# Building Community Resilience to Climate Change with Facilitated, Collaborative Dialogue: Evaluating the VCAPS Process

By

Zoë McAlear

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Author_____
Department of Urban Studies and Planning
May 13, 2020

Certified by _____
Professor Lawrence Susskind
Department of Urban Studies and Planning
Thesis Supervisor

Accepted by_____
Ceasar McDowell
Professor of the Practice
Chair, MCP Committee
Department of Urban Studies and Planning

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## Abstract

As communities around the world experience greater impacts from climate change, collaborative adaptation planning efforts are crucial to preparing for the future. This research examines one of these efforts, a pilot of the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) technique by Western Water Assessment (WWA) at the University of Colorado Boulder across six communities in Colorado and Utah. The VCAPS process facilitates conversations amongst local decision-makers using collaboratively-built causal diagrams to understand how a hazard leads to specific outcomes and consequences, which correspond to potential points of intervention or actions. Using a survey and two series of interviews with participants, as well as documentation from the workshops, this research assists in the evaluation of WWA's six pilots. The questions guiding this research ask to what extent the VCAPS process better prepared the pilot communities to face their identified climate hazard(s), in terms of increased motivation, ability to overcome challenges or barriers to adaptation, and actions generated or influenced by the workshop. I find that these six pilot workshops demonstrate the potential of the VCAPS process to inform participants' understanding of their region's climate change risks and generate climate adaptation-related actions in their communities. At the same time, feedback and reflections from participants suggest various ways in which the process might be adapted for future iterations in order to respond to current challenges or limitations. I propose recommendations to address these, often relying on examples of other collaborative climate adaptation processes.

Thesis Supervisor: Lawrence Susskind
Title: Ford Professor of Urban and Environmental Planning

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# Introduction

Water supply providers and government officials in the Spanish Valley/Moab region in Utah have begun to notice increased variability in their weather from year to year, and increased exposure to extremes in temperature and precipitation. The region experienced a historic drought in 2018, with extremely low snowfall that resulted in reduced runoff and water availability. The following year, 2019, was an extremely wet year, with a large winter snowpack and an extended cool and wet period in the spring. This increasingly extreme variability has left decision-makers unsure of how to best manage water supply in the region, and what actions they can take to minimize their vulnerability and prepare for the future. In this context of uncertainty, a local decision-maker heard about a research program, Western Water Assessment (WWA) at the University of Colorado Boulder, that was running pilots of a process designed to increase a community's resilience to weather and climate impacts, and invited them to the Spanish Valley/Moab region. The decision-maker hoped that this process, which focuses on knowledge-sharing and collaborative dialogue, would help to facilitate conversation and joint action around the issues caused by drought in the region.

WWA accepted the invitation and held a community workshop with stakeholders in the Spanish Valley/Moab region as the sixth such pilot in the Mountain West of the process known as "Vulnerability, Consequences, and Adaptation Planning Scenarios" (VCAPS). Following extensive pre-workshop preparation and interviews with all of the participants, a WWA climate scientist and a facilitation team traveled to Moab in July 2019 to run the workshop. Over two days, the group was first presented with regionally-focused climate science observations and projections, and then worked together to map out the potential outcomes and consequences of the local climate hazards, before jointly identifying possible responses or actions. As a closing for the workshop, participants shared the action that they planned to move forward individually or within their organization, and the action they most hoped the group would work on collectively. Following the workshop, the participants returned to their daily jobs and responsibilities, potentially continuing to think about the issues discussed through the process, but also shifting focus back to other pressing concerns. The question then is: what happened next? Did the VCAPS workshop have a lasting effect on the Spanish Valley/Moab region's resilience to climate impacts?

## Objective of Research

This past summer, I worked as a graduate fellow for the Wallace Stegner Center's Environmental Dispute Resolution (EDR) Program at the University of Utah. The EDR Program assisted in the facilitation of Western Water Assessment's VCAPS workshop in the Spanish Valley/Moab region discussed in the introduction, and I was able to contribute to and observe the effort. Now working with WWA as my thesis client, I aim to assist them with evaluation of this pilot workshop, and five others from 2018, to understand the workshops' impact on each community and how the VCAPS process could be improved for the future. WWA is currently deciding whether to continue using VCAPS as a tool in communities and, if so, what changes might be made to make it more useful and meaningful for its participants.

The VCAPS process is a tool for collaborative planning around climate change adaptation. It connects education and knowledge-sharing with outcome-focused discussion. The questions remain, though, of whether these collaborative conversations result in tangible actions that make the residents and infrastructure safer and more resilient, and how else we should measure the tool's effectiveness and utility. Additionally, if the workshops are not resulting in actions as an outcome, how can the process be adapted to better support participants in taking the actions they identify?

The mission of Western Water Assessment is to "conduct innovative research in partnership with decision-makers in the Rocky Mountain West, helping them make the best use of science to manage for climate impacts" (Western Water Assessment). The second part of this mission aligns with the general goals of the VCAPS workshop, which are, as I understand them, to: 1) share region-specific, usable science with workshop participants; 2) increase collaboration between the different entities that are present; and 3) catalyze adaptation-related planning and projects by collaboratively identifying short- and long-term actions and strategies.

At the center of this process is WWA's self-definition as a boundary organization, meaning that, for them, it is the co-development of usable science, through iterations of communication and collaboration with decision-makers, that will affect change (Dilling, Clifford, Mcnie, Lukas, & Rick, 2008; Kirchhoff, Lemos, & Dessai, 2013; Mcnie, 2007). Researchers from WWA write that, as a boundary organization, they "act as a two-way conduit between decision-maker communities and the research community. They mediate the transfer and creation of knowledge and buffer each side of the boundary from potential negative consequences such as the politicization of science" (Dilling, Clifford, Mcnie, Lukas, & Rick, 2008: 9). WWA was interested in incorporating the VCAPS process into their work with communities because it fits into their self-identified role as a boundary

organization; these workshops are an opportunity to share scientific climate information with stakeholders, as well as a tool to then allow the group to collectively filter that information through their own knowledge and experience, to make it meaningful and usable for their work as a community. For this research, I accept this understanding of WWA's role in the VCAPS process and use it as a central idea in my analysis of the outcomes and effectiveness of this method.

I am using this research, in part, to explore the connection between the communication of usable scientific information to stakeholders, and how effectively this contributes to the realization of the desired outcomes of the VCAPS process. Different theories attempt to define this connection, but I will share two here that contain components that will emerge in later sections of this research. First, Robert Kates (2007) writes, "Accelerations in collective action requires four conditions: changes in public values and attitudes, vivid focusing events, an existing structure of institutions and organizations capable of encouraging and fostering action, and practicable available solutions to the problems requiring change" (p. xiv). Second, Susanne Moser and Lisa Dilling (2007) present a theory of communication that says, "For communication to be effective, i.e., to facilitate a desired social change, it must accomplish two things: sufficiently elevate and maintain the motivation to change a practice or policy and at the same time contribute to lowering the barriers to do so" (p. 679).

My research through this thesis builds on the theories above, including usable science, effective communication, and how social change or collective action are catalyzed, to evaluate the success of Western Water Assessment's six pilot VCAPS workshops in the Mountain West. I am using the following questions as a guide:

1. Does the VCAPS process, as demonstrated through these six pilots, result in tangible actions that make the local residents and infrastructure safer and more resilient?
    a. If not, or not to a great extent, how could the process be modified so that its outcomes are most useful to more participants in moving identified actions forward?
2. Did the VCAPS workshop elevate a motivation to change in each pilot community, and how has this motivation been maintained over time in relation to realized actions?
3. To what extent did the VCAPS process provide adequate and useful information, or other types of support, that assisted each pilot community in overcoming participant-identified barriers to change?
4. What community characteristics, including before, during, and after the workshop, connect to successfully maintaining motivation over time and implementing tangible actions?

# Background and Context

## Vulnerability, Consequences, and Adaptation Planning Scenarios

VCAPS was developed as a joint project of the Social and Environmental Research Institute and the Carolinas Integrated Sciences and Assessments Program. The technique was first tested and refined in 2011 in two South Carolina coastal communities, before being applied in other coastal communities in Alabama, Maine, Massachusetts, North Carolina, and South Carolina (VCAPS). Additionally, training workshops have allowed the developers of the technique to teach it to other professionals who have applied it in other regions. Western Water Assessment began to pilot the technique in the Mountain West in 2018, focusing primarily on the management of drought and extreme precipitation events.

The VCAPS process's design allows stakeholders to explore potential outcomes of climate change in their region while building relationships with each other and collaboratively identifying actions and strategies that could help increase their resilience. The process consists of three main phases: initial interviews with a local "community champion(s)" to identify one to two local hazard(s) that are related to climate change (i.e., drought or extreme precipitation); identification of key project participants who are engaged in the community's response to the hazard(s), and completion of pre-workshop interviews with them; and an eight-hour workshop that is spread across two half days. The workshop itself primarily consists of two components: a one-hour presentation from a climate scientist on up-to-date local observations, climate change projections, and potential outcomes related to the chosen local hazard(s); and a diagramming exercise and discussion that results in one or more mapped causal structure(s) of a hazardous event, including points of intervention and potential participant-identified actions to address the mapped outcomes and consequences.

In more detail, the VCAPS diagramming exercise is conducted in real-time using the open-source program known as Visual Understanding Environment, a concept and content mapping application, on a screen in front of participants.[1] The discussion begins with a management concern (i.e., drought) and climate stressor(s) (i.e., increased temperature), which have been identified as key participant concerns through the pre-workshop interviews. From that point, participants brainstorm

[1] More information can be found at: https://vue.tufts.edu/.

the physical and social outcomes and consequences that stem from each climate stressor. In addition, participants attempt to identify contextual factors, or the factors that are unique to the region's context that influence its ability to cope with a particular outcome or consequence. Once they have identified some of these initial building blocks, the group begins to brainstorm potential actions that public and/or private actors in the region could take to address the different outcomes and consequences. The actions should be connected with an arrow to specific intervention points within the causal structure, to show which outcomes or consequences could be mitigated by a particular action. The diagrams use different shapes and colors for the five components, as well as arrows to show how they connect (Figure 1).

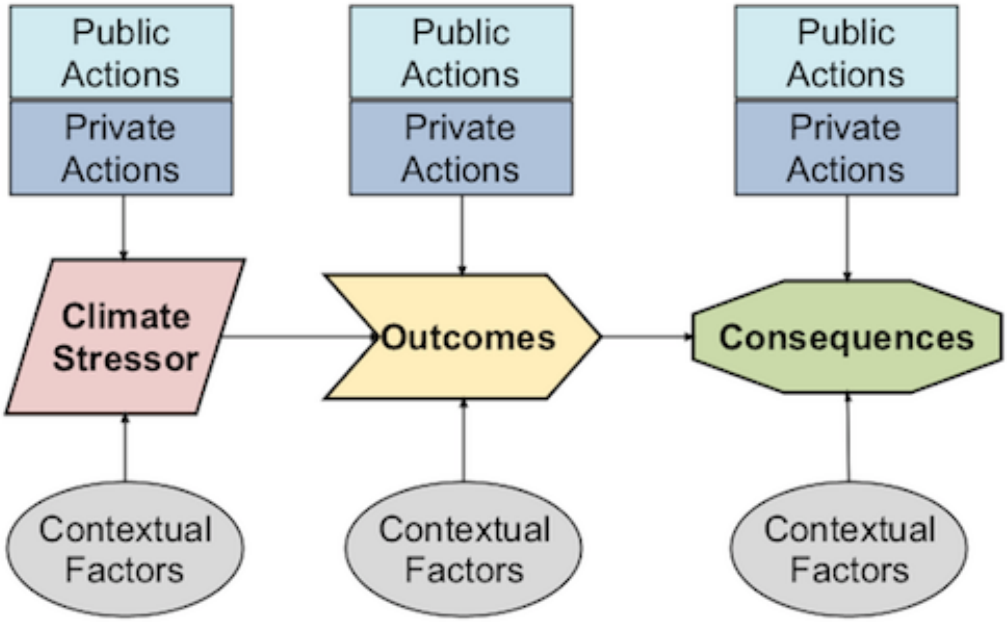


*Figure 1: The Building Blocks of a VCAPS Diagram (Source: https://www.vcapsforplanning.org/process.html)*

The diagrams serve primarily as a brainstorming tool. Participants contribute individual components and a WWA team member uses the diagramming software to note down contributions using the building blocks described above, connecting them with arrows as they go. The facilitator of the process (whose role will be further discussed in the following section) can then pause the brainstorming to allow participants to reflect on what they have created so far, propose changes, dispute a contribution, ask questions, etc. As the resulting diagrams are meant to be a brainstorm, there is not a particular decision rule to decide what is or is not included; if there is disagreement, participants can discuss amongst themselves to clarify their viewpoints, but contributions will remain in the diagram if a participant maintains that they should be part of the structure. The WWA climate

scientist or facilitator could choose to step in to make corrections or ask questions if they viewed a component as inaccurate but, in general, the pilot workshop teams allowed the participants to form their own conclusions on what should or should not be included (Duncan, 2020).

In their analysis of the first eight VCAPS workshops conducted on the East and Gulf Coasts, Webler (of the Social and Environmental Research Institute) et al. (2014), explain that this diagramming process has its roots in hazard management and vulnerability assessments. First, hazard management focuses on a causal stream of events, "begin[ning] with drivers and initiating hazard events, and then flow[ing] through a sequence of intermediary outcomes that end in consequences to humans and what they value" (p. 170). Second, they see "the VCAPS process [as] a form of 'bottom-up' vulnerability assessment that facilitates participants' integration of sensitivity, resilience, and adaptive capacity concepts into the causal chain of hazards" (p. 171). These two components are combined in VCAPS diagrams, which contain nodes "typically beginning with a stressor (hazard) and leading to harmful consequences that are of concern in a community," while linking contextual factors to bring in local understandings of vulnerability and indicating potential management interventions that "represent a scenario or a plausible future that the community wants to plan for" (p. 172).[2]

The two-part setup of this workshop aligns with the previously-discussed role of WWA as a boundary organization. In the first part of the workshop, the presentation, the WWA researcher is the communicator of scientific research, having collected information from various sources and now summarizing it for participants to inform their understanding of how climate change is currently, and will in the future, affect their local region. During this section, though, participants are encouraged to share their personal understandings and ask questions. In the second part, after an explanation of the diagramming tool, participants then take the lead on incorporating the presented scientific information into their own understanding of their local environment to collaboratively brainstorm the components of the causal structures. The first part of the workshop is primarily one-way communication from researcher to community members, but the second part of the workshop is driven by the participants themselves with the guidance of a facilitator. This setup raises important

[2] Throughout this research, the causal diagrams produced in the VCAPS workshops are sometimes referred to as "scenarios," but this explanation of the process's roots in hazard management and vulnerability assessments should help to distinguish the diagram and workshop's function from scenario planning, which generally moves beyond representing a scenario or a plausible future (as stated here) to "develop[ing] a series of initiatives, projects, and policies that may help support a preferred scenario, a component of a scenario, multiple scenarios, or all scenarios" (American Planning Association).

questions both about the facilitation of the workshop, as well as about the identification of participants. These two components will be further discussed in the context of WWA's pilots in the following section.

## Western Water Assessment's Pilot VCAPS Workshops

Western Water Assessment conducted five community workshops in 2018 as part of their official pilot of the VCAPS process in the Mountain West, as well as an additional workshop in July 2019 at the request of a community member from Moab, Utah. WWA conducted these workshops as part of their federally-funded work through the National Oceanic and Atmospheric Administration's (NOAA) Regional Integrated Sciences and Assessments (RISA) Program. Every five years, WWA must apply to qualify for funding and, if funded, they receive one-fifth of that funding each year until they must apply again. During those five years, WWA has discretion over how that funding is spent, but they must maintain consistency with their original proposal. When WWA applied for funding five years ago, they included a pilot of the VCAPS method in Colorado as part of their application, which is what allowed them to fully fund the five original community workshops. As will be explained in further detail below, a facilitator external to Western Water Assessment worked on the two Utah workshops, and was thus not covered by WWA's funding through the RISA Program; instead, this work was done pro bono for the Springdale/Rockville/Hurricane workshop and was paid for between various agencies for the Spanish Valley/Moab region workshop.

One or more "community champion(s)" assisted Western Water Assessment in planning each workshop, by helping to identify a list of potential participants and decide on the content and/or focus of the workshop. The community champions were identified in different ways. First, WWA submitted a blurb to the Colorado Municipal League's newsletter advertising their VCAPS pilot program and searching for communities that would be interested in participating.[3] Representatives from the municipalities of Cortez and Durango responded and both ended up as the community champion for their respective workshop as they were directly involved in climate planning in their community and had the capacity to convene local participants (Duncan, 2020). Second, WWA used personal connections to find other interested communities and brought on

[3] The Colorado Municipal League is a consortium of Colorado municipalities with a mission of "Advocacy, information, and training supporting exceptional municipal governance" (https://www.cml.org/utility-pages/about-cml).

Carbondale and Routt County in Colorado and Springdale/Rockville/Hurricane in Utah as the other three pilot communities. For these three workshops, the personal connection either became the community champion or helped connect the WWA team to another local stakeholder who had more political and social capital to convene participants (Duncan, 2020). Lastly, as previously stated, after these initial 2018 pilots, a community stakeholder in Moab, Utah reached out to WWA to ask if they could participate, and a sixth workshop was held there in 2019. This stakeholder became the community champion for the Spanish Valley/Moab region workshop, as they had strong professional connections in the area with a range of stakeholders. In addition to the primary community champion described for each workshop above, some communities included a second or third community champion at their discretion.

Regardless of how the community champion was identified, they spearheaded the process of identifying workshop participants. In an interview with Benét Duncan of WWA, she explained that WWA would assist them if they had questions on how best to identify participants, but otherwise let the community champion lead the process (Duncan, 2020). Additionally, community champions were given guidance, based on advice from the developers of the VCAPS process, that the ideal group size was ten to fifteen individuals. As each community champion was responsible for the process of identifying participants in their community, each group of participants was likely chosen using a different methodology. In general, the VCAPS workshops piloted by WWA engaged community decision-makers who are directly involved in the operation of the systems most directly affected by the identified local hazard(s), or in the response to the hazard(s), and, thus, most able to advance climate adaptation planning in their community. Stakeholders varied at each workshop but included members of local planning commissions and city councils; city staff; county commissioners, board members, and staff; state- or national-level Forest Service and Bureau of Land Management staff; water provider board members and staff; as well as representatives of other stakeholder groups, such as environmental advocates and/or agricultural producers. In the end, the community champion(s), as well as the willingness and/or availability of their invitees to participate, determined the makeup of the final group for each workshop.

In addition to the community participants, it is important to further introduce the Western Water Assessment team members who contributed to each workshop, and how each of their roles impacted the process. First, each workshop had a WWA researcher who gave the climate science presentation and answered technical or scientific questions throughout the discussion. Second, a team member worked as the diagrammer, translating participants' brainstorm contributions into the

diagram software and organizing components as the discussion continued. Third, another individual was a notetaker with the role of collecting a transcript of the meeting to inform the workshop's report and to assist the diagrammer in keeping up with the conversation. Lastly, each workshop had a facilitator whose primary responsibilities were keeping the group on task and following the agenda, ensuring that all participants were able to contribute, and guiding the participant-driven discussion through the different components of the causal structure for each hazard. Various WWA employees facilitated the first four workshops in Colorado, primarily for budgetary reasons, as they were all covered by the program's general funding from NOAA. Each of these four workshops had a different facilitator, as the WWA team thought that it was a good opportunity to give team members experience facilitating and build their team's capacity for the future (Duncan, 2020).

