Washington's Ocean Action Plan:

Enhancing Management of Washington State's Ocean and Outer Coasts

Volume 2: Final Report of the
Washington State Ocean Policy Work Group

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Washington State Ocean Policy Work Group
Final Report: Volume 2

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Forks Chamber of Commerce; Grays Harbor Community College;
Ilwaco Charter Association; Jamestown S'Klallam Tribe;
Jessie's Ilwaco Fish Co., Inc.; Lower Elwha Klallam Tribe; Makah Tribe;
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Ocean Shores Interpretive Center; Ocean Shores Public Schools;
Olympic Coast National Marine Sanctuary;
Olympic Coast National Marine Sanctuary Advisory Council;
Olympic Coast Alliance; Olympic Environmental Council;
Olympic Natural Resource Center – University of Washington;
Olympic National Park; Pacific County Economic Development Council;
Peninsula College; People for Puget Sound; Port Angeles Public Schools;
Ports: Friday Harbor, Grays Harbor, Ilwaco, Peninsula,
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Quileute Tribe; Quinault Indian Nation;
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San Juan County Visitor's Bureau; San Juan Island Marine Resources Committee;
San Juan Safaris; SeaDoc Society – University of California Davis;
Surfrider Foundation; Tulalip Tribe;
U.S. Fish and Wildlife Service – National Wildlife Refuges;
Washington SeaGrant – University of Washington;
Washington Public Ports Association; Washington State University Extension;
Washington Trollers Association; Westport Charter; Westport Shipyard

[1] *This contains a partial list of the organizations that participated in outreach meetings and/or provided comments to the Ocean Policy Work Group. Many private citizens also participated in public outreach meetings.*

Acronyms

CAO	Critical Areas Ordinance, developed by local communities as part of the Growth Management Act
COP	Committee on Ocean Policy
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
CTED	Washington State Department of Community Trade and Economic Development
DNR	Washington State Department of Natural Resources
DOH	Washington State Department of Health
DOT	Washington State Department of Transportation
Ecology	Washington State Department of Ecology
EBM	Ecosystem-based Management
EMD	Emergency Management Division, Washington State Military Department
EPA	US Environmental Protection Agency
GMA	Growth Management Act
IOOS	Integrated Ocean Observing System
JSOST	Joint Subcommittee on Ocean Science and Technology
NANOOS	Northwest Association of Networked Ocean Observing Systems
NOAA	National Oceanic and Atmospheric Administration
OCNMS	Olympic Coast National Marine Sanctuary, or the Sanctuary
OPWG	Washington State Ocean Policy Work Group
ORMA	Ocean Resources Management Act
OSAC	Oil Spills Advisory Council
PSAT	Puget Sound Action Team
RSM	Regional Sediment Management
SIMOR	Subcommittee on Integrated Management of Ocean Resources
SMA	Shoreline Management Act
State Parks	Washington State Parks and Recreation Commission
USACE	United States Army Corps of Engineers
USCOP	United States Commission on Ocean Policy
USFWS	US Fish and Wildlife Service
WDFW	Washington State Department of Fish and Wildlife

Volume 2: Final Report of the Ocean Policy Work Group

The Ocean Policy Work Group's final report contains two volumes.
This publication is Volume 2.

Volume 2:

- USCOP Recommendations – Many of the USCOP's recommendations apply to state management issues. This chapter provides a review of the recommendations applicable to state management. It also summarizes how the state currently manages the issues outlined in the "State of Ocean & Coastal Resources" and issues for USCOP topics not specifically selected by the OPWG for further analysis or recommendations.

- Public Comment Summary – The OPWG conducted outreach to coastal communities to gather input on ocean and coastal resource issues. This chapter offers a summary of comments received during outreach sessions.

- Recommendations – Six recommendation chapters constitute the bulk of Volume 2. These chapters contain the OPWG recommendations and relevant background on the problems and management gaps the recommendations address. The OPWG chose to address issues under the following headings:
    - Marine Resource Stewardship
    - Coastal Vulnerabilities from Marine Sources
    - Coastal Pollution
    - Ocean Research, Observing, and Education
    - Sustainable and Resilient Communities
    - Governance

For information on the following topics, please see Volume 1 of the final report.

Volume 1:

- Introduction – This provides context on ocean issues nationally and on formation of the Ocean Policy Work Group.

- State of Ocean Resources & Coastal Communities – As required by the budget proviso, this chapter summarizes the status of Washington State's ocean resources and coastal communities and their contribution to the state's character, quality of life, and economic viability.

- Key Recommendations – A list of the Ocean Policy Work Group's high priority recommendations.

Executive Summary

Oceans are making waves in the headlines. In summer of 2006, scientists discovered an extensive collection of deep-sea corals just off Washington's coast and within the Olympic Coast National Marine Sanctuary.[2] Many of the corals appeared damaged or destroyed - scientists suggested fishing disturbance as a likely cause. Unfortunately, much of the news indicates troubling signs for oceans. The *Seattle Post-Intelligencer* reported that researchers conducting annual West Coast counts of seabirds, fish, and other marine animals found sea life unusually scarce in 2006 – for the second year in a row.[3] The *National Geographic* featured an article in July 2006 entitled, "Our Coasts in Crisis," detailing the many threats our ocean and coastal resources face. Finally, accumulating evidence suggests that Washington's outer coast is developing a periodic "dead zone" – an area of water with low oxygen that can suffocate marine life.[4]

Washington's character, quality of life, and economic viability rely, in part, on its outer coast and ocean resources. These majestic and significant resources maintain cultural identities, provide recreational opportunities, sustain our economy and coastal communities, inspire the general public and researchers alike, and supply valuable food. Habitats on outer coast and ocean are some of the highest quality and most diverse in the state. Our rocky coastlines, sandy beaches, inland bays, estuaries, offshore islands, and open-ocean are home to a stunning array of wildlife. Washington's outer coast and ocean are home to some of the best quality marine resources left in our state – the need to protect, understand, and manage them appropriately is of paramount importance.

- Fishery landings in Washington's outer coast ports produced over $44 million in ex-vessel revenue in 2005.
- Oyster aquaculture in Willapa Bay and Grays Harbor accounts for over two-thirds of the state's oyster production – with a value of $13.9 million in 2005.
- Ocean and coastal resources support a wide array of recreational and cultural activities that attract numerous tourists. Over half of the state's residents visit a beach at least annually. Tourism is one of the largest employers on the outer coast, providing between 9 and 17 percent of the jobs.
- In 2005, over 10,000 ships, tankers, barges, or carriers passed through the Strait of Juan de Fuca.

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[2] Welch, Craig. June 27, 2006. "Colorful coral seabeds a 'breathtaking' discovery." *Seattle Times.*
[3] Kay, J. *San Francisco Chronicle*. In: June 30, 2006. "Annual count shows scarcity of sea life." *Seattle Post-Intelligencer*.
[4] *Peninsula Daily News.* July 30, 2006. "Marine 'dead zone' killing fish, crabs."

With its high population and highly urbanized areas, the Puget Sound tends to have greater problems with water pollution, stormwater runoff, and toxic sediments. However, Washington's outer coast is not immune from marine resource issues that require research and management. Researchers found more aquatic invasive species, such as *Spartina* (a foreign salt marsh grass) and the European green crab, in Willapa Bay than in sites studied in Puget Sound. Toxic algal blooms routinely pose threats to human health and commercial and recreational shellfish harvesting. Coastal hazards such as flooding, erosion, tsunamis, and landslides put lives, property, and coastal infrastructure at risk.

The state must respond to emerging ocean resource issues as well. During July 2006, for example, tribal fishermen frequently hauled up dead crabs in crab pots, observed unusual numbers of dead fish washed up on beaches, and found deepwater fish in shallow tide pools. Researchers discovered the possible cause - low oxygen in the water on the outer coast. This suggests a new and possibly growing seasonal water quality problem that requires greater monitoring and research.

Ocean and coastal resources face increasing pressures from human uses. Impacts from development, population growth, pollution, climate change, and over-use of resources can cause populations of species to decline and degrade the habitats upon which they rely. These impacts can also threaten human health, safety, property, and livelihoods. To preserve and enhance our quality of life, Washington needs to protect and restore our ocean resources and create sustainable coastal communities.

A few years ago, two national, blue-ribbon commissions - the Pew Commission and the U.S. Commission on Ocean Policy - provided voluminous recommendations on improving management of our oceans and coasts. In response to these efforts, the Governor's Office established the Washington State Ocean Policy Work Group in 2005 to: 1) summarize the status of Washington's ocean resources and their value to the state's economy, cultural identity, and quality of life and 2) provide recommendations for improving protection and management of the state's ocean resources.

Given the significant efforts of groups such as the Puget Sound Partnership, the Ocean Policy Work Group chose to not duplicate work and instead focused its efforts on Washington's outer coast and straits. A few issues overlap with the work of these other groups, which requires on-going coordination between the resource issues that these groups have in common.

Values of Ocean Resources

Washington's ocean resources provide many benefits to our state's economy, quality of life, and culture, including:

- Employment & Economy
- Fisheries & Aquaculture
- Tourism & Recreation
- Marine Transportation & Ports
- Cultural & Historical Preservation
- Research & Education
- Human Health & Biodiversity
- Offshore Energy & Minerals
- Aesthetics and other non-market values

What is the State of Our Ocean Resources & Coastal Communities?

Oceans and coasts are dynamic places. Currents, tides, storms, waves, and eddies shape the ocean and coastal environment. Washington's coast is geologically active and presents many natural hazards such as landslides, erosion, earthquakes, flooding, and tsunamis. Any future climate changes will also impact ocean resources and coastal communities with higher sea levels, more frequent flooding, greater wave energy and erosion, and altered chemistry of the ocean.

Fragmented research and lack of monitoring has resulted in gaps in our understanding and prediction of ocean processes limiting the effectiveness of resource management. The state needs coordinated, prioritized research and increased monitoring to better understand and predict how the ocean and its resources behave, fully realize the ocean's influence on us and our influences on it, and determine the best way to adapt our management of the ocean's precious resources.

Status of Coastal Communities

For thousands of years, area tribes utilized ocean and marine resources for subsistence, culture, and economy. Today, treaties preserve tribes' access to and continued reliance on these vital resources.

In the past, coastal communities relied heavily on natural resources to support their economy. These communities continue to make use of these natural resources, but tourism, recreation, and development constitute a growing part of their economy. However, many coastal communities are currently struggling with higher unemployment and lower incomes than the state average. Growing retirement populations are also reshaping coastal communities.

Status of Habitats

The outer coast and ocean has many diverse habitats including estuaries and bays, rocky intertidal, sand dunes, sand and gravel beaches, kelp beds, submarine canyons, coastal waters, and the continental shelf. Many of these habitats are protected as nature reserves, national wildlife refuges, national parks, and marine sanctuaries. Threats to habitats include development, climate change, invasive species, pollution, recreation, and resource extraction – their impacts can result in degraded or lost habitats and can even affect protected habitats.

Status of Species

Washington's outer coast and straits are home to an amazing variety of wildlife and plants - from Northwest icons such as orca whales and salmon to playful sea otters, colonies of seabirds, amazing invertebrates, and rare deep-sea corals. Some of the largest nesting colonies of seabirds in the nation are located in the islands off Washington's coast. Declining populations pose threats to many our state's marine and ocean species. Many species are endangered or threatened including several stocks of salmon and many marine mammals. However, some marine mammal populations appear to be recovering after near extirpation at the beginning of the 1900s. Some stocks of commercially important fish appear to be healthy and sustainable, while others are currently considered depleted.

Key Recommendations

The Washington State Ocean Policy Work Group (OPWG) examined a wide range of ocean and coastal issues including: scientific research and monitoring, sustainable fisheries, education, ecosystem-based management, ocean energy, aquaculture, coastal hazards, erosion and sediment management, climate change, derelict fishing gear, oil spills, sustainable and resilient coastal communities, and how to effectively manage and govern ocean and coastal resources.

In developing their recommendations, the OPWG sought public input from coastal communities and stakeholders. Volume 1 of the final report summarizes the status and values of Washington's ocean resources and offers a highlight of the key recommendations for immediate action. Some of these key recommendations include:

- Establishing a collaborative governance process to continue coordinated management of ocean resource issues
- Prioritizing ocean research and monitoring by developing a strategic plan
- Increasing collection of groundfish and benthic habitat data
- Improving marine safety through better weather and ocean information by seeking support for Doppler RADAR and buoy sensors
- Conducting a detailed ecosystem assessment to facilitate ecosystem-based management
- Educating the general public and children about our ocean resources

In Volume 2 of the final report, the OPWG provides background on current state management and issues, summarizes public comments received, and presents over 50 recommendations for improving management, coordination, and financing of Washington's ocean and coastal resources.

Goals for Washington's Ocean & Coastal Resources

The Ocean Policy Work Group developed the following goals to broadly capture their work and recommendations:

1. Manage the state's ocean and coastal areas to protect valuable marine resources and maintain ecosystem health while ensuring the vitality of coastal communities, through: effective, sustainable fisheries management; development of a state marine aquaculture policy; use of ecosystem-based management; and investigation of developing renewable ocean energy technologies.
2. Protect the coastal environment and its communities from the threats of marine hazards, such as storm surge and tsunamis, the effects of global climate change, and increased erosion, through improved research and management and increased planning efforts. Through state work, ensure continued coordination to prevent and manage pollution and marine debris.
3. Enhance the sustainability and resiliency of outer coast communities through appropriate economic development practices that honor the historical practices of the past, maintain present successes, and plan for future uses to maximize benefits to the state's residents.
4. Increase state attention on ocean-related scientific research and observation practices that satisfy coastal management needs while furthering integrated and coordinated scientific knowledge of the state's marine environment.
5. Inform all state citizens of the vital importance of the state's ocean resources by collaborating on ocean literacy programs in state K-12 education and expanding public outreach on ocean issues.
6. Create a state interagency team on ocean policy to coordinate state policy and consult and collaborate with tribes, local government, ports, and interested citizens.

Conclusion

Washington's ocean resources are essential to our culture, quality of life, and economic health. They provide abundant opportunities, yet face a myriad of threats. We have the chance to steer a better course for our oceans and ourselves. As we face new and emerging issues, managing our ocean resources effectively for the next century and beyond will take action including: a renewed commitment, new management paradigms, sustained research and monitoring, better coordination and cooperation, and planning. We must renew our vow to protect and restore Washington's ocean resources and create sustainable, resilient coastal communities.

U.S. Commission on Ocean Policy Recommendations: how they apply to state management of ocean and coastal resources

U.S. Commission on Ocean Policy

In 2004, the U.S. Commission on Ocean Policy completed a comprehensive review of ocean-related laws and issues. The Commission held sixteen public meetings around the country and conducted eighteen regional site visits, receiving testimony, both oral and written, from hundreds of people. From these meetings the Commission received a clear message that our oceans, coasts, and Great Lakes are in trouble and we need major changes to the way we manage them. As a result, the Commission presented over 200 recommendations, each one calling on specific responsible parties to act on and account for its progress. The USCOP developed thirteen fundamental guiding principles including sustainability, stewardship, ecosystem-based management, preservation of marine biodiversity, and participatory governance (see sidebar for complete list[5]).

The Commission directed most of their recommendations at Congress, the executive branch leadership, and federal agencies. At the same time, the USCOP also acknowledged **the need for full state, tribal, territorial, and local participation in ocean policy development and implementation**. Since many of the nation's most urgent ocean and coastal issues are local or regional in scope, they require the active involvement of state and local policy makers, as well as a wide range of stakeholders.

U.S. Commission on Ocean Policy's Guiding Principles

- Sustainability
- Stewardship
- Ocean–Land–Atmosphere Connections
- Ecosystem-based Management
- Multiple Use Management
- Preservation of Marine Biodiversity
- Best Available Science and Information
- Adaptive Management
- Understandable Laws and Clear Decisions
- Participatory Governance
- Timeliness
- Accountability
- International Responsibility

[5] See Appendix B for the Commission's definitions of these guiding principles.

Recommendations for States

The USCOP envisioned a central role for states in developing an integrated, coordinated, and comprehensive national ocean policy. Throughout their recommendations, they indicate areas for state involvement such as:

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- **formal and informal ocean education** at all levels, including outreach to underrepresented and underserved communities.
- **creation of regional ocean councils** to help coordinate federal, state, tribal, and local planning and action, and designation of regional ocean information programs to supply the information needed to support ecosystem-based approach.
- **improved management of coastal areas**, including incorporation of coastal watersheds to achieve better pollution control, growth management, hazards mitigation, transportation planning, sediment management, and habitat conservation and restoration.
- development of a prioritized, comprehensive plan for **upgrading the nation's aging and inadequate wastewater and drinking water infrastructure**, including improved stormwater management.
- **coordination of a national monitoring network** and creation of useful products based on monitoring data.
- **planning for early detection, prompt notification, and rapid response to marine invasive species.**
- **prevention of marine debris**, in part through public outreach and education.
- **management of commercial and recreational fish stocks and sustainable aquaculture operations.**
- participation in a broad dialogue on the **development of a coordinated offshore management regime**, including the design and implementation of marine protected areas." (USCOP. 2004. *An Ocean Blueprint for the 21st Century*, Final Report, pages 473 and 474; emphasis added.)

In addition, the Commission calls for state involvement in ocean observations and science to support policy decisions. States need to provide input on their information needs and priorities for basic and applied ocean science and technology, including economic and social data. Finally, states should act as full partners in designing and implementing regional ocean observing systems and their incorporation into the national Integrated Ocean Observing System.

The USCOP also provided some specific recommendations for states. These recommendations relate to regional ocean councils, coastal habitats, water quality, and fishery management.

Regional Ocean Councils[6]

States, working with relevant stakeholders, should use a flexible and voluntary process to create regional ocean councils. Pending the creation of these regional ocean councils, governors in each region should select a suitable entity to operate a regional ocean information program that carries out research, data collection, information product development, and outreach based on the needs and priorities of ocean and coastal decision-makers. This entity should:

- Include representation from federal agencies, state, territorial, tribal, and local decision makers, scientists, as well as experts in information exchange and outreach.
- Communicate regional research and information priorities to federal agencies and other with ocean and coastal responsibilities to help guide their programs.
- Maintain strong links with the regional ocean observing systems to help them fulfill regional data collection requirements while adhering to national Integrated Ocean Observing System (IOOS) requirements.

Coastal Habitats[7]

Each state should identify priority coastal habitats and develop a plan for establishing partnerships among willing landowners for conservation purposes, with participation from federal agency, local government, non-governmental, and private sector partners.

Water Quality[8]

State and local governments, with assistance from the U.S. Environmental Protection Agency (EPA), should adopt and enforce more effective building codes and zoning ordinances for septic systems including improvements in public education about the benefits of regular maintenance. The Commission also recommends state and local governments require land use planning and decision making to carefully consider the individual and cumulative effects of development on water quality, including impacts on stormwater runoff. Finally, where necessary to meet water quality standards, states should issue regulatory controls on concentrated animal feeding operations in addition to those required by EPA.

[6] USCOP recommendations 5-1 and 5-4
[7] USCOP recommendation 11-1
[8] USCOP recommendations 14-2, 14-3, and 14-11

Fishery Management[9]

According to the USCOP, all interstate fishery management plans should adhere to the national standards in the Magnuson-Stevens Fishery Conservation and Management Act[10] and the federal guidelines for these standards. States should participate in the development of guidelines to ensure they are applicable to interstate plans. In addition, all state fishery management entities should consider the potential benefits of adopting programs that authorize fishery managers to institute dedicated access privileges. The Commission outlines several minimum requirements for a dedicated access program including adequate public discussion and consultation with stakeholders prior to adoption. Finally, states should collaborate with the National Marine Fisheries Service, regional fishery management councils, and interstate fisheries commissions to develop regional bycatch reduction plans that address the broad ecosystem impacts of bycatch for areas under their jurisdiction.

> ***Bycatch*** *is the unintentional catch of non-target species by commercial or recreational fishermen - an economic and ecological problem.*
>
> USCOP. 2004. *An Ocean Blueprint for the 21st Century*. Final Report.

Current Washington State Laws & Programs

Given the range and detail of the Commission's report, it is reassuring that Washington is already well on its way to achieving many of their recommendations through existing laws and programs.[11] Later in the report, the Ocean Policy Work Group will examine several issues in-detail that require improvements to protect, restore, and manage our state's ocean and coastal resources. In this section, we will summarize the other areas of current state work that relate to the USCOP's recommendations.

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[9] USCOP recommendations 19-10, 19-15, and 19-22

[10] Passed in 1976, the Magnuson-Stevens Fishery Conservation and Management Act guides regional fishery councils which manage marine fisheries in federal waters by setting fishing limits, gear restrictions, and area closures for certain species of fish, as deemed necessary for conservation of the species and fishery.

[11] While the recommendations of the Ocean Policy Work Group focus on the state's outer coast and straits, most current state programs involve areas throughout our marine waters and coastal lands. As a result, the summaries of state programs may indicate work affecting ocean resources, but not occurring exclusively on the outer coast or in the straits.

Managing Coasts and their Watersheds (USCOP Chapter 9)

Coastal areas are popular places to live, work, and visit. They provide enjoyment and produce cultural, economic, and social benefits. Yet, our use puts stress on these sensitive environments. Washington's outer coast is currently experiencing growth, particularly from a burgeoning retirement-age population.

In order to reduce the negative effects of coastal development, the USCOP recommends utilizing a watershed approach to planning and managing growth appropriately. Many state programs and laws utilize a watershed approach to resource planning.

> *A **watershed** is a geographic area in which water flows on its way to a larger water body, such as a stream, river, estuary, lake, or ocean.*
>
> USCOP. 2004. *An Ocean Blueprint for the 21st Century*. Final Report.

