that contaminated material moves from disposal sites for dredged material and sewage sludge. However, other negotiators pointed to conflicting evidence, indicating that ocean-dumped contaminants remain immobile. Since the evidence conflicted, parties were unwilling to recommend management action and opted instead for research to settle the question.
Concluding Observations Regarding Anticipating and Avoiding Problems of Implementation

I have argued that efforts to resolve policy disputes of a science-intensive nature must anticipate and address four sets of potential obstacles to implementation: failure to secure legitimate participation, an insufficient response to the technical aspects of issues, inadequate efforts to package suitable agreements, and failure to bind parties to their agreements. Close attention to all four issues is necessary to ensure implementation.

Several strategies for packaging management recommendations in a way that anticipated problems of implementation have been described. With the help of NYAS mediators, negotiators recognized the possible linkages across issues that enable them to forge recommendations agreeable to the multiple parties. In this way, trades across issues were enabled—as illustrated in the discussion of dredging issues. Here, it was particularly useful to sort recommendations into options for action, research, and management; and to assign relative priorities to management recommendations. In other cases, NYAS mediators helped parties sort out the components of individual recommendations to write recommendations that integrated the interests of multiple negotiators. In cases where negotiators were able to identify significant obstacles to implementation to management recommendations, these were stated explicitly. Discussion of obstacles to implementation of recommendations was paired with specific interim steps to help overcome these obstacles. Framing recommendations that were contingent on certain research or assessment findings was also a useful strategy. Still another useful strategy was to inject added clarification of terms and conditions. Another helpful approach was to frame recommendations as a research task rather than a high priority action. These efforts to anticipate and address problems with implementation helped lay the foundation for ratification—the final phase of single text negotiation procedure described in the next section.
USING A SINGLE TEXT PROCEDURE TO HELP RESOLVE SCIENCE-INTENSIVE DISPUTES

This portion of the chapter examines the use of a single text negotiation procedure to help resolve science-intensive disputes. A single text is simply a document that all parties to a negotiation agree to use as the focus for collaborative development of findings and recommendations. My fundamental argument is that the single text negotiation procedure, assisted by a team of active mediators, is an effective means to organize an effort to resolve science-intensive disputes. All of the recommendations presented earlier in the chapter can be accomplished within the framework of a single text procedure. Scientists, policy makers, and affected stakeholders can work on an equal footing in helping to build a single text. The single text can be the focal point for collection, synthesis, and presentation of information in an appropriate format. Findings incorporated in a single text can identify areas of scientific agreement, and scientific disagreement and uncertainty. Recommendations can be packaged in a single text. Throughout the development of the text, a team of mediators plays an active role.

The discussion begins with a review of how the single text process has been conceived by other analysts. Then, four key phases of building a negotiated single text are reviewed: setting the agenda, joint review of relevant information, development of multiple drafts of the text, and ratification of the text. The need for protocols for negotiating a single text is discussed. The roles and responsibilities of a team of active mediators is reviewed, and the discussion reflects on the need for protocols to guide the process of joint fact finding and single text negotiation.
Several analysts (Sohn, Fisher and Ury, 1978; Raiffa, 1983; Moore and Carlson, 1984; Sebenius, 1985; Susskind and McMahon, 1985; and Susskind and Cruikshank, 1987) have recommended that disputing parties use a single negotiating text as opposed to professing competing versions of facts and recommendations. Fisher and Ury (1978) outline the single text negotiation process:

[The essence] of the development and improvement of a single negotiating text...is to prepare a discussion paper of some kind which blocks out the lines of an agreement, and then to go through a series of sessions in which the mediator (who may be the chairman or rapporteur of the group) listens to criticisms and suggests improvements. Through a series of such discussions and revisions the document gradually becomes a single illustrative draft text of a complete agreement.27

Fischer and Ury suggest a number of ways in which such a single text can be prepared:

The parties may be asked to prepare lists of "subjects and issues" to be dealt with in an agreement, and then through of discussion of these lists, the mediator may prepare a single list of topics to be covered by the agreement. Alternatively, a mediator himself may suggest in writing various ways in which differences might be dealt with. After hearing responses to such a paper, he might prepare the first version of a single text. Another possibility is to have outside experts or nonpartisans develop an initial working draft. During the revision of the text would be expected that the mediator would sometimes meet jointly with the parties and sometimes have separate meetings with one party alone.28
Raiffa (1983) describes how a single negotiating text was used in the Camp David Negotiations at the suggestion of Professor Roger Fisher:

The U.S. team devised and proposed an entire package (of positions on issues in dispute) for the consideration of the two protagonists. They made it clear that the United States was not trying to push this first proposal, but that it was meant to serve as an initial, single negotiating text—a text to be criticized by both sides and then modified and remodeled in an iterative manner. These modifications would be made by the U.S. team, based on the criticisms of both sides. The SNT was to be used as a means of concentrating the attention of both sides on the same composite text. 29

Sebenius (1984) identifies the use of a single negotiating text to summarize the financial arrangements associated with seabed mining as one factor contributing to the success of the Law of the Sea negotiations. He tracks how the financial terms of contracts, informed by the MIT model, were embodied in successive drafts of the text. He also points out that in this instance the chairman, Ambassador Tommy Koh of Singapore, controlled what went into the negotiated text:

Koh was charged with the responsibility of producing a text that would enjoy a substantially improved prospect of consensus in the overall conference. Once the inherited text had been clarified and restructured, he needed numbers and percentages for the various fees. To get such figures, he pressed participating countries to advance proposals. As a technique of seeking compromise, this had mixed results. Since the countries wanted their positions reflected in the text, and since Koh selected what went into it, there was some tendency for delegations to push their proposals toward the chairman’s perceived zone of "fairness". 30

In their account of one of EPA’s experiments in regulatory negotiation, Susskind and McMahon report (1985):

Working from a single negotiating text proved important in focusing the negotiations. In the first demonstration [regarding non conformance penalties for truck engines that fail to meet air quality standards], EPA asked participants to produce a statement of the policies that would guide the Agency in formulating the specific language of the rule. In the second demonstration, the Agency asked the participants to draft the actual language of the rule. 31
Although the cited literature is significant, there are few published accounts of the use of single negotiating text procedure in efforts to resolve disputes of a science-intensive nature (Susskind and Cruikshank, 1987; Ozawa, 1988). This account will help provide some insights on the single text procedure.

Framing the Agenda for Single Text Negotiation

This task of agenda setting, as Susskind and Cruikshank point out (1987): requires a balance:

If the initial set of issues to be covered in the negotiations is too broad, the discussions of specific points may be superficial and therefore unproductive. A huge agenda, moreover, is disheartening and may demoralize even the most committed parties. On the other hand, if too narrow a range of issues is proposed, one or more participants may not find their particular burning issue on the agenda. Unless that issue is added, that group may decide that it is not worth continuing. And finally, if the agenda is too limited, there may not be enough items to "trade"—that is those issues that participants value differently may not emerge, and a creative integrative solution may not be possible.

As was described in Chapter 6, the Bight Initiative began with the very broad problem domain of "improving management of the Bight". To move from this initial problem statement to achieve a balance between "boundedness" and "having enough items to trade" required that the mediation team complete several tasks. Setting the agenda began with analytic tasks. The mediation team conducted an extensive series of interviews, in which respondents were asked to rank order the most pressing Bight issues (from a carefully drawn list of 23 issues). The responses were sorted and tallied using the software program dBASEIII to arrive at a list of five top issues, three of which related to dealing with sources and risks posed by contaminants in the Bight. Then, another round of meetings and caucuses with key stakeholders was needed to narrow the problem from "managing contaminants" to "managing PCBs".

The final step of agenda setting, parties negotiated a table of contents for the single text. The NYAS team prepared a provisional draft
table of contents for consideration at a workshop in May, 1987. Then, the NYAS organized the assembled negotiators into three mixed teams and asked each team to prepare a modified version of the table of contents. By midday, the three teams had finished their task. Next, each team was asked to present its proposal for a revised table of contents to the full group, and to select a "delegate" to a working team to synthesize the three drafts. With the assistance of the NYAS mediators, the working team prepared a single negotiated table of contents. This table of contents effectively represented the final agenda for negotiation. Preparing the table of contents in this way gave the participants an important sense of momentum, and modeled the way the mediators envisioned the final text might be prepared. It is apparent that without the mediation team's extensive and sustained involvement in agenda setting, the stakeholders would not have been able to meet around a sufficiently bounded issue.

The Linkage Between Joint Fact-Finding and Single Text Negotiation

The previous sections of this chapter have emphasized the need to deal more effectively with the technical dimensions of issues inherent in science-intensive disputes. I argued that processes for public decision making need to do a better job of getting and taking advantage of usable information, to translate technical information and present it to all the affected stakeholders in an appropriate format, to handle scientific disagreement more effectively, and to cope with complexity and uncertainty.

The experience of the Bight Initiative shows that each of these tasks can be achieved within what can be called the fact-finding phase of building a single text. Substantial efforts were made to get and take advantage of usable information. The task of building the text involved tapping the expertise of over 20 experts in a such diverse disciplines as biological oceanography, sedimentology, risk assessment, and ecological modeling. The parties reviewed or considered over over 150 published articles, and drafted over 120 findings.
Concerted efforts were made to translate information and present it in appropriate format. The experience of the Bight Initiative showed that joint review of relevant information in direct dialogue with scientists enabled participants to build their understanding of an issue in a stepwise fashion. As a sources subcommittee of the negotiators worked to build a table showing PCB inputs, reservoirs, and losses, simply defining these terms (and about ten others) developed a common language and sense of shared purpose among participants.

During the task of building the single text, negotiators tried to probe the basis of scientific disagreement, where possible narrow this disagreement, and where disagreement persisted, to explicitly state the range of interpretations associated with a particular data set. Additionally, specific research tasks were proposed to narrow or eliminate uncertainty in the future. The joint review of information also helped parties map the bounds of good information.

The Bight Initiative strongly underscores the conclusion that joint fact-finding and single text negotiation are mutually reinforcing procedures. Briefings or memorandums prepared by scientific panelists to support their briefings created "raw material" for the negotiated text. The development of a single text presents an opportunity to characterize the entire causal sequence of a complex problem. In the case of the single negotiated text produced by the Bight Initiative, stakeholders were able to investigate and express their findings related to sources, fates, and effects of PCBs. The iterative revision of a single text can accommodate the general discourse in large group workshops and the detailed technical comments that mediators may receive in smaller caucuses.

**Interim Written Products and Caucuses in Development of the Negotiated Single Text**

Participants in the Bight Initiative not only jointly reviewed information, they also put in a sustained effort to develop five chapters
of written findings. The development of the negotiated single text was assisted by the production of a series of interim written products. The task of recording meeting highlights and preparing meeting summaries was integral to the preparation of the single text.

The detailed summaries recapped the agenda, presented the key points scientific briefings and summarized the highlights of the dialogue. While the meeting summaries were not a verbatim transcript, they were a very careful record, wherein each comment was attributed to specific participants. These summaries provided each participant with history of the deliberations, and proved helpful to participants who missed meetings. Additionally, the NYAS mediators prepared a total of five draft versions of the text over a five month period.

The task of recording the interactions of scientific panelists and decision makers and other stakeholders is described for the work of the mediator in the New York dioxin dispute, (Susskind and Cruikshank, 1987):

As the panelists talked, the facilitator highlighted their arguments on large pads of paper displayed at the front of the room. As each page was filled, the facilitator taped it to the wall. Soon paper covered practically every available inch of wall. [He] repeatedly checked with the panelists to be certain that he had recorded the points they thought were most important. This somewhat exhausting process lasted almost eight hours, but as certain patterns began to emerge, it proved to be time well spent. 33

The Academy team used this approach, supplemented with three other techniques. They used a personal computer to create a record that approximated a real time transcript. Second, they used a battery of laser printers to develop interim versions of selected drafts of the text for instantaneous review by participants. These steps reduced the turnaround time for producing meeting summaries and draft versions of text, and enabled mediators to double check the points they had recorded. Third, they sent excerpts from the meeting summaries to scientific panelists to enable them to phone in corrections before the final meeting summaries were produced.
Additionally, NYAS mediators prepared a glossary of terms and definitions that was continuously updated and distributed over the course of the ten meetings.

NYAS mediators took the lead in preparing the text, thus concentrating the attention or parties on the same document. In all, five successive versions of the text were prepared and distributed to the parties. The first two drafts were based on a series of meetings devoted to joint fact-finding and two workshops devoted to developing management recommendations. The first draft, prepared July 21, 1987, reflected outcome of a July 15 Workshop. The second draft was prepared September 10, 1987, to reflect the outcome of the August 18 Workshop.

After the NYAS team prepare a second draft of the full synthesis text for distribution to all negotiators, they convened a series of caucuses with major clusters of interest groups. The composition and outcome of caucuses are recounted in detail in Chapter 6. Participation in the caucuses mirrored the composition of coalitions.

The caucuses gave negotiators a chance to offer detailed comments and provided the NYAS team with corrections to improve the quality of the document. Caucuses provided an opportunity of members of coalitions to compare notes and arrive at unified positions and gave the Academy insights into the willingness of respective groups to sign onto the document. Some comments went to the tone of the document. Environmental groups were adamant that the tone of the document not cast the risk from PCBs in an inappropriately de minimus light. Other participants concentrated their comments on the wording of findings. Port interests asked for minor clarifications in the way the document explained how PCBs may be adsorbed to sediments, and industry representatives asked that EPA’s methods for assessing cancer risk be balanced with their own critique of the agency’s methods.

Other participants commented on specific recommendations. The NMFS representative supported recommendations for better environmental
sampling, commercial fishermen supported the recommendation to continue monitoring PCB levels in striped bass, and the The Long Island Regional Planning Board urged that new PCB decontamination technologies be investigated. On balance, most participants offered comments that were unique; there were few obvious conflicts with revisions sought by other parties. However, as described earlier in this chapter, there were several trades.

The Academy synthesized the comments received in the caucuses and prepared a third draft of the single text and distributed this document to all negotiators in advance of a final meeting on October 12, 1987. The Academy explained that the document reflected the advice received in the caucuses, and asked participants to identify specific changes they would need in order to recommend ratification. The meeting focused on two key sections of the report: the recommendations and the presentation of effects of PCBs on human health and biota. By the end of the meeting, most parties indicated they could support the document.

A fourth draft prepared October 10, 1987 reflected the outcome of caucuses with interest groups. A fourth draft, prepared October 27, 1987. The fifth draft reflected the outcome of the final meeting with EDF and industry participants on December 3, 1987, and final round of "shuttle diplomacy" carried on by the mediation team. (These steps are described in detail in Chapter 6.)

The Structure of the Negotiated Single Text

The final negotiated single text begins with a page including the signatures of the heads of eighteen participating organizations and an executive summary that recaps the key findings and management recommendations. The next five chapters of findings are report the group's findings. Recommended management chapters are reported in the sixth chapter. Seven appendices present more detailed information. The body of the text is 47 pages, and there are 28 pages of appendices. (The appendices of this dissertation present several excerpts from the negotiated text.)
Chapter 1 of the text presents an overview of the Hudson/Raritan Estuary and the New York Bight, and explains the chemistry and historical use of PCBs. The second chapter on biological effects reports on human health and biota. The human health discussion reviews the links between PCBs and cancer in humans, developmental toxicity and reports of some important epidemiological studies. The discussion of effects on biota summarizes on PCB levels in fish reported by three government agencies: the National Marine Fisheries Service, New York State DEC, and New Jersey DEP. Reproductive impairment and other effects on biota are also reviewed.

Chapter 3 of the text summarizes sources and movement of PCBs. This chapter includes the tabular presentation of inputs, reservoirs, and losses of PCBs. Chapter 3 of the negotiated text also reviews the fates of PCBs—the transformation by physical, chemical, or biological processes. Chapter 4 briefly discusses socioeconomic effects of PCBs on fisheries, port operations, and tourism. Chapter 5 presents an overview and comment the existing management structure. The chapter includes a detailed summary of the regulatory framework, restrictions on industry discharge, control on specific PCB inputs and reservoirs, and spill notification requirements. Also included in Chapter 5 is a summary comparison of the respective methods used by the states of New York and New Jersey to sample, analyze, and interpret PCB levels in fish.

The recommended management strategies which follow are organized into management principles, management options (sorted by high and medium priority, and those that face major obstacles), a research agenda (sorted by high and second priority), and suggestions for public education. Specific recommendations are included for source reduction, more consistent monitoring of environmental trends, and coordinated issuance of health advisories associated with PCB-contaminated fisheries. Promising new technologies are identified that merit investigation as alternatives to more traditional methods of PCB decontamination (principally incineration). A number of specific recommendations were quoted above in the review of packaging agreements as a way to avoid problems with implementation. In all, there are twenty six recommendations.
The appendices report more detailed information. Appendix 1 includes a flow diagram that presents a simplified version of the steps involved in building the single text document. Appendix 2 presents a glossary of important terms pertaining to management of PCBs. The details of a joint NOAA-NMFS/EPA/FDA model to compute exposure to PCBs from bluefish consumption are explained in Appendix 3. Appendix 4 contains EPA's assessment of PCBs in context with 58 suspected carcinogens. References appear as Appendix 5. Appendix 6 presents an overview of PCB decontamination technologies, and Appendix 7 is a roster of participants.

Ratification of a Single Text Document

The ratification of the single negotiated text brings the process to a logical conclusion. Susskind and Cruikshank (1987) describe this phase of consensual problem solving processes:

[R]epresentatives must return to their organizations and say, "This is the final draft of the agreement. Do you support it? Are you willing to have me sign it on your behalf?"34

One account of the ratification phase is found in Susskind and McMahon's description be a portion of the "ratification phase" of EPA's experiments with negotiated rulemaking (1985):

EPA and the facilitators attempted to make certain that everyone knew what they were doing when they signed the final drafts of the proposed rules. They were committing themselves in the first demonstration and their organization in the second. In both cases they were agreeing to support the draft during the review and comment period, and if they were not changed, after that as well. By making the written document the focus of negotiations, EPA was able to focus all the energies of the participants on a shared task.35

The core purpose of ratification is to ensure that parties know what they are buying into and to bind parties to their agreements. This hopefully confers the advantage of helping parties avoiding major implementation obstacles. The ratification phase of the Bight Initiative was documented in detail in Chapter 6. Over a six month period, the
mediation team worked to secure letters of ratification from top decision makers in each of the twenty two organizations that had participated in shaping the single text. They succeeded in bringing eighteen organizations on board. Additional tasks were needed in the Bight Initiative. The NYAS team had to help parties sell the agreement back home across peer divisions, up through organizational hierarchies, and among members and counterparts in coalitions. Additionally the NYAS team worked to secure the ratification of recalcitrant parties.

