Oregon Sea Grant – POORT
Community Engagement on Climate Change

Port Orford Pilot Project
Interim Report, January 2010

Sea Grant Project Team
Joseph Cone, PI
Patrick Corcoran
Shawn Rowe
Michael Harte
Jenna Borberg (Grad. Research Assistant)
Joy Irby (Graduate Student)

A new day in Port Orford
1. BACKGROUND

1.1 Climate Change on the Oregon Coast

1.2 Adapting to Climate Change

1.3 Community Engagement and Preliminary Social Research

2. PORT ORFORD COMMUNITY ENGAGEMENT

2.1 Project Goals

2.2 Why Port Orford?

2.3 Project Methods

3. RESULTS: PORT ORFORD COMMUNITY ENGAGEMENT

3.1 Workshop 1, January 21, 2009 – Climate Concept Mapping and Influence Diagramming

3.2 Inter-workshop Comparison of Influence Diagrams and the Expert Model

3.3 Workshop 2, March 26, 2009 – Port Orford’s Climate Change Preparation

3.4 Evaluation of Workshops

4. NEXT STEPS

5. APPENDICES

5.1 Appendix A – Brief Notes on Port Orford

5.2 Appendix B – Key Points to Consider When Planning for Climate Change

5.3 Appendix C – Quick Q & A: A Community Resilient to Climate Change?

6. REFERENCES
1. BACKGROUND

1.1 Climate Change on the Oregon Coast

In recent years, research has generated substantial new knowledge about long-term global climate change, shorter-term climate variability, and their emerging social and economic consequences. Climate change will increasingly affect Earth’s natural and human systems in the 21st century and beyond, in ways that people locally will consider both negative and positive, depending on their circumstances. Current uncertainties about the amount and rate of climate change will be reduced as more is learned about past climates, as global and regional climate predictive models are refined, and as understanding of the interactions among air, sea, and land are improved. Such research in the natural sciences is vital to the health, sustainability, and adaptability of human systems — social, economic, and political.

In the Pacific Northwest the expected effects of climate change are significant and demand creative policy and management action. Coastal resources and the communities that depend on them are particularly vulnerable to climate change, particularly over the longer term. The Pacific Northwest coast is by nature a dynamic environment. Major storm events, coastal upwelling, climate oscillations, shifts in the California current, low oxygen events, and tectonic uplift and subduction are some of the many processes that affect coastal communities and their environment. Anticipated future impacts from changes in Pacific Northwest’s climate include increased air and water temperatures, shifts in marine ecosystems and fishery resource availability, added stresses on salmon populations from warmer streams and habitat changes, changes in water resource availability, increased flooding, and coastal erosion increased by sea-level rise.

To date, a systematic and comprehensive analysis of the likely effects of climate change on the Oregon coast has not been produced, although reports by the University of Washington Climate Impacts Group (Huppert et al. 2009), the Oregon Coastal Management Program (Weber 2009), and others (including Oregon Climate Change Research Institute and University of Oregon Climate Leadership Institute) add valuable pieces to the puzzle. When the project highlighted in this report began in 2007, a consolidated and detailed view of any particular Oregon coast location was lacking, and so it became an objective of the project to assemble at least a preliminary view. That assembly and view are further discussed below.

1.2 Adapting to Climate Change

Consensus is growing that coastal communities will need to adapt to the changing climate over the next century (Adger et al. 2007; Littell, McGuire Elsner, Whitley Binder, & Snover 2009; Karl, Melillo, & Peterson 2009). Climate change impacts on Pacific Northwest coastal communities will be amplified as coastal populations and development increase (Mote et al., 2003). Additionally, rural communities that typify the Oregon coast may be more susceptible to climate change than urban areas for primarily social reasons. They may lack institutional resources to address the issue, and their economic reliance on natural resources is affected by the changing climate (Wall & Marzall 2006).

Individuals and communities legitimately also want to understand the extent of uncertainty associated with both climate effects and the adequacy of human response. While such uncertainty merits careful evaluation to understand the range of effects and the usefulness of alternative policy actions and adaptations, it’s also important to remember that uncertainty is not unique to climate change. Individuals and communities have a great deal of experience with making prudent decisions in the face of environmental and social uncertainty.
1.3 Community Engagement and Preliminary Social Research

Community engagement, in part, involves translating the results of applied research in ways that can be adopted by community members (National Sea Grant 2000). The principal difference between engagement and the older, and conventional, concept of “outreach” is that engagement fundamentally involves a dynamic, two-way mode of interaction between specialized information-holders, such as scientists and university personnel, and community members. (“Outreach” typically means a more one-way “dissemination” or reaching out by those information-holders.) The role of the community members in engagement is crucial. Engagement is only in part about translating applied research.\(^1\) Priority must first be given to understanding the needs, interests, and barriers to action that the community has.