In Washington, the Watershed Planning Act sets up a system for local management of water resources by large watershed areas. This planning process covers water resources, and optionally water quality and habitat as well. The Department of Ecology's (Ecology) Shorelands and Environmental Assistance (SEA) Program oversees this watershed planning and related grants. The SEA program also houses the state's Coastal Zone Management Program (CZMP), which includes the majority of Washington's coastal watersheds, and programs to protect wetlands and manage floodplains.

Similarly, the Salmon Recovery Act relies on local lead entities to guide habitat restoration and related projects for key salmon bearing watersheds. The Washington Department of Fish and Wildlife (WDFW) and the Salmon Recovery Funding Board guide this process. As a response to the listing of many salmon stocks as endangered or threatened, the Statewide Strategy to Recover Salmon uses a watershed-based planning effort.[12] Finally, Ecology's water quality program also utilizes watershed approach to managing and targeting agency resources for water quality (see "addressing coastal water pollution").

The state oversees coastal land use planning through two key laws:

1. Shoreline Management Act (SMA)
2. Growth Management Act (GMA)

Both laws allow local planning based on state guidelines. These laws attempt to balance local growth needs with protection of important habitats.

[12] These recovery planning areas include the Columbia River, Puget Sound, and Hood Canal.

The Legislature enacted the Shoreline Management Act (SMA) in 1971 to prevent uncoordinated and piecemeal development of shorelines.[13] The SMA encourages water-dependent uses, protects shoreline natural resources, and promotes public access to the shoreline. Cities and counties develop local shoreline master programs to regulate development. Ecology provides technical assistance; reviews and approves local programs; and reviews certain permit decisions. The SMA is part of the state's Coastal Zone Management (CZM) Program.

The state adopted the Growth Management Act in 1990 to encourage wise land use and planning. The GMA requires management of growth at a regional and local level according to statewide goals. Local governments must identify and protect critical areas and natural resource lands; designate urban growth boundaries; and prepare and implement comprehensive land use plans.

Slower growing cities and counties are not required to fully plan under the GMA.[14] The Washington State Department of Community Trade and Economic Development (CTED) provides technical assistance, but, unlike Ecology and the SMA, does not have approval authority over local GMA plans. Independent regional growth management hearings boards hear petitions for review of potential violations of the GMA.

Coastal Zone Management Program

Congress passed the federal Coastal Zone Management Act (CZMA) in 1972 to encourage the appropriate development and protection of the nation's coastal and shoreline resources. The Coastal Zone Management Act gives states the primary role in managing these areas.

The USCOP recognized the importance of the CZMA and recommended Congress reauthorize the CZMA with amendments to strengthen its effectiveness including requiring resource assessments, measuring and reporting on goals and performance measures, expanding coastal boundaries, and providing incentives for good performance.

Under the CZMA, the state prepares a Coastal Zone Management Program (CZMP). The Department of Ecology's Shorelands and Environmental Assistance Program implements Washington's CZMP. Recommendation Chapter 6 – Governing Washington's Ocean and Coastal Resources - provides more details on Washington's CZMP and some recommendations for improving state management.

[13] The shoreline management act was then confirmed through a public referendum in 1972.
[14] For example, Grays Harbor County does not currently fully plan under the GMA. Grays Harbor County must adopt a critical areas ordinance and classify natural resource lands, but is not required to adopt a comprehensive land use plan or designate urban growth boundaries.

Conserving and Restoring Coastal Habitat (USCOP Chapter 11)

As mentioned earlier, Washington's coast and ocean contain many unique and important habitats. The USCOP[15] urges states to prioritize habitats and develop a collaborative plan for coastal habitat conservation. Several state programs protect, restore, and enhance these areas.

A solid understanding of existing conditions is necessary to prioritize sites and protect important habitats. One assessment program is the Nearshore Habitat Program, administered by the Department of Natural Resources (DNR). Under this program, the Submerged Vegetation Monitoring project keeps track of important habitat, including eelgrass. The ShoreZone Inventory, also part of the DNR Nearshore Habitat Program, describes some major coastal ecosystems such as Willapa Bay. Washington Department of Fish and Wildlife (WDFW) administers the Priority Habitats and Species Program. This program conducts research to support habitat protection and enhancement work including assessing baseline habitat, identifying needs, and monitoring results.

Many state agencies contribute to coastal and ocean habitat conservation including DNR, WDFW, Ecology, and Washington State Parks and Recreation Commission (State Parks). DNR's Aquatic Reserves Program protects a series of sites on state-owned submerged lands, such as Maury Island Aquatic Reserve, from various impacts.

WDFW also acquires land for conservation purposes, owning or managing 800,000 acres of wildlife areas and 600 water access sites. WDFW established a network of marine protected areas primarily located in Puget Sound on public aquatic and intertidal lands. This network includes marine preserves (limited takes allowed), conservation areas (no takes allowed), and sea cucumber and urchin exclusion zones.[16] Several of these protected areas are located in the San Juan Islands. State Parks manages the Seashore Conservation Area on Washington's outer coast balancing public recreation with habitat needs. Ecology provides grants to local, tribal, and state agencies for protection of areas with conservation, ecological, recreation, historical, or aesthetic values that are threatened by conversion through the Coastal and Estuarine Land Conservation Program (CELCP). Ecology also oversees management of Padilla Bay National Estuarine Research Reserve.

*Marine preserves sometimes allow certain types of harvest, or "**takes**." Marine conservation areas prohibit any harvesting also called "**no takes**." WDFW's urchin and sea cucumber "**exclusion zones**" only prohibit harvesting these two marine species.*

[15] USCOP Recommendation 11-1

[16] The sea cucumber and urchin exclusion zones only prohibit the take of sea cucumber and sea urchins.

Restoration and enhancement programs move beyond conservation to improve habitat on Washington's shorelines. WDFW's Technical Applications (TAPPS) Division develops, implements, and evaluates habitat restoration projects and provides technical and engineering assistance. WDFW also provides numerous grant and funding opportunities. Ecology's Washington Conservation Corps is a youth work-training program that focuses on protecting, restoring, and enhancing the state's natural resources. State Parks is working with Columbia River Estuary Study Taskforce (CREST), Sea Resources, and several other partners on an estuarine restoration project at Fort Columbia State Park. The project will:

- Re-establish the connection between the tributary of the Chinook River and its associated wetlands and floodplain with the greater Columbia River estuary.
- Provide full habitat opportunity for fish and wildlife.
- Provide seasonal flood storage.

State Parks also worked with several partners[17] to protect and restore habitat at Leadbetter Point. This area includes a large complex of coastal dunes, intertidal estuarine wetlands, swamp, marsh, and upland forest habitat.

Federally protected areas compliment state habitat protection. As mentioned earlier, Washington's outer coast contains several types of federally protected areas including the Olympic Coast National Marine Sanctuary, Olympic National Park, and several National Wildlife Refuges. In addition, the EPA's National Estuary Program coordinates work in the lower Columbia River and Puget Sound.

Addressing Coastal Water Pollution (USCOP Chapter 14)

Since rivers and streams eventually flow to the ocean, it is essential to combat water pollution both upstream and along the coast. Equally important is preventing degradation of areas with good water quality. Sources of water quality pollution are often divided into non-point source pollution (polluted runoff) and point-source pollution (discharge with a distinct source).

Non-point source pollution, the leading cause of water pollution, includes bacteria, chemicals such as pesticides or fertilizer, and sediments. The USCOP offers many recommendations to improve coastal water quality through state and local government actions (see previous section *Recommendations for States*).

In 1993, Ecology's Water Quality Program adopted a watershed approach to their water quality management framework. This allows the program to prioritize and

[17] Partners included: the Trumpeter Swan Society, Columbia Land Trust, Ducks Unlimited, U.S. Fish and Wildlife Service.

target agency resources to achieve more focused results. Each year, the Water Quality Program schedules four major watershed areas to begin a strategic planning process, primarily to address clean up for waterways that do not meet state standards (also called total maximum daily loads, or TMDLs).

Ecology also issues wastewater discharge permits[18] including for sewage treatment plants, stormwater, and industrial discharges. The state provides technical assistance to solve problems in minor cases of permit violations, while significant violations receive civil and/or criminal penalties. Under the Clean Water Act, Ecology also identifies water bodies, which do not meet water quality standards. For these water bodies, Ecology prepares cleanup plans with local stakeholders and monitors the results.

A section later in the report will specifically cover programs and recommendations on marine debris and derelict fishing gear (see Chapter 3 – Coastal Pollution).

Limiting Vessel Pollution and Vessel Safety (USCOP Chapter 16)

Ship borne commerce and recreational vessels such as cruise ships are important part of the maritime economy. Yet, vessels release air pollutants and discharge waste, which degrade marine habitats and water quality. Vessel accidents can spill large amounts of oil and other harmful materials.

Most USCOP recommendations focused on improving international influence and federal authority such as the U.S. Coast Guard for vessel safety, enforcement, and accident response. The Commission also suggested reducing air emissions voluntarily[19] and extending laws to cover waste discharges from cruise ships. Several programs in Washington combat vessel pollution in state waters.

In Puget Sound, the Clean Air Agency prioritized reduction of diesel emissions. The *Diesel Solution* programs collaborated with cruise ships and the Port of Seattle to reduce air quality impacts associated with marine activity. By installing on-board equipment in four cruise ships that dock in Seattle, the vessels can plug-in to the city's electrical grid while in port instead of running their diesel engines. This effort resulted in significant reductions in diesel emissions.

A sludge discharge from one of the large passenger vessels in 2003, led to an administrative order that required a workgroup and cooperation of the large cruise lines. This led to adoption of a Memorandum of Understanding (MOU) in 2004 among Ecology, the Port of Seattle, and the Northwest Cruise Ship Association to

[18] Also called National Pollutant Discharge Elimination System (NPDES) permits.
[19] The EPA is currently proposing stricter standards on diesel engines, including those used in marine vessels. These new regulations should take effect in 2011.

improve the treatment of waste discharges from cruise ships operating in Washington waters.

Under the agreement, cruise ships must use some of the latest Coast Guard-approved equipment to treat and dump sewage and wastewater inside state waters. The MOU specifies discharge standards for water discharges from these advanced wastewater treatment systems on large passenger cruise ships and bans all other wastewater discharges. The agreement also works to protect marine waters from other cruise ship wastes such as garbage and hazardous wastes. Ecology inspects the vessels regularly during the Seattle/Alaska cruise season and requires the cruise lines to sign-off on compliance. Cruise ships may not dump heavier sewage sludge within 12 miles of the coast.

The legislature has considered codifying the cruise ship MOU, but has not taken any action. A study on how viruses from cruise ships may impact shellfish beds is currently underway and is scheduled for completion by November 2007. Ecology and the Washington State Department of Health (DOH) are also studying smaller passenger vessels (fewer than 250 passengers) to identify what type of discharges are occurring; where the discharges occur; and how to prevent discharges that do not meet our state's water quality standards.

In September 2006, a federal district court ruled against the EPA's regulation that exempts ship discharges from Clean Water Act permits.[20] The court found this regulation violated the intent of the Clean Water Act and ordered the EPA to develop regulations for permitting ballast water and other ship discharges under the Clean Water Act within two years. Some expect the EPA to appeal this decision to the Ninth Circuit Court.[21]

State Parks' Boating Program coordinates the federal Clean Vessel Program placing and/or replacing recreational boat sewage disposal devices (pumpouts) at public and private marinas. Staffers work with marinas to apply for funds from this 75 percent match grant program. Since 1994, State Parks has placed 109 pumpout units preventing more than 2.8 million gallons of sewage from entering Washington's waters.

State Parks also provides information to recreational boaters on ways to limit and prevent vessel pollution through various mediums including purchasing radio spots and distributing State Parks publications directed at recreational boaters through various boat shows, Marine State Parks, and local marine law enforcement officers.

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[20] United States District Court for Northern District of California No. C03-05760 SI; Order Granting Plaintiffs' Motion for Permanent Injunctive Relief. Northwest Environmental Advocates, et al. v. United States Environmental Protection Agency.

[21] Marten Law Group. "Court to Vacate Federal Regulation Excluding Ballast Water Discharges from Clean Water Act Permit Requirements." Available at: http://www.martenlaw.com/news/?20061004-cwa-regs-vacated.

Other boating education partners, such as the U.S. Coast Guard Auxiliary and U.S. Power Squadrons, distribute materials in their public boating safety education classes. State Parks collaborates with several other state and local agencies including WDFW, Ecology, DOH, and the Hood Canal Coordinating Council to ensure consistency of their message.

With the enactment of mandatory boater education by the 2005 Legislature, State Parks ensures approved course materials include sufficient information on vessel pollution. Ecology also produces publications available to the public regarding vessel waste and pollution.

Marine vessels damaged by age or accidents are often abandoned in the water or stranded on shore. Abandoned or derelict vessels can leak oil, block navigation, and threaten public safety. Established by the state in 2003, the Department of Natural Resources manages the Derelict Vessel Removal Program.[22] DNR prioritizes the removal of vessels that are in danger of breaking up, sinking, presenting environmental risks, or blocking navigation channels. Since 2003, DNR and other authorized public entities have removed or facilitated the removal of over 150 derelict or abandoned vessels. As of October 2006, 109 vessels remain on the removal list. Most likely additional vessels remain unidentified.

Ecology's Spill Prevention, Preparedness and Response Program manages spills of oil and other hazardous materials. In 2005, the legislature created the Oil Spills Advisory Council composed of balanced stakeholder interests to provide independent recommendations to decision-makers on improving and funding oil spill prevention, preparedness, and response. Due to the Council's on-going detailed examination of oil spill issues and recommendations, this was not a focus for the Ocean Policy Work Group. However, recommendation Chapter 3 – Coastal Pollution will provide a brief summary of programs and the OPWG's related recommendations.

[22] The program is funded through the Derelict Vessel Removal Account (DVRA), which collects an additional $2.00 fee on annual vessel registrations, and an added $5.00 fee for the identification document required for a foreign vessel.

Preventing the Spread of Aquatic Invasive Species (USCOP Chapter 17)

Invasive species are non-native species that cause ecological or economic harm through their spread. Some examples of invasive, or nuisance, species in Washington include: cordgrass (*Spartina*), Japanese eelgrass, oyster drill, varnish clam, tunicates, and the European green crab. The USCOP recognized the large economic and ecological threat posed by aquatic invasive species. Their recommendations included:

- Accelerating detection and response of invasive species.
- Preventing invasions from major pathways such as ballast water.
- Streamlining management and coordinating among state, federal, and regional plans.

Washington's established aquatic invasive species programs attempt to accomplish some of these objectives. WDFW coordinates the Aquatic Nuisance Species (ANS) Committee to foster state, federal, tribal, and private cooperation to prevent introduction and stop the spread of aquatic nuisance species. The ANS Committee developed the 2001 Washington State Aquatic Nuisance Species Management Plan, which coordinates and identifies management actions. In addition, the group developed an early detection and response plan; responded to a recent tunicate invasion; and compiled a list of the 100 worst aquatic invaders in Washington. Currently, the group is working to improve education and outreach.

In 2006, the governor established the Washington Invasive Species Council to enhance invasive species management throughout the state. In the past, DNR conducted surveys for aquatic invasive species in Puget Sound and areas of the outer coast. The Puget Sound Action Team is also involved in invasive species work in Puget Sound and Georgia Basin shared waters.

State Parks currently conducts annual surveys for *Spartina* on their properties in Grays Harbor and partners with several other agencies and non-profits to control any *Spartina* found. State Parks in the northwest region work with WDFW to monitor for green crab and routinely watch for and eradicate new invasions of *Spartina*. Finally, State Parks' boating program provides information to recreational boaters on ways to prevent the spread of invasive aquatic species.

Ballast water is one main way invasive species are introduced to coastal waters. Ships take in ballast water for stabilization. To take on new cargo in a new port, ships release ballast water, along with any organisms, even bacteria or viruses, into the surrounding water. Under a new Washington law, large commercial ships must exchange ballast water mid-ocean; treat the ballast water with chemicals, UV irradiation, or filtration; or avoid releasing it in coastal waters at all. WDFW oversees the ballast water program. Ecology and DNR assist the ballast water program with technical and regulatory expertise.

Connecting the Oceans and Human Health (USCOP Chapter 23)

Marine organisms provide benefits to human health through development of pharmaceutical drugs, nutritional supplements, and other biomedical, laboratory, and industrial applications. Nationally, seafood consumption is rising. However, humans face public health threats from contaminated seafood and coastal waters. The Commission established the importance of this health connection to our oceans. Their recommendations included:

- Encouraging research on marine organisms for beneficial uses.
- Improving research and development of technologies to understand and detect harmful algal blooms, toxins, bacteria, and other pathogens to prevent damage to human health.
- Protecting seafood safety and monitoring and preserving coastal water quality by fully implementing all existing programs.

Given the historical importance of seafood in Washington, several programs exist to protect human health. DOH's Food Safety and Shellfish Program runs several programs to protect public health as it relates to consumption of seafood. The Biotoxin Program monitors for paralytic shellfish poisoning and amnesic shellfish poison year-round and closes fisheries when levels are unsafe. During the summer, DOH also monitors for the bacterium *Vibrio parahaemolyticus*.

Shellfish can concentrate other harmful substances, such as bacteria from sewage, heavy metals, pesticides, or other chemicals. DOH evaluates commercial shellfish growing areas and harvest sites for safety from these other risks and licenses harvesters, shellstock shippers, and shucker-packers annually. The Recreational Shellfish Program classifies and restricts harvest on a limited number of recreational beaches according to proximity to shoreline pollution sources and water quality. DOH also monitors accumulation of chemicals such as mercury and pesticides in fish from waters around the state. Most fish consumption advisories in Washington occur in industrial areas such as Seattle, Tacoma, or Bremerton (none occur on the outer coast). The EPA lists national advisories for mercury in fish, including ocean fish such as tuna, mackerel, and swordfish.

The Olympic Region Harmful Algal Bloom (ORHAB) partnership is a locally formed partnership funded by NOAA to develop collaboration and cooperation to mitigate the effects of harmful algal blooms. The ORHAB partnership includes federal, state, and local management agencies, tribes, businesses, public interest groups, and academic institutions. The Quileute and Makah tribes and the Quinault Indian Nation have all participated in the ORHAB project including monitoring and researching harmful algal blooms. The group investigates origins of harmful algal blooms, monitors for their occurrence, and researches methods to reduce the impacts of harmful algal blooms. In addition, ORHAB provides education to residents and visitors about harmful algal blooms.

Swimming in degraded coastal waters can cause illness from bacteria, protozoa, and viruses. The BEACH[23] Program, a joint program between DOH and Ecology, monitors bacteria levels at about 70 of Washington's recreational beaches during the summer. The Program's goal is to reduce the risk of disease to people that play in marine waters by working with local county health organizations, tribes, and other organizations to post and publicize advisories when increased levels of bacteria are detected and when sewage is spilled onto the beach.

Protecting Marine Mammals and Endangered Marine Species (USCOP Chapter 20)

With declining populations, many marine mammals, sea turtles, seabirds, and salmon face extinction. The USCOP affirmed that federal laws play an important role in listing and recovering endangered species as well as protecting marine mammals. However, they also criticized the inability of management approaches to protect species from indirect and cumulative impacts. The Commission suggested federal management reforms, including clarifying permitting, utilizing ecosystem-based management, and conducting further research on threats to marine species. In addition, they encouraged the federal agencies to work with states to establish cooperative agreements for managing endangered species.[24]

Ecosystem-based management reflects the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live.

USCOP. 2004. *An Ocean Blueprint for the 21st Century*. Final Report.

In Washington "species of concern" include all state or federally listed endangered, threatened, sensitive, and candidate species. Our state cooperates with federal, tribal, local, and international governments to assist the recovery of these species. WDFW and DNR oversee state recovery plans and habitat conservation planning and land acquisition grants.

As mentioned earlier, the state focuses efforts to recover listed salmon through the Statewide Strategy to Recovery Salmon.[25] Regional and watershed collaborative recovery plans include actions such as riparian and estuary restoration, floodplain comprehensive management plans, programs to encourage protection on private lands, regulation of private and nonfederal public forest lands, and U.S. Forest Service road maintenance or abandonment. WDFW uses a variety of approaches to manage for healthy salmon populations including stock and habitat inventories and

[23] BEACH is an acronym for Beach Environmental Assessment, Communication and Health Program. An EPA grant primarily funds the BEACH program.
[24] Section 6 of the federal Endangered Species Act allows these cooperative agreements, but is chronically underfunded.
[25] Fifteen salmon populations throughout the state including Hood Canal, Puget Sound, Columbia River, and Lake Ozette. The Lake Ozette Steering Committee is in the process of drafting a plan.

assessment. WDFW, NOAA Fisheries Service, tribal governments, and Canada co-manage harvest of salmon.

Salmon are not the only such group of species dependant upon Washington's coasts. The state recovery plan for endangered sea otters includes oil spill prevention and preparation, habitat protection, and reduction of sea otter-fishery conflicts. The state and federal agencies recently listed the southern resident population of orcas, or killer whales, as endangered. Recently, NOAA Fisheries Service proposed a draft designation for orca critical habitat area[26] that includes most of Puget Sound and the Strait of Juan de Fuca.

[26] NOAA Fisheries Service plans to finalize the designation of orca critical habitat by November 2006. More information available at: http://www.nwr.noaa.gov

Summary of Public Comments from Coastal Communities and Stakeholders

The Ocean Policy Work Group would like to thank those who participated during the outreach sessions. The involvement of coastal communities, tribes, and other interest groups was an integral part of developing appropriate recommendations for the state. This summary is an attempt to capture the main thoughts, ideas, and concerns shared by those who participated. The work group attempted to reach out to interest groups, citizens, tribes, and local governments – in other words, the broad range of people whose lives depend on and are influenced by our ocean resources (see list of participants on page iii). Unfortunately, the group did not have the time to go to every community or talk to every person. Thus, this summary is limited to the places the work group went and the voices the group heard. To assist the reader, public comments are summarized around topic areas. Any geographic differences are noted in the comments. Additionally, Appendix D contains a more detailed list of comments heard by location visited.

