PREPARING FOR AND ADAPTING TO CLIMATE CHANGE IMPACTS: NEXT STEPS FOR THE WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES AQUATIC RESOURCES PROGRAM

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Introduction and Background

In response to a growing body of research on projected climate change impacts to Washington State's coastal areas, the Washington State Department of Natural Resources' (DNR) Aquatic Resources Program (the Program) initiated a climate change preparedness effort in 2009 via the development of a Climate Change Adaptation Strategy (the Strategy)[i]. The Strategy answers the question "What are the next steps that the Program can take to begin preparing for and adapting to climate change impacts in Washington's coastal areas?" by considering how projected climate change impacts may effect: (1) Washington's state-owned aquatic lands[ii], (2) the Program's management activities, and (3) DNR's statutorily established guidelines for managing Washington's state-owned aquatic lands for the benefit of the public.

The Program manages Washington's state-owned aquatic lands according to the guidelines set forth in Revised Code of Washington 79-105-030, which stipulates that DNR must manage state-owned aquatic lands in a manner which provides a balance of the following public benefits:

(1) Encouraging direct public uses and access;
(2) Fostering water-dependent uses;
(3) Ensuring environmental protection;
(4) Utilizing renewable resources. (RCW 79-105-030)

The law also stipulates that generating revenue in a manner consistent with these four benefits is a public benefit (RCW 79-105-030).

Many of the next steps identified in the Strategy build off of recommendations provided by earlier climate change preparation and adaptation efforts in Washington State, most notably those provided by the Preparation and Adaptation Working Group, which were convened by Washington State Executive Order 70-02 in 2007, and those made in the Washington Climate Change Impacts Assessment (Climate Impacts Group, 2009).

Increasing the resiliency of state-owned aquatic lands and the Aquatic Resources Program

The Strategy identifies numerous threats and management issues associated with projected climate change impacts. To respond to these threats and issues, the following next steps are recommended to increase the resiliency of state-owned aquatic lands and the Program. These recommended next steps fall into two categories: (1) building adaptive capacity, (2) implementing adaptive actions. Actions aimed at building adaptive capacity aim to overcome institutional, legal, technical, cultural, fiscal, and other barriers to planning for climate change (Climate Impacts Group, 2009). Specific adaptive actions are recommended to reduce identified climatic vulnerabilities.

Building Adaptive Capacity

To build the adaptive capacity of the Program, DNR should begin by articulating a formal, agency-wide climate change preparedness message, which clearly establishes the agency's approach to addressing climate change. Establishing the agency's climate change message is an important first step towards integrating climate change preparedness into DNR's institutional culture, and would provide a strong foundation for initiating future climate change preparedness efforts. Second, staff time should be dedicated to preparing for climate change, specifically to mainstreaming climate change information into all aspects of the Program, since Washington State law requires state agencies to "strive to incorporate [climate change] adaptation plans of action as priority activities when planning or designing agency policies and programs."[iii] The successful incorporation of climate change considerations into staff's daily work should be one of the criteria used to evaluate staff performance.

In addition, DNR staff should continue to engage in adaptation and preparation activities at the State and regional levels. Specifically, the Program should advocate within DNR to ensure Program participation in the development of Washington's integrated climate change response strategy, as mandated by State law.[iv] At the regional level, DNR

should continue its involvement in regional efforts like the West Coast Governors' Agreement on Ocean Health Climate Change Action Coordination Team. Participation in regional initiatives allows for the leveraging of other State and federal resources, which is essential in today's fiscally constrained environment.

The Program should also encourage the establishment of a formal venue or process for interagency coordination and collaboration to prepare for climate change in Washington's coastal areas. A formalized structure for interagency coordination is essential in the coastal zone, where considerable overlap of agency authority and jurisdiction exists. Without effective interagency collaboration, Washington State runs the risk of developing a disjointed or inconsistent approach to adapting to and preparing for climate change.

Finally, the Program should partner with other entities (e.g., universities, Washington Sea Grant) to promote research on the potential effects of climate change on Washington's shellfish species, including geoducks. At present little or no research has been undertaken to determine how vulnerable geoduck may be to climate change. As a co-manager of the wild stock geoduck fishery, DNR should initiate research on the potential impacts of climate change to the fishery. Other shellfish (e.g., oysters, clams) are also of great economic and cultural significance in Washington State; while some research exists on how climate change may impact these species, much more research is needed. DNR should encourage further research on how projected climate change impacts like warmer sea surface temperatures and changing ocean pH may impact shellfish.