Therefore, prior to engaging the Port Orford community, the Oregon Sea Grant project team had undertaken some preliminary research, including a largest-ever survey of Oregon coast professionals regarding climate change. The needs, interests, and barriers to action were explicitly queried in that survey; the detailed results are now published and available online.\(^2\) With those results as a reference point, we invited the Port Orford community participants to take the same survey, which eight members of the group did prior to the first workshop. The responses helped the Sea Grant team prepare for the community workshops.

<table>
<thead>
<tr>
<th>Question</th>
<th>0.0% (0)</th>
<th>0.0% (0)</th>
<th>0.0% (0)</th>
<th>62.5% (6)</th>
<th>37.5% (3)</th>
<th>0.0% (0)</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>I'd be willing to take action in my work if there were new funding available to do so.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>62.5% (6)</td>
<td>37.5% (3)</td>
<td>0.0% (0)</td>
<td>8</td>
</tr>
<tr>
<td>I'd be willing to take action in my work if I hear a sense of local urgency to do so.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>87.5% (7)</td>
<td>12.5% (1)</td>
<td>0.0% (0)</td>
<td>8</td>
</tr>
<tr>
<td>I think climate change is more important for the next generation of decision-makers.</td>
<td>12.5% (1)</td>
<td>50.0% (4)</td>
<td>37.5% (3)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>8</td>
</tr>
<tr>
<td>Given the predicted timeframe of climate change effects, it's important to involve people now aged 21-31 in public decision-making processes.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>12.5% (1)</td>
<td>50.0% (4)</td>
<td>37.5% (3)</td>
<td>0.0% (0)</td>
<td>8</td>
</tr>
<tr>
<td>There will be more options in the future to successfully address the effects of climate change on my community.</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>25.0% (2)</td>
<td>75.0% (6)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>8</td>
</tr>
<tr>
<td>I'm ready to be a leader on this issue.</td>
<td>0.0% (0)</td>
<td>12.5% (1)</td>
<td>25.0% (2)</td>
<td>50.0% (4)</td>
<td>0.0% (0)</td>
<td>12.5% (1)</td>
<td>8</td>
</tr>
<tr>
<td>I'm prepared to devote time and resources to this issue.</td>
<td>0.0% (0)</td>
<td>12.5% (1)</td>
<td>37.5% (3)</td>
<td>50.0% (4)</td>
<td>0.0% (0)</td>
<td>0.0% (0)</td>
<td>8</td>
</tr>
</tbody>
</table>

Figure 1. The eight Port Orford participants in the pre-workshop survey indicated strong interest in addressing climate change, given certain conditions.

---

1 According to the Carnegie Foundation for the Advancement of Teaching, “Community engagement describes the collaboration between institutions of higher education and their larger communities for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity.”

2 http://seagrant.oregonstate.edu/sgpubs/onlinepubs/s09001.html
In general the survey responses showed that the respondent-participants strongly agreed that climate change was a concern to which both individuals and government need to respond. The respondents were particularly agreed about their willingness to act “if I hear a sense of local urgency” (figure 1). In addition, the Port Orford respondents showed general similarity with coastwide respondents from the larger survey with respect to perceptions of climate risks\(^3\) (figure 2). Given the number of Port Orford respondents, their responses can be considered no more than suggestive of some portion of the community, yet their emphasis on livability and safety concerns are clear as one of the significant differences from the larger coastwide survey’s respondents.

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Oregon Survey (n=911 risks by 239 people)</th>
<th>Port Orford (n=35 risks by 8 people)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location specific impacts of climate change on the coast.</td>
<td>0.00%</td>
<td>2.86%</td>
</tr>
<tr>
<td>Impacts of climate change on coastal weather and storms.</td>
<td>17.12%</td>
<td>17.14%</td>
</tr>
<tr>
<td>Impacts of climate change on ocean and coastal processes: sea level rise,</td>
<td>31.83%</td>
<td>25.71%</td>
</tr>
<tr>
<td>shoreline erosion, sediment transport and beach width, flood elevations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts of climate change on marine ecosystems: ocean productivity, species</td>
<td>12.40%</td>
<td>11.43%</td>
</tr>
<tr>
<td>composition, endangered species, exotic species.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts of climate change on estuarine ecosystems: salinity, rainfall.</td>
<td>2.63%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Impacts of climate change on terrestrial and riverine ecosystems: forest fires,</td>
<td>12.40%</td>
<td>8.57%</td>
</tr>
<tr>
<td>landslides, stream flow, exotics.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts of climate change on community infrastructure: roads and bridges,</td>
<td>8.12%</td>
<td>2.86%</td>
</tr>
<tr>
<td>water and sewer systems, public buildings and existing shoreline protective</td>
<td></td>
<td></td>
</tr>
<tr>
<td>structures, jetties, ports.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts of climate change on human livability and safety: diseases, agriculture,</td>
<td>6.15%</td>
<td>22.86%</td>
</tr>
<tr>
<td>public access to recreation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impacts of climate change on energy resources.</td>
<td>0.11%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Economic impact, and costs and benefits: net migration, loss of productivity,</td>
<td>5.93%</td>
<td>8.57%</td>
</tr>
<tr>
<td>building design standards, transportation, tourism, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No worries, this is a bunch of crap.</td>
<td>3.29%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Figure 2. Self-described risks, coastwide Oregon professionals vs. Port Orford respondents.