Locations of Ocean Policy Work Group's public and stakeholder meetings

Forks
Friday Harbor
Ilwaco
La Push
Neah Bay
Ocean Shores
Olympia
Port Angeles
Westport

1. Marine Resource Stewardship

Sustainable Fisheries

Many communities shared the importance of fishing to the economy and culture of coastal areas. The large decline in salmon fisheries forced the fishing industry to diversify into black cod, halibut, Dungeness crab, and rockfish. One local report asserted a link between the loss of traditional fisheries and elevated negative social and health indicators compared to the state averages for these same indicators.[27] Especially on the southwest coast, people indicated the need for access to a diversity of fish resources in order to sustain the industry and communities over the long-term. Some people strongly advocated for increasing fisheries enhancement through coastal hatcheries. Many in Ilwaco expressed the need to allow greater predator control of seals, sea lions, and seabirds. Others responded that predator

[27] See Martin, I. September 2005, A Social Snapshot of the Columbia River Gillnet Fishery by Irene Martin, Salmon for All, Astoria, OR. Examples of negative health indicators included poverty, life span, suicide rate, domestic abuse, and substance abuse.

control was a simple, misguided, and scientifically ungrounded solution. They felt it demonstrated the larger problem of greatly depleted living marine resources.

Many expressed opposition to the current proposal for fish processor quotas by the Pacific Fisheries Management Council. The smaller fish processors assert that this quota would put them out of business. Most people in the fishing industry supported increased and improved research on fish stocks such as sardines, groundfish, albacore, and mackerel. Additionally, some mentioned the need for good water quality to protect ocean resources.

Aquaculture

The subject of fin-fish aquaculture brought strong and contrasting views, especially in the North Olympic Coast and San Juan Island regions. Many citizens felt that these operations should not be continued or expanded. In particular, they cited concerns over water pollution, disease, fish escapement, sustainability, use of fish meal,[28] navigation, negative interactions with marine mammals, and improper allocation of a public resource for private gain.

On the other hand, the industry pointed out the large and sustainable economic contribution of their current year-round operations in the Strait of Juan de Fuca. They felt that they handled most issues regarding pollution and escapement. They acknowledged the concern over use of fishmeal, but stated that most of their food came from vegetable sources and a few unusable small fish species. In addition, they stated demand for fishmeal was so high; it would be used to feed farmed animals such as fish, hogs, or chicken anyway. In their view, fish at least convert fishmeal more efficiently than other farmed animals. Those involved in the industry supported the reasonable expansion of fin-fish operations through methods such as ocean zoning.

Those involved with shellfish aquaculture expressed the need to protect and improve water quality for their industry to thrive. Since the shellfish industry is phasing out the use of carbaryl - a contact insecticide and parasiticide - to control burrowing shrimp, shellfish aquaculturists stated a need for increased research on alternative control methods in Willapa Bay.

[28] Smaller fish are often caught and turned into fish meal to feed farmed fish. Some participants expressed concern that using fish meal for raising farmed fish instead of feeding wild fish would negatively impact the sustainability of wild fish and other marine species.

Coastal Energy

Many people expressed support for the moratorium on offshore oil and gas development and an interest in making it permanent. The Makah tribe shared support for offshore renewable energy and their proposed wave buoy pilot project to produce renewable energy.

Ecosystem-Based Management

Most people want to manage ocean resources more holistically. However, people had difficulty defining what constituted ecosystem-based management. In particular, many people expressed concern about marine protected areas, which is one tool for managing ocean resources. Tribes wanted to ensure their treaty rights remain protected with access to their usual and accustomed areas. Several tribes neither oppose nor support the use of marine protected areas. Instead, they indicated the state should utilize caution and address problems with the appropriate management tools, rather than implementing marine protected areas just to use another management tool. Other participants felt ecosystem-based management must include the use of marine protected areas.

The San Juan County Marine Resources Committee provided information on its progress toward implementing ecosystem-based management. They are utilizing a strategic planning process that identifies conservation targets; assesses the health of these targets; prioritizes human-caused threats with the greatest impact on ecosystem health; and develops strategies to address the threats. The San Juan County Marine Resources Committee ecosystem planning process brings together managers, experts, and local citizens and provides a strategic approach that has built-in monitoring to gauge success. However, they face challenges on gathering information and data that measures the whole system, educating the public, and collaborating to bring people together. They felt the state could help by improving collection of monitoring data for various aspects of ecosystem health.

2. Coastal Vulnerabilities from Marine Sources

Natural Hazards

Despite the good work by state and local governments, the public including public officials, stakeholders, agencies, and citizens recognized key gaps and improvements necessary to better manage coastal hazards.

Some communities are aware of the coastal hazards they face, but many are not prepared to respond. Important and effective ways to educate and to prepare the public were identified including: 1) on-going education targeting adults and schools and 2) more workshops with hazard experts. Education and planning led Clallam County to be the first county in the state to achieve "Tsunami-Ready" status. Large seasonal and transient populations in places like Ocean Shores and the San Juan Islands add challenges to hazard education and response.

Many people expressed appreciation for the recent funding obtained for All Hazard Alert Broadcast alarms. However, more of these are needed to reach all at-risk coastal communities. Many isolated communities such as Forks and La Push have problems establishing access to communications such as radio reception or cell phones.

Many people expressed the need to avoid development in high-hazard areas or at a minimum require buyers to assume the risk of those properties. In addition, coastal communities need additional resources to plan, prepare, and mitigate impacts of coastal hazards. The Quileute Tribe provides an example of a community working to reduce risk. Much of the tribe's community is in the tsunami zone and they frequently face flooding from storm surges. In order to mitigate this impact, they are attempting to move their school out of the zone by negotiating with the National Park for additional uphill land.

For communities such as Westport, evacuation planning and response to events pose a challenge due to their location and limited resources. There is only one main road out of Westport and past evacuation alarms resulted in a disorganized warning and response. In these areas, local and state partners may need to establish creative solutions such as vertical evacuation structures, drop support networks, and a stock of supplies for schools.

The public expressed a need for better data and research including a coastal weather Doppler RADAR, weather buoys, tsunami run-up modeling, and assistance identifying hazards for land-use planning. Better data would improve knowledge of current and future weather and ocean conditions not only for those people affected on land by storms and flooding, but also those that rely on access to the ocean for their livelihoods.

Coastal Erosion & Sediment Management

The public echoed concerns about chronic and "hot spot" erosion especially along the southern coast. Many people emphasized a need to reevaluate where government allows development to occur. People pointed out that solutions chosen to combat erosion should not increase erosion in other areas. Other comments included enforcing the shoreline management act, strengthening hydraulic project approvals, encouraging or requiring the use of softer beach protection methods and setbacks, increasing property owner education, and moving development lines out of the "dynamic zone" where erosion occurs.

A few citizens were frustrated by what they viewed as a workable policy - developed by the Coastal Erosion State Task Force in 1999 - being dropped due to objections from some stakeholders. The Coastal Communities of Southwest Washington told of its work to represent the communities in erosion issues and promote solutions.

Most people expressed support for using dredged materials to replenish beaches, but that appropriate removal and placement is important to avoid impacts to marine resources and safety. Many people said they supported continuing the Benson Beach pilot project as the best method for keeping the most sediment in the littoral system while reducing potential negative impacts such as navigation problems and impairing crab habitat. Some participants mentioned revising the state's Coastal Zone Management Program in order to exert more pressure on the Army Corps of Engineers to mitigate for impacts to marine resources.

Several communities and small ports are facing backlogs of dredging that the Army Corps of Engineers used to maintain. For example, the Baker Bay channel is critical for fishermen to gain access to the Columbia River and Pacific Ocean and to the Port of Ilwaco for fish and crab processing plants. Yet, it is currently very shallow and needs to be dredged to maintain safe passage for vessels.

The Quileute Tribe expressed similar concerns regarding the Quillayute River. Six of the southwest Washington ports are considering forming a cooperative to share dredging equipment and permitting expertise in order to make progress on this critical infrastructure need. In addition, many coastal ports need resources to repair and maintain dock, float, and pier facilities, which are aging or have been damaged by storms. Many people expressed frustration at the lack of assistance and involvement from the Army Corps of Engineers on dredging and other infrastructure needs such as jetty maintenance in Westport and La Push. In several areas, people stated concerns that timing windows established to protect fish resources from dredging impacts were not appropriate for local conditions and too narrow to finish dredging projects. Many people mentioned the need for an increased state presence and role in a range of sediment management issues including utilizing

sediment beneficially to combat erosion and planning sediment management regionally.

Climate Change

According to some citizens and stakeholders, climate change is too large of an issue for local groups alone to adequately address. Citizens had concerns about the impacts climate change on the spread of disease and exotic species in marine ecosystems. Others expressed a need to assess new needs and adapt to changes. Some people felt it was important to reduce emissions of greenhouse gasses and break our dependence on fossil fuels by advancing alternative energy. A few scientists felt that the state should do further climate research into past climate and future climate scenarios.

3. Coastal Pollution

Oil Spills

Many people expressed concern about the threat of oil spills. The Makah Tribe emphasized the cultural importance of marine resources that oil spills put at risk and the history of oil spills in the area. They maintain that the state's outer coast remains under-funded and under-protected from oil spills. One way to combat this threat is through year-round funding for the rescue tug at Neah Bay. This tug is currently only funded for nine months of the year. They also indicated a need:

1. To include local tribal representatives into the regional response team (RRT).
2. To incorporate their "all hazards plan" with Ecology's emergency response plan.
3. To improve and increase state funding for emergency response and hazard plans.

In the San Juan Islands, residents, scientists, and non-profit organizations all voiced similar concerns about oil spills and their impact on marine species and habitat. They also indicated that the issue was too large for local governments to tackle on their own. In Westport, people mentioned the importance of recognizing limited response capabilities of small coastal communities and a need for state assistance in achieving necessary preparedness for oil spills. Additionally, they urged the state to recognize the difference in response capabilities for open ocean conditions versus protected marine waters. The City of Forks described an effort currently underway to work with the oil industry to develop a storage and response site for the north coast at Fork's Quillayute Airport. Participants in Forks expressed the importance of having stored materials, a designated response and rendezvous site,

and significant federal investment to provide "forward defense and response" to an oil spill.

Derelict Fishing Gear and Marine Debris

Derelict fishing gear was a concern of many people, especially along the north coast and straits. This abandoned or lost gear continues to capture and kill fish, marine mammals, and birds. Gear can also damage habitat and pose safety hazards to recreational and fishing divers. In La Push, the Quileute Tribe spoke of problems with lost crab pots and lost lead balls from trawling gear. They also indicated concern over lead balls potentially leaching contaminants into the water. The Quileute Tribe suggested:

1. Having Department of Natural Resources (DNR) train tribal divers in removal techniques.
2. Expanding Marine Resources Committees and Northwest Straits work.
3. Partnering with the Sanctuary to utilize Remotely Operated Vehicles (ROVs) and other technologies to identify problem areas and recover gear.

The Jamestown S'kallam Tribe indicated lost crab pots, especially small ones used by recreational fishers, represent a large part of the problem. Others, in Port Angeles, cited experiences removing fishing nets and the large number of fish, marine mammal, and bird carcasses and bones found in or underneath them. Some suggested having Washington Department of Fish and Wildlife (WDFW) examine gear requirements to ensure that crab pots sold and used in the state contain rot cord. That way, if the pot is lost, the cord deteriorates and prevents fish and crabs from continually being captured and killed.

4. Ocean Research, Observation & Education

Ocean Research and Observation

Current infrastructure for ocean-related research is piecemeal and fragmented. Agency mandates often drive individual research projects. People indicated that ocean research needs better coordination in Washington. For example, coastal tribes and the Olympic National Marine Sanctuary already conduct a lot of research. The tribes have a large knowledge base, including traditional ecological knowledge and current research that can provide a more holistic picture of the status of our outer coast, straits, and ocean. Some people felt public outreach and education should occur as a condition of funding for research projects.

Stakeholders suggested identifying a point person in state government to organize strategic needs and directions, identify experts, and provide technical assistance for grants. Most people recommended that the state, tribes, and sanctuary coordinate and create a research priorities plan for the outer coast and work to implement it. Since oceanographic effects are not limited to Washington's influence, many advised the inclusion of trans-boundary partners such as Oregon, California, British Columbia, and Alaska.

State scientific ocean research focuses on individual problems and often lacks connection among various issues of overall ecosystem health and management. Ecosystem-based management may provide a framework for assessing ecosystem health and analyzing synergy of all human activities. Many suggested the first step is to develop key indicators for statewide ocean and coastal health and biodiversity guidelines.

People also expressed a need for more monitoring—not just more research. Monitoring is essential for validation of ongoing work such as habitat restoration and assessment of status and trends. Long-term monitoring also allows for adaptive and ecosystem-based management. Participants felt greater state involvement is necessary to provide funding stability.

Many specific research, monitoring, and observing needs were brought up during outreach sessions. These included:

- Improving weather hazards and oceanographic forecasting with more buoy sensors, coastal Doppler RADAR, and a coastal weather station.
- Expanding fish stock and sea urchin surveys with instruments such as remotely operated vehicles (ROVs).
- Advancing understanding of oceanographic patterns.
- Refining spawning data.
- Assessing fin-fish aquaculture impacts on wild stocks and the economy.
- Researching ghost shrimp life history and alternate control methods.
- Supporting comprehensive benthic mapping.
- Improving social science research.
- Enhancing monitoring and understanding key habitats and restoration strategies.

Furthermore, people indicated that some issues require continued and expanded research to help us better understand their effects on ocean and coastal resources. In particular, people expressed interest in impacts of Harmful Algal Blooms (HABs), coastal pollution and water quality, low oxygen events, invasive species, fish predator populations (sea lions, seals, and cormorants), underwater noise, dam removal, and climate change.

Ocean Education

Ocean education is a priority for many coastal stakeholders. Education stimulates public interest, understanding, safety, sense of place, stewardship, and opportunity around ocean and coastal resources. Ocean safety and heritage are particularly important to convey to both visitors and coastal residents. Yet, distance poses challenges to providing consistent ocean education in coastal communities. As with ocean research, stakeholders recommended forming a strategic plan for ocean education that would bring groups together and connect opportunities, pathways, and audiences.

Many participants conveyed an interest in additional interpretive and science centers in coastal communities. These centers would draw visitors and residents and improve ocean education. Some expressed disappointment at promises of interpretive centers, such as in Forks, which never materialized. Others suggested the state provide increased funding for agencies to do education and outreach. For example, currently some groups on the coast print state pamphlets instead of agencies, due to lack of funding. Two areas of education drew more specific attention from participants: K-12 and the general public.

K-12

Many people shared that ocean education in public schools (K-12) can create a spark for children's learning. Oceans and coasts inspire curiosity, imagination, and help children learn inter-connectedness of humans with these systems. They also provide a platform to reinforce basics such as math, science, and reading.

Public school education poses many challenges in outer coast communities. Educators reported declining school enrollment, limited funding, and higher dropout rates than elsewhere in the state. Additionally, students in coastal communities often face transient living situations, drug and alcohol problems, and limited family resources. Many educators expressed frustration at the lack of integration of ocean and coastal topics into the curriculum, but acknowledged they focus on what students must learn to pass state testing requirements.
As discussed above, ocean research is a growing need, but many local students have poor science and math skills, which direct them away from science careers.

Stakeholders provided several suggestions and opportunities to improve ocean education for K-12 such as:

- Define ocean literacy requirements; integrate them into the required curriculum.
- Provide a "Teach the Teachers" program that could better prepare them to teach environmental and ocean science.
- Increase funding for field trips and to schools, in general.

- Utilize visiting scientists in the classrooms, perhaps with state agency involvement.
- Increase skills and vocational training, especially around marine industries, for those students likely to dropout.
- Extend ocean education to schools in other areas of the state, because many of these children visit the outer coast.
- Improve science offerings to high school students to prepare them for college.
- Reinstate a program similar to Science and Tribes Environmental Program (STEP). This partnership between tribes and the University of Washington provided inspiration to young people on topics such as marine biology and forestry. The program resulted in improved college attendance by tribal members.

General Public Education

Washington's ocean and coasts attract visitors and residents. However, human uses and individual actions can cause harm to these valuable resources. Educating the public is important to reduce harmful behaviors, improve personal safety, and protect human health. In particular, participants mentioned the need to target tourists, shoreline homeowners, and recreational users.

Some key topics for educating the general public cited were:

- The importance of oceans.
- How human actions on land relate to ocean health.
- Public health, including shellfish.
- How to protect water quality.
- Safety on beaches and in coastal waters.
- Response to coastal hazards.
- Importance of culture and history of the area.
- Effects of coastal development on resources.
- Preventing and reporting marine debris.
- Reducing the spread of invasive species.

Participants shared some ways to increase effective education with the general public including providing education on ferries for tourists, improving signage on state and park lands, increasing grants for local public outreach campaigns on ocean issues (similar to Puget Sound Action Team's PIE program), and utilizing different mediums such as flyers, radio, TV, newspapers, and magazines. Finally, some suggested expanding programs that utilize volunteer residents to monitor coastal health and educate others such as the Beach Watchers (supported by Washington State University Extension) and Dockwalkers programs.

5. Sustainable & Resilient Communities

Sustainable Coastal Economy

The economic issues facing coastal communities are often similar. Most areas traditionally relied on natural resources such as timber and fisheries. While natural resources remain important, they no longer provide the bulk of the jobs. Most coastal communities face higher unemployment, lower wages, and greater poverty than the state averages. Citizens shared concerns over other indicators of social and economic hardship such as domestic violence and drug and alcohol abuse. Some linked these problems to a decline in traditional fisheries and economic opportunities. The economy of coastal communities is changing with growth of the tourism industry and booming development of retirement and vacation homes. Some indicated that increased growth and unrestrained development could threaten ocean resources, which could negatively affect tourism. Because of development, housing prices are increasing - making it difficult for working families to find affordable housing in many areas.

Community members felt strongly that eco-tourism is not a panacea for local economic woes. Many people indicated their communities need other industries like bio-diesel, boat building, aquaculture, educational and interpretive centers, and research and development to provide a foundation for a strong and resilient coastal economy.

Some local needs, solutions, and ideas were quite diverse. The following list includes different ideas presented by geographic location.

- *Forks:* Diversify economic base with living wage jobs; reinvigorate economy in Forks, Sekiu, and Clallam Bay; develop port biomass energy project; expand airport so tourists can fly in; create joint interpretive center for coast; finish loop road for outer coast; and complete trails and parks in Clallam Bay.

- *Friday Harbor:* Develop port industry cluster with a marine tech center that links education and research; and build on University of Washington labs for marine education, research, and economic synergy (provide increased funding for labs).

- *Ilwaco:* Dredge boat basin and channel; and improve marina infrastructure.

- *La Push:* Repair boat basin and jetty; dredge for channel and basin; and rely on growing tourism (new buildings and development).

- *Neah Bay:* Utilize comprehensive tourism plan with Makah Museum as anchor.

- *Ocean Shores:* Provide increased funding for interpretive center upgrade or larger facility; and improve infrastructure (sewage treatment and drinking water). The Quinault Indian Nation owns the Ocean Shores marina, which needs dredging and infrastructure replacement to make it a viable marina that will support commercial and recreational uses.

- *Port Angeles:* Increase short-sea shipping (barging) among smaller ports; state should provide more funding for tourism marketing and staffing in Washington; non-profits need financial support from state tourism, and technical assistance; communities, tribes, and the region should also continue to promote tourism (historical, cultural recreational, natural, scenic and archeological).

- *Westport:* Develop Doppler RADAR weather and marine research station; infrastructure improvements (sewer); dredge in Ocean Shores to improve ferry service; bring people together to shape a common vision; and utilize convention and conference center all year.

6. Governance

Several entities shared their role in managing ocean and coastal resources on Washington's coast including federal agencies, the Northwest Straits Commission, tribes, and local governments. The federal agencies recommended focusing on existing governance mechanisms and increasing state involvement in federal management of areas such as the Olympic National Marine Sanctuary, Olympic National Park, and the several national wildlife refuges. This federal-state partnership will achieve greater coordination for mutual issue areas (such as research and education), reduce duplication, and leverage resources.

The goal of the Northwest Straits Commission is to protect and restore marine resources and habitat. The Commission provides financial support and technical guidance to Marine Resources Committees (MRCs) in seven northern counties. MRCs are citizen-based and are made up of representatives from the scientific community, local and tribal governments, and economic, recreational and conservation interests. Each MRC sets local community priorities; sponsors projects to address priorities; and oversees the work. This approach coordinates diverse partners; supports creative, action-oriented solutions; provides a platform for education and outreach on local issues; and is relatively inexpensive.

Representatives at the Northwest Straits urged that its non-regulatory focus was not the only solution. They indicated regulatory approaches are also needed to solve problems facing our marine systems. The Commission suggested replication of its successful model, without changing the current role of the Northwest Straits Commission.

All treaty tribes reiterated the need to uphold their treaty rights and access to usual and accustomed areas. The state and federal government must consult tribes as co-managers in issues involving resource management. Most tribes are involved in marine resource research, habitat restoration, fisheries enhancement, and many other marine resource management issues.

Local government representatives and citizens advocated for a "bottoms-up" approach to governance that allows local communities to prioritize projects and have better involvement with state resource managers. At the same time, local representatives urged the OPWG not to create another local entity or mechanism; if an adequate one already existed. Local communities were interested in the state assuming a stronger presence and role in ocean resources issues as well.