The first WWA facilitator for Durango had previous formal facilitation training through NOAA and experience facilitating small and large meetings. After the first workshop, she shared materials from her past facilitation training with colleagues that would facilitate in the future. In addition, the team ran simulations of the workshop for facilitators (and diagrammers) to practice the role (Duncan, 2020). Following these initial four workshops, the final two workshops in Utah were both facilitated by Danya Rumore of the Environmental Dispute Resolution Program at the University of Utah, who has extensive professional experience in facilitation and mediation. Additionally, Danya received guidance from the previous facilitators through a conversation about the goals of the workshop and potential difficult moments in the agenda (Duncan, 2020).

In addition to the distinctions discussed above, including who were the community champion(s), participants, and facilitators, the six workshops varied greatly from each other, in terms of what and how many units of government participated in the workshop, how many and what hazard scenarios they discussed, and the general community and environmental context of each. In addition, each of the workshops varied in terms of what follow-up has occurred since the workshop, what types of actions have or have not been completed, and how participants reflect on their experience. For a more in-depth exploration of each community's context, and an analysis of how the six workshops, and their outcomes, compare and contrast, see "Key Findings and Analysis."

## VCAPS-Related Research

This review and evaluation of Western Water Assessment's VCAPS pilots in Colorado and Utah fits within two existing bodies of academic research: previous academic research on the VCAPS process and research on other formats of community-based climate adaptation-focused

participatory processes. This section will summarize these two bodies of research, and compare and contrast WWA's pilots with examples of these other processes. This summary aims to show that this evaluation of WWA's pilots is important in order to provide an in-depth analysis of this new branching of the VCAPS process into Mountain West communities, as well as demonstrate its potential as a form of community-based adaptation planning. In addition, comparison with other participatory methods helps to identify strategies and techniques that could be adapted into the VCAPS process in order to strengthen its impact on communities.

Previous academic research on the VCAPS process has primarily been conducted by the team of researchers (associated with the Social and Environmental Research Institute and/or the Carolinas Integrated Sciences and Assessments Program) who initially designed and piloted the technique. This growing body of work on the VCAPS process has three primary goals. The first goal is to introduce the VCAPS process and explain its purpose as a tool. The researchers place it within the larger framework of facilitation tools, writing, "Participatory modeling…is viewed as a way of bringing stakeholders together to organize information about complex systems into tools that are more useful for local decision-making than those designed by scientists and decision makers alone" (Tuler, Dow, Webler, & Whitehead, 2015: 25). The second goal of their work is to examine particular pilots to determine the effectiveness and usefulness of the project, including in Dauphin Island, AL (Janasie, 2014), Sullivan's Island, SC (Kettle et al., 2014), and South Thomaston, ME (Webler, Stancioff, Goble, & Whitehead, 2017), as well as through a comparison of multiple sites (Webler, Tuler, Dow, Whitehead, & Kettle, 2014). Specific goals and outcomes analyzed through this research include how well VCAPS: facilitates deliberative group learning, builds collaboration across governmental units, identifies locally relevant adaptation strategies, and prioritizes management actions (Kettle et al., 2014; Webler, Tuler, Dow, Whitehead, & Kettle, 2014).

As an example of previous workshop-specific research, Nathan Kettle et al. (2014), focus on the VCAPS process conducted in Sullivan's Island, South Carolina and use participant interviews to demonstrate its outcomes. Their overall argument is that VCAPS, as a "mediated modeling process, informed by local engagement and deliberation, support[s] risk-based management approaches for climate adaptation" (p. 29). Their research looks in-depth at the various outcomes of the diagramming process, sharing the impacts of concern, management actions, and contextual factors that participants contributed to the discussion. Through these outcomes, and participant feedback, they seek to demonstrate that VCAPS "facilitated knowledge exchange and adaptation planning through the documentation and synthesis of existing issues, prioritization of management actions,

connection of environmental- and climate-related changes to consequences, and identification of adaptation tasks, communication strategies, and information needs among town staff" (p. 27).

As another example, Webler et al. (2014), maintain a similar argument to Kettle et al.'s, research, saying "Our findings illustrate how an analytic-deliberative process that integrates local and scientific knowledge offers great potential for adaptation planning" (p. 167). This research analyzes the use of VCAPS in eight coastal communities in South Carolina, North Carolina, Massachusetts, and Alabama, utilizing post-workshop short questionnaires and interviews to assess the outcomes of the process. They find that it enabled three positive outcomes: "helped communities to consider how climate-related stressors lead to undesirable consequences and to identify locally relevant adaptation strategies," "helped to build collaboration across governmental departments," and "produced outputs that could be used to justify to the public why specific management actions were important to take" (p. 179-80).

In addition to looking at self-reflective research on the VCAPS process, it is also important to note that the VCAPS process fits within a spectrum of many other community-based climate adaptation processes, with varying levels of overlap in techniques, goals, and outcomes. Aspects of VCAPS can be recognized in many of these other tools. First, some processes, such as the Climate Literacy Partnership of the Southeast and the Rural Climate Dialogues Program, focus on dialogue in order to acknowledge different points of view and build community around climate change as an issue (McNeal, Hammerman, Christiansen, & Carroll, 2014; Myers, Ritter, & Rockway, 2017). These examples differ in terms of the outcome that each professes as its goal. In contrast to the VCAPS process, the Climate Literacy Partnership of the Southeast was focused on dialogue as a mechanism of community education, as they recognized broader engagement as the first step in taking climate action since "we will not make real progress without broad input" (McNeal, Hammerman, Christiansen, & Carroll, 2014: 632). On the other hand, the Rural Climate Dialogues Program concentrated on mobilizing action but, in contrast to VCAPS, focused on public engagement and active involvement of citizens in decision-making leading to "the production of citizen-driven recommendations or findings" (Myers, Ritter, & Rockway, 2017: 10).

Others go beyond dialogue to focus on deliberation as the key technique. An example of this is in Michigan coastal communities where a "Deliberation with Analysis" facilitated dialogue technique was used to co-create climate change plans that ultimately led to local and regional initiatives (Crawford, Beyea, Doll, & Menon, 2018). Similar to VCAPS, this particular process was focused on incorporating "local residents' knowledge and values with local climate data," but

focused on the creation of local and regional climate adaptation plans in conjunction with planning departments (p. 284). While the researchers record various actions that participants note as outcomes of the meetings, they lament that there may not have been meaningful change in terms of "learning from and respecting differences, integrating diverse views, and enhancing communication" (p. 298). As an additional technique, other methods incorporate visual thinking, including in Port Orford, Oregon, where researchers and participants used concept maps and influence diagrams to analyze the decision context, evaluate potential solutions, and make decisions (Cone, Rowe, Borberg, & Goodwin, 2013).

Lastly, other models focus more strongly on collectively imagining future scenarios, such as through scenario building or science-based role-play simulations (Murphy et al., 2016; Susskind, Rumore, Hulet, & Field, 2015). Scenario-building shares an overlap with the VCAPS method in terms of the causal structures that are at the core of each but, as noted earlier, diverges first in terms of how participants build alternative scenarios for comparison and, second, in how they then engage in future-visioning to "develop a series of initiatives, projects, and policies that may help support a preferred scenario, a component of a scenario, multiple scenarios, or all scenarios" (American Planning Association).

Further reflections on these processes, in relation to the VCAPS process and the lessons they can provide, are included in "Recommendations and Conclusions," but a full evaluation of these other forms of community engagement in comparison to VCAPS is beyond the scope of this research.

## Methodological Approach

Western Water Assessment began an evaluation of their VCAPS pilot in the summer of 2019 to determine if the process was useful for the six communities and effective in accomplishing its main goals, to decide whether or not WWA will continue using VCAPS with communities in the future. This research builds off aspects of their ongoing evaluative work, as well as explores new avenues of questioning. In addition to documents and data connected to each workshop, including pre-workshop interview summaries and workshop final reports, I rely on a WWA-conducted survey and two sets of interviews (one set conducted by WWA staff and one set I conducted myself), as described below.

### Western Water Assessment's Survey

When I began conversations with Western Water Assessment in August 2019 regarding this research project, researchers there were already in the process of developing and distributing a follow-up survey for the first five pilot workshops conducted in 2018. WWA distributed the survey in December 2019 and collected responses until mid-January 2020 (See Appendix B for the survey protocol and questions). Of the 51 participants from the five original pilots, WWA received 35 responses for a 69% response rate. The purpose of the survey, as defined by WWA, was to help researchers evaluate the effectiveness and impacts of the VCAPS process on the pilot communities. I was able to review the survey design and questions in August 2019, and I requested the addition of questions related to my particular research interests. These additional questions focused on asking participants to identify changes in their personal and community motivation to take action on the discussed hazard, whether the VCAPS process helped participants identify ways to overcome barriers to taking action, and how the workshop could be designed to do that more effectively.

### Interviews

In addition to the survey, WWA researchers had initiated interviews of the community champions from the original five pilots from 2018 to supplement the short answers from the survey. A WWA researcher, Katie Clifford, conducted interviews with two participants from Routt County, two from Carbondale, and one each from Durango, Cortez, and Springdale/Rockville/Hurricane. As described in the introduction to the interview, the purpose of these interviews was to understand

what the community champions found valuable or not so valuable about the process, as well as whether or not it led to any decisions, actions, or lessons learned (See Appendix C for the interview questions). In developing my interview protocol and questions to supplement these seven participant interviews, there was too much of an overlap in content to justify re-interviewing the same community champions, so I only reached out to additional participants for my interviews.

In total, I interviewed 16 participants with four from Durango, three from Carbondale, three from Cortez, two from Routt County, zero from Springdale/Rockville/Hurricane, and four from the Spanish Valley/Moab region. I attempted to interview a variety of stakeholders within each community (i.e., a mix of city employees, elected officials, interest group stakeholder representatives, etc.) in order to hear a range of views. Similar to WWA's set of interviews, I described the purpose to participants as "understanding what about the process you found useful or not, and how it has or hasn't led to actions or other outcomes for you, your organization, and your community." I was primarily interested in asking open-ended questions to encourage the interviewees to reflect on any impacts of the VCAPS process and provide feedback on how the process could be improved to have a greater impact on other communities in the future (See Appendix D for the interview questions).

Thus, in total, my analysis draws on 23 interviews: five from Durango, five from Carbondale, four from Cortez, four from Routt County, one from Springdale/Rockville/Hurricane, and four from the Spanish Valley/Moab region. Given that I was unable to conduct interviews with participants from the Springdale/Rockville/Hurricane workshop, my analysis in the sections below primarily focuses on the other five workshops, for which I have a relatively even number of interviewees. However, to give some details on the Springdale/Rockville/Hurricane workshop, without generating specific conclusions from these limited data, I reference other resources including the workshop report, survey responses, and WWA's interview with the community champion.

# Key Findings and Analysis

## Context and Outcomes of the Community Workshops

Before sharing general analysis from the survey, as well as central takeaways across the six workshops, this section includes important context details of each community, its workshop, and their outcomes. The two tables below provide an overview of some of the key characteristics that distinguish each of the communities and their workshop, before expanding on each one individually.

*Table 1: Pilot Workshop Overview (Part A)*

| | **Durango, CO** | **Carbondale, CO** | **Cortez, CO** |
|---|---|---|---|
| **Workshop Date** | July 2018 | September 2018 | October 2018 |
| **Government Unit(s) & Population(s)** | City of Durango – 18,500 | Town of Carbondale – 6,800 | City of Cortez – 8,700 |
| **Facilitator** | WWA Team Member | WWA Team Member | WWA Team Member |
| **Participants** | **Eight**: city employees, commissioners, and councilors | **Ten**: town employees and board members, elected officials, and other non-affiliated sustainability-related stakeholders | **Twelve**: city employees, commission members, and committee members |
| **Community Champion(s)** | Director of City Operations | Town Manager and one of the Town Trustees | Director of Public Works |
| **VCAPS Scenario(s)** | **Two drought** scenarios (2018 type-drought and 2018-type drought lasting three years); **Two extreme precipitation** (short-term, high-intensity microburst and multi-day, heavy-rain event) | **Two drought** scenarios (2018-type drought and 2018-type drought lasting multiple years) | **Two drought** scenarios (2018-type drought and drought that would trigger a compact call on the Colorado River) |
| **Water Sources** | Senior water rights on the Florida and Animas Rivers | Senior water rights on various rivers and surface water allotment from Ruedi Reservoir | In-flow stream rights on the Dolores River and surface water allotment from McPhee Reservoir |

*Table 2: Pilot Workshop Overview (Part B)*

| | **Routt County, CO** | **Springdale, Rockville, & Hurricane, UT** | **Spanish Valley/Moab Region, UT** |
|---|---|---|---|
| **Workshop Date** | October 2018 | November 2018 | July 2019 |
| **Government Unit(s) & Population(s)** | Routt County, CO – 25,220 | Springdale – 600<br>Rockville – 270<br>Hurricane – 17,130 | City of Moab – 5,250<br>Grand County – 10,000<br>San Juan County – 15,000 |
| **Facilitator** | WWA Team Member | Danya Rumore | Danya Rumore |
| **Participants** | **Eleven**: county and state employees, Colorado State University Extension employees, and other non-affiliated sustainability- and agriculture-related stakeholders | **Ten**: city employees, elected officials, and emergency management personnel (5 from Springdale, 2 from Rockville, 2 from Hurricane, and 1 general) | **Fifteen**: city and county employees, council members, and commissioners, water supply agency employees, federal and state employees, and other non-affiliated sustainability-related stakeholders |
| **Community Champion(s)** | Deputy County Manager, a Colorado State University Extension agent, and the Executive Director of the Yampa Valley Sustainability Council | Director of Community Development (Springdale) | Facilitator for the Moab Area Watershed Partnership |
| **VCAPS Scenario(s)** | **Two drought** scenarios (2018-type drought and 2018-type drought lasting three years) | **One drought** scenario (moderate drought with warm and extreme temperature variations); **One extreme precipitation** scenario (short-duration, high-intensity rainfall) | **One drought/reduced water supply** scenario |
| **Water Sources** | Many county municipalities and agricultural producers have senior water rights | Springdale with senior water rights to the Virgin River; Rockville and Hurricane primarily use groundwater | Varied water rights to ground and surface water, depending on the supplier |

**Durango, Colorado:**

*Figure 2: Durango, Colorado (Source: The Durango Herald)*

*Figure 3: Durango in the SW corner of Colorado (Source: Google Maps)*

Western Water Assessment's first pilot VCAPS workshop took place in the City of Durango, Colorado in the midst of one of the region's most severe drought events in recent history (Page et al., 2018: 4). The region has historically experienced drought on a cyclical basis, but also experiences seasonal monsoons and extreme precipitation events that pose very different challenges from drought conditions. With this in mind, this workshop's facilitators took on the ambitious task of using the VCAPS diagramming process to explore two drought scenarios (a 2018-type drought and a 2018-type drought lasting three years) and two extreme precipitation scenarios (a short-term, high-

intensity downburst and a longer monsoon event). These discussions took place amongst eight workshop participants, all of whom were city employees, commissioners, and council members, as convened by the Director of City Operations. One interviewee emphasized the diversity of participant interests present in the workshop, saying that it was beneficial to have individuals from many different departments, including utilities, planning, and parks and recreation (Interview 11).[4]

Multiple participants from this workshop affirmed that the VCAPS process had furthered their understanding of the discussed hazards, with one interviewee saying, "Everybody in the region has a broad understanding of drought, and concern of economic and other impacts of drought…but the workshop really made a more formative idea of what the outcomes could look like" (Interview 10). A survey respondent echoed this sentiment: "I had been aware of the issues and of staff work toward addressing them, but the workshop brought home to me the extreme risk we face from prolonged drought."

The 2018-type drought conversation in this workshop focused on reduced water supply, which participants identified would then lead to three primary branches of outcomes: prioritization of water uses, reduced ecological health of the river (with cultural/economic impacts and water quality impacts), and curtailment of their primary water source (leading to increased costs to utilize their secondary water source) (Page et al., 2018: 10-13). The discussion primarily "focused on 'upstream' actions related to conservation that serve to mitigate all four of [those] issue areas" (p. 13). The longer-lasting drought scenario then built on this framework to focus on how to deal with "acute water supply limitations," continuing to think about upstream conservation actions, as well as mandating restrictions (p. 14).

In terms of the second identified hazard, the less-severe extreme precipitation conversation focused on how to mitigate runoff and flooding issues in the city, including through improvements to stormwater systems and mandating flood-resilient development, with an eye towards potential water quality impacts of pollutant and sediment runoff (p. 15). The more extreme precipitation diagram built on this to primarily focus on the emergency management aspect of a larger precipitation event (including consideration of both preparatory actions and emergency response actions) (p. 18).

At the end of the workshop, participants expressed that it had been useful to "discuss the long view" and "have structured, facilitated conversations," and shared general next steps that they

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[4] See Appendix A for a complete "List of Interview Citations."

hoped to take individually or collectively (p. 20). This group's actions were primarily process-focused, including developing a timeline for actions and analyzing cost tradeoffs, communicating climate information back to key decision-makers, and organizing a follow-up conversation within six months (p. 20-1). However, since the workshop, the group has not officially met to go through the report and develop a timeline or priorities for moving forward.

Outside of these potential process-related actions, participants identified other specific actions that they or others have moved forward since the workshop. The City was in the process of drafting a drought management plan prior to the workshop, but one interviewee stated that it will now be more reflective of what they learned and created during the VCAPS process, including specifying identified actions that the group generated (WWA Interview 1). Many of the workshop participants were included on a committee that is helping to put this plan together (Interview 10). Additionally, the City was also in the process of funding and designing a new water treatment plant to make use of additional storage capacity, and are looking to pursue a diversification of water supply projects. An interviewee specified that the workshop influenced forward momentum on this project, particularly due to reflections during the long-term drought discussion (Interview 11).

Given the desire at the end of the workshop to continue the process of prioritizing actions and working collaboratively (as described above), it is interesting to see that participants have not followed through on this nor developed a more detailed plan to carry out identified actions from the workshop. Interviewees reflected on the challenges and barriers to moving forward on these actions and mentioned one interesting one beyond the usual concerns of funding and staff capacity. They expressed that it has been difficult since the VCAPS workshop to find a sense of urgency to address drought. One interviewee summed it up by saying that concern was high in 2018 because of low snowpack and drought, but that this has "dissipated since then as weather conditions have improved and drought hasn't been such an urgent issue" (Interview 8). Another interviewee added in the complexity that the City of Durango is "blessed with really senior water rights," so proponents of water conservation have to figure out how to respond to people who ask "Why would we let wet water pass us by?" (Interview 10). Similar concerns were raised by participants in each of the other four 2018 workshops, as all were communities that experienced extreme drought in 2018 followed by a year with a much wetter winter and spring. This context is important to keep in mind when analyzing the follow-through of all of the workshops, as outcomes would have potentially been different given subsequent drought years and a greater sense of urgency.