The Role and Responsibilities of a Team of Active Mediators in the Single Text Procedure

In the dispute resolution literature, the appropriate roles of nonpartisan intervenors have been variously conceived and debated. One view is that "process professionals" should attend only to the smooth running of a meeting, or should care only that parties are satisfied with an outcome. Another view is that mediators should be concerned about the wisdom, efficiency, durability and implementability of the outcome (Susskind and Cruikshank, 1987) and should help create outcomes that set good precedents. In fact, the NYAS team had a variation on this debate in establishing the style of involvement it would bring to the Bight Initiative.

Ozawa and Susskind (1985:34-35) introduce the concept of an activist mediator:

[A] process in which the mediator assumes an activist role offers special promise for "keeping the negotiators honest"...A mediator can ensure that information in conveyed in a language that is readily comprehensible to all parties...In short, as a guardian of the process, a mediator can intervene to correct miscommunications, to clarify ambiguous messages, and to challenge deceptive communications. Also a mediator can point out when differences in interpretations have arisen and when participants are making prescriptive rather than descriptive statements.36

The experience of the Bight Initiative shows that the sustained involvement of a team of active mediators is integral to the successful
use of the joint fact-finding procedure. These roles and responsibilities, explained in depth in Chapter 6, include those sketched by Ozawa and Susskind, as well as several other tasks. An activist mediator posture was essential at every stage of the Bight Initiative, from conducting exploratory interviews to designing the collaborative process, recruiting participation, engaging scientists, leading parties through the joint fact-finding procedure, drafting interim versions of the text, and securing ratification of the final document. At any of these stages, the process could easily have broken down without the strategic intervention and guidance of the mediation team. As described in Chapter 6, my conception of an "activist" mediator, informed by Susskind and Cruikshank (1987) and others, holds that the nonpartisan intervenor must pay close attention to the extent to which the proceedings are well informed, the perceived fairness of the process, and quality of the outcome. It is doubtful that a narrower concern only for the smooth running of the process would have enable to group to reach closure on the joint fact-finding and preparation of the single text.

Some of the tasks of an active mediator have already been suggested. One is to the recruit and organize participation in a fashion that engages affected stakeholder groups and engages individual representatives with the commitment and endurance to see their way through joint fact-finding and creation of successive drafts of a negotiated text. The Bight Initiative also showed that in the course of single text negotiation over issues of a science-intensive nature, mediators must pay take steps to facilitate the interaction of scientists and negotiators. Important tasks include recruitment of credible scientists, which may involve building a preliminary roster, scanning the scientific literature, and discussing the credentials of potential panelists with their peers in the scientific community. It may also involve asking leading scientists for help in recruiting panelists. This recruitment process may require a compensate scientists for their time and travel.

Mediators in the Bight Initiative learned that they had to give very explicit instructions to get the desired contributions from participating
scientists. Among the roles scientists played were to give technical briefings, participate in question and answer sessions, or to assist negotiators in their deliberations of management alternatives. After some initial presentations did not go as well as participants hoped, NYAS mediators gave scientists more specific guidance about the subjects they were to address, the context of their contribution, and the background of the assembled participants. The mediation team consistently played the role of translators and kept scientists focussed on their task—whether it was to describe cause and effect relationships, illuminate the implications of policy options, or help the group invent prescriptions for policy action.

Additional tasks included taking the lead in drafting and distributing iterations of the single text. Academy mediators were also active in helping negotiators create a package recommendations that diverse parties could support. As was discussed in the previous section, they used several techniques to foster trades across linked issues, to frame management options as contingent recommendations where key data was missing, and to assist negotiators in clearly spelling out major obstacles to implementation of certain management options (such as dredging "hot spots" in the lower estuary), along with appropriate interim steps.

NYAS mediators remained active through the ratification phase. They assisted negotiators in gaining the support of their organization for the single text. In other cases, they created opportunities for members of caucuses with more reluctant parties to broaden participation in the ratified agreement.

Selection and Ratification of Mediators to Assist the Single Text Negotiation Procedure

In the Bight Initiative, the team of mediators was to a large degree "self selected". The team worked to secure and maintain the confidence of the Officers of the Academy. There was no formal ratification of the team
by participating stakeholders; this step was implicit in their agreement to participate in the Bight Initiative. This was a fairly unique case, since the host Science and Decision Making Project was one of few to have resolution of science-intensive disputes as one of its stated missions. It is reasonable to anticipate that in future efforts to resolve science-intensive disputes, disputing parties, networks of conflict resolution professionals, or perhaps officers in organizations willing to serve as host auspices would have more to say about the recruitment and ratification of suitable mediators.

More work is needed to confirm the demand for mediators in technically complex disputes. It is also worth considering whether to consider science intensive disputes as a special class of public disputes and to offer specialized training for intervenors in such conflicts. If, as the evidence presented in this dissertation suggests, there is an abundant potential workload, then a systematic effort is needed to build a pool of qualified mediators. Mediators need skills in diplomacy, conciliation, and interpersonal relations, as well. The experience of the Bight Initiative teaches that expertise in the subject matter under discussion definitely enhances the contributions a mediation team can make. Short of recruiting a mediator who is a leading figure in a substantive field, more expertise in the subject is better than less when it comes to helping a group of negotiators work through science-intensive issues. An alternate formulation in disputes where multiple scientific disciplines are involved (such as managing the risks of a contaminant), staff with "subject matter" expertise could be recruited as supporting members of the team, thus leaving the process skills up to the mediators.

Restrospective Comment on The Need for Protocols for Joint Fact-Finding and Single Text Negotiation

The Bight Initiative clearly demonstrates that joint fact-finding and single text negotiation is a complex process. Such a process should be guided by clear protocols, spelling out groundrules for the major steps.
Although NYAS mediators prepared an initial draft of groundrules, these were never formally ratified by the group. Rather, groundrules were proposed, discussed, and informally adopted as they were needed during the course of the Bight Initiative.

In retrospect, it appears that a more systematic effort to draft and seek ratification of protocols would have assisted both negotiators and the NYAS team. What subjects should protocols address? As a first cut, it appears that five areas need special mention. First, protocols are needed to ensure consistent participation. Ideally, each organization should name one primary delegate and one alternate. Second, protocols would be useful to guide the selection and instruction of scientific panelists. Third, if the assembled negotiating group agrees to prepare a set of written findings, some guidance is needed as to the documentation required for each finding (i.e. publication in a peer-reviewed journal, personal communication). Fourth, protocols should spell out the procedures for review and ratification of the negotiated document, including an explicit time frame during which revisions may be sought. The lack of such protocols for the Bight Initiative greatly complicated the ratification process. Fifth, protocols are needed to monitor implementation of the informal agreement.

Concluding Observations Regarding the Negotiated Single Text Procedure

The single text negotiation procedure can be an excellent organizing framework for the interventions recommended in this chapter to improve the resolution of science-intensive public policy disputes. The three traditionally separated groups—scientists, policy makers, and other stakeholders can meet with the shared purpose to develop a single text.

The development of a single text meshes well with the recommendations for improving the way scientific information is used in decision making. A single text can be a focal point for the collection of useable information, and can be a document that records areas of scientific agreement, as well as the bases of scientific disagreement and uncertainty.
A ratification phase is strongly recommended to bring the single text to closure and avoid a major class of implementation problems: failure to secure binding commitments from key parties. The experience of the Bight Initiative also suggests several important conclusions regarding ratification of a negotiated single text. Mediators may have to assist negotiators in securing ratification in the various organizational channels described above. Since "ratification" is a new term for most organizations, mediators should expect that the process will generate some internal debate, and may take considerable time. Even though the document subject to ratification is an informal agreement, it connotes a much higher degree of formality than a report sponsored by a single organization. Although this may pose obstacles in the short run, it may pay dividends with smooth translation to formal agreements in the long run. For instance, as a result of the in depth discussion of the need for consistent testing of PCBs in fish and the ratification by a broad group of stakeholders, New York State DEC reversed its decision to halt monitoring of PCBs in striped bass. The agency's earlier plan to stop the monitoring drew criticism from a broad spectrum of participants in the Bight Initiative, including environmentalists, commercial fishermen, and industry representatives.

The process I have outlined in this chapter requires leadership. The evidence from the Bight Initiative suggests that the best way to provide this leadership is through a team of active mediators. A more passive concern about smooth running of meetings might be helpful in limited circumstances, but there is much more to the resolution of science-intensive disputes. Sustained, aggressive intervention of an active mediation team is likely to be essential for successful resolution of science-intensive disputes. The team should be willing to work hard in the earliest stages of organizing participation, and sustain its efforts through a dynamic involvement in joint fact-finding and packaging agreements.

Active mediators will need to serve as recruiters of scientific expertise, translators of technical terms, and brokers between negotiators
and technical experts capable of organizing the information that parties to complex disputes need to make well-informed decisions. Such mediators, I believe, need strong skills in facilitation and conflict resolution, as well as a solid grounding in the subject matter under discussion. Mediators should attempt to recruit support staff to provide still more technical expertise to the team. In complex disputes, there is likely to be a large volume of information to screen, sort, and package for the consideration of parties to a negotiation.

Active mediators should pay attention to the quality of the outcome. This implies both a concern that the recommendations are well informed, and that they are "packaged" in such a way as to avoid the prospect of disgruntled parties trying to throw a figurative wrench in the works. Active mediators should also create situations that enable parties to reconvene if circumstances change or if new information changes a forecast of future outcomes. The experience of the Bight Initiative shows that the involvement of a team of active mediators to guide participants through the negotiated single text procedure holds promise for resolving disputes of a science-intensive nature.
THE NEED FOR SUPPLEMENTS TO TRADITIONAL METHODS OF HANDLING COASTAL AND MARINE RESOURCE DISPUTES

As we near the 1990s, it is time to take a fresh look at the way coastal resources are managed in the United States. Coastal zone management has been a recognized field of professional endeavor in the United States for almost two decades. There are well established professional journals (Coastal Management is in its 18th year); the sixth biennial conference for the profession (Coastal Zone '89) is scheduled for July, 1989; and over 20 states and territories have coastal management programs approved by the federal Office of Ocean and Coastal Resources Management. But as the field matures, scholars and practitioners of coastal management would benefit by looking closely at its sibling field of alternative dispute resolution. The reason is straightforward: the cases analyzed in this dissertation have shown that traditional legislative, administrative and judicial methods of handling resource management disputes have fallen short in several important ways. In case after case, traditional procedures have not adequately engaged affected stakeholders, nor have they utilized adequate scientific information, moved aggressively to clarify areas of disagreement, packaged acceptable agreements, or bound parties to their informal agreements by means of ratification mechanisms to "sell agreements back home."

Of course, some of these problems have been identified in the literature on coastal management. Although solid evaluative literature on coastal management is scarce, several leading analysts have complained about the way planning agencies handle scientific information (Clark, 1979). While recognition of some of these problems dates back ten years, the response of traditional administrative, legislative and judicial mechanisms does not live up to the challenge.

Furthermore, Chapter 1 presented a series of reasons to expect that science-intensive disputes over coastal and marine resources will arise with increasing frequency during the 1990s and beyond. These factors are briefly recounted here. First, the coastal zone is characterized by the
complex aggregation of natural and built systems which interact in ways that are difficult to forecast. Second, there is an exceptional degree of institutional fragmentation in the coastal zone. The number of government actors with overlapping mandates for the coast means that myriad agencies are likely contenders in public disputes over coastal resource use. Third, because of the availability of multiple resources and amenities, the coastal zone is the object of intense competition among multiple users. This competition will intensify as coastal areas become more densely populated. Fourth, proponents of different policy priorities and proposals for resource use frequently recruit competing experts to bolster their own cases. Fifth, when scientific consensus is sought, it too often takes the form of elite panels that isolate marine scientists from policy makers and citizens. Many of these factors were documented in the case studies presented in Chapters 2 through 5.

Taken together, I believe the evidence is persuasive that new supplementary approaches must be developed to handle the disputes that will inevitably arise over coastal and marine resource allocation, setting policy priorities, and creation of regulatory standards. My documentation of the New York Bight Initiative has shown that negotiation-based modes of decision making, based on face-to-face dialogue among policy makers, other stakeholders and neutral scientists produced a number of benefits.

There are a small handful of institutional models that incorporate some elements of negotiation-based problem solving. One state, California, has created an agency (the State Coastal Conservancy) with a quasi-mediator mandate to work out disagreements between developers and regulatory agencies. In a few instances, the Conservancy has also served as a broker between development oriented agencies and those with a conservation mandate. The Conservancy has the ability to allocate funds for technical analysis which are sometime used in a fashion that approaches the joint fact finding process described in the Bight Initiative (Susskind and McCreary, 1985; Grenell, 1985; Petrillo, 1988; McCreary and Adams, 1988). However, the Conservancy is not entirely
neutral and nonpartisan; it has a mandate to carry out the policies contained in the California Coastal Act through the implementation of specific projects. Needless to say, not all parties share these goals.

The Alaska coastal program incorporates a mediation feature for disagreements that arise among state agencies. According to Program Director Jan Caulfield, staff of the Intergovernmental Council function as "institutional mediators" when state agencies disagree as to whether a state-sponsored development should go ahead. Additionally, as discussed in Chapter 3, the U.S. Corps of Engineers has advanced several directives and training programs to promote more routine use of alternative dispute resolution techniques. Priscoll (1988) has documented the use of such techniques by the Corps to help settle several coastal resource disputes.

Additionally, there are a handful of examples of successful facilitation and mediation over coastal issues, in addition to the work on the Massachusetts tidelands case described in Chapter 5. For example, mediators Vern Huser and Sam Gusman played an essential role in resolving the last land use conflicts that blocked state approval of a land and water use plan for the Columbia River Estuary (Gusman and Huser, 1984; Susskind and McCreary, 1985). The author served as a facilitator in a successful day-long session dedicated to characterizing the risks to the marine environment posed by tributyltin (TBT), a toxic constituent in marine bottom paints. The outcomes of the workshop were presented to a legislative panel, which prepared three resolutions outlining policy recommendations. These in turn were translated quite directly into legislation restricting TBT use in several Western states (McCreary, 1987). The Columbia River and TBT facilitation efforts were less complex procedurally and technically than the Bight Initiative, but they included many of the same elements.

These examples suggest that improved approaches to dispute resolution will be a welcome addition to the practice of coastal resource management. In my view, much more work needs to be done to develop and test models to engage affected stakeholders, enable collaborative
development and review of technical information, and package acceptable agreements. As a senior manager of the Office of Ocean and Coastal Resources Management observed when she recommended the Bight Initiative for funding "This [Bight Initiative] is right at the edge of the field [of coastal management and marine policy]." 38 More evaluative research is needed to pinpoint the shortcomings in the way existing legislative, administrative, judicial mechanisms handle coastal resource disputes, to discover obstacles to more effective use of supplementary processes, and to test experimental processes such as those exemplified by the Bight Initiative.

CONCLUDING OBSERVATIONS ON THEORY BUILDING FOR RESOLUTION OF SCIENCE INTENSIVE DISPUTES

There have been a few significant efforts to document mechanisms to resolve disputes of a science-intensive nature (Carrow and Myhart, 1983; Ozawa, 1988), but more work is needed to develop and test mechanisms along the lines of the Bight Initiative. They need not, of course, be as exhaustive and time consuming as the three year project. Both the New York City dioxin mediation and its failed counterpart in Philadelphia (both one day events) are useful sources of insights. Similarly, the one day TBT facilitation at the Bodega Marine Laboratory showed the value of working through the sequence from identifying areas of scientific agreement, to identifying areas of scientific disagreement, and then to identify and rank order research and analysis to clarify these disagreements.

A Research Agenda for Resolution of Science-Intensive Public Policy Disputes

The foregoing discussion and the experience of the New York Bight Initiatives raise a host of questions regarding efforts to resolve science-intensive disputes. While this dissertation has addressed many of these points in varying level of detail, the following questions merit further investigation:
An initial set of questions relates to the auspices for resolution of science-intensive disputes. Given the criteria suggested for appropriate auspices (i.e. scientific credibility and nonpartisan stance with regard to the issues), are academies of science logical auspices for other fact-finding and single text negotiation efforts? Are universities credible auspices, or are they too often seen as allied with one position? What other organizations would represent credible auspices?

Second, more attention should be devoted to the appropriate constitution and organization of a team of nonpartisan intervenors to be created under such auspices. What commitments of support should mediators seek from host institutions? What is the apparent "demand" for assistance to resolve disputes of science-intensive nature? Should all members of mediation team have both "process skills" and "subject matter expertise", or is some division of labor more efficient? How should mediators be ratified by a group of disputants?

A third set of questions relates to the protocols to guide joint fact-finding and single text negotiation. What subjects should they cover and what groundrules should these protocols spell out? At what point during the collaborative process should they be developed and ratified?

Fourth, several questions arise over how best to put the three groups—stakeholders, policy makers, and scientists—on a more equal footing. What steps can a team of nonpartisan mediators take to ensure sustained, continuous participation of stakeholders in joint fact finding and single text negotiation? Are additional incentives needed? Would resources for travel and lodging make a difference? What steps might be taken, besides access to expertise and "immersion" in a joint fact-finding process, to put disparate groups on a more equal footing with regard to their capacity to understand and debate complex public policy questions? A related concern is what steps can be taken to build the capacity of scientists and other technical experts to understand the policy context for which they are asked to provide advice?
The question of selection and presentation of information is extremely important. What formats are most useful for portraying information regarding complex causal relationships, such as the relationships between natural systems and new technologies? With regard to appropriate handling of scientific disagreement, if there are two or more divergent interpretations of a single data set what formats of text and graphics are useful for presenting a data set along with two or more disparate interpretations of the data set. How can computers be used to assist in the useful presentation of technical information in service of developing single negotiating texts? How can computers be used to portray a common data base, map cause and effect relationships and enable joint forecasting of outcomes of policy alternatives?

The question of anticipating problems with implementation also needs more attention. What strategies can be used to package agreements acceptable to all sides? What steps can be taken to facilitate the ratification phase of informal single text agreements? What steps can be taken to assist negotiators with the task of bringing their organizations on board? How can mediators work with ratifying organizations to engage recalcitrant parties? Can groundrules define a reasonable "stopping point" in the quest for ratification from all parties? What mechanisms are useful for translating information agreements into binding agreements?