Other Issues

Citizens brought up a host of other issues. Since land uses influence coastal and ocean resources, often people suggested including these upland areas in ocean resource management. Some people mentioned the need to protect and restore coastal and ocean habitats. A few people discussed the variety of projects and potential future uses of ocean and coastal areas and suggested a mechanism to systematically handle these projects and provide consistent state policy (such as offshore aquaculture and energy projects).

Along the Strait of Juan de Fuca and San Juan Islands, important issues included cleaning up contaminated sediments and improving water quality, including international pollution sources. In Westport and Ilwaco, businesses mentioned the need for an improved immigration-worker program to allow them to maintain their workforce.

Recommendation Chapters

The following chapters provide the Ocean Policy Work Group's recommendations to improve coordination and management of our ocean resources. The bullets below each chapter title list the issues covered in that chapter. Each issue contains a background, summary of the US Commission on Ocean Policy's related recommendations, relevant programs and laws, and the OPWG's recommendations.

Chapter 1 - Marine Resource Stewardship

- Sustainable Fisheries
- Aquaculture
- Ecosystem-based Management
- Ocean Energy

Chapter 2 - Coastal Vulnerabilities from Marine Sources

- Natural Hazards
- Coastal Erosion and Sediment Management
- Climate Change

Chapter 3 - Coastal Pollution

- Marine Debris - Derelict Fishing Gear
- Oil Spills

Chapter 4 - Ocean Research and Education

- Ocean Research & Observing
- Ocean Education

Chapter 5 - Sustainable & Resilient Communities

- Sustainable Economy: Planning; Infrastructure; Business & Industry; Workforce Development; Training and Education; and Research

Chapter 6 - Governance

Chapter 1 – Marine Resource Stewardship

Marine Resource Stewardship encompasses a wide range of activities, such as fisheries and aquaculture management, ecosystem-based management, habitat restoration, conservation of marine biodiversity, reduction of marine pollution, and protection of marine mammals and birds. To focus its efforts in the face of such a wide range of activities, the OPWG chose to address four of the most active topics at the state and federal level:

- Sustainable Fisheries
- Aquaculture
- Ecosystem-based Management
- Ocean Energy

Vision for Marine Resource Stewardship

The state manages the use of its rich marine resources by balancing economic, social, and ecosystem needs to achieve long-term sustainability and biodiversity. Washington supports state-of-the-art science and resource assessments to accurately gauge ecosystem health and management needs. The state actively seeks input from all relevant stakeholders including tribes, coastal communities, local governments, affected sectors, and interested parties in management decisions. Washington explores use of new management tools and policies based on problems identified.

Sustainable Fisheries

Sustainable fisheries are critical to maintaining the economic and social sustainability of Washington's coastal communities and the health of our ocean ecosystems. Key coastal fisheries include groundfish, Dungeness crab, halibut, tuna, and salmon. Coastal fisheries had a combined ex-vessel value of over $46 million in 2005. For generations, fishing has been a way of life for many Washington citizens. Declines in fisheries and fishing opportunity, such as salmon and groundfish, have negative impacts on the economic, social, and cultural well-being of coastal communities.[29]

The majority of fisheries management takes place through the federal fishery council process, which is viewed by many as successful. The state also manages

[29] See Appendix E for more details on the status of fisheries in Washington.

some specific fisheries and provides input to the regional fishery management council process.

The Pacific Fishery Management Council (PFMC) manages most of the commercial fisheries in marine waters off the coast of Washington State through the development of fishery management plans. PFMC has management plans for salmon, groundfish, coastal pelagic species (such as sardines), and highly migratory species (such as albacore tuna). This process includes large numbers of stakeholders including representatives from state agencies, tribal governments, public at large organizations, fishing industry, federal agencies, and others. This varied array of stakeholders contributes to the complexity inherent in the management of Washington's fishery resources. So far, the process has worked because of its openness and access for all concerned stakeholders.

Pacific halibut is not under the PFMC's groundfish plan, but, rather, is managed by the International Pacific Halibut Commission (IPHC), which is comprised of commissioners from the U.S. and Canada. IPHC sets the annual harvest limits for each country, by area. The PFMC's halibut catch sharing plan describes how the catch is further divided along the U.S. West Coast (Area 2A).

The Washington Department of Fish and Wildlife (WDFW) is the primary agency responsible for the management of the state's fishery resources,[30] and WDFW plays a large role on the PFMC. WDFW manages Dungeness crab to the outer limit of the Exclusive Economic Zone (EEZ), which extends from 3 to 200 miles offshore, as well as all coastal commercial fisheries not managed by PFMC (such as pink shrimp, spot prawns, razor clams, and geoducks), and recreational fisheries. Together with tribes, WDFW co-manages the ocean and in-river salmon fisheries. For a more detailed examination of marine fisheries management in Washington, see Appendix E.

[30] State fishery management encompasses both marine fish and shellfish fisheries.

US Commission on Ocean Policy Recommendations

In some cases, the USCOP found that past fishery management practices led to overfishing, that is, harvesting at a rate higher than what can be sustained over the long-term. While acknowledging the progress made by managers in recent years, they suggested several changes to current management to promote long-term sustainability of U.S. fisheries. The USCOP asserted that, over time, fisheries management must move toward an ecosystem-based approach. In addition, they recommended:[31]

- Increasing the role of science by separating fisheries allocation and assessment.
- Exploring the use of dedicated access privileges.
- Providing independent review of scientific information.
- Integrating ecosystem science, data collection.
- Coordinating management and enforcement with data.
- Developing regional bycatch reduction plans.
- Improving regional coordination and planning.

Many of these recommendations require amendments to the Magnuson-Stevens Act[32] by Congress, while others call for changes by federal agencies in their program directions, such as NOAA. Yet, the states play an integral role in regional fisheries management decisions and, according to the USCOP, need to maintain an active role in these issues.

Relevant Laws and Programs

- Pacific Fishery Management Council manages most commercial marine fishing, includes a designated seat for WDFW.
- Tribal governments co-manage fisheries with the state.
- WDFW manages state commercial fisheries such as Dungeness crab, pink shrimp, and spot prawns, as well as recreational fisheries.
- Olympic Coast National Marine Sanctuary conducts benthic habitat mapping activities and collaborates on research and management.
- Ocean Resources Management Act is part of the state's coastal zone management program (Ecology). While it does not currently influence fisheries, the law provides the ability to include living resources at a later time, if deemed necessary.

[31] See USCOP Chapter 19, especially recommendations 19-9, 19-10, 19-15, 19-21, 19-22.
[32] The Magnuson-Stevens Fishery Conservation and Management Act exerted U.S. control over fisheries within 200 nautical miles of the coast and set up regional fishery management councils to develop and implement plans for these fisheries.

Key Problems

- Lack of resources for benthic habitat mapping. Mapping will increase knowledge of fish habitats and improve state management.
- Need increased research on specific fish stocks, especially groundfish.
- Need to review and evaluate current state fishery management practices for potential areas of improvement.

Recommendation 1-1

Support groundfish management on a regional level, which could have a smaller geographic scope than West Coast-wide, by: 1) collaborating to increase data collection and analysis and 2) encouraging the Pacific Fishery Management Council to incorporate regional differences into fisheries management on the West Coast.

The designation of a few rockfish species as overfished a few years ago greatly restricted Washington's tribal, sport, and commercial fisheries. Fish populations are notoriously difficult to study. In order to assess the status of groundfish stocks and the recovery of overfished rockfish, the state must increase data collection on these populations utilizing state-of-the-art technologies such as sonar and remotely operated vehicles. This requires increased funding and collaboration among researchers. Fishing interests from tribes and local communities supported the state enhancing its groundfish research.[33]

In order to effectively address the biological and ecological needs of specific fisheries, we must manage some of our fish stocks according to their regional populations rather than based on the whole West Coast population. Some rockfish stocks, such as yelloweye rockfish, have populations that settle in specific areas as adults. During the OPWG outreach sessions, fishermen, tribes, and state managers expressed frustration that managing such fisheries for the entire West Coast may result in decreased fishing opportunity despite populations that may be less depleted off Washington. The state should encourage the Pacific Fishery Management Council to amend its management to account for these regional differences, where appropriate.

Recommendation 1-2

Collaborate on benthic habitat research efforts, including nearshore and shelf habitat characterization and mapping.

In the interim report, the OPWG focused on the urgent need for benthic habitat research to improve the sustainability of Washington's fisheries along the outer coast. Benthic habitat characterization and mapping will establish a baseline of the

[33] From OPWG outreach sessions, see "Summary of Public Comments" section.

current status of ocean resources. Currently, only limited research exists for identifying and mapping for Washington's outer coast and offshore benthic habitats. Many participants in coastal communities agreed that better benthic habitat research would improve fisheries management.

Increased research on habitat will allow fishery managers at the federal, tribal, and state levels to better conserve and enhance fish stocks that depend on certain habitats. Olympic Coast National Marine Sanctuary has conducted a great deal of benthic mapping and has a goal of mapping the entire sanctuary.[34] But, neither the federal or state government currently has the funding nor the human resources required to conduct the necessary benthic habitat research independently. As a result, the state should collaborate with others to identify specific data needs and develop a joint plan to fund and execute additional research. Examples of possible collaborating partners include: federal agencies, tribes, research institutions, Olympic Coast National Marine Sanctuary, other government agencies along the West Coast, and British Columbia.

Aquaculture

Washington's two main types of aquaculture are shellfish and finfish. Shellfish aquaculture is one of the oldest industries in the state. Fish hatcheries, or fish enhancement, primarily for salmon have also operated in Washington since the early 1900s. Open-water finfish operations, also called "offshore" or "net pen" aquaculture,[35] are relatively new to the state, but some sites have been around for over 30 years. Local and national attention on finfish aquaculture operations caused the OPWG to focus policy and management analysis on this specific activity. Washington currently manages finfish aquaculture through water quality permits, aquatic farm registration, and escapement and disease standards. State authority extends to all state waters and any activities that affect resources in the state's coastal zone.

During public comment sessions, the OPWG received strongly opposing views regarding finfish aquaculture, especially net pen operations. This included: 1) dissatisfaction with currently operating net pen sites; and 2) issues regarding potential expansion of net pen operations, or other, new types of offshore aquaculture. Many citizens felt that this type of aquaculture degraded water quality, detracted from the goal of sustainable wild fisheries, introduced diseases, reduced genetic quality of native stocks through escapement, interfered with

[34] Olympic Coast National Marine Sanctuary's Benthic Mapping Program: http://olympiccoast.noaa.gov/research/mapping/welcome.html.

[35] As opposed to hatcheries, which release fish into the wild, net pens keep fish captive and fed until they are harvested. Hatcheries and net pen operations share similar techniques for spawning, early cultivation, and disease screening.

navigation, promoted foreign corporations, and brought negative interactions with attracted marine mammals and seabirds. On the other hand, those involved with the industry maintained the importance of their economic contribution to the local community. They also indicated that regulations resolved many issues such as pollution and escapement. Industry favored a more predictable approach to siting net pen aquaculture operations such as that provided by ocean zoning.[36]

Due to the large demand for fish and recent declines in wild fisheries, Congress recently proposed legislation to expand and license areas of federal waters for finfish aquaculture (National Offshore Aquaculture Act of 2005). Presently many in Congress favor versions of national legislation that contain an "opt-out" provision for states, which would give states some flexibility in how they respond. Recently, NOAA Fisheries adopted a policy on offshore aquaculture and proposes increasing their involvement in aquaculture activities. The state lacks a position on the expansion of finfish aquaculture both in nearshore and offshore areas. A clearly articulated policy position would allow the state to collaborate and to engage the federal government on national aquaculture policy. With additional stakeholder input, the state of Washington should pursue a position on the issue and provide comments to the federal process.

US Commission on Ocean Policy Recommendations

Nationally, the U.S. lacks federal programs to comprehensively regulate offshore aquaculture. As a result, the USCOP recommended that Congress amend the National Aquaculture Act to designate NOAA as the lead for developing a program that offers comprehensive, environmentally-sound permitting and leasing, and a regulatory framework for marine aquaculture.[37] Additionally, the Commission suggested NOAA expand marine aquaculture research, development, training, extension, and technology transfer. As in other issue areas, the Commission suggested including state, local, and tribal input to these processes.

Relevant Laws and Programs

- WDFW provides aquaculture education, and requires escapement plans for finfish operations.
- Department of Health ensures aquaculture is conducted in a manner that protects public health. This includes a health certification based on water quality and disease standards.
- Ecology provides water quality permits; shoreline master programs handle related comprehensive planning and permitting; and the coastal zone

[36] Ocean zoning is similar to zoning for land uses. It provides a way to designate areas for certain types of development and others for conservation (i.e. identify areas unsuitable for development and others more suited to development).
[37] See USCOP Chapter 22, especially recommendations 22-2, 22-3, and 22-4.

management program requires federal consistency for finfish aquaculture operations.
- Department of Agriculture promotes aquaculture products and registers operations as state farms.
- DNR leases state-owned aquatic lands for aquaculture.
- Tribal governments have co-management responsibilities.
- Federal legislation is currently proposed to institute and standardize licensing for finfish aquaculture in federal waters, including the National Offshore Aquaculture Act.

Key Problems

- Absence of state finfish aquaculture policy to interact with federal government on potential offshore activities.
- Need for increased public input on development of state policy.
- Requires further research on potential effects of offshore aquaculture siting.
- Shellfish aquaculture industry needs to find a feasible alternative for controlling burrowing shrimp.

Recommendation 1-3

Organize a stakeholder process on all issues of finfish aquaculture through the William D. Ruckelshaus Center or other appropriate consensus facilitator.

Given the strong opposing views on finfish aquaculture, the OPWG recommends approaching the William D. Ruckelshaus Center or another facilitator to organize collaborative stakeholder meetings in areas near proposed or current finfish aquaculture activities. Stakeholders[38] should include a wide range of interest areas such as labor representatives, public citizens, fish and shellfish growers associations, non-governmental organizations, representatives and scientists from federal, local, tribal, and state governments, and others. The facilitator should keep records of these meetings in order to provide a foundation for future policy development.

The **William D. Ruckelshaus Center** is a joint effort of Washington State University and the University of Washington.

Its mission is to act as a neutral resource for collaborative problem solving in the region. The Center brings together a wide network of stakeholders, science and research, and analysis to find long-term solutions to policy conflicts in Washington State. Past Center projects have successfully handled some of the most contentious issues in the state.

Source: The William D. Ruckelshaus Center at http://pcc.wsu.edu/.

[38] Throughout this report, the term "stakeholder" refers to any person or entity with an interest in or concern about a particular issue.

The goal of the meetings should be to gain input on the issues specific to offshore aquaculture development including:

- Siting
    - Local issues, visual, and noise impacts
    - Navigation issues
    - Interactions with marine mammals, seabirds, and other marine species
- Disease control
    - Health and safety issues for consumers
    - Inspections, use of antibiotics, disease outbreak
- Pollution Control and Escapement
    - Localized pollution under pens, escapement plans (WDFW), and effectiveness, clarity, and coordination of current regulations and agencies.
- Economic impacts
    - Foreign or domestic companies and their respective impact on the local economy.
    - Impact on local economy including related sectors such as fisheries and marine transportation.

Recommendation 1-4

Continue to pursue state agency, legislative, and public input in order to provide clear state input on the development of national aquaculture policy, such as the National Offshore Aquaculture Bill.

The National Offshore Aquaculture Bill of 2005 would provide the Secretary of Commerce the authority to establish and implement a regulatory system for aquaculture in federal waters. In order to provide a strong and decisive state response to any federal proposals for offshore aquaculture, the state must pursue a clear policy on potential aquaculture development in federal waters off of Washington's coast. The state should specifically investigate issues as listed above (see Recommendation 1-3).

Recommendation 1-5

The state, tribes, and academia should pursue increased research on the potential physical, biological, and socioeconomic effects of marine fish enhancement and aquaculture.

Current and potential expansions of finfish aquaculture operations can influence the marine environment and the socioeconomics of coastal communities. While

many other countries conduct a significant amount of research on finfish aquaculture, fewer studies exist for the U.S.[39] The state needs to improve its understanding of potential local impacts of finfish aquaculture operations through increased research. It should also review available scientific studies on aquaculture.

Ecosystem-based Management

Activities on land can influence coastal and marine ecosystems. This land-sea interface can pose challenges for resource managers that usually focus on either the land or the marine environment. Ecosystem-based management (EBM) can provide a way to bridge the gaps between land and sea to encompass the range of resource uses and influences on coastal ecosystems. EBM is a term used to describe an approach to managing coastal resources, which includes management of living and non-living resources, habitat, air and water quality, and how humans interact with both ocean and nearshore environments. Some describe EBM as a new approach. Others would argue that, to some extent, EBM has been in practice for several years, but there simply was not a common term used to describe the process. There are many working definitions of ecosystem-based management, yet most contain similar components. The Scientific Consensus Statement on Marine Ecosystem-based Management[40] describes EBM in the following manner:

"Ecosystem-based management is an integrated approach to management that considers the entire ecosystem, including humans. The goal of ecosystem-based management is to maintain an ecosystem in a healthy, productive and resilient condition so that it can provide the services humans want and need. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors." (italics added)

Thus, ecosystem management relies on understanding how ecosystems work and how natural patterns and humans influence the ecosystem. EBM requires monitoring, analysis, and integration and forecasting: "to interpret relationships and interactions among ecosystem components and between human activities and the natural ecosystem." Ecosystem-based management also requires use of adaptive management - the process of continually evaluating and adjusting management measures based on better scientific understanding and changing circumstances to improve the desired outcome.

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[39] For example: Nash, C. 2003. Interactions of Atlantic salmon in the Pacific Northwest VI. A synopsis of the risk and uncertainty. *Fisheries Research* 62: 339-347.
Heffernan, M.L. 1999. A review of the ecological implications of mariculture and intertidal harvesting in Ireland. *Irish Wildlife Manuals*, No. 7. ISSN 1393-6670.
[40] Published March 21, 2005.

Washington State lacks a specific ecosystem-based strategy or process for managing its marine resources. Such a strategy would improve the effectiveness of Washington State's marine resource management by evaluating ecosystem processes and functions. This, in turn, allows the use of management measures based on ecosystem health and goals. Additionally, the state could more accurately estimate impacts of current and proposed human activities.

The interest in applying ecosystem-based approaches to marine resource management is rising around the U.S. and internationally. Recent peer-reviewed journals, general newspapers, and federal reports contain numerous references to EBM. Federal agencies, as well as potential regional ocean governance entities, are investigating the use of ecosystem-based management. NOAA's Ecosystem Task Team recently released a report on how to align the agency's various programs to support and enhance ecosystem-based management.[41] They concluded that the agency should provide integrated ecosystem assessments at a regional level. They maintained that ecosystem assessments should achieve the following:[42]

- Compile all relevant data for a defined ecosystem;
- Report on current conditions and trends;
- Synthesize time series to understand climate and human use drivers;
- Evaluate time series data of key indicators of ecosystem state (status) to proposed reference levels for safe and desired states of marine systems;
- Forecast the relationship between state indicators and pressure indicators to inform management; and
- Provide periodic ecosystem assessment updates to inform managers, stakeholders, and decision-makers.

Furthermore, NOAA's Ecosystem Task Team suggested that NOAA must establish partnerships in order to complete these assessments. The state must prepare its own policies and research to collaborate with these efforts and institute ecosystem management throughout state resource agencies.

After evaluating an ecosystem, managers can utilize a variety of

*A **Marine Protected Area** is any area of the marine environment that has been reserved by Federal, State, territorial, tribal or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein.*

NOAA Marine Protected Areas Center. July 2006. *Draft Framework for Developing the National System of Marine Protected Areas.*

[41] See External Ecosystem Task Team Report to NOAA Science Advisory Board. *Evolving an Ecosystem Approach to Science and Management Throughout NOAAA and its Partners.* Final Report. July 24, 2006.

[42] See External Ecosystem Task Team Report to NOAA Science Advisory Board. *Evolving an Ecosystem Approach to Science and Management Throughout NOAAA and its Partners.* Final Report. July 24, 2006.

ecosystem tools to manage multiple uses and needs. For ocean and coastal ecosystems, some of these tools include ocean zoning, marine protected areas, and marine reserves. Through the PFMC process, WDFW worked with stakeholders to develop marine protected areas for the purposes of coral and essential fish habitat protection and rockfish recovery. The marine protected areas include areas closed to bottom trawling, commercial hook-and-line area closures, and areas closed to recreational fishing for bottomfish and halibut. WDFW continues to work with the tribes, stakeholders, and the Olympic Coast National Marine Sanctuary to further refine and consider new marine protected areas off Washington's coast.

US Commission on Ocean Policy Recommendations

The USCOP maintained that ecosystem approaches were so fundamental to managing ocean resources that they made it a guiding principle to overlay all of their recommendations. Since ocean policy involves multiple societal needs and ecological factors, one cannot merely manage one part of the system. Ecosystem-based management allows managers to consider connections among different parts of the system.

The USCOP suggested that large marine ecosystems and associated coastal watersheds might form an appropriate scope for ecosystem units. But, they also stated management of ecosystems must remain flexible to manage on smaller or larger scales. The Commission declared that ecosystem approaches would result in many benefits such as:

- Increasing coordination among managers to reduce duplication and maximize resources.
- Providing a forum to address conflicts among management entities with differing mandates.
- Allowing easier assessment and management of cumulative impacts.[43]

In particular, the Commission suggested the following specific management arenas should incorporate ecosystem approaches and principles:[44]

- Marine protected areas.
- Regional sediment management.
- Fisheries in establishing essential fish habitat and reducing bycatch.
- Coral reef protection.

