be. Unfortunately, such information is not always available at the local level for all hazards. So, until more information becomes available, communities may have to focus on what they do know about existing hazards, and make some provisional decisions.

This is just what the working group did in its August 2010 workshop. In informal discussions, members of the group gravitated away from specifically climate-linked hazards to better-known hazards, such as those associated with a potential tsunami on the southern Oregon coast, or, more locally, with the potential breaching of Garrison Lake during flooding events. Such flooding, which might be triggered by increased winter storminess associated with a changing climate, could break the high-pressure sewer line that runs across the Arizona Street Bridge, causing significant spills and environmental harm.

Likely Climate Changes

While Port Orford residents might like to know exactly how a changing climate will affect where they live, the best information currently available is not nearly so specific. Instead, scientists can describe regional trends and projections based on their best knowledge, in reports such as two published in December 2010.* Some excerpts follow.

Future regional climate changes in Oregon likely include:

- Increases in average annual air temperature (equal to 0.2–1 degrees F/decade)
- Warmer and drier summers
- Forests west of the Cascades more vulnerable to fire
- Increased frequency of extreme precipitation events and flooding
- Increased coastal erosion and risk of inundation from rising seas and storm surges
- Increases in frequency and magnitude of coastal flooding events
- Shifts of plant and animal species upward or northward on land, and deeper or northward at sea
- Increases in water temperatures in the ocean
- Ocean water that is more acidic and corrosive to certain species, potentially affecting recruitment and survival of shellfish species, and affecting key organisms at the base of the food chain, with related additional effects

The Working Group and its Activities

This informal project, begun in 2009, has been locally coordinated and led by the Port Orford Ocean Resource Team. This organization has been assisted by a group of natural and social scientists and practitioners, mainly from Oregon State University, and supported throughout by the Oregon Sea Grant program based there. The aim of the project has been to establish the potential effects of a changing climate in Port Orford and vicinity and to consider what, if anything, the community might want to do about these effects.

The working group of about 10 interested Port Orford residents had no official capacity, yet they simply had a shared interest in the town they might inhabit, a desire to change a local climate. This report summarizes the project activities to date. These local workshops— in January and March 2009 and August 2010— built on one another and involved the working group in hands-on activities, which followed best practices of group decision making.

Figure 1 outlines the process that the group typically used in making decisions. The results of this project have been published in a number of diagrams produced by the group, which captured the group’s thinking in a visual format. The development of these “concept” or “Working Group” diagrams has provided an opportunity for all participants to present, share, and discuss their understanding of the risks associated with environmental change and the responses the community might consider.

Participants’ views of the climate risks were then compared to the available information from climate scientists and found to be in very good agreement, as reflected in Figure 2 (under overleaf). Participants’ views of the climate risks were then compared to the available information from climate scientists and found to be in very good agreement, as reflected in Figure 2 (under overleaf). The results of this past work have been detailed in a number of diagrams produced by the group, which captured the group’s thinking in a visual format. The development of these “concept” or “Working Group” diagrams has provided an opportunity for all participants to present, share, and discuss their understanding of the risks associated with environmental change and the responses the community might consider.

Figure 2 contains a great deal of information and can be a bit overwhelming at first. But one can see its value by recognizing that the information is organized into a set of ideas that are logically linked and read from left to right in six related columns. The headings of those columns are highlighted in yellow. Each column contains the “Primary Biophysical Impact” of those events. In the first column the “Broader Climate Changes” of those impacts are related. In the second column, “Impacts” of those impacts are related. The group’s presentation was received with interest, and the City of Port Orford Planning Commission agreed to consider changes to the climate when reviewing City Ordinances, the Port Orford Comprehensive Plan, and the City’s hazard mitigation plan. The group’s presentation was received with interest, and the City of Port Orford Planning Commission agreed to consider changes to the climate when reviewing City Ordinances, the Port Orford Comprehensive Plan, and the City’s hazard mitigation plan.

Making Decisions

In summer 2010 the Port Orford working group was asked questions about which they wanted to be in their face. They responded, “to determine critical local vulnerabilities in the natural environment and make recommendations about how to respond to those critical local vulnerabilities.” To reach this goal for the (local) question was to determine local vulnerabilities through a scientific assessment that involves two main components: (1) a review of information that describes current conditions and (2) a review of information that describes how circumstances might change over time.

A Current Focus on Hazard Vulnerability

In summer 2010 the Port Orford working group was asked what they wanted to do about what they knew. They responded, “to determine critical local vulnerabilities in the natural environment and make recommendations about how to respond to those critical local vulnerabilities.” To reach this goal for the (local) question was to determine local vulnerabilities through a scientific assessment that involves two main components: (1) a review of information that describes current conditions and (2) a review of information that describes how circumstances might change over time.

