# Importing Growth Management Strategies to Curb Urban Sprawl in the Pearl River Delta, China

by

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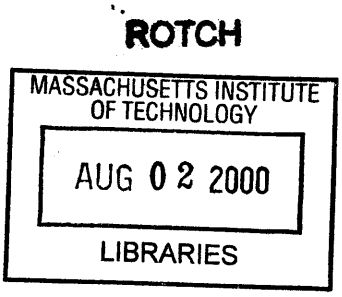


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Submitted to the Department of Urban Studies and Planning
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## ABSTRACT

As China has opened its doors to capital from the West, especially Hong Kong, during the past twenty years, problems not encountered under the strictly socialist system have appeared in regard to land use in the Pearl River Delta area of Guangdong province. Urban sprawl with uncoordinated land uses has sprouted around Guangzhou, as well as other smaller cities. This urban development has occurred mostly at the expense of agricultural lands in the Delta. Estimates have been made claiming that one-third of the Delta's agricultural land has been encroached upon. Preservation of agricultural land is a stated goal of the Chinese central government for reasons of food security. With the population forecast to double by 2020 and the distinct possibility of increased motorization, the threat of sprawl and severe degradation of agricultural land is great.

Other places have encountered similar issues as cities have grown in market economies. This thesis explores the experiences of American jurisdictions with the growth management strategies of urban growth boundaries and concurrency to observe which aspects of these growth management strategies have worked well and whether any can be applied to the Pearl River Delta context. Additionally, it explores which liabilities of the programs might be successful in the different context and what institutional barriers exist to creating programs similar to these in China. This thesis also explores where in the PRD a growth management program might be successful and locations in the Delta where such programs should not be attempted.

Thesis Supervisor: Terry Szold
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## Description of Studio

This thesis is being done in conjunction with the Hong Kong and Pearl River Delta Studio, in which the area's future regarding land use, transportation, economic development and the environment is being explored. In the course of the studio, the team developed strategies and scenarios for the physical development of the HK/PRD Region, as part of Project 2022. Project 2022 is the initiative of a consortium which has been formed to develop strategies and scenarios for positioning HK /PRD as a competitive city region. The purpose of Project 2022 is to provide the research data and analysis in urban planning, the environment and infrastructure to frame and focus the debate on how HK and the PRD should develop.

The Hong Kong and the Pearl River Delta (HK-PRD) region has been one of the fastest growing economies of the last twenty years but now faces serious problems - environmental degradation, congestion, chaotic growth, fragmented jurisdictions, lack of planning and intra-regional coordination. This growth boom is expected to continue to attract a large number of immigrants, up to 20 million in the next twenty years, and will have an enormous effect on future land use outcomes. How this growth is accommodated will have a great influence on whether Hong Kong remains

competitive with other global cities in the region, such as Singapore and Shanghai. The entry of China to the World Trade Organization (WTO) will create new problems and opportunities, including a probable increase in factory construction in rural areas.

Participation in the studio has allowed me to explore questions that I first had on a visit in 1998 to the Nan Sha and Panyu regions of the Delta concerning the future spatial development patterns. Working in the studio heightened my awareness of other issues at play in the Pearl River Delta that are affected by land use choices, such as the expected massive population increase, air quality, and the existing densities in Guangzhou.

The volume of articles circulated by e-mail regarding air quality in Hong Kong and witnessing the gray skies over Guangzhou introduced me to a problem that I was unaware of in 1998 and demonstrated to me the urgent necessity of a better coordinated land use system to attempt to solve problems that have been and will become evident. The visit to the Mattel plant outside the urbanized area of Nanhai plus the bus trip from Shenzhen to Guangzhou also did this, as the existing sprawl between Shenzhen and Guangzhou or potential for sprawl in Nanhai struck me as needing attention. I did not realize that the potential for sprawl was so great in the area before my visit and subsequent

class discussions. The visit to the Mattel plant, as well as the visit to the Varitronix plant in Shenzhen, familiarized me with the standards of living associated with dormitories. This, along with our short stay in Guangzhou, allowed me to better understand the densities of development in China - an understanding that I would not have had solely from reading an article on the subject.

# Chapter 1: The Pearl River Delta and Reasons for Concern

The Pearl River Delta Region (PRD) is the area of southern China occupied by the alluvial basin of the Pearl River (Zhujiang), the third largest river system in China. The term Pearl River Delta refers in this thesis to the area of Guangdong province that lies within the Delta. Hong Kong is not included because it already has a well-established land-use control system that differs greatly from that found in Guangdong, a compact urban form, and little remaining agricultural land.

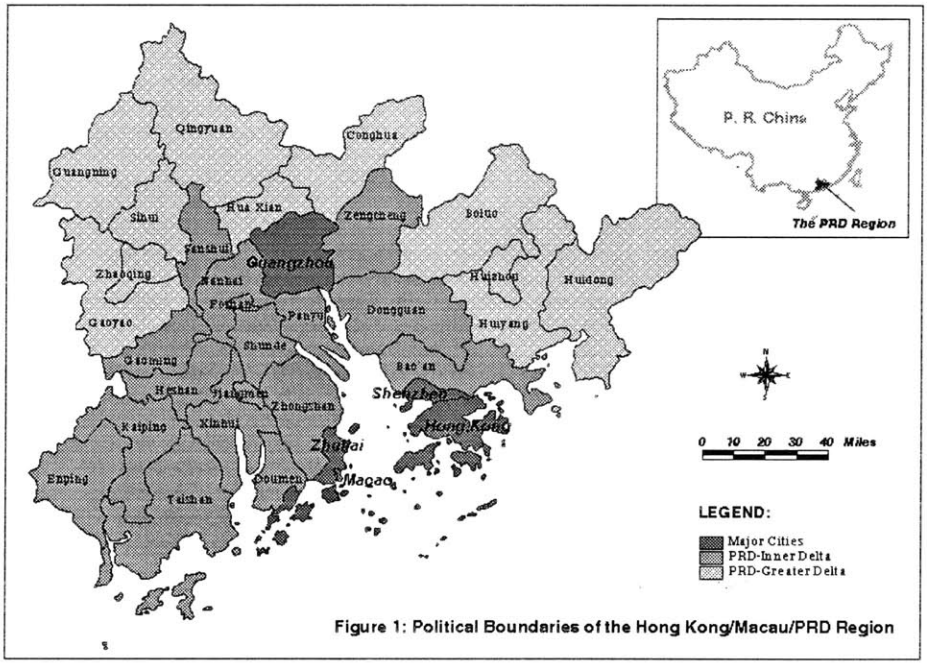


Figure 1: Political Boundaries of the Hong Kong/Macau/PRD Region

**Map of the Pearl River Delta**[1]

[1] Map by Zhang Ming, studio teaching assistant

Because the PRD Region is located in a delta, the land is quite fertile for agriculture and has been historically been home to rice paddies and fish farms. During the last twenty years, though, the economy has diversified. Since 1978, the PRD has been seen as the major player in improving China's economic status, due to the PRD's proximity to Hong Kong. The area has become a magnet for business and manufacturing and has attracted many workers from the poorer regions of northern China who come to work in the area to earn money to bring home to the North.

Population forecasts for the PRD differ greatly. Most forecasts predict a population in 2020 of between 40 million and 50 million residents. Population change in the region is dependent on many factors (economic health, WTO status) whose effects at this time are unknown. It is almost an absolute certainty that a very large number of new residents will need places to live and infrastructure to supply them services. The land area of the PRD is 47,430 $km^2$ (almost 19 million acres), roughly the size of the New York City metropolitan area. The process of providing places for these people to live in this relatively small area without destroying certain sectors of the economy, such as agriculture and tourism, or threatening public health, will be challenging and deserves investigation.

Comparing the PRD to other mega-urban regions in Asia that are a decade or two ahead economically of where the PRD is currently can provide insight as to what the future holds for land development patterns in the Delta. According to Ira M. Robinson,[2] these mega-urban regions have experienced: rapid urbanization resulting in development in the cities' hinterlands; "amorphous and amoeba-like" spatial forms, with no established geographical boundaries; and leapfrog development that puts new towns, industrial estates, and housing projects onto formerly agricultural lands. The PRD has begun to experience these development outcomes, specifically the area between Guangzhou and the Guangzhou Economic Trade Development Zone and along the two highways on the eastern side of the Pearl River and the Lingdingyang, between Dongguan and Shenzhen.

According to Robinson,[3] a sprawling pattern of development spreads infrastructure costs over a more decentralized population, thereby increasing per capita infrastructure costs.

Examination of the development patterns of these mega-urban regions raises concerns for the future of the PRD and spawns questions about measures that can be taken to prevent the PRD and its agricultural land from being overrun by sprawling urban development.

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[2] Robinson, 1995

## Ominous Signs for the Future

Since land reform in 1987, local governments have been given the right to sell the rights to land in order to raise revenue for themselves. Local governments run enterprises and have a vested economic interest in fostering as pro-growth an environment as possible. This approach causes local governments to change city plans to allow for such development.[4] Elaborate land-use plans have been created for areas in the PRD, but Mee Kam Ng and Wing-shing Tang have questioned whether they have had any effect on what has been built.[5]

Under the city-leading county system, city governments are responsible for providing urban physical infrastructure. Additionally, rural areas are allowed to develop non-farm uses, which they were not allowed to do before land reform. When the city-leading-county system was implemented, it effectively rendered the provincial authority impotent[6] because the provincial governments lost financial control of the local governments.