[43] U.S. Commission on Ocean Policy. 2004. *An Ocean Blueprint for the 21st Century*. Final Report. Pages 63-65.

[44] See USCOP Recommendations 6-3, 6-4, 12-1, 19-21, 19-23, 21-2, and 21-5.

Relevant Laws and Programs

- Washington State resource agencies such as WDFW, DNR, Ecology, State Parks, conduct a wide range of related research and management.
- Tribal government co-management responsibilities.
- Local governments manage local development and conservation through Shoreline Master Programs and defining Critical Area Ordinances under the Growth Management Act. In particular, outer coastal counties must include ocean resource management issues in their Shoreline Master Programs (under the Ocean Resources Management Act). These processes require solid ecosystem information.
- San Juan County Marine Resource Committee[45] is currently using an ecosystem framework for their marine resource planning.
- Federal resource research and management agencies include: NOAA Ecosystem Task Team, NOAA Fisheries, Olympic Coast National Marine Sanctuary, U.S. Fish and Wildlife Service - National Wildlife Refuges, and Olympic National Park.
- Olympic Coast National Marine Sanctuary (OCNMS) is conducting two ecosystem-related initiatives: System-Wide Monitoring Program (SwiM)[46] and a biogeographic assessment[47] of the sanctuary.

Key Problems

- Absence of specific state strategy to implement ecosystem-based management in state marine resource management practices.
- Need to expand use of existing state agency mandates, as well as provide new agency direction, to use ecosystem knowledge in state resource management.
- Need to compile research on past ecosystem conditions and current ecosystem health to identify 'ecosystem baselines' for use in ecosystem-based management; and
- Must identify appropriate tools for an ecosystem-approach to managing Washington's ocean and coastal areas.

[45] The Nature Conservancy originally developed this methodology. For more information on the San Juan County Marine Resources Committee process visit: http://www.sjcmrc.org/programs/msaplan.htm.
[46] Information on SWiM available at: http://sanctuaries.noaa.gov/science/monitoring/welcome.html.
[47] Information on the biogeographic assessment available at: http://ccma.nos.noaa.gov/ecosystems/sanctuaries/olympic_nms.html.

Recommendation 1-6

Assess coastal and ocean resources and trends to facilitate an ecosystem-based approach in management of ocean and coastal resources. Develop performance measures and key indicators to evaluate progress toward ecosystem health.

In order to manage the multiple needs of our oceans and coasts and maintain a sustainable ecosystem, we must assess the various resources and trends of ocean and coastal systems. While Volume 1 of this final report provides a brief overview of this status, an in-depth assessment of key ecosystem resources and trends requires compiling more scientific data. It also involves selecting key ecosystem indicators and setting goals. As mentioned in NOAA's Ecosystem Task Team, an assessment may be more effective with collaboration among various partners: federal, state, local, and tribal governments; and academia. An ecosystem assessment is the first step toward ecosystem-based management. The benefits of EBM include better management and policy decisions, improved coordination, increased efficiency, and sustainable, healthy ecosystems.

An effective way to conduct an ecosystem assessment is to determine key indicators of ecosystem health. Research on the baseline and trends of these few indicators can then yield a better picture of the status of the ecosystem. From these indicators, managers can set performance measures, or "ecosystem goals", to gauge progress on achieving ecosystem health.

These clearly defined ecosystem goals should be the basis for an ecosystem-based management approach, and state activities should pursue achievement of these goals. In San Juan County, the Marine Resources Committee shared a similar method as a successful example of local ecosystem-based management.[48] Another similar example is the Olympic Coast National Marine Sanctuary's System-Wide Monitoring Program (SWiM), which provides a systematic way to monitor ecosystems at the local-level, assesses the status and trends of the natural resources and human uses in the Sanctuary's ecosystems, and evaluate impacts on water, habitat, and living resource quality.[49] The draft of OCNMS' SWiM document is due out soon. Some participants in OPWG outreach asserted that the state needed to utilize an ecosystem approach in order to establish baselines and provide meaningful management decisions.

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[48] Instead of "ecosystem goals", the San Juan County Marine Resource Committee utilized "conservation targets".

[49] U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Ocean Service, National Marine Sanctuary Program. July 2004. National Marine Sanctuaries: A Monitoring Framework for the National Marine Sanctuary System.

Recommendation 1-7

Over the long-term, the state should continue to explore and consider using various management tools for coastal and ocean resources through a collaborative state, tribal, and federal process.

Protecting ecosystems or habitats by using management tools, such as marine protected areas, would protect marine biodiversity for the state of Washington, as well as global biodiversity. It would also provide ecosystems time to recover from anthropogenic impacts such as overfishing, habitat destruction, and marine pollution. A healthy ecosystem increases resilience to future impacts, such as the effects of climate change on ocean life. Furthermore, a healthy, diverse ecosystem supports the wide-range of ocean uses such as fishing and recreation. Yet, many outreach participants expressed concern over utilizing these ecosystem management tools without proper justification or participation from stakeholders.

One way to assess management tools is through a biogeographic assessment. The Olympic Coast National Marine Sanctuary plans to conduct a biogeographic assessment in 2007-2009. This tool utilizes various types of biological and physical data to identify threatened habitats and areas that are important for species.[50] The resulting products allow a sanctuary to evaluate current management practices and explore alternative management options. The biogeographic assessment may also be useful for assessing the status of ocean and coastal ecosystems (Recommendation 1-6).

As the state explores and considers new management tools, it must collaborate with tribes, federal agencies, stakeholders, and local governments. Furthermore, the state must base use of any management tools on the specific problems identified for our marine ecosystems. To identify these key problems, the state must first assess the health of our ocean and coastal ecosystems.

Ocean Energy

Ocean energy refers to technologies that produce energy from offshore wind, waves, tidal currents, or by extraction of offshore oil and natural gas. Development of renewable energy from the ocean, such as wind, wave, and tidal energy can provide a cleaner, renewable source of energy. Several currently proposed potential energy developments will require input from the state, which calls for a timely and clear state policy for ocean energy.

[50] Some categories of data are imagery (aerial and satellite photos), human stressors, bottom type, bathymetry, oceanography, and species distribution.

The Federal Energy Regulatory Commission (FERC) has received several project proposals to study areas for marine renewable energy development. The proposed sites are located throughout Puget Sound, the Columbia River, Willapa Bay, and off Cape Flattery. As an example, AquaEnergy and the Makah tribe propose to use four wave buoys to create about 1 MW (megawatt) - enough electricity to power about 150 typical homes.[51] Impacts from these types of facilities are likely less than fossil fuel energy development, but remain largely unknown. Thus, these proposals provide an opportunity for the state to gather more research and guide the appropriate development of marine renewable energy. In addition, the federal government, under the Minerals Management Service, is in the midst of preparing a program to enable leasing of federal waters for renewable energy development.[52]

Since 1990, Washington has had a moratorium on leasing for oil and gas exploration and development in federal waters off the coast.[53] The moratorium is set to expire in 2012. Soon, the Minerals Management Service (MMS) will decide on how to proceed with leasing activities after 2012. Recently introduced federal legislation would open up areas of federal waters previously covered by the presidential moratoria to oil and gas leasing and development. Other potential energy projects include a liquid natural gas terminal proposed for the Columbia River.

US Commission on Ocean Policy Recommendations

Given the contentious history of offshore oil and gas development in the country, the USCOP stated that affected stakeholders should have a say in decision-making.[54] They recommended that the federal government grant revenues from oil and gas leases to all coastal states for conservation and sustainable development of renewable ocean and coastal resources.[55] The Commission also suggested expanding research and monitoring of environmental impacts of oil and gas development. The USCOP also recommended establishing a comprehensive program for managing and developing offshore renewable energy. Again, as in other areas, the USCOP highlighted the importance of a federal-state partnership on offshore issues.

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[51] Ocean Energy Division of Finavera Renewables, formally AquaEnergy Group Ltd. at: http://finavera.com/wave/makah_bay.

[52] The MMS is in the scoping process for a draft programmatic Environmental Impact Statement (EIS). They anticipate releasing a draft EIS in early 2007.

[53] The moratorium also affects Oregon, California, and many other places, including most of the East Coast.

[54] See USCOP Chapter 24, especially recommendations 24-1 and 24-5.

[55] Yet, the USCOP stated that oil and gas producing states should receive a greater share of the revenues.

Relevant Laws and Programs

- Ecology co-administers Shoreline Management Act with local governments; provides federal consistency determinations under the Coastal Zone Management Program; approves water quality certifications; and administers State Environmental Policy Act (SEPA). The Ocean Resources Management Act (ORMA), one of the enforceable policies of the Coastal Zone Management Program, asserts the state's interest in activities in federal waters that impact the coastal zone.
- WDFW authorizes Hydraulic Project Approvals for in-water work, consults on the needs of endangered and threatened species and priority habitats.
- DNR owns and leases state-owned aquatic lands – the beds of subtidal and intertidal waters.
- State Parks is involved where projects impact state seashore park lands.
- CTED promotes development of cleaner energy sources to meet state demand.
- Department of Transportation is interested in potential impacts to navigation for ferries from projects.
- Energy Facility Site Evaluation Council (EFSEC) consists of all natural resource agencies and governor's representative to provide streamlined approval process for energy projects in the state. This does not include hydroelectric projects or small-scale projects (under 350 MW). Alternative energy projects of any size can opt-in to the process.
- At the federal level: Federal Energy Regulatory Commission (FERC) issues preliminary permits and licenses for hydropower and other energy projects. Congress authorized Minerals Management Service (MMS) to develop a program to license offshore renewable energy projects (in federal waters). Federal agencies with related permitting or authority interests include: NOAA Fisheries, U.S. Army Corps of Engineers, U.S. Fish and Wildlife, and Olympic Coast National Marine Sanctuary.

Key Problems

- Lack of a clear state ocean energy policy to interact with federal government on marine renewable energy and oil and gas development issues.
- Limited knowledge on potential impacts of active, proposed, and potential marine renewable energy projects in Washington State. Absence of state guidelines or policy regarding such projects.
- Need a state mechanism to interact with tribal governments on proposed renewable energy projects in tribal waters and coastal areas, on potential expansion of successful models into state-managed areas.

Recommendation 1-8

The state should support extension of the offshore oil and gas moratorium in perpetuity.

Federal legislation introduced in the summer of 2006 attempts to open offshore areas for oil and gas leases that are currently covered by a presidential moratorium. At this time, the MMS is also preparing its 5-year plan for the 2007-2012 Outer Continental Shelf oil and gas lease sale period, as required by law. This plan will address the Energy Policy Act requirement of inventorying offshore oil and gas and identifying Washington State rules that constrain offshore oil and gas development. The Office of the Governor responded in October 2005, expressing continued support for the current leasing moratorium.[56] More recently, the Governor's Office, through the West Coast Agreement on Ocean Health sent a letter to the President and Congress reiterating the need to make this moratorium permanent.[57] OPWG supports extension of this moratorium in perpetuity.

Recommendation 1-9

Integrate policy for marine and ocean renewable energy among state agencies. Interact with the Minerals Management Service on offshore energy issues. Evaluate potential impacts on existing uses and investigate developing comprehensive guidelines for renewable ocean energy such as through a Programmatic Environmental Impact Statement.

The state has an interest in environmentally responsible development of renewable energy in coastal and ocean waters. Since the MMS is currently developing its program for offshore areas, now is the time for the state to engage in and shape the outcome. In particular, state agencies such as WDFW, DNR, and Ecology contain authorities related to offshore development. The Department of Ecology houses the Coastal Zone Management (CZM) Program, which can engage on federal projects and policies that impact Washington's coastal zone. In addition, one of the CZM Program's responsibilities is to respond to state and federal policy initiatives that will impact the state's coastal zone.[58] Thus, this program is a natural place to coordinate state agency interaction with and response to the federal government's developing offshore renewable energy program.

Recently, FERC has received a flurry of applications to study areas in Washington's waters for tidal and wave energy development. Multiple state agencies have authorities and interests related to permitting and locating these types of

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[56] Again, the moratorium is set to expire in 2012.

[57] The governors of Oregon and Washington also sent letters supporting making this moratorium permanent.

[58] Department of Ecology, Shorelands and Environmental Assistance Program. February 2001. *Managing Washington's Coast: Washington State's Coastal Zone Management Program.* Publication 00-06-129

developments, yet little is known about their potential impacts. State agencies would benefit from coordinating on renewable energy scientific, technical, legal, and policy issues. For example, conducting a rapid scientific assessment could identify issues and serve as a starting point for development of a comprehensive State strategy. In this process, state agencies should consult with and gather input from stakeholders including energy applicants; regulators; tribes; marine industries and businesses; recreation, navigation and environmental interests; and the general public. State agency collaboration should evaluate potential impacts on existing uses of marine resources and investigate the possibility of developing comprehensive guidelines or policies[59] for environmentally responsible renewable ocean energy projects. As a result, project proponents would benefit from more predictable permitting.

Recommendation 1-10

Promote only environmentally responsible marine renewable energy development and solicit further input from stakeholder groups from Washington, Oregon, and British Columbia.

In order to learn more about renewable energy development, the state should solicit further input and lessons-learned from stakeholder groups, including neighboring states and provinces with projects underway. The state should seek to promote only environmentally responsible development of marine renewable energy. As noted in Recommendation 1-9, the state must further evaluate the potential impacts of these developments on existing uses of marine resources first.

[59] One way to define a state policy would be through a Programmatic Environmental Impact Statement (EIS).

Chapter 2: Coastal Vulnerabilities from Marine Sources

As discussed earlier, Washington's coast is susceptible to a variety of natural threats including storms, flooding, landslides, tsunamis, earthquakes, erosion, and sea level rise. Often, hazards result in damaged or lost lives, property, and infrastructure. We grouped these coastal vulnerabilities into the following policy topics: coastal hazards, erosion and sediment management, and climate change. Investigation of these issues revealed common needs for: 1) increased agency coordination in planning and management and 2) improved awareness and understanding through monitoring, research, and public education and outreach.

Vision for Coastal Vulnerabilities

In vulnerable coastal areas, sound coastal management protects lives, promotes sustainable and sensible development, protects the environment and the economy, and increases preparedness. As a result of good management, fewer lives, less property, and less infrastructure are lost or damaged from natural hazards. Governments minimize the risks natural, coastal hazards pose by: researching and monitoring coastal processes including erosion, sedimentation, and impacts of climate change; enhancing technical data and support; improving land use planning; educating the public; and improving coordination.

The state actively partners with federal, local, and tribal interests in erosion and regional sediment management issues. To restore and maintain natural coastal processes by maximizing use of dredged material to replenish coastal beaches, where appropriate. The state adopts and supports a proactive framework for dealing with climate change.

Coastal Hazards

Significant hazard events put lives, property, infrastructure, ecosystems, and the economy at risk. Many coastal communities developed in floodplains, such as Aberdeen and South Bend. Storm surges in the winter can cause flooding of low-lying places like La Push, Long Beach, Ocean Shores, and Westport. Washington is one of the most flood-prone states with 25 presidential disaster declarations for flooding between 1971 and 2001. The statewide flooding in 1995-96 exceeded $500 million in damages. Other coastal areas have unstable bluffs and are subject to landslides.

Major earthquakes in the Pacific Ocean can generate tsunamis that impact Washington's outer coast and Strait of Juan de Fuca. Several tsunamis have struck the state's shoreline throughout history, including three since 1960. The 1964

Alaska earthquake generated a tsunami that caused $640,000 in damage (2004 dollars). Projected tsunami wave heights for Washington's coastal communities vary between 4 and 30 feet. In the next 50 years, there is a 10 to 14 percent chance of a magnitude 9 or greater earthquake in the area directly off the state's outer coast (called the Cascadia Subduction Zone) and a resulting tsunami. A local, Cascadia Subduction earthquake could also cause the level of the coast to fall six feet, in effect raising sea level the same amount.

Coastal communities face the complex task of balancing economic development needs with hazard mitigation. Changing existing infrastructure and development patterns to reduce hazard risk presents challenges. For example, in La Push, the Quileute tribe would like to reduce hazard risk by relocating its school to higher ground and out of the path of storm surges and tsunamis. This would require a land acquisition from the surrounding Olympic National Park - the parties are currently in the midst of negotiations. Opportunities for development, such as condominiums, in small coastal communities can boost depressed local economies. However, often the most desirable coastal land to develop is located in hazard areas.

State, local, tribal, and federal involvement is essential to reduce risks; respond to hazard events; and cleanup and restore impacted communities. This includes land use planning, data collection on hazards, hazard avoidance and mitigation, and response planning. Several state agencies conduct these various aspects of hazards management. While state agencies partner well on some specific issues like tsunamis, they would benefit from continued coordination to comprehensively address all coastal hazards. Local land use planning in hazardous areas requires solid data and risk protocols. Yet, minimal funding limits state hazards research and technical outreach to communities. Many local participants in OPWG outreach sessions acknowledged that they and their communities lacked preparedness for hazard events. Education, widely viewed as a key component to preparedness, varies a great deal at the local level. In order to effectively manage coastal hazards, Washington must address these challenges and gaps.

US Commission on Ocean Policy Recommendations

The US Commission on Ocean Policy's recommendations on coastal natural hazards included the following broad reforms:

- Improving emergency management technical assistance and planning.
- Reducing incentives for development in high-hazard areas.
- Improving collection and use of hazard-related data.
- Discouraging growth in fragile or hazard-prone coastal areas.

The Commission aimed most of the recommendations at the Federal Emergency Management Agency (FEMA), but emphasized the importance of involving state and local government in appropriate actions to provide consistency, coordination, communication, and efficiency to hazard management.

Relevant Programs and Laws

The state oversees many laws and programs that manage, mitigate, plan, and respond to coastal hazards including:

- Emergency Management Division (EMD), under the Washington State Military Department, is the primary agency for hazard mitigation. It develops and implements the State Hazard Mitigation Plan; trains emergency responders; organizes response and recovery; manages the State's Tsunami Program and State/Local Tsunami Workgroup; and provides hazard response planning.
- Communities must designate and protect geologically hazardous and frequently flooded areas using Critical Areas Ordinances (CAO) adopted under the Growth Management Act. The Washington State Department of Community Trade and Economic Development (CTED) provides technical assistance to local governments implementing this act. Ecology supplies technical assistance on hazards, flooding, and wetlands for CAO designations.
- Ecology oversees local development of Shoreline Master Programs under the Shoreline Management Act. In particular, new state guidelines provide ways for local communities to address development in hazardous areas including tools such as setbacks, building standards, and considering alternative erosions structures. Washington's Coastal Zone Management Program provides educational resources on the state's coastal areas.
- Under the state Floodplain Management Act, Ecology's floodplain planning and management regulates development in floodplains according to state and federal standards. It also provides local community grant funding to reduce flood damage including comprehensive planning and maintenance projects.

- Department of Natural Resources (DNR) maps geological hazards, provides community education regarding hazards for disaster and land use planning, and assists in emergency response.
- Emergency managers at the county and city level provide local planning and response.
- Washington Conservation Corps (WCC) provides a group of trained, on-call disaster responders.
- Washington Department of Transportation manages statewide transit infrastructure including maintaining public safety. This includes programs such as the bridge retrofit program designed to improve the stability of older structures.
- Washington SeaGrant recently partnered with the National Oceanic and Atmospheric Administration (NOAA) Coastal Storms Initiative. They are currently working to improve storm prediction and observations by deploying more buoys and sensors and developing computer models, especially for the Lower Columbia River.
- State Parks provides education to the public on coastal hazards at relevant state-owned properties. They also manage infrastructure to allow natural coastal processes and avoid hazards.

The Federal Emergency Management Agency (FEMA) prepares the nation for all types of hazards and manages federal response and recovery efforts following any federal disaster. This is achieved primarily through funding and regulatory guidance. FEMA also initiates proactive mitigation activities, trains first responders, and manages the National Flood Insurance Program.

Key Problems

- Insufficient education on coastal hazards to local governments, residents, and visitors.
- Need for more data collection, hazards research, monitoring, modeling, and better integration of knowledge with local-level planning and management. State agencies lack resources to provide adequate technical assistance to local communities.
- Inadequate risk protocol for local decision-making.
- Not enough coordination between various agencies involved in coastal hazard research and management.
- Support for federal flood map modernization must continue.
- Lack of stable, adequate funding.

Reducing Community Risks to Natural Hazards

Coordination

Recommendation 2-1

Increase coordination for coastal hazard planning and preparedness among state agencies including partnering with federal, tribal, and local governments to prioritize data collection, improving outreach and dissemination of resources for local communities, and strengthening communication.

Support continued efforts of an informal inter-agency committee to address coastal hazard issues with an emphasis on increasing coordination; partner with federal and local governments to prioritize and coordinate data collection;[60] improve outreach and dissemination of resources to local communities; and strengthen communication between local emergency managers and city and county planners. Ecology should convene another meeting of this group with the aim of identifying an appropriate agency lead and any resources needed to continue its work. The interagency committee should at least include DNR, EMD, Ecology, CTED, and WSDOT and these agencies should collaborate on a regular basis.

While some efforts exist on specific hazard issues, such as the State/Local Tsunami Workgroup, Washington does not have an integrated and coordinated mitigation program for all coastal hazards. This hinders assessment of needs and improvements to response and preparedness. Coordination of pre-hazard planning among state and local players should be primary focus. Encourage state agencies to utilize existing coordination efforts (e.g. Coastal Communities of Southwest Washington) to improve communication and outreach with local stakeholders.

Education

Recommendation 2-2

Enhance public education on tsunamis and other coastal hazards with additional resources from the state and federal government. NOAA's tsunami program and workshops in communities are examples of successful models for education.

In particular, support increased resources for community workshops with coastal communities and tribes using state hazard experts. Many members of the public felt that hazard awareness and preparation is an important, on-going need. Inadequate education occurs in many communities. Some expressed that past workshops with state experts provided an effective way to educate, especially for local planners.