2. PORT ORFORD COMMUNITY ENGAGEMENT

2.1 Project Goals

The goal for the Port Orford community engagement project as identified by the Sea Grant team was to assist the community in becoming more resilient\(^4\) to climate change. The Sea Grant approach was intended to be different from that of a consultant or other “expert” providing a prepared solution for the community. Instead, consistent with Sea Grant and OSU Extension, the approach would directly involve community members in the process of identifying information needs and their difficulties in acting on the information. With assistance, the community would evaluate their own vulnerability to climate change and identify ways to reduce this vulnerability and begin to prepare for climate change.

\(^3\) The question was open-ended and provided no cues about answering; its position in the survey was prior to any other in which specific risks were named.

\(^4\) Resilience has been defined in many ways (Moser 2008), but here it can be understood as the capacity of a system to experience shocks while retaining essentially the same function, structure, and feedbacks, and therefore identity. A system can be social or ecological or, better, their combination.
effects. These goals were to be discussed with and confirmed by the community participants.

In addition to these Port Orford goals, the Sea Grant researchers hoped to obtain transferable knowledge and insights to assist other communities in adapting to climate change,

2.2 Why Port Orford?

The Sea Grant project team considered several desirable characteristics for a community to work with on this project. The community would have: (1) an existing community organization with a good reputation; (2) the organization able to convene community participants; (3) constructive working relationships with university and team members; (4) apparent trust and goodwill between the parties, and (5) a manageable size and local issue complexity.

We identified Port Orford because it met these criteria. We approached the leadership of the Port Orford Ocean Resource Team (POORT), a local nonprofit organization, to act as community convenor of the project and chief collaborator. POORT, directed by local commercial fishermen, dedicated to natural resources, and with a history of success in progressive enterprises, agreed to convene an ad-hoc community group. The group was understood to be completely voluntary, without any official capacity. Community members who participated in the workshops included both public officials and interested citizens.

2.3 Project Methods

Two workshops were planned for Port Orford in Spring 2009. In consultation with the POORT convenors, the Sea Grant project team designed the workshops to address the goals in a sequential way, to be partly planned and partly adaptive based on what arose in the workshops.

The planned design of the workshops was derived from a well-established framework developed in the social-science disciplines of behavioral decision-making and risk communication. One synthesis of these two disciplines is a model of multi-party communication known as “nonpersuasive communication” (Fischhoff 2007), represented in figure 3.

The essence of this model is that successful communication about scientific and technical issues is far more than just presenting the “best available [physical] science” -- which is often what is sought by or provided to decision makers. Instead, communication that is successful, in the sense that it results in well-considered actions, depends critically upon understanding the scientific issue (here, the effects of climate change) from the perspective of the user, stakeholder, or community (National Research Council 2005, Cone 2009).

The 20 questions of the previously mentioned survey provided a baseline for understanding participants’ perspectives. From our communication model, we recognized that the community would want to know what knowledge and advice that climate (“domain”) scientists would have for Port Orford. We possessed this information, but the workshop process would not begin with it. Instead we wanted to establish more clearly what the community participants believed about the local effects of climate change and the risks that the community faced, from their perspective. To determine this, we planned to use two tools: concept maps and influence diagrams.

Concepts maps, used in many learning settings, and influence diagrams, used traditionally in risk analysis, make thinking visible. The user’s ability to visually represent thinking with concept maps and diagrams illustrates two essential properties of understanding, the representation and the organization of ideas (Halford 1993). To understand a concept means having an internal representation or mental model that reflects the structure of that concept; a concept map makes that mental model explicit so that it can be reviewed with others. Review and deliberation with others are valuable for
several reasons: individuals refine, clarify, and negotiate individual understanding.

Beyond individual understanding is negotiation of a group understanding. While the premise of much group work is that the group knows more than any individual in it (Daniels and Walker 2001), how participants arrive at their group understanding is valuable both as product and as process. In the process, will all voices be heard and considered? Will the product be a faithful representation of the richness and diversity of the whole?