**Carbondale, Colorado:**

*Figure 4: Carbondale, Colorado (Source: Pierre Hollard on Wikipedia.org)*

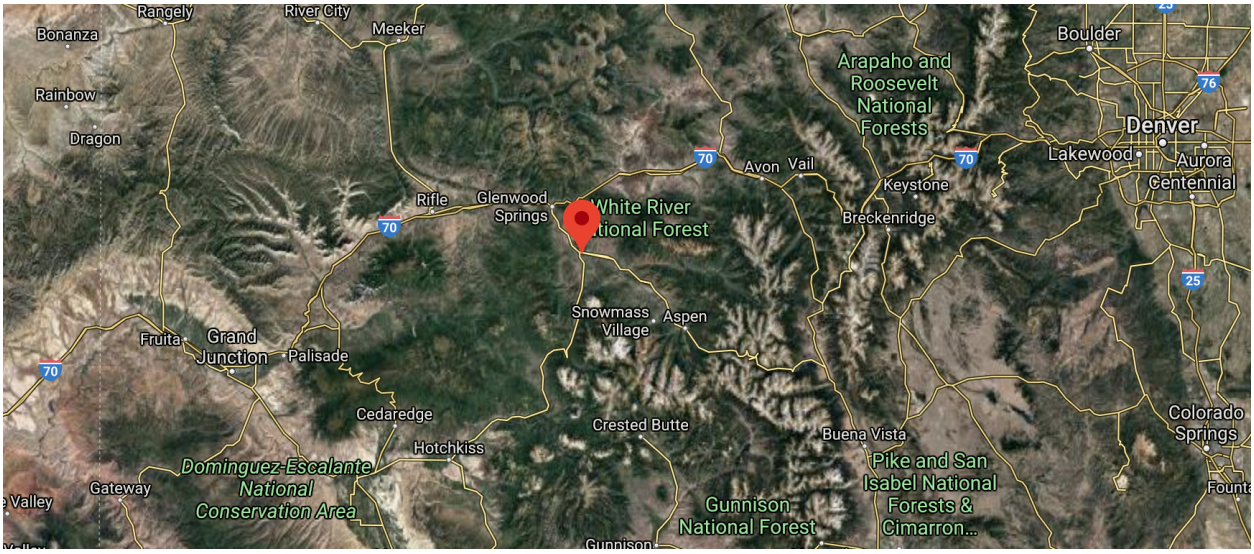


*Figure 5: Carbondale in the Mountains of Colorado to the West of Denver (Source: Google Maps)*

The second pilot took place in September 2018 in Carbondale, Colorado, a mountain town of 6,820 residents, while they were still in the midst of one of the area's most severe droughts to date (Ehret, Lukas, Arens, Clifford, & Dilling, 2018: 6). For this workshop, the Town Manager and one of the Town's Trustees assisted WWA in convening eight other participants, including elected officials, town staff, and board members, as well as two non-affiliated sustainability-related stakeholders. The Town of Carbondale had a climate action plan and climate action goals in place before the VCAPS workshop but was hoping that the process would provide them with specific

climate data to focus future planning (WWA Interview 2). Even in a community such as Carbondale with planning efforts in place, one interviewee explained the benefit of the VCAPS process, saying, "I'm not 100% certain we would have had any conversation around these vulnerabilities until it was full crisis…So, I think the greatest benefit was that it set the stage for proactive discussion around such critical components of what the threats are to the community" (WWA Interview 3). With this forward-looking perspective at the front of everyone's minds, the workshop focused on two drought scenarios, a 2018-type drought and a 2018-type drought lasting multiple years.

The first set of diagrams covered a wide range of issue areas, including reduced water supply and runoff, stress on ecosystems, wildfires, more concentrated solids in wastewater, tourism, reduced irrigation for town facilities and agriculture, and a potential call on Nettle Creek (Ehret, Lukas, Arens, Clifford, & Dilling, 2018: 13).[5] The second set of diagrams expanded on three themes from the first set: stress on ecosystems, increased wildfire risk, and tourism impacts (p. 21). Actions resulting from these discussions ranged from landscape-level changes to address ecosystem and wildfire risks (including vegetation management and restoration, and changes in municipal irrigation) and water supply-related changes (including increasing water treatment system capacity and water storage options) to more process-related actions (including sharing workshop outcomes with the public and connecting with NGOs to increase public education) (p. 26-32).

As a demonstration of the success of the VCAPS workshop for Carbondale participants, all of the survey respondents had a lot to say about what they learned about drought at the workshop, including "the socio-economic aspects discussed were not on my radar," "the local impact, what we can do better, what we need to plan and budget for, where are our weak points, what are our strong ones, what other stakeholders need to be involved," and "how broad the impacts could be." Additionally, others commented on how these learnings increased their concern about drought, with one writing that "the Town is resilient in many ways to drought, even extreme drought. However, there are some tipping points" and another writing that "a two- to three-year drought could be devastating to our community and the health of our park systems." These indications of participant learning and increased motivation were then followed by a strong response by participants to move forward on actions after the workshop.

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[5] In 2018, a first-ever "call" was placed on Nettle Creek because senior water rights holders found insufficient water to "satisfy their legal diversion rights, so they called on more junior users to reduce their diversions." This affected the Town of Carbondale who had to borrow water from more senior water users in nearby agricultural lands to maintain water for 42 homes that could have lost access to their domestic water (Ehret, Lukas, Arens, Clifford, & Dilling, 2018: 20).

All of the Carbondale-based respondents to WWA's survey say that the VCAPS workshop contributed to new drought-related actions in the Town and participants demonstrate concrete outcomes. As one interviewee summed it up, the VCAPS process "highlight[ed] how [drought concerns] could be integrated into city planning and how to integrate into the budget, already existing plans, within water management plans, etc." (Interview 13). This sentiment has played out for the Town of Carbondale in terms of their follow-up actions. First, participants met as a group after the VCAPS workshop and turned action items from the report into a matrix for themselves to better understand what they hoped to accomplish. They held a public meeting, which included a presentation from a WWA climate scientist and an explanation from participants on their outcomes from the workshop and next steps for the Town. Additionally, as one interviewee explained, the Town was about to begin annual municipal budgeting and so participants took advantage of the moment to prioritize actions from VCAPS in the budgetary process in order to take action on some immediate projects, and set priorities for the future (WWA Interview 3). Participants have also taken the time to better integrate findings and ideas from the workshop into already existing plans, such as the Town's water management plan (Interview 13). This workshop's follow-through stands out from the others for its clear process, including internal reflection, external communication, and quickly acting to incorporate findings into the municipal budget and existing plans in order to institutionalize their learnings and plan for the actions that they prioritized.

**Cortez, Colorado:**

*Figure 6: Cortez, Colorado (Source: DesertUSA.com)*

*Figure 7: Cortez in the SW Corner of Colorado Outside Mesa Verde National Park (Source: Google Maps)*

The third pilot workshop took place in October 2018 in Cortez, Colorado, the county seat of Montezuma County, with a population of 8,709 and senior water rights on the Dolores River. Montezuma County is economically dependent on agriculture, and the City of Cortez is also very dependent on tourism, particularly in relation to nearby Mesa Verde National Park (Clifford et al., 2018: 3). The Director of Public Works assisted Western Water Assessment as the community champion and helped to convene eleven other participants, including city employees, commission, and committee members, with many representing specific interests such as water treatment plants, golf courses, and parks and recreation. One interviewee mentioned that this was the most useful aspect of the process: "getting together a group of people from diverse knowledge and work roles, and being able to put together a more cohesive message to the public," especially since Cortez' focus has been and continues to be on water conservation-related education (Interview 16).

As in the previous two pilots, the region experiences regular droughts and experienced a severe drought in 2018 which, for example, resulted in turning off irrigation water on August 29th

compared to the norm of mid-October (p. 3). The City of Cortez has focused on water conservation efforts in the past, resulting in a decreasing per capita water demand over the past 30 years from 325 gallons per person per day in 1990 to 200 gallons per person per day in recent years (Clifford et al., 2018: 4). As WWA's report notes, though, "This number, even if significantly lower than 30 years ago, is nevertheless still much higher than most cities across the U.S. and the rest of the world" (p. 4). Despite this long-time focus on water conservation efforts, one interviewee remarked that although "there was some awareness," there was "not an informed concern until we started doing this planning process…VCAPS made it more tangible for everyone…" (Interview 15). Similarly, another interviewee remarked that although "drought and drought mitigation was at the forefront of our minds," the VCAPS workshop was "a way to jumpstart things" (Interview 16). With goals of furthering these efforts and continuing to work on water conservation and water supply, this workshop focused on two drought scenarios: a 2018-type severe drought and a drought that could trigger a compact call on the Colorado River.[6]

The first diagramming conversation focused on reduced water supply, water treatment concerns, water conservation focused on residential use and irrigation on city properties, increasing wildfire risk, and impacts to the agricultural community (Clifford et al., 2018: 13). The second drought-related diagram focused on the outcomes and consequences of a compact call on the Colorado River. As one interviewee described, the VCAPS process drew the group into talking about specific tradeoffs for the first time, such as the example of "Should parks still be green with grass and people not be allowed to water at their houses? Is the common good more important?" (Interview 17). Actions identified in this workshop focused on many of the conservation and public education goals that participants were already committed to (but identifying new potential actions), while also exploring more direct actions (including expanded storage options, water restriction mechanisms, and landscape changes for municipal properties) (p. 28-35).

The Cortez workshop participants are notable amongst this group of pilot workshops for how closely they have kept up with the actions that they set as priorities during the workshop, and for how much they have been able to accomplish since. Workshop participants (excluding WWA

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[6] In 1922, the seven U.S. states in the Colorado River basin signed the Colorado River Compact, which allocated water rights on the river based on separating the states into an Upper Division and a Lower Division, with the Upper Division required to pass along a specific flow of water to the Lower Division. A compact call would reduce water to users in the Upper Basin States if they are "unable to deliver the water they are required to send through Lake Powell [to the Lower Basin States] under the rules" of the Colorado River Compact (American Rivers, 2019). In this case, the state of Colorado is in the Upper Division and a compact call could reduce water availability from the Colorado River for users in Cortez.

team members, who do not maintain regular involvement post-workshop) have continued to meet regularly over the past eighteen months. Their first meetings included going through the report as a group and pulling together their own executive summary to make it more readable and useful for themselves. They also invited a WWA climate scientist to give the workshop presentation at a City Council meeting to share the process with a wider group of elected officials (Interview 16). From there, the group launched a broader public outreach and engagement effort called "Water is Our Future" to further their work on water conservation. They have given presentations to different groups, tabled at local events, organized educational seminars and demonstrations, partnered with local businesses and plant nurseries on different campaigns, and provided rebates for the purchase of low water consumption fixtures. The group is also using ongoing monitoring to ensure that their actions are having an impact on local water demand (Interview 16). So far, the group has invested $15,000; this represents a tripling of their intended investment after the group approached the City Council post-VCAPS to ask for greater support (WWA Interview 4). In addition, the group is working on parallel efforts to improve planning efforts through the City's water source protection plan and an upcoming drought mitigation plan that will significantly build off the outcomes of the VCAPS process (Interview 16).

**Routt County, Colorado:**

*Figure 8: Routt County, Colorado (Source: co.routt.co.us, Colorado Cattlemen's Ag. Land Trust)*

*Figure 9: Routt County in NW Colorado (Source: Google Maps)*

Later in October 2018, the fourth workshop took place in Routt County, Colorado, which is located west of the Colorado Rockies in the north of the state. The county has a population of 25,220, "representing an almost 87% increase over the past 30 years," and relies primarily on agriculture (including cattle ranching and hay farming) and river-based recreation as its economic base (Rick, Duncan, Clifford, & Dilling, 2018: 4). For this workshop, the WWA team worked with the Deputy County Manager, a Colorado State University Extension agent, and the Executive Director of the Yampa Valley Sustainability Council to identify experts on agriculture as participants for the workshop. The additional eight participants (for eleven total) included one county commissioner and one county employee, two state employees (Forest Service and Department of Natural Resources), another Colorado State University Extension agent, and three local agricultural producers/advocates. Respondents to WWA's survey and interviewees expressed the view that this diversity of expertise was a really useful part of the process.

As in the other Colorado communities, Routt County experiences drought on a cyclical basis and experienced one of its most severe drought events in 2018. With interest in beginning to work on a drought plan at the County level, this workshop focused on two drought scenarios: a 2018-type drought and a 2018-type drought lasting multiple years. The first set of diagrams focused on four issue areas related to reduced water supply: reservoir drawdown, reduced ecological health of the

river, increased severe wildfire events, and a strong focus on reduced agricultural production (Rick, Duncan, Clifford, & Dilling, 2018: 12-3). The second set of diagrams for a multi-year drought largely focused on more extreme outcomes related to the issue areas above, as well as an additional potential issue of water conflicts (p. 20). At the end of the workshop, participants reconfirmed their commitment to two of the workshop's initial goals, recognizing that they would like to continue to work towards meeting them: 1) "Identify actionable strategies to support the agricultural community and mitigate risks associated with drought, in light of scientific uncertainty"; and 2) "To inform county drought response planning to include strategies that promote a vibrant agricultural community in Routt County" (p. 30).

From the survey, respondents wrote that what was useful about the process was, "The concept of shared learning and planning – getting people together with different expertise and experiences to address a common issue" and "Reasoning through possible scenarios with people who have firsthand knowledge of what might happen." One interviewee went more into detail describing the usefulness of having different people in the room to say that it was helpful for "making headway with elected officials" and giving different water management districts the opportunity to share their various approaches (Interview 18). However, this same interviewee also raised a critical issue about the workshop, saying that the collaborative learning and relationship-building in the room did not carry beyond the workshop. This was due to some participants feeling as though they did not get a lot out of the workshop and, thus, being less willing to engage on related issues in similar forums since then. The interviewee mentioned that conveners expended a lot of social capital to get specific people in the room, but then the workshop ended up being a "net-negative on social capital" (Interview 18).

The lack of action that concerned the above survey respondent is mirrored in the outcomes described by the eight survey respondents and in conversations with the interviewees. In responding to the survey, only two participants said that new actions had been taken, with four "not sure," and two responding "no." Those participants who do believe there have been follow-up actions since the workshop described the following. One interviewee mentioned a continuing desire for a climate action plan at the County level but, in the meantime, they are working on redoing the County Master Plan with a broader focus on land management decisions and integrating in reflections from the workshop discussion (WWA Interview 5). A subsection of participants who were committed to moving actions forward met a couple of times following the workshop and worked to bring on an intern through the Colorado State University Extension. This intern helped these participants work

through the report, including going through action tables to "remove 'pie-in-the-sky' brainstorm ideas and try to narrow [them] down to more reasonable ones" and attempting to attach individuals or agencies to specific action items (WWA Interview 5). Lastly, the intern helped participants establish the Routt County Wildfire Mitigation Council, which is spearheaded by the Colorado State Forest Service. One action from this was to organize a wildfire mitigation conference in May 2019. It is key to note in this example that actions have mostly been catalyzed by specific actors, including Colorado State University Extension and the Colorado State Forest Service, but that they do not necessarily demonstrate ongoing collaboration between all participants.

### Springdale, Rockville, and Hurricane, Utah:

*Figure 10: The Virgin River in Zion National Park (Source: Chad Woodward, Wikimedia Commons)*

*Figure 11: From West to East: Hurricane, Rockville, and Springdale, in Southwest Utah (Source: Google Maps)*

The fifth, and final official, pilot workshop took place in November 2018 and focused on three communities in Washington County, Utah along the Virgin River: Springdale, Rockville, and Hurricane. All three are gateway communities to Zion National Park, with populations of 592, 272, and 17,135, respectively (Arens, Clifford, & Rumore, 2018: 4). Working with the Director of Community Development for Springdale as the community champion, the workshop included nine other participants from the three communities, including city employees and an elected official, as well as emergency management personnel. The workshop included five participants from Springdale, two from Rockville, two from Hurricane, and one who works between all three communities. A unique characteristic of this workshop is that many participants work together regularly through the Zion Regional Collaborative, a regional planning group, which has, among other things, introduced its members to impacts of climate change on extreme precipitation and drought (Arens, Clifford, & Rumore, 2018: 6).

The three cities draw water from a variety of sources and experience regular drought, although "water availability typically exceeds demand even in drought years." As an additional concern, monsoonal rains in the late summer and fall can cause extreme precipitation events and flash floods (p. 4). The general interests of participants for this workshop were planning and coordination related to natural disaster response, and increasing regulation and education to mitigate impacts of drought and extreme precipitation (p. 25-26). Springdale and Rockville did not have drought or flood response plans at the time of the workshop, but Hurricane had a water scarcity plan and a flood response plan (p. 25). In line with this context, the workshop focused on a drought scenario (for a moderate drought, with warm and extreme temperature variations) and an extreme precipitation scenario (a short-duration, high-intensity rainfall).

The drought diagramming process focused on seven issue areas: reduced municipal water supply, sustained reduction to irrigation water, prioritization of water use, reduced groundwater, increased energy demand, reduced riparian ecosystem health, and wildfire (Arens, Clifford, & Rumore, 2018: 14). The extreme precipitation diagrams focused on five issue areas: infrastructure damage, reduced water supply, urban runoff, human risk, and drought feedback on flood risk (p. 20). These two discussions generated a lot of potential actions, which generally fit into four response buckets: planning (i.e., develop drought and river management plans, and update building codes and ordinances to promote water conservation), coordination (i.e., work with Washington County to change water efficiency codes), regulation (i.e., require water-efficient fixtures and green stormwater infrastructure in new construction), and education (i.e., resident and tourist-focused education on water conservation, flashfloods, and rockslides) (p. 28-31).

However, it is not clear that there has been much follow-through in terms of the actions identified in the workshop. The one interviewee stated that there had not been follow-up meetings, nor follow-through on any actions, at least from their point of view (WWA Interview 7). The survey had mixed responses from five participants: two participants think it led to new action, two are "not sure," and one thinks it did not. The two survey respondents that believe actions occurred since the workshop shared that they have been working on a river management plan and that there have been public meetings sharing information received during the workshop. It may be that these follow-up actions, or others, have occurred in one municipality without communication or coordination with the others, but that conclusion is not identifiable from the survey results.

**Spanish Valley/Moab Region, Utah:**

*Figure 12: Spanish Valley, Utah (Steven Baltakatei Sandoval on Wikipedia.org)*

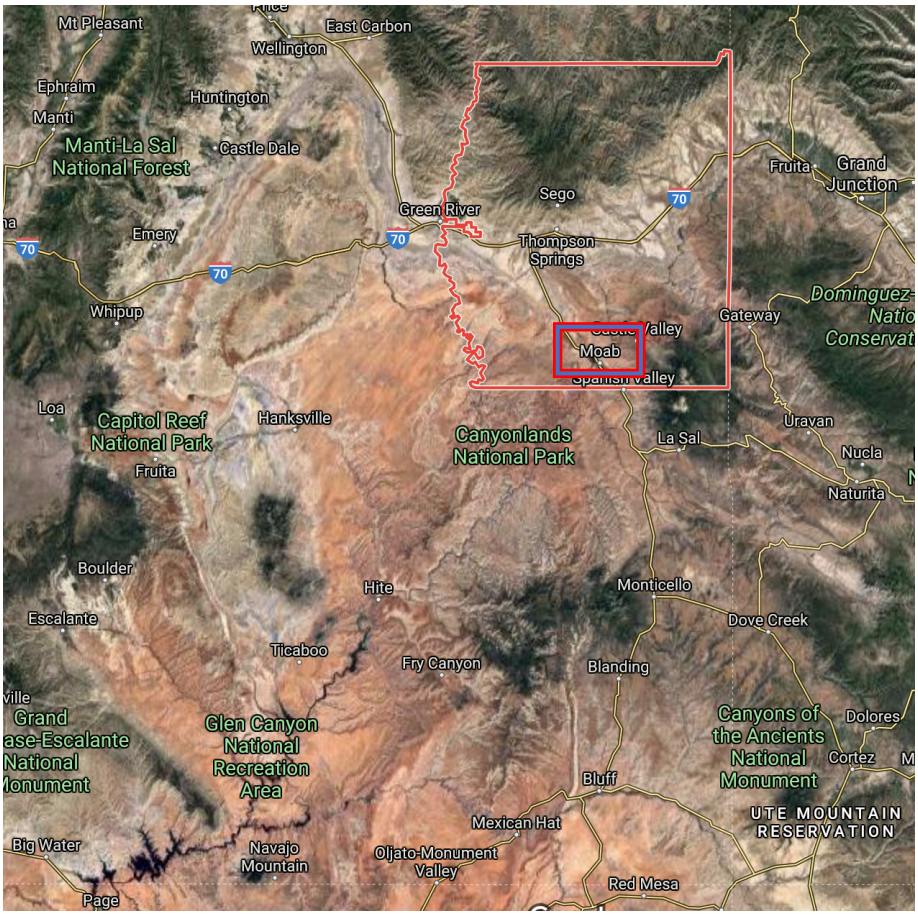


*Figure 13: Moab in Grand County with San Juan County to the South in SE Utah (Source: Google Maps)*

Lastly, a year after the first set of five pilots, Western Water Assessment completed a sixth pilot in the Spanish Valley/Moab, Utah region in July 2019, at the request of a community stakeholder, to bring together representatives from the City of Moab, Grand County (where Moab is located), and San Juan County (located south of Grand County). Moab had a population of 5,046 at the 2010 census and has since grown slightly to an estimated 2017 population of 5,250; Grand County has an estimated population of 10,000 and San Juan County has an estimated population of 15,000 (Arens, McAlear, & Rumore, 2019: 4). The hierarchy of water rights in the region is: Moab Irrigation Company (which provides municipal, industrial, and secondary/agricultural water for Spanish Valley residents), Moab City (water to residents for municipal and industrial uses from springs and wells), Grand County Water and Sewer Service Agency (GWSSA) through the Grand Water Conservancy District, and then the San Juan Spanish Valley Special Service District (SJSVSSD).[7] The region experiences drought, including a severe drought in 2018, but, historically, total water availability has exceeded demand even in drought years (p. 4).