Funders of research in dispute resolution, collaborative problem solving, and science advising for policy should be encouraged to underwrite research on these questions. Post hoc documentation of dispute resolution efforts should also be supported so as to bolster the data base on this important subject. Additionally, mediators should be encouraged to solicit commentary on processes to resolve disputes, as the Academy of Sciences received in its several letters of ratification. The hoped-for result will be to improve the resolution of disputes and in turn to enhance the management of limited natural resources.
I want to pose a final set of overarching questions. This inquiry has investigated the shortcomings of the traditional legislative, administrative, and judicial system with regard to resolution of science-intensive policy disputes. Do the shortcomings I identified arise with all types of knowledge-intensive policy disputes? If so, should the prescriptions I suggested also apply?

Alternatively, does the discussion of problems and the set of prescriptions apply to any field where knowledge is advanced and organized through the structure of major paradigms, as described by Kuhn (1962). In what ways are scientific issues different from non-scientific issues with regard to getting and taking advantage of information, and handling disagreement and uncertainty? Is it appropriate to put "knowledge holders", policy makers and affected stakeholders in other policy disputes on a more equal footing? If there is no important difference between science-intensive disputes and other types of knowledge-intensive disputes then the implications of this research could be extended in several new directions. This would be a fruitful subject for future inquiry.
REFERENCES


Complaint, United States of America v. Metropolitan District Commission and Commonwealth of Massachusetts, Defendants. Civil Action 83-1572-MA.


Ecological Analysts, Inc. and SEAMOcean, Inc. 1983b. Technical Information to Support the Re-Designation of the 12 Mile Site for Ocean Disposal of Municipal Sewage Sludge.


Massachusetts Department of Public Health. 1988. Health Advisory for Contamination in Fish and Shellfish from Quincy Bay. June 20, 1988


Massachusetts Water Resources Authority. No date. MWRA Chronology.

Massachusetts Water Resources Authority. 1986. Memorandum of Understanding Between the City of Quincy and the Massachusetts Water Resources Authority Concerning the Processing of Interim Sludge in Quincy at the Fore River Staging Area.


FOOTNOTES: CHAPTER TWO

1 A generic treatment of these problems can be found in *Breaking the Impasse* (1987) by Lawrence Susskind and Jeffrey Cruickshank, Basic Books.


3 Interview with Daniel Willard, Chairman, School of Public Environmental Affairs, Indiana University, Bloomington, Indiana. October 31, 1988.


9 Information sources are:

New Hampshire: Kathryn Cousins, OCRM Program Manager
New Jersey: *New York Times* November 6, 1988
Maryland: Interview with Jon Kusler, Association of State Wetlands Managers
Virginia: Interview with Leo Sneed, Staff Scientist, Chesapeake Bay Foundation. Richmond, Virginia. May 20, 21, 1988.
South Carolina: Chester Sansbury. South Carolina Department of Health and Environmental Conservation, Columbia, South Carolina. November 1, 1988; Tim Kana, Coastal Resource Engineering, October 31, 1988
Georgia: Millhouser Interview.
Florida: Millhouser Interview.
Texas: Millhouser Interview.
Minnesota: Interview with Ann Berger
FOOTNOTES: VIRGINIA TIDELANDS CASE

1 A generic treatment of these problems can be found in Breaking the Impasse (1987) by Lawrence Susskind and Jeffrey Cruickshank, Basic Books.


3 Interview with Daniel Willard, Chairman, School of Public Environmental Affairs, Indiana University, Bloomington, Indiana. October 31, 1988.


9 Information sources are:

New Hampshire: Kathryn Cousins, OCRM Program Manager
Maryland: Interview with Jon Kusler, Association of State Wetlands Managers
Georgia: Millhouser Interview.
Florida: Millhouser Interview.
Texas: Millhouser Interview.
Minnesota: Interview with Ann Berger
Wisconsin: Interview with Larry Larsen
Illinois: Interview with Ann Berger
Indiana: Interview with Dan Willard, Interview with Ann Berger
Ohio: Interview with Ann Berger

10 Keynote address by Dr. Lydon Lee, Society of Wetland Scientists

States: Current Status and Trends.

12 Just vs. Marinette County 201 N.W. 2nd 761 (Wisc.) 1972, dealt with
wetland regulation in Wisconsin and concluded it is not an unreasonable
exercise of police power to prevent harm to public rights by limiting the
use of private property to its natural uses.

13 Sibson vs. State 336 A. 2d 239 (N.H. 1975), concerned wetland filling
in New Hampshire. The court upheld wetland regulation even though it
reduced possible speculative value of the property.

Another landmark case was Penn Central vs. City of New York 438 US
104 (1978) which dealt with the question of whether regulation for the
purposes of transferring development constituted a taking. The court
concluded that reasonable use of the property remained, and so therefore
was not a taking.

14 In First English Evangelical Lutheran Church of Glendale vs. County
of Los Angeles 480 U.S.____ 17 EIR 20787 (June 9, 1987), the Court ruled
that (1) land use regulations could indeed result in a taking of property
even where the regulations are of a temporary nature although the basic
test for what constitutes a taking remains unchanged—where all uses of
the property are eliminated; and 2) damages (monetary compensation) must
be an available remedy for such a "temporary" taking. However, the Court
did not explicitly address whether the county’s floodplain regulations
constituted a taking of the Church’s property.

15 Nollan v. California Coastal Commission 482 U.S._____, 55 LW 5145
(June 26, 1987) involved the Commission’s issuance of a beachfront
residential lot to replace a small bungalow on a larger house only on the
condition that the owners dedicate an easement allowing for lateral public
access along a portion of the beach, which is located between two public
beaches. The court stated that because the public policy being served by
the permit condition was to promote vertical access (access from the
nearest public road to the shore), a sufficient nexus between the public
goal and the restriction did not exist.


Interview with Jeter Watson, Staff Attorney, Chesapeake Bay Foundation. Richmond, Virginia. May 23, 1988.

The Chesapeake Bay Agreement, signed August 15, 1987, is an informal accord by the Governors of Virginia, Maryland, and Pennsylvania and the Mayor of Washington, D.C. to take a series of steps to maintain and enhance the water quality and environment of the Chesapeake Bay.

Interview with Leo Snead, Staff Scientist, Chesapeake Bay Foundation. Richmond, Virginia. May 20, 21, (Richmond, Virginia) and June 2, 1988 (Washington, D.C.). (Hereinafter Snead Interview.)


The successive versions of the legislation are Draft legislation "Nontidal Wetlands" December 11, 1987; House Bill No. 1037 Offered January 26, 1988; House Bill No. 1037 Amendment in the Nature of a Substitute, Proposed by the House Committee on Conservation and Natural Resources February 14; 1988; House Bill No. 1037 Amendment in the Nature of a Substitute (Proposed by the Senate Committee on Agriculture, Conservation, and Natural Resources on March 7, 1988).

Snead interview.

Interview with Catherine Harold, Executive Director, Virginia Council on the Environment, Richmond, Virginia. June 7, 1988. (Hereinafter Harold Interview.)

Snead interview.

Snead interview.

House Bill No. 1037 (Offered January 26, 1988)

Snead interview.

Interview with Jeter Watson, Staff Attorney, Chesapeake Bay Foundation. Richmond, Virginia. May 23, 1988. (Hereinafter Watson Interview.)

Watson interview.

Watson interview.

Watson interview.

Watson interview.
35 Interview with Barbara Wrenn, Deputy Secretary for Natural Resources, Richmond, Virginia. June 7, 1988. (Hereinafter Watson Interview.)

36 Snead interview.

37 Snead interview.

38 Interview with Dr. Carl Hershner, Co-Director, Estuarine Research and Policy Center, Virginia Institute of Marine Sciences. May 24, 1988. (Hereinafter Watson Interview.)


41 Snead interview; Hershner interview.

42 Snead interview.

43 Snead interview.

44 House Bill No. 1037 Amendment in the Nature of a Substitute, Proposed by the House Committee on Conservation and Natural Resources February 14; 1988.

45 Watson interview.

46 Snead interview.

47 Snead interview.

48 Harold interview.

49 Snead interview.

50 Hershner interview.

51 Hershner interview.

52 Snead interview.

53 Hershner interview.

54 Interview with Carl Bomer, Principal Lobbyist, Virginia Homebuilders Association. Richmond, Virginia, June 8, 1988. (Hereinafter Bomer Interview).

55 December, 1987 CBF draft nontidal wetlands legislation, "Permit Standards", p. 3.
House Bill No. 1037 Offered January 26, 1988 Sec. 10-262.1
Definitions p. 3; Sec. 10-262.4. Standards for allowable uses in
wetlands.

House Bill No. 1037 Offered January 26, 1988 Sec. 10-262.1
Definitions p. 3; Sec. 10-262.4. Standards for allowable uses in
wetlands.

House Bill No. 1037 February 14, 1988. Standards for allowable uses
and activities in nontidal wetlands.

Watson interview.

House Bill No. 1037 Amendment in the Nature of a Substitute (Proposed
by the Senate Committee on Agriculture, Conservation, and Natural
Resources on March 7, 1988). Section 10-261.1 Definitions; Section
10-262.4 Standards for allowable uses and activities in nontidal wetlands.

Bomer interview.

Interview with John Keeling, Executive Director, Principal Lobbyist,
Virginia Farm Bureau. Richmond, Virginia, June 8, 1988. (Hereinafter
Keeling Interview.)

Harold interview.

House Bill No. 1037 February 14, 1988. Standards for allowable uses
and activities in nontidal wetlands.

House Bill No. 1037 Amendment in the Nature of a Substitute (Proposed
by the Senate Committee on Agriculture, Conservation, and Natural
Resources on March 7, 1988). Section 10-261.1 Definitions; Section
10-262.4 Standards for allowable uses and activities in nontidal wetlands.

Wrenn interview.

Hershner interview.

Snead interview.

Keeling interview.

Watson interview.

Snead interview.

Watson interview.

Snead interview.

Harold interview.

76 Hershner interview.

77 Harold interview.

78 Harold interview.

79 Harold interview.

80 Keeling interview.

81 Harold interview; Interviews with Dennis Swartout and David Oliver, Computer Cartographic Center, University of Massachusetts, Amherst, Massachusetts, June 4, 1988.

82 Keeling interview.

83 Hershner interview; Bomer interview; Snead interview; Watson interview;


87 Interview with Don Silva, Chairman, New Mexico Assembly Natural Resources and Energy Committee. Albuquerque, New Mexico. November 2, 1988


91 Weeks Interview.
92 Munz Interview.
93 Craig Interview.
94 Silva Interview.
95 Dotson Interview.
96 Silva Interview.
FOOTNOTES: CHAPTER THREE

1 Section 102 (c) of the National Environmental Policy Act (42 U.S.C. 4341 et. seq.) requires that Federal agencies prepare an Environmental Impact Statement (EIS) on proposals for major Federal actions significantly affecting the quality of the human environment. The object of NEPA is to build into agency decision-making processes careful consideration of all environmental aspects of proposed actions.


3 National Environmental Policy Act (42 U.S.C. 4341 et. seq.); known as NEPA.


5 Coastal Zone Management Act (16 U.S.C. 1451 et. seq., 1972); known as the CZMA.

6 Marine Protection, Research and Sanctuaries Act (33 U.S.C. 1401 et. seq.); known as the MPRSA or the Ocean Dumping Act.

7 In Breaking the Impasse, (Basic Books, 1987) Susskind and Cruikshank describes this "decide, announce, defend" sequence with particular reference to facility siting, although it applies equally well to agencies that manage coastal resources.


9 A detailed search of cases using the computerized Lexis system conducted as part of this dissertation research revealed that litigation over several hundred cases involving coastal issues had reached the state or federal courts. The following table details these cases. It remains to be determined how large a proportion of total agency decisions these litigated cases represent.

<table>
<thead>
<tr>
<th>APPROXIMATE NUMBER OF CASES LITIGATED ON MAJOR COASTAL ISSUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Consequences of Dredging and Dredged Material Disposal</td>
</tr>
<tr>
<td>Federal Court</td>
</tr>
<tr>
<td>State Court</td>
</tr>
</tbody>
</table>
10 See especially Squires, Donald. 1983. *The Ocean Dumping Quandary*
   *The Ocean Dumping Quandary: Waste Disposal in the New York Bight.* State

11 Squires, 1983; Geoffrey A. Bryan "Bioavailability of and Effects
   of Heavy Metals in Marine Deposits" in Ketchum, Capuzzo, et al. (eds).
   pp.41-80.

12 Testimony of Don Lollock, California Department of Fish and Game
   before the San Francisco Bay Conservation and Development Commission,
   September 4, 1986.


15 Coastal Zone Management Act (16 U.S.C. 1451 et seq, 1972); known as
   the CZMA.

   seq.); known as the MPRSA or the Ocean Dumping Act.

17 The Fish and Wildlife Coordination Act (add U.S.C. citation)

   requires federal agencies which are proponents of projects, or which are
   asked to approve projects that would impound, divert, or modify any water
   body to give wildlife conservation equal consideration with other factors
   throughout the agencies’ planning and decision making processes.
   Administration of the act is delegated to the U.S. Fish and Wildlife
   Service and the National Marine Fisheries Service. In practice, this
   means that the Corps and EPA must coordinate with NFMS and the USFWS on
   major dredging projects.

18 MPRSA, Section 102 [a].

19 MPRSA, Section 103 [d].

20 40 CFR Part 6.1 presents a synopsis of environmental review
   procedures; Part 6.4 describes public and other agency involvement.

21 40 CFR Part 6.2 describes the content of EIS documents; 40 CFR Part
   6.4 describes public and other agency involvement.

22 As noted above the Fish and Wildlife Coordination Act involves the
   NFMS and the USFWS in consultation and informal review of major dredging
   projects.

23 40 CFR Part 6.511 describes procedures for the Record of Decision
   (ROD) under NEPA. 40 CFR Part 6.400 (e) states "the responsible official
   shall disseminate the ROD to those parties which commented on the draft or
   final EIS."
Pursuant to the MPRSA on January 11, 1977 EPA promulgated the Ocean Dumping Regulations (40 CFR Parts 220-229) which establishes categories of permits (40 CFR 228.5-228.6) and establishes criteria for the evaluation of permit applications (40 CFR Part 227) and for the designation and management of dumping sites (40 CFR Part 228-228.5). 40 CFR 228.5 sets general criteria for the selection of sites. For instance, 40 CFR 228.5 (a) states that the "dumping of materials into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation."

40 CFR 228.6 sets forth specific criteria for site selection. For instance, 40 CFR 228.6 (a) provides "in the selection of disposal sites, the following factors will be considered...(2) location in relation to breeding, spawning, nursery, feeding, or passage areas of living resources in adult or juvenile phases; (3) location in relation to beaches and other amenity areas;...(6) dispersal, horizontal transport and vertical mixing characteristics of the area....(8) interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean."

40 CFR 227 sets out criteria for evaluation of permit applications. 40 CFR 227.4 lists criteria for evaluating environmental impact; 227.10 addresses hazards to fishing, navigation, shorelines, and beaches; 40 CFR 227.15(c) states that [the need for dumping will be determined by] "relative environmental risks, impact and costs of ocean dumping as opposed to other feasible alternatives."

40 CFR Part 230 sets forth guidelines for specification of disposal sites for dredged or fill material under Section 404 of Clean Water Act.

16 U.S.C. sec. 1546 (c)(3)(A) states in part: "After final approval by the Secretary of a state’s management program, any applicant for a required Federal license or permit to conduct an activity affecting land or water uses in the coastal zone of that state shall provide in the application...a certification that the proposed activity complies with the state’s approved program and that such activity will be conducted in a manner consistent with the program."

A Lexis computer search was begun as part of this dissertation research to determine outcomes of dredging litigation. The number of relevant statutes and the overlap with other wetlands issues made this a definitive analysis beyond the scope of this research.


CBE Comments to the U.S. Army Corps of Engineers regarding Army Corps of Engineers Draft Memorandum, November 20, 1988; Interview with Alan Ramo, Counsel, Citizens for a Better Environment, June 20, 1988 (Hereinafter Ramo interview).

Interview with Robert Tasto. Associate Marine Biologist, Environmental Services Division, California Department of Fish and Game. Oakland, California. June 22, 1988. (Hereinafter Tasto Interview.)

Tasto interview.

Wall interview; Wax interview.

Ramo interview.

Ramo interview; Tasto interview.

Wall Interview. The Corps explains that the haul distance to to B-1 was 42 nautical miles (nm) compared to 31 nm and computed that this 11 nm haul difference would translate into $10-$11 million for the Oakland project.

Ramo Interview; Interview with Patrick Cotter, Ocean Dumping Coordinator, USEPA Region 9 (hereinafter Cotter interview)

Letter from Alan Ramo to General Kelly, U.S. Corps of Engineers Re: Port of Oakland Channel Deepening. March 2, 1988. Other signatories to the letter included Barry Nelson, Save San Francisco Bay Association; Arthur Feinstein, Golden Gate Audubon Society; Zeke Grader, Pacific Coast Federation of Fishermen's Associations; Joan Patton, San Francisco Bay Chapter of the Oceanic Society; and Dana Kokubun, San Francisco Bay Chapter of the Sierra Club.


Ramo Interview.


Tasto interview.

Ramo interview; Tasto interview.


(Hereinafter Koehler Interview.)

Koehler Interview.

Koehler Interview.


San Francisco Examiner, May 13, 1988

San Francisco Examiner, May 14, 1988

San Francisco Examiner, May 14, 1988

County of San Mateo v. Port of Oakland, 329780

San Francisco Examiner, May 27, 1988

Koehler Interview; Mann article.

Koehler Interview; Mann article; County of San Mateo v. Port of Oakland order filed; September 15, 1988; petition denied.

Koehler Interview; Half Moon Bay Fishermens’ Marketing Association v. Carlucci, 88-2600, Order filed; November 11, 1988; petition denied.

Letter from Alan Ramo, CBE to Division Engineer, May 24, Patrick Kelly, 1988.