[60] The USCOP also recommends greater coordination on hazards research in their Recommendation 10-2.

Monitoring, Research, and Land Use Planning

Recommendation 2-3

Address gaps in hazards research and planning. Advance baseline data and research on coastal hazards conducted by state agencies. Improve technical and financial assistance provided by state agencies to coastal communities for land-use planning.

Monitoring, research, and technical assistance are essential to planning appropriately. While some state agencies currently conduct this work, greater resources are needed to provide improved data and assistance to communities. This reduces communities' vulnerability to hazards and reduces investment in hazardous areas, therefore preventing future harm to lives, buildings, and public infrastructure.

- Fund basic and expanded agency research in hazard identification, monitoring, assessment, and mapping such as: run-up modeling, erosion mapping, forecasts, and collateral damage assessments. As a first step, the state should conduct strategic planning and prioritization for research based on different coastal issues. (See Recommendation 4-1, and 4-1E for strategic research plan)

- Ecology, DNR, and EMD should translate data into useable products such as forecasts, maps, and models for planning at the local level. Develop products that will support Shoreline Master Program and Critical Areas Ordinance updates. Shoreline Master Programs and Critical Areas Ordinances provide requirements for protecting the public and property from geological hazards and floods. Encourage and assist local entities in incorporating appropriate climate change scenarios into this planning.

- Provide adequate funds to local governments for updating critical areas ordinances and shoreline management plans, especially as it pertains to improving identification, planning, and management of natural hazards. Strongly encourage local communities to use a risk protocol/framework as part of planning that includes a risk assessment and a decision on the acceptable level of

Risk Assessment Resources

- NOAA Coastal Service Center – Risk and Vulnerability Assessments
- "No Adverse Impact in the Coastal Zone" by Association of State Floodplain Managers, includes information on conducting risk management.
- FEMA community rating system

risk for the community.[61] Many coastal communities acknowledged the need for risk analysis in the 1999 Coastal Erosion Task Force Report.[62] Public involvement is an important component of the risk protocol.

Another important step to improving coastal hazard research is Doppler RADAR. A Doppler on the outer coast would: 1) provide more accurate and up-to-date weather for the whole state since most weather systems arrive from the coast, and 2) increase marine safety, especially for fishing and shipping industries. The OPWG recommends pursuing for a Doppler RADAR under ocean research Recommendation 4-3.

Recommendation 2-4

Analyze effectiveness of shoreline policies, regulations, and education at reducing hazard risks.

In the short-term, increase availability and distribution of shoreline property education materials along the outer coast. Examples include those developed by Puget Sound Action Team and Department of Ecology. In the long-term, the state or an appropriate independent party should examine the effectiveness of current policies, regulations, such revised local planning efforts under the SMA and GMA, and education at preserving natural coastal processes, addressing impacts and effectiveness of erosion control structures, and reducing risks to people and property.

Relationship to Federal Government Initiatives

Recommendation 2-5

The federal government should adjust coastal hazard programs to reduce hazard risk such as reducing incentives, improving coordination, and modernizing flood mapping.

The state should encourage the federal government to follow three particular recommendations from the USCOP: 1) move forward on restructuring the National Flood Insurance Program to reduce incentives for building in hazardous areas (USCOP 10-3);[63] 2) provide adequate funding for Federal Emergency Management

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[61] References for Risk Assessment Resources listed in the text box: NOAA Coastal Services Center, Risk and Vulnerability Assessments at: http://www.csc.noaa.gov/vata/; Association of State Floodplain Managers, No Adverse Impact approach, http://www.floods.org/home/default.asp; FEMA Community Rating System, http://www.fema.gov/business/nfip/crs.shtm.

[62] Members of the Coastal Erosion Task Force. March 1999. *The Coastal Erosion Task Force: A Report to the Governor*. pgs. 43-44.

[63] USCOP 10-3 recommends the National Flood Insurance Program: 1) establish clear disincentives to building or rebuilding in high-hazard zone by requiring property owners pay actuarially sound rates for insurance; 2) enforce measures to reduce vulnerability to hazards including retrofitting

Agency flood map modernization efforts including use of the Pacific Coast methodology (USCOP 10-2);[64] and 3) work with state and local partners to address coastal hazard issues (USCOP 10-2). In addition, the federal government should promote the "No Adverse Impact" approach to coastal flood hazard management. "No Adverse Impact" means establishing policies that ensure that the actions of one property owner or community do not adversely impact other property owners.

What is "No Adverse Impact"?

No Adverse Impact is a comprehensive, voluntary approach to hazard management developed by the Association of State Floodplain Managers. The No Adverse Impact principles for the coastal zone includes specific local community approaches for hazard identification and mapping; planning; regulations and development standards; mitigation measures; infrastructure; emergency services; and education and outreach. For example, the No Adverse Impact approach for hazard mapping is to realistically map the full range of hazards – now and in the future. In addition to mapping floodplains, data would include sea level change, tsunamis, coastal erosion, frequency of coastal storms, and environmentally sensitive areas. Risk analysis and management is vital to planning under the No Adverse Impact approach.

Source: Association of State Floodplain Managers. September 2006. *No Adverse Impact in the Coastal Zone: Draft.*

Recommendation 2-6

The state should evaluate current programs and take the actions needed to reduce impacts of coastal hazards including prioritizing grant applications for projects that provide flood mitigation, conducting workshops on "No Adverse" impact, and considering changes to state guidelines and laws.

Specific actions should include: 1) Reviewing, and as necessary, revising the SEPA handbook to encourage hazard mitigation when the SEPA checklist identifies steep or unstable slopes, potential erosion, or flooding potential; 2) Giving priority consideration to Flood Control Assistance Account Program (FCAAP) grant applications for projects that provide mitigation for coastal hazards; 3) Conducting "No Adverse Impact" workshops for coastal communities; and 4) Considering more restrictive state laws for regulating development in coastal areas (e.g. restricting

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buildings and buyout programs for buildings with repetitive-loss histories; and 3) create enforceable mechanisms to direct development away from undeveloped floodplains and erosion zones.

[64] USCOP 10-2 recommends setting up a task force of appropriate federal, state and local agencies and governments to improve the collection and use of hazards related data. This includes a high priority for updating flood maps through the flood map modernization initiative.

development in FEMA Mapped Velocity Zones to only water-dependent uses.). Reducing incentives for building in hazard prone areas and encouraging uses that minimize adverse impacts will put fewer lives at risk and less infrastructure and property will be damaged by hazard events.

Improving Response to a Natural Hazard Event

Repair Critical Infrastructure

Recommendation 2-7

Fix aging and critical infrastructure on outer coast through additional resources for Washington State Department of Transportation (WSDOT) bridge retrofit program.

This infrastructure is vital for community response and evacuation in the event of a tsunami, flooding, or other natural hazard event. Due to their rural and isolated nature, many coastal communities rely on one major route for evacuation. If a bridge fails on an essential route during an earthquake, it prevents safe evacuation and response including escaping the potential resulting tsunami. The state should consider providing increased or dedicated resources to WSDOT bridge retrofit program to ensure this work occurs in coastal areas.

Warn of an Event and Enable a Timely Response

Recommendation 2-8

Encourage the state and federal government to complete the All Hazards Alert Broadcast network for Washington's outer coast and straits. This network will warn of a hazard event and enable a timely response.

If necessary, the state should provide partial matches in funding to accomplish this task. Alarms minimize potential loss of life by allowing advanced warning and response for coastal populations. Many people in coastal communities appreciated the work of Governor Gregoire and Senator Cantwell to provide funding for 30 of these alarms. However, 96 total alarms are needed to adequately cover at-risk populations on our coast.

Erosion and Sediment Management

Over thousands of years, Washington's coast accumulated sediment. In the past several decades, dams and dredging decreased the amount of sediment leaving the Columbia River and slowed this accumulation on outer coast beaches. Washington's southwest coast, a part of the Columbia River littoral cell, experiences chronic and severe erosion in some locations. Erosion and sediment problems also exist all along Washington's coast, from La Push to the Elwha River and Ediz Hook.

Coastal erosion has significantly destroyed and threatened public parks, private property, and public structures such as roads and sewers. Over the past 40 years, Cape Disappointment State Park[65] has lost about 260 acres of land and Westhaven State Park has lost over 200 acres of land. In the last century, Washaway Beach on Willapa Bay has eroded at a rate of 100 feet per year. The Washington State Department of Transportation (WSDOT) spent $27 million to protect State Highway 105 with a rock jetty in 1998. In 2005, winter storms gouged a hole through an embankment in a stretch of road farther south of this jetty.[66] The state spent $417,500 in emergency repairs to protect the highway.[67] WSDOT is spending an additional $940,000 to reinforce the embankment and stabilize it against winter storms.[68] Another example is the 1993 breach at the South Jetty in Westport, which endangered navigation, the city's sewage treatment plant, and West Haven State Park.[69] It cost nearly $8 million to repair the damage. Erosion in 1995 threatened condominiums in Ocean Shores. As a result, owners paid over $500,000 to construct a rock revetment. A final example is the shifting mouth of Connor Creek, which has altered public access roads to the beach and caused localized flooding.

Over time research on sediment and erosion processes has led to a better understanding of management and technical issues. For example, it is now commonly understood that shoreline structures such as bulkheads and riprap can actually increase erosion on adjacent properties and reduce beach height. Other areas of the country have utilized approaches such as putting sand back on the beach or in the nearshore to rebuild beaches destroyed by erosion.

Dredge material can often provide a good source of sand for these efforts. Just north of the Columbia River, the US Army Corps of Engineers (USACE) in cooperation

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[65] Formerly known as Fort Canby State Park.
[66] According to Pacific International Engineering (PIE) the jetty was not designed to protect this area against the type of storm that caused the damage in winter of 2005.
[67] Washington Department of Transportation contract number DMD024.
[68] Washington Department of Transportation: http://www.wsdot.wa.gov/News/2006/10/20_SR105Washaway.htm
[69] Southwest Washington Coastal Erosion Study background available at: http://www.ecy.wa.gov/programs/sea/swces/overview/background_p2.htm.

with State Parks conducted a pilot project at Benson Beach, which placed a small amount of dredged material on the beach. Local groups are working to continue this project with larger amounts of sand. As a result, they hope to determine a way to provide a long-term solution to coastal erosion issues.

Dealing with erosion and sediment management requires a broader look, beyond individual projects to encompass the whole system – regional sediment management. Early attempts to address broad erosion and sediment management policy in Washington included the Coastal Erosion Task Force, a multi-stakeholder group, which produced detailed recommendations in 1999. While participants reached agreement on many issues, ultimately differences in opinions caused decision-makers to ignore their recommendations. In 2001, another informal attempt to form a multi-stakeholder, Regional Sediment Management partnership fizzled due to changes in personnel and inadequate funding. Currently, the USACE oversees a related effort, the Regional Sediment Evaluation Team (RSET), a multi-agency team that is focused on revising the Lower Columbia Dredge Material Evaluation Framework. This will consolidate dredging guidance to provide regional consistency in evaluating dredging projects.

Management and permitting of dredging and erosion control projects still focus on individual projects, but things are beginning to change. California recently developed the California Coastal Sediment Management Master Plan. This collaboration between local, state, and federal agencies, and non-governmental organizations evaluates their state's sediment management needs on a regional, system-wide basis.[70]

> *"Regional Sediment Management (RSM) uses understanding of sediment systems to provide a context for managing projects and activities involving sand and other sediments. It recognizes sediment as a resource that is integral to economic and environmental vitality. Stakeholder teams identify inter-related sediment resource needs and opportunities, and collaboratively leverage programs, data, information and other resources to balance sediment-related objectives over time."*
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> *Source:* U.S. Army Corps of Engineers, "10 Frequently Asked Questions about Regional Sediment Management", May 2006.

In the Pacific Northwest, the Lower Columbia Solutions Group involves the relevant stakeholders, and local, state (Oregon and Washington), and federal agencies. This group holds promise for advancing regional sediment to address our state's needs.

Utilizing a regional approach to sediment management requires changes and commitment at all levels of government. In addition, continued erosion and

[70] California Coastal Sediment Management Master Plan available at: http://www.dbw.ca.gov/CSMW/sedimentmasterplan.htm.

sediment monitoring and assessments are necessary to provide more accurate information and better inform local decisions.

US Commission on Ocean Policy Recommendations

The Commission recognized the advances in understanding of coastal processes and harmful past management practices. For managing sediment and related shoreline issues such as erosion, the general recommendations were:

- Developing a strategy for managing sediment regionally utilizing ecosystem-based and watershed management and adopting necessary changes to the US Army Corps of Engineers to achieve this goal.
- Improving assessments, monitoring, research, and technology to enhance sediment management.
- Coordinating regional dredging teams and regional ocean councils to establish regional sediment management programs.
- Developing and coordinating strategies for contaminated sediment issues.

Relevant Programs and Laws

The state has many permitting, public works statutes, and authorities related to dredging, erosion, and sediment management.

- Department of Ecology provides permits under the Clean Water Act (401 Water Quality Certifications) and federal consistency determinations with Coastal Zone Management Program. Under the Shoreline Management Act, Ecology adopted revised guidelines that strengthen local shoreline master programs' provisions regarding coastal processes including erosion management. Revised Shoreline Master Programs must ensure "no net loss" of shoreline functions, which includes: 1) utilizing setbacks for new development; and 2) requiring softer approaches to shoreline stabilization such as vegetation over harder structures such as bulkheads (Washington Administrative Code 173-26-231).
- The Washington Department of Fish and Wildlife (WDFW) protects fish and wildlife via the State Hydraulic Code by issuing Hydraulic Project Approval permits for work conducted in the water to minimize harm to spawning grounds, fish, and wildlife.
- In Puget Sound, coastal embayments, and the Columbia River, the multi-agency Dredge Material Management Program oversees disposal of dredged materials. The Department of Natural Resources authorizes dredge removal from state aquatic lands and permits, manages, and monitors the disposal sites. The federal Environmental Protection Agency permits all other ocean dredge material disposal sites.

- Washington State Parks and Recreation Commission (State Parks) oversees the Seashore Conservation Area along outer coast ocean beaches between ordinary high tide and extreme low tide, except areas within tribal reservations. This area is primarily preserved for public recreation. As mentioned above, erosion has caused loss of state park lands. State Parks' policy is to avoid interfering with erosion processes on park lands and to relocate infrastructure as necessary.

At the federal level, the U.S. Army Corps of Engineers (USACE or Corps) conducts most federal navigation dredging and related projects. In the past, small coastal ports were able to get assistance from the Corps for dredging boat basins and side channels. Other federal agencies involved with dredging and sediment management include EPA, NOAA Fisheries, and US Fish and Wildlife Service.

Key Problems

- Inadequate funding for continued, long-term erosion, and sediment monitoring and modeling.
- Lack of defined state principles and active involvement in regional sediment management.
- Inadequate recognition and funding for small port dredging and maintenance needs, as well as a mechanism for meeting dredging and infrastructure needs long-term.

Recommendation 2-9

The state should adopt the following goals and principles on erosion and sediment management:

1) Require beneficial use of dredged materials where appropriate to deal with chronic erosion.
2) Minimize impacts to navigation and other marine resources.
3) Enforce permit conditions set out for projects.
4) Use a regional approach in order to increase efficiency and effectiveness of sediment management.
5) Use best available science on coastal sediment processes as a key component for management and planning.

Coastal communities are very involved and interested in utilizing sediment beneficially, but indicated reuse of sediment must rely on solid science and minimize negative impacts. The 1999 State Coastal Erosion Task Force report specifically recommended using dredged material beneficially within the Columbia Littoral Zone,

What is Beneficial Use?

Dredge materials used to be considered "spoils," when, in fact, they can be quite useful. Some beneficial uses of dredge materials include combating erosion (e.g. beach nourishment), applying it for upland purposes (e.g. construction materials), or enhancing habitat. The OPWG is particularly interested in pursuing beneficial uses to solve Washington's coastal erosion problems.

improving scientific data, and minimizing impacts to natural resources. The minority report generally agreed with these recommendations. Thus, the state should better articulate and use the sediment and erosion principles and goals defined above through state policies, programs, and involvement.

Recommendation 2-10

Through the Governor's office, the state should actively participate in and represent the state's interests in the Lower Columbia Solutions Group.

The Lower Columbia Solutions Group involves a broad array of stakeholders including Oregon and Washington, local interests, and federal agencies such as the U.S. Army Corps of Engineers. This group acts as a bi-state clearinghouse for information; coordinates policy, projects and research; and provides sustainable solutions and conflict resolution. The LCSG has already completed a beneficial use pilot project in Oregon. As a next step, they are considering moving beyond these projects to understand the greater system and develop a comprehensive, regional, system-based approach. By actively joining and supporting the Lower Columbia Solutions Group, Washington will be able to leverage greater resources and work more efficiently toward regional solutions.

In addition, the state should engage in Regional Sediment Management headed by the USACE and EPA and other related efforts. The goal of engaging in these activities should be to develop, support, and implement a comprehensive regional sediment management program that uses lessons from other state efforts, best available scientific information on the Columbia River and coastal processes, and meets the principles listed in Recommendation 2-9.

Recommendation 2-11

Provide dedicated resources to participate in and represent the state's interests in regional sediment management and permitting issues through the Department of Ecology.

The state needs to improve its involvement in regional sediment management issues. Currently, Ecology works on project specific permitting issues and lacks the staff resources to effectively represent the state's interests and expertise and participate with local and federal partners in developing a broader regional sediment management plan. Together, these recommendations (2-10 and 2-11) address the lack of state involvement on regional sediment issues. **Specific tasks should include:**

a) **Assisting in developing dredge disposal sites that keep sediment in the littoral drift cell.** Since Ecology maintains technical and permitting expertise in coastal erosion processes, water quality, and dredge disposal, the agency

should assist in identifying beneficial uses sites that will meet the principles and goals outlined in recommendation 2-9. This involvement will jump-start and maintain the use of sediment regionally to address erosion problems along Washington's outer coast.

b) Engaging Congress and the Army Corps of Engineers in achieving the U.S. Commission on Ocean Policy's recommendations on improving regional sediment management including: 1) utilizing an ecosystem-based approach that balances ecological and economic considerations (USCOP 12-1 and 12-2[71]); 2) ensuring use of a least-cost evaluation that accurately reflects environmental, safety, and beneficial use costs and benefits (USCOP 12-3[72]); and 3) partnering with federal, state, and local scientists, planners and managers in creating and implementing an effective regional sediment management plan.

Recommendation 2-12

Conduct long-term sediment and erosion monitoring and support the Department of Ecology's Coastal Monitoring and Analysis Program.

Ecology's Coastal Monitoring and Analysis Program lacks consistent, stable, and adequate funding. The current state investment is a mere half of a full-time employee (FTE), while project funding provides an additional three positions (one of these is an Americorps/Washington Conservation Corps). By strengthening and expanding the Department of Ecology's current program, it could provide seasonal and long-term data on coastal processes; assess impacts of climate change to these processes; document the effectiveness of dredge disposal sites at retaining sediment in the littoral cell; and provide useful planning products for local community planning. Erosion and sediment processes are not static over time. Monitoring provides a critical foundation for understanding these processes in Washington and planning appropriately. The legislature should fund a comprehensive, long-term erosion and sediment monitoring program.

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[71] USCOP 12-1 requests a national strategy for managing sediment on a regional basis that balances ecological and economic considerations; acknowledges adverse impacts from activities that affect sediment flow or quality; involves port managers, planners (coastal, land use, and watershed), and other stakeholders; and emphasizes watershed management as a tool. USCOP 12-2 states that Congress should direct USACE to adopt regional and ecosystem-based management of sediment-related projects.

[72] USCOP 12-3 recommends the USACE use a least-coast disposal option that accurately reflects the full range of economic, environmental, and other relevant coasts and benefits for reuse of dredged material, as well as other disposal methods.

Recommendation 2-13

Provide independent analysis of sediment transport modeling tools as called for by the U.S. Commission on Ocean Policy.[73]

The state should apply and examine existing regional models of sand transport through the Columbia River, estuary, and adjacent coast for permitting and planning. Models of erosion-based setbacks are important tools for local governments to use in their Shoreline Management Program updates. This assessment and analysis is necessary for Ecology to carry out its permitting and planning responsibilities. While Ecology has expertise in this area, it lacks stable resources to expand this work. The state should provide adequate resources to allow increased use and analysis of modeling tools.

Recommendation 2-14

The state should engage the US Army Corps of Engineers to provide resources to maintain navigability of smaller ports and related infrastructure in coastal communities.

Where deemed necessary, the state should evaluate ways to support increased investment for projects no longer funded by the Corps such as boat basin dredging. One way would be through support for a multi-county port cooperative partnership. Many small ports expressed frustration over navigation projects the USACE formerly supported and no longer sponsor. These projects are critical to small ports maintaining their navigability and communities retaining their economic viability.

[73] USCOP 12-6 calls for independent review of US Army Corps of Engineers to monitor past project outcomes and cumulative, regional impacts of USACE activities within coastal ecosystems and watersheds. The state should conduct similar independent reviews in order to participate in the process effectively.

Climate Change

Scientific evidence and agreement for human-induced climate change is well established. The rapid rise in greenhouse gasses such as carbon dioxide from burning fossil fuels is already causing a variety of changes such as: diminished glaciers and snow pack; decreased ice extent; and increased surface temperature.