Fifteen participants directly involved with water supply and water quality management attended this workshop, although only ten were able to attend on the second day. Participants included three representatives from the City of Moab (employees and a City Council member), five representatives from Grand County (employees/representatives of the County and two representatives from GWSSA), two representatives from SJSVSSD, two representatives from the Bureau of Land Management, a state employee for the Division of Water Rights (DWRi), and two non-affiliated sustainability-related stakeholders. However, one interviewee did share that there were a few participants who were not able to attend so they "didn't have quite the coverage they wanted to get," including from County Councils and the City's Engineering Department (Interview 23). The community champion for this workshop is the facilitator for the Moab Area Watershed Partnership (MAWP), which regularly convenes local stakeholders to work on issues of water quality in the region. One interviewee recognized that MAWP was a helpful precursor to the VCAPS workshop, as many participants were already well-organized and coordinated from that group, but that VCAPS

[7] As explained by the Utah Division of Water Rights, "One of the fundamental principles of Utah water law is priority between appropriators" based on either when the appropriator "placed the water to beneficial use" (if before 1903) or when they filed for appropriation with the state engineer. Utah then employs "first in time, first in right," meaning that "Priority distribution requires that a senior appropriator's water right be satisfied before a subsequent appropriator receives any water (Utah Code 73-3-21)" (Utah Division of Water Rights, 2010). In this case, Moab Irrigation Company is considered to have the most senior water rights, descending to the SJSVSSD with the most junior water rights. If a severe water shortage were to occur and there was not sufficient water quantity to meet the allotments of all of the water rights holders, those with more senior water rights would have access before those with more junior rights.

was also helpful because it was "great to hear ideas on other things [beyond water quality]" and focus more on the long-term (Interview 21). This same interviewee shared that the diverse group of participants meant that they heard about unfamiliar topics and built new connections (Interview 21).

In this workshop, participants discussed one scenario of drought and reduced water supply, focusing on themes of groundwater depletion, extreme precipitation, wildfire risk, flora and wildlife risk, and water quality and extreme heat, although the issues overlapped during the discussion (Arens, McAlear, & Rumore, 2019: 17). This discussion generated many potential actions, which generally fit into four response buckets: planning (i.e., develop a Spanish Valley groundwater management plan and change regulations to reduce impervious surfaces), coordination (i.e., develop consistent water conservation ordinances across the different water supply entities and assess collective capacity to fight wildfires), education (i.e., use grants or incentives to increase water storage on private properties), and landscape management (i.e., forest management to reduce erosion, improve water retention, and reduce fire risk) (p. 39-41).

In summing up actions that have taken place since the workshop, one interviewee shared that the focus has been on "low-hanging fruit and easier things" that individual stakeholders can run with, while "bigger-picture things are on the sidelines, though on a handful of people's minds" (Interview 20). Participants have made presentations, including a summary of the science presented in the workshop and the actions that were discussed, to Moab's City Council and the Moab Water Conservation and Drought Management Advisory Board. An immediate water supply-related action was that the City of Moab and GWSSA connected their water supply infrastructure. This is important because, in the winter, Moab has historically let surface water run into the river, while GWSSA pumps groundwater so, in the future, GWSSA will be able to buy water from Moab and reserve groundwater for drier times. Grand County has also approved ordinances to restrict landscaping and water usage for overnight accommodations; the City of Moab is in the process of working on a similar ordinance. Additionally, participants continue to look for new water supply opportunities. Lastly, Utah's Division of Water Rights (DWRi), who had a representative participate in the workshop, has held two sessions out of three on groundwater monitoring for the Moab Area Watershed Partnership. DWRi compiled information from various sources into one presentation and identified weaknesses in terms of what is not being monitored. DWRi hopes to catalyze a study to determine more systematically how/where monitoring should be conducted to improve regional understanding of groundwater availability over time (Interview 22).

## General Survey Findings

Western Water Assessment's survey was sent to the 51 participants from the five original pilot workshops in 2018, excluding participants from the Spanish Valley/Moab region workshop less than six months before. Of those 51 participants, 35 responses were officially recorded for a 69% response rate. The general conclusion from the survey is that the majority of respondents had a positive experience with the VCAPS process, even when providing reflections on how it could be improved in the future. Asked how useful VCAPS was for them, 94% said that the process was "very useful" (54% overall) or "somewhat useful" (40% overall). Additionally, as one measure of overall satisfaction, 83% of respondents indicated that they would recommend the workshop to other communities, with only 9% indicating "not sure," and 6% indicating "no" (with one no-response).

Beyond these general results, participants' responses were more mixed when asked to rate other aspects of the process connected to the central questions of this evaluative research, including outcomes related to changes in motivation and the realization of specific actions. In general, the workshop seemed to be personally motivating for participants as, when asked whether the workshop increased their own motivation to take action to address the discussed hazard(s), 80% said they "agree" (51% overall) or "somewhat agree" (29% overall). There is a noticeable decline in perceptions of motivation when asked if the workshop increased their community's motivation to take action to address the discussed hazard(s), with only 54% saying they "agree" (31% overall) or "somewhat agree" (23% overall) and another 34% saying that they "neither agree nor disagree." Lastly, when indicating whether the workshop led to new actions taken by their community aimed at addressing the discussed hazard(s), 63% responded "yes," 23% "not sure," and 14% "no." The sections above look more in-depth at what types of actions participants identify in each community but, in general, they range from education-related actions (i.e., community forums, workshops, and a water conservation campaign) and planning-related actions (i.e., formation of a Wildfire Mitigation Council, and incorporating findings into the municipal budget and drought management plan) to actions with more tangible, quantifiable outcomes (i.e., demonstration plots of low water usage plants on City properties and rebates for low water consumption fixtures).

These survey results do not yield definitive conclusions about any particular aspect of the workshops, but they provide an overall picture of what more than two-thirds of the participants think about the workshop and its outcomes.

## Analysis of Community Workshops

In addition to the above workshop-by-workshop context and analysis of their outcomes, and the general survey analysis, this section focuses on three key areas of overlap from survey responses and interviews from across the six workshops: Workshop Participants, Diagram-Building, and Workshop Outcomes. This section serves to collect reflections on these three topics across communities to better compare experiences from the six workshops, and will directly lead into the following section, "Recommendations and Conclusions," which looks at recommendations for the entire VCAPS process, including how to address the following three challenges.

### Workshop Participants:

Survey respondents and interviewees shared various reflections on the participant make-up of their particular workshop. First, a focus for participants was on the importance of having had elected officials take part in the workshop, as seen in positive comments from workshops where they were present and in constructive comments from workshops where they were not. Participants from the Durango and Carbondale workshops reflected on the benefits of having had elected officials participate, for the ways in which it increased their awareness of the hazards, and made them more open to taking action after the workshop. In Durango, one interviewee shared that he has heard an elected official participant say that VCAPS "opened [their] eyes and made [them] more aware and concerned around issues surrounding drought" (Interview 10). Additionally, that same interviewee mentioned that elected officials have been referencing VCAPS as a driving reason behind them pushing forward actions and making specific decisions (Interview 10). In Carbondale, interviewees also noted the importance of having elected officials champion and attend the workshop. As one interviewee shared, this "helped get the elected official buy-in and focused on [drought] because she pushed to make sure that this was an ongoing discussion," and sharing information and outcomes with elected officials after the workshop "helped focus budgeting on certain [identified actions]" (WWA Interview 2). Another interviewee shared that it has been easier to go to elected officials since the workshop and ask them to prioritize funding for specific actions because the VCAPS process added "legitimacy" to their asks (Interview 12).

Adding to the above, participants from the Routt County and Springdale/Rockville/Hurricane workshops noted the potentially negative aspects of lacking elected representatives. One survey respondent shared that, in Routt County, it would have been useful to have "more policy-makers and commissioners in the room that can actually do something about

these issues," while the interviewee from Springdale/Rockville/Hurricane thought that participants might "not [have given] the workshop as much weight or priority or credibility as maybe it should have had" without elected officials present (WWA Interview 7).[8]

In addition to these reflections on the importance of including elected officials, participants from the other two workshops, Cortez and the Spanish Valley/Moab region, shared thoughts on key stakeholders that they thought were missing. First, participants from the Cortez workshop noted that it was missing certain representatives, which they felt may have limited its usefulness. One survey respondent, when asked what could have made the workshop more useful, wrote, "Though there were many different perspectives, it may have been useful to ask, 'Who is not represented at this table and should they be?' No County representatives were present and their participation may have been helpful." Additionally, an interviewee reflected that it would have been important to "really [get] the agricultural community involved due to their dependence on water, because they have a whole other set of observations" (Interview 15). These two missing stakeholders, the County and agricultural representatives, might arguably be important voices to have at the table given that the County's economy relies predominantly on agriculture, a water-dependent industry. Without these two key stakeholders represented in the workshop, the outcomes of the workshop may not account for the full water-related context of Cortez, and its region's needs, which could affect their relevance and stability in the long-run.

Meanwhile, in the Spanish Valley/Moab region, one participant remarked that, despite their best efforts, not everyone was able to attend so they were missing stakeholders from County Councils and the City's Engineering Department (Interview 23). Lastly, another interviewee shared that, although the Division of Water Rights (DWRi) was present, they thought it was an oversight that the Division of Water Resources (DWR) was not, as they focus on drought planning but do not always carry their initiatives into rural areas. For this participant, it seemed like a missed opportunity to not make this connection between DWR and a rural area that could use their support in the long-term (Interview 22). Although I cannot say that the Division of Water Resources would have been an important representative in the workshop, given that they are not currently a stakeholder in water

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[8] As a reminder, I was not personally able to interview any participants from the Springdale/Rockville/Hurricane workshop and thus only have interview data from the one participant interviewed by WWA. Although I have supplemented as possible with information from the workshop report and WWA's survey, the use of only one interview is a major limitation to the analysis of this workshop given that I rely on one primary viewpoint. In this section, and in "Recommendations and Conclusions," I do present a couple of takeaways from that interview, but the reader should see them as only one individual's experience of the VCAPS process and not as representative of all of that workshop's participants.

management in the region, this does raise an interesting question of how the VCAPS process can also work to connect participants with resources that might support their follow-up efforts. If this interviewee from DWRi is correct, and DWR could provide drought planning support to the Spanish Valley/Moab region, then this may have been a helpful connection to make during the process, even if DWR did not participate as a stakeholder in the workshop.

This analysis of participants' thoughts on stakeholder representation will connect to further reflection and recommendations on this challenge under "Participant Selection" in the following section, "Recommendations and Conclusions."

### Diagram-Building:

In general, participants gave positive feedback regarding the diagram-building process in their workshop. Multiple interviewees mentioned how the diagrams helped them to make connections between different themes and recognize the intersections between the various identified outcomes (WWA Interview 1; Interview 9), and another interviewee described the usefulness of being able to "see all of the branches of the tree" in order to acknowledge the many unintended consequences of drought (Interview 19). Additionally, participants expressed appreciation for the facilitation of the exercise, as it allowed them the space to brainstorm and discuss as a group, without worrying about directing the conversation or note-taking (WWA Interview 1; Interview 10; Interview 11; Interview 15). More specifically, one interviewee said that the most useful part of the process was, "going through the VCAPS [diagramming] process. [The facilitators'] moderation was very useful for us as a group of local people. Once they provided the overall frame, the scenarios, then breaking it down to local participant feedback and input" (Interview 15).

However, one question that arose from participant feedback was the usefulness of working through multiple sets of diagrams, either to model two hazards or to model two variations of one hazard. On the positive side, none of the interviewees in Durango (two drought and two extreme precipitation scenarios) nor Cortez (two drought scenarios) shared any negative thoughts about discussing multiple sets of diagrams. One interviewee in Durango even stated that it was useful to work through all four, particularly with both drought and extreme precipitation scenarios, because the two themes appealed to different participants and helped them each realize the interconnections between issues of drought and of extreme precipitation (WWA Interview 1).

On the other hand, participants from the Carbondale, Routt County, and Springdale/Rockville/Hurricane workshops had specific concerns. In Carbondale, where

participants modeled two variations of one hazard, one interviewee noted that the second variation resulted in too similar of a discussion, while another reflected that the group ran out of time and was unable to "get a lot out of the second scenario" (WWA Interview 2; WWA Interview 3). Similarly, in Routt County, where participants also modeled two variations, one participant shared that the two sets of diagrams ended up looking mostly the same with one just a bit more extreme, and another mentioned the confusion they ran into trying to keep the two scenarios separate (WWA Interview 5; WWA Interview 6). Another interviewee affirmed that they spent a lot of time developing the two scenarios when they could have instead focused on degrees of variation within one scenario, and expressed frustration that they kept going down the path of the second scenario even when they knew it was not working "because it was the process" (Interview 18). This workshop is a key example that suggests that participants may have found it more useful to work on one diagram for the entirety of the workshop, with variations within it for the two drought scenarios, instead of forcing the conversation into two separate diagrams. Lastly, in more mixed feedback, the interviewee from the Springdale/Rockville/Hurricane workshop noted that using the two scenarios was helpful, but ambitious, as there may have been "a few too many variables" with three communities in the room (WWA Interview 7).

The feedback from the five workshops that used multiple sets of diagrams (either for two variations of one hazard and/or for two hazards) is not clear-cut. Instead, the above suggests that the consideration likely needs to continue to be made on a workshop-by-workshop basis, in collaboration with participants, with thought put into what the value add is from using multiple sets. More complete recommendations based on this analysis can be found under "The Workshop" in the following section, "Recommendations and Conclusions."

### Workshop Outcomes:

One of the clearest points of overlap from survey responses and interviewees is that most participants thought the workshop could have taken participants one step further to help them turn their list of potential actions into an outcome that was more immediately actionable for them. However, to begin with, Cortez had no respondents raise this issue and, instead, multiple interviewees shared reflections that demonstrated the opposite outcome. One interviewee in particular, in describing why the VCAPS process was useful, helps to frame what the process's steps and outcomes felt like for participants in Cortez: "[the VCAPS process] was useful for coming up with some action items and an action plan…and coming up with strategies and identifying who was

going to be the go-to to getting those executed. Then [the report] provides a road map to refer to and track your progress" (Interview 15). This seems to suggest that participants in Cortez, in the workshop and their meetings after, went a step further than most or all of the other workshops by attaching responsibility to specific actions, if not by name, then by agency or position title (Interview 15). As another interviewee described, although participants in Cortez may have been concerned before the workshop, "[the process] helped to bring more specific light to potential and existing problems, and helped further define our issues with the people that were interested," which led to the workshop participants moving forward on more specific conservation- and planning-related efforts than they were before the workshop (Interview 16).

Beyond Cortez, though, the other five workshops provide evidence that the process could be improved by including an additional step to better support participants in moving their identified actions forward after the workshop. First, in Durango, when responding to whether or not the VCAPS process helped participants overcome barriers to action in their local community, one of the interviewees summed up the workshop's outcome saying, "I don't know if this [workshop] went far enough to do that. I think it was more a 'Here are the issues. Here are the potential problems and solutions.' But I don't think that the City took [the report] as a planning document, but more as an identifier of potential problems" (Interview 8). He expressed that the outcome of the workshop was not "a step-by-step list of what needs to happen next" and that there would likely have to be another phase, or phases, to go through the report and decide what to do next given budgetary and other constraints (Interview 8).

In Carbondale, despite forward motion on actions post-workshop, various interviewees expressed that the outcomes of the workshop did not feel like enough. One interviewee mentioned that they felt the challenge of translating the outcomes of the workshop into next steps for the Town (WWA Interview 2). As another expressed, they would have liked to "get further with the recommendations" in the workshop itself or afterward in order to specify who is responsible for what, as the challenge is having people take ownership and move things forward after the workshop when they return to their day-to-day responsibilities (Interview 13). Lastly, one interviewee noted that the workshop generated so much information that it was hard to know priorities and decide on implementation details, including "what will make a difference, what's doable, who's responsible, are there budget issues", etc. (Interview 14).

In Routt County, participants connected a lack of action since the workshop to their feeling that the workshop did not leave them with an outcome that prepared them well for taking next

steps. One survey respondent wrote, "It seemed like an exercise for the benefit of the researchers. It wasn't clear how to take the model and use it to inform action." Another wrote that it would have been useful for the workshop to "help define actionable items, connect to resources for needed information and that might help facilitate action, define steps to take to help overcome barriers, ideas to help engage community, provide or point to other plans or organizations who have had success with planning and action." Additionally, one participant felt the need to narrow down action items from the workshop to deal with the mix of "'pie-in-the-sky' along with more reasonable [actions]." This interviewee felt that it would have been useful to work on this prioritization in the workshop itself with the help of WWA because "[locals] probably have an idea of what's happening in their community, but I don't know if they truly know what to do about it, you know?" (WWA Interview 5).

Participants from the Springdale/Rockville/Hurricane workshop shared thoughts about what else they think the VCAPS workshop could have done to be more useful or to help them overcome barriers to action. One survey respondent shared that it would have been useful to have "More detailed emphasis on strategies for adaptation to climate threats. We really need some help developing strategies to deal with climate risks, but just aren't sure how to get started," while another wrote that the workshop could have "Maybe [identified] more specific action steps we can take, and also suggest resources (funding, technical assistance, model communities, etc.) to help us take those next steps."

Lastly, in the Spanish Valley/Moab region workshop, participants expressed general concerns that the workshop could have gone further in providing support for actions following the workshop. One interviewee would have liked to have a formal structure in place to continue the conversation, including identifying point people during the workshop and following up on commitments, and working on prioritizing and figuring out rough budgets for actions. They further stated that "[VCAPS] is a good planning tool, but without an understanding of trade-offs, risks, and cost-benefit analysis it's hard for the City Council to know where to put resources" (Interview 20). Another echoed the sentiment that workshops such as this are always a one-time thing and that they would have liked to see a more "strategic, long-term initiative" in some form (Interview 22). Lastly, another interviewee expressed that the outcome of this workshop was "not a lot of action items to move on," so participants were left with the question of what to do next and how to do it (Interview 23).

This set of reflections from workshop participants, on how identified actions translate to actual action after the workshop, makes a very strong conclusion for the importance of adapting the VCAPS workshop to include a final stage in order to collectively prioritize actions, attach responsibility, and make a follow-up plan. Further recommendations on this topic are included under "The Workshop" in the following section.

# Recommendations and Conclusions

## Overall Findings & Recommendations

This section seeks to organize general findings from the survey and interviews that apply to most or all of the pilots, as well as share my personal recommendations on how the VCAPS process could be improved for future workshops, with influence from best practices and alternative techniques in the literature. The reflections below are in response to the main challenges and concerns raised by participants in their surveys and interviews. However, it is worth reiterating here that, despite the constructive feedback from participants, the overall evaluation of the VCAPS process was positive for the majority. In survey responses and interviews, participants shared how much they learned about the climate science for their region and from the knowledge at the table, as well as how useful they found the diagramming and discussion process for building a collective understanding of how to respond to their most pressing climate hazards.