In summer 2010 the Port Orford working group was asked what they wanted to do about what they knew. They responded, “to determine critical local vulnerabilities in the natural environment and make recommendations about how to respond to those critical local vulnerabilities.” To reach this goal for the (local) question was to determine local vulnerabilities through a scientific assessment that involves two main components: (1) a review of information that describes current conditions and (2) a review of information that describes how circumstances might change over time.

The Working Group’s Insights

Understanding the Working Group’s Insights

This report summarizes the project activities to date. Three main points have emerged:

1. The working group has developed a conceptual framework for understanding the potential effects of a changing climate in Port Orford and vicinity.

2. The working group has identified a number of potential biophysical impacts of a changing climate in Port Orford and vicinity.

3. The working group has identified a number of potential social impacts of a changing climate in Port Orford and vicinity.

Figure 2 contains a great deal of information and can be a bit overwhelming at first. But one can see its value by recognizing that the information is organized into a set of ideas that are logically linked and read from left to right in six related columns. The headings of those columns are highlighted in yellow. Each column contains the “Primary Biophysical Impact” of those events. In the first column, the “Broader Climate Changes” of those impacts are related. In the second column, “Impacts” of those impacts are related. The group’s presentation was received with interest, and the City of Port Orford Planning Commission agreed to consider changes to the climate when reviewing City Ordinances, the Port Orford Comprehensive Plan, and the City’s hazard mitigation plan. The group’s presentation was received with interest, and the City of Port Orford Planning Commission agreed to consider changes to the climate when reviewing City Ordinances, the Port Orford Comprehensive Plan, and the City’s hazard mitigation plan.

Likely Climate Changes

While Port Orford residents might like to know exactly how a changing climate will affect where they live, the best information currently available is not nearly so specific. Instead, scientists can describe regional trends and projections based on their best understanding, in reports such as two published in December 2010.* Some excerpts follow.

Potential local impacts include:

- Increased coastal flooding
- Increased sea level rise
- Increased storm intensities
- Increased droughts
- Increased wildfires
- Increased soil erosion
- Increased heat waves
- Increased air pollution
- Increased water pollution
- Increased groundwater levels
- Increased plant and animal species spread on land, north and west, and toward higher elevations
- Increased air and water pollution
- Increased water temperatures
The Working Group and its Activities

This informal project, begun in 2009, has been locally coordinated and led by the Port Orford Ocean Resource Team. This organization has been assisted by a group of natural and social scientists and practitioners, mainly from Oregon State University, and supported financially by the Oregon Sea Grant program and friends. The aim of the project has been to understand the potential effects of a changing climate in Port Orford and vicinity and to consider what, if anything, the community might want to do to address those effects.

The working group of about 10 interested Port Orford residents had no official capacity, other than they shared a shared interest in how the town might adapt to a changing climate. This informal organization for the project activities is as follows: three local workshops—in January and March 2009 and August 2010—built on one another and involved the working group in hands-on activities, which followed best practices of group decision-making.

Figure 1 outlines the process that groups typically use in making decisions. The results of the past work have been detailed in a number of diagrams produced by participants, which captured the group’s thinking in a visual way. The developments of “concept maps” was intended to provide an equal opportunity for all participants to present, share, and discuss their understanding of the risks associated with environmental change. The results of this past work have been detailed in a number of diagrams produced by participants, which captured the group’s thinking in a visual way. The development of “concept maps” was intended to provide an equal opportunity for all participants to present, share, and discuss their understanding of the risks associated with environmental change.

To overcome the limitations in the current science to support them.

In these concerns, they have the overwhelming evidence of sea level rise and increases in extreme weather, water temperature, storms, and other hazards. The working group didn’t stop there, however—it is considered that “sustainability” (column 3) of increased pollutants and a “Potential Social Impact” (column 5) could take on a variety of forms or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer as it goes forward in refining its understanding and actions regarding the changing climate. What is clear is that the working group is concerned about the key features of a changing climate: increased temperatures, extreme weather events, changes in vegetation, changes in the timing of seasonal events, changes in ocean currents, changes in ocean salinity, and changes in ocean currents. To these analysts, they have the overwhelming evidence of current science to support them.