Because of the lack of development of the Guangdong land markets, there is little control over land transfer; a

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[3] Robinson, 1995
[4] Ng and Tang, 1999
[5] Ng and Tang, 1999

black market has developed and people illegally occupy land, especially agricultural lands. Local governments either ignore illegal occupancy, especially if it spurs economic growth or "fine" the illegal users to line the city's coffers.[7] The illegal land uses are not just squatter settlements; some are large-scale developments. Many of the illegal land uses are serviced by water supply and electric infrastructure.[8]

Competition between cities has led to poor planning outcomes. This is best demonstrated by an examination of infrastructure systems in the PRD. Five new international airports have been constructed, with Guangzhou also considering constructing a new airport. According to Ng and Tang, there is a low density of highway and rail networks, an incompatibility of road widths between cities and an absence of consideration for high-speed transport for the whole region.[9]

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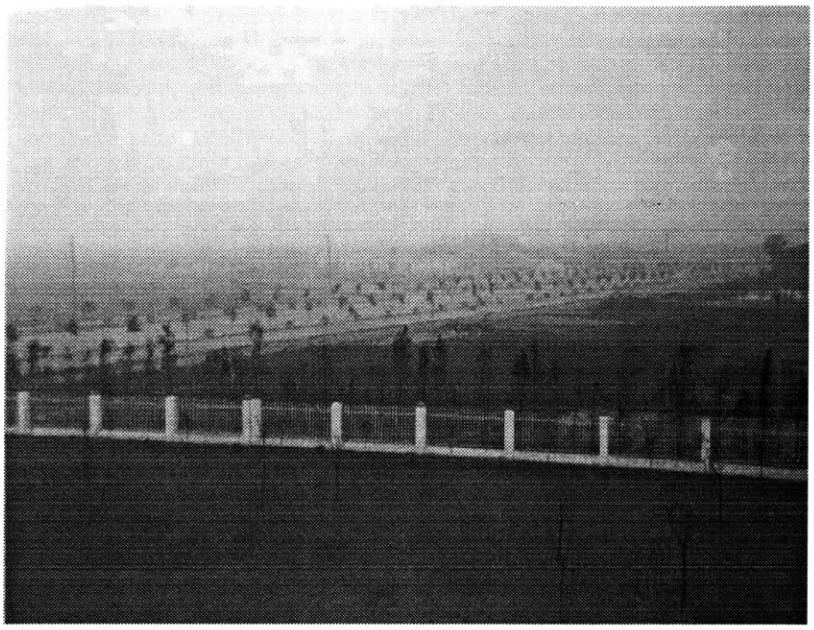
[6] Ng and Tang, 1999, Wu and Yeh, 1999
[7] Ng and Tang, 1999
[8] Ng and Tang, 1999
[9] Ng and Tang, PRDUSP-An Analysis



**Lands surrounding new Mattel plant in Nanhai**

Fulong Wu and Anthony G.O. Yeh have found that there has been rapid decentralization through leapfrog developments in peripheral areas of Guangzhou[10], especially to the east of the city. They blame this sprawl on localities' competition for external investment. Between the city center and the Guangzhou Economic Trade Development Zone is a vast area of urban sprawl in an area that used to have "rural landscapes with some scattered State industrial projects and is characterized by large construction sites under land leasing, unregulated land conversion by farmers and leap-frogged low-density residences."[11]

[10] Wu and Yeh, 1999
[11] Wu and Yeh, 1999

It has been estimated that one-third of the agricultural land in the PRD has been encroached upon.[12] Not all of this land has been developed, though, as investment dollars have not always be available.[13] While the proportion of land that is taken for development that is agricultural land outside Guangzhou has been decreasing, 58.1% of the newly developed land has been agricultural.[14] The loss of agricultural land in the Delta could mean of loss of prime agricultural land in the nation with the world's largest population, a loss of agricultural heritage, and higher food prices (both fish and vegetable) in Guangdong and Hong Kong, as these foodstuffs must be imported. Currently, 55 to 65% of Hong Kong's vegetables are imported from China, mostly from the PRD. Even with China's problems in 1997, it still supplied 65% of the broccoli, bell peppers, artichokes, eggplants and a wide variety of Asian vegetables.[15]

China dominates the Hong Kong vegetable import market during the autumn, winter and spring months, because it can supply the market at much lower prices than its competitors. At certain times of the year, China can provide fresh vegetables at a tenth of the price of other countries. In recent years, China has increased its vegetable production

[12] Ng and Tang, PRDUSP-An Analysis
[13] Ng and Tang, PRDUSP-An Analysis
[14] Wu and Yeh, 1999

in order to supply more of its Asian neighbors with fresh produce and several Hong Kong companies have invested in vegetable growing ventures in China. Evidence of China's push to supply Hong Kong's fresh vegetable market could be seen in imports of garlic, leeks and cabbage, which rose 31% in 1997.[16] Uncontrolled urban development that destroys agricultural land could damage a growing sector of the PRD economy and adversely affect Hong Kong.

A growing concern among observers of the PRD is the imminent motorization (private automobiles) of the population as incomes rise. An increase in mobility may well lead to a greater demand to build at the fringe of cities, threatening agricultural land and, if done in an unorderly fashion, requiring a large capital outlay by local governments for road, water, and sewer infrastructure.

As the Chinese government continues to mix the socialist system with a market economy, perhaps systems that have been enacted in market economies to combat problems beginning to emerge can be used to mitigate the PRD's problems. The strongest American growth management strategies are employed in states where state government authority over land is greatest. There is no place in the U.S. completely analogous to the PRD, so, of course, any model would have to be modified somewhat to fit the PRD if

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[15] Adkins, 1998

there appears to be a likelihood of transferability. I have chosen to examine urban growth boundaries, concentrating mostly on its governance and performance in western Oregon, and concurrency, with examination of programs in Florida and Washington. These states were chosen as the closest approximation to the Chinese system in terms of the role of the central authority.

The situations in the states and cities in the United States I discuss in this thesis are different in many ways than the situation in southern China. Overall population and population densities (especially in the large cities, such as Guangzhou) are much greater in China and the governmental system is different. Yet, the goals of the American jurisdictions are the same as those of the Chinese, in terms of the preservation of farmland and the need for the orderly provision of infrastructure.

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[16] Adkins, 1998

# Chapter 2: The Oregon Experience

The Willamette Valley is home to the majority of Oregon's flat, well-watered agricultural areas. Additionally, it is home to 70 percent of the state's population of 3 million. Over one-third of Oregon's population lives in the Portland metropolitan area at the northern end of the Valley. The northern end of the Valley is also home to its best agricultural land, because of its location at the mouth of the tenth-largest (by volume) river in the United States.[17] Over the past centuries, annual floods have enriched the land in the Valley, making it fertile for agriculture. Additional fertility came as a result of a massive one-time flood when a glacier dam broke, releasing the waters of Lake Missoula into the Columbia Basin. The floodwaters swept up the valley depositing silts. While the southern end of the valley has lost much of its fertility, the northern end, where the majority of the population lives (and where growth pressure is greatest) has retained most of its fertility. The Willamette Valley is smaller than the PRD, encompassing 2.5 million acres, yet produces a bounty of crops, including grass seed,

[17] US Army Corps of Engineers, 1999

meadowfoam, cherries, Christmas trees, vegetables, hops, berries, corn, higher-end goods such as flower bulbs, as well as livestock.

The Valley's population grew by about 500,000 (+1.5% rate)[18] between 1970 and 1990, and has continued to grow throughout the 1990s. In the same period, total agricultural land decreased by 3% and mixed farm and forest land decreased by about 43%.[19] The Willamette Valley has faced increased population pressure and has felt the need to protect its economically vital agricultural land.

To do this, Oregon created a land use system that relies heavily on urban growth boundaries to protect agricultural land and contain sprawl. As part of the growth boundary legislation, there are provisions that govern infrastructure provision to not-yet urbanized areas. It should be noted that Oregon's growth management strategy was developed after the emergence of the automobile as the dominant force in urban development, whereas the Pearl River Delta still has a chance to devise a strategy before motorization is increased to a point where land use patterns mimic those in areas where the automobile dominates, such as the United States or Taipei.

[18] Willamette Valley Futures
[19] Willamette Valley Futures

## Urban Growth Boundaries

Urban growth boundaries (UGBs) have been appearing in land use codes in the United States, especially the western states, for twenty-five years, as an attempt to curb sprawl and preserve agricultural lands. This chapter describes urban growth boundaries and related terms, their history, the relationship between levels of government responsible for the boundaries, and praise and criticism that this device has received. Experiences will be drawn mainly from two Oregon cities, Portland, well known for its use of urban growth boundaries and metropolitan government, and Corvallis, a smaller city without a metropolitan government charged with overseeing its boundary.

### Definitions

*What is an urban growth boundary?*

Urban growth boundaries are lines drawn around cities or metropolitan areas in comprehensive land use plans that are used to limit the amount of land that can be developed at urban densities as a measure to combat sprawl. UGBs "mark the separation of urban and rural land" and are intended to encompass an adequate supply of buildable land

that can be efficiently provided with urban services, such as roads, sewers, water lines and street lights, to accommodate the expected growth during a 20-year period.[20] The premise behind the UGB strategy is that by providing land for urban uses within the boundary, rural lands will be protected from urban sprawl. It should be noted that UGBs are not a no-growth measure, like growth caps or development moratoria. UGBs address where and what type development occurs. While a no-growth measure would be very unpalatable to a city or county in a developing area, UGBs may be acceptable, especially to cities that claim to be eco-friendly, such as Zhongshan. If a UGB were to be implemented in such a city, it might be a selling point to investors looking for place to develop businesses that require high-skilled laborers that consider quality of life in relocation decisions.

According to Nelson,[21] urban containment planning (of which UGBs are a prevalent type) has two basic purposes: to promote compact and contiguous development patterns that can be efficiently served by public services, and to preserve open space, agricultural land, and environmentally sensitive areas that are not suitable for urban development. These purposes of containment plans coincide with the concerns of the Guangdong government. Land outside the boundary is

[20] Metro UGB web page

usually restricted to farm or forest uses and to very low-density residential development ranging from one unit per ten acres to one unit per twenty acres.[22]

Because Chinese local governments both own all land and provide infrastructure, theoretically UGB principles could work effectively in the PRD context, even more effectively than in the U.S. market economy, where private ownership of land for development is the prevalent.

*What is the urban fringe?*

Urban fringe (or urbanizable land) is the term for the land between the city limits and the urban growth boundary. This is where most new development occurs and is an important aspect of any discussion of UGBs. The land, at least in Oregon's cities, is governed by an Urban Fringe Management Agreement, agreed upon by the adjacent city and county. This relationship is detailed further in the City/County Relationships section of this chapter.

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[21] Nelson, 1995
[22] Nelson, 1995

**UGB History and Governance**

In 1973, the Oregon Legislature passed Senate Bill 100. Combined with other bills addressing farmland preservation, the Willamette Valley Greenway, coastal zone management, and subdivision regulation reform, the state tackled the problems associated with population growth. Out of this legislation came the requirement for UGBs to be created.