The recommendations included in this section are meant to build off of the existing VCAPS process, which has provided value both to individual participants, as well as to communities through these six pilots, to imagine how it could learn from these experiences and provide even more value in future iterations. Additionally, these recommendations are presented with the caveat that WWA will have to determine, moving forward, how best to balance these suggestions with their potential constraints, including financial resources and the limited in-workshop time to which participants commit.

This section is organized chronologically through the stages of the VCAPS process into four main subsections of analysis: Identifying Communities, Participant Selection, The Workshop, and Post-Workshop.

### Identifying Communities:

As discussed previously, WWA did not systematically choose, nor employ specific guidelines in selecting, the six communities to participate in this pilot process. Instead, WWA put out a call for interested communities in a Colorado municipal newsletter and used personal connections to find the original five communities; the Spanish Valley/Moab region joined the pilot based on stakeholder interest after hearing about the process. Based on this, one of the original questions driving my research was: What community characteristics, including before, during, and after the workshop,

connect to successfully maintaining motivation over time and implementing tangible actions? I was curious to know if there were inherent differences in the selected communities that led to greater workshop-related outcomes in one versus another. It is difficult, in the end, to answer that question because, first, the sample size of six communities is too small to come to any definitive conclusions and, second, there are not many clear indications even amongst that small sample size. Although it is not possible to give a definitive answer to this question, this section explores a few potential hypotheses using the survey and interview results and what they might point to, given the results of the workshop across the six communities. At the very least, these are interesting considerations to keep in mind when selecting VCAPS communities in the future.

First, disparate outcomes from different workshops could potentially be related to how well-organized and connected stakeholders were before the workshops. In this group of six communities, there are two examples of pre-workshop stakeholder collaboratives: the Zion Regional Collaborative in the Springdale/Rockville/Hurricane workshop and the Moab Area Watershed Partnership in the Spanish Valley/Moab region workshop. Additionally, two other workshops, Durango and Cortez, could be examples of this as well, as all participants were employees of, or directly connected to the City government (via City Council, a commission, or a committee, etc.). However, in all of these cases, the potential advantage was only that stakeholders may have been previously connected, as neither stakeholder collaborative focused explicitly on water supply issues, and the City-related participants in the other two examples worked in diverse roles on various topics. Neither the pre-existing collaborative structures nor the City-related professional connections emerged in survey responses or interviews as a major contributor to the workshop outcomes; additionally, only one of the four workshops (Cortez) demonstrated more action or participant collaboration post-workshop that could have potentially been linked to these pre-existing connections.

Another hypothesis was that pre-existing climate change-related planning efforts in a city or region might lead to greater outcomes. The primary example of this from these six workshops is Carbondale, which had a climate action plan in place before the workshop that was referenced in interviews. However, as one participant noted, the presence of a climate change-related plan does not mean the City is focused on adaptation planning: "I'm not 100% certain we would have had any conversation around these vulnerabilities until it was full crisis…So, I think the greatest benefit was that it set the stage for proactive discussion around such critical components of what the threats are to the community" (WWA Interview 3). Previous climate change-related planning efforts might mean that stakeholders involved in that planning are more aware of the risks and have thought

about potential actions but, as demonstrated by Carbondale, they are still likely to benefit from the VCAPS process.

Relatedly, it would likely be expected that having an awareness or existing concern for the hazard(s) might lead to a greater sense of urgency at the end of the workshop, and more commitment to carrying out actions. However, it is difficult to see whether this holds true in this group of six workshops since, as explained in the Durango workshop's context above, five of the six workshops were held at the end of a severe drought that was then followed by a wet winter and spring. Many interviewees expressed the challenge this posed to maintaining the sense of urgency and risk that they felt leading up to and during the workshop.

Lastly, one of the major ways in which the six workshops differed from each other was in the makeup of the government bodies that participated in each: three workshops with only one municipality, one workshop with three municipalities, one workshop with one county, and one workshop with one municipality and two counties. Survey respondents and interviewees were not asked to reflect on this characteristic of their workshop, and few mentioned something related in their answers to other questions. However, in Cortez, one of the workshops with only a municipality present, one survey respondent stated that "No County representatives were present and their participation may have been helpful." This statement recognizes that effectively planning to mitigate the hazards discussed in the workshop might need to stretch beyond municipal boundaries and connect with higher levels of government that do have local influence or relevance, such as the county government. On the other side of this, the interviewee from the Springdale/Rockville/Hurricane workshop expressed that it may have been too complicated including three communities in the workshop since "each community has a different way of responding or different policy mandates or different priorities…different constituencies, different resources…[so the process] generated so much data and so much information that it was difficult to really kind of hone in or get to a fine level of detail on any one specific strategy or issue," (WWA Interview 7). These data points do not provide enough proof to say that one formation of government entities makes for a more successful workshop than another, but does suggest that the decision should be made on a workshop-by-workshop basis given the regional context and goals for the workshop. This decision connects to the strategy used to identify workshop participants, which I will discuss next.

Ultimately, the difficulty in answering this question points to the importance of focusing on adapting other steps within the VCAPS process to set communities up for success, instead of

hypothesizing about what characteristics might make one community more successful than another. As the VCAPS process is one that each community must opt into, the most important prerequisite should be that there is enthusiasm among stakeholders for participating and that they are committed to all of the different stages. From there, the WWA team has more control over adapting the other steps of the process to best ensure positive outcomes for the groups, as follows in the rest of this section.

### Participant Selection:
### Representation in the Current VCAPS Process –

A key takeaway from participant feedback is that who is in the workshop matters. This analysis was shared in more detail in the previous section under "Workshop Participants," and highlighted two key takeaways from survey respondents and interviewees. First, many participants shared the importance of including elected officials, either because they noted it as a positive aspect of their VCAPS process or because they noted a lack of elected officials negatively affecting their outcomes. Second, other participants shared thoughts on stakeholders that they saw as missing from their workshops, such as representatives from another level of government (i.e., county government) or a specific stakeholder group (i.e., agricultural producers). This section will expand on these findings from the survey and interviews to look more in-depth at the question of representation in the VCAPS process, including suggestions on how to adapt the process to better address participant concerns.

The VCAPS process aims to bring together local decision-makers and does not seek to be a fully representational process. This can be seen in the pilot workshops, as three out of the six (Durango, Cortez, and Springdale/Rockville/Hurricane) were comprised entirely of city employees (or adjacent stakeholders, such as board or commission members) and/or elected officials, with no non-governmental representatives included. It is worth noting here, though, that Durango and Cortez are two of the workshops with tangible outcomes in terms of follow-through on identified actions, suggesting that, in this set of workshops, there is not a clear relationship between representation of a broad group of stakeholders and workshop outcomes. This instead suggests that workshop composition should be based on community context, the hazard(s) being discussed, and the goals of the workshop. However, I do think it is important to also note the benefits of carefully considering representation in each workshop, as the composition of participants directly determines the discussion during the workshop and, thus, what become the possibilities for outcomes and

actions after the workshop. Including a broader range of stakeholders is likely to diversify the ideas contributed in the diagramming process, as representatives of different groups have additional understandings of potential outcomes and consequences of the hazards, as well as thoughts on mitigating actions. Additionally, ensuring that the process is more representative from the beginning helps to create legitimacy when city employees and elected officials move forward on actions after the workshop.

There are, however, constraints on the number of participants that would allow for an effective workshop, particularly if the group represented a wide range of stakeholder interests, given that the workshops are already time-constrained. From this set of pilots, though, it is not clear what an ideal or appropriate number of participants might be. The six workshops ranged from eight to fifteen participants, with the middle four settling in the range of ten to twelve. No survey respondent nor interviewee commented specifically on the number of participants, suggesting perhaps that there were, at least, no strong negative feelings of these numbers being too high and causing issues in the running of the workshop. Potentially this is an area for continued experimentation in future VCAPS workshops, particularly if the context of a specific workshop suggests the need for a greater number of participants in order to lead to useful outcomes. Additionally, recognizing that the number of participants in the workshop itself will need to be limited to some extent, raises the question of how VCAPS communities can be encouraged by WWA to broaden stakeholder involvement after the workshop. This will be discussed in the later section, "Post-Workshop."

Beyond questions of the spread of representation in workshop participants is the important consideration of whether there are participants who are likely to generate enthusiasm around the VCAPS process and be able to maintain momentum post-workshop in order to generate action. One possibility is that the community champion(s) can play an important part in this, but reflections from the pilot workshop suggest that other individuals, such as elected officials or other community leaders, will be crucial as well. Lessons regarding this point are seen in the two communities who have had the most forward movement on identified actions, Carbondale and Cortez. First, in Carbondale, one interviewee shared the importance of having a person (who in this case was both one of the community champions and an elected official) spearheading follow-up actions and maintaining enthusiasm. However, this individual effort could only be maintained for so long before other professional responsibilities made this long-term championing more difficult (Interview 12). Building off this, in Cortez, one interviewee described the importance of having a core group of people, including their community champion, a key elected official, and a couple of other

individuals, maintaining momentum (Interview 16). Ultimately, Cortez has been able to maintain the most consistent, long-term collaboration post-workshop and also has had significant forward movement on identified actions. In comparison to the other five workshops, this group of long-term champions seems likely to be a key feature of their success.

In addition to these two workshops, Routt County provides another interesting example for the role that representatives from the Colorado State University Extension have played in maintaining follow-up. One of the community champions for that workshop was an extension agent and, along with the other extension agent participant, they have played a key role in the actions taken since the workshop. Most importantly, they were able to leverage their position to hire a Colorado State University intern to create new capacity for following through on identified actions. This suggests that it could also be useful to think about community-based anchor institutions as potential supports post-workshop, as they often have access to research capacity and funding. The Rural Climate Dialogues, one of the participatory climate change adaptation processes introduced earlier, provides an example of this. Myers et al. (2017), in comparing two cases and exploring elements for why community action occurred to a greater extent in one versus the other, write: "Morris, unlike Itaska County, is home to a public university that has served as an anchor and coordinating body for community adaptation efforts. The University of Minnesota-Morris has devoted staff and student resources to writing grants and conducting community education events" (p. 23). Of course, many of the communities where VCAPS workshops are held are small, rural towns without universities, but many of them do have other community institutions that might play a similar role. For example, an NGO organization might provide an important link to community members that could assist in follow-up stages of community engagement. As many participants raise personnel time capacity and funding as two key constraints, including a representative from an anchor institution, or a similar organization, could help to provide connection to necessary resources that can help to overcome these challenges.

### Adapting Participant Selection –

With all of the above reflections in mind, there is an opportunity to rethink the model for how participants are identified to participate in a particular VCAPS workshop, to ensure that there is careful consideration of both the range and depth of the different representatives. As explained previously, the team at Western Water Assessment works with one (or sometimes more) "community champion(s)" to identify a list of potential participants who are then invited to the

workshop. The community-by-community analysis above demonstrates that these decisions are made thoughtfully, as each workshop is unique in terms of the mix of stakeholders dependent on the context of the community or region, and the issue(s) on which they will focus. However, there is a limitation to having only one or two stakeholders be the driving force in determining who else should be included, given that they only have a personal understanding of the issue and its scope, and potentially bring personal biases into the decision. Webler et al. (2014), recognize this limitation in their evaluation of the East and Gulf Coast VCAPS workshops, writing, "We have relied on local champions to identify important issues for discussion and to recruit community members to participate…At the same time, we recognize the pitfalls of relying on local champions. Local champions may seek to push their own agendas or exclude people with whom they disagree" (p. 183).

Feedback from across the six workshops suggests that the current model of participant selection for the VCAPS workshops is not sufficient to ensure that an effective and representative mix of individuals is at the table, potentially hurting both the usefulness of the content of the workshops and its outcomes, as well as the likelihood of follow-up. First, I think that WWA can support community champion(s) in this process by providing resources to help guide them in stakeholder selection, including guidance on the considerations discussed above, such as including elected officials, community anchor institutions, etc. Second, I would recommend that WWA rethink the process through which community champion(s) select participants for the workshops. One tool that is available as inspiration is a stakeholder assessment which, "characterize[s] the range of perspectives in a community by interviewing a set of people whose views are likely to be representative of most of the interests and values in that community" (Susskind, Rumore, Hulet, & Field, 2015: 68-9). It "begins with a provisional list of the constituencies or categories of people that represent the range of local perspectives on issues of adaptation planning" before a neutral party interviews one or two people from each category who, at the end of the interview, are offered the chance to identify others who should be interviewed until a "full range of community perspectives" has been gathered (p. 69-70). The list of those interviewed will not be the same as the list of invitees for the engagement process, but the process helps to narrow down potential participants, as well as gather important information on community context.

Currently, in the VCAPS process, I see the pre-workshop interviews with participants as building towards one aspect of a stakeholder assessment: providing community context and an overview of prior viewpoints and knowledge before the workshop. However, these interviews are

only conducted with participants that were pre-identified by the community champion(s). I do see an advantage in the VCAPS process continuing to utilize community champion(s), as they are chosen for their social or political capital that will help them convince individuals to participate in the process. But, to mitigate the effect of having only one individual driving the convening process, I think that WWA could adapt the pre-workshop interviews to move towards a model that is more similar to a stakeholder assessment, to assist the community champion(s) in ensuring broader representation. This adaptation would not necessarily need to follow all of the steps described in a stakeholder assessment above, but could modify it to fit the current VCAPS process by building on the pre-workshop interviews.

One option would be to continue to have the community champion(s) create the initial list of possible participants, particularly if WWA provided them with information that might assist them in developing a more representative list. At that point, WWA would begin to conduct pre-workshop interviews with that initial list, but adding in the component of asking each interviewee who else should be represented at the table. After the WWA team felt that they had covered a wide enough range of stakeholders through this process, they could then present the list of possibilities back to the community champion(s) for a final narrowing. This type of process might mean conducting more pre-workshop interviews, including with individuals who might not ultimately be invited to participate, but would assist the community champion(s) in overcoming their personal blind spots and including a wider range of participants. This approach could also help to inform the process in other ways, by gathering information from a broader range of potential participants to determine how best to set up and frame the workshop.

Within the VCAPS process, as it is currently, I think it would be difficult to interview potential participants only to not invite them to the workshop, as the process is not currently set up for engagement with individuals beyond workshop invitees. However, I think that the above proposal could become more palatable when considered in conjunction with other recommendations to follow, which will look at post-workshop opportunities to broaden participation in the process beyond workshop invitees. Another option, though, if WWA did not want to interview participants who would not be invited to participate in the workshop would be to ask the community champion's initial list of participants to suggest additional participants to the champion, who would then produce a final list of participants for WWA to interview. This potentially misses out on further circles of participants, but would at least serve to give recommended participants the chance to identify who might not be currently represented but would

add a valuable presence to the workshop. It should be noted that either of the above adaptations would require WWA to spend more time on this stage of the VCAPS process, due to both conducting more pre-workshop interviews and engaging more directly with the community champion(s) during the selection process. This choice has implications for how WWA budgets their team's time to run each of these workshops and would have to be balanced with other changes to the process. Hopefully the identification of the two options will allow WWA to consider the different ways in which stakeholder selection might be adapted, in connection to any potential constraints.

Additionally, one final note on the topic of distinguishing between participants who are invited to participate in the workshop and those who are not is the importance of including a broader circle of elected officials and decision-makers in the process from the very beginning, including those who will not attend the workshop. This pre-workshop engagement, by WWA and/or the community champion(s) can help to ensure that they endorse the workshop and are willing to play a role in potential outcomes. An example of this can again be seen in the Rural Climate Dialogues, as Myers et al. (2017) explain how investment by elected officials was another potential element in why community action occurred to a greater extent in one case versus another: "The City of Morris, through the City Manager, was also initially invested in the Citizens Jury process, presenting about city infrastructure despite being personally skeptical about climate change. That commitment has translated to ongoing support for the jury recommendations" (p. 23). Giving the City Manager a role in the process, although they were unable to be a part of the citizen juries, helped to keep them invested throughout all of the stages until they were able to lend their support for the recommendations. Similar considerations should be made in future iterations of the VCAPS process to include a broader range of elected officials throughout the various stages, in order to flow more smoothly into the post-workshop follow-up that will be discussed below.

## The Workshop:

### Framing the Workshop –

To begin this section, I want to reflect on two interviewees who shared their thoughts that the workshops did not begin from a place of first recognizing ongoing work in the community and then building from there. I think that the two participants wanted it more explicitly recognized that the community was not starting from zero, but that the workshop was meant to build on the current state of climate adaptation work in the community. One interviewee, in response to a question about

actions post-workshop, stated that "it kind of flusters me at times because we have been doing things and people think we were not doing things," and went on to say that the community had already been working on many of the actions that were identified in the diagrams (Interview 19). The other interviewee was also critical that the workshop did not consider the "historical perspective," or work already being done, when framing the issue (Interview 22).

To this end, I would recommend using an asset-based approach to the workshop facilitation by including more explicit recognition of the history of climate adaptation in the community, as well as related knowledge and experience in the room, at the beginning of the workshop.[9] This information could be explicitly gathered from the adapted stakeholder assessment suggested above, by interviewing a broader range of potential participants with different knowledge about what is ongoing and what resources already exist. This recognition at the beginning could include both framing the introduction to the workshop in this way, as well as inviting participants to share thoughts on this in their introductions, including their past knowledge and experience, as well as climate adaptation actions already accomplished in the community. As the VCAPS workshop is primarily meant to be community-driven, I think introducing the workshop in this way then leads more smoothly into the climate scientist-led presentation, which puts outsider knowledge at the center, before moving on to the participant-led component for the remainder of the workshop.

### The Diagramming Process –

One major takeaway from the survey and interviews is that the scenario discussion and diagram-building process is generally a positive aspect of the experience for participants. However, from participants' reflections, there are two important caveats to this: the use of multiple sets of diagrams to model two hazards or two variations of one hazard, and the method of reporting back the diagram outcomes to participants in the report. First, as described in the across-community analysis in the previous section, there were mixed results regarding the usefulness of working through multiple sets of diagrams to examine two or more scenarios. Participants in Carbondale, Routt County, and the Springdale/Rockville/Hurricane workshop all expressed complications using

[9] An asset-based approach is commonly referenced in planning in terms of Asset Based Community Development (ABCD), which "builds on the assets that are found in the community and mobilizes individuals, associations, and institutions to come together to realize and develop their strengths." This distinguishes it from a "Deficit Based approach that focuses on identifying and servicing needs" (https://www.nurturedevelopment.org/asset-based-community-development/). This same mindset can be applied to facilitation, by focusing on a group or community's assets and strengths as the building blocks to collective work.

multiple scenarios and questioned the usefulness or efficacy of this method within their group. However, participants in Durango and Cortez did not raise specific concerns.

Interestingly, at the beginning of the Spanish Valley/Moab region workshop, a participant questioned how they could work on only one diagram about drought when, in their mind, three different kinds of drought existed: short-term drought, long-term drought, and climate change-related drought (meaning in the very long-term). The facilitator responded, agreeing with this statement, but asking whether it added value to work through three different sets of diagrams based on this. Participants, through a temperature check, seemed to agree that it did, until one participant suggested working through a diagram of short-term drought first, and then going back to see what would happen with long-term drought, or adding in those variation-related additions as they went. The group agreed on this and so the facilitator then aimed to include short- and long-term drought variations in the same diagram and to make specific distinctions between the two in terms of what actions would apply on the different time scales. Ultimately, having watched the discussion, I think that participants did not end up focusing much on long-term drought specifically, likely because they found it the most urgent to consider short-term drought, and possibly because their identified actions connected to drought on both timescales. In this case, it seemed to serve participants to talk about drought more generally, without a time-scale restriction. They may not have accomplished as much as they did through the diagram if they had been forced, midway through the discussion, to attempt to start from scratch with a new set of diagrams specifically related to long-term drought.