Over the past 100 years, the Pacific Northwest regional average temperature has increased 1.5 degrees Fahrenheit.[74] Climate change has the potential to cause even more dramatic changes including rising sea levels and wave heights; warming ocean temperatures; altering the pH and productivity of the oceans; increasing flooding and severe storm frequency; and advancing the spread of diseases. This may dramatically alter our ocean and coastal ecosystems such as the number and type of fish, shellfish, kelp, marine mammals, and other marine species found off our coast. As a result of climate changes, coastal communities could face inundation from rising sea levels, increased erosion of coastal shorelines, and greater damage from flooding, landslides, and storms. Additionally, these changes could influence public health by limiting the availability of clean water and sanitation in low-lying coastal communities.

In order to combat climate change, reducing greenhouse gas emissions and adapting our state's resource planning and management are essential. Initial steps taken in the Northwest region by cities, counties, and states provide important progress. Yet, the state must better define its role and strategy to adequately tackle climate change.

US Commission on Ocean Policy Recommendations

The Commission recognized the potential for climate change to influence all aspects of ocean and coastal resource management. They especially noted increasing storms and sea-level rise, which create even more vulnerable coastal zones. The Commission also recognized enough knowledge on climate change exists to take immediate actions. At the same time, they indicated the need to better understand the role of oceans in global cycles and the effects of atmospheric chemistry and temperatures on marine ecosystems in order to improve our knowledge and refine our strategies. To that end, they recommended expanded research efforts on ocean systems that include the information on complex inter-relations such as climate change's role in disease events.

[74] University of Washington, Climate Impacts Group more information at: http://www.cses.washington.edu/cig/.

Relevant Programs and Laws

- State agencies addressing climate change include CTED's Energy Policy Division and Governor's Policy Office.
- Ecology's Air Quality Program conducts carbon emissions inventorying; while the Shorelands and Environmental Assistance Program has worked on climate change, sea level rise research, and El Niño-related shoreline erosion.
- The University of Washington's Climate Impacts Group has worked with local communities on climate change response planning including water resources.
- State land managers and agencies have real estate and infrastructure in vulnerable coastal areas including State Parks, DNR, and WSDOT.
- The federal government addresses climate change through the EPA, Department of Energy, and Council on Environmental Quality.

Key Problems

While recent efforts have begun to address issues such as emissions from cars, more work remains. Climate change work in Washington lacks sufficient coordination, policies, and funding to clearly focus state planning and management.

- No clear state policy or legal framework to deal with the effects of climate change.
- Lack of systematic mechanism to track environmental change due to climate change, inventory impacts, assess vulnerabilities, and provide planning for at-risk areas.
- State land managers such as State Parks, DNR, Department of Transportation, and public ports will be impacted and need to address issues of climate change in managing their infrastructure and land holdings.

Understanding and Adapting to Climate Change

Recommendation 2-15

Improve state climate change coordination by elevating a lead agency or individual and clarifying roles and responsibilities.

This effort will increase coordination and cooperation between climate-related state agencies, including bridging the gap between "climate" agencies and coastal management agencies, and improve planning and response. It will also enable the state to adapt its capacity to deal with impacts of climate change.

Recommendation 2-16
Develop and implement effective climate change education and outreach.

Develop a strategy and implement a statewide program to improve and increase public education and outreach efforts to aid in the transfer and translation of technical climate change information to the general public. In order to adapt and mitigate the impacts of climate change, education and outreach should focus on the ultimate goal of changing behavior of state agencies, local players, and the general public. As part of this effort, support workshops for climate researchers (UW, state agencies, etc.) to collaborate with coastal tribes and coastal communities on climate change issues and plan for the future.

Recommendation 2-17
Conduct climate research necessary to predict impacts and vulnerabilities and adapt resource planning, mitigation, and management.

Examples of research areas include:

- Conduct state research on climate change including impacts and vulnerabilities to nearshore, coastal, and related riverine resources and communities.
- Develop an integrated climate change risk and vulnerability assessment for the state including retrospective and probabilistic research.
- Provide an updated assessment of long-term sea level change and other coastal processes such as wave height due to climate change.
- Develop planning assessments to disseminate coastal climate change information in a useful manner to state transportation and local planning departments for infrastructure and growth planning and risk mitigation.

This research will fill a critical gap in state knowledge and provide the necessary level of detail to inform climate change-related planning, mitigation, and management.

Reducing the Threat of Climate Change

Recommendation 2-18
Continue addressing the threat of climate change by promoting development of renewable energy sources, including offshore sources such as wave and wind energy; reducing greenhouse emissions; improving energy efficiency; and increasing regional alternative transportation.

These activities will reduce greenhouse gas emissions and lessen our state's contribution to climate change. Recently, Washington joined seven other states by adopting strong standards to reduce greenhouse gas emissions from cars. The Governor's office should continue to work with the other West Coast States on climate change initiatives. (See Recommendations 1-9 and 1-10 on ocean energy)

Chapter 3 - Coastal Pollution

Human activities on the land and in watersheds can increase water pollution, which can negatively influence coastal waters. The less developed outer coast contributes less pollution from runoff and industrial sources than Puget Sound. As a result, Washington's ocean and nearshore waters benefit from generally good water quality. However, coastal pollution could pose an increasing problem due to growing development and urbanization on the outer coast. This raises the importance of on-going watershed planning efforts undertaken by lead agencies.

Uses of ocean resources such as shipping, fishing, and recreation can also contribute pollution to marine waters. While not in the OPWG's initial review due to current programs in the state, coastal communities frequently expressed concern over the threat to marine resources posed by two specific pollutants: derelict fishing gear and oil spills.

Vision for Coastal Pollution

The state identifies sources of pollution that threaten marine resources and actively pursues cleanup of these sources. Targeted education and regulations effectively prevent pollution. When spills occur, first-rate planning and response capabilities minimize the impact to the state's valuable marine resources. Adequate state resources and partnerships provide the foundation for successfully protecting marine resources from pollution.

Marine Debris – Derelict Fishing Gear

There are several types of marine debris: marine plastics, derelict fishing gear, derelict vessels and glass, metal, and rubber. The variety and quantity of plastics found in the marine environment has increased dramatically in recent years. Products include common domestic material (bags, cups, balloons), industrial goods (plastic sheeting, hard hats, resin pellets), and lost or discarded fishing gear (nets, buoys, traps, lines). The majority of debris on beaches comes from shoreline and recreational activities, but vessels and fishing gear also pose problems.[75]

Wildlife can be harmed when they ingest marine debris or become entangled in it. Derelict fishing gear is particularly hazardous. This gear often continues to ensnare and kill fish, marine mammals, and seabirds until it is identified and removed. However, weather and sea conditions on the outer coast also can make it difficult to retrieve lost fishing gear. As abandoned or derelict vessels deteriorate, they

[75] U.S. Commission on Ocean Policy. September 2004. An Ocean Blueprint for the 21st Century. Final Report, Washington D.C.

create fields of marine debris. The vessels and the pieces can pose a navigational hazard, threaten human safety, abrade natural reefs, and entrap marine mammals. Creosote logs also pose a risk since they contain and leach toxic chemicals into the water. Creosote can also impact marine organisms including the larval and embryonic forms of forage fish such as herring.

Washington addresses marine debris in many ways. Harbor, port, marina, and coastal solid waste management plans incorporate marine debris issues. The widely distributed Puget Sound Boaters Guide educates boaters about marine debris.[76] State Parks and other organizations coordinate beach cleanups and education on preventing marine debris. Ecology oversees litter prevention programs statewide.

The Northwest Straits Commission developed Derelict Gear Removal Guidelines, in partnership with Washington Department of Fish and Wildlife and other organizations. WDFW adopted and published these guidelines and manages the public reporting system (online and hotline reporting). The reporting system includes a database of locations and priority ranking for removal. Both agencies conduct public education programs distributing informational brochures, fact sheets, and posters on how to report and avoid creating derelict gear. As part of their education and outreach, the Northwest Straits Commission also provided technical assistance to export the program to other entities and states. Since 2002, the Northwest Straits Commission has removed over 1100 derelict crab pots and more than 460 nets covering 94 acres of marine habitat. It has also investigated and removed about one third of the nearly 4000 derelict gear targets in its database. In addition, WDFW annually reviews its fishing gear restrictions. Currently, WDFW mandates the use of rot cord on crab pots. This prevents a crab pot from continuing to capture fish and crabs, if the pot is lost.

US Commission on Ocean Policy Recommendations

The USCOP recognized the significant threat marine debris poses to marine wildlife and human health and safety.[77] They suggested that NOAA create a marine debris program to expand and complement EPA's program.[78] They recommend this include expanding laws, partnering with local governments and stakeholders, and improving monitoring and research. For derelict fishing gear, the USCOP recommended that NOAA work with all interested parties to develop incentives or other effective programs to prevent, reduce, and safely dispose of derelict gear. Finally, the USCOP also acknowledged the need for international work to address derelict fishing gear and ensure adequate port facilities for handling garbage from ships.

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[76] Puget Soundkeeper Alliance publishes the guide with funding from the Washington State Parks & Recreation Commission and the Department of Ecology.
[77] See USCOP Chapter 18, especially recommendations 18-2 and 18-5.
[78] EPA's program focuses on beach and river cleanups, while the USCOP suggests NOAA focus on handling entanglements, coral reefs, and reducing derelict fishing gear.

Relevant programs & laws

- In Washington State, DNR manages the Derelict Vessel Removal Program, which has removed or facilitated removal of 150 vessels since its inception in 2003. In 2005, DNR and State Parks started a pilot project for removal of creosote-impregnated beach logs.
- Northwest Straits Commission and WDFW partner on derelict fishing gear removal. The Northwest Straits Commission has completed derelict gear removal outside of the Northwest Straits region and continues to expand their efforts in central and southern Puget Sound. DNR's dive team removes some gear and provides technical training on safe gear removal practices.
- Marine plastics task force created a plan and provided authority to DNR to implement it. Due to lack of dedicated funding, no program currently exists.
- WDFW examines its fishing gear requirements annually.
- State Parks and Ecology both conduct education on preventing litter.
- The Washington State Patrol enforces littering laws through fines.
- Federally, NOAA runs the Abandoned Vessel Program through the Damage Assessment Center (DAC). This program uses a database to identify vessels that could potentially threaten coral ecosystems in U.S. waters. In the future NOAA would like to expand this program to document vessels in all regions of U.S. waters.
- EPA supports programs to reduce and cleanup litter in coastal areas including funding for the annual International Coastal Cleanup run by the Ocean Conservancy. EPA also assists in reducing land-based litter through education on storm drains and their connection to the nation's waters.
- NOAA's Marine Debris Program[79] is a national effort to prevent, identify, remove, and reduce the occurrence of marine debris. Recently this program provided a grant to remove crab pots near Astoria, Oregon.

Key Problems

- Successful model of derelict fishing gear removal in the state, but no consistent program outside of the Northwest Straits counties. Derelict fishing gear was identified as big issue by tribes and in some coastal communities.
- Plans and authorities related to marine plastics, but no funding to implement the program.

[79] NOAA's Marine Debris Program: http://marinedebris.noaa.gov/welcome.html.

Recommendation 3-1
Establish a statewide program approach to identifying and removing derelict fishing gear.

The Northwest Straits Commission developed a successful model of derelict fishing gear removal in the state and Washington Department of Fish and Wildlife operates a gear reporting hotline. Additionally, Department of Natural Resources' dive team provides some training for locals on removing derelict gear. A statewide program for identifying and removing derelict fishing gear could efficiently bring together these efforts and apply them to all of the state's marine waters.

Recommendation 3-2
The Northwest Straits Commission and DNR's dive team should provide derelict fishing gear removal training and resources to local communities on the outer coast.

During outreach sessions, many participants expressed a desire for assistance in identifying and removing derelict gear. The Northwest Straits Commission has the most experience with developing derelict fishing gear programs and guidance on removing the gear. They already work to export this knowledge to other interested parties. The Northwest Straits Commission recently exported their derelict gear program to the Olympic Coast National Marine Sanctuary with funding from NOAA. As a result, the Sanctuary completed some surveys and removed a significant amount of net in August 2006. Likewise, the Department of Natural Resources' Dive Team has provided technical support and training for safely removing gear once it is identified. Thus, the OPWG suggests these groups continue to share experiences, knowledge, and appropriate training with local communities on the outer coast. However, the legislature must allocate additional funds to these groups to accomplish this. The OPWG also encourages coastal communities to partner with Olympic National Marine Sanctuary, University of Washington, and other entities that own equipment such as sonar and remotely operated vehicles for locating deepwater gear.

Recommendation 3-3
WDFW should supply targeted education to recreational and commercial fishers regarding derelict fishing gear reporting and prevention.

WDFW already conducts education with the fishing community on gear requirements, fishing seasons, and closed areas. The OPWG recommends utilizing these partnerships and opportunities to target education that emphasizes ways to prevent, reduce, and report derelict fishing gear. In addition, WDFW is currently seeking grant funding through NOAA's Marine Debris Program to target removal of crab gear on Washington's north coast.

Recommendation 3-4
DNR should re-examine the marine plastics program and provide recommendations on potential dedicated funding sources.

The legislature provided DNR with the authority to oversee the action plan developed by the marine plastic debris task force.[80] Yet, due to a lack of dedicated funding, DNR no longer runs this program. DNR should re-examine this program and identify potential sources for funding, revising, and reinstating the program.

Oil Spills

As discussed earlier in the report, major oil spills pose a risk to water quality and wildlife along Washington's outer coast and the Strait of Juan de Fuca. The Strait of Juan de Fuca is a busy thoroughfare for shipping from Puget Sound, local oil refineries, and British Columbia. In 2005, over 10,000 ships, tankers, barges, or carriers with oil or hazardous materials passed through the Strait of Juan de Fuca. In 1991, the *Tenyo Maru* sank off the coast of Washington, spilling over 100,000 gallons of oil.[81] Oil from this wreck fouled beaches from Vancouver Island to northern Oregon with most oil accumulating on beaches of the Makah Indian Reservation and the Olympic National Park. The oil spill killed thousands of seabirds and lingered in important kelp beds. Following the passage of federal laws in the early 1990s, the volume of oil spilled nationally has decreased.[82] State programs have also improved over time. The risks posed by oil spills require on-going attention to enhancing prevention, preparedness, and response.

The legislature created the Oil Spills Advisory Council in 2005 to provide independent recommendations to decision-makers on improving and funding oil spill prevention, preparedness, and response. Due to the Council's on-going detailed examination of oil spill issues and recommendations; this was not a focus for the Ocean Policy Work Group. During the course of outreach, however, many coastal communities indicated it was a high priority to reduce the risk of oil spills and improve response capabilities. They also advocated for increased state resources to meet these response needs. Thus, the Ocean Policy Work Group provides this brief background and a few recommendations on oil spills directly in response to feedback from coastal communities. It is not the intention of the

[80] See Revised Code of Washington, Chapter 79.145.
[81] Department of Ecology, news release August 1, 2006, "Marbled murrelet habitat gets 200-year protection in oil spill settlement" Publication 06-140
[82] USCOP. 2004. *An Ocean Blueprint for the 21st Century.*

OPWG to provide a comprehensive, system-wide analysis of oil spill issues. This work is already underway through the existing Oil Spills Advisory Council.

Ecology's Spill Prevention, Preparedness and Response Program is nationally recognized as a model program for managing spills, including oil spills. This is achieved through: 1) screening and inspecting vessels, and oil transfer oversight, 2) investigating incidences, 3) compliance and enforcement, and 4) enhancing oil spill contingency plans. In 2004, the legislature adopted a "zero spills strategy" to prevent oil from entering the waters of the state. The rules to enact this law are currently being developed and will establish pre-booming and alternative measures to prevent and contain spills. In addition, Ecology is currently updating rules regarding oil transfers.

Ecology's resource damage assessment committee includes State Parks, DNR, WDFW, DOH, and Office of Archaeology and Historic Preservation. This committee reviews oil-spill pre-assessments and, when a spill occurs, determines quantifiable damages, feasibility of restoration or enhancement, and considers restoration proposals presented by the responsible party.[83] The Spills Program works with stakeholders and land-holding agencies such as DNR and State Parks to identify sensitive aquatic environments and establish locations to install buoys for rapid boom installation should an oil spill occur. Ecology maps sensitive areas, i.e. eelgrass beds, shellfish beds, estuaries, on the Geographic Response Plans (GRP's) that the field responders use to help assess and mobilize appropriate assistance.

In addition, the 2006 Legislature provided funds for Ecology to distribute oil spill response supplies to in 60 critical locations around the state.[84] This includes outer coast locations such as Cape Disappointment, Willapa Bay, Grays Harbor, Neah Bay, and other sites. These caches of equipment will allow a rapid response by local communities when spills occur.

Derelict or abandoned vessels pose a risk of leaking oil and other hazardous materials into marine waters. This year, a derelict vessel grounded in Ocean Shores since 1965, the *SS Catala*, was uncovered and found to be leaking oil.[85] DNR manages the state's derelict vessel removal program, which reimburses a number of state and local government entities up to 90 percent of the costs involved with removing and disposing of derelict and abandoned vessels. The program works with vessels up to 200 feet in length in all Washington's navigable waters. The program has removed or facilitated the removal of 150 derelict or abandoned vessels. Over 100 vessels remain on the program's inventory for removal, and it is

[83] If they have a responsible party identified.
[84] Department of Ecology Media Advisory, 06-198. September 28, 2006. "Ecology begins delivery of oil-spill response supplies around Puget Sound and other state waters: first stop, Seattle" http://www.ecy.wa.gov/news/2006news/2006-198.html. Ecology granted equipment to a variety of local public entities including tribes, ports, cities, and counties.
[85] Originally buried by sand, recent high winds and waves uncovered the *SS Catala*.

expected that many more remain unidentified in Washington's waterways. The program faces a significant problem because vessels over 100 feet in length are extremely expensive to remove. Current funding cannot facilitate removal of these large vessels that pose the greatest risk.

Federal and international regulations and treaties also play an important role on this issue. Ongoing efforts include the federal salvage regulations. The relevant programs and laws listed below give some examples of key federal and international entities. Additionally, the USCOP final report provides more details on the federal and international regulations and programs related to vessel safety and oil spills.

US Commission on Ocean Policy Recommendations

The USCOP acknowledged the progress made at phasing-out single hulled tankers and reducing the amount of oil spilled under the Oil Pollution Act. In order to comprehensively address oil spills, the Commission recommended conducting a risk-based assessment of all oil transportation systems to identify and prioritize sources with the greatest risk.[86] The federal agencies, with assistance from states, should then develop a comprehensive, long-term plan for action to reduce spill risks. The USCOP also suggested that the U.S. Coast Guard and partners identify places of refuge for vessels in distress. Furthermore, the Commission recommended combating pollution from small vessels through education, outreach, incentives for replacing older and more polluting engines, and resources for pilot programs. In addition, they supported increasing research to aid understanding of pollution impacts and control technologies. Finally, the Commission felt that U.S. Coast Guard education on maritime issues should also support ocean and coastal management needs.

Relevant Programs and Laws

- Ecology's Spill Prevention, Preparedness, and Response Program implements state laws and regulations related to oil spills. It also provides drills, training, and enforcement. It also operates under a memorandum of agreement with the coast guard to assure a coordinated and effective spill program.
- State natural and cultural resource agencies provide support for planning and protecting sensitive marine resources.
- Oil Spills Advisory Council is a multi-stakeholder group tasked with providing recommendations on reducing risk of oil spills and improving preparedness and response.
- U.S. Coast Guard responds to stranded vessels and other maritime incidents. The Coast Guard also administers rules designed for shipping safety including those developed through international treaties or by international

[86] See USCOP Chapter 16, recommendations 16-10 through 16-14.

bodies. One example is the International Convention for the Prevention of Pollution from Ships (MARPOL).
- Other federal agencies also play a role in managing oils spills and maritime transportation such as the U.S. Department of Transportation, EPA, and Minerals Management Service.
- United Nations International Maritime Organization (IMO) develops international regulations and guidelines on vessel safety, security, and environmental protection. This includes administering MARPOL.[87]

Key Problems

- No year-round funding for a state-of-the-art rescue and response tug at Neah Bay.
- Backlog of derelict or abandoned vessels that pose a high spills hazard.
- Need to continue to identify gaps in regulations and enforcement at addressing the causes and reducing risks of oil spills.

Recommendation 3-5

The Oil Spills Advisory Council (OSAC) should continue its process and detailed work to improve the state's oil spill prevention, preparedness, and response.

Already, the OSAC has made significant progress in identifying specific needs to achieve the state's "zero spills" strategy. This council provides broad, multi-stakeholder involvement and representation including industry and environmental groups. It also consults with oil spill experts. Rather than duplicating the process of comprehensively analyzing oil spill prevention, preparedness, and response, the Ocean Policy Work Group feels the OSAC is an appropriate venue for these efforts.

Recommendation 3-6

Maintain a year-round response and rescue tug at Neah Bay.

The north coast of Washington has a history of oil spills and is located near valuable marine resources ("usual and accustomed areas" for tribes, Olympic Coast National Marine Sanctuary, and Olympic National Park). Additionally, the Strait of Juan de Fuca is an area of high vessel traffic throughout the year. Vessels can break down any time of the year requiring assistance from a response tug.

The state currently supports a rescue tug for nine months of the year. By fully funding a year-round, tug, the state will provide better response coverage for the entrance to the Strait of Juan de Fuca, the Strait and Washington's outer coast. The tug at Neah Bay provides quicker response to the north coast than from other harbors.

[87] More information on the IMO and MARPOL available at: http://www.imo.org/Conventions/contents.asp?doc_id=678&topic_id=258 - 1

During outreach sessions, many participants identified this as an important step to preventing and minimizing risks from oil spills. Thus, the Ocean Policy Work Group suggests fully funding a year-round rescue tug. It is important to note that the rescue tug is only one step to improve oil spill prevention, preparedness, and response. The OPWG did not analyze the detailed requirements of such a tug, but supports a full-time, year-round tug that will meet the needs for responding to oil spills and performing rescues.