Concurrent with the latest round of litigation, the Port of Oakland secured a Section 103 permit from the Corps to begin dredge operations in the Inner Harbor and awarded the project to a local contractor. Dredging got underway during the four day window between the dissolution of the emergency injunction by the federal appeals court and the state superior court issuance of the TRO. An adjacent landowner observed dredging on the site of the former Todd Shipyard (land he owned) and reported this to attorneys to the fishermen. EPA investigated and determined that the dredging violated the permit conditions not to dredge and dispose of certain contaminated materials from the Todd area. A $150,000 fine was levied by the Corps against the Port, and another $100,000 was levied against the dredge operator for violating the 103 permit by dredging in high toxic area. (Koehler Interview, Wall Interview).

Koehler Interview; Wall Interview; Tasto Interview; Interview with Mex Wax, Public Information Officer, Port of Oakland, Oakland, California. June 22, 1988.

Koehler Interview;
Wax Interview.
Wall Interview.
Koehler Interview.
CBE Letter to Division Engineer Patrick Kelly, May 24, 1988.
Wall Interview.
Wax Interview.
Tasto Interview.
Koehler Interview.
Tasto Interview; Cotter Interview.
Wall Interview.
Tasto Interview.
Cotter Interview.
80 Koehler Interview.
81 Koehler Interview.
82 Wall Interview.
83 Wax Interview.
84 Ramo Interview; Tasto Interview; Cotter Interview
85 Wax Interview.
86 Tasto Interview.
87 Wax Interview.
88 Tasto Interview.
89 Interview with Harbor Master, Pillar Point Harbor District, September 3, 1988
90 Wax Interview.
91 Wall Interview.
92 Wall Interview.
93 Ramo Interview; Tasto Interview.
94 Cotter Interview.
95 Tasto Interview.
96 Koehler Interview.
97 Wall Interview.
99 Wallace and Sward. 1989: San Francisco Chronicle, p 1 quoting "Another West Coast maritime expert, who has spent years watching the Port of Oakland and declined to be interviewed by name.


Port of Oakland Dredged Material Dispute Interview Guide, p.4

Port of Oakland Dredged Material Dispute Interview Guide, p.5

Port of Oakland Dredged Material Dispute Interview Guide, p.5

Koehler Interview.

Tasto Interview.

Wall Interview.

Port of Oakland Dredged Material Dispute Interview Guide, p.6

Port of Oakland Dredged Material Dispute Interview Guide, p.6

Koehler Interview.

Tasto Interview; Wall Interview; Koehler Interview; Wax Interview.

Wax Interview.

Wax Interview.

Tasto Interview.

Tasto Interview.

Tasto Interview.

Wall Interview.

Cotter interview.

Tasto interview.

Wax interview.

Interview with Joseph Bodovitz, California Environmental Trust, San Francisco, California, March 30, 1989. (Hereinafter Bodovitz interview.)

Bodovitz interview.

Bodovitz interview.

Bodovitz interview.
127 Bodovitz interview.


132 Lancaster interview.
FOOTNOTES: CHAPTER FOUR

1 Judge Bazelon’s observations are found in the decision Ethyl Corp. v. EPA 541 F.2d 1, 67 (D.C. Cir.1976) (decision en banc). Many other commentators have made the case that the judicial system does a poor job of handling disputes of a science-intensive nature. See, for example, Lawrence Bacow and Michael Wheeler, 1984, Environmental Dispute Resolution, Plenum Press. See also Thomas Dignan, The Case Against the Use of Adversary Adjudicatory Proceedings in Technical Decision Making, paper presented to at American Academy for the Advancement of Science Conference, Boston, Massachusetts, February 14, 1988.


The framework for my review of the history of efforts to clean up Boston Harbor and many of the specific data cited in this chapter are based in large part on two working papers prepared by Eric Jay Dolin at the Department of Urban Studies and Planning, Massachusetts Institute of Technology. These are "Annotated Chronology of the Events Surrounding the "Clean Up" of Boston Harbor (cited as Dolin 1989a) and "The Clean Up of Boston Harbor—Past Failures, Current Progress, and the Outlook for the Future" (cited as Dolin 1989b).


8 Master’s Report, p.10.

9 Master’s Report, p.11.


Interview with Paul di Pietro, Department of Environmental Quality Engineering, March 20, 1989; tally of data reported in Table V, 1988 Beach Postings - Chronological Order, which appears in the report "MDC Beach Testing - 1988".


Quincy Bay report p. 15; also Boucher "Cancer Found in Founder in Boston Harbor" The Boston Globe, October 29, 1984:45;


27 Civil Action No. 85-0489-MA. EPA suit against MDC, MWRA, Sewer Commission.

28 Civil Action No. 85-0489-MA. EPA suit against MDC, MWRA, Sewer Commission.


30 Susskind et al. p. 238.

31 The EPA administrator published a Federal Register notice on September 5, 1978 requiring that a preliminary waiver application be filed.

32 "Final Regulations Establishing Criteria for Modification of Secondary Treatment Requirements for Discharges Into Marine Waters" 44 FR 34784 15 June, 1979


34 (MDC Waiver Application, 1979)
Title II of Clean Water Act Amendments of 1977 (33 USC 1369):
Section 301(h), Standards and Enforcement of Effluent Limitations
The Administrator, with the concurrence of the state may issue a permit
under section 402 which modifies the requirements of subsection (b)(1)(B)
of this section with respect to the discharge of any pollutant in an
existing discharge from a publicly owned treatment works into marine
waters, if the applicant demonstrates to the satisfaction of the
Administrator that
1. there is an applicable water quality standard specific to the pollutant
for which the modification is requested, which has been identified under
section 304(a)(6) of this Act;
2. such modified requirements will not interfere with the attainment or
maintenance of that water quality which assures protection of public water
supplies and protection and propagation of a balanced indigenous
population of of shellfish, fish and wildlife and allows recreational
activities, in and on the water;
3. the applicant has established a system for monitoring the impact of
such discharge on a representative sample of aquatic biota, to the extent
practicable;
4. such modified requirements will not result in any additional
requirements on any other point or nonpoint source;
5. all applicable pretreatment requirements for suources introducing
waste into such treatment works will be enforced;
6. to the extent practicable, the applicant has established a schedule of
activities designed to eliminate the entrance of toxic pollutants form
nonindustrial sources into such treatment works;
7. there will be no new or substantially increased discharges from the
point source of the pollutant to which the modification applies above the
volume of discharge specified in the permit;
8. any funds available to the owner of such treatment works under Title II
of this Act will be used to achieve the degree of effluent reduction
required by section 201(b) and (g)(2)A to to carry out the requirement of
this Subsection.

O' Brien and Gere. 1982. Combined Sewer Overflow Project Inner
Harbor Facilities Plan, volume II. pages 3-9, cited in Master’s Report,
page 37.

EPA Administrative Order to MDC August 8, 1980, cited in Civil Action
No. 85-0489-MA. EPA suit against MDC, MWRA, Sewer Commission.

EPA Administrative Order to MDC 1981, administrative order. Civil
Action No. 85-0489-MA p. 12

Information needed to rule on waiver

Complaint, City of Quincy v. Metropolitan District Commission, Civil
Case No. 138,447 (Massachusetts Superior Court, Norfolk County, December
17, 1982.


Master's Report, pages 41-163.


Proposed Findings of Fact Based on the Analysis of Section 301(h) Secondary Treatment Waiver Application for the Boston Metropolitan District Commission Proposed by U.S. EPA Office of Marine Discharge Evaluation

This case study is based on review of published articles, court documents, and interviews with a dozen key parties to the litigation and subsequent harbor cleanup Few published articles on the work of special masters draw from restrospective interviews with the parties involved.

I conducted in depth interviews with William Golden, Peter Koff, Michael Sloman, Patrick Parento, Peter Shelley, Douglas McDonald, William Lahey, and Neal Barrata. Shorter interviews were completed with Laura Steinberg, formerly counsel to the Boston Water and Sewer Commission; Cheryl Breen, Harbor Coordinator for EDEA; Susan Ives, consultant to EDEA for the Boston Harbor Trust Bay; and Tom Markham, of the MWRA.

In the in depth interviews, I asked respondents to consider several phases of activities: the litigation and appointment of the master; the master's findings and remedies; the recommendation of legal remedies and agreement on the procedural order; the monitoring and compliance meetings. Then, I asked parties to consider the receivership trial, the ascendancy of the federal case, Judge Mazzone's Scheduling Order, and the MWRA's negotiation of mitigation agreements with Quincy and Winthrop.
Interviewees were asked for in-depth comments on items including the technical quality of the master’s findings, comments on the experts involved, the physical remedies, and the overall scope of the report. They were also asked to comment on the clarity of the agenda for the monitoring meetings, the available expertise, the tone of the meetings, and the nature of the meetings as an occasion to build improved relationships among parties.

49 Complaint, City of Quincy v. Metropolitan District Commission, Civil Case No. 138,447 (Massachusetts Superior Court, Norfolk County, December 17, 1982.)

The plaintiff alleged that the MDC had violated the Massachusetts Clean Waters Act (MCWA), which prohibits discharges into coastal waters without, or contrary to, a joint federal-state permit. The City also claimed damage from violation of state laws prohibiting discharges into coastal waters, and tidal waters or shellfish flats. Two other causes of action rested on state laws requiring the MDC to maintain its sewerage system and to minimize environmental damage from Nut Island. The final statutory cause of action came under the Massachusetts Environmental Policy Act, which requires the filing of environmental notification. Answers were filed by the BWSC on February 11, 1983 and by the MDC on April 20, 1983. In addition, the MDC filed a counterclaim alleging that Quincy discharges pollution through its storm drains at Wollaston Beach, and charged that as owners and operators it suffered injuries. Later, the plaintiff amended its complaint to a cause of action in the nature of mandamus for failing to remedy the violations of law alleged in their first six causes of action.


51 Golden Interview

52 Golden Interview

53 Golden Interview

54 Golden Interview and Interview, Peter Koff. Attorney, City of Quincy, April 7, 1988. (hereinafter Koff Interview).

55 Golden Interview.

56 Golden Interview.

57 Golden Interview.

58 Golden Interview.

59 Golden Interview.

Further Findings, Rulings, and Orders on Plaintiff City of Quincy’s Application for Preliminary Injunctive Relief, City of Quincy v. Metropolitan District Commission, Civil No. 138,447. July 8, 1983.


Garrity Interview.

Garrity Interview.

Garrity Interview.


Master’s Report, page 5.

Golden Interview.

Little article.


Master’s report pages 137-146.

Master’s report, pages 62-70; pages 149-150.


Master’s report, pages 157-160.

Master’s report, page 162.

Master’s report, pages 163-164.


Golden Interview.

428
Koff Interview.

Interview. Mike Sloman, Formerly Staff Attorney, Massachusetts Attorney General’s Office. Currently Attorney, Palmer and Dodge. Boston, Massachusetts, April 1, 1988. (Hereinafter Sloman Interview).

Interview. Neal Barrata, Formerly Senior Engineer, Metropolitan District Commission; Currently Senior Engineer, Massachusetts Water Resources Authority. (hereinafter Barrata Interview).


Barrata Interview.

Plaintiffs’ Objection, pages 2-3.

Plaintiffs’ Objection, page 1.

Defendants’ Objection, page 2.

Sloman Interview.


Barrata Interview.

Defendants’ Objection, page 35.

Plaintiffs Attorneys felt the scope was appropriate, as did EPA’s attorney.

Defendant’s Objection, page 35.

Shelley Interview.

Plaintiffs’ Objection, page 1.

Defendants’ Objection, page 2.

Koff Interview, Sloman Interview.

Letter from Michael Deland, EPA Regional Administrator, Region 1 to Paul Garrity, Superior Court Re: willingness of EPA to participate with parties in City of Quincy v. MDC to establish a contemplated schedule of benchmarks, and to make decisions regarding cleanup of Boston harbor in a timely fashion.


Letter from William Geary, MDC Commissioner to Michael Deland, EPA Region 1 Administrator (August 11, 1983). (Cited in Doneski, 605).

Lahey Interview, Koff Interview, Shelley Interview.

Lahey Interview

Parento Interview.

Lahey Interview, Sloman Interview.

Doneski, 1985; Petersen, 1986.

MacDonald Interview, Sloman Interview.

Garrity Interview.

Koff Interview, Sloman Interview.

Parento Interview.

Shelley Interview.
Sloman Interview.
Lahey Interview.
Lahey Interview.
Barrata Interview.
MacDonald Interview.
MacDonald Interview.
Sloman Interview.
Koff Interview.
Sloman Interview, Lahey Interview, Barrata Interview.
Lahey Interview.
Sloman Interview.
Shelley Interview.
Shelley Interview.
Sloman Interview.
Shelley Interview, MacDonald Interview, Sloman Interview, Parento Interview.
Shelley Interview.
MacDonald Interview.
Parento Interview.
Sloman Interview.
Barrata Interview.
Garrity Interview.
Koff Interview.


Doneski, 564-565.
The Massachusetts Water Resources Authority Act of 1984, (ch. 372 G.L.C. Section 2722) gives the following purposes for establishment of the new authority: (i) efficient and economical operation of water delivery and sewage collection, disposal, and treatment systems...(ii) repair, replacement, rehabilitation, modernization and extension of the delivery of water sewage collection, disposal and treatment systems for the service areas of the Authority including the financing on a self-sustaining basis of capital and operating expenses. (Donekski, 607)


Environmental Protection Agency. Tentative Decision of Denial of 301(h) Waiver March 29, 1985. As Regional Administrator Michael Deland explained: The technical data contained in the MDC’s application as supplemented by EPA’s National 301(h) Waiver Task Force, and the findings of our independent consultant and our Region I staff have given me enough information upon which to make this difficult decision. I am confident that not only is this decision legally defensible, but it is the right one for Boston Harbor... The data clearly shows that sever and adverse environmental impacts to the marine environment would result from discharge of primary treated sewage carried through a nine-mile pipe to a designated outfall point in Massachusetts Bay... I submit that a horizontal pipe to a designated outfall point in Massachusetts Bay is not dissimilar from tall stacks in the midwest. There is no "away" in the realm of pollution control, no "out of sight, out of mind". Moving the discharge point to Massachusetts Bay does not solve the problem, it just moves it. Environmental News, April 2, 1985

The MWRA board, anticipating EPA’s denial, instructed legal counsel to clarify procedures for appeal.


MacDonald Interview.


In announcing the decision, MWRA Executive Director said: "We take this step to illustrate our profound desire to get on with the business of cleaning up the Harbor. Further legal entanglements could well have delayed progress for an additional five years or more. Such a delay is intolerable." MWRA –The Clean Up of Boston Harbor – Status Update, September 23, 1985, p. 13.


Shelley Interview.
Shelley Interview. CLF retained a New York-based expert, Dr. Arturo Ressi di Cervia, who had earned his doctorate at the University of Bologna. Ressi, an expert in pouring concrete in confined areas, but unlike CIM, he had never overseen the design of a large public works project. Moreover, Judge Mazzone found that he "did not have, and did not pretend to have any particular knowledge in matters such as the mechanical, electrical, and piping portions of new treatment plants. Further, he was clearly unfamiliar with, and unimpressed by, state and federal environmental regulations."


Garrity Interview.


MacDonald Interview.

Parento Interview.

Interview with Cheryl Breen, Deputy Secretary of Executive Office of Environmental Affairs for Boston Harbor, April 26, 1988. (Hereinafter Breen interview); Interview with Tom Markham, Massachusetts Water Resources Authority, Office of Intergovernmental Affairs. April 27, 1988. (Hereinafter Markham Interview).

Town of Winthrop v. Massachusetts Water Resources Authority, suited filed in Suffolk Superior Court alleging that the July 10, 1985 vote of the Board violated the Massachusetts Environmental Policy Act (MEPA).

Breen Interview; Markham Interview.
Interview with Lawrence Bacow, Professor, Center for Real Estate Development (CRED), Massachusetts Institute of Technology. March 21, 1989.

Memorandum of Understanding Between Town of Winthrop and the Massachusetts Water Resources Authority Concerning Certain Effects of the Construction and Operation of Secondary Waste Water Treatment Plant Facilities at Deer Island, February 12, 1988. Also Breen Interview; Markham Interview.


Breen Interview; Markham Interview.


Sloman interview; Golden interview; Koff interview. In early 1987, Governor Dukakis appointed Paul Levy to head the the MWRA. Levy is the MWRA's third executive director after interim head Paul Shapiro and Michael Gritzuk, who shifted to the Chief Engineers position.

Stipulation and Order Issued by the Court (U.S. District Court for the District of Massachusetts) United States of America Plaintiff vs. Metropolitan District Commission Defendant (Civil Action combined (Conservation Law Foundation of New England Inc. Plaintiff vs. Metropolitan District Commission Civil Action 83-16-14-MA), August 23, 1988. (Filed April 13, 1988). The agreement states in part: "The Commonwealth and the Metropolitan District Commission together shall pay the sum of two million ($2,000,000)....to establish a separate account for the Boston Harbor-Massachusetts Bay Environmental Trust (the "Trust") which is or will be a trust designed to coordinate and fund projects dedicated to restoration, protection, and environmental education for Boston Harbor and Massachusetts Bay."

Interview with Susan Ives, Consultant to the Executive Office of Environmental Affairs, March 25, 1988. Ms. Ives first developed the idea for the trust in a course taught by Professor Haar.

Master's report p. 125

Master's report, p. 128

MacDonald interview.

Lahey interview.

MacDonald interview.

Susskind and Cruikshank, 1987; Fisher and Ury, 1981.

Little, p. 473.

The firm of Envirogro was chosen to process sludge. Its contract with MWRA calls for ending all sludge dumping by 1991. Envirogro will also write bid specifications for constructing the plant where sludge is converted to pellets—a process patented by Environ-Gro—and will operate the plant. \textit{Boston Globe}, March 15, 1988 "Envirogro gets nod for Boston Harbor cleanup".

Little, p. 475

FOOTNOTE: CHAPTER FIVE

1 The passage of the California Coastal Act is detailed in Squire, Peverill and Stanley Scott. 1984. The Politics of California Coastal Legislation: The Crucial Year, 1976. Institute of Governmental Studies, University of California, Berkeley. Negotiations among key groups with a stake in coastal development were crucial to the ultimate success of the legislation. Although some construction and building trade groups did not actively support the bill, they adopted a conciliatory posture of no opposition.


3 Interview. Robert Craig, President, The Keystone Center, Keystone, Colorado. April, 1988. The Keystone Center also convened a dialogue to define "how clean is clean" to guide remedial work at hazardous waste sites. The product of that effort was incorporated in the Superfund Amendments and Reauthorization Act of 1986.