All cities, except for the Portland metropolitan area, are responsible for creating and maintaining their UGBs. The UGB itself is enforced jointly by local governments and the state, while local land use regulations are enforced only by the local governments. The bureaucracy set up to deal with UGBs is extensive. The Oregon system has several layers of government that must be involved in decisions, and three levels of courts can be called upon to make decisions.

In Portland's case, Metro[23] is responsible for managing the regional urban growth boundary. The boundary was originally adopted in 1979, and currently encompasses 365 square miles (236,000 acres) of land covering the urbanized areas of three counties (Washington, Clackamas, and Multnomah) and 24 cities. This area has an approximate population of 1.3 million.[24]

[23] Metropolitan Services District, the Portland area's regional government
[24] Metro UGB, as of February 2000

The Oregon Legislature granted Metro several specific land-use planning powers, including: coordination between regional and local comprehensive plans and adoption of a regional urban growth boundary, the power to review and require consistency of local comprehensive plans (including increasing densities allowable by zoning) with statewide and regional planning goals, and the power to plan for activities of metropolitan significance, including transportation, and air and water quality.[25]

Although cities and counties are responsible for creating UGBs, the Oregon state government has final say regarding decisions on UGBs. Senate Bill 100 also created a seven-person, gubernatorially-appointed Land Conservation and Development Commission (LCDC) and charged it with adopting and implementing state planning policy. Through its Department of Land Conservation and Development (DLCD), the nation's first comprehensive, independently funded and managed land planning agency, the LCDC required all cities and counties to comply with 14 statewide goals.

Plans for the UGBs of each of Oregon's 241 cities must be consistent with criteria set forth by Goal 14 (urbanization) of the Statewide Land Use Goals. Goal 14 contains locational factors that must be considered when deciding what land will be included in the UGB. These

[25] Metro UGB web page

factors are concerned with three main issues: efficient use of land, protection of agricultural land at the city's edge, and cost-effective public services. For example, Factor 3 calls for "orderly and economic provision of public facilities and services." That standard suggests that a rugged hilly area should not be included in the UGB, as extending services there would be expensive. The LCDC is charged with making sure that local UGB plans are consistent with the statewide goals. Cities and counties send their new land use decisions to LCDC for review. This review is not a rubber stamp; local governments frequently must change their plans due to the disapproval of LCDC.[26]

Governments that have failed to prepare plans consistent with LCDC policies have faced penalties, including loss of state revenue sharing and other funds, LCDC-imposed development moratoria, and DLCD preparation of the plan, with costs borne by the local government. The LCDC has imposed development moratoria on mostly smaller, rural counties for short periods of time. By 1985, all cities and counties had plans that were acknowledged by the LCDC as consistent with the statewide planning goals.[27] If land control powers were to revert to the provincial government, then Guangdong could implement an institutional hierarchy such as Oregon's. Until that happens, it is

[26] Nelson, 1992

unlikely that there will be any standards set for local land use actions.

LUBA

If a city, county or Metro is unhappy with the decision made by LCDC regarding a UGB modification, the entity can appeal. The first level of appeal is the Oregon Land Use Board of Appeals (LUBA). LUBA is a three-member tribunal that sits like a tax court but reviews only land use cases. LUBA is required to issue decisions on appeals within three months. Cases can then be appealed to the state's Court of Appeals, and then to the state Supreme Court, both of whom are noted for their timely issuance of decisions. Land use appeals in other states can extend over a period of years.[28]

Judicial institutions, such as LUBA, are non-existent in the Chinese context. It is mentioned here only to further demonstrate the amount of administration necessary to run UGBs.

Has state-level intervention been successful? According to Nelson,[29] it appears that state participation in the land use system has resulted in less land available

[27] Nelson, 1992
[28] Nelson, 1992
[29] Nelson, 1993

for urban development than would have occurred under a purely local system of land control.

This investigation of UGB governance indicates that there must be an extensive government infrastructure to manage and coordinate state priorities and local plans. There must also be a higher level of government to assure that all localities are playing by the same rules.

*What is an urban reserve?*

Urban reserves are areas outside the current urban growth boundary that will be added to the region's urban land supply based on their suitability for development. The reserves are required to contain a 30-year supply of buildable land just outside the current urban growth boundary. If the boundary is expanded, the added land will come from the urban reserves.[30] Urban reserves were first enabled after the Land Conservation and Development Commission amended Goal 14 to require Portland and six other cities to create urban reserves adjacent to their UGBs in 1992.

The purpose of the reserves has been two-fold. One is to provide certainty to cities, developers, and land owners

[30] Metro Reserves web site

where the region will grow in the next several decades so they can plan accordingly. The second is to protect future expansion land from piecemeal development that would make efficient urbanization more difficult when expansion does occur.[31]

Since the reserves are land being set aside for urban use far down the road, the expectation for this land is that it should remain rural until it is needed for urban densities. According to the Oregon Urban Reserve Rule (660-21-040(1)), "...Lands in the urban reserve shall continue to be planned and zoned for rural uses... Once inside the UGB, the land would be zoned for urban uses."

**The Reserve Experience in Oregon**

As of 1994, only seven (later reduced to four) Oregon cities were mandated by the LCDC to create urban reserves, one of which was the Portland metropolitan area. The original seven cities were chosen based on population size, population growth, and the amount of development in nearby exception land.[32] Other cities were given the choice of implementing the rule, but none have chosen to do so.

[31] Oregonian: January 14, 2000
[32] Nelson, 1993

By 1995, the cities affected by the reserve rule had to temporarily stop up-zonings in exception areas[33] near their UGBs and establish the extent to which UGBs may be extended into certain exception areas over time. The reserves were supposed to contain some forest and farm lands, but only to the extent that development patterns, soil conditions, and related factors indicated that the lands are necessary for conversion to urban uses.[34]

## The Selection Process

Some reserves are proposed by individual jurisdictions and property owners, while public planning agencies (in Portland's case, Metro) propose others. The process of determining reserves is an open, public process. Metro, when choosing the reserves required by the 1992 state decision, conducted open houses and public hearings around the region, conducted computer analysis, examined state-required factors and received input from local jurisdictions for all the urban reserves under consideration.

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[33] There were thousands of acres of land already developed in low density residential uses that could not be brought into UGBs without making the UGBs quite expansive, and many of those areas were of marginal quality for farming or forestry. For those, the LCDC created the "exception lands" category. Development of exception lands is subject to large acreage lot minimums and other land use restrictions aimed at preventing conflicts with nearby farming and forestry uses.

[34] Nelson, 1993

Metro addressed the state requirements by performing the following analyses: the relative cost of urban-level water, sewer and stormwater facilities; forecast of traffic congestion of roads serving potential urban reserve areas; existing and proposed school facilities; local government 2015 housing and employment allocation responses; evaluation of already developed maps and data concerning floodplains, steep slopes and wetlands; and evaluation of already developed analysis of exception land and soil types.[35] Consideration was also given to the balance of jobs and housing in the area, the size of each study area, terrain and proximity to centers.

Additionally, state law dictates requirements for urban reserves that serve as standards for the LCDC during its approval process. Urban reserves should provide:[36]

- orderly and economic provision for public facilities and services;
- maximum efficiency of land uses within and on the fringe of the existing urban area;
- environmental, energy, economic and social consequences
- retention of agricultural land as defined, with Class I being the highest priority for retention and Class VI the lowest priority; and

[35] Metro Reserves web page
[36] Metro Reserves web page

- compatibility of the proposed urban uses with nearby agricultural activities.

The selection of the Portland area reserves was clearly not a cursory process. State law requires that the first priority for urban reserve designation is exception areas or non-resource land. Second priority is marginal lands, followed by secondary lands and forestry/agricultural lands.[37]

## Expansion and the Future of Reserves

Metro is obligated by law to maintain a twenty-year supply of land within the UGB. The supply is to be reviewed at least every five years. In December 1997, the Metro Council concluded that some expansion was necessary to meet the twenty-year obligation. The Council adopted a set of projections that estimated that 32,370 new housing units would be needed over the next 20 years. Metro predicts that 470,000 more people will live within the UGB by 2017.[38]

In order to meet the demands of the projections, Metro designated 18,579 acres for new urban reserves on March 7,

[37] Metro Reserves web page
[38] 1997 figure, Metro Reserves web page

1997.[39] This designation of reserve land was challenged by residents unhappy with the inclusion of lands near Beaverton and Stafford and later overturned in court. In January of 2000, the Oregon Court of Appeals upheld a decision of the Land Use Board of Appeals stating that Metro had improperly chosen land for the reserves. The ruling against Metro was due to the inclusion of resource (mostly farm) land that should not have been included before all non-resource land had been used up.

A few days later, on January 27, 2000, LCDC approved a rule change that makes it voluntary for Metro to designate urban reserves around the edge of the UGB.[40] This change allows Metro to avoid the costly and time-consuming process of re-designating a set of new urban reserves around the edge of the region. Whether urban reserves will exist in the future remains uncertain.

The process for determining the selection of the urban reserves has proven to be highly-politicized and time consuming. These issues will be discussed later in this thesis.

Richard Benner, director of the Department of Land Conservation and Development, told a Metro committee on January 12, 2000 that the urban reserve rule has not worked

[39] Metro Reserves Ruling Appeal home page
[40] The Oregonian, January 28, 2000

well.[41] The process, even uncompleted, has encompassed three years. It seems inefficient for a process to take almost five years to complete, when the size of the reserves is reviewed every five years. This is even after a comprehensive job, with citizen input and forecasts being included in plans, in preparation of the plan that failed judicial review.

While the reserves may not have been effectively implemented, the principles behind them can be applied to other places, especially in China, where agricultural land is valued and infrastructure can play a large role in the spatial future of the region.