Based on the data from the six pilots, I cannot make specific recommendations about how many sets of diagrams should be used in the future, but I think that the consideration needs to continue to be made on a workshop-by-workshop basis with thought put into what the value add is from using multiple sets. An adapted stakeholder assessment, as suggested earlier, will help to gather sufficient information to inform this decision based on participant-identified needs and interests. First, in terms of using multiple sets for two variations of one climate hazard (i.e., a one-year drought and a three-year drought), I think that the Spanish Valley/Moab region workshop above provides a potential alternative. The diagramming exercise could be adapted to work through the less extreme variation of the hazard, while including additions related to the more extreme variation within it and, if time allows, focusing a portion of the discussion only on what might be missing from the diagram to address the more extreme variation. Second, I do see value in modeling two hazards in separate diagrams (i.e., drought and extreme precipitation) if a majority of workshop participants are directly involved in working on both issues and express a strong desire to explore

both topics in the workshop, although they know that this will limit their time discussing each one. This decision should be made using participant information from the pre-workshop interviews, in collaboration with the community champion(s), based on what is most urgent for the community and will best support their immediate actions after the workshop. It might also be suggested to participants that they use the workshop to focus on solely one hazard, knowing that this will help them to learn the VCAPS diagramming technique and open the opportunity to self-organize a workshop on the second hazard in the future.

Second, many participants mentioned that the report back of the outcomes of the workshop (i.e., scenario diagrams and action tables in the report) was a less useful aspect of the process, both because the physical product is not readable or easy to use. At least half of the interviewees related that the diagrams may have worked relatively well on the screen (as part of the process), but not in the report (as an outcome) because they were hard to understand and read. As one interviewee explained, the diagrams are so large that they lose their value because the reader cannot re-track why they linked x, y, and z (Interview 10). Emblematic of this point is that participants from three of the communities described meeting as a group, or a subset of the group, after the release of the report to re-organize their conclusions in a more usable and readable format for themselves, including in Carbondale, Cortez, and Routt County. However, these community rewrites were less about restructuring the diagrams into a more readable format and more about moving from a list of non-prioritized actions into a more actionable list, which leads into the following section of recommendations. As such, the unreadability of the diagrams in the report may be less important in the future, if WWA takes the steps suggested by participants below to create other more usable outcomes, and relies on the diagrams for the value they provide as a facilitation tool in the workshop discussion itself.

### Final Workshop Stage –

As expressed earlier, many participants shared that they did not find the outcomes of the workshop to be as useful as they could be because they felt that the workshop did not go far enough to assist them in taking subsequent steps. The conclusion from many respondents and interviewees is that there seems to be a missing stage at the end of the workshop that takes identified actions from list form in the diagrams and action tables to another format that is more immediately useful. One Carbondale interviewee's comment particularly stood out to me from all of the interviews when they said that the VCAPS process "highlight[ed] how [drought concerns] could be integrated into

city planning and how to integrate into the budget, already existing plans, within water management plans, etc., and how to effectively do that" (Interview 13). This stood out to me as extremely high praise of the workshop both because it demonstrates the immense impacts that a successful VCAPS workshop could have by impacting ongoing processes within a community, but also because the across-community analysis shared in the previous section demonstrates that this sentiment may not be shared by most participants in the other workshops. Instead, survey respondents and interviewees shared feedback about how the workshop did not do enough for them to provide forward momentum, as well as ideas for how the workshop could be improved to better do so.

In presenting ideas for how to adapt the process, interviewees primarily shared the need for time in the workshop to focus on prioritization and implementation details, including "what will make a difference, what's doable, who's responsible, are there budget issues, etc.," as well as "tradeoffs, risks, and cost-benefit analysis" (Interview 14; Interview 20). One interviewee shared that they felt the need to spend time after the workshop narrowing down action items, as the final list was a mix of "'pie-in-the-sky' along with more reasonable [actions]," and that it would have been useful to spend time in the workshop, with the support of WWA, to accomplish this prioritization (WWA Interview 5). Providing a summation of these points, another interviewee shared that identifying actions could have been a really useful part, but "they weren't as explicit as they could have been to make 'movers and shakers' stand up and take notice." Instead, they would have needed to be presented as more "chewable, succinct opportunities" to garner support (Interview 23).

To think about how to adapt the final stage of the workshop, and its outcomes, to be more useful for participants, I want to reference the VCAPS creators from their research on the process: "Participatory modeling…is viewed as a way of bringing stakeholders together to organize information about complex systems into tools that are more useful for local decision-making than those designed by scientists and decision makers alone" (Tuler, Dow, Webler, & Whitehead, 2015: 25). However, the response to this, based on an overwhelming majority of survey responses and interviews, is that the "tool" (the diagrams) used in the VCAPS process are not currently providing sufficient value to their potential users to deeply influence local decision-making. Based on the interviews referenced directly above, that share participants' varied responses to the diagrams, there are potential improvements to be made in terms of how the diagrams are created, what participants produce beyond the diagrams, and how the information is shared after the workshop.

First, in thinking about how the diagrams are created, there were a few participants who shared that watching the diagrams appear on a screen in front of them, often in an unreadable way,

was not useful engagement for them. In the Spanish Valley/Moab region workshop, for example, at the end of the first day, participants let facilitators know that they were unable to read the diagrams on the screen at the front of the room, which was inhibiting their ability to double-check the information and identify what was missing. This often resulted in repetitive discussion, or pauses, during which participants tried to remember what had already been said in order to contribute something new. For the second day, after the WWA team had organized the diagrams, they printed them on 11X17 pieces of paper so that each participant had the existing diagrams in front of them and discussion could build from there. However, this did not fully solve the issue, as participants were still unable to see changes that were made on the screen during the second part of the discussion. Although I am not going to delve into details here, there is an opportunity to rethink this component of the workshop to consider how the diagramming process itself, and the representation of the information produced, might be more participatory. An example of this from an existing community-based climate change adaptation process comes from Port Orford, Oregon where researchers introduced concept mapping and influence diagrams to participants as strategies for community engagement on climate change. However, in contrast to the VCAPS process, participants worked on these diagrams with their hands and in rotating small groups, utilizing poster boards and sticky notes to collaboratively work through the stages of discussion (Cone, Rowe, Borberg, & Goodwin, 2013: 11-3). This example could be a great inspiration for the VCAPS process, suggesting an alteration where participants pair their discussion with physical manipulations of diagram components, either as a large group or as small groups than then join together to create a shared diagram collectively.

Second, perhaps the clearest consensus from survey respondents and interviewees is that the VCAPS process is missing a stage at the end of the workshop that takes the outcome of a list of potential actions and transforms it into one that is more immediately actionable for participants. This includes, as shared by interviewees above, a minimum of prioritizing actions and attaching responsibility to specific actions, but should likely also include initial discussion about long-term tradeoffs and cost-benefit analysis of specific actions. I would add that it is also important for participants to commit to a follow-up process, including when they will meet next, how they will communicate information beyond workshop participants and engage elected officials, and who is responsible for organizing these efforts. The success of these follow-up efforts is ultimately dependent, both in the short- and long-term, on specific participants taking on the responsibility to act as coordinators and push the process forward. This connects back to earlier discussion on the

selection of workshop participants and ensuring that there are individuals who will have the capacity to act in this role, such as representatives from anchor institutions, committed elected officials, community leaders, etc.

Third, the changes described above then lead into addressing how information is shared with participants after the workshop. Current critiques lie in the unreadability of the diagrams in the workshop report and lack of utility in the list of management actions, as they do not synthesize the information, provide any sense of prioritization, or translate directly into an action plan. If the workshops were to include a final stage focused on this synthesis and prioritization, the report could then be adapted to best present this information as its main takeaways, while still sharing the diagrams and process that led to that final outcome for reference.

### Post-Workshop:

### Continued Stakeholder Engagement –

The additional preparation for post-workshop described in the section above then leads into an opportunity for change within the VCAPS process in terms of how workshop participants bring other stakeholders into the process afterward, by both sharing information and creating opportunities for others to share ideas on how to move forward. There are two important components of this, both of which were raised by interviewees: involving counterparts who were not present in the workshop (i.e., other elected officials, commissioners, etc.) and involving the general public.

First, a Durango participant shared that an issue he had with the workshop was that it did not include all of his counterparts in his particular position, making it difficult to effectively share information back with them afterward in a way that engaged them. The interviewee expressed that "encapsulating learnings and giving a summary" after the workshop did not provide the same value for the non-participants as the diagramming activity had provided the workshop participants (Interview 9). As inviting all counterparts of each representative would not allow for diverse participation and maintaining a small enough group, this feedback then raises the question of how to prepare participants to more effectively engage their coworkers after the workshop to bring them on board and generate momentum for specific actions. One interviewee echoed this sentiment, remarking that they would have liked to see a "follow-up presentation to the responsible elected officials and key staff members" that did not participate, especially focusing on "conclusions that are

hard to swallow" to explain to them the thought process behind the workshop's conclusions and why participants think they are necessary (Interview 11).

These participants identify an important action that should be a part of participants' follow-up to the workshop: representative communication back to the group of stakeholders they represented. After workshop participants have collectively decided on a strategy for sharing information with non-participants, each representative can be responsible for sharing with their identified group. This broader inclusion at this stage of the process will help to prepare the community to move forward on action steps by explaining the thought process used in the workshop and why particular actions were prioritized. One interviewee raised this concern, regarding a key decision-maker who had not been present in the workshop, expressing that they became a roadblock to particular actions after the workshop because they had not been included in the discussion and did not fully understand the logic behind them (Interview 14). Workshop participants can position themselves ahead of these types of responses by proactively reaching out to non-participants in their represented group to share outcomes with them and bring them into subsequent stages of community action.

Second, and directly related to the above, an interviewee from Carbondale raised the crucial question of how to complement the VCAPS workshop with a broader public component to create enough momentum to support long-term change:

> "If the process is designed for action, what are the key factors you're going to need to work into this to ensure it results in greater action? And one is intentional stakeholder discussions are great, but it's best to complement them with broader public outreach, as well, just to create that momentum and a mixture of forces that can help move things forward…The VCAPS workshop was very thoughtful, academic, and effective…but if the purpose of the whole effort is to trigger really, really effective action…there needs to be some intentional mechanism to orchestrate or build the community, political will that will sustain deeper action" (Interview 14).

The momentum to carry forward any type of public engagement after a VCAPS workshop would have to come from the participants themselves, but this is another way in which the process itself could have a built-in component to set participants up for success by encouraging its consideration and providing relevant guidance or resources. Additionally, this consideration connects to the following section which shares ideas and feedback from workshop participants on how the process could be expanded to include additional components that might provide more ongoing or long-term support. However, the importance of focusing on the building blocks addressed in the previous

sections (such as identifying participants, considering participatory diagramming, prioritizing actions, etc.) should not be overshadowed by consideration of a follow-up phase to the original VCAPS process. Additional follow-up will not overcome potential challenges, such as missing stakeholders or a lack of elected official buy-in, that arise because of how the original stages of the process are conducted.

### Phase Two of VCAPS –

With that being said, many survey respondents and interviewees expressed interest in official follow-up to support them in accomplishing actions identified during the workshop, so the question of how to conduct this does deserve attention. In sharing how the VCAPS process could have better supported participants in the months and longer-term after the workshop, particularly in relation to follow-through on identified actions and other outcomes, respondents and interviewees had various ideas that generally fit into two categories: access to resources and information, and opportunities for official follow-up.

First, various participants expressed interest in the VCAPS process and its facilitators leveraging their resources to leave them with access to resources and information that would help them move forward, such as through a "centralized resource/data repository" (WWA Interview 1). In terms of what specific resources would be useful, one interviewee expressed the need for "better access to resources on regional climate change and related issues," recognizing that they might be embedded within the report, but that they still do not feel as accessible as they could if they were more explicitly compiled (Interview 10). Other interviewees expressed interest in "case studies or examples of model policies and financing mechanisms" and information about obtaining grants (Interview 20; Interview 16). To expand on this, another stated that it would be most useful to have examples from non-liberal communities on how they have implemented drought mitigation and related land management changes, to counteract the usual examples that are shared as best practices (Interview 18). Lastly, an interviewee expressed interest in more explicit guidance, saying that it would have been useful to have a "checklist of here's where you can go from here" or a "playbook" (WWA Interview 2). Connected to this is the idea expressed by many participants that there is a desire for greater connection amongst communities facing similar issues, particularly those that have also completed a VCAPS workshop, in order to learn from each other.

For those participants that expressed interest in official follow-up, or a "phase two" of VCAPS, their ideas fell into two general categories: follow-up within their community, or follow-up

between different VCAPS communities. For those interested in follow-up within their own community, many participants saw it as a way to distinguish VCAPS from other workshops, which are often a "one-time thing," by making it more of a "strategic, long-term initiative" (Interview 22). Many interviewees mentioned that they would like to see WWA return after six months or a year to reconvene the group, review progress, reevaluate next steps, and make connections to resources, as necessary (WWA Interview 1; Interview 15; Interview 16; Interview 21). However, other interviewees thought that, while scheduled follow-ups in the long-term are necessary, they are not the responsibility of WWA and the group should self-identify one or more champion(s) to ensure future meetings and reevaluation (Interview 9; Interview 12).

The other set of ideas from participants related to follow-up between different VCAPS communities. Some interviewees thought about this as a virtual or long-distance connection, in that it would be helpful to "hear how other communities have derived value from the workshop and what they've done," especially as some participants have already found that learning about other communities' work has been a catalyst for new ideas for them (Interview 10; WWA Interview 3). Other interviewees expressed interest in an in-person connection between representatives from the communities who have already participated in VCAPS. One interviewee imagined this as a follow-up in a centralized location between representatives for a "roundtable discussion" that they could then take back to the other participants in their community. This type of "phase two" was desirable for this interviewee as it "changes up the format so that it isn't just WWA going into each community" (Interview 17).

In considering these post-workshop actions, WWA will have to balance their available time and resources with the potential value gained by each community who receives the extra support. Most importantly, if WWA chooses to implement follow-up stages to the original VCAPS process, the community will still need to have internal momentum and motivation for action. Therefore, if WWA is going to invest more resources beyond the original process, the participants, and their extended community, must also demonstrate commitment to continue working together towards the outcomes identified in the workshop. For example, this might mean ending a workshop by presenting participants with a post-VCAPS "playbook" that gathers important resources, shares experiences from other VCAPS communities, and recommends best practice next steps (including those identified previously, such as share-back to represented groups and the broader community). This could be in conjunction with the modified final report, which would include the prioritized actions discussed at the end of the workshop. From there, WWA could implement more frequent

check-ins with communities (i.e., every three to six months) for a period of time (i.e., one year) before deciding whether to move forward with one of the in-person follow-up options described above (in-person follow-up or a meeting of community champions from each workshop) if momentum and commitment are visible.

## Additional Reflections

As noted, WWA cannot ultimately be responsible for all of the recommendations suggested in the above section, as the work of transforming the workshop into adaptation actions will always lie with the community participants, and some of the recommendations will require participant initiative to implement. It is important to recognize this, and acknowledge which parts of the process WWA is able, or not able, to control. In thinking about how to use this process with future communities, WWA should clearly establish for themselves what parts of the process are their responsibilities and what is ultimately the responsibility of community members. However, despite WWA not having responsibility for the entire process, there are likely ways that they can assist community members with guidance or resources to best support them in the parts of the process that rely on their initiative. This might connect to the idea of the "playbook" described above, which would provide communities with ideas and resources for using the workshop as a catalyst for action. WWA could expand on this to also include guidance for other stages of the process that are the responsibility of the community, such as in determining participants.

Additionally, WWA could begin the workshop process in each VCAPS community by using written agreements to lay out the process in detail, including expanded steps described above (i.e., community engagement post-workshop), and clarify responsibilities for community champion(s), workshop participants, and WWA team members. This would assist with giving community participants a clearer picture of the purpose and goals of the workshop, as well as what is expected of them in exchange for the investment that WWA is making by committing their time and funding to have a workshop in that specific community. This type of agreement would feed in well to later stages in the VCAPS process, by laying out the steps that participants could use to continue their work after the VCAPS workshop is complete in order to transform the outputs into actions for their community. This would hopefully generate more momentum for participants, as they would finish the workshop with a clearer picture of what next steps are and what is expected in each of their roles.

This connects to recognizing the costs that are embedded within the VCAPS process, for both participating communities and WWA, and working to ensure they match the value gained by the community from the workshop. These costs are especially important to consider given some of the recommendations suggested above, including a more thorough participant selection process, more participatory facilitation activities during the workshop, and more organized follow-up activities, which would increase WWA's inputs into various steps in the process. The agreement mentioned above could help to create accountability for both parties, in part to help ensure that WWA's investment is matched in other ways by community participants, such as through post-workshop engagement efforts.

## Conclusions

To conclude, I want to return to the four questions that I used to guide this research, in order to reflect on whether these six pilot communities are now more prepared to deal with the risks of climate change in their area having gone through the VCAPS process. First, one question asked what community characteristics connect to successfully maintaining motivation over time and implementing tangible actions. I reflect on this question, and various hypotheses, in an earlier section, but there are few clear indications from this set of six workshops as many characteristics had differing effects on a workshop-by-workshop basis. One clear takeaway is that communities, and particularly community champion(s), should demonstrate enthusiasm and motivation, as they must opt into the VCAPS process and provide forward momentum during various stages. Beyond this, though, without clear indicators, it makes more sense for WWA to focus their efforts on strengthening the other steps of the VCAPS process to give any motivated community that begins the best chance of reaping potential benefits.

The second question focused on how the VCAPS workshop might have affected the mentality of participants, in terms of their motivation to address the climate hazard(s) facing their community. As shared earlier, the survey provides one indicator of this. In general, the workshop seemed to be personally motivating for participants as, when asked whether the workshop increased their own motivation to take action to address the discussed hazard(s), 80% said they "agree" or "somewhat agree." There is a noticeable decline in perceptions of motivation when asked if the workshop increased their community's motivation to take action to address the discussed hazard(s), with only 54% saying they "agree" or "somewhat agree," and another 34% saying that they "neither

agree nor disagree." Many interviewees shared how the workshop had increased their personal motivation, by providing them with new scientific information that made the issue seem more urgent and making the challenges and opportunities facing their community clearer. They also often pointed to other participants in whom they have seen an increase in motivation leading to a greater dedication to action, particularly in elected officials. The less clear answer, however, is how well this motivation is maintained over time, especially for communities and participants that pointed to few follow-up actions that were influenced by the workshop. This connects to the other challenges that might be complicating or preventing action on climate change adaptation, even if motivation levels are high in the period immediately following the workshop, as addressed in the next question.

This third question asked to what extent the VCAPS process provided adequate and useful information, or other types of support, to assist the communities in overcoming participant-identified barriers to change. With this question, I was interested in how VCAPS does or does not set participants up for success after the workshop, in terms of the particular challenges posed by climate change adaptation. In general, interviewees responded that the process did not go far enough to help them overcome particular barriers to action, including those generally identified by participants: funding, staff capacity, knowing what steps to take next, generating community will and commitment to action, etc. The VCAPS process is not designed to solve all of these challenges, of course, but I do think that the participant-influenced recommendations above provide ways to ensure that VCAPS does more for participants in terms of these barriers in future iterations. This might include providing resources and guidance on funding, encouraging the inclusion of anchor institutions or similar community leaders in the workshops, ending the workshop with prioritized actions, producing a VCAPS "playbook" to guide post-workshop steps, etc.