4 This case analysis is based on review of the literature, Massachusetts agency documents, and interviews with six key participants in shaping the legislation and regulation. The problem context and the discussion of the facilitated dialogue are derived from Susskind, Lawrence and Scott McCreary. 1985. "Techniques for Resolving Coastal Resource Management Disputes Through Negotiation." Journal of the American Planning Association 51(3):365-374. Earlier drafts of this case have been reviewed by Dennis Ducsk, William Lahey, and Barbara Ingrum, and their comments have been incorporated.

5 Susskind and McCreary; also Lahey, William. 1985. Waterfront Development and the Public Trust Doctrine. 60 Massachusetts Law Review.


7 Susskind and McCreary, 1985.

8 Interview with William Lahey, Formerly MCZM Staff Counsel, now Associate Attorney, Palmer and Dodge, March 10, 1988; February 28, 1989 (Hereinafter Lahey Interview)

9 Lahey Interview.

10 Lahey Interview.

11 Lahey Interview.


Lahey Interview.

Lahey Interview.


Lahey Interview.

Lahey Interview.

Lahey Interview. Members of the Tidelands Advisory Committee included Arthur Lane representing his steamship agency; Roy Tate from the Town of Scituate; Andrew Dominick, President of Cape Ann Amaiana Corporation; Richard Silva, Mayor of Gloucester; Lawrence Carr of Sasaki Associates; Attorneys Gregor McGregor; Norman Snow of the law firm Gaston Snow & Ely Bartlett; and Dunbar Lockwood of Lincoln Center.

Other members of the Tidelands Advisory Committee included Thomas Galvin of Massport; Robert Swain of the Bank of New England; Lorraine Downey representing the City of Boston Environment Department; Kelly McCloud of the Environmental Lobby of Massachusetts; Anthony Pangoro of Macomber Development Associates; Robert Braman of of Braman Engineering Company, Penny Levin of Marblehead, Attorney Stuart Becker; Dave Ross of Massachusetts Coastal Gunners; Daniel Greenbaum of Massachusetts Audobon Society; Donald Connors of Choate Hall & Stewart, Barry Ketschke of New England Power Service Company; Charles Cork of Davis, Malm, & D'Agostinostine, and William Spence of Mass Bay Lines.

Interview with Renee Robin, Formerly MCZM Staff Counsel, Executive Director, Public Space Partnerships, Harvard University, March 9, 1988; (Hereinafter Robin Interview).

Lahey Interview.

Interview with Dennis Ducsik, MCZM Tidelands Coordinator, MCZM, March 15, 1988 and April 25, 1988. (Hereinafter Ducsik Interview); Interview with Barbara Ingrum, MCZM Staff Planner, March 9, 1988; (Hereinafter Ingrum Interview).

Ducsik Interview.

Ducsik Interview, Clayton Interview.

Ducsik Interview.
Ducsik Interview, Ingram Interview.

Acts of 1986, Ch. 348 reamended.

Ducsik Interview.

310 CMR 9.00 Waterway Regulations Public Hearing Draft (December, 1986).

Ducsik Interview.

Memorandum to Reviewers from Gary Clayton, Division Director dated December 22, 1986. Public information sessions were held on January 12, January 15, and January 21, 1987; public hearings were held February 2, 1987 (Springfield), February 9, 1987 (Lakeville), and February 12, 1987 (Boston); Lahey Interview.

Lahey Interview.

Interview with Gary Clayton, DEQE, Division of Wetlands and Waterways, March 7, 1988 (Hereinafter Clayton Interview).

Ducsik Interview, Clayton Interview, Wallerstein Interview.

Wallerstein Interview. The draft regulations (p.80) contain this guidance regarding marinas: "The facilities of any marina located in Commonwealth tidelands shall be available for use by the general boating public. The maximum term of any contract or other agreement for exclusive use of any docking facility shall not exceed one year with the option of yearly renewal. The licensee shall provide a written procedure for fair and equitable assignment from a waiting list for use of vacant or new docking facilities. This procedure may be based on one or more of the following: 1. date of application; 2. lottery; 3. size and type of vessel; or other method deemed appropriate by the Department."

Ducsik Interview; Interview with Stan Wallerstein, Counsel to Waterways Action Committee, March 11, 1988; (Hereinafter Wallerstein Interview).

Wallerstein Interview.

Wallerstein Interview.

Ducsik Interview.

Wallerstein Interview.

Clayton Interview.

Wallerstein Interview.
The Special Advisory Committee on Recreational Boating schedule and agenda were as follows (Tentative Meeting Schedule June 15, 1987).

- June 11, 1987: water dependent use
- June 22, 1987: determination of project type
- July 7, 1988: utility and sanitary requirements; fee schedule
- July 21, 1987: assignment of moorings and slips; dockominiums
- July 28, 1987: term of licenses;
- August 11, 1987: public access; grace period
Ingrum Interview.

Lahey Interview.

Lahey Interview.

Ducsi Interview; DEQE/CZM Special Advisory Committee on Recreation Boating, Discussion Outline No. 6. Terms of Licenses for Recreational Boating Facilities. Typical maximum lease durations are 30 years in Maine, 49 years in California, and 55 years in Washington.

Ingrum Interview.

Arthur D. Little, Inc. 1985.

Ducsi Interview.

Ducsi Interview.

Robin Interview.
1 The analytic framework which has informed both the structure of the chapter and the design of the New York Bight Initiative has been developed over a period of fifteen years at the MIT-Harvard Public Disputes Program, principally by Professor Lawrence Susskind of MIT and his colleagues. These developments have been clustered in five areas:


A second area of inquiry has been to characterize the theory and practice of negotiated rulemaking. Important contributions have been made by Lawrence Susskind and and Jerry McMahon (1985) "Documentation of EPA's Non-Conformance Penalites (NCP) Negotiated Rulemaking Demonstration." Harvard University Program on Negotiation. 196p.; and Lawrence and Jerry McMahon (1985) The Theory and Practice of Negotiated Rulemaking. Yale Journal on Regulation 3:133-166.


2 Founded in 1831, the Academy had built a long and successful track record in convening scientific conferences, publishing a highly-regarded series of Annals and The Sciences, a monthly magazine. As a membership organization, the Academy also sponsored a series of "sections", much like the American Bar Association, to promote informal exchange of ideas.
Among these was a Science and Public Policy Section. Although the Section had met for years, the Academy had no staff dedicated to improving the interaction of Science and Public Policy until 1984.


7 Initially, the Academy team envisioned that the issue of sewage sludge disposal held promise as a more specific focus for facilitated dialogue and negotiation. In 1985, New York and several New Jersey suburbs barged sewage sludge from treatment facilities and dispose of it a site 12 miles offshore under an interim permit from EPA. EPA had sought to halt continued sewage sludge disposal at a site just outside New York Harbor, known as the 12-mile site in the New York Bight Apex. EPA contended that dumping was causing significant degradation of nearshore waters, and should end under the terms of the Marine Pollution, Research, and Sanctuaries Act.

When EPA acted under its guidelines and criteria to phase out dumping in 1981, the City sued EPA. The City argued that ocean disposal at the 12 mile site was the most feasible action. EPA, the City contended, had a responsibility to take a broader look at air and land disposal methods, and weight ocean disposal against those options. The City’s hired analysts contended that the only known effect of moving dumping from the 12 mile site would be a dramatic cost increase. The City further contended that sludge dumping represented only one of many waste streams introducing contaminants into the Bight Apex.

A legal ruling supported the City. Judge Abraham Sofaer ruled that New York could continue dumping until EPA acted on the City’s petition to commence site designation rule-making procedures, and it must decide on the City’s Special Permit Application. Although the City and EPA settled their differences later that spring, with the City agreeing to phase out dumping at the 12 mile site by December 31, 1987, the core disputes over management of the Bight remained very real. The task of examining the sludge controversy acquainted the NYAS with a broad array of science-intensive issues central to use and management of the Bight. These include suitable disposal of contaminated dredged material, management of contaminated fisheries, and coping with algal blooms that cause periodic "green tides". The initial reconnaissance and proposal writing convinced the Academy that it could play a useful role.

The procedure used to recruit participation is described later in this chapter.


The key discussants in shaping the program were Program Director Janice Perlman, Co-Director Marc David Block, Program Consultant Scott McCready, and Donald Straus, a senior advisor to the Science and Public Policy Program. This exchange is discussed later in the chapter.

Another important task the Academy faced in its startup phase was to distinguish its credentials from two good government groups promoting a "bi-state institutional arrangement to promote better management of the Bight". These groups, Citizens Union Foundation and the New York City Citizens' Advisory Committee on Environmental Policy were represented by Robert Alpern and Eugenia Flatow. Flatow and Alpern had been active in water quality issues in the metropolitan region for several years. These two activists were generally supportive of the Academy's involvement. In fact, they were instrumental in recruiting participation for the Academy's first meeting. But after the initial meeting, Flatow and Alpern insisted that the Academy's funding proposals to the coastal programs of New York and New Jersey be coordinated with their own plans.

The Academy envisioned convening a set of dialogues with a consistent participation focusing on a single issue. Flatow and Alpern proposed a series of "public outreach" seminars on multiple topics hosted by regional universities. Since the Academy needed the support of the coastal programs, the NYAS team engaged in a concerted effort to distinguish its role and credentials from those of Flatow and Alpern. These efforts were successful, but the interaction with Flatow and Alpern consumed months of time in late 1985 and early 1986.

The coastal programs of New York and New Jersey used the Academy's proposal as the basis for a joint grant request through a competitive grant round under Section 309 of the Coastal Zone Management Act. These "309" grants are intended to promote bi-state cooperation. This grant was successful.
The concept of a single negotiated text is well explained in Roger Fisher and William Ury (1978) *International Mediation: A Working Guide—Ideas for the Practitioner*. They credit initial development of the idea of the single negotiating text to Dr. Louis Sohn, now an emeritus Professor of Political Science and the Georgia Institute of Technology. Fisher and Ury explain:

Several alternative negotiating procedures are based upon the development and improvement of a single negotiating text to which nobody is committed but to which all might become committed later, depending on what happens. The essence of the procedure is to prepare a discussion paper of some kind which blocks out the lines of an agreement, and then to go through a series of sessions in which the mediator (who may be the chairman or rapporteur of the group listens to criticisms and suggests improvements. Through a series of such discussion and revisions the document gradually becomes a single illustrative draft text of a complete agreement.

Fischer and Ury suggest a number of ways in which such a single text can be prepared:

The parties may be asked to prepare lists of "subjects and issues" to be dealt with in an agreement, and then through of discussion of these lists, the mediator may prepare a single list of topics to be covered by the agreement. Alternatively, a mediator himself may suggest in writing various ways in which differences might be dealt with. After hearing responses to such a paper, he might prepare the first version of a single text. Another possibility is to have outside experts on nonpartisans develop an initial working draft. During the revision of the text would be expected that the mediator would sometimes meet jointly with the parties and sometimes have separate meetings with one party alone.


The Academy team felt strongly that "imposing" an issue on the group would undermine the Academy's credibility as a neutral convenor. But the mechanism suggested by the NYAS—to have working teams of negotiators draft memos nominating issues and submit them to a steering committee for discussion—did not win support. Rather, key Bight stakeholders expressed a strong desire to see the Academy, in consultation with key agencies, better define the problem focus. Participants also urged the Academy to scale back the proposed scope and duration of the project from twelve months to five months in order to reduce the demand on staff time asked of key agencies.

With funding from the William and Flora Hewlett Foundation, the Academy completed about 100 interviews with users and managers of the Bight. These interviews, based on a mix of open-ended and close-ended questions, were intended to illuminate the diverse interests with a stake in the Bight and to help set an agenda for negotiation. Some of the questions focused on the ecological status of the Bight; others focused on identifying some of the obstacles to timely and effective use of scientific information. Still others asked respondents to rank the most pressing issues in the Bight. These are described a bit later on.


Variations on the initial and revised proposal were sent to a total of 14 prospective funders. Response was very positive. The Office of Coastal Resources Management agreed to the joint proposal of New York and New Jersey. Private funders included the Port Authority of New York and New Jersey, the Towboat and Harbor carriers, the Exxon Foundation. Agency funders included the New York City Department of Environmental Protection, the Interstate Sanitation Commission, and Long Island Regional Planning Board. Eleven organizations (in addition to the Hewlett Foundation) agreed to fund the Bight Initiative. Altogether, the NYAS raised $65,000 from external sources, and the Academy agreed to contribute a like amount to cover staff time. Organizations that declined to fund the Initiative were the Hudson River Foundation, the New York Sea Grant Program, and the Regional EPA.


Appendix E presents excerpts from findings.

The single text document was published in May, 1989.


Tasto interview; Cotter interview; Koehler interview.

Tasto interview; Cotter interview; Koehler interview; Interviews with Mel Wax, Port of Oakland, Oakland, California, July 12, 1988; and Brian Wall, U.S. Corps of Engineers, San Francisco, California, July 12 and September 10, 1988.

Wax interview; Wall interview; Koehler interview
Interview with William Lahey, Attorney, Palmer and Dodge; formerly General Counsel, Massachusetts Coastal Zone Management, Boston, Massachusetts, March 10, 1988.

Lahey interview.

Lahey interview.


Lahey interview; interview with Dennis Ducisik, Tidelands Coordinator, Massachusetts Coastal Zone Management, Executive Office of Environmental Affairs, Boston, Massachusetts, March 15 and April 25, 1988; interview with Barbara Ingrum, Coastal Planner, Massachusetts Coastal Zone Management, Executive Office of Environmental Affairs, Boston, Massachusetts, March 9, 1988;

For an a discussion of procedures and principles for recruiting participation, see Lawrence Susskind and Jeffrey Cruikshank, Breaking the Impasse. New York: Basic Books.

This account is based on a synthesis of the author's first hand experiences as a participant observer, various internal memoranda and meeting summaries. A more detailed discussion of the New York Bight Initiative can be found in a report prepared by the author for the American Academy of Arts and Sciences, "Resolving Science-Intensive Public Policy Disputes: Lessons from the New York Bight Initiative".

The interviews included questions on respondents' roles in use and management of the Bight; their perception of the degree of stress present in the Bight and the Bight Apex; and their view of the most pressing Bight issues. They were also asked how the issue they viewed as most pressing might be solved. The results were reported in New York Academy of Sciences, Science and Decision Making Program. New York Bight Initiative. "Findings from Stakeholder Interviews and Surveys." New York Bight Initiative. July, 1986.

The nine categories of stakeholders were: 1) environmental and health organizations; 2) waste management organizations; 3) commercial and recreational fishery and wildlife organizations; 4) waterfront development, port, and navigational interests; 5) recreational organizations; 6) mineral resources; 7) business and industry organizations; 8) regional marine science programs; 9) elected officials and staff. Within the first eight categories, the list was grouped into non-governmental organizations, and federal, state, and local organizations.

For instance, building the extended roster helped make clear the coalition between recreational users and environmentalists.

The fact that the NYAS asked interviewees for their suggestions demonstrated Academy mediators were listening actively, and taking suggestions seriously.
Results of the survey were as follows: A total of 71 ranked questionnaires were returned to the Academy in which respondents ranked ordered the top five Bight issues from a list of 23 issues. No single issue emerged as the unanimous choice, but five issues were mentioned by over half of the respondents. As shown below, question of assessing risks to the environment posed by contaminants topped the list. Human health risks and contamination contribution by source were also major concerns.

<table>
<thead>
<tr>
<th>Issue</th>
<th>No. Respondents</th>
<th>Percentage of Total Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessing Risks to the Environment Posed by Contaminants</td>
<td>43</td>
<td>61%</td>
</tr>
<tr>
<td>Assessing Risks to Human Health Posed by Contaminants</td>
<td>38</td>
<td>54%</td>
</tr>
<tr>
<td>Establishing Contaminant Contribution by Source</td>
<td>38</td>
<td>54%</td>
</tr>
<tr>
<td>Managing Dredged Material Disposal</td>
<td>36</td>
<td>51%</td>
</tr>
<tr>
<td>Strengthening the Information Base for Bight Decision Making</td>
<td>36</td>
<td>51%</td>
</tr>
</tbody>
</table>

Ports interests asked for three conditions 1) the precise topic for single text negotiation must be one for which a considerable body of scientific information existed; 2) the Academy must persuade local environmentalists to come to the table; 3) Academy mediators had to agree to lead the group to concrete recommendations and not just more research. The Academy felt it could deliver on all three of these simple preconditions for port participation.

The NYAS worked out an arrangement whereby a senior analyst for the Rahway Valley Sewarage Authority, one of the ocean-dumping municipalities, would represent the interests of the New Jersey Association of Sewerage Authorities.

Next, the Academy approached the Oceanic Society, another Washington-based organization with a strong track record in ocean and estuarine issues. Although an Oceanic Society lawyer later attended one meeting at the Academy, acute shortages of staff time precluded the organization's full participation.

As will be discussed later in this chapter, EDF's handling of participation created problems towards the end of the Bight Initiative process.

The procedure used to narrow the agenda was discussed previously.
Some agency staff threatened not to participate if this individual took part in the meetings. Others warned that he would be disruptive and alienating. The NYAS team solved this problem by meeting with the individual on his home turf for several hours.

The NYAS worked hard to keep the Commercial Fishermen well informed by sending out summaries of every meeting and by keeping in close contact by telephone.

The meeting with the toxicologist in Washington and subsequent events are described more fully later in this chapter.

Still another problem arose when a representative of the Rahway Valley Sewerage Authority left her job to take a position with private industry. Since her participation was considered "above and beyond the call of duty" by her parent organization, no successor was appointed. However, representatives of two other wastewater management agencies remained active—the Interstate Sanitation Commission and the New York City Department of Environmental Protection.

See, for instance, Lawrence Susskind and Jeffrey Cruikshank. Breaking the Impasse New York: Basic Books; Roger Fisher and William Ury Getting to Yes. [fix format]

Interview with Barbara Wrenn, Virginia Department of Natural Resources, Richmond, Virginia, June, 1988.

Hershner interview.

In my interview, Hershner reported: "As VIM's designated scientific advisor to the state, I was present [at the legislative hearings] but my professional opinion wasn't asked. There was no consideration of what's scientifically reasonable. Trading a natural non-tidal wetland for a manmade pond/detention basin represents a net loss of ecological value. That's the bottom line."

Hershner interview.

Cotter interview.

Koehler interview.

Wax interview; Wall interview.

Wall interview.

Wall interview.

Cotter interview.

