Case Study: Homer, Alaska's Climate Adaptation Progress Despite Uncertainties

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INTRODUCTION

Homer, AK, located 125 miles southwest of Anchorage, has a current population of approximately 5,700. Positioned along the shore of Kachemak Bay, Homer has expansive views of glaciers, forests, and mountains. Residents and tourists alike enjoy the strong sense of community found in Homer and the many options for outdoor recreation such as kayaking, fishing, and wildlife viewing. As such, it will come as no surprise that the City of Homer is taking steps to protect its people, infrastructure, and natural resources from the impacts of climate change, and to establish sustainability as a key component of long-range planning and future development.

In September 2006, Mayor James Hornaday attended a national convention on climate change and heard from experts on climate science and policy. During this convention, it occurred to Mayor Hornaday that local governments can and should play a critical role in reducing locally generated greenhouse gas emissions while also helping local communities begin preparing for unavoidable changes in climate.

READY TO LEAD ON CLIMATE PROTECTION

Mayor Hornaday came back to Homer ready to make the town a national leader in climate protection – starting with the creation of the Homer Global Warming Task Force (GWTF). The City Council approved Resolution 06-141(A) in January 2007, officially commissioning the GWTF to study and make recommendations to City Council on how to reduce greenhouse gas emissions and reduce the impact of climate change on Homer's environment, economy, infrastructure, and future development. Seeking logistical and technical guidance, Homer joined ICLEI-Local Governments for Sustainability USA in March 2007 under the Cities for Climate Protection campaign. Later, Homer also agreed to be one of five local governments helping to develop ICLEI's Climate Resilient Communities program (for more details on the Climate Resilient Communities program, visit www.icleiusa.org/programs/climate/climate-adaptation).

A PLAN FOR MITIGATION AND ADAPTATION

As part of Homer's involvement in the Cities for Climate Protection and Climate Resilient Communities programs, the City created the Homer Climate Action Plan (CAP), which was completed by the GWTF, Homer City staff, and an intern (generously funded though the University of Alaska and the U.S. EPA's Pollution Prevention Program) and released with support from the Mayor and City Council in December 2007.

To ensure the report's success, the City of Homer worked closely with a number of stakeholders, including the Alaska Marine Conservation Council, Sustainable Homer, Homer Chamber of Commerce, Alaska Conservation Solutions, Alaska Islands and Ocean Visitor Center, and ICLEI. The comprehensive report includes background on the scientific consensus surrounding climate change, a baseline assessment of greenhouse gas emissions in Homer, emissions reductions targets, mitigation measures, and recommended actions for adapting to a changing climate. To review the report, visit www.ci.homer.ak.us/CLPL.pdf.

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IDENTIFYING CLIMATE IMPACTS

A key component of Homer's action planning was utilizing the latest scientific projections of global and regional changes in climate. Whiles these projections generally have a high level of certainty, the City grappled with the fact that most of these models are not designed to project finely detailed climate changes and associated impacts at the local level. This gap in knowledge can create challenges for communities that are considering working on adaptation.

Nevertheless, Homer understood the importance of identifying local impacts using state projections and incorporating high-level adaptation and sustainability principles into their planning process from the onset. As such, the Homer CAP utilizes scientific climate projections for Alaska from several well-respected sources, including the U.S. Global Change Research Program (USGCRP), the Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC AR4), and the Alaska State Legislature's Alaska Climate Impact Assessment Commission." [1,2,3]

Using the aforementioned climate projections, the Town of Homer identified the following climate change impacts:

- Disruption of commercial fisheries due to ocean acidification and warming waters
- Damage to infrastructure from more frequent and severe storms
- Water shortages resulting from changes in surface water availability due to reduced snowpack and increased evaporation
- Increased coastal erosion from rising sea levels and storm events
- Increased risk of flooding from rising sea levels and extreme weather events
- Increased wildfire risks due to hotter, drier conditions
- Heavy infestation of spruce trees by bark beetles
- Changes in agriculture due to warmer temperatures and longer growing seasons
- Shifting tourism patterns and potential population growth from "climate refugees"

In addition to these identified impacts, the City is communicating with researchers at the University of Alaska-Fairbanks' Center for Climate Assessment and Policy, who are collaborating with additional scientists to further study regional and local climate change impacts and communicate results to policy makers. Homer also has a keen eye on research taking place through the Kachemak Bay National Estuarine Research Reserve on the extent of isostatic rebound, the rise of land that was previously depressed by a retreating glacier, in Homer and throughout the Kachemak Bay area.

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ADAPTATION ACTIONS AND PRIORITIES

Once climate change impacts were studied, Homer was able to determine a core set of adaptation actions and priorities, organized using three main goals:

1. Protect existing infrastructure

- Take proactive measures to protect or relocate at-risk infrastructure
- Develop management plans for Port & Harbor facilities on the Homer Spit (construction, maintenance, dredging, etc.) that take into account climate impacts
- Keep up to date on sea level rise, storm surge, and coastal/bluff erosion.

2. Undertake emergency preparedness measures

- Inventory storm water runoff system, identify problem areas, and ensure it can handle increased frequency of extreme weather events
- Increase fire fighting capability, for both wildfire and structural fires
- Protect the ability of wetlands and the watersheds to store water, which will give protection from extreme weather.