In addition to the above three questions, the final one captures my main interest with respect to the outcomes of the VCAPS process: Does the VCAPS process, as demonstrated through these six pilots, result in tangible actions that make the local residents and infrastructure safer and more resilient? The answer is mixed from the six communities, although any information on actions generated was only relayed through survey responses and interviewees, which might overlook actions by participants beyond these respondents. I would identify Cortez as one of the most successful workshops in this regard, as they maintained momentum on process-related actions (follow-up meetings, action prioritization, etc.) and tangible outcomes (water conservation campaign and community engagement efforts, and integrating VCAPS outcomes into planning processes). The workshop built on already-existing efforts and interests of participants, but clearly catalyzed forward

momentum and collaboration amongst the group. Similarly, Carbondale participants have followed a clear process since the workshop to reflect internally on prioritizing actions, communicated externally about the outcomes of the process, and acted quickly to incorporate findings into the municipal budget and existing plans to institutionalize their learnings. Although it is still to be seen how these actions will result in tangible adaptation-related projects or programs for the community, this workshop demonstrated how the outcomes of VCAPS can have a strong influence on ongoing planning and budgeting processes.

Beyond these two examples, the other four workshops demonstrate varying levels of follow-through on actions. They are less coordinated and process-driven than Cortez and Carbondale, but all have seen at least some follow-up actions. Participants in Durango have incorporated outcomes into their drought management planning process and are using momentum to push forward pre-existing plans to build a new water treatment plant and diversify their water supply. Routt County has integrated outcomes into the County Master Plan and formed a Routt County Wildfire Mitigation Council. Springdale/Rockville/Hurricane participants pointed to two primary actions, including public meetings to share workshop outcomes and a river management plan. Lastly, in the Spanish Valley/Moab region, participants have organized presentations to share workshop outcomes, built redundancy into their water supply infrastructure between water supply providers, approved landscaping and water usage-related ordinances, and are collaborating on groundwater monitoring improvements.

All six of the workshops demonstrate at least some tangible outcomes, which is promising for the potential of future iterations of VCAPS workshops that integrate lessons learned from these in order to provide even more value for communities in the future. Additionally, besides the indicator of success of actions taken since the workshop, it is important to look at the range and depth of potential actions identified through the diagramming processes. The conversations around the climate hazard(s), as presented more fully in "Context and Outcomes of the Community Workshops," were rich in terms of the intersecting issues that they explored through various causal structures of outcomes and consequences, and the range of public and private actions that participants identified as potential interventions. Many survey respondents and interviewees shared the diagramming process and conversation as useful and instructive, and this is evident in the diagrams that were produced as a result. I think that the outcomes of the workshop (as represented by the diagrams) are a strong indicator of the potential of the VCAPS process, particularly if future

iterations provide more support to participants to translate these outcomes into a more organized and prioritized action plan for them to follow after the workshop.

Lastly, as a subsection to this final question, I asked how the process could be modified so that its outcomes are most useful to more participants in moving identified actions forward. This pilot of the six workshops demonstrated that the VCAPS process holds a lot of promise and that many individual participants and whole communities gained value from their experience that will in the future, or has already, made them more prepared to deal with the risks of climate change in their region. Those same participants also provided useful reflections and feedback that can be used to increase this value in the future. The detailed answer to this question lies above in the various recommendations I put forth, and I hope that they are useful to WWA in thinking through potential future iterations of VCAPS.

This research focuses on a pilot program in six communities of one collaborative climate adaptation process, but it provides useful lessons for the future of VCAPS workshops by WWA, for the use of the VCAPS process more generally, and for other similar community-based efforts. I was initially interested in this research because I think that many communities, small and large, rural and urban, are at a major crossroads for how they move forward in terms of climate change adaptation. As they begin to feel the effects become more urgent, now is the moment to use processes such as this one to create opportunities for a broad range of stakeholders to collaboratively learn about potential impacts, strategize actions, and discuss prioritization and tradeoffs in order to prepare. Creating this infrastructure for collaborative conversation and decision-making will be crucial as the stakes become higher and conflict becomes more likely, to best prepare communities to face these challenges collectively.

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# Appendix A: List of Interview Citations

**Western Water Assessment's Interviews:**

| Interviewee Citation | Interview Community |
|---|---|
| (WWA Interview 1) | Durango, CO |
| (WWA Interview 2) | Carbondale, CO |
| (WWA Interview 3) | Carbondale, CO |
| (WWA Interview 4) | Cortez, CO |
| (WWA Interview 5) | Routt County, CO |
| (WWA Interview 6) | Routt County, CO |
| (WWA Interview 7) | Springdale/Rockville/Hurricane, UT |

**Zoë McAlear's Interviews:**

| Interviewee Citation | Interview Community | Interview Date |
|---|---|---|
| (Interview 8) | Durango, CO | 02/17/2020 |
| (Interview 9) | Durango, CO | 02/26/2020 |
| (Interview 10) | Durango, CO | 03/09/2020 |
| (Interview 11) | Durango, CO | 03/10/2020 |
| (Interview 12) | Carbondale, CO | 02/18/2020 |
| (Interview 13) | Carbondale, CO | 02/25/2020 |
| (Interview 14) | Carbondale, CO | 02/27/2020 |
| (Interview 15) | Cortez, CO | 02/26/2020 |
| (Interview 16) | Cortez, CO | 02/26/2020 |
| (Interview 17) | Cortez, CO | 03/09/2020 |
| (Interview 18) | Routt County, CO | 02/21/2020 |
| (Interview 19) | Routt County, CO | 02/21/2020 |
| (Interview 20) | Spanish Valley/Moab Region, UT | 02/17/2020 |
| (Interview 21) | Spanish Valley/Moab Region, UT | 03/03/2020 |
| (Interview 22) | Spanish Valley/Moab Region, UT | 03/09/2020 |
| (Interview 23) | Spanish Valley/Moab Region, UT | 03/11/2020 |

## Appendix B: Western Water Assessment's Follow-Up Survey

You have been asked to take this short survey because you participated in a VCAPS (Vulnerability, Consequences, and Adaptation Planning Scenarios) workshop in your community in 2018.

Your participation in the survey will help researchers at Western Water Assessment evaluate the effectiveness and impacts of the VCAPS process. We ask that you provide honest answers to the questions so that we can continue to improve the process and better serve communities. The survey should take you approximately 10 minutes to complete. We greatly appreciate your assistance with this research.

Your responses are anonymous and cannot be identified, and your participation is voluntary so you may choose to stop taking the survey at any time without penalty.

If you have questions about this survey, please contact Katie Clifford at katie.clifford@colorado.edu or Benét Duncan at benet.duncan@colorado.edu. If you have questions about your rights as a research study participant, concerns, or complaints that you do not want to talk to the study team about, you can contact the University of Colorado Institutional Review Board (IRB) at (303) 735-3702 or irbadmin@colorado.edu. The IRB is independent from the research team.

1. Do you consent to participate in this survey?
    a. Yes
    b. No

2. What VCAPS community were you part of?
    a. Durango, CO (hazards discussed: drought & extreme precipitation)
    b. Cortez, CO (hazard discussed: drought)
    c. Routt County, CO (hazard discussed: drought)
    d. Carbondale, CO (hazard discussed: drought)
    e. Hurricane, Springdale & Rockville, UT (hazards discussed: drought & extreme precipitation)

3. How useful was the VCAPS workshop to you?
    a. Not at all useful
    b. Mostly not useful
    c. No opinion
    d. Somewhat useful
    e. Very useful

4. Short Answer: What, if any, elements of the workshop were most useful and why?

5. Short Answer: What could have made the workshop more useful?

6. This workshop taught me about how the hazard(s) discussed can change and impact my community in the future. Likert 1-5

7. This workshop taught me about my community's vulnerabilities to the discussed hazard(s). Likert 1-5

8. This workshop taught me about the ways in which my community is resilient to the discussed hazard(s). Likert 1-5

9. This workshop helped our group better understand aspects of the discussed hazard(s) we hadn't understood before. Likert 1-5

If agree or somewhat agree,

a. Short answer: What did you learn about the discussed hazard(s) at the workshop?

If disagree or somewhat disagree,

b. Short answer: What could we have done to help your group better understand the discussed hazard(s)?

10. This workshop helped our group better understand how we can increase our resiliency to the discussed hazard(s). Likert 1-5

11. This workshop increased *my own* motivation to take action to address the discussed hazard in my community. Likert 1-5

12. This workshop increased *my community's* motivation to take action to address the discussed hazard. Likert 1-5

13. This workshop led to new actions taken by my community aimed at addressing the discussed hazard(s). (for example: future meetings, presentations, hazard plans, specific projects aimed at building resiliency grant applications, etc.) Yes/No/Unsure

    If Yes,

    a. Short answer: Please briefly list what actions have been taken

14. What do you think are the key barriers that make it challenging for you and your community to address the discussed hazard? Short answer

15. To what extent did this workshop help you identify ways to overcome these barriers? Likert 1-5 (a great deal; a lot; a moderate amount; a little; none at all)

16. What could this workshop have done differently to help your community overcome these barriers and/or to generally help your community take action to address the discussed hazard(s)? Short answer.

17. I think my community will be more resilient to the discussed hazard(s) in the future because of VCAPS. Likert 1-5

18. Would you recommend this workshop to other communities? (Yes, No, Not sure)

19. Long answer: Anything else you want us to know about the VCAPS workshop or your actions following the workshop?

Thank you again for participating in this survey, your time is much appreciated and will help us structure future work with communities.

# Appendix C: Western Water Assessment's Interview Guide

Champion Interview Guide:

We are interested in hearing the opinions of those of you who participated in our pilot VCAPS project to understand what you might have found valuable or not so valuable, as well as any other feedback you wish to share. We are also very interested in hearing if it led to any decisions, actions or lessons learned. We would greatly appreciate your honest opinions as they will help us understand how to modify the process going forward.

Intro question:

1. Can you tell me briefly about why you wanted your community to participate in a VCAPS workshop?

Knowledge:

2. Was the scientific knowledge provided and information generated in the workshop valuable?
    a. If so, how?
    b. Did your understanding of [climate hazard] in your community change?
    c. Did VCAPS help you learn about the physical and social dimensions of [climate concern]?
    d. What are the top concerns you have about who / how people might be impacted?

Process:

3. Did you find it helpful to have two [or 4 for the double communities] scenarios to work through thinking about [climate hazard] at different intensities?

4. Did the VCAPS project impact how people are working together on [climate hazard] issues?

Actions:

5. Has the group of VCAPS participants (and others) met again since the workshop? If so, can you tell me about those meetings? What were the goals?

6. Did the VCAPS process help generate local actions and management strategies to respond to [climate concern]?
    a. Did you leave with an understanding of management priorities for your community to respond to [climate concern]? If so, what were the top priorities?

7. Did the VCAPS project help inform planning and decisions about _____ [climate stressors / management concerns that were part of VCAPS process]? Explain / elaborate....
    a. What plan or decision?
        • How?
        • Did the effort lead to new questions or interests that were explored in subsequent studies or efforts?
    b. Has a final report from the project been a useful resource?
    c. Have the diagrams from the project been a useful resource?
    d. What sort of additional information did you need?

8. If no action has taken place, why not?
    e. What barriers and challenges prevent action on [climate hazard] in your community?

9. Do you think your community is more resilient to [climate hazard] after the VCAPS workshop? Please explain and tell me how you would define resilience.

<u>Overall questions:</u>

10. Before the workshop, how informed did you feel about what the VCAPS process would entail?
    a. What might WWA be able to do early on in the relationship to clarify VCAPS expectations and processes?

11. What was the greatest benefit of having a VCAPS workshop in your community?
    a. Were there other important benefits? If so, what?

12. What was the biggest weakness or disappointment in the VCAPS process?
    b. Were there other weaknesses? If so, what?

13. Overall, how useful did you find the VCAPS workshop and process for your community's work on [climate hazard]?

14. Did you feel like it was worth the time of you and your colleagues to participate in VCAPS?
    c. Would you recommend it to a colleague from another city/community?

15. What changes would you recommend WWA make to VCAPS before running more workshops in other communities?

## Appendix D: Interview Guide

1. The VCAPS workshop in which you participated focused on [climate hazard]. In your role with [stakeholder group], how does your work connect to [climate hazard]?

2. To what extent were you and your organization concerned about and/or taking action to address [climate hazard] prior to the VCAPS workshop?
    a. Do you think that changed as a result of the VCAPS workshop? If so, how and why?

3. To what extent was your community/region concerned about and/or taking action to address [climate hazard] prior to the workshop?
    a. Do you think that changed as a result of the VCAPS workshop? If so, how and why?

4. Overall, what did you find most useful about the VCAPS process personally and why?
    a. What do you think was most useful for your organization and/or your community?
    b. What did you find least useful about the VCAPS process and why?

5. To what extent has [stakeholder group] or your broader community moved forward on the actions identified in the workshop (or others) to respond to [climate hazard]?
        i. Why or why not?
        ii. What, if anything, might have made the VCAPS process more helpful in assisting you, your organization, and your community in taking action on [climate hazard]?

6. In addition to what you have already said, do you have any other thoughts about what was or is preventing your organization and/or community from taking action on [climate hazard]?
        iii. Do you think the VCAPS workshop helped you and others overcome these challenges and, if so, how?
        iv. Any thoughts on what would help your organization or community overcome those barriers?

7. Anything else you would like to add that I might have missed in my questions, particularly that might help me better understand the usefulness of the VCAPS process for your community?

# Appendix E: Final Report for Western Water Assessment

## Introduction

This research brief serves as an addendum to my master's thesis project titled, "Building Community Resilience to Climate Change with Facilitated, Collaborative Dialogue: Evaluating the VCAPS Process," in which I worked with Western Water Assessment (WWA) as my client. The purpose of this brief is to distill the information from my thesis into key takeaways for WWA as they decide whether to continue using VCAPS (Vulnerability, Consequences, and Adaptation Planning Scenarios) as a tool in communities and, if so, what changes might be made to make it even more useful and meaningful for future participants.

This project focuses on an evaluation of WWA's pilot workshops of the VCAPS process in the Mountain West, including the five community workshops conducted in Colorado and Utah in 2018 as part of the official pilot, as well as the sixth workshop conducted in Utah in July 2019 at the request of a community member. This research relies on results from three primary sources of data: 1) a WWA-conducted survey of the first five pilot workshops, which was distributed in December 2019 and collected responses until mid-January 2020 (with 35 out of 51 participants responding, for a 69% response rate); 2) a WWA-conducted set of interviews with seven community champions from the original five pilots; and 3) a set of interviews I conducted with 16 additional participants. In total, then, this analysis draws on 23 interviews: five from Durango, five from Carbondale, four from Cortez, four from Routt County, one from Springdale/Rockville/Hurricane, and four from the Spanish Valley/Moab region. In addition, I draw on additional workshop-related documents, including WWA's pre-workshop interview summaries and workshop reports.

In evaluating the success of WWA's six pilot VCAPS workshops in the Mountain West, I used four questions as a guide:

1. Does the VCAPS process, as demonstrated through these six pilots, result in tangible actions that make the local residents and infrastructure safer and more resilient?
    a. If not, or not to a great extent, how could the process be modified so that its outcomes are most useful to more participants in moving identified actions forward?
2. Did the VCAPS workshop elevate a motivation to change in each pilot community, and how has this motivation been maintained over time in relation to realized actions?
3. To what extent did the VCAPS process provide adequate and useful information, or other types of support, that assisted each pilot community in overcoming participant-identified barriers to change?
4. What community characteristics, including before, during, and after the workshop, connect to successfully maintaining motivation over time and implementing tangible actions?

The following summarizes the main takeaways from my research into two sections, to first share reflections and feedback on what worked well in this pilot of the VCAPS workshop in the Mountain West, and then share suggestions and recommendations for potential alternatives.

## What Worked Well

The general conclusion from WWA's survey is that the majority of respondents had a positive experience with the VCAPS process. Asked how useful VCAPS was for them, 94% said that the process was "very useful" (54% overall) or "somewhat useful" (40% overall). Additionally, as one measure of overall satisfaction, 83% of respondents indicated that they would recommend the workshop to other communities, with only 9% indicating "not sure," and 6% indicating "no" (with one no-response). The following takeaways share some of the most positive aspects of these pilot workshops, including what participants found most useful and what the survey and interviews show to be the most successful aspects of the process:

**Increased Motivation for Participants & Elected Officials:**

In general, the workshop seemed to be personally motivating for participants as, when asked whether the workshop increased their own motivation to take action to address the discussed hazard(s), 80% said they "agree" (51% overall) or "somewhat agree" (29% overall).

In addition, many participants discussed how the workshop influenced the motivation of elected officials who had participated and noted that this increased motivation was particularly important in generating follow-up actions:

- In Durango, one interviewee shared that he heard an elected official participant say that VCAPS "opened [their] eyes and made [them] more aware and concerned around issues surrounding drought," as well as reference VCAPS as a driving reason behind them pushing forward actions and making specific decisions.
- In Carbondale, one interviewee shared that VCAPS "helped get the elected official buy-in and focused on [drought] because she pushed to make sure that this was an ongoing discussion," and that sharing information and outcomes with elected officials after the workshop "helped focus budgeting on certain [identified actions]." Another interviewee shared that it has been easier to go to elected officials since the workshop and ask them to prioritize funding for specific actions because the VCAPS process added "legitimacy" to their asks.

**Furthered Understanding of Discussed Hazard(s):**

Survey respondents and interviewees generally expressed that they learned a lot from this process, both from the climate science presentation and from each other during the diagramming process. In the survey, when asked to rank their response to "This workshop taught me about how the hazard(s) discussed can change and impact my community in the future," 97% said they "agree" (60% overall) or "somewhat agree" (37% overall).

- In Durango, one interviewee shared that "Everybody in the region has a broad understanding of drought, and concern of economic and other impacts of drought…but the workshop really made a more formative idea of what the outcomes could look like" and another said, "I had been aware of the issues and of staff work toward addressing them, but the workshop brought home to me the extreme risk we face from prolonged drought."
- In Carbondale, participants shared that they had learned a lot from the scientific presentation and diagramming-process, including: "the socio-economic aspects discussed were not on my radar," "the local impact, what we can do better, what we need to plan and budget for, where are our weak points, what are our strong ones, what other stakeholders need to be involved," and "how broad the impacts could be."
- In Cortez, one interviewee shared that although "there was some awareness," prior to the workshop, there was "not an informed concern until we started doing this planning process…VCAPS made it more tangible for everyone…" Similarly, another interviewee remarked that although "drought and drought mitigation was at the forefront of our minds," the VCAPS workshop was "a way to jumpstart things."

**Connected Diverse Stakeholders:**

In each workshop, there was the opportunity for stakeholders to collaborate who had not had the chance to work together on these issues before, whether because they worked on different topics or in different roles within a municipality, or because they were from different government entities or organizations.

- In Cortez, one interviewee mentioned that the most useful part of the process was "getting together a group of people from diverse knowledge and work roles, and being able to put together a more cohesive message to the public."
- In Routt County, survey respondents and interviewees expressed that the diversity of expertise in the participants was a really useful part of the process. One survey respondent wrote that the most useful part of the process was, "The concept of shared learning and planning – getting people together with different expertise and experiences to address a common issue."
- In the Spanish Valley/Moab region, one interviewee shared that the diverse group of participants meant that they all heard about unfamiliar topics and built new connections.

**Created Learning Through the Facilitated Process of Diagram-Building:**

Many interviewees mentioned how the diagrams helped them to make connections between different themes and recognize the intersections between the various identified outcomes. One interviewee specifically described the usefulness of being able to "see all of the branches of the tree" in order to acknowledge the many unintended consequences of drought.

Additionally, participants expressed appreciation for the facilitation of the exercise, as it allowed them the space to brainstorm and discuss as a group, without worrying about directing the conversation or note-taking. More specifically, one interviewee said that the most useful part of the process was, "going through the VCAPS [diagramming] process. [The facilitators'] moderation was very useful for us as a group of local people. Once they provided the overall frame, the scenarios, then breaking it down to local participant feedback and input."