Cotter interview; Koehler interview; Wall interview.

Koehler interview.
Wax interview.

Interview with William Golden. Formerly Attorney, City of Quincy, Currently Massachusetts State Senator, April 10, 1988; Interview with Peter Koff; interview with Peter Koff, Attorney, City of Quincy, April 7, 1988.


Sloman interview.

Interview with Peter Shelley, Attorney, Conservation Law Foundation, Boston, Massachusetts, April 5, 1988.

Lahey interview.

Lahey interview; Ducsik interview; Ingrum interview.

For a discussion of the role of scientists in joint fact finding, see Lawrence Susskind and Jeffrey Cruikshank Breaking the Impasse. New York: Basic Books.

The author's first-hand observations and notes are the basic source for this account of the recruitment and involvement of scientists in the Bight Initiative.


Letter from New York Academy of Sciences to Dr. Joseph O’Connor regarding participation in the New York Bight Initiative, December 15, 1986. The basic text of that letter was as follows:

Thank you for agreeing to serve as a technical advisor as part of our New York Bight Initiative. The basic premise of the Initiative is that direct communication among scientists, agency staff, and interest groups can improve the use of scientific information in decision making. Your charge will be to give a 20-30 minute overview of current scientific information on sources of PCBs in in the marine environment. Your presentation should cover your own work as well as your knowledge of current scientific literature.

The goals for the January meeting will be to frame current understanding of PCBs and set a narrower agenda of questions that require in-depth investigation in structured dialogue among scientists, policy makers, and representatives of key interest groups. This narrowing of issues will help us ensure that we can accomplish significant progress in the five months we have.
"Should you agree to participate, your charge would be twofold. First, we would like you to make a concise 20 minute presentation. Your presentation should begin with major findings of your research. Then, you should try to suggest what your findings reveal about major management problems relative to coping with PCBs in the Hudson-Raritan Estuary and New York Bight system. Second, you should expect to answer questions in a dialogue with approximately 25 "core group" members. Since core group members are all laypersons, you should take care to make the presentation accessible. Joint fact finding and information sharing will set the stage for later face-to-face negotiation on appropriate policy responses to coping with PCBs.

"The August workshop will have two major objectives: 1) refining management options developed at the July 26 meeting; 2) refining sections of the draft text on biological effects. Your greatest contribution will probably be in helping the group refine and critique management suggestions, and in offering an overview of New Bedford Harbor for comparative purposes."

"You should be forewarned that the group is a contentious one, and in the words of one scientific advisor "a bunch of prima donnas". Some individuals will no doubt take pains to point out how New Bedford and the Hudson/Raritan-Bight are different. But do not let this dissuade you from participating fully."

Hershner interview; Snead interview.

Interview with John Keeling, Prinicipal Lobbyist, Virginia Farm Bureau, Richmond, Virginia, June 8, 1988.

Harold interview.

Wall interview.

Wall interview; Wax interview.

Koehler interview; Harbor master interview.

Wall interview.

Letter from Alan Ramo, Executive Director, Citizens for a Better Environment to Division Engineer Patrick Kelly, May 24, 1988.

Shelley interview.

Lahey interview; Wallerstein interview; Ducsik interview; Ingram interview.

For an account of joint fact finding, see Lawrence Susskind and Jeffrey Cruikshank (1987) *Breaking the Impasse*. New York: Basic Books

The author's first-hand observations and notes are the basic source for this account of the efforts to handle scientific disagreement and uncertainty in the Bight Initiative.


New York Academy of Sciences—New York Bight Initiative. Meeting Summary, February 19, 1987. Among the definitions developed in structured dialogue were the following:

**SOURCE**
Place from which a flux occurs.

**FLUX:**
Movement of PCBs at some rate; mass of PCBs that passes a given rate per unit of time.

**LOSS:**
Negative flux from the Hudson/Raritan-New York Bight system by any means.

**VOLATILIZATION**
Conversion from liquid or solid to gas or vapor state; process by which PCBs enter the atmosphere.

**UPPER HUDSON**
That portion of the Hudson River above the Troy locks to at least as far up river as Fort Edward; that portion of the Hudson River above the extent of tidal influence.

**GENERAL ELECTRIC DISCHARGES**
Water discharge containing PCBs from General Electric plants at Hudson Falls and Fort Edward. Discharges formerly occurred at these two plants; now the only discharge is from the Fort Edward plant through a water treatment facility.

**PCBs**
Polychlorinated biphenyls; a group of chlorinated organic compounds that persist in the environment and accumulated in biota; PCBs were manufactured for industrial uses, especially for electrical equipment because of their heat transfer properties and low combustibility.
PCBs were used widely in chemical applications during the 1960s. Later, Monsanto started using PCBs only for electrical equipment and other uses of PCBs were curtailed. In a sense, Monsanto was the original source (manufacturer) of PCBs. GE was among the companies that bought the product and manufactured equipment which used PCBs. This equipment subsequently discharged PCBs into the environment.

TRANSFORMERS and CAPACITORS. Capacitors contain free fluid. PCBs were previously used to prevent transformer fires. Storage yards for used electrical equipment or spills from equipment in service are both sources of PCB contamination in the environment. There are many PCB-filled units still in use.

91: New York Academy of Sciences—New York Bight Initiative. Meeting Summary, February 19, 1987. Another key finding was: "Potentially significant loadings—such as industrial discharge, sewage treatment plant (STP) effluent, combined sewer overflow and urban runoff—are not adequately measured."


STEVEN: Should this information be included in our text?

COX: That’s what I’m concerned about now. There are thousands of publications out there now and ....

CURRILL: It seems to me that we shouldn’t start listing studies. Should Weis’s report be included in the text? No.

WEIS: I was asked to draft text about biological effects. The text needs to be accurate about what’s in the literature.

WILK: Some evidence [of PCB effects on fish and invertebrates described in laboratory studies] is not conclusive but it is suggestive.

COX: We can write that we considered the above-listed studies, and conclude they are not so important to our needs.

LUTZIC: If we leave out this information, it demeaned our report. If we don’t include it, someone will think you were trying to avoid it and deliberately trying to slant the material.

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WEIS: A summary would be appropriate: "Thus, in laboratory studies, deleterious effects of PCBs on reproductive habits have occurred at levels of 1 ppb or less. European field studies of flatfish and seals strongly suggest that PCBs are responsible for reproductive impairment. However, in the Hudson River, there are no data that conclusively relate PCBs to reproductive impairment."

Dr. Joseph O'Connor, another scientific advisor, helped the group out of the jam by suggesting some alternate language.

O'CONNOR: Consider an excerpt from the recent NOAA report on PCBs in Atlantic Bluefish:

Despite laboratory evidence describing PCBs as highly toxic at low concentrations there are few published data showing evidence of ecological effects due to PCBs in natural systems. However, some studies provide evidence that PCB effects in natural systems may be subtle and difficult to isolate from the effects of other environmental contaminants. We know of no data demonstrating that PCBs in natural environments are the direct cause of chronic or acute toxicity.

WEIS: I must take issue with this last statement. That assertion makes light of good correlations between some of the lab studies and European field studies of flatfish and the study of seals. A fair, even-handed treatment must mention these items. Then, the text should note that these effects were not shown in the Hudson. I could live with that.


Negotiators also came to agreement around two high priority research items to help deal with technical uncertainty: to conduct a tiered study of PCB movement through the sediment and water column of the Hudson/Raritan Bight system, and to document congener-specific research on the movement of PCBs through various environmental compartments, including edible seafood and other selected biota.
Brooks (1984) has argued that classifying viewpoints as technological optimists versus technical pessimists often fails to capture the essential disagreements in a debate over a technically-intensive issue. The experience of the Bight project showed that technological optimism is contextual. A parallel situation arose in the dredging case, environmentalists were optimistic that new technologies could be found to augment traditional radar, while Port interest were skeptical that dredge spoil could safely be moved to the outer continental shelf.

Excerpts from the dialogue are as follows:

COX: Ten years ago, ozone generators posed an occupational hazard when we used ozone technology for sewage treatment.

CRUMPET: That was ten years ago. Now, ozone is generated commercially. Exit gases are treated to remove residual odor.

CURILL: I'm not sure these processes could be used for treating known hot spots. We have to define hot spots before we choose a technology. By the time this estuarine area is ready to consider a technology, the technology will have advanced beyond what we have discussed today.

LIJZIC: But we need to discuss these alternatives with reference to the technology as it exists today and how we address this issue in the text.

COX: If we recommend this, then are we creating expectations from the public?

PHELPS: Some of you have tunnel vision related to treatment technologies. These are being considered for New Bedford Harbor. It won't hurt to be acquainted with decontamination technologies.

COX: If we recommend any technology, it will get pulled out of context.

LIJZIC: I think we can worded it so that that won't happen. All we have to do is explain very carefully, in the text, what we mean when we make a recommendation.

WEIS: I feel that we can write a document that is very clear.

COX: I have twenty years' experience of being distorted.

WEIS/SANDERS: We should not exclude this information altogether. Surely we can write something that with appropriate caveats without endorsing the technology.
CURLL: I want to expunge this statement: "In Mr. Carpenter's view all three of these technologies could be easily adapted to sediments in estuarine environments". I'm worried that some local politician will pick this up and say that small dock owners would need to use expensive technology to clean up dredged material.

LUTZIC: Carpenter explained that these technologies work with fresh water sediments and are less effective with salt water. So there is no danger of including this statement in the document.


A related drafting strategy was to express the uncertainties associated with forecasts of risk. For instance, Finding #1 under "Carcinogenicity and Pathways to Humans" explained:

EPA uses a conservative upper bound risk model; the actual risk may be less. The overall lifetime risk of cancer for all causes is 350 per 1000 people and the death rate from cancer is 200 per 1000 people.

Finding #10 stated:

Critics of EPA's methods—including many respected health professionals—point out that extrapolating linearly (as in EPA models) may be much too conservative. Specifically, they criticize extrapolating from very high doses—such as the maximum tolerated doses—to low dose human exposure even for those carcinogens that are mutagens. Such analysts suggest that the agency should present an array of slopes to show maximum, most probable, and minimum risks for PCBs. In this way, a sensitivity analysis on their data could be provided. (Cox, 1988). However, EPA counters that at present, no methods are available to enable this sort of sensitivity analysis.

The text went on to explain: (Finding #13, Carcinogenicity and Pathways to Humans).

EPA's methods reflect the consensus view of several respected scientists in the regulatory and scientific communities. They are consistent with recent findings of the Office of Science and Technology Policy, which stated that when the precise mechanism of cancer induction is not known—as with PCBs—then a straight line projection is a reasonable and prudent method to use. The rationale—that "it is reasonable, for practical purposes, to regard an agent for which there is sufficient evidence of carcinogenicity in animals as presenting a carcinogenic risk to humans"—reflects the views of the International Agency for Research on Cancer (IARC), World Health Organization

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107 Snead interview; Harold interview.

108 Snead interview; Harold interview.

109 Koehler interview.


111 Interview with Douglas MacDonald, Attorney, Palmer and Dodge, Boston, Massachusetts, March 26, 1987; Shelley interview.
Shelley interview; Long Term Scheduling Order

Ingrum interview; Ducsik interview.

Ingrum interview; Ducsik interview.


As Susskind and Cruikshank [1987:145] point out in *Breaking the Impasse*: describe the process of inventing options. This is examined furthr in Chapter 7.

The complete list of management options included in the packets for the July 21, 1987 workshop is as follows:

**TENTATIVE MANAGEMENT OPTIONS PRESENTED FOR DISCUSSION**

1. Principle: Find strategies to reduce PCB content below 2 ppm [the FDA standard] in edible fish so that these fisheries can be reopened.

2. Principle: Understand and work to eliminate the synergistic interaction to PCBs, other chemical compounds (such as dibenzofurans, and dioxin) and other causes of disease.

3. Adoption by of New York and New Jersey unified health advisories to limit bluefish consumption by recreational fishermen.

4. Revisit the 2ppm FDA standard.

5. Explore the reduction of PCBs from sewage treatment plant effluent using new technologies such as ozone, UV light, and reverse emissability.

6. Adoption by New York and New Jersey New York and New Jersey of unified testing procedures to measure PCBs in bluefish, striped bass, and other fish.

7. Buy out equipment containing PCBs: electrical equipment and white goods (such as refrigerators).

8. Dredge "hot spots" in the harbor or estuary and dispose of PCBs with incineration or other new technologies.

9. Shift from maintenance dredging of selective channels that accumulate PCB-laden silt to dredging new channels.

10. "Compare notes" with managers of other urban estuaries such as Chesapeake Bay, Boston Harbor, and New Bedford Harbor.
Pros:
1. Uniform procedures would present resource users and managers with a clearer idea of the problem (Cindy Zipf, Clean Ocean Action).
2. Uniform procedures are needed to create a rational management environment (David Berkovits, Port Authority).
3. Uniform testing procedures set the stage for a uniform response. This is simply a technique—though an important one—that leads to a decision. Joint action on guidance for fish consumption would be even more useful. (Gene Flotow, NYC Citizens’ Committee on Environmental Policy).
4. It would be useful to pick up reports and know results are comparable (Joseph O’Connor, NYU Medical School).

Cons:
1. Cost is a major obstacle. Remember, different agencies have different mandates. This gives rise to different procedures (Berkovits).
2. Quality assurance is a problem; not all labs have equal track records.
3. Creating uniform procedures represents a shift in the way testing has been done. This is in itself a major stumbling block.

Specific Details to Make the Option Workable
1. Securing an agreement to archive samples in a consistent manner would be a useful first step. To appreciate the value of this approach, imagine samples taken to measure DDT levels in fish and wildlife had been saved. Regrettably, with the exception of federal bluefish samples, only stored samples have been preserved in an inappropriate manner.

2. The geographic origin of the samples would have to be defined. (Miguel Padilla, New York State DEC).

Information or Point of View Needed to Make a Sound Recommendation
1. Key contacts are Tom Belton, New Jersey DEP; Ed Horn, NYSDEC; Jim Gilford, EPA; Stuart Wilk, NMFS.

2. It might be useful to start with states, but we shouldn’t single out just New York and New Jersey. Seek an Eastern seaboard consortium. Maybe we shouldn’t single out striped bass. Uniform testing procedures for a consortium of East coast states would be a good idea.
Would Option be Acceptable if Packaged With Another Option?
This option is acceptable in and of itself.

Does This Option Warrant Further Attention?
Definitely


120 One advisor present at the meeting was Ben Carpenter of Research Triangle Institute who had authored "PCB Sediment Decontamination Processes: Selection for Test and Evaluation". Research Triangle Institute prepared for EPA's Hazardous Waste Engineering Laboratory, Cincinnati, Ohio.

121 Also present were Judith Weis of Rutgers University and Lawrence Skinner of New York State DEC.

122 The caucuses were drawn as follows:

- EPA (Water Division, Marine Programs, Enforcement);
- New Jersey DEP (Planning, Coastal Management, Science and Research);
- Fisheries and Wildlife Interests (National Marine Fisheries Service, U.S. Fish and Wildlife Service, New York State Commercial Fishermen's Association);
- New York State Environmental Management Agencies (New York State DEC, New York State Coastal Program);
- Wastewater Managers (Interstate Sanitation Commission/New York City Department of Environmental Protection); Long Island Regional Planning Board added to caucus;
- Environmental Groups (Clean Ocean Action, EDF, American Littoral Society);
- Environmental/Good Government Groups (Citizens' Union Foundation; New York City Environmental Policy Forum);
- Ports (Port Authority of New York and New Jersey, Towboat and Harbor Carriers Association, and Maritime Port Council)
- Electrical Equipment and Chemical Manufacturers (GE, Monsanto, Chemical Manufacturers Association).

123 Recognizing the size and diversity of EPA and New Jersey DEP separately, the NYAS chose to meet with them separately in order to promote a specific discussion about the single text among the divisions that had a stake in the recommendations or would have a hand in ratification.
New York State environmental agencies offered positive comments. The Coastal Program pointed out that while the New York State DEC representative to the Bight Initiative had strong policy analysis skills, but urged the Academy to engage agency scientists in review of the draft document.

Predictably, fisheries interests focussed their comments on issues related to their mission and mandate. The NMFS representative was pleased that the NYAS draft went further than an earlier $900,000 NMFS study in its recommendations for better environmental sampling and more specific steps for source reduction.

The representative of commercial fishermen observed that the overall discussion had sometimes been too technical to follow. But they pointed out that since there are over 200 congeners (chemical forms) of PCBs, they endorsed congener-specific testing which, they predicted, would show that the chemical forms of PCBs shown to cause cancer in rats were not present in striped bass. He supported the recommendation that consistent testing of PCB levels in striped bass ought to continue.

New York City DEP had long shouldered criticism for continued sludge dumping at the 12-mile site in the Bight Apex, was anxious to have the single text reflect the fact that dumping was slated to be phased out beginning December, 1987. DEP representatives also sought clarification that sewage treatment plants, while they may not remove all trace amounts of toxics, do not typically add to the waste stream.

Clean Ocean Action and the American Littoral Society, though generally positive about the draft recommendations, were adamant that the single text not become a "port and industry synthesis" by understating the severity and importance of PCB contamination.

Port interests were conciliatory. They expressed the view that while they had been initially skeptical of the process, they felt it would yield an even-handed and scientifically sound product.

The study they referred to was Massachusetts Department of Public Health, Massachusetts Health Research Institute, and U.S. Centers for Disease Control. 1987. The Greater New Bedford PCB Health Effects Study 1984-1987.

New Bedford Harbor and the Acushnet Estuary were closed to fishing in 1979. The study suggested that the low levels were due to a combination of the ban on open uses of PCBs and the closure of New Bedford Harbor to fishing. The study recommends continuation of the fishing ban, and urges residents not to consume recreationally caught seafood from the area.

Another industry comment was that while the regulatory matrix as an accurate and concise way to present information, but urged the Academy to delete a 12-page appendix describing the regulations. They suggested that the Academy might assume a liability problem if they didn’t delete the Appendix.
In all, five versions of the text were developed:

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<td>Second</td>
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<td>Third</td>
<td>Oct. 10, 1987</td>
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<td>Fourth</td>
<td>Oct. 27, 1987</td>
<td>Reflected Outcome of Final Meeting and Additional Mediator Shuttle Diplomacy</td>
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146 New York Academy of Sciences. Managing PCBs in the Hudson/Raritan Estuary and the New York Bight p. 44.