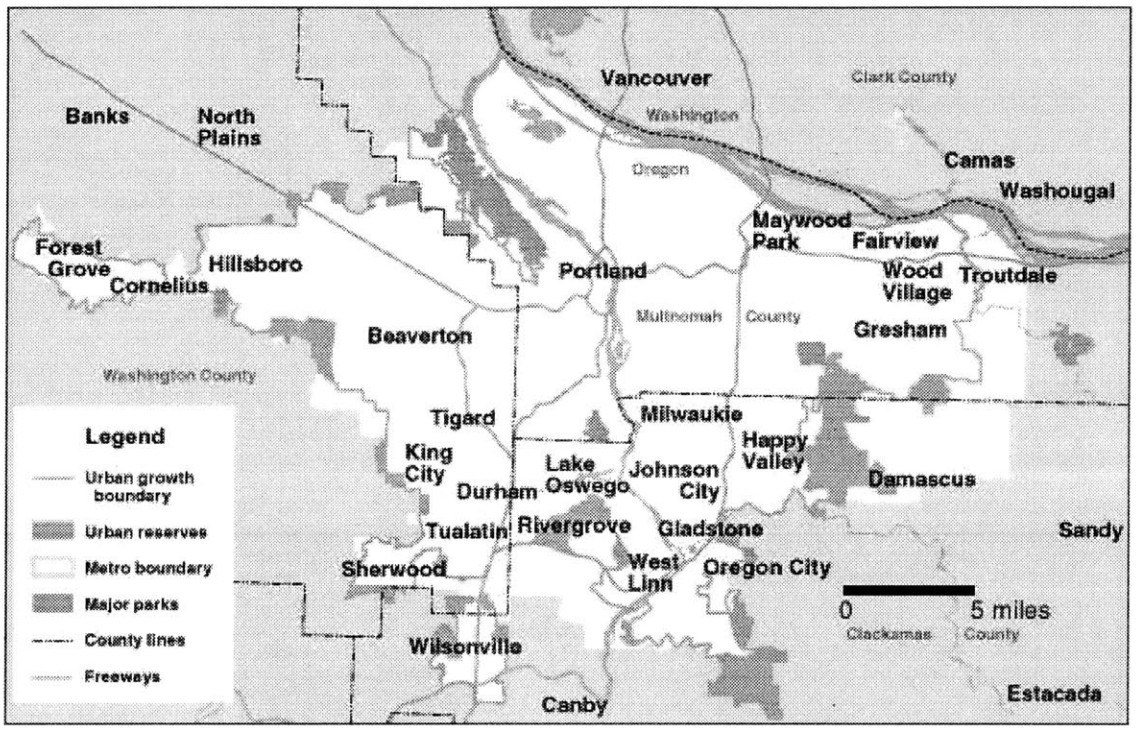
The cumbersome nature of the process of selecting urban reserves can serve as a lesson for PRD planners. A system that becomes too complicated may ultimately fail. Portland had nearly two decades of growth management experience when the reserve system was formulated, yet the reserves program was scrapped. Such an intricate system should not be put in place in the PRD, an area with little experience in growth management, at least not for several decades.

Other Possibilities

[41] Oregonian: January 14, 2000

Nelson[42] suggests that it may be prudent for selected UGB expansion into urbanizable exception lands and the creation of highly dense satellite towns. The satellite towns would be strategically located outside major urban areas, created out of existing towns where political, economic and social infrastructures exist to guide planning and development. These places could be linked to major urban areas via transportation corridors including light rail if economically feasible and put into place through a combination of new statutory authorities enabling private sector initiatives in creating the satellite towns through redevelopment.

[42] Nelson, 1993




**Map of the Portland area's UGB (from Metro)**

## Expanding the Boundary

Urban growth boundaries can be changed. In fact, UGBs are designed to be changed. Metro uses four methods to amend its UGB:

- legislative amendment;
- major amendment;
- locational adjustment;
- roadway realignment - administrative adjustment.

The primary means of long-term changes to the urban growth boundary is by legislative amendment initiated by the

Metro Council to comply with state and regional growth management policy. A legislative amendment must show that there is a need for additional urban land because population or employment growth is much different than originally expected. Once a demonstration of need has been made, the area selected for the amendment must be shown to be superior to the others. It must ultimately be shown that amending the boundary is the best way to address the needs of the urban population.

A major amendment has the same requirements as a legislative amendment; the major amendment pertains to areas of 20 or more acres. Metro has a quasi-judicial hearings process for amendments proposed by petitioners. A locational adjustment is a minor technical adjustment of less than 20 acres. A roadway realignment adjustment is a minor adjustment to accommodate the modification of a road on the UGB line.

There are problems inherent with changing the location of a boundary. Many are political, but perhaps the most difficult is determining how big the boundary is. By law, local governments (or Metro) must include enough land within the boundary to allow for the needs of housing, industry, commerce, recreation and open space for a twenty-year period.[43] Since clairvoyance is not taught in planning

[43] Nelson, 1995

school, planners must base realignment decisions on their best guesses and forecasts. A gross miscalculation can have serious effects on the land market and government spending. Designation of too little land within a boundary can lead to large increases in the cost of land and housing, legal challenges, and political pressure to prematurely extend the boundary.[44] If too much land is designated or the lands are built to insufficient densities, the purpose of encouraging compact, contiguous development is defeated. This usually leads to sprawl and excessive and premature capital outlays.

Because there is no regional plan for the allocation of immigrants or even a widely accepted estimate on the number of immigrants during the next twenty years or when these immigrant will arrive, it would be extremely difficult for PRD planners to accurately determine how much land should be included in cities' UGBs.

According to Nelson,[45] there is a good indicator as to whether a UGB has been effective in having an effect on the price of farmland. If a gap in land values between land within and outside the boundary is not observed, then too much land has been included within the boundary. This indicator is only somewhat helpful, as development may have already occurred on agricultural land in the fringe before this data becomes available.

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[44] Nelson, 1995

## Inflexibility and the "Fringe Element"

The urban reserves are (to be) managed in such a way as to prevent low-density development that could preempt efficient UGB expansion.[46] Unfortunately, this management can only apply to land that already does not have substantial build-out. The urban reserves include land that is currently used for small-acreage homesites because of exception decisions made during the 1970s and 1980s. The fear is that hundreds of small-acreage homesites encircling the UGB may prevent efficient UGB expansion when the need to increase the supply of buildable land becomes evident.[47] A new interest consisting of noncommercial farmers, sometimes called "hobby farmers," has emerged that is highly resistant to expansion of the growth boundary. These "hobby farmers" are not by profession farmers; rather, these residents derive most of their income from work elsewhere. Ninety percent of farms under 160 acres where new homes were authorized in the 1980s reported non-farm income.[48] Half of the farm operations with new homes were in the Willamette Valley, which contains Portland and 60 percent of Oregon's

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[45] Nelson, 1995
[46] Nelson and Duncan, 1995, p. 81
[47] Nelson, 1995

population.[49] Cultivating strawberries or Christmas trees can allow these landowners to get rural homebuilding permits under the exemption designed for farmers.

Ironically, by building their homes on large rural parcels, these hobby farmers are creating the exurban sprawl that UGB advocates wish to avoid. Their large parcels will not be easily subdivided into small-home lots in the future, perhaps causing a need for land to be included for urban use out beyond the "hobby farmer" homes, or at least making infrastructure provision difficult, as large parcels may be interspersed between smaller ones. Hobby farmers are hostile to UGB expansion because higher-residential densities and development of nearby open space would diminish their desired quality of life. The presence of established communities of residents leads some to believe that UGB expansion into these areas will be fought tooth and nail.[50] A problem that has arisen and is feared will arise with greater frequency in the future is the reaction of those who live on the edge of the boundary about expansion.

Nelson[51] mentions an anecdote about the Citizens for Planning Organization of the Reedville area, just outside the Portland UGB near Hillsboro, is proud of the fact that they have defeated several UGB expansion proposals by local

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[48] Staley and Mildner
[49] Staley and Mildner, 2000
[50] Nelson, 1993

developers. Many times minor boundary adjustments are needed to round out the UGB, allow for more efficient development in parts of the UGB that are built-out or remedy admitted mistakes. The inflexibility of these UGB neighbors can hinder the UGBs effectiveness.

Time

The process of selecting new lands for urban growth boundary expansion or urban reserves has been exceedingly time-consuming. The urban reserve process that ended in 2000 with some of the reserves being disallowed by LUBA and the appeals court and the death of the urban reserve requirement took three years to complete.[52]

If LCDC had not chosen to scrap the urban reserves, the process may have taken even longer. Further, Metro struggled for two and a half years to expand the boundary.[53] Metro missed deadline after deadline when creating expansion plans. This is not all the fault of Metro, though. State laws require review of all options to ensure due process. Additionally, Metro must take other issues into account than buildable land into consideration when planning, such as salmon habitat. Requirements to consider these side issues,

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[51] Nelson, 1992
[52] Oregonian, January 14, 2000
[53] Nokes, Oregonian, Dec. 26, 1999

when inserted mid-stream, cause delays as plans must be reworked.

The process of selection would undoubtedly be quicker in the PRD, as the lengthy citizen input and legal appeals processes would not interfere with land use designations.

**Other Mechanisms**

The urban growth boundary will not work effectively in a vacuum. There must be other measures in legislation that work in tandem with the UGB legislation. These can include affordable housing provisions, faster permitting, and fair approval processes.

Housing Affordability Measures

Richard Peiser (1989[54] in Nelson, 1995) observed that urban containment boundaries are prudent land use policies but only when accompanied by policies that increase urban density and intensity. Local governments within the Portland metropolitan region are required by a housing rule to zone for an overall density of six to ten units per acre of vacant residential land. At least half of all residentially zoned land must allow multi-family housing or

[54] Peiser, Richard. Density and Urban Sprawl. *Land Economics* 65, 3: 194-204.

attached single-family housing. All cities and counties with populations of 2,500 or more must permit manufactured housing on single lots.[55]

The Portland region couples its UGB policies with "pro-housing" policies. Without these policies, the UGB would quickly be pushed to the breaking point.[56] The reasons for this are two-fold. If developers are encouraged to build at higher densities within the boundaries, then there should be less demand for land to be developed near the boundary and beyond it. Greater housing affordability is aided by rules that require cities and counties to allow for affordable housing within their limits.