Implementing Adaptive Actions

In addition to increasing the adaptive capacity of the Program, DNR should work to increase the resiliency of Washington's state-owned aquatic lands and the Program by implementing specific adaptive actions. First, it is vital that DNR begin to inform lessees of state-owned aquatic lands about the risks associated with projected climate change impacts. DNR leases are frequently 30-year leases, so tenants signing leases today can reasonably expect to see the effects of climate change during their lease period. Similarly, DNR land managers should begin considering sea level rise when reviewing existing uses or authorizing new uses. Specific guidance for land managers on how to incorporate sea level rise into the review process should be developed.

DNR should also prioritize the implementation of adaptive management, and should increase funding for monitoring accordingly. Adaptive management is the ideal management approach for natural resource managers coping with climate change, as it allows for optimal decision-making in the face of uncertainty (Glick et al. 2009). The Program's Stewardship Science Program is already developing an adaptive management implementation plan; this effort should be strongly supported.

In addition, DNR must work to implement policies that increase the ecological resilience of the nearshore environment. Climate change will likely place coastal habitats and species under considerable stress. One way to minimize the effect of climatic stressors is to reduce the presence of other, non-climatic stressors like pollution and invasive species. DNR already works diligently to reduce non-climatic stressors through initiatives like its Habitat Conservation Plan, the Derelict Vessel Removal Program, the Invasive Species Program, Contaminated Site Clean Up, and the Creosote Removal Program. To augment these existing efforts, DNR should continue its ongoing work with the Puget Sound Partnership and the Puget Sound Nearshore Restoration Project (PNSERP), and work to address some of the other challenges facing the nearshore environment, such as non-point source pollution and unauthorized outfalls. DNR can also increase ecological resilience by increasing restoration and conversation efforts, with a focus on restoring or enhancing ecological function and processes, and protecting biological diversity (Glick et al. 2009). DNR has several conservation tools to employ, including the designation of withdrawn areas, conservation leasing, and its Aquatics Reserves Program.

The initial scoping conducted in the Strategy revealed that climate change threatens to inhibit DNR's future ability to provide a balance of public benefits as articulated in RCW 105-79-105. Accordingly, DNR should work to foster new uses which provide public benefits and may be less vulnerable to climate change than existing uses. For example, the Program could diversify the way it provides the public benefit of utilizing renewable resources by encouraging the development of wave and tidal energy on state-owned aquatic lands, as hydrokinetic energy is a renewable resource. DNR could also encourage the cultivation of more climate-resilient strains of shellfish as a way of continuing to promote the utilization of renewable resources via shellfish aquaculture and harvesting of wild shellfish (Climate Impacts Group, 2009).

Finally, DNR should work to promote a policy of managed retreat in response to sea level rise. Managed retreat allows coastal environments to migrate landward unimpeded as beaches and bluffs erode or water levels rise (Climate Impacts Group, 2009). Under a managed retreat scenario, waterfront structures and infrastructure are demolished and relocated farther inland as the sea advances, thereby allowing coastal habitats a chance of survival. While challenging to implement for a variety of reasons, a policy of managed retreat should be pursued by DNR wherever possible, as it will almost certainly ensure a greater degree of ecological resilience for the nearshore environment than any other response to sea level rise. The Program should seek to establish buffer areas that would allow for the landward migration of coastal environments through the use of conservation easements and other devices. Another option would be the implementation of rolling easements,[v] which are already in use in the States of South Carolina, Texas, and Hawaii.

Conclusions

DNR must proactively prepare for the projected impacts of climate change in order to ensure it will be able to meet its statutorily mandated management guidelines in coming decades. The recommendations provided here should be seen as the first steps towards developing a more detailed and comprehensive climate change adaptation effort.

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[i] This paper summarizes the recommendations provided in the Strategy. To read the entire Strategy, please see: http://www.cses.washington.edu/db/pdf/fredricksonthesis682.pdf

[ii] Washington's state-owned aquatic lands are aquatic lands held in public trust and managed by DNR's Aquatic Resources Program; they include tidelands, shorelands, harbor areas and beds of navigable waters. See Revised Codes of Washington 79.105.060.

[iii] Chapter 519, Session Laws of Washington for 2009, http://www.leg.wa.gov/CodeReviser/documents/sessionlaw/2009pam3.pdf

[iv] Ibid.

[v] James Titus coined the term "rolling easement" in his 1998 article, "Rising Seas, Coastal Erosion, and the Takings Clause: How to Save Wetlands and Beaches without Hurting Property Owners." When a rolling easement is in place, coastal property owners build and use waterfront property with the understanding that they will not be permitted to protect their property with the use of armoring or stabilization structures if erosion or inundation occurs. As the sea advances, the easement automatically moves or 'rolls' landward. In this way, coastal environments can naturally migrate landward, allowing for the preservation of nearshore habitat. Public use and access of the coastlines is also preserved where rolling easements are in place.