150 Snead interview; Hersher interview; Harold interview.

151 Koehler interview.

152 Lahey interview; Dusik interview; Ingrum interview.

153 Interview with Cheryl Breen, Deputy Secretary of Executive Office of Environmental Affairs for Boston Harbor, Boston, Massachusetts, April 26, 1988; interview with Tom Markham, Office of Intergovernmental Affairs, Boston, Massachusetts, April 27, 1988.


As Susskind and Cruikshank explain, [1986:127] during the ratification phase, representatives must now return to their constituents and ask,

This is the final draft of the agreement. Do you support it? Are you willing to have me sign it on your behalf? Or in some cases, 'Are you each willing to sign it.'

155 The New York Academy of Sciences eliminated funding for the Science and Decision Making Program in October, 1987. Marc David Block and Scott McCreary continued working gratis through January, 1988. After January, Scott McCreary was the sole member of the mediation team working to carry the effort through the ratification phase.

156 See Susskind and Cruikshank for a discussion of ratification.
See Figure 6.3 for a list of ratifying organizations.

The actual letter of ratification was signed by William Evans, the Director-designate of NOAA, NMFS' parent agency within the Department of Commerce on January 15, 1988.

This caveat read in part: "We do not necessarily agree with all the findings and conclusions of the cited articles or personal communications and by ratifying the Document, the Department specifically retains the right and responsibility to conduct future information gathering, analysis, and policy development to resolve PCB-related problems. Accordingly, the Department reserves the right to assert positions which differ from those set forth in the document."

The New Jersey Department of Environmental Protection, the New York State Bureau of Coastal Resources and Waterfront Revitalization, and the New York State Department of Environmental Conservation used some form of this caveat in their ratification letters.


Personal communications with Geraldine Cox, CMA; Bryce MacDonald, General Electric; and Paul Michael, Monsanto, November 1, 1988.

As Susskind and Cruikshank [1987:129] observe: "Agreements in principle are valuable because they make it possible to avoid another full round of review—assuming of course that minor changes can be agreed on by the participants without further need to touch base."

The mediator was optimistic that the meeting could at least narrow areas of disagreement. The meeting was open to all Bight stakeholders, but none aside from industry participants chose to attend. He also speculated that since all four the participants held doctorates in the sciences, they would probably reach a common perspective by virtue of a shared background.


Personal communication from Heinz Pagels, Executive Director, New York Academy of Sciences, to Scott McCreary, February 20, 1988.

After CMA declined to ratify, the mediator sought advice from other professionals in the mediation and industry-governmental relations field. He described CMA's position to Jerry Prout, External Affairs Officer to Procter and Gamble, a major CMA member. He asked other participants to speak to Cox on his behalf. Finally, he contacted the Director of the Keystone Center and asked for advice and possible intervention with CMA. Both were sympathetic but had no firm suggestions.

Memorandum from Leslie Mooney, New York Academy of Sciences to Marc Block, Scott McCreary and Heinz Pagels: "Lucy from Ellen Silbergeld's office called to say that EDF will sign on to the NY Bight Initiative", December 22, 1987. Later, Ellen Silbergeld said she knew nothing of the message.

Letter from Ellen Silbergeld and Dianne Fisher, Environmental Defense Fund to Scott McCreary, February 16, 1988 re: decision not to ratify the text.

Letter from Ellen Silbergeld and Dianne Fisher, Environmental Defense Fund to Scott McCreary, February 16, 1988 re: decision not to ratify the text.
Letter from Paul Michael, Monsanto Corporation to Scott McCreary, April 6, 1988.

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Letter from Paul Michael, Monsanto Corporation to Scott McCreary, April 6, 1988.

Personal communication from Nick Stevens, Interstate Sanitation Commission to Scott McCreary; similar comments were received in telephone conversations with Ed Wagner of New York City DEP and Dan Curll of the Towboat and Harbor Carriers Association.

Letter from Steve Hamilton, Manager, Environmental Health and Technology, General Electric Corporation to Heinz Pagels, Executive Director, New York Academy of Sciences, April 21, 1988 re: decision not to ratify single text.

In a follow up conversation with Scott McCreary on April 26, 1988, Steve Hamilton explained that GE had concluded that they just couldn’t live with some passages that had been agreed upon by the other parties. Hamilton added that Vice President Roger Strelow had directed him not to spend any more time on the Academy’s project.

Letter from Steve Hamilton, Manager, Environmental Health and Technology, General Electric Company to Heinz Pagels, Executive Director, New York Academy of Sciences, April 21, 1988

Letter from Steve Hamilton, Manager, Environmental Health and Technology, General Electric Corporation to Heinz Pagels, Executive Director, New York Academy of Sciences, April 21, 1988


Letter from Roger Strelow, Vice President, Corporate Environmental Programs to Scott McCreary, May 26, 1988 re: decision not to ratify single text.

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Letter from Roger Strelow, Vice President, Corporate Environmental Programs to Scott McCreary, May 26, 1988 re: decision not to ratify single text.

Letter from Chris Daggett, Regional Administrator, Environmental Protection Agency, to Scott McCreary, March 7, 1988 re: ratification of the single text.


Letter from Langdon Marsh, Deputy Commissioner, New York State Department of Environmental Conservation, to Scott McCreary, July 26, 1988 re: ratification of the single text; Letter from Richard Dewling, Commissioner, New Jersey Department of Environmental Protection to Scott McCreary, April 4, 1988 re: ratification of the single text.

Letter from Lee Koppelman, Long Island Regional Planning Board, to Scott McCreary, November 12, 1987 re: ratification of the single text. The Board did not change its position on ratification even though subsequent versions of the text were produced.

Letter from Harvey Schultz, Commissioner, Department of Environmental Protection, to Scott McCreary, January 5, 1988 re: ratification of the single text.

Letter from Langdon Marsh, Deputy Commissioner, New York State Department of Environmental Conservation, to Scott McCreary, July 26, 1988 re: ratification of the single text.

Letter from Stephen B. Hamilton, Manager, Environmental Science and Technology, to Heinz Pagels, Executive Director, New York Academy of Sciences April 21, 1988 re: decision not to ratify the single text.

Letter from Paul Michael, Monsanto Corporation to Scott McCreary, April 6, 1988. Portions of his letter stated:

Letter from Ellen Silbergeld and Dianne Fisher, Environmental Defense Fund to Scott McCreary, February 16, 1988 re: decision not to ratify the text.
Letter from William Evans, Assistant Administrator, National Marine Fisheries Service to Scott McCreary, January 15, 1988 re: ratification of the single text.

Letter from Lee Koppelman, Director, Long Island Regional Planning Board to Scott McCreary, November 12, 1987 re: ratification of the single text.

Letter from James Kirk, Director, Port Development, Port Authority of New York and New Jersey, to Scott McCreary, April 21, 1988 re: ratification of single text.

Letter from Richard Dewling, Commissioner, New Jersey Department of Environmental Protection to Heinz Pagels, April 4, 1988 re: ratification of the single text.

Letter from Cindy Zipf, Coordinator, Clean Ocean Action to Scott McCreary, April 1, 1988 re: ratification of the single text.

Letter from Richard Dewling New Jersey Department of Environmental Protection to Heinz Pagels, April 4, 1988 re: ratification of the single text.

Letter from Chris Daggett, Regional Administrator, Environmental Protection Agency, to Scott McCreary, March 7, 1988 re: ratification of the single text.

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Letter from James Kirk, Director, Port Development, Port Authority of New York and New Jersey, to Scott McCreary, April 21, 1988 re: ratification of single text.

Letter from Harvey Schultz, Commissioner, Department of Environmental Protection, to Scott McCreary, January 5, 1988 re: ratification of the single text.


Letter from Gail Shaffer, Secretary of State on Behalf of New York State Coastal Program to Scott McCready, April 19, 1988 re: ratification of the single text.

Letter from Stephen B. Hamilton, Manager, Environmental Science and Technology, to Heinz Pagels, Executive Director, New York Academy of Sciences April 21, 1988 re: decision not to ratify of the single text.

Letter from Ellen Silbergeld and Diane Fisher, Environmental Defense Fund to Scott McCready, February 16, 1988 re: decision not to ratify single text. The letter read in part "While it is now mostly factually correct, it still reads as if it were written by someone unfamiliar with the field, who has heroically attempted to accommodate the views of others".

For instance, Alan Mytelka, Director of the Interstate Sanitation Commission wrote: "I want to recognize and thank you and Marc David Block for investing your considerable skills and efforts in successfully leading the many diverse organizations and interests to arrive at a significant final product"; Lee Koppelman wrote: "I would like to compliment you, your colleagues, and the New York Academy of Sciences in the successful completion of the New York Bight Initiative Project and its final report"; Harvey Schultz of New York City DEP wrote: "I want to compliment you and Marc David Block for your diplomatic yet firm handling of the process which greatly contributed to the success of the project." The NYAS received a dozen similar comments from other parties to the negotiation.


FOOTNOTES: CHAPTER 7


New York Academy of Sciences, Science and Decision Making Program. p. 44.

New York Academy of Sciences, Science and Decision Making Program. p. 44.


New York Academy of Sciences, Science and Decision Making Program. p. 43.

New York Academy of Sciences, Science and Decision Making Program. p. 44.


Raiffa, Howard. 1982. p. 211.


### Upper Hudson (cont.)

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### Major Inputs

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### Major Losses

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APPENDIX B: INPUTS, RESERVOIRS, AND LOSSES OF PCBs IN THE HUDSON/RARITAN ESTUARY AND NEW YORK BIGHT, 1957 TO 1979

(Sections A, B, and C summarize data from the Upper Hudson, the Lower Hudson, and the Hudson-Raritan Estuary, respectively. Note that the three sites at which flow were measured are labeled A, B, and C on the map at left. All data are in metric tons.)

INPUTS TO UPPER HUDSON
Inflow from reaches above Fort Edward: ?
Runoff: ?
GE’s discharges: <115 to 500
Industrial discharge: ?

RESERVOIRS IN THE UPPER HUDSON
Land disposal sites: 250+
Electrical equipment: "Large"
Dredged material: 37
Sediments: ?

INPUTS TO THE LOWER HUDSON RIVER
Inflow from Upper Hudson: 60
Runoff: ?
Industrial discharge: ?
Sewage plant effluent: ?

RESERVOIRS IN THE LOWER HUDSON
Land disposal sites: 250+
Electrical equipment: "Large"
Sediments: ?

INPUTS TO THE HUDSON/RARITAN ESTUARY
Inflow from Lower Hudson: 42-59
Runoff: ?
Industrial discharge: 4.0
Atmospheric deposition: 2-84

RESERVOIRS IN THE HUDSON/RARITAN ESTUARY
Land disposal sites: ?
Electrical equipment: ?
Sediments: ?

LOSSES FROM UPPER HUDSON
Flow past Troy: 60
Dredged: 37
Volatilized: 23

LOSSES FROM LOWER HUDSON
Flow past G.W. Bridge: ?
Volatilized: ?

LOSSES FROM HUDSON/RARITAN ESTUARY
Flow past transect: ?
Dredged: ?
Volatilized: 10
APPENDIX C: SUMMARY OF PCB REGULATIONS

The following set of tables summarizes federal regulatory requirements for polychlorinated biphenyls. The general regulatory framework is found in regulations at CFR 761 under the Toxic Substances Control Act. Basic regulation of PCB use, phaseout, disposal, and incineration is found here.

Other regulatory requirements are found in regulations made under the Federal Water Pollution Control Act. Some regulations could apply to situations involving PCBs without specifically mentioning the substances. One such example would be cleanup of sites contaminated with PCBs under the Comprehensive Environmental Response, Compensation, and Liability Act (superfund law; CERCLA). Furthermore, cleanups at superfund sites, under interim guidance issued by the Environmental Protection Agency August 27, 1987, would cleanup groundwater to standards set under the Safe Drinking Water Act. In the following tables, only regulations that specifically mention PCBs are listed. In those cases in which regulations could apply but do not specifically refer to PCBs, they are not included in the tables.

### GENERAL REGULATORY FRAMEWORK

<table>
<thead>
<tr>
<th>Action</th>
<th>Effective Date</th>
<th>Regulation/Legal Authority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture, processing, distribution banned</td>
<td>Jan 1, 1979</td>
<td>40 CFR 761/Toxic Substances Control Act</td>
</tr>
<tr>
<td>Ban on uses</td>
<td>Phaseout began Oct. 1, 1984; final October 1, 1990</td>
<td>40 CFR 761/TSCA</td>
</tr>
<tr>
<td>Designated as hazardous substances</td>
<td>March 13, 1978</td>
<td>40 CFR 116/Federal Water Pollution Control Act (Clean Water Act), Sections 311(b)(2)(A) and 501(1)</td>
</tr>
<tr>
<td>Proposed recommended maximum for drinking water set at 0</td>
<td>50 FR 46936</td>
<td>Would amend 40 CFR 141.50/ Safe Drinking Water Act</td>
</tr>
<tr>
<td>Limit of 2 ppm set for fish intended for human consumption</td>
<td>August 20, 1984</td>
<td>FDA</td>
</tr>
<tr>
<td>Listed as hazardous substances that may subject applicants for NPDES permits to additional requirements</td>
<td>July 18, 1980</td>
<td>40 CFR 122, Table 2D-4 Clean Water Act</td>
</tr>
<tr>
<td>Ambient water criterion for PCBs in navigable waters set at 0.001 micrograms per liter</td>
<td>Jan 12, 1977 (compliance date Jan. 12, 1978)</td>
<td>40 CFR 129.105(a)(3)/ Clean Water Act</td>
</tr>
<tr>
<td>Toxicological profile required</td>
<td>52 FR 12940</td>
<td>Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 104(i)</td>
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<td>52 FR 12940</td>
<td>Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 104(i)</td>
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</tbody>
</table>
## RESTRICTIONS ON INDUSTRY DISCHARGE

<table>
<thead>
<tr>
<th>Industry Type</th>
<th>Discharge Limits</th>
<th>Effective Date</th>
<th>Federal Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCB manufacturers</td>
<td>None permitted</td>
<td>Jan. 12, 1977</td>
<td>40 CFR 129.105/Clean Water Act</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(compliance Jan. 12, 1978)</td>
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</tr>
<tr>
<td>Electrical capacitor manufacturers</td>
<td>None permitted</td>
<td>Jan. 12, 1977</td>
<td>40 CFR 129.105/Clean Water Act</td>
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<td>(compliance Jan. 12, 1978)</td>
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</tr>
<tr>
<td>Electrical transformer manufacturers</td>
<td>None permitted</td>
<td>Jan. 12, 1977</td>
<td>40 CFR 129.105/Clean Water Act</td>
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<td></td>
<td></td>
<td>(compliance Jan. 12, 1978)</td>
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<tr>
<td>Steam electric generating plants</td>
<td>None permitted</td>
<td>Nov. 7, 1974</td>
<td>40 CFR 423.17(a)/Clean Water Act</td>
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<tr>
<td>Electroplating</td>
<td>Monitoring required</td>
<td>July 15, 1986</td>
<td>40 CFR 413/Clean Water Act</td>
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<td></td>
<td></td>
<td>(compliance date)</td>
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<tr>
<td>Metal finishing</td>
<td>Pretreatment standard</td>
<td>February 16, 1986</td>
<td>40 CFR 433/Clean Water Act</td>
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<td></td>
<td>for TTO:</td>
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<tr>
<td></td>
<td>2.13 mg/l daily max*</td>
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<tr>
<td>Aluminum forming</td>
<td>Pretreatment standard</td>
<td>October 24, 1986</td>
<td>40 CFR 467/Clean Water Act</td>
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<tr>
<td></td>
<td>for TTO:</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>2.13 mg/l daily max*</td>
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<td></td>
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</tbody>
</table>

*Monitoring for total toxic organics (TTO), which is defined as the summation of all quantifiable values greater than 0.01 milligrams per liter of a list of substances including PCBs.