A 1991 study by 1000 Friends of Oregon and the Home Builders Association of Metropolitan Portland found that the region's housing policies have benefited homebuyers and renters in the Portland area, and should be extended to other parts of Oregon.[57] In Metro Portland, the "Metropolitan Housing Rule" is used to ensure that enough land is zoned for needed types. The Rule calls for the three counties and 24 cities to allow development to occur at certain minimum "target" densities, and to allow at least 50% multi-family and townhouse units. The rule is intended to prevent communities inside the UGB from adopting across-

[55] Nelson, 1992
[56] Hales and Ketcham, 1991
[57] Hales and Ketcham, 1991

the-board "large-lot" zoning practices that "exclude" lower- and middle-income households from the community.[58]

## Permit Fast Tracking

One promise of the statewide planning process was faster permitting once planning had been completed in order to remove a degree uncertainty from the approval process.[59] To assure this, the state legislature passed a law that requires all permits to be filed within 120 days of official submittal. Nelson[60] quotes Charles Hales of the Home Builders Association of Metropolitan Portland observing that a developer can process a subdivision within 180 days "from a mere gleam in the builders eye to groundbreaking." Average subdivision approval time has fallen from 18 months in the late 1970s to less than four months.[61] Hales stated that average subdivision review takes 18 months nationwide and up to two years in Seattle.

## Reduced Discretion

[58] Hales and Ketcham, 1991
[59] Nelson, 1992
[60] Nelson, 1992
[61] Nelson, 1992

Local governments often use discretionary standards to approve or disapprove development proposals. These standards allow local governments to deny or greatly modify development proposals to "further the public welfare" or "maintain community liveability" or "foster a high quality of life."[62] Oregon law makes it difficult for local governments to make decisions on a whim. When local governments employ any discretion in decision-making, it must be in writing. The developer knows in advance whether the project meets the criteria. The criteria are reviewed by the LCDC to assure that they are not unreasonable to meet. This injects greater predictability into the development process, saving time and legal costs.[63]

The rules regarding local discretion and the 120-day decision rule reduce risk to developers, as they have a greater understanding of what will be allowed and that decisions will not be dragged out. Since risk and time add to developers' costs, any reduction in these factors should lead to a reduction in the price that a consumer pays. Thus, these measures should reduce housing prices within the UGB that some fear will escalate. Housing prices will be further discussed later in the paper.

The Chinese system of granting development approvals is different than Oregon's. Thus, these specific mechanisms

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[62] Nelson, 1992

would not be present in any Chinese plan, but in order to encourage development, there would have to be some mechanism(s) to provide developers with certainty to reduce their risk. Rather than doing this through codes, local Chinese governments might try to influence developers through infrastructure provision.

Perhaps the most prudent approach for cities in Guangdong to take is the pro-active approach of building road, sewer and water infrastructure in anticipation of development in areas that the cities deem fittest for development. The presence of the infrastructure (built and ready for service) should encourage development in the designated areas. The value of the land is thus greater than comparable unserviced land and can be leased at a higher rate. The city can recoup its costs from the higher lease. The presence of the infrastructure gives developers the certainty that they desire when designing a project. This would require coordination between planning agencies and agencies responsible for providing infrastructure.[64] This coordination does not currently exist in many cities in the PRD, but would be more likely to occur than inter-city cooperation.

The availability of infrastructure may encourage industries to locate in these areas. Otherwise these

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[63] Nelson, 1992

industries might locate where there is poor or no infrastructure for waste disposal, causing environmental degradation, damaging the health of people and stunting the growth of cash crops in the Pearl River Delta. If clean water is necessary for certain processes, such as textile production, it may lower costs for these types of companies, making the PRD more competitive with other developing regions in China and worldwide.

There may be drawbacks to this type of approach. If every city plans for growth by building infrastructure, there may be problems if a lot of the anticipated development never arrives. Once again, inter-city coordination is necessary in avoiding problems. Chinese cities also must be careful not to provide too much new basic infrastructure without assuring that the overall system has enough capacity. Overloads on the systems could cause problems for the infrastructure in the older parts of cities, which is not always in good condition.

**Housing**

Density

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[64] Mattingly, 1993

"It is our judgment, based on long experience with UGB evaluations with UGB evaluations in Oregon, that the Portland region's current UGB has had, at least until recently, negligible effects on the amount or rate of growth, though it has had some effect on density."[65]

An important goal of the UGB policies was to increase urban density within existing urban areas. This program has seemingly worked in some areas, although densities fall short of what had originally been hoped. The average size for a newly platted single-family lot in the Portland area was 6,200 square feet in 1998, down from 9,000 square feet eight to ten years ago.[66] Accordingly, densities for new developments increased on average from five homes per acre to eight homes per acre from 1994 to 1997 and from 4 units per acre in the 1970s.[67] The amount of land used for new housing development has declined as multi-family housing units have increased from 25 percent of all housing permits in 1992 to 49 percent in 1997. One of the principal ways in which housing prices are kept in check is by increasing housing density.[68]

This is being accomplished through in-fill development, redevelopment in existing areas at a higher density than is currently present, and transit-oriented development (such as

[65] ECO-Northwest Portland, p. 5-5
[66] Abbott, *The Oregonian*, January 16, 2000
[67] Nelson, 1992

Orenco Station in Hillsboro). Cities and counties have adopted a variety of measures to encourage compact development, such as reducing the required number of parking spaces to allowing granny flats.[69]

## Under-densification

Even with this increase in density shown by the Portland example, the attempts at raising density can't be viewed as a complete success. Many local developers find that they receive more favorable local government treatment when they propose projects that are under the maximum density allowed.[70] Although Portland allowed high densities, actual densities were one-third less than those allowed by local plans.[71] Looking outside Portland, actual densities inside UGBs ranged from two-thirds to one-fourth below the levels permitted by local plans among Oregon's metropolitan regions.[72]

In Brookings, a city on the southern coast near the California border, new single family subdivisions used less than half of the density permitted by zoning; in Bend only

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[68] Nelson, 1992
[69] Abbott, *The Oregonian*, Jan. 16, 2000
[70] Nelson, 1992
[71] Staley and Mildner, 2000
[72] Nelson, 1992

40% of the allowable density was used. By falling short of the zoned densities, Bend and Brookings are using up their land supply prematurely and may be exacerbating pressure to expand the UGBs before the projected 20-year period.[73]

The density increases in Portland fall below the levels needed to meet Metro's projected population increase. If current trends continue with no UGB expansion, there will be a housing unit shortfall of 42,060 units by 2017.[74] If densities increase to achieve the recommendations of the Metro 2040 Plan, there will be a shortfall of nearly 9,000 units.[75] As a measure to increase densities and avoid UGB expansion, Metro recently implemented a mandate for a minimum density of more than six units per net acre, which is creating new economic and political tradeoffs and problems.[76]

## Prices

It is unclear whether the UGB has negatively affected housing affordability. Logically, any restriction on the supply of land should translate into higher land prices and higher housing prices. This is argued by some, but others

[73] 1000 Friends of Oregon Newsletter, 1991
[74] Staley and Mildner
[75] Staley and Mildner

claim other factors mitigate the effects of the supply constraint. As land prices have increased, lot size has decreased in the Portland metropolitan area. Since the lots are smaller, the home prices consumers see are lower. One thing is clear; homebuyers are getting less for their money, but they still have places to live, just without a spacious lawn and a two-car garage. There is some concern about the redevelopment that has been happening in lower-income neighborhoods and the effect that the new construction has on nearby residents.

Some of the disparity in figures given in this section may be due to the times in which the data were collected. Some of the lower-price numbers come from the early 1990s, while the figures of Staley and Mildner come from the later 1990s, when a strong economy, especially in the high-technology sector, and an increase in population have increased prices across the board dramatically, as any economic spurt would.

According to Staley and Mildner, since the passage of Oregon's growth management laws, the cost of housing in urban areas has increased significantly. As examples, they claim that, according to the National Association of Homebuilders, the city of Eugene ranks in the bottom three

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[76] Staley and Mildner

percent in housing affordability nationwide and that Portland and Medford rank among the bottom ten percent.

Other lessons can be taken from Boulder, Colorado's experience. Boulder has had an urban growth boundary, surrounded by a city-owned greenbelt for many years. This green ring has caused the amount of developable land in Boulder to decrease over time. According to a report prepared for Metro by consultants ECO Northwest, Boulder's housing market has changed due to this supply constraint, since developers have compensated for rising land prices by building smaller units on smaller average size lots. In turn, the character of the housing stock has attracted a population that desires smaller units. If a metropolitan area were to constrain housing quantity and choice by reducing the land available for development, prices would rise. In Boulder's case, this has caused an increase in people living in other nearby cities (with lower home prices) and commuting to Boulder to work.[77] While Boulder itself may not be sprawling, other parts of the Denver area may be, leading to longer commutes; Boulder may just be transferring its negative externalities elsewhere. This is due to the application of different land use standards in a limited area.

[77] ECO Northwest Portland

By restricting uses outside of the regional boundary to a large degree, the option of living in a jurisdiction with no anti-sprawl measures and commuting does not seem to exist in Portland's case at first glance, thus forcing people into higher-density homes. The restriction on rural use is binding only in Oregon, though. Across the Columbia River, in Washington state, lies the City of Vancouver, which has grown rapidly lately. Since 1990, Vancouver has annexed more people than any other city in the state. Vancouver's population has increased from 46,380 in 1990 to 132,000 in 1998.[78] This has moved the city from the ninth to fourth largest in the state. This is due, in the most part, to Portland's economic and population growth. Approximately one in every three workers in Clark County (Vancouver and its suburbs) works in Oregon. Of the total labor force in Clark County, only 69% remain in Clark County to work. Oregon's industrial area is dependent to a degree on labor from Clark County.[79] In terms of area, Vancouver has exploded in size from 15.6 to 44.8 square miles since the start of the decade.[80] Thus, Vancouver is home to many people that could be living within Portland's UGB. Portland's UGB may, in fact, be causing sprawl in Clark County. The lack of population pressure provided by

[78] Vancouver, WA Annexation web page
[79] Metro Transportation web page
[80] Vancouver, WA Annexation web page

residential expansion across the Columbia may have delayed decisions that may have made or broke the UGB. There is no literature describing the effect that Vancouver's growth has had on Portland's UGB and need for housing, but one must assume that Vancouver has acted as a safety valve for Portland's growth.[81]

Countering the claims of those who claim that UGBs are responsible for the rise in housing prices in Portland is a study cited by 1000 Friends of Oregon. This study (unnamed in article) claims that Portland was the 23rd-least affordable housing market in the United States. Nine of the top fifteen least-affordable markets were in California (which do not have UGBs or only recently have UGBs or urban service areas).[82]

According to Nelson,[83] house prices have not risen much relative to the nation. A study by Russ Beaton, a Willamette University economics professor, found that Oregon's prices rose in tandem with the national trends in the early 1980s.[84] Of course this study was done twenty years ago, not within the last five years, when the price of land within the UGB has risen drastically.