A Current Focus on Hazard Vulnerability

In summer 2010 the Port Orford working group was surveyed about what they viewed as the major challenges they were facing. They responded, “to determine critical local vulnerabilities in the natural environment” and “to make recommendations about how to respond to these critical local vulnerabilities.” Experts in this field say that, ideally, priorities would be set among various hazards through a scientific assessment that involves good measurements and an understanding of how probable the hazard is, how often it occurs, and how certain we are about it. These limitations of the diagram should not be thought of as mistakes or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer at any time.

In Figure 2 contains a great deal of information and can be a bit overwhelming at first. But one can see its value by recognizing that the information is organized into a set of ideas that logically flow from one to another. The headings of these columns are highlighted in yellow. At the left, in the first column, there is a “Broad Climate Effects” column that Port Orford working group’s overview of what the problems are, what might be done about them, and—importantly—how various factors are related.

To overcome the limitations in the current science to support them.

In these concerns, they have the overwhelming evidence of sea level rise and increases in extreme weather, water temperature, storms, and other hazards. The working group didn’t stop there, however—it is considered that “sustainability” (column 3) of increased pollutants and a “Potential Social Impact” (column 5) could take on a variety of forms or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer as it goes forward in refining its understanding and actions regarding the changing climate. What is clear is that the working group is concerned about the key features of a changing climate: increased temperatures, extreme weather events, changes in vegetation, changes in the timing of seasonal events, changes in ocean currents, changes in ocean salinity, and changes in ocean currents. To these analysts, they have the overwhelming evidence of current science to support them.

A Current Focus on Hazard Vulnerability

In summer 2010 the Port Orford working group was surveyed about what they viewed as the major challenges they were facing. They responded, “to determine critical local vulnerabilities in the natural environment” and “to make recommendations about how to respond to these critical local vulnerabilities.” Experts in this field say that, ideally, priorities would be set among various hazards through a scientific assessment that involves good measurements and an understanding of how probable the hazard is, how often it occurs, and how certain we are about it. These limitations of the diagram should not be thought of as mistakes or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer at any time.

In Figure 2 contains a great deal of information and can be a bit overwhelming at first. But one can see its value by recognizing that the information is organized into a set of ideas that logically flow from one to another. The headings of these columns are highlighted in yellow. At the left, in the first column, there is a “Broad Climate Effects” column that Port Orford working group’s overview of what the problems are, what might be done about them, and—importantly—how various factors are related.

To overcome the limitations in the current science to support them.

In these concerns, they have the overwhelming evidence of sea level rise and increases in extreme weather, water temperature, storms, and other hazards. The working group didn’t stop there, however—it is considered that “sustainability” (column 3) of increased pollutants and a “Potential Social Impact” (column 5) could take on a variety of forms or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer as it goes forward in refining its understanding and actions regarding the changing climate. What is clear is that the working group is concerned about the key features of a changing climate: increased temperatures, extreme weather events, changes in vegetation, changes in the timing of seasonal events, changes in ocean currents, changes in ocean salinity, and changes in ocean currents. To these analysts, they have the overwhelming evidence of current science to support them.

In summer 2010 the Port Orford working group was surveyed about what they viewed as the major challenges they were facing. They responded, “to determine critical local vulnerabilities in the natural environment” and “to make recommendations about how to respond to these critical local vulnerabilities.” Experts in this field say that, ideally, priorities would be set among various hazards through a scientific assessment that involves good measurements and an understanding of how probable the hazard is, how often it occurs, and how certain we are about it. These limitations of the diagram should not be thought of as mistakes or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer at any time.

In Figure 2 contains a great deal of information and can be a bit overwhelming at first. But one can see its value by recognizing that the information is organized into a set of ideas that logically flow from one to another. The headings of these columns are highlighted in yellow. At the left, in the first column, there is a “Broad Climate Effects” column that Port Orford working group’s overview of what the problems are, what might be done about them, and—importantly—how various factors are related.

To overcome the limitations in the current science to support them.

In these concerns, they have the overwhelming evidence of sea level rise and increases in extreme weather, water temperature, storms, and other hazards. The working group didn’t stop there, however—it is considered that “sustainability” (column 3) of increased pollutants and a “Potential Social Impact” (column 5) could take on a variety of forms or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer as it goes forward in refining its understanding and actions regarding the changing climate. What is clear is that the working group is concerned about the key features of a changing climate: increased temperatures, extreme weather events, changes in vegetation, changes in the timing of seasonal events, changes in ocean currents, changes in ocean salinity, and changes in ocean currents. To these analysts, they have the overwhelming evidence of current science to support them.