The rationale for and making of concept maps and influence diagrams we intended to present in workshop 1. The resulting mental maps would be discussed further in workshop 2.

As mentioned, a climate science concept map was created that mapped the major predicted climate change effects for the Oregon coast, and this model was reviewed by regional climate change experts. Following the first workshop, comparisons would be drawn between maps created in that workshop with this model, to better determine knowledge, misunderstandings, and information needs of the Port Orford community. This assessment would help guide the second workshop, where the similarities and differences between the scientist and community maps would be discussed and options for how best to proceed with available information would be explored.
The Sea Grant team recognized that community members would understand, better than the team, the appropriate framework for them to take further action on climate change. The nature of voluntary groups such as this ad-hoc community group (where people contribute because they want to, not because they have to) means people must choose to roll up their sleeves and implement projects. A key concept in the management of such volunteers is that of “ownership.” If people are involved in selecting an action, they’re more likely to have ownership of that action and are more likely to help implement it. Furthermore, broad local involvement increases the likelihood that actions will be accepted and supported over time. This support is critical given the timeframe often needed to show results (Corcoran 1998).

Accordingly, we planned to focus attention during the second workshop on the question, “Where do you want to go from here?” – without any preconceived outcome. Similarly, we planned for any further workshop or assistance to the community following the second workshop to be driven by community interests, which we intended to determine via personal interviews with workshop participants, following the second workshop. Lastly, to determine the value of this project and to identify transferable methods to carry into other coastal communities, the project would be evaluated approximately six months to one year after the last workshop or meeting contact between the team and community, again through interviewing workshop participants.

All necessary approvals for the conduct of the research would be obtained from Oregon State University.

3. RESULTS: PORT ORFORD COMMUNITY ENGAGEMENT

3.1 Workshop 1, January 21, 2009 – Climate Concept Mapping and Influence Diagramming

The first workshop began with the Sea Grant team providing a quick training on the meaning and process of concept mapping. The team asked the 10 community participants to write down on sticky notes what they believed about how climate change might affect Port Orford. The group then arranged the sticky notes (figure 4) into a single concept map (figure 5) that diagrammed how these elements were related to each other (e.g., causes, effects, categories, etc.). From this activity, five broad climate change-effect categories were identified: effects associated with infrastructure, marine ecosystems, terrestrial ecosystems, economic issues, and extreme weather.

In the next step, participants created influence diagrams on poster paper by using the ideas generated by the previous steps and listing all of the risks associated with each of the five identified categories (figures 6-10). They were instructed to take one category at a time and try to address risks that they could actually do something about. In groups of two or three people, survey participants then went to the poster for each category and identified where decisions could be made to mitigate risks and who was responsible for that decision. (Specialists familiar with conventional influence diagram notation will note the differences in the graphical approach used during the workshop, which reflects the group’s deliberation sequence and seemed natural at the time.)

Workshop participants produced thoughtful and detailed assessments of climate change risks that their community faces. Further, they identified actions that could be taken to reduce these risks. For example, a sequence of causes and effects identified in the marine ecosystem effects category is: climate change could lead to a loss of biodiversity, which could cause a decrease in tourism, and this could be addressed through diversifying the tourism base, with the Port Orford Chamber of Commerce being the responsible party for making this decision (figure 11).

In the workshop wrap-up, participants requested more information on climate change and community effects – indications that the workshop engaged them and prompted further thinking.
Figure 5. Community Concept Map: “How Will Climate Change Affect Port Orford?” The version shown here is from the maps of individuals, compiled and grouped (circled items) by the participants into principal effects. Hand-written sticky notes on a poster were transcribed after workshop 1 by the Sea Grant team. At that time several of these community concerns (labeled by the black rectangles) were noted as corresponding to ones described in a Washington state climate assessment (Climate Impacts Group 2009), here denoted by orange text in the black rectangles.

Note: Concept maps in this report are in .pdf format, so they can be expanded and rotated by selecting the appropriate tools in your .pdf viewing application (e.g., Adobe Reader). These instructions apply to the .pdf format of this report.
Figure 6. Community Influence Diagram: Infrastructure Effects. The community participants’ influence diagrams were created during workshop 1 and afterwards transcribed to the version shown. Texts outside of boxes (typically to the left) describe risks associated with the effect category, and arrows from the risks show how those risks influence further effects. Decisions or actions that might be taken to address the risk (blue rectangle) and who would be responsible for those actions (white rectangle, red text) are also shown.
Figure 7. Community Influence Diagram: Marine Ecosystem Effects. See explanatory notes to figure 6.
Figure 8. Community Influence Diagram: Terrestrial Ecosystem Effects. See explanatory notes to figure 6.
Figure 9. Community Influence Diagram: Economic Effects, and Figure 10: Extreme Weather Effects (below). See explanatory notes to figure 6.
Figure 11. Climate Specialists’ Model
Figure 12. Port Orford Community Model. In columns 2-5, the darker-shaded color indicates a point of congruence with the climate specialists’ model.
3.2 Inter-workshop Comparison of Influence Diagrams and the Expert Model

Prior to the second workshop, the Sea Grant team transferred the hand-written community maps to digital form (using free CMap Tools\(^5\) software). Many areas of agreement between the influence diagrams produced by the participants of the first workshop and the climate specialist model can be noted (compare figure 11 and 12), and the team planned to highlight these agreements in the second workshop.