According to Eban Goodstein, Associate Professor of Economics at Portland's Lewis and Clark College, the effect

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[81] Vancouver Annexation web page
[82] The Oregonian, Jan. 13, 1995
[83] Nelson, 1992

of land-use regulations on housing prices in Portland was relatively small. Of the $144,000 median price of a home in Portland in 1996, Goodstein claims that less than $10,000 was due to land-use regulations.

The coordination of land use may also lower costs to the consumer through efficiency. In theory, modest increases in density translate into capital facility investment and maintenance savings that homebuyers ought to realize through tax savings and lower user fees that would otherwise occur.[85] From an efficiency perspective, UGBs and related policies provide information to developers about future development patterns that, if accurate, can improve the dynamic efficiency of land markets. If it is known that development will soon take place on agricultural land inside a UGB, then improvement in agricultural production is unlikely. Land market efficiency is enhanced as information about future development is capitalized into land values and market participants can react accordingly. The most effective way to do this is through centralized regional planning and administration. If sewers can be coordinated at a regional level so that the entire development community knows for certain where facilities are and where they'll be extended, then development costs will be reduced.[86]

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[84] Nelson, 1992
[85] Nelson, 1992
[86] Nelson, 1993, p. 31

As mentioned in a previous section, if there is a concerted effort by local PRD administrations to provide infrastructure to areas that they are appropriate for development (poor farm land, farmland that has been encroached upon), this land can be incorporated into cities in a more efficient manner than is currently occurring.

## Urban In-fill/Detractors

In-fill and redevelopment are a crucial element of the state's plans to concentrate population. There has been a resulting business in in-fill development on smaller sites. A significant portion of the development in the Portland metropolitan region has been in in-fill projects. Metro estimates that 25.4 percent of development in the Portland metropolitan UGB is either in-fill or redevelopment.[87] While this may be seen as desirable since it promotes denser development, it has also affected lower-income residents. The land that is attractive for redevelopment is cheaper land where lower-income people can afford to live. Redevelopment of the land results in displacement of residents who cannot afford the new construction. Conflict has arisen as established residential areas often oppose redevelopment and in-fill proposals that are seen as

[87] Staley and Mildner

introducing different people to the area, creating more traffic and raising property values/costs.[88]

Local real estate consultants estimate that from the second quarter of 1995 through the second quarter of 1997, rising housing prices pushed 80,000 single-family homes over thresholds of affordability.[89] Only 6,450 single-family homes and 3,530 multi-family units were approved between 1990 and 1997.[90]

High in-fill/refill rates require higher home prices to justify the development of smaller and relatively more expensive parcels of land.[91] Also, if homebuyers cannot trade off home size for larger lots, they may invest in building bigger and more expansive homes. Portland was achieving a higher rate of in-fill and redevelopment because land and housing prices were increasing. Inner-city Portland appeared to be affected the most from these higher rates of redevelopment. From 1990 to 1995, inner-city neighborhoods in Portland experienced a substantial increase in inflation of home prices. Home prices in north Portland doubled, rising from $41,300 in 1990 to $83,800 in 1995 (in

[88] Staley and Mildner
[89] Staley and Mildner
[90] Staley and Mildner
[91] Staley and Mildner

non-inflation-adjusted dollars).[92] The average home price regionwide increased from $97,684 to $152,700.[93]

Staley and Mildner's arguments, simply put, are that higher refill rates come at a cost: higher housing prices, less affordable housing, and less private open space or yard area. Most housing units in the PRD do not have a significant amount of private open space or yard area, so this concern would not be of great concern to PRD planners.

In some areas of the PRD, there is no need for increased density that could be induced by higher prices caused by constraining land supply. Central Guangzhou is quite dense presently and is becoming more so without the benefit of a UGB. Central Shenzhen is also thriving with dense settlement. But as Yeh and Wu have described, there is a fair amount of uncoordinated, low-density development that, if emulated in the future, could endanger agricultural production, so strategies that increase densities may not be inappropriate for the PRD context. Thus, increasing land prices may not be as troublesome in the PRD as in Oregon.

[92] Staley and Mildner

**Farmland**

According to Nelson, farming in the Willamette Valley owes its survival to the Oregon planning program.[94] Agriculture and forestry are the states first and second leading economic sectors. Tourism is the fourth leading economic sector, and is Very much related to the beauty of Oregon's open spaces. Without the willingness to restrict farmland to farm uses only, the farming economy would probably have died. Farming depends on an infrastructure of suppliers and workers as well as a sizeable land base. As the land base dwindles and farmers perceive future urbanization of their land, the entire farming infrastructure deteriorates and eventually collapses.[95] This accelerates sale of farmland for essentially non-farm uses. Also, accelerating the process is the fact that buildable land typically sells for 10 times the value of farmland.[96] That is why it has been important to keep land values low on farmland outside the UGB; the temptation to sell to developers is lessened. Oregon has successfully preserved and even enhanced the critical mass of farmland needed to support the farming infrastructure.[97] There are

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[93] Staley and Mildner
[94] Nelson, 1992
[95] Nelson, 1992
[96] Oregonian: January 14, 2000
[97] Nelson, 1992

anecdotes of farmers just outside the Portland UGB buying "exception" land outside the Portland UGB for more money than rural residentially-inclined buyers would pay. The farmers are putting that land into high value crops like grapes for wine-making.

**Transportation Money**

In the three counties where sprawl was greatest (Deschutes, Curry and Jackson, all of which are mostly rural), the DLCD study noted that "state highway expenditures may work against state land use policies to concentrate growth inside UGBs." About 85% of each of those county's state highway dollars went to projects in rural areas that would, as the DLCD study put it, "enhance the attractiveness of rural housing opportunities by aiding access to them."[98]

**Exception Land**

Subdivision and development of exception land on one to ten-acre parcels is easier in part because everyone has written the land off, as neither urban land nor farmland. Exception land is not subject to the kind of technical

[98] 1000 Friends of Oregon Newsletter, Spring 1991

review and development requirements as developments inside the UGB. Low-density urban development is often a consequence. The fast-growing central Oregon city of Bend, until recently (after a large UGB expansion), saw that there was more development outside the UGB than inside.

**City/County Cooperation**

The urban fringe in Oregon is under county jurisdiction, yet it is the city that will eventually be responsible for providing services to the area. There is a state mandate that cities and counties have a written agreement on how to treat these lands to prepare them for orderly assimilation into the growing city when the time comes. Unfortunately, the results of these plans are often undesirable. In this section, first, there will be an examination of the Urban Fringe Management Agreement between Benton County and Corvallis, Oregon to demonstrate the complex nature of the agreements. Second, there will be a discussion of a case in which this agreement, no matter how thorough and well intentioned, failed to create a positive outcome.

Corvallis and Benton County have a policy for planning in the urban fringe, the Corvallis Urban Fringe Management

Agreement. The city and county were required to establish this joint management procedure by Oregon law (ORS 197.190). The State requires, through both statutes and the Statewide Planning Goals, that there be a generalized, coordinated Comprehensive Plan Map and policy statement for the urban fringe.

Corvallis and Benton County have agreed to the following process for review and action on development proposals and implementing programs that pertain to the urban fringe.

Corvallis is to make recommendations on the following:

a. Amendments to the zoning ordinance text and map
b. Planned Unit Developments
c. Conditional Use Permits
d. Land division
e. Public facility master planning
f. Public improvement projects
g. Utility extensions
h. Health hazard areas
i. Capital improvement programs
j. Special district formation

Corvallis is responsible for the preparation of a Public Facilities Plan for the UGB as required by ORS 660-11-000 and ORS 197.712. The city has to consult with the County and consider incorporating into the Public Facilities Plan recommendations made by the County about design standards, extensions, and improvements to county roads within the UGB. One might expect that given the documentation of agreement between the city and county that development outcomes would be at densities that were not conducive to sprawl, but this has not been the case.

Highland Dell Estates

The Highland Dell Estates development in Corvallis is a recent example of the lack of coordination despite the presence of plans. The Highland Dell area is a 143-acre site located adjacent to the northern city limit of Corvallis. Housing to the south of the limit is built-out at urban density. In the mid-1990s, the Frontier Land Company proposed and requested annexation for 411 single-family homesites on the 143-acre parcel. It was recommended for approval by the City's planning commission, but was turned down by the City Council for referral to the voters because of opposition related to a number of factors, most particularly traffic impacts and access. As a result the

developer submitted an application to the Benton County for a subdivision composed of 32 five-acre lots and received approval. As part of the approval, the developer was required to demonstrate how the plan could be resubdivided to a higher density and provided with services in the future.

**Development at Highland Dell Estates**

While city and county staffs did the best they could to take a low density development and plan for future urbanization through the requirement for a resubdivision plan, based on experience elsewhere, there is little confidence by those involved that such a resubdivision would actually occur in the future.[99] If it does happen, it will likely occur in a piecemeal fashion, making extension of

sewer and water lines practically difficult and expensive. Based upon experience to date, the most likely scenario is that future residents, enamored with their rural lifestyle, will oppose resubdivision plans by any of their neighbors and/or attempt to block future annexation of properties to the City to receive urban services.[100]

Even though Corvallis had its required UGB and a written agreement on how to handle the urban fringe, low-density, large-lot, potentially sprawl-inducing housing was allowed to be constructed at the edge of the city because of a lack of coordination between the city and county governments. While the city/county structure in the PRD is different than in Oregon, the Highland Dell Estates example demonstrates the importance coordination has in growth management efforts.

**Final Review of the Oregon Experience**

It is clear that the UGB process is not simple; it requires sophisticated planners at several levels of government in Oregon. There must be coordination between cities and counties, and cities and state agencies. Nor do

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[99] Cogan Owens Cogan
[100] Cogan Owens Cogan

UGBs solve all problems relating to urban sprawl; UGBs may in fact cause other problems.