40 CFR 433.15(e): An existing source subject to this subpart shall comply with a daily maximum pretreatment standard for TTO of 4.57 mg/l.
<table>
<thead>
<tr>
<th>PCB Input/Reservoir</th>
<th>Regulatory Activity</th>
<th>Effective Date</th>
<th>Act/Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land disposal approval of RCRA</td>
<td>Standards; injection for disposal of concentrations above 50 ppm</td>
<td>June 6, 1985</td>
<td>EPA policy for CERCLA offsite response actions</td>
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<tr>
<td></td>
<td></td>
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<td>50 FR 45933</td>
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<tr>
<td>Land disposal</td>
<td>Requirements for disposal site</td>
<td>See CFR for dates</td>
<td>40 CFR 761.75, TSCA</td>
</tr>
<tr>
<td>Hazardous waste treatment, disposal facilities</td>
<td>General requirements</td>
<td>Nov. 19, 1980</td>
<td>40 CFR Part 264</td>
</tr>
<tr>
<td>Electrical equipment</td>
<td>Restriction on manufacture, processing, distribution, use (greater than 50 ppm)</td>
<td>Oct. 1, 1984</td>
<td>40 CFR 761 Subpart</td>
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<tr>
<td>PCB articles</td>
<td>Disposal requirements</td>
<td>See CFR for dates</td>
<td>40 CFR 761.60(b) TSCA</td>
</tr>
<tr>
<td>PCB containers</td>
<td>Disposal</td>
<td>See CFR for dates</td>
<td>40 CFR 761.60(c), TSCA</td>
</tr>
<tr>
<td>Non-liquid PCBs</td>
<td>Limit on air emission from incineration; 0.001 g PCB/kg PCB burned</td>
<td>See CFR for dates</td>
<td>40 CFR 761.70, TSCA</td>
</tr>
<tr>
<td>Dredged materials</td>
<td>Disposal requirements</td>
<td>See CFR for dates</td>
<td>40 CFR 761.60 (a)(5) TSCA</td>
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<tr>
<td>Dredged materials</td>
<td>Ocean dumping, in general</td>
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<td>33 CFR Part 324</td>
</tr>
<tr>
<td>Dredged materials</td>
<td>EPA ocean dumping, in general</td>
<td>Jan. 11, 1977</td>
<td>40 CFR Part 225;40</td>
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<td>40 CFR 227.13</td>
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<tr>
<td>Dredged materials</td>
<td>EPA prohibition on ocean dumping of waste contaminated with known carcinogens</td>
<td>Jan. 1, 1977</td>
<td>40 CFR 227.6 (a)(5)</td>
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<tr>
<td>Sewage treatment sludges</td>
<td>Disposal requirements PCB concentration&gt;50ppm</td>
<td>See CFR for dates</td>
<td>40 CFR 761.60 (a)(5)</td>
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<tr>
<td>Sewage treatment</td>
<td>Ocean disposal</td>
<td>Dec. 31, 1981</td>
<td>PL 95-143</td>
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<tr>
<td></td>
<td></td>
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<td>Section 4</td>
</tr>
<tr>
<td>Contaminated soil, rags, debris at concentrations &gt;50 ppm</td>
<td>Disposal requirements</td>
<td>See CFR for dates</td>
<td>40 CFR 761.60 (a)(4)</td>
</tr>
</tbody>
</table>
APPENDIX D: COMMENTARY IN LETTERS OF RATIFICATION

Positive Commentary
1-Scientifically sound; well documented
useful synthesis; fair rendering of facts
2-Useful process; future model; enjoyed participating
3-Fair; representative
4-Recommendations solid/useful
5-Mediation team praised (diplomatic; firm; perserverent)

<table>
<thead>
<tr>
<th>Environmental Mgmt Agencies</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>U.S.EPA</td>
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<td></td>
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<td>S*</td>
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<tr>
<td>NJDEP</td>
<td>X</td>
<td>X</td>
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<td></td>
<td>G*</td>
<td>G*</td>
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<tr>
<td>LI Reg Planning Board</td>
<td></td>
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<td></td>
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<td></td>
<td>G</td>
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<td>NYSDEC</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>G</td>
<td>S</td>
<td></td>
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<tr>
<td>NYS Coastal Program</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>G</td>
<td>S</td>
</tr>
</tbody>
</table>

Wastewater Treatment Agencies
ISC                           |   | X | X | X |   |   |   |   |
NYCDEP                       |   | X |   |   |   |   |   |   |

Private Fishing Interests/ Agencies
NMFS—NOAA                   | X |   |   |   |   |   |   |   |
U.S.FWS                      | X | X | X | X |   |   |   |   |
NYSCommercial Fishermen’s Assoc. |   |   |   |   | X | X |   |   |

Environmental Organizations
Clean Ocean Action           |   |   |   |   |   | G | S | G |
American Littoral Society    |   |   |   |   |   |   |   |   |
EDF                          |   |   |   |   |   |   |   |   |
Coalition for the Bight      | X |   |   |   |   |   |   |   |
NYC Env Policy Forum         | X |   |   |   |   |   |   |   |
Monmouth-Ocean Development Council | X | X |   |   |   |   |   |   |

Port Interests
Port Authority of NY/NJ       | X | X | X | X |   |   |   |   |
Towboat Harbor Carriers Association | X |   |   |   |   |   |   |   |
Maritime Port Council         | X |   |   |   |   |   |   |   |

Elect Equip/Chem Manfactrs
CMA                          |   |   |   |   |   | X | X |   |
Monsanto                     |   |   |   |   |   | X | X |   |
GE Company                   |   |   |   |   |   | X | X |   |

Total Comments
11 10 4 8 15

Total Positive Comments: 48

Negative Commentary
6-Reservations about findings
7-Reservations about recommendations
8-Mediation team criticized
G* = General reservations
S* = Specific reservations
APPENDIX E: RECOMMENDED MANAGEMENT STRATEGIES

A. Management Principles

1. Reduce PCB levels in fish and other biota in the Estuary and the Bight. Recommended management actions should be practicable within the context of protecting human health and environmental integrity.

_Rationale:_ Reducing available PCBs in the ecosystem will lead to reduced PCB levels in fish food and other biota. The resultant lowering of PCBs in fish will help achieve the goal of reopening fisheries by bringing PCBs levels in fish below the 2ppm level. Moreover, reducing PCB levels in fish will reduce possible risks to human consumers. Achieving this goal will require that environmental managers join with private interests to seek specific implementation strategies.

2. Seek to understand the interaction of PCBs with other chemical compounds and causes of disease in marine biota.

_Rationale:_ PCBs exist with dozens of other contaminants. Observed effects cannot be traced specifically to PCBs. Further study of PCBs along with other priority contaminants would enhance the identification of causes of particular environmental effects.

3. Key agencies should join with private interests to develop a strategic plan to implement the recommendations that follow. _Set cost-effective priorities for analysis, research, and management actions within the larger context of managing contaminants in the Estuary and the Bight_. Any plan developed should be integrated across local, state and federal agencies and created with the _full participation_ of other affected interests.

B. High Priority Management Options

1. Key agencies should join with private interests to develop a strategic plan to implement the recommendations that follow.

2. Ensure continuation of existing procedures and appropriate enforcement of all regulations pertaining to PCBs to minimize the quantities of PCBs entering the Hudson-Raritan/Bight system.

3. a. Improve procedures for secure interim storage and destruction of PCBs contained in electrical equipment for the New York Bight area.

b. Assess the extent of PCBs in discarded appliances. _If it is determined that significant PCBs are present, create a mechanism for effective collection, secure interim storage and destruction of PCBs contained in appliances (white goods)._ (Many appliances made prior to the 1979 ban on PCB production contained capacitors and other electrical equipment which contained PCBs.) As one element of this strategy, consider the application of new PCB destruction technologies as an alternative to incineration facilities.

4. Assess the appropriateness of updating the Interim Guidance Matrix for PCBs to take account of recently obtained data and studies in progress on bioavailability of PCBs in dredged material.

_Rationale:_ The Interim Matrix, prepared in 1980 helps guide the disposal of dredged material. Since then, considerable research has been completed on bioavailability of PCBs and new studies are ongoing. Additional studies which could shed light on this question are in progress. Moreover, the matrix committee—composed of key environmental management agencies—is meeting after a period of inactivity. This could present an opportunity to update guidance for dredging based on the best available information.
5. Monitor potentially large inputs of PCBs to the estuary and Bight.

Table 5, showing PCB reservoirs, inputs, and losses indicates that most of the data for the estuary and Bight is either ten years old or very sketchy. Better, more up-to-date information is needed to determine whether, in fact, PCBs are present in inputs, waters, and sediments.

The analysis should clearly distinguish the following inputs: downriver contaminant movement, industrial discharge, sewage treatment plant effluent, combined sewer overflow, and runoff from nonpoint sources. As of December 31, 1987 sludge dumping ceased at the 12 mile site and disposal shifted to the 106 mile site (See Figure 1).

6. Explore the reduction of bioavailable PCBs in the Hudson-Raritan Bight system from several possibly significant sources. This investigation should clearly distinguish the following possible sources: sewage treatment plant effluent, industrial discharge, combined sewer overflow, stormwater runoff, dredging and downriver transport.

7. Encourage agencies to adopt unified protocols for sampling, analysis, and interpretation of PCBs in bluefish, striped bass, and other migratory species. (As used here, "unified" means closely coordinated and compatible; it does not necessarily mean identical.) As a first step, encourage the states of New York and New Jersey to adopt unified protocols. Synchronize federal programs with test results at the state level. Eventually, it would be desirable for federal agencies (FDA, EPA, and NMFS) and the mid-Atlantic states to arrive at unified protocols.

a. Where common fisheries are involved, the states of New York and New Jersey should coordinate the development of plans for sample timing and location.

b. In the risk assessment elements of sample interpretation, all assumptions should be clearly stated, and agencies should coordinate the factors and assumptions used.

c. Archiving samples for PCBs and other contaminants is recommended, to enable trends analysis and congener-specific analysis. Convene a working group of qualified agency analysts to develop the idea of a unified archive for samples containing PCBs and other contaminants.

Since current preparation and storage methods may result in some loss of contaminants over time, other techniques which can render contaminants stable—such as liquid nitrogen storage and/or ampule storage—merit investigation. Accordingly, the working group should consider such issues as appropriate preparation and freezing techniques, appropriate storage, desired attributes of a host institution, required funding, and funding mechanisms.

d. Bluefish and striped bass should be sampled for PCBs at appropriate intervals to enable documentation of trends. Sample frequency must represent a trade-off between expense and effectiveness. Sampling at one year intervals would be prohibitively costly, while sampling at five year intervals would leave excessive data gaps. A three year sampling interval holds promise as a reasonable compromise.

e. Recognize the positive evolutionary trend towards congener-specific analysis in testing of fish, and encourage states to coordinate in the development of this approach.

8. Work towards adoption of a policy whereby states regulating shared migratory fisheries shall consult in the issuance of health advisories. Develop methods for sharing data and building consensus between state and federal agencies (including NMFS, FDA and EPA) concerning a unified policy for measuring and interpreting contaminated fisheries. States should consider the NOAA/FDA/EPA sample design for bluefish as a guide in planning future studies of fisheries.

9. Carry out the research agenda (items VI.E., high priority research, and and VI.F., second priority research).
C. **Medium Priority Management Options**

1. **Convene** a series of conferences or **working meetings**—at the NYAS or under other suitable auspices—to illuminate scientific issues related to management of contaminants in East coast harbors and estuaries. Report on and evaluate successful efforts with new decontamination technologies. Involve scientists, agency staff, interest groups and elected officials.

2. **Convene** an in-depth scientific conference at the NYAS or under other suitable auspices dedicated to updating the literature on PCB sources, fates, and effects.

D. **Management Options Which Face Major Obstacles/Interim Steps**

*(Note: In the team deliberations, these management options were not ranked as high priority, primarily because they face major obstacles in implementation. Here, the management options, the specific obstacles, and possible interim steps are discussed.)*

1. Based on the documentation of PCB levels in water and sediments, and the assessment in opportunities for reducing PCBs [*"High Priority Management Options 5 and 6"] create a strategy to achieve reduction of bioavailable PCBs in the Hudson-Raritan Bight system from several possibly significant sources. This strategy should clearly distinguish the following possible sources: sewage treatment plant effluent, industrial discharge, combined sewer overflow, stormwater runoff, dredging and downriver transport.

   **Rationale:** To reduce PCB concentrations in marine fish, significant reduction is needed in the total mass of available PCBs. Although wastewater contains only a minute fraction of PCBs per gallon, the enormous volume of wastewater makes it a potentially significant source of PCBs. Movement of PCB-laden sediments from the Upper Hudson is a significant source of PCBs in the Estuary and Bight.

   **Major Obstacles:** First, assessing the magnitude of these possible sources is hampered by the fact that PCBs are not consistently measured in wastewater discharges throughout the region. Some facilities routinely measure PCBs, while others do not. Moreover, in some facilities in the metropolitan area, PCBs have not been detected in measurements of effluent over the past 18-24 months. PCBs in combined sewer overflow and urban runoff are very tough to measure. Undertaking these steps is likely to be very costly.

   Second, since PCBs are present in wastewater only at very low concentrations, additional, costly technology is likely to be required to further reduce these very low levels. PCBs in combined sewer overflow and urban runoff may be even harder to control because of the dispersed nature of the inputs.

   **Interim Steps:** Technological improvement is needed to develop further industrial treatment. Emerging PCB decontamination technologies, though not yet commercially available, may hold promise (described in Appendix 5). Full application of hazardous waste disposal standards may be a way to address discarded stockpiles of PCB remnants in inks and hydraulic fluids.

2. **Dredging highly contaminated areas in the lower estuary is a possible management strategy.** Here, it is important to distinguish highly contaminated areas discovered in the course of maintenance dredging from those identified in an active search for contaminated areas as a PCB management strategy. If it is decided that certain sediments need to be decontaminated, a clear plan must be developed. However, several major obstacles would need to be overcome.

   **Major Obstacles:** First, there is no formal definition of "highly contaminated areas" or "hot spots". Second, managers lack good information about PCB levels in most of the Estuary and the Bight. Currently, PCBs are only measured in areas subject to regulatory review: channels and berthing areas. Third, the volume of material that would require treatment is massive. Fourth, the destruction technology remains a major hurdle. Fifth, dredging hot spots may increase the bioavailable PCBs in some areas.
Interim Steps: States—in conjunction with other interested parties—should develop standard definitions of "highly contaminated areas" or "hot spots". Documentation of existing PCB levels in the Bight and estuary is needed. A tiered approach is appropriate, in which areas that exceed the threshold for "hot spot" are mapped in more detail. Whether remedial dredging is appropriate must then be decided.

A range of decontamination and disposal technologies should be investigated, including several new technologies now reaching the pilot stage. Some, but not all of these technologies appear to be adaptable to the marine environment. These technologies are explained in Appendix 6.

3. Dredging hot spots in the Upper Hudson River has been actively proposed by NYS DEC and EPA as a method to reduce available PCBs in fish (EPA and NYS DEC, 1987). The agencies intend to undertake a pilot demonstration project.

The Upper Hudson has not been an explicit focus of this single text document. For this reason, the participants in the single text process did not examine the management option of dredging the Upper Hudson in depth. However, the information developed on sources of PCBs does show that some PCBs from the Upper Hudson are indeed transported to the Lower Hudson, and to the Estuary. Accordingly, remedial dredging could be expected to reduce some portion of bioavailable PCBs. Currently, there is no reliable model available to forecast 1) the effects of remedial action on the total volume of available PCBs in the Lower Hudson and the Estuary; 2) the effect of PCB removal on PCB levels in edible fish.

However, several major obstacles would need to be overcome.

Major Obstacles: First, as dredging proceeds, substantial amounts of sediment will be resuspended. This could increase the bioavailable PCBs in some areas. Second, a considerable volume of material must be treated. Third, interim storage of contaminated material is likely to evoke considerable local opposition. Fourth, the destruction technology remains a major hurdle.

Interim Steps: If it is decided that certain sediments need to be decontaminated, a clear plan must be developed. Explore methods to reduce the resuspension and increase the capture of contaminated sediments.

New decontamination technologies capable of destroying PCBs may hold promise. Several new technologies are reaching the pilot stage. Track the results of the test decontamination of sediments from New Bedford Harbor, Massachusetts using the Basic Extraction Sludge Treatment (B.E.S.T.8), slated to be reported this fall. Critically review prospects for the application of other emerging technologies described in Appendix 6.

Construct a model to illuminate the effects of remedial action on the total volume of available PCBs in the Lower Hudson and the Estuary; and the corresponding effect on PCB levels in edible fish.

Engage affected citizens and interest groups in direct dialogue with agency decision makers and scientists over details of the dredging proposal, as a supplement to formal hearings. Consider both the Public Involvement Coordinating Group and the NYAS Bight Initiative process models.

E. High Priority Research Agenda

1. Improve our understanding of PCB pathways and health effects.

Comment: Conduct a tiered study of PCB movement through the water and sediment of the system. Improve understanding of the relationship between an organism’s feeding mechanism and the extent of PCB uptake. Track the movement and transformation of PCBs through the food web. Improve predictions of actual human health effects of eating PCB-contaminated fish.
2. **Conduct congener-specific research** concerning:
   a. the movement of PCBs through "storage compartments" in the Hudson/Raritan-Bight system (water/sediment/biota);
   b. levels of PCBs in selected organisms including edible seafood.

   **Comment:** The more highly chlorinated congeners are likely to be more toxic, so they deserve special study. Commercial mixes of Aroclor such as Aroclor 1254, 1248, and 1260 contain 20 to 60 different congeners. The technology is available to identify specific congeners, although it is costly. It would be useful to know which mixes are present in the system, and whether they vary from one portion of the system to another.

   Two kinds of data are needed to lay the foundation for regulation of PCBs on a congener-specific basis. First, data are needed on effects of specific congeners on selected organisms. Second, actual levels of specific congeners must be documented. Together, these two data sets would enable congener specific standards to be set.

   A tiered analysis should be conducted on edible seafood. In samples that exceed the FDA limit of 2 ppm PCBs, use more precise analytic methods, such as capillary chromatography, to identify specific congeners, especially those that are highly chlorinated.

3. **Determine the movement of contaminated sediment—including material deposited at disposal sites—in the Bight.** Specifically examine whether material moves back into bays and estuary.

   **Comment:** Existing studies seem to conflict on the movement of sediments—which may include adsorbed PCBs and other contaminants—from the Bight back into bays and estuaries. Studies sponsored by the Army Corps of Engineers and others seem to indicate that PCBs remain at the dredge material dump site. Investigations by Young et al. (1985) and Boehm et al. (1983) suggest dispersion of sediment particles from the Bight back into bays and estuaries. However, these studies are confounded by the failure to use a tracer unique to the material dumped. Accordingly, a careful study is needed, using a tracer unique to the material dumped.

4. **Update the information on PCB reservoirs, inputs, and losses in the Hudson-Raritan/Bight system presented in Figures 3A and 3B and Table 5.**

   **Comment:** These figures and tables were constructed based on the synthesis of over 30 published references, the direct participation of seven scientists, and the comments of six other scientific reviewers. Nonetheless, there are still gaps in the data. Filling these data gaps would support better management of PCBs. As information becomes available, summarize the movement of specific PCB congeners in the system.

F. **Second Priority Research Agenda**

1. *If sewage treatment plants are shown to contribute significant PCBs, then investigate the prospects for adapting new technologies capable of destroying PCBs to sewage treatment plants in the Bight region.* Explore the effectiveness of biological digestion in breaking down PCBs into harmless constituents. Test enhanced biological digestion methods in small pilot units of sewage treatment plants.

   **Comment:** The tests of PCB destruction by bacteria have depended on high densities of PCBs. The very low concentrations likely to be present in sewage treatment plants may not be sufficient to "feed" the bacteria. As a first step, monitor initial tests of these technologies in other settings. Create a forum for critical review of first tests of these technologies.
2. Create a model to quantify PCB levels in fish resulting from management alternatives to reduce release of PCBs into the environment.

    Comment: The existing array of management options is quite limited. Additional, promising management strategies must be developed before they can be modeled.

3. Re-visit the FDA standard of 2 ppm.

    Comment: Convene a group of health professionals to periodically assess the validity based on most recent data, and recommend changes, if necessary. The existing 2 ppm standard (lowered from 5 ppm) is the product of nine years of effort. Moreover, the costs involved could be considerable.

G. Public Education

1. Public education efforts should include a reasoned presentation of known effects of PCBs on human health and the environment. Education should convey the evolving nature of our understanding of these effects, and must indicate that the precise effects are still not fully understood. For example, the basis of EPA's ranking of PCBs as a probable human carcinogen should be clearly communicated.

2. The context of PCBs—as one class of contaminants in the Hudson/Raritan Estuary and Bight, and as one risk factor among many—must be clearly communicated.

3. Terms such as probable human carcinogen, toxicity, teratogenicity, mutagenicity must be clearly explained.