3.3 Workshop 2, March 26, 2009 – Port Orford’s Climate Change Preparation

This four-hour afternoon meeting resumed with a review and analysis of workshop 1 results. The team distributed paper copies\(^6\) and projected digital images of three interpretations of climate change concerns: the Community Concept Map (figure 5), the Climate Specialists’ Model (figure 11) and the consolidated Port Orford Community Model (figure 12). The latter was structured to reveal the similarities between the specialists’ model and the community’s, among other features.

The team noted that very little climate prediction information was available that specifically focused on the Port Orford vicinity, which is a local instance of a well-recognized limitation of current climate preparation. Climate prediction largely depends on models which to date have focused on rather large regional geographic areas (Sarachik 2008). This limitation has several consequences for a community wanting to prepare for climate change. It causes them to consider what science is available, what guidance that science offers, and how adequate that guidance is to decisions the community might want to make. These considerations were discussed in following portions of the workshop.

In the absence of climate science specific to the Port Orford area, the team’s development of the Climate Specialists’ Model (figure 11) provided a serviceable approximation. It was assembled from available published sources that had either a regional Pacific Northwest context (Huppert 2009) or a coastwide Oregon context (Weber 2009). In addition, qualified members of the project team\(^7\) reviewed the specialists’ model for accuracy. In workshop presentation, the team noted the similarities between what scientists (figure 11) and the community participants (figure 5) recognized as significant effects of climate change. To highlight this similarity and tease out additional information, the team compiled the community influence diagrams (figure 6-10) into a community model (figure 12). The team’s premise was that organizing and making visible a great deal of information in a diagrammed form might help the community see connections clearly that might otherwise not be seen.

The community model was structured in columns containing items that linked graphically and conceptually from left to right, from broader climate effects to primary biophysical impacts to biophysical risks to potential social/economic impacts to potential interventions. The final column considered “who is responsible” for making those interventions. Both the climate scientists and community models highlighted infrastructure effects, a decrease in drinking water, impacts on fisheries, and increased disease and public health effects. The Port Orford model differed somewhat in focus, with stronger emphasis on social impacts, including displaced population, increased isolation, disruption in local livelihood, and loss of jobs.

---

\(^5\) The concept mapping tools used are available for free at http://cmap.ihmc.us/download/

\(^6\) Following the workshop, participants were sent the diagram image files via e-mail.

\(^7\) Dr. Nathan Mantua, University of Washington Climate Impacts Group; Dr. Michael Harte, OSU College of Oceanic and Atmospheric Sciences
In response to participants’ questions, the team noted that first, the community model did not include every detail contained in the influence diagram sources, and second, the number of arrows converging on a particular column-topic are an indication of the factors associated with that topic and the degree of participant attention on them. Not noted were two limitations of the analysis -- that it was almost entirely qualitative and the variables of concern were not subjected to any attempt at objective measures. The scientific uncertainties and probabilities associated with certain climate effects (for example, How much sea level rise? How sure are we?) were not explicitly addressed in the workshop process (nor did the community participants request that they should be).

Recognizing that community participants had a considerable amount of information to absorb, the workshop team paused to discuss with the community members about the best way to proceed in the workshop. While the team was concerned to make workshop time productive and moved quite quickly to help community participants frame how they might proceed, the team wanted the community to indicate their preferences. The team acknowledged that the community’s “sphere of concern” was larger than the sphere of (relatively near-term) influence (Covey 1990) and one way to proceed was to select an issue that community was already working on or concerned about. The metaphor of a “lens” was used to describe how an existing concern might be seen anew and constructively when viewed through a “climate change lens.” As the community had identified the effects of climate change on infrastructure as of particular concern, the team asked if there were current opportunities to address infrastructure issues.

As it happened, community participants were involved in re-writing both a local storm water ordinance and a floodplain ordinance. These ordinances sparked discussion and interest among the participants to focus on them, and the group divided in two to write down ideas concerning each ordinance through the “climate change lens.” Each group was given a sheet of poster paper and markers; team members participated in separate groups to help moderate and answer questions. After a time the groups rotated and considered the other issue, adding thoughts to the poster sheets. The resulting worksheets (figure 13, as example) were more in the form of a brainstorm than a structured concept map or influence diagram, but the two participants who had proposed the focus on ordinances said that the discussion was helpful to them.