Many observers, such as Nelson, believe that the Oregon UGB experiment has been successful, so at first glance it may be a strategy that the cities in the Guangdong Province should study if they are interested in sprawl control. According to Nelson,[101] the successes of the program include: 1. development has been focused inside the UGBs 2. the effect on housing prices has generally been favorable, 3. housing patterns have become more dense, 4. the permit "fast tracking" program has been effective 5. reduced discretion has lead to greater certainty 6. the legal process has been streamlined, and 7. the program preserved large blocks of rural land for resource use. Densities in the cities have increased and farmland has been preserved.

The success has been tempered by complications, though. The process of modification has been time-consuming. Administration of the UGB has been costly. Since 1974, Oregon has spent $100 million to run the UGB process.[102] According to some, housing prices have risen to levels that have endangered housing affordability for the low- and middle-class residents in Portland. The treatment of land on the edge of the UGB, with large lots being occupied by

[101] Nelson, 1992
[102] Nelson, 1992

affluent, non-farmers may have been inappropriate in terms of sprawl control and may present problems in the future.

**UGB Possibilities in China**

City densities in the PRD could be affected by decisions concerning the UGB. Local jurisdictions or the Guangdong authority can adjust the location of the boundary to suit their needs. The land for development can be relatively unrestrained and development can continue to occur as low-density construction on the fringes. Conversely, the jurisdiction can constrict the land supply to encourage higher-density development and facilitate transit-oriented-development, using Portland's model of eight to ten units per acre (unlikely, as this is a very low density for China), or allocating 270 $m^2$ per person as Singapore does, or allocating 100 $m^2$ per person, as called for in the Pearl River Urban Systems Plan.

Decisions regarding auto use and ownership would play a role in determining the size of a UGB. A system that encourages auto ownership and auto use will undoubtedly lead to a lower-density city or a highly congested city if the development area is severely restricted. Decisions concerning the allotment of parking would be of great importance. The provision of parking structures, and

especially surface parking, would lead to a much lower urban density and thus require more land to be used for urban development. Whichever jurisdiction were to control the governance of the UGB might want to operate within a shorter time horizon than Metro's twenty-year horizon, as the magnitude of immigration and uncertainty around and trade/economic growth issues will make population forecasting very difficult.

Where could a UGB work in the PRD?

A UGB is unlikely to be used in Guangzhou. The population is too great and the core of the city has a high population density already. In fact, an aim of the city may be to de-densify, which certainly would not be helped by a UGB. The presence of the sprawl spreading to the east towards the Guangzhou Economic Trade Development Zone may preclude a UGB. UGBs would probably be more sensible around smaller cities or larger cities that have not experienced a great amount of sprawl.

Additionally, the sprawling development along the highway corridor between Dongguan and Shenzhen seem ill-suited for this type of measure, as its corridor shape would be problematic to draw a circle around, the area is

geographically confined by mountains and most agricultural land there has already been developed.

Cities on the western side of the River, far to the south of Guangzhou might be appropriate. Small towns may also be appropriate. Cities to the east of Dongguan may want to institute such measures to protect their neighboring lands from the rampant land clearing around that city. Cities that claim to be eco-friendly or that derive much income from agricultural goods may also be appropriate locations for such policies.

# Chapter 3: Adequate Public Facilities Measures

It is clear that urban growth boundaries require a large bureaucracy and a land planning ethic that most places do not have. There are other methods of growth management that are simpler in nature and require fewer governmental agencies. One of these is the adequate facility requirement. Adequate facility requirements, or concurrency requirements, have also been used in the United States as a means of battling sprawl. Like UGBs, these requirements are not designed to stop growth, only to manage new development in a responsible way. While, both UGBs and concurrency are concerned with the orderly provision of infrastructure; concurrency is exclusively so. This makes it an appropriate model to examine when considering the Pearl River Delta's future, as much of the PRD's future will be determined by infrastructure timing and location. The basic philosophy behind adequate facility requirements is that no development should occur if there is not the infrastructure to support it. In order for a development to be approved, there must be adequate sewer, school, road and water capacity in place at the time the project is completed.[103]

[103] Fodor

Two states are best known for their concurrency requirements, Washington and Florida. Florida enacted its concurrency laws in the late 1970s, in response to a rapid influx of population (up to an average of 1000 new Floridians per day).[104] Florida lawmakers feared that this growth, if uncontrolled, would harm the state's environment, be costly to municipalities, and damage the state's agricultural and tourist economy. Washington state, harboring similar concerns, has also adopted adequate public facilities measures, but applies them only to transportation infrastructure.

**Standards**

Adequate level of service must be defined if adequate public facilities laws are instituted. Washington law states that proposed development may not proceed if it would lower the Level of Service (LOS) of a transportation facility below the adopted standard.[105] Transportation improvements that would bring the LOS back to the adopted standard must be reasonably funded and scheduled for completion within six years. Florida law is similar in that local governments are not allowed to issue permits that would result "in a reduction in the level of services for

[104] Arline, 1998

the affected public facilities below the level of services provided in the comprehensive plan of the local government."[106]

Since Washington's concurrency laws are applicable only to transportation infrastructure, LOS measurements are concerned only with transportation infrastructure. Vancouver uses three tests to examine a new development for concurrency. These tests include: 1) an evaluation of whether we can drive through corridors at a minimum predetermined average speed; 2) an evaluation of specific intersections along a given corridor to ensure that a predetermined percentage of these intersections meet the LOS standards; and, 3) what is referred to as the "300 second test." The 300 second test measures whether you are able to get through an intersection within two cycles (light changes) or a maximum of 300 seconds. The 300 seconds is based on the worst case scenario. Traffic lights in the city vary in time, location to location, and range from 55 seconds to 120 seconds. If you can't get through the intersection in two cycles, then the intersection would fail this test. Failure of any one of these three tests will cause the affected areas to be closed to future development

[105] City of Vancouver, WA Transportation web page
[106] Nelson, 1995

until the next annual review or until satisfactory improvements are identified and funded.[107]

Thus, a system to monitor performance is necessary. This requires hiring a staff or investing in technologies to gather this data, which could be costly, especially in a large city. Cities in the PRD may not be willing or able to spend funds on monitoring level-of-service, especially when the alternative (no growth management) does not require the employ of a larger staff or investments in technologies.

**Assessments**

Florida's concurrency program was originally evaluated by many as flawed. The level-of-service requirement forced developers to look away from areas that were already built-out to fringe or rural lands where traffic flow was not great and there was excess capacity.[108] This consequently led to a lack of in-fill or "main street" development and encouraged urban sprawl. Instead of containing growth and creating compact cities, the growth management technique led to increased road construction and increased auto-dependence.[109]

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[107] City of Vancouver, WA Transportation web page
[108] Weitz, 1999
[109] Ewing, 1998

Problems have also arisen due to a lack of coordination between municipalities and (non-road) infrastructure providers. Private utilities in Florida are regulated by the state Public Service Commission. Franchise areas can be approved by the state that can be in conflict with local comprehensive plans and utilities can be built beyond a municipality's urban service area, defeating local growth management efforts by opening up new areas with unburdened infrastructure.[110]

The original Florida concurrency laws have been amended to allow for the concurrency regulations to be ignored in cases where the cause of compact development will be aided by new development. This change in philosophy assumes that center cities and main streets will be congested and that that is not necessarily harmful for the city. It is still too early to determine whether this new approach has been successful,[111] but it highlights the need to avoid rigidity in growth management strategies, since flaws will invariably surface.

Concurrency, although it concerns infrastructure, expenditures also appears to inappropriate for this context. Local governments seem happy with providing infrastructure to all projects, even those that are illegal, regardless of the level of service. The problem Florida has experienced

[110] Arline, 1998

with the lack of coordination between one arm of the state government (the Department of Community Affairs) and another (the Public Service Commission) does not bode well for the PRD, given its recent history of government coordination. Additionally, since auto use is currently low, road infrastructure in many places (Guangzhou excepted) may not currently be overburdened. This practice, though, may prove helpful in the future if auto use rises significantly and inter-municipality coordination improves, providing that Florida's mistakes are avoided.

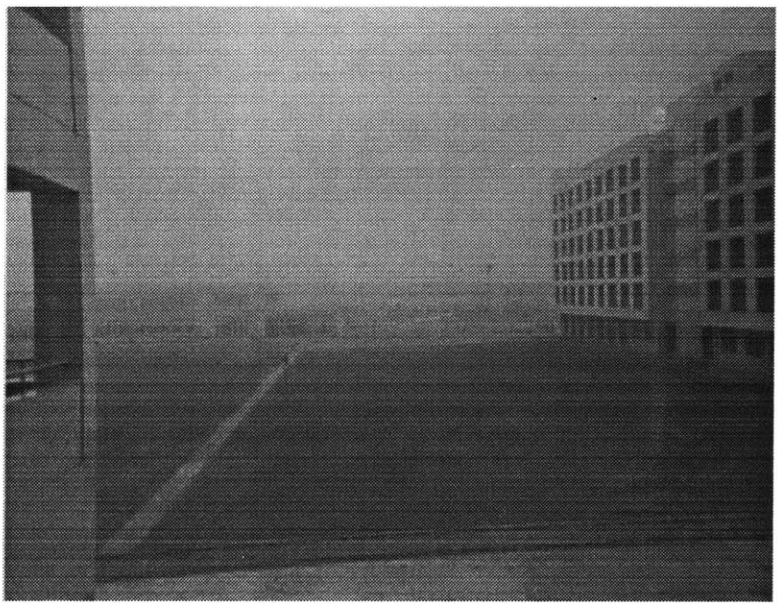
[111] Arline, 1998

# Chapter 4: The Chinese Context and Conclusions

The Chinese context provides issues that are not present in the American contexts that are worth mentioning in regard to the spatial future of growth in the PRD. This chapter briefly explores these issues and reaches conclusions about the appropriateness of the growth management programs discussed in this thesis and what decisions would need to be made to allow any growth management program in the PRD to have a likelihood of success.