In summer 2010 the Port Orford working group was surveyed about what they viewed as the major challenges they were facing. They responded, “to determine critical local vulnerabilities in the natural environment” and “to make recommendations about how to respond to these critical local vulnerabilities.” Experts in this field say that, ideally, priorities would be set among various hazards through a scientific assessment that involves good measurements and an understanding of how probable the hazard is, how often it occurs, and how certain we are about it. These limitations of the diagram should not be thought of as mistakes or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer at any time.

In Figure 2 contains a great deal of information and can be a bit overwhelming at first. But one can see its value by recognizing that the information is organized into a set of ideas that logically flow from one to another. The headings of these columns are highlighted in yellow. At the left, in the first column, there is a “Broad Climate Effects” column that Port Orford working group’s overview of what the problems are, what might be done about them, and—importantly—how various factors are related.

To overcome the limitations in the current science to support them.

In these concerns, they have the overwhelming evidence of sea level rise and increases in extreme weather, water temperature, storms, and other hazards. The working group didn’t stop there, however—it is considered that “sustainability” (column 3) of increased pollutants and a “Potential Social Impact” (column 5) could take on a variety of forms or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer as it goes forward in refining its understanding and actions regarding the changing climate. What is clear is that the working group is concerned about the key features of a changing climate: increased temperatures, extreme weather events, changes in vegetation, changes in the timing of seasonal events, changes in ocean currents, changes in ocean salinity, and changes in ocean currents. To these analysts, they have the overwhelming evidence of current science to support them.

In summer 2010 the Port Orford working group was surveyed about what they viewed as the major challenges they were facing. They responded, “to determine critical local vulnerabilities in the natural environment” and “to make recommendations about how to respond to these critical local vulnerabilities.” Experts in this field say that, ideally, priorities would be set among various hazards through a scientific assessment that involves good measurements and an understanding of how probable the hazard is, how often it occurs, and how certain we are about it. These limitations of the diagram should not be thought of as mistakes or fatal flaws. Instead, the diagram can be understood as a kind of roadmap to which the community may refer at any time.
understanding of how probable the hazard’s occurrence may be. Unfortunately, such information is not always available at the local level for all hazards. So, until more information becomes available, communities may have to focus on what they do know about existing hazards, and make some provisional decisions.

This is just what the working group did in its August 2010 workshop. In informal discussions, members of the group gravitated away from specifically climate-linked hazards to better-known hazards, such as those associated with a potential tsunami on the southern Oregon coast, or, more locally, with the potential breaching of Garwood Lake during flooding events. Such flooding, which might be triggered by increased winter storms associated with a changing climate, could breach the high pressure water line that runs across the Arizona Street Bridge, causing significant spills and environmental harm.

Likely Climate Changes

While Port Orford residents might like to know exactly how a changing climate will affect where they live, the best information currently available is not nearly so specific. Instead, scientists can describe regional trends and projections based on their best knowledge, in reports such as two published in December 2010.* Some excerpts follow.

Future regional climate changes in Oregon likely include:

• Increases in average annual air temperature (equal to 0.2–1 degrees F/decade)
• Warmer and drier summers
• Forests west of the Cascades more vulnerable to fire
• Increased frequency of extreme precipitation events and flooding
• Increased coastal erosion and risk of inundation from rising seas and storm surges
• Increased frequency and magnitude of coastal flooding events
• Shift of plant and animal species spread northward on land, and deeper northward at sea
• Increased rates of ocean acidification
• Ocean wettest that are more acidic and corrosive to certain species, potentially affecting recruitment and survival of shellfish species, and affecting tiny organisms at the base of the food chain, with related additional effects


After hearing the presentation by the Working Group on the Effects of Changing Climate, the Port Orford Planning Commission agreed unanimously that effects of future climate change must be considered when reviewing City Ordinances, the Port Orford Comprehensive Plan, and land-development proposals. No matter what the causes of climate change and its effects are, we must be diligent as a coastal City and be prepared.

Dave Holman, Chairman
City of Port Orford Planning Commission

Looking to the Future

Having identified the most probable local hazards, the community group chose to move forward with projects that are already ready to proceed but that match up with climate concerns.

To begin, in November 2010 the group made a presentation to the Port Orford Planning Commission about their work and the dangers of increased frequency and intensity of storms. The group’s presentation was received with interest, and the Commission agreed to consider changes to the climate when making future decisions and to include language to that effect in its comprehensive plan.

One other tangible project the working group identified is to reinforce the Arizona Street Bridge to reduce its vulnerability to natural disasters. The City would need to locate funding for this project, possibly through the Pre-Disaster Mitigation program at FEMA (the Federal Emergency Management Agency).