In the next section of the workshop, the community group was invited to select and begin planning for two or three priority risks from the Port Orford community model. Risks were drawn from the identified “potential social/economic impacts” and the participants were asked to individually consider, which ones can the community do something about in the mid-term, i.e., approximately 3-5 years? The team suggested that the community might consider three criteria in making their selection: community achievability, affordability, and popularity (within the broader community). After a short time for considering the question, choices were written on a flip chart and the most popular were chosen for further consideration: decreased drinking water, infrastructure destruction, and impacts on fisheries.

Participants were divided into three groups and asked to address the following questions on poster sheets (with priority given to the first two questions): What do you know now about this issue, relative to climate change effects? What do you need to know in order to take action? What can be done to address the issues identified? Ten minutes were allotted per group before rotating to the next risk; each group had an opportunity with each risk. Example results for the decreased drinking water risk are shown in figure 14.

After all participants had the chance to review and add to each of the worksheets, about ten minutes was devoted to group discussion of the worksheet results. The team noted that while the
community recognized various unknowns and uncertainties relating to the effects of climate on the three priority topics (and no doubt others), the lack of perfect and complete information is the rule, rather than exception, with virtually all planning decisions. As uncertainty is inherent in most decisions, the question becomes, what’s the most useful way to think about planning given uncertainty.

This led directly to a set of presentations by team members reflecting on this broad topic. Lara Whitely Binder discussed a two-page handout about adaptation planning, “Key Points to Consider When Planning for Climate Change,” (Appendix B), and distributed a guidebook for local, state, and regional governments, Preparing for Climate Change. Joe Cone discussed the idea of resilience, as both a goal and a framework for longer-term planning that addresses the adaptability of social and ecological systems together. (A community that’s resilient to climate change would be able to tolerate

---

8 Available at cses.washington.edu/db/pdf/snoveretalgb574.pdf
significant disturbances without falling into an undesirable condition.) He distributed a one-page overview, “Quick Q & A: A Community Resilient to Climate Change?” (Appendix C), referenced a process by which resilience planning could be conducted, and offered to continue discussions about resilience if the community was interested.

In brief remarks, Pat Corcoran underscored the value of developing and using a climate change “lens” through which to view planning activities. Jeff Weber, the Oregon Department of Land Conservation and Development’s coastal conservation coordinator, reviewed how the department’s Coastal Management Program provides some funding and technical assistance to adopt, maintain, and implement local comprehensive plans. Weber distributed the department’s report to the Oregon legislature, Climate Ready Communities, and noted that it was based on a larger, unpublished study by the department on the available science regarding climate change on the Oregon coast. And he noted that climate change adaptation would be both a “long-term dialogue and empowerment process with local jurisdictions” and that, at the time, the department was still developing a comprehensive approach to climate change. After a brief wrap-up, the workshop concluded and participants went to dinner together, where discussions continued informally.

3.4. Evaluation of Workshops
An evaluation was conducted at the end of the first workshop simply to determine what

---

participants liked or felt needed to be changed (for other workshops). One unexpected and positive outcome of the workshop training occurred shortly afterwards, as POORT staff put to use their training in developing concept maps in conducting a planning workshop of their own.

Following the second workshop, team members interviewed by phone four workshop participants. The purpose was to sample satisfaction and interest in future engagement. The interviewees were asked the same questions\(^\text{10}\) and the interviews recorded and analyzed.

In general, interviewed participants described satisfaction with the workshops, stating that their participation caused them to think about risks of climate change that they would not have thought about otherwise, and about climate change as it will affect their community (rather than as a global and distant issue). One participant noted the diverse background of the workshop participants and the importance of bringing diverse community members to a shared understanding of the climate issue. Another participant noted that influence diagrams worked well as a workshop tool because it allowed the group to work together, with everyone included, and helped the group come to consensus.

When interviewees were asked what they believe Port Orford needs to do to respond to climate change, and next steps to take, there was agreement among these four that the community does, in fact, need to take action. While some interviewees readily highlighted issues of concern (e.g., sea level rise), others seemed not yet to have digested the new information that had been presented in the two workshops. Nonetheless, there was general agreement that the community needs to come up with a long-term plan or at least set priority issues to deal with. Also, interviewees believed that climate change awareness and understanding needs to increase among workshop participants and the remainder of their community. They believe that continued engagement with Oregon Sea Grant could be beneficial in preparing their community for climate change through assisting in prioritizing climate change issues to address, and through expanding efforts to include more Port Orford citizens, possibly through a town-hall style meeting.