Currently many factory workers in the PRD live in on-site dormitories. The dormitories increase population density and reduce the need for public transportation, since workers do not need to commute. This concentration of workers probably would preserve farmland, but many of the factories are built on lands outside of cities and towns, so agricultural land is not preserved, as it might be if the factories were located within cities more often. It is uncertain how much longer this system of dormitory living will continue. If China joins the WTO, the attraction to come work in the PRD to earn money to send home may lessen. Other areas of China may become more competitive as foreign

companies can invest directly in China, without having to be funneled through Hong Kong and its hinterland. As incomes increase in the PRD, it is possible that factory workers will look to live elsewhere and commute. This will create a demand for more housing, which might be developed on the urban fringe on agricultural land. This is an unlikely scenario, but would be worth envisioning when designing a program that would reduce the urban use of agricultural land.



**Worker Dorms at Mattel plant in Nanhai**

The introduction of private infrastructure providers may cause a change in and use control in the future. Although there are pilot programs, such as a program in

Shanghai, it is unlikely that privatization of infrastructure will occur to a large extent in China in the near future.[112] Thus, cities should retain their power of infrastructure provision well into the future.

**Conclusions About Importing Growth Management Programs**

In this section, there will first be a short discussion of the growth management reviewed in this thesis and what institutions need to be in place for there to be success. The discussion will then turn to the Chinese context and how well the growth management programs mentioned in this paper might work in the PRD. Finally, there will be recommendations about what lessons and aspects of growth management can be applied in China.

Urban growth boundaries require regional coordination and cooperation; a method of monitoring to determine whether there is enough/too much land within the boundary; a designated body that selects which lands are to be included within the boundaries; a system of grading agricultural land by fertility; and mechanisms to counter anticipated problems that might arise due to the presence of a UGB. Concurrency also requires coordination and monitoring, in this case, the level-of-service provided by infrastructure, whether it be

[112] Wu, Weiping, 1999

sewer, schools, or roads. Without these requirements, these programs would be ineffective and not worth pursuing.

Ancient Chinese cities were constructed as towns with walls built around the settlements and agricultural lands. Is a return to this design, with UGBs serving as the figurative walls, possible? Would concurrency be an appropriate measure? The emphasis on economic development at all costs, the lack of power of plans, the lack of coordination between localities and the local governments' willingness to ignore illegal uses suggest that strategies such as this would be doomed to failure. Any approach that would stand a chance of success in the region would have to appeal to local governments economically, rather than in a land planning context.

In order for any growth management program to be implemented in the PRD, whether it be a UGB, an adequate infrastructure provision law, or any variation of those, certain decisions must be made to facilitate the process. Almost paradoxically, the Chinese socialist government has less control over local land use decisions than the American states have over land within their jurisdictions. There must be a fundamental shift in the philosophy of local governments regarding planning and resource management. Decisions favoring a regional approach to growth will aid the cause of growth management. This could be accomplished

through a redistribution of power back to the provincial government or through a regional body with representation from all of the cities, although the latter choice may be ineffective due to its lack of financial power over the cities. Perhaps guidelines can be made at the provincial level outlining appropriate or allowable densities for cities to follow. Additionally, the provincial level government could set standards for which agricultural land might be the most appropriate to take for development, if necessary. Since the provincial government is responsible for inter-city infrastructure provision, its investments would have to be allocated in such a manner that local growth controls would not be undermined.

It is not entirely necessary for there to be a provincial or regional authority to enact growth control measures. Individual jurisdictions could enact measures, but might run the danger of spreading their externalities to other jurisdictions without similar controls, a la the Boulder or Vancouver, WA cases.

Without any change in the political climate in the PRD, it is difficult to heartily recommend any of the growth management programs as a whole examined in this thesis. The amount of regional and state level governance that is key in Oregon's program does not exist even to set guidelines or review plans, as Oregon's LCDC does. A line could easily be

drawn around a city and statements could be made by planning authority regarding not allowing growth outside of the line, but the presence of such a line is unlikely to discourage sprawling development in the current situation.

**Figure 1: Summary Chart of Urban Growth Boundary Usefulness**

| | Definition and Features | Requirements for Effectiveness | Likelihood of PRD Success |
|---|---|---|---|
| **Urban Growth Boundaries** | Line drawn around cities or metropolitan areas, outside which development at urban densities is highly discouraged. Expandable when necessary. Usually contains enough land for projected 20-year growth. Can be designed to encourage any density. | • Intra-city governmental coordination<br>• Inter-city governmental coordination<br>• Body that chooses lands appropriate for development<br>• A method to determine which lands should be protected<br>• Accurate projections of population and land needs<br>• Decisions regarding preferred densities<br>• Mechanisms to help counteract any anticipated problems associated with UGB<br>• Universal standards, if done at regional scale | A lack of coordination would lead to differing standards. Cities might fear placing themselves at competitive disadvantage or spread their problems to other parts of the region Guangzhou may be too large and might seek other methods. The area between Guangzhou and Shenzhen is already too developed to make much of an impact. "Eco-cities" could use the measure as advertisement for quality of life. Success is ***unlikely***. |

Concurrency is also likely to encounter problems if imposed on this context. Control in one area likely will

drive sprawl to other nearby areas, probably less able to cope with development pressure. The goal of preventing sprawl and preserving agricultural land would probably not be met by the enactment of concurrency requirements. Thus, UGBs and concurrency would not be useful in the PRD context, unless there is a dramatic shift in governmental policy.

**Figure 2: Summary Chart of Concurrency Usefulness**

| | **Definition and Features** | **Requirements for Effectiveness** | **Likelihood of PRD Success** |
|---|---|---|---|
| **Concurrency** | Does not allow development to occur if there is not sufficient infrastructure to support it. | • Intra-governmental coordination<br>• Monitoring to determine whether the is sufficient infrastructure<br>• Standards defining sufficient level-of-service<br>• Illegal development is not serviced | Lack of current intra-governmental coordination in the PRD does not bode well for concurrency. Success is ***unlikely***. |

The best strategy described in this thesis to combat the urban sprawl problem in the Delta is the strategy in which local governments pro-actively supply infrastructure in anticipation of development in areas that cities feel are best suited for future development (not high value

agricultural land). While there are drawbacks to this strategy, such as the possibility of overbuilding infrastructure because of overanticipation of demand, the risks associated with and the amount of governance required for this strategy are the least of the three discussed in this thesis. By concentrating development in designated areas, capital outlay should be less than in a situation of sprawl. Thus, local governments might be enticed to undertake this program. While this ultimately may not be the perfect solution, it fits the PRD context better than the other strategies and is worth exploration by Chinese officials.

**Figure 3: Summary Chart of Pro-active Infrastructure Provision Usefulness**

| | **Definition and Features** | **Requirements for Effectiveness** | **Likelihood of PRD Success** |
|---|---|---|---|
| **Pro-active Infrastructure Provision** | Local governments build infrastructure only to designated areas where development is appropriate. | • Intra-governmental coordination<br>• Determination of what land is best to develop<br>• Illegally-occupied lands are not serviced by the cities | Of the three programs, this is the ***most likely*** to succeed. It will only succeed, though, if there is coordination between planning and economic wings of local governments |

Pieces of the American programs may be used to help solve or prevent problems in the PRD regarding land use. Regardless of which (if any) growth management program is formulated by the governments in the PRD, there are principles from the American cases that can be used to guide their strategies and lessons that can be learned from the American experiences that should be incorporated into any Chinese growth management efforts. These principles seem to be transferable across national borders. These principles include:

1. Problems will invariably arise with any growth management program, as in the case of Florida's growth management effort actually contributing to exurban sprawl. There should be a method of monitoring to uncover any problems that may be arising so that remedies can be formulated. Any plans that are made should try to be as flexible as possible, so that changes can be made to remedy problems that may occur in a timely fashion.

2. Agricultural land should be examined to determine which lands would best be used for urban uses. Because of the magnitude of the expected population growth in the PRD, it seems unlikely that all

agricultural land can be saved from urban development. Thus, local PRD governments will be faced with decisions on which lands to allow development, if they are truly concerned with the preservation of agricultural land. Cues can be taken from the Oregon system in terms of preserving the most valuable agricultural land while sacrificing the least.

3. The goal of effective provision of services found in the American examples should be applied to plans in China. While this has not always been achieved in the United States, the pursuit of the goal has served as a guide for the American programs. In theory, the effective provision of services should reduce sprawl because planners should be able to funnel development to pre-determined areas because of the reduced risk faced by developers.

4. Regional coordination is a key aspect of growth management. If one municipality enacts a growth management program, nearby cities should not have to suffer the consequences of the locality's externalities, as in the case of Vancouver, WA and the cities around Boulder, CO. Conversely, cities

should not feel that that they would put themselves at a competitive disadvantage if there were increases in land prices due to growth management, as some fear Portland is doing.

5. While regional coordination is necessary, intra-governmental coordination is also a must. The economic development and planning arms of local jurisdictions must work together, so that competing interests do not render plans ineffective, such as the situation in Florida's state government.

An interesting project to pursue might be an examination of how the governments in the PRD may be encouraged to cooperate. The report prepared by the studio paints a frightening picture of the future if there is no coordination. Even if the Chinese governments realize the pitfalls of the current system, they may not have clear ideas on solutions. Such a study might be of assistance for them.

Growth management programs are not perfect, but the terrible consequences that may well result from a large population influx and the current governmental situation, lead me to believe the PRD is an appropriate location for such programs. Even if a few problems result from growth

management implementation, they should be lesser in severity than what could conceivably, and probably will, happen. Unfortunately, it is doubtful that growth management will occur in the near future without some sort of impetus. It may be necessary for a planning disaster to occur before anything is done at the local level. Perhaps if Guangzhou continues its sprawling pattern and eventually engulfs Foshan and Nanhai and stretches eastward to Dongguan, destroying farmland and creating traffic problems reminiscent of Bangkok, it could spur action by cities afraid of becoming a "new Guangzhou." Oregon was afraid of "Californication" (Los Angeles-type sprawl) before creating its system. As incomes increase in the PRD, a certain number of people may demand a higher quality of life and attempt to influence local governments to choose more sustainable development practices. This would be a worst case scenario, but not unlikely to be the situation that occurs. Hopefully, the jurisdictions of the PRD will not take so long to determine that a change in land policy is necessary.

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