**Resulted in Follow-Up Actions for All Workshops:**

Participants from all six of the workshops demonstrated tangible outcomes and follow-up actions, which is promising for the potential of future iterations of VCAPS workshops. These actions ranged from process-related outcomes (follow-up meetings, public communication of workshop outcomes, etc.) to adaptation-related projects and planning (incorporation of workshop outcomes into municipal budgeting and planning efforts, changes in local ordinances, public education campaigns, etc.).

Additionally, besides the indicator of success of actions taken since the workshop, it is important to look at the range and depth of potential actions identified through the diagramming processes. A close look at the outputs of the workshop, as captured in the final reports, demonstrates that the conversations in the workshop were rich in terms of the intersecting issues they explored through various causal structures of outcomes and consequences, and the range of public and private actions that participants identified as potential interventions. This is another key indicator of the potential of the VCAPS process, as it clearly generates new connections and ideas among participants.

**Resulted in Integration of Workshop Outcomes into Planning Processes:**

Participants from all six workshops mentioned at least one follow-up outcome or action that related to using the information and outputs from the VCAPS process to either improve a past plan or contribute to a current or future planning process:

- In Durango, the City was in the process of drafting a drought management plan, and one interviewee stated that it will now be more reflective of what they learned and created during the VCAPS process, including specifying actions that the group generated.

- In Carbondale, one interviewee said that the VCAPS process "highlight[ed] how [drought concerns] could be integrated into city planning and how to integrate into the budget, already existing plans, within water management plans, etc." This workshop's follow-up actions then included prioritizing actions from VCAPS in their municipal budgeting process and integrating findings into existing plans, including the Town's water management plan.
- In Cortez, participants mentioned improving planning efforts through the City's water source protection plan and an upcoming drought mitigation plan that will significantly build off the outcomes of the VCAPS process.
- In Routt County, one participant mentioned that they are currently redoing the County Master Plan to have a broader focus on land management decisions and integrating in reflections from the workshop discussion.
- In Springdale/Rockville/Hurricane, a representative from one of the municipalities mentioned that they are now working on a river management plan.
- Lastly, in the Spanish Valley/Moab region, the workshop helped generate more forward motion on a collaborative groundwater monitoring plan for the region.

## Suggestions and Recommendations for Alternatives

The reflections below are in response to the main challenges and concerns raised by participants in their surveys and interviews. The recommendations included in this section are meant to build off of the existing VCAPS process, which has provided value both to individual participants, as well as to communities, through these six pilots, to imagine how it could learn from these experiences and provide even more value in future iterations. Additionally, these recommendations are presented with the caveat that WWA will have to determine, moving forward, how best to balance these suggestions with their potential constraints, including financial resources and the limited in-workshop time to which participants commit.

This section is organized chronologically through the stages of the VCAPS process into three main categories (Participant Selection, The Workshop, and Post-Workshop), before ending with Additional Reflections.

### Participant Selection

**Emphasize the Importance of Participants who can Contribute Momentum:**

WWA could share guidance with future community champion(s) on ensuring the inclusion of participants who can contribute momentum to the process, whether through enthusiasm, resources, and/or decision-making power. From the pilot workshops, there are two related takeaways:

- The two communities that had the most forward movement on identified actions, Carbondale and Cortez, demonstrate the importance of having key individuals (in these cases, community champion(s) and/or elected officials) as post-workshop motivators:
    - In Carbondale, one interviewee shared the importance of having a person (who in this case was both one of the community champions and an elected official) spearheading follow-up actions and maintaining enthusiasm. However, this individual effort could only be maintained for so long before other professional responsibilities made this long-term championing by one individual difficult.
    - As an alternative, in Cortez, one interviewee described the importance of having a core group of people, including their community champion, a key elected official, and a couple of other individuals, maintaining momentum. Ultimately, Cortez has been able to maintain the most consistent, long-term collaboration post-workshop and also has had significant forward movement on identified actions. In comparison to the other five workshops, this group of long-term champions seems likely to be a key feature of their success.
- Routt County provides an example of an additional role that could be important in future workshops: representative(s) from anchor institution(s). In Routt County, the Colorado State University Extension agents played a crucial role in follow-up actions. As many participants raise personnel time capacity and funding as two key constraints, including a representative from an anchor institution, or a similar community organization, could help to provide connection to necessary resources that can help to overcome these challenges.
    - Another example of this could be representative(s) from a community organization(s) who would likely be able to provide leadership on community engagement and education efforts post-workshop.

**Adapt the Model of Participant Selection:**

This recommendation is in response to participants from various workshops who shared thoughts on participants or representatives that they viewed as missing from the process, to potentially detrimental effect.

- Participants from Routt County and Springdale/Rockville/Hurricane noted the potentially negative aspects of lacking elected representatives. One survey respondent shared that, in Routt County, it would have been useful to have "more policy-makers and commissioners in the room that can actually do something about these issues," while the interviewee from Springdale/Rockville/Hurricane thought that participants might "not [have given] the workshop as much weight or priority or credibility as maybe it should have had" without elected officials present.
- Participants from Cortez also noted that their workshop was missing key stakeholder representatives: One survey respondent, when asked what could have made the workshop more useful, wrote, "Though there were many different perspectives, it may have been

useful to ask, 'Who is not represented at this table and should they be?' No County representatives were present and their participation may have been helpful." Additionally, an interviewee reflected that it would have been important to "really [get] the agricultural community involved due to their dependence on water because they have a whole other set of observations."

These reflections demonstrate that workshop participants themselves have useful thoughts to share on who should participate in the workshop and what representatives might be important to include in order to address the hazard(s). Additionally, there is a limitation to having one or two stakeholders be the driving force in determining who else should be included, given that they only have a personal understanding of the issue and its scope, and potentially bring personal biases into the decision. If WWA is interested in changing the current model of participant selection so that the decision is made by more than one individual, an adaptation could be made to more carefully consider both the range and depth of representatives in future workshops.

One tool that is available as inspiration is a stakeholder assessment which, "characterize[s] the range of perspectives in a community by interviewing a set of people whose views are likely to be representative of most of the interests and values in that community." It "begins with a provisional list of the constituencies or categories of people that represent the range of local perspectives on issues of adaptation planning" before a neutral party interviews one or two people from each category who, at the end of the interview, are offered the chance to identify others who should be interviewed until a "full range of community perspectives" has been gathered.[10] With inspiration from stakeholder assessments, a recommendation would be to modify the pre-workshop interviews to give initially-identified participants the opportunity to recommend other individual(s) or group(s) who should also be present or represented in the workshop. The extent to which this happens (i.e., how many cycles of interviewees are allowed to identify additional participants) will have to be determined by WWA based on available resources and how much time they want to dedicate to this step in the process.

**Increase Inclusion of a Broader Group of Elected Officials / Decision-Makers:**

If there is concern about setting expectations and increasing buy-in amongst the broader group of elected officials and decision-makers in a community, WWA could consider encouraging the community champion(s) or participant(s) to engage them in the process from an early stage. More fully including elected officials and decision-makers who will not participate in the workshop in the process from the beginning would increase their awareness of the workshop, what its goals are, and what will be the outcomes of the process that they might ultimately have to react to and engage with

[10] Susskind, L., Rumore, D., Hulet, C., and Field, P. (2015). Managing Climate Risks in Coastal Communities. London and New York: Anthem Press. Pg. 68-70.

in decision-making and implementation steps post-workshop. This type of pre-workshop engagement, likely by the community champion, will help to ensure that the elected officials endorse the workshop and are willing to play a role in potential outcomes, and will also make it easier for the community champion and other participants to follow-up with them after the workshop.

## The Workshop

**Recognize Ongoing Work & Existing Knowledge in Workshop Framing:**

If WWA were interested in using more of an asset-based approach to the workshop facilitation, they could consider including more explicit recognition of the history of climate adaptation in the community, as well as related knowledge and experience in the room, at the beginning of the workshop.[11] This recognition at the beginning could include: 1) framing the introduction to the workshop in this way, using information from the pre-workshop interviews; and 2) inviting participants to share thoughts on this in their introductions, including their climate-related knowledge and past experience, as well as climate adaptation actions that they know have already been accomplished, or are in progress, in the community.

As the VCAPS workshop is primarily meant to be community-driven, introducing the workshop in this way could lead more smoothly into the climate scientist-led presentation, which puts outsider knowledge at the forefront, before then moving on to the participant-led component for the remainder of the workshop. This recommendation is in response to the concerns of two participants:

- One Routt County interviewee, in response to a question about actions post-workshop, stated that "it kind of flusters me at times because we have been doing things and people think we were not doing things," and went on to say that the community had already been working on many of the actions that were identified in the diagrams.
- One Spanish Valley/Moab region interviewee was critical that the workshop did not consider the "historical perspective," or work already being done, when framing the issues that were the focus of the workshop.

[11] An asset-based approach is commonly referenced in planning in terms of Asset Based Community Development (ABCD), which "builds on the assets that are found in the community and mobilizes individuals, associations, and institutions to come together to realize and develop their strengths." This distinguishes it from a "Deficit Based approach that focuses on identifying and servicing needs" (https://www.nurturedevelopment.org/asset-based-community-development/). This same mindset can be applied to facilitation, by focusing on a group or community's assets and strengths as the building blocks to collective work.

**Consider the Value of Using Multiple Sets of Diagrams in a Workshop:**

Based on the data from the six pilots, I cannot make specific recommendations about how many sets of diagrams should be used in the future, but I think that the consideration needs to continue to be made on a workshop-by-workshop basis with thought put into what the value add is from using multiple sets. This recommendation is based on reflections from participants on the usefulness of utilizing multiple sets of diagrams:

- First, on the positive side, no participants in Durango (two drought and two extreme precipitation scenarios) nor Cortez (two drought scenarios) shared any negative thoughts about discussing multiple sets of diagrams. One interviewee in Durango even stated that it was useful to work through all four, particularly with both drought and extreme precipitation scenarios, because the two themes appealed to different participants and helped them each realize the interconnections between issues of drought and of extreme precipitation.
- In Carbondale (two drought scenarios), one interviewee noted that the second variation resulted in too similar a discussion, while another reflected that the group ran out of time and was unable to "get a lot out of the second scenario."
- In Routt County (two drought scenarios), one participant shared that the two sets of diagrams ended up looking mostly the same with one just a bit more extreme, and another mentioned the confusion they ran into trying to keep the two scenarios separate. Another interviewee affirmed that they spent a lot of time developing the two scenarios when they could have instead focused on degrees of variation within one scenario, and expressed frustration that they kept going down the path of the second scenario even when they knew it was not working "because it was the process."

I do see value in modeling two hazards in separate diagrams (i.e., drought and extreme precipitation) if a majority of workshop participants are directly involved in working on both issues and express a strong desire to explore both topics in the workshop, although they know that this will limit their time discussing each one. This decision should be made using participant information from the pre-workshop interviews, in collaboration with the community champion(s), based on what is most urgent for the community and will best support their immediate actions after the workshop.

In terms of using multiple sets for variations of one climate hazard (i.e., a one-year drought and a three-year drought), I think that the Spanish Valley/Moab region workshop provides a potential alternative, wherein participants elected to use one set of diagrams while still considering potential variations of one hazard. In this way, the diagramming exercise could be adapted to work through the less extreme variation of the hazard, while including additions related to the more extreme variation within it and, if time allows and participants think it is necessary, then focusing a portion of the discussion only on what might be missing from the diagram to address the more extreme variation.

**Consider Alternatives to Make the Process More Participatory:**

In thinking about how the diagrams are created, there were a few participants who shared that watching the diagrams appear on a screen in front of them, often in an unreadable way, was not useful engagement for them. Participatory processes similar to VCAPS that use concept mapping or similar techniques could provide inspiration for adapting this process to include hands-on, physical manipulation of the diagram components. This could either happen as a full group working collaboratively on one diagram, or as small groups working on sections of the diagram before synthesizing them together to collectively create a final diagram.

- One example of this comes from a community-based climate change adaptation process in Port Orford, Oregon where researchers used concept mapping and influence diagrams as strategies for community engagement. In contrast to VCAPS, participants worked on these diagrams with their hands and in rotating small groups, utilizing poster boards and sticky notes to collaboratively work through the stages of discussion.[12]

**Add a Final Workshop Stage to Prioritize Actions:**

If WWA is looking to assist workshop participants in transforming the identified actions at the end of the workshop into a more immediately actionable outcome, future workshops could include a final prioritization stage at the end of the workshop. This could include prioritizing actions and attaching responsibility to specific actions, but should likely also include initial discussion about long-term tradeoffs and cost-benefit analysis of specific actions. I would add that it is also important for participants to commit to a follow-up process, including when they will meet next, how they will communicate information beyond workshop participants and engage elected officials, and who is responsible for organizing these efforts.

Interviewees primarily shared the need for time in the workshop to focus on prioritization and implementation details, including "what will make a difference, what's doable, who's responsible, are there budget issues, etc.," as well as "tradeoffs, risks, and cost-benefit analysis."

- One interviewee shared that they felt the need to spend time after the workshop narrowing down action items, as the final list was a mix of "'pie-in-the-sky' along with more reasonable [actions]," and that it would have been useful to spend time in the workshop, with the support of WWA, to accomplish this prioritization.
- Another interviewee shared that identifying actions could have been a really useful part, but that, ultimately, "they weren't as explicit as they could have been to make 'movers and shakers' stand up and take notice." Instead, they would have needed to be presented as more "chewable, succinct opportunities" to garner support.

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[12] Cone, J., Rowe, S., Borberg, J., and Goodwin, B. (2013). Community Planning for Climate Change: Visible Thinking Tools Facilitate Shared Learning. Journal of Community Engagement and Scholarship, 5(2), pp. 7-19.

## Post-Workshop

**Encourage the Inclusion of Other Stakeholders Post-Workshop:**

Reflections from pilot participants helped to highlight two important actions that should be a part of future participants' workshop follow-up: 1) representative communication back to the group of stakeholders they represented; and 2) communication to the general public. Broader inclusion at this stage of the process will help to prepare the community to move forward on action steps by explaining the thought process used during the workshop and explaining why particular actions were prioritized. These two processes should include both sharing information out, as well as creating opportunities for others to contribute their ideas and participate in the next stages of implementation and monitoring. If WWA wanted to encourage participants to follow these two connected recommendations, they could share resources and best practices with participants to assist them in doing so effectively.

In terms of communicating back to the group of stakeholders they represented, a Durango participant shared that an issue he had with the workshop was that it did not include all of his counterparts in his particular position, making it difficult to effectively share information back with them afterward in a way that engaged them. The interviewee expressed that "encapsulating learnings and giving a summary" after the workshop did not provide the same value for the non-participants as the diagramming activity had provided the workshop participants. As inviting all counterparts of each representative would not allow for diverse participation and maintaining a small enough group, this feedback then raises the question of how to prepare participants to more effectively engage their coworkers after the workshop in order to bring them on board and generate momentum for specific actions.

- Another interviewee echoed this sentiment, remarking that they would have liked to see a "follow-up presentation to the responsible elected officials and key staff members" that did not participate, especially focusing on "conclusions that are hard to swallow" to explain to them the thought process behind the workshop's conclusions and why participants think they are necessary.

In terms of communicating with the general public, one interviewee shared the following thoughts to explain the importance of this step:

- "If the process is designed for action, what are the key factors you're going to need to work into this to ensure it results in greater action? And one is intentional stakeholder discussions are great, but it's best to complement them with broader public outreach, as well, just to create that momentum and a mixture of forces that can help move things forward…The VCAPS workshop was very thoughtful, academic, and effective…but if the purpose of the whole effort is to trigger really, really effective action…there needs to be some intentional mechanism to orchestrate or build the community, political will that will sustain deeper action."

**Provide Follow-Up Resources:**

Various participants expressed interest in the VCAPS process and its facilitators leveraging their resources to leave them with access to resources and information that would help them move forward, such as through a "centralized resource/data repository." In terms of what specific resources would be useful, interviewees expressed their interest in:

- "Better access to resources on regional climate change and related issues," recognizing that they might be embedded within the report, but that they still do not feel as accessible as they could if they were more explicitly compiled.
- Case studies or examples of model policies and financing mechanisms
- Information about obtaining grants
- Examples from non-liberal communities on how they have implemented drought mitigation and related land management changes, to counteract the usual examples that are shared as best practices
- Lastly, an interviewee expressed interest in more explicit guidance, saying that it would have been useful to have a "checklist of here's where you can go from here" or a "playbook."

**Consider Phase Two Options:**

If WWA is interested in following up with participant requests for follow-up to the VCAPS process, there are two primary options that participants identified as potentially useful interventions. They reflected that this could help distinguish the VCAPS process from other workshops, which are often a "one-time thing," by making it more of a "strategic, long-term initiative."

One option mentioned by interviewees is that they would like to see WWA return to their community after six months or a year to reconvene the group, review progress, reevaluate next steps, and make connections to resources, as necessary.

Another option related to follow-up between different VCAPS communities. Some interviewees thought about this as a virtual or long-distance connection, in that it would be helpful to "hear how other communities have derived value from the workshop and what they've done," especially as some participants have already found that learning about other communities' work has been a catalyst for new ideas for them. Other interviewees expressed interest in an in-person connection between representatives from the communities who have already participated in VCAPS. One interviewee imagined this as a follow-up in a centralized location between representatives for a "roundtable discussion" that they could then take back to the other participants in their community. This type of "phase two" was desirable for this interviewee as it "changes up the format so that it isn't just WWA going into each community."

## Additional Reflections

**Balance WWA and Community Investment:**

In considering these post-workshop actions, WWA will have to balance their available time and resources with the potential value gained by each community who receives their support. Most importantly, if WWA chooses to implement any of the above changes and/or follow-up stages to the original VCAPS process, the community will still need to have internal momentum and motivation for action. This connects to recognizing the costs that are embedded within the VCAPS process, for both participating communities and WWA, and working to ensure they match the value gained by the community from the workshop. These costs are especially important to consider given some of the recommendations suggested above, including a more thorough participant selection process, more participatory facilitation activities during the workshop, and more organized follow-up activities, which would increase WWA's inputs into various steps in the process. Therefore, if WWA is going to invest more resources beyond the original process, the participants, and their extended community, should also demonstrate commitment to continue working together towards the outcomes identified in the workshop.

**Clarify WWA and Participant Responsibilities:**

WWA cannot ultimately be responsible for all of the recommendations suggested in the above section, as the work of transforming the workshop into adaptation actions will always lie with the community participants, and some of the recommendations will require participant initiative to implement. It is important to recognize this, and acknowledge which parts of the process WWA is able, or not able, to control. In thinking about how to use this process with future communities, WWA should clearly establish for themselves what parts of the process are their responsibilities and what is ultimately the responsibility of community members.

First, WWA could begin the workshop process in each VCAPS community by using written agreements to lay out the process in detail, including expanded steps described above (i.e., community engagement post-workshop), and clarify responsibilities for community champion(s), workshop participants, and WWA team members. This would assist with giving community participants a clearer picture of the purpose and goals of the workshop, as well as what is expected of them in exchange for the investment that WWA is making by committing their time and funding to have a workshop in that specific community. This type of agreement would feed in well to later stages in the VCAPS process, by laying out the steps that participants could use to continue their work after the VCAPS workshop is complete in order to transform the outputs into actions for their community. This would hopefully generate more momentum for participants, as they would finish the workshop with a clearer picture of what next steps are and what is expected in each of their roles.

Additionally, despite WWA not having responsibility for the entire process, there are likely ways that they can assist community members with guidance or resources to best support them in the parts of the process that rely on their initiative. This might connect to the idea of the "playbook" described above, which would provide communities with ideas and resources for using the workshop as a catalyst for action. WWA could expand on this to also include guidance for other stages of the process that are the responsibility of the community, such as in determining participants.