4. NEXT STEPS

In the spirit of the second workshop of continuing to take practical steps and using available planning opportunities, one of the team members worked with a community participant to propose a presentation to the Curry County Planning Commission on the likely impacts of climate change on the county.

Reference was made to two current activities that are relevant to climate change -- the City of Port Orford's storm water ordinance and Curry County's floodplain plan update. To allay potential concerns, the team member noted that, first, climate change need not be thought of as another chapter to the comprehensive plan but rather as a filter or lens through which to broadly consider land use planning; and second, that “belief in climate change” is not needed to make reasonable adaptations to

\(^{10}\) How would you say the workshops have gone so far?; how would you describe your current thinking about how Port Orford needs to respond to climate change?; have the workshops had any influence on this way of thinking?; what is/are the next step/s that you think the community needs to take with respect to preparing for the effects of climate change?; how can our project help you take that step?; and what would cause you to come to a third workshop?
the impacts of increased storm and flood events.

While a meeting with only the planning commission did not occur, in September 2009 the team member gave a climate-change presentation in Gold Beach to members of the Lower Rogue Watershed Council, Curry County Planning Commission, the South Coast Watershed Council, and other interested community members. The 90-minute evening meeting also included questions and discussions. As it happened, the Port Orford storm water and flood plain ordinances revised in 2009 were written and adopted for current, not future, climate conditions. According to participants, the Planning Commission and the City Council agreed that it will probably be some time before climate change conditions take effect, and these ordinances can be modified as necessary in the future.

At the time of writing this report, the project team is willing to continue to engage the Port Orford community on climate-change learning and outreach in any constructive way.

5. APPENDICES

5.1 Appendix A – Brief Notes on Port Orford\(^{11}\)

Port Orford is located on the southern Oregon coast, 28 miles north of Gold Beach on U.S. Route 101. The city has a total area of 1.6 square miles. A lake or natural lagoon exists within city boundaries as well as a large amount of wetlands. The port is an open-water dock (no natural protection) and boasts the only drydock port on the west coast. The fishing boats are lifted in and out of the water by operated cranes, set on custom-made dollies, and parked in rows on the dock. The municipal water supply comes entirely from surface sources, specifically Hubbard Creek.\(^{12}\)

As of the U.S. census of 2000 (most recent available), there were 1,153 people, 571 households, and 311 families residing in the city. The racial makeup of the city was more than 95% White. The median age was 50 years, while the median income for a household in the city was $23,289 and the median income for a family was $29,653. Males had a median income of $35,221 versus $15,179 for females. The per capita income for the city was $16,442. About 16.1% of families and 17.8% of the population were below the poverty line, including 21.9% of those under age 18 and 9.2% of those age 65 or over. Slightly more than 10% of the population had completed an undergraduate bachelor’s degree, and about 9% held graduate or professional degrees.

5.2 Appendix B – Key Points to Consider When Planning for Climate Change

Contact: Lara Whitely Binder, UW Climate Impacts Group (lwb123@u.washington.edu; 206-616-5349)

\[\text{begins next page}\]

---

\(^{11}\) Most of the data and descriptions are from the Wikipedia entry: [http://en.wikipedia.org/wiki/Port_Orford,_Oregon](http://en.wikipedia.org/wiki/Port_Orford,_Oregon) (accessed 23 Nov. 2009).

\(^{12}\) According to official sources, planning work is in progress to increase the impoundment (raise the dam) to assure a reliable source of water in summer months in dry years. Ground water sources (wells) are inadequate to supply a meaningful amount of water to the City. Garrison Lake could be a secondary source but would definitely be adversely affected by an increase in sea level. Both the sewage and water treatment plants, along with municipal buildings (City Hall, Police Department, Fire Department) are located in low lying areas subject both to tsunamis and storm damage that could be more likely with climate change.
Goal of adaptation planning: To become a more “climate resilient” community. What does this mean? It means taking proactive steps to reduce the risks associated with climate change for your community and important ecosystems. Developing a climate adaptation plan is a means of reaching this goal.

Climate change will most likely worsen many existing management stresses by increasing the frequency, duration, and/or extent of events that contribute to existing management challenges. This has two important implications:

- Implementing actions to deal with climate change will have benefits in the near term as well as the long term
- Planning for climate change is not separate from other aspects of community planning; need to integrate adaptive planning into existing planning and decision making frameworks

Additional key points:

- Planning for climate change is a risk management issue in the same way that we evaluate the risks associated with tsunamis or changes in the economy. What is your community’s risk tolerance for projected climate change impacts? What steps can be taken to reduce those risks?
- We will not have perfect information; we rarely do. Uncertainty is an inherent part of any decision.
- You do not have to “get it right” the first time. Look for the small accomplishments early on for building momentum.
- There is no single prescribed way for adaptive planning, although the major milestones will be similar (see below for the basic process). Become familiar with the concepts associated with planning for climate change but adjust the “recipe” to meet your specific needs.
- Public education is important. Look for opportunities to advertise what the community is doing to prepare for climate change.
- While the discussion is most often oriented to the problems of climate change, look for the opportunities as well.
- Much can be gained from addressing non-climate stresses that contribute to climate vulnerability.