3. Adopt wise policies for future development

- Institute smart growth management policies to maximize benefits of any population changes
- Enact restrictions that prevent development on erosion-prone slopes and bluffs
- Encourage water conservation and assess the City's future drinking water needs
- Consider climate change in all long-range planning efforts (transportation, land use, Homer Spit, emergency management, economic development).

AN EFFECTIVE ADAPTATION STRATEGY

The Homer Climate Action Plan has been in existence for almost three years now, and Homer has found that the most effective adaptation strategy so far has been to address current problems with the knowledge that climate change may make presently experienced impacts more severe. The City has not yet proposed major changes or relocation of low-lying infrastructure (e.g., at the Port and Harbor), due to the significant cost involved and uncertainty regarding future sea level rise. However, progress can be made by making low-cost upgrades to projects already in the planning phase for various infrastructure components. For example, Homer experienced two floods in the fall of 2002 that exceeded the level of flood water expected every 100 years on average. As a result, projects were planned to lessen flood risk. Taking into consideration future increases in flood severity and frequency due to climate change, certain culverts in need of repair or replacement were replaced with larger culverts or expanded bridges.

The City's reservoir and drinking water system are also presently stressed, due largely to increases in population and tourism along with warmer temperatures that have reduced water availability. Homer has addressed these existing issues in both their Capitol Improvement Plan and Water-Sewer Master Plan, calling for system improvements and development of a new water source. Knowing that elevated temperatures and increased evaporation due to climate change will continue to exacerbate the problem, Homer has identified the importance of finding a solution that can meet future needs while also accommodating a changing climate.

Additionally, warmer, drier conditions in the forests surrounding Homer have heightened the risk of wildfires. Knowing that this climate trend is projected to continue has helped the City establish a high priority status for a new firefighting truck, additional equipment, and fire engine refurbishment along with training. Homer has also recognized that current coastal erosion will also worsen due to climate change, and that maintenance and repair of sea-walls can get costly. As such the City decided that additional measures such as new Steep Slope Ordinances and limits on development in certain areas were needed.

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ADAPTATION-MITIGATION SYNERGIES

As advised in the CAP, Homer established a Sustainability Fund using money donated by local citizens, with additional funds appropriated by the City Council. Later the Council created a Revolving Energy Fund with money transferred from depreciation reserve accounts, essentially taking the place of the Sustainability Fund. Homer is receiving additional funding via the federal Energy Efficiency and Conservation Block Grant program. Financial savings from increased energy efficiency and conservation in City operations due to Homer's mitigation efforts will also be allocated to the Revolving Energy Fund, to be used for further efficiency, conservation, and renewable energy projects. The Fund's guiding documents do not currently have specific language that acknowledges adaptation directly, but City staff understand that that there are several important synergies that exist between greenhouse gas emissions reduction strategies and efforts to prepare for climate change impacts.

Current issues such as uncertainty regarding the availability and cost of fossil fuels will likely be more pronounced as the climate changes and more emphasis is placed on reducing greenhouse gas emissions. By investigating possibilities for renewable energy generation, Homer aims to realize multiple benefits. Homer was recently approved for funding for a project to asses the tidal energy potential and development feasibility of several sites in Kachemak Bay, which would result in a comprehensive tidal, energetic, and circulation flow model of the entire Kachemak Bay region. The project could help diversify the economy by establishing local expertise in the tidal power industry, while also helping move toward energy security and reduced dependence on fossil fuels. Any effort explored by the City to reduce energy consumption will result in benefits for both the City's mitigation and adaptation efforts.

Another opportunity that Homer recognizes could both mitigate climate change and make Homer less vulnerable to climate change impacts is the ability to increase local, sustainable agriculture. Climate change will have strong impact on agricultural production worldwide, causing potential disruptions or cost increases in food supply for communities located far from their food source. Encouraging community needs to be met via locally owned businesses and locally produced products will reduce greenhouse gas emissions from transportation while also increasing resilience to changes in world markets and world food supply.

ADAPTING TO AN UNCERTAIN FUTURE

Homer still has much adaptation work that needs to be done to ensure preparedness for and resilience to climate change impacts. However, the City has been swift to engage in the process of resilience planning and in the face of uncertain impacts, has been able to complete concrete, justifiable adaptation actions. Strong political support from the Mayor and City staff, and support from community volunteers, has been essential to Homer's success. Including the public in the development of the Climate Action Plan through news announcements, draft distribution to community groups, comment periods, and open presentations and discussion forums, was extremely helpful in gaining momentum for the process. The City has remained involved in community education and outreach efforts through participation in state and local symposiums and networking events addressing climate change and continues to work to improve public understanding of the climate system and how climate action can save money, improve public safety, and support economic development.

In addition to the City's great work to date, they realize that information about how the climate is and will change and the associated impacts is likely to keep evolving. As such, the City will continue to study climate science and revise and revisit existing plans to ensure that climate considerations are effectively integrated.

[1] http://globalchange.gov/publications/reports/scientific-assessments/us-impacts/download-the-report

[2] http://www.ipcc.ch/publications_and_data/ar4/wg2/en/contents.html

[3] http://nccsp.org/scientific_knowledge/climate%20impacts%20-%20alaska.pdf