

HB 1303 Coastal Sector Scope

Climate Impacts Group, University of Washington

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Background/Sector Description

The coastal sector includes the entire Washington State coastline, including the outer coast from the Columbia river mouth in the south to Cape Flattery, the Willapa Bay and Grays Harbor shorelines, the Strait of Juan de Fuca and San Juan Islands, the mainland shore from the Canadian border to Fidalgo Island, the Whidbey Basin, and Puget Sound proper. This sector includes the State's largest cities and ports, numerous smaller towns, some of which are on very low elevation terrain, rural areas with many shoreline homes (San Juans, Whidbey Is.), large agricultural districts (Skagit Delta), marine sanctuaries, and oil refineries, and expansive mudflats supporting shellfish aquaculture, and providing nursery areas for marine organisms (e.g. crab). Rising sea levels and sea temperatures are likely to inundate low-lying nearshore lands, increase erosion of beaches and bluffs, and alter the dynamics of coastal ecosystems. Consequently, climate change may have large impacts on coastal agriculture, port operations, coastal residential properties, roads, water supply from aquifers, and nearshore fish and shellfish.

Motivating Questions

Key questions are (a) To what extent will rising sea levels and ocean temperatures impact coastal areas through inundation, increased flooding, and/or erosion? (b) How will specific vulnerable areas, such as the Port of Seattle, downtown Olympia, the Skagit Delta, and key areas of Willapa bay be affected? (c) How will shellfish aquaculture be impacted? and (d) How can the negative impacts of CC be reduced through adaptation?

Research Approach

This research will build upon the work of Peterson(2007), Canning (2006), and others to quantify the likely impacts in Washington State of sea level rise, and associated coastal erosion and saltwater intrusion into coastal freshwater aquifers. The research will focus on specific regions and economic sectors expected to experience high levels of impact: (a) Ports of Seattle, Tacoma, and Olympia; (b) the Skagit Delta and Fidalgo Island; (c) Willapa Bay (Long Beach/Ocean Park, South Bend/Bay Center); (d) Grays Harbor (Ocean Shores); and (e) shellfish aquaculture tracts in Willapa Bay and Puget Sound. For each of these major sectors of climate impact we will accumulate available evidence for each sector from published and un-published information. Further, we will collect site-specific information and perspectives through conversations and collaboration with key local personnel. Coastal maps will be updated, as feasible, with tide gauge data, and coastal flooding will be forecasted consistent with the range of predicted SLR. Potential effects on salinization of coastal freshwater aquifers, and hence water supplies, will be examined. Finally, this body of information will be interpreted to quantify impacts and ranges of uncertainty associated with each impact consistent with predicted SLR in JISAO/CIG climate change scenarios.

Generally, estimating impacts will require some consideration of human adaptation to climate changes. For example, with no mitigation or retreat from likely inundation or erosion (i.e. "business as usual" or BAU), the impacts are likely to have greater economic consequences than with gradual and measured actions to avoid inundation and/or erosion (Yohe, 2000). With foreknowledge of an expected range of SLR, private landowners, coastal management planners, and county/local land use regulators can make a number of decisions which will reduce the impact of SLR. Hence, the impact assessment can begin by

assuming no adaptation to SLR, but we will also seek to develop reasonable expectations for future human actions that can be directly and clearly tied to plausible assumptions about adaptation to climate change. To the extent possible, these assumptions will be developed with the local collaborators listed above. Direct impacts will include extent of facilities and resources affected by coastal inundation, magnitude of water supply aquifers damaged by saltwater intrusion, and degree that shellfish tracts could experience reduced production.

Expected Results

1. An assessment of the impacts of sea level rise under the “business as usual” scenario will be examined in the context of several “hotspots” likely to experience serious problems: Puget Sound Ports, coastal communities on coastal bays and accreted sediments; the Skagit delta; and shellfish culture tracts.
2. A description and discussion of feasible adaptations to reduce the magnitude of impacts of sea level rise will be developed in collaboration with local entities. Legal and institutional barriers to adaptation will be identified.
3. In coordination with other tasks at CIG, the implications of climate change for ocean circulation and coastal ecosystems will be identified, and impacts on Puget Sound and coastal fisheries and aquaculture will be quantified.
4. Finally, the economic consequences of climate impacts would be explored and quantified to the extent feasible with information that is available. Given plausible scenarios of adaptation to SLR, we will provide some rough assessments of how planning and adaptation may reduce the economic costs associated with SLR. Legal and institutional dimensions of planning and adaptation to SLR will be explained and appropriate responses identified.

We expect items (1) and (2) to be in reasonable shape for inclusion in the draft report due in December 2007. The remaining two items will be fleshed out and written up for the final report in December 2008.

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Potential Collaborators:

Staff from Puget Sound Ports
Skagit River System Cooperative
Coastal City planning and water utility officials (Long Beach, Ocean Park, South Bend)
Oyster Growers - Taylor Shellfish, Pacific Shellfish Institute