The basic adaptation planning process outlined in Preparing for Climate Change:

a) Information gathering – how will climate change affect my community/region? (an ongoing part of the process)
   - e.g., UO Climate Leadership Institute, UW Climate Impacts Group, IPCC (for global information), individual research studies
b) Make the commitment to prepare for climate change
c) Assemble your planning “team” and bring them up to speed
   - You may have a team of several people or one person overseeing the adaptation planning effort.
• Team members -- or at least departments to consult with -- may include economic
development, emergency management, planning and zoning, water supply, wastewater
treatment, transportation, flood control, coastal zone management, business community,
NGOs, other levels of government, and neighboring communities.

d) Determine priorities for planning (vulnerability assessment)
• At its core, what are you most concerned about? Information will help prioritize adaptive
planning efforts.
• Do not need to tackle all issues all at once.
• Where do you currently experience problems associated with temperature, precipitation
extremes/extreme weather events? Is climate change likely to make these worse or better?
What are the implications of these impacts? (getting a sense of your sensitivity)
• How easily these concerns/areas/functions can be adjusted to address the impacts (getting a
sense of your adaptability)

e) Develop and implement your adaptation “strategy”.
• Consider no regrets, low regrets, and win-win (co-benefit) strategies
• Consider the need to develop adaptive capacity (i.e., addressing institutional, legal, cultural,
technical, fiscal and other barriers) and well as the need to implement adaptive actions
• Examples of steps that build adaptive capacity:
  o Outreach and education to stakeholders
  o Training opportunities and access to technologies that support adaptation needs
  o Partnerships with organizations that can support adaptation needs
  o Identifying and addressing regulatory, institutional, and other barriers to adaptation
    planning
• Examples of adaptive actions:
  o Increase water conservation measures
  o Strengthen dikes and levees where appropriate
  o Restore critical habitat for climate-sensitive species
  o Plant tree species known to have a broad range of tolerances
  o Improve the use of early warning systems for extreme heat events
  o Increase use of setbacks or rolling easements for coastal land uses
• Choice and timing of some adaptive actions may depend on specifics of the climate
  projections; building adaptive capacity is not dependent of specific climate projections

f) Periodically revisit your adaptation plan for needed adjustments – how has the science, your
community changed?

General Implementation Tools:
• Zoning rules and regulations
• Taxation (including tax incentives)
• Building codes/design standards
• Utility rates/fee setting
• Public safety rules and regulations
• Issuance of bonds
• Infrastructure development
• Permitting and enforcement
• Best management practices
• Outreach and education
• Emergency management powers
• Partnership building with other communities

5.3 Appendix C – Quick Q & A: A Community Resilient to Climate Change?
Contact: Joe Cone, Oregon Sea Grant

Q. What would a climate-change-resilient community be?
A. Definitions differ, but, generally, a community that’s resilient to climate change would be able to tolerate significant disturbances without falling into an undesirable condition. The community would be able to adapt, because it’s paying attention and making adjustments.

Q. How would a climate-resilient community be different from one that is not?
A. Communities that are not resilient are ultimately not able to withstand (or adapt to) shocks and disturbances. Such communities typically are more fragile and are not addressing their vulnerabilities.

A Resilient Community
ANTICIPATES problems, opportunities, potentials for surprises
REDUCES VULNERABILITIES related to development paths, socio-economic conditions, sensitivities to possible threats
RESPONDs effectively, fairly, and legitimately
RECOVERS rapidly, better, safer and fairer

Q. In concept, what’s different about planning for resilience?
A. Resilience is a property of a system (a combination of elements that interact to form a more complex whole). So a community would undertake an assessment of both human and natural systems. Those who study resilience recognize that these systems are linked (often referred to as social-ecological systems) and they are dynamic.

Q. How might a community start?
A. The goal of resilience is, admittedly, rather new. So a community that is interested in considering or exploring resilience is likely open to new approaches, probably perceives that resilience could be a key to a sustainable future, and has the desire and ability to influence
decisions and actions that affect the community. The community might wish to begin with a work group that would examine the pros and cons of developing a resilience assessment and make a recommendation to leaders about undertaking one. (Or just do it.)

Q. What published help is there for resilience planning?

- Community and Regional Resilience Initiative: http://www.resilientus.org/

6. REFERENCES