Recommendation 3-7

Eliminate the backlog of large, commercial vessels identified by DNR's Derelict Vessel Removal Program.

As mentioned previously, derelict and abandoned vessels often leak oil into the marine environment. DNR manages a program that identifies these vessels and funds their removal and disposal. Removing large vessels (greater than 100 feet) is expensive and DNR's Derelict Vessel Removal Program requires increased funding to remove the backlog of vessels identified. In addition, the Legislature should consider separating the Derelict Vessel Removal program's funding into two accounts for commercial vessels and recreational vessels. For specifics on changes necessary to the Derelict Vessel Removal Program, the OPWG supports the recommendations of OSAC.

Chapter 4 – Ocean Research and Education

Scientific data and education on ocean resources are fundamental to progress and management of any of the issues covered thus far. While many ocean research and education efforts are underway, they are often uncoordinated, lack connection to the big-picture, and fail to maximize effectiveness and efficiency. As a result, the state needs strategic planning to coordinate efforts and prioritize work in the state.

Vision for Ocean Research, Observing, and Education

Washington collects scientific data that lead to well-informed management, policy, and planning decisions. The state develops a linked network of scientists and resource managers whose research, monitoring, and observing needs are funded and implemented in a prioritized, integrated manner. Washington's public is ocean literate, understands ocean processes, the importance of the oceans to mankind, and the effects of mankind's actions on the oceans. The state promotes ocean literacy through strategic planning for all educational levels.

Ocean Research and Observing

Managing issues facing our ocean and coastal environments requires solid science including areas such as protecting human health, preparing for marine hazards, preventing chronic erosion, addressing declining living marine resources, and improving degraded water quality. In order to adequately address these problems, Washington State must expand and prioritize scientific research, monitoring, and ocean observing. This includes improving knowledge of the marine environment including physical oceanography, biological communities, sediment processes, wave energy, nearshore processes, and habitats.

The state lacks an over-arching agenda for research priorities to address these, and other problems, in its marine waters. Specific groups within Washington, like the Puget Sound Action Team, Olympic Coast National Marine Sanctuary, the Northwest Straits Commission, state and local agencies, and academia, develop their own scientific research priorities and, for the most part, operate independently. This results in fragmented research, monitoring, and observing projects that lack coordination. In turn, this impedes the assessment of resource conditions; hampers strategic planning of research needs; and slows identification and implementation of appropriate resource management in the state.

The absence of a common state agenda for scientific research, observing, and monitoring also impairs state input to federal ocean research activities and access to federal funding. The state must be prepared to provide immediate and clear input in federal regional research planning. Active and organized participation in federal planning will allow the state to direct and align its priorities with long-term federal funding opportunities and objectives.

Washington State's observing network lacks cohesion due to multiple, uncoordinated systems run by various entities. Data collection is not standardized, which often causes incompatible data sets. Without coordination, entities do not maximize data collection opportunities — for example different buoy systems could potentially carry additional sensors. These gaps lead to insufficient long-term monitoring of ecosystem health, inadequate awareness of potential ocean hazards, and limit our knowledge about ocean processes off Washington's coast.

More recently, the Puget Sound Partnership was tasked with examining issues and developing a plan to restore the health of Puget Sound. This effort may identify areas of overlap with the OPWG report, including research and monitoring needs. These two efforts should coordinate and collaborate on appropriate issues, but it is critical that the state begin to coordinate and prioritize research, observing, and monitoring needs on Washington's outer coast.

Current instruments and monitoring stations in use along Washington's 157 miles of outer coastline include: two moored buoys, two land-based monitoring stations, and one National Ocean Service water level observation station at Neah Bay. In the Strait of Juan de Fuca, a few additional buoys are managed by Canada, the National Data Buoy Service, or the National Ocean Service. Offshore from Grays Harbor, the Scripps Institution of Oceanography owns

Scientific research: to study a problem, pattern, or subject using specific scientific methods. Research works to determine the cause(s) of the problem, pattern, or subject.

Monitoring: the systematic collection and analysis of data that provides information on the properties of a particular thing over time. Monitoring is useful for measuring project performance at a variety of scales (locally, regionally, and nationally).

Ocean Observing:* to measure, monitor, and collect a wide range of data on basic properties of the ocean and related environments.

Ocean Observing System:* includes instruments and sensors to sample, detect, and measure environmental variables. The sensors are installed on a ship, satellite, or buoy (also called a platform). Observing systems also require telecommunications systems to send and receive data and computer systems to analyze and model the data.

*Source: US Commission on Ocean Policy. 2004 *An Ocean Blueprint for the 21st Century.* Final Report.

and runs a waverider buoy. The Joint Effort to Monitor the Straits (JEMS) provides data from three transects across the Strait of Juan de Fuca. The Olympic Coast National Marine Sanctuary has ten seasonal buoy moorings that measure, among other parameters, dissolved oxygen and currents. The Washington Department of Ecology manages eleven water quality monitoring stations in Grays Harbor and Willapa Bay and three stations in the Strait of Juan de Fuca. Ecology also has four continuous mooring stations in Willapa Bay. The Coastal Margin Observatory for the Columbia River is located at the river mouth. While these monitoring efforts provide some data, they are not comprehensive enough to provide a full picture of ocean conditions off Washington.

Mooring: often a mooring contains a buoy tethered to the seafloor with instruments and sensors to gather data continuously.

Station: a fixed location that is visited at regular intervals to gather data.

Transect: a line followed by a ship. Researchers gather data at several points along this line.

Depending on funds available, scientists often utilize several other types of observation instruments like drifters, Remotely Operated Vehicles (ROVs), Autonomous Underwater Vehicles, satellites, and ships. Oceanic Remote Chemical/Optical Analyzers (ORCAs) provide data on water quality from the water's surface down to the bottom, called vertical profiles. Researchers are currently using such technologies to understand water quality issues in Hood Canal.

The future holds promise for increasing our ability to observe ocean processes through cabled observatories already in use such as the Victoria Experimental Network Under the Sea (VENUS)[88] and proposed cabled observatories such as the North-East Pacific Time-Series Undersea Networked Experiments (NEPTUNE).[89] These cables can provide real-time data for multiple locations on oceanographic processes and conditions such as water quality, habitats, and marine species.

In addition, ocean observing networks have begun to provide a framework for coordinating data. The regional Northwest Association of Networked Ocean Observing Systems (NANOOS) monitoring network includes Washington, Oregon, and northern California and feeds into the national Integrated Ocean Observing System (IOOS). NANOOS seeks to coordinate current monitoring efforts and involve the range of regional stakeholders to address their ocean data needs. While these indicate initial steps toward integration, the observation and monitoring systems off the Washington coast remain relatively uncoordinated with large gaps in data.

[88] VENUS project information available at: http://www.venus.uvic.ca/.
[89] NEPTUNE project information available at: http://www.neptune.washington.edu.

US Commission on Ocean Policy Recommendations

The USCOP concluded that improving research and observing is fundamental to understanding and managing our ocean and coastal resources. Under ocean research[90], they recommended significantly increasing federal funding and coordinating and conducting research strategically. Recommendations included:

- Double the budget for research.
- Institute a national program of social science and economic research to examine the human dimensions and economic value of marine resources.
- Improve strategic planning and inter-agency coordination.
- Advance use of modern technology, infrastructure, and data management systems.
- Develop a national strategy for ocean research that will guide agencies.

For ocean observing,[91] the USCOP suggested the National Ocean Council create a national integrated ocean observing system (IOOS) that all stakeholders could use. In building this national system, the Commission recommended seeking input from all levels of governments and working with all stakeholders to ensure the IOOS collects useful information for a broad user community.

The Commission deemed input from all sectors, including state and local governments and academia as integral to advancing both ocean research and observing.

Relevant Programs and Laws

The following agencies and entities conduct ocean or coastal-related research:

- Multiple state agency research projects (DNR, WDFW, Ecology, PSAT, CTED, etc.)
- Pacific Marine Fisheries Compact Research
- NW Straits Commission
- Olympic Coast National Marine Sanctuary
- University of Washington: Olympic Natural Resources Center, Friday Harbor Labs and research by individual professors
- Coastal tribes
- The SeaDoc Society
- Olympic Region Harmful Algal Bloom (ORHAB) partnership is researching harmful algal blooms through a variety of activities.

In addition, the Washington State Academy of Sciences will be established in April 2007.

[90] See USCOP Chapter 25, especially recommendations 25-1, 25-2, 25-4, and 25-5.
[91] See USCOP Chapter 26, especially recommendations 26-1, 26-4, 26-6, and 26-12.

Programs that conduct monitoring and/or observing on ocean or coastal processes include:

- Department of Ecology research and monitoring programs include: coastal erosion study, marine & freshwater water quality monitoring, and marine sediment quality monitoring.
- DNR's ShoreZone Inventory provides information on nearshore, intertidal, and subtidal habitats.
- Department of Health monitors water quality and shellfish safety.
- The Puget Sound Ambient Monitoring Program conducts monitoring in Puget Sound including the Straits and San Juan Islands.
- Washington State Department of Fish and Wildlife monitors marine species.
- Federal agencies conducting research and monitoring include the NOAA National Data Buoy Center, National Ocean Service, National Ocean Partnership Program, and National Weather Service.
- NANOOS is the Northwest's component of NOAA Integrated Ocean Observing System (IOOS).
- Seabed cabled observatories provide real-time oceanographic data, like the already-operational VENUS and the NEPTUNE project proposed by University of Washington.

Key Problems

- No overarching strategic plan that prioritizes research, monitoring, and observing needs:
  - Piecemeal, fragmented, and reactive approach to acquiring data and information.
  - Projects often driven by narrow agency mandates or individual academic research projects.
  - Proviso funding or grant conditions can narrow the focus and limit the usefulness of the data collected.
  - Lack of coordination between local, state, federal, tribal governments, and academia in identifying research needs and addressing problems in the marine environment.
- Gaps in ocean observing and inadequate long-term monitoring data limit the ability to make conclusions on status and trends and predict future scenarios. Adequate observing and monitoring for our ocean and coasts requires long-term, dedicated funding for installing and maintaining sensors; collecting data; and interpreting data collected.
- No standardized methods for data collection across multiple research and monitoring efforts.
- Need better trans-boundary coordination with other West Coast states and internationally.
- Poor coastal weather and hazard predictions resulting from few buoys and no coastal Doppler RADAR.

Recommendation 4-1

Develop an ocean research, monitoring, and observing summary report and strategic plan which summarizes current and prioritizes future research, monitoring, and observing efforts.

The Ocean Policy Work Group recommends a study to identify, quantify, and summarize the broad spectrum of current ocean research, monitoring, and observing work in the state. This report should be a snapshot rather than an in-depth inventory. In-depth inventories take too long to complete and, often, reflect outdated information by the time of publication. This study should identify gaps and problem areas. This would help resolve the over-arching regional goals and objectives to allow Washington to prioritize its future ocean research needs in the form of a strategic plan. In addition, the summary report should identify funding issues. For example, status and trends monitoring requires long-term, dedicated funding to be a useful tool; observing systems need one-time funding for installation, but ongoing funding for maintenance and data analysis.

Many projects in progress have hard contractual obligations linked to their completion. Since these projects were never originally designed by regional priorities, acting after-the-fact to better coordinate them and their outputs may be difficult. Perhaps, more important is the need to institute a strategic process to align new projects with over-arching goals and objectives. The strategic plan should emphasize regional priorities, increased coordination and collaboration between parties, standardization of protocols, and real-time data transferability.

Research and science move fast requiring an adaptive, dynamic, and regularly updated strategic plan. A strategic plan should not stand in the way of new data acquisition, nor should it constrain progress in light of new research needs. Since it is virtually impossible to predict scientific developments and needs ten years into the future, the plan should be a strategic process framework as opposed to a strictly delineated, prioritized list of individual research, monitoring, and observing projects. The plan should include a mechanism for assessing progress and for adapting priorities to fit new, groundbreaking information and policy framework changes.

Several private organizations and government agencies have already conducted work to define the research necessary to address Washington's most pressing coastal issues. However, most studies are not specific to the outer coast, nor have they been consolidated. A few studies have been or are currently being conducted,[92] but much of the work focuses on Puget Sound and Hood Canal, not

[92] Some programs that conduct research and monitoring in marine waters include: the Puget Sound Action Team, Governor's Monitoring Forum, Puget Sound Partnership, Olympic Coast National Marine Sanctuary, Northwest Straits Commission, Washington Sea Grant, Southwest Washington Coastal Erosion Study, Department of Ecology, the Department of Fish and Wildlife, the Hood Canal Council, and Hood Canal Dissolved Oxygen Program.

the outer coast. However, many of the principles could apply. At the regional level, the Ocean Resources Assessment Program, Pacific Northwest Regional Marine Research Program, and the Pacific Northwest Coastal Ecosystems Regional Study have led efforts to identify research needs. These studies would be a good starting point for an ocean-centered study.

The state should undertake the following efforts to further enable development of a strategic research plan:

4-1A Conduct an ocean research, monitoring, and observing conference to prioritize, plan, and coordinate future observing, monitoring, and research needs. The state should design a conference to pull together the broad spectrum of scientists and resource managers. The conference theme and organization should facilitate compilation of the summary report and strategic plan such as through a combination of presentations and workshops.

Oceanographic measurements that provide data on the Pacific Ocean's 'vital signs' will always be necessary to provide a strong foundation for other research projects. Most of the scientific community supports the idea of prioritizing ongoing collection of solid, basic oceanographic data from the outer coast. With assistance from scientists and managers, explore how to make a strategic plan responsive and adaptive to new information and policy changes.

The OPWG recommends a second conference for ocean education and suggests that the conferences be run back-to-back, since many researchers are also educators. See Recommendation 4-5C for ocean education conference.

4-1B Collaborate with other West Coast states, Olympic National Marine Sanctuary, tribes, local governments, and Sea Grant on strategic research planning work. Washington's ocean issues are not confined to its borders. Thus, it is important to initiate and increase trans-boundary coordination with California, Oregon, and British Columbia. Both California and Oregon established ocean research priority frameworks that may serve as models. Washington's coastal tribes and the Olympic National Marine Sanctuary will also play an important role in defining research priorities, since they already conduct a great deal of ocean science work. It is also important to incorporate and support citizen-based research in these efforts as a way to generate data on and stewardship of marine resources.

Washington, Oregon, and California's Sea Grant programs submitted a joint proposal for marine research planning to the national Sea Grant program.

This provides an excellent opportunity to work together on regional ocean research planning.

4-1C Report on the status of Washington's observing systems and explore potential for federal partnership for long-term ocean observations. The summary report should include a summary on the current status of the systems and how coastal and ocean stakeholders use them. By defining its research priorities in the strategic plan, Washington should be able to convey state needs as part of the federal observing effort, either through NANOOS or individual federal agency efforts.

4-1D Identify key biodiversity and ocean ecosystem health indicators. The strategic plan should identify ocean ecosystem health indicators for monitoring of status and trends over time. This will facilitate adaptive management of state and local resource policies. Furthermore, the state needs a way to assess and respond to federal and global problems. This also requires quantification of the impacts to ecosystem health. As mentioned earlier, identification of ecosystem health indicators is a key component to ecosystem-based management (see Recommendation 1-6). Similar efforts by the Puget Sound Partnership's Science Working Group as well as the Puget Sound Nearshore Partnership to develop a list of biodiversity and ocean ecosystem health indicators could inform this effort on the outer coast.

4-1E Identify new scientific research and observing needs for the state's programs, policies, and planning. The summary report should investigate new—or seldom used—scientific research, monitoring, and observing methods, and their utility in filling existing gaps to meet the strategic plan's goals and objectives.

4-1F Examine the feasibility of a scientific advisory committee or similar structure for future state ocean policy efforts. The summary report should identify key stakeholders for potential inclusion on a scientific advisory committee to increase coordination and collaboration and to provide scientific input that supports decision-making on ocean policy issues. The study should explore all models including broadening the scope of the Puget Sound Action Team, or bringing the advisory committee under the purview of the Academy of Sciences. The study should recommend the most appropriate model or format.

Key parties would include state and federal agencies, tribal researchers, academia, and private and environmental NGO scientists. The Olympic Coast National Marine Sanctuary is an important federal stakeholder for these scientific research issues. The committee would require regular work group meetings and potentially legislative mandates and funding to formalize the structure. Since a mechanism does not currently exist for this

work, this research group could be an advisory group of the Washington Interagency Ocean Policy Team (see Recommendation 6-1). As a result, it could easily inform other on-going ocean policy efforts in the state.

Recommendation 4-2

Collaborate with Oregon and California on ocean research, monitoring, and observing to secure federal funding.

As a result of tri-state coordination, Washington could maximize resource efficiency and effectiveness, request regional funding that coordinates broader efforts, and garner more federal funding. Continuance of the tri-state initiative on ocean policy is a vital method for achieving this collaboration. Currently, California has two ocean observing systems and Oregon and Washington jointly promote NANOOS.

Recommendation 4-3

Pursue installation of Doppler RADAR facility on Washington's outer coast and promote placement of additional buoys and sensors on outer coast. Integrate observing networks.

Washington's outer coast needs integrated buoy and Doppler RADAR systems to improve coastal weather and hazard predictions and to increase understanding of oceanographic conditions and processes. There is little useful weather RADAR coverage on Washington's coast, which results in poor meteorological forecasting for crucial weather features such as heavy precipitation and strong winds. The National Weather Service installed three RADARs to provide coverage to western Washington,[93] but their distance from the coast and the Olympic Mountains block their effectiveness and results in less accurate and unreliable data for forecasting. The best coastal RADAR data is from as far south as Eureka, California. Washington's outer coast, an area prone to powerful weather systems, has among the worst coastal RADAR coverage in the country. Wind speed calculations from other western Washington Dopplers offer very limited and inaccurate data. This is a serious concern for shipping in the Columbia River and the Strait of Juan de Fuca and for the safety and economic wellbeing of coastal communities. A coastal Doppler RADAR would provide accurate, timely data.

The University of Washington (Atmospheric Sciences) estimates that two Doppler RADAR facilities would provide adequate coverage for Washington and Oregon.[94] If only one RADAR could be acquired, a Washington coast facility would provide the best coverage for the entrances to the Columbia River and Strait of Juan de

[93] Camano Island in Puget Sound, and Portland and Medford in Oregon.
[94] One in Westport, Washington and one on the central Oregon coast (Newport, for example).

Fuca. The state should collaborate with Oregon to secure these additional Doppler RADAR systems. Many coastal communities indicated that the state should consider establishing a research center associated with the Doppler RADAR. See Recommendation 5-8 for specifics on additional research and educational centers.

The OPWG also recommends extending the multi-sensor, buoy network on the coast, especially those that collect data on wave height and current direction and speed. Increased data would enhance weather and wave forecasting thus promoting vessel safety. Real-time sensing of currents would assist oil spill modeling and response by predicting the direction of oil movement once a vessel accident occurs. This data must be shared and available in a timely manner to state and local agencies responsible for organizing oil spill response.

The state should continue to collaborate with others to integrate ocean observing systems. Support development and operation of a regional Northwest Association of Networked Ocean Observing Systems (NANOOS) that will be part of the proposed national IOOS system. IOOS will bring together a wide range of participants from all levels of government to acquire data relevant to many of the issues raised in this report.

Recommendation 4-4

The state should support the installation and expansion of the proposed NEPTUNE[95] cabled ocean observatory project to improve ocean research, monitoring, and observation on the outer coast.

Where appropriate, the state should collaborate on the best uses of the NEPTUNE system for state ocean research and monitoring needs. The state should further investigate potential additional outcomes of the proposed NEPTUNE project on outer coast, including additional employment and infrastructure opportunities specific to installation and maintenance of the observatory that could directly benefit coastal communities.

[95] Again, NEPTUNE stands for: North-East Pacific Time-Series Undersea Networked Experiments.

Ocean Education

Human actions affect our oceans and changes to the oceans ultimately affect humans. In order to utilize ocean resources responsibly and maintain them for future generations, we must create an ocean literate public. Ocean education is a key part of achieving progress on issues outlined throughout the report. Ocean literacy opportunities include many different types and levels of education: K-12 education; further education at college-level; public education and outreach; professional education, and workforce skills development for ocean-related industries. Improving ocean literacy will result in a workforce able to use, research, manage, and sustain Washington's ocean and coastal resources. Ocean literacy also protects public health and welfare, strengthens science education, and increases understanding and stewardship of resources by the general public.

> **Ocean Literacy:** an understanding of the ocean's influence on you and your influence on the ocean.
>
> Source: College of Exploration's Ocean Literacy Campaign at: http://www.coexploration.org/oceanliteracy/.

Washington has several exemplary ocean outreach programs, but formal ocean education in the state is weak. The K-12 curriculum does not contain a formal ocean education requirement. Often, universities and colleges cannot provide high-level ocean-related courses because incoming students are poorly educated on basic science and math skills, as well as ocean issues. In Puget Sound, ocean and marine outreach efforts are fairly strong. However, outreach on the outer coast is more fragmented. The Olympic Coast National Marine Sanctuary and the Olympic Natural Resources Center, along with few local interpretive centers provide varying levels of public education.

Ocean education as a subject should be clarified and defined for each of the educational levels, since each type of education has its own distinct process, goals, and objectives. The state should compile a strategic plan to achieve statewide ocean literacy.

US Commission on Ocean Policy Recommendations

The USCOP declared that enhancing ocean education for children and the general public would increase ocean stewardship, promote better science literacy, and create a knowledgeable workforce to research and manage ocean resources. While education cuts across many of their other recommendations, USCOP specifically suggested[96] creating a national ocean education office to coordinate federal efforts.

Other recommendations included:

[96] See USCOP Chapter 8, especially recommendations 8-2, 8-4, 8-7, 8-8, 8-17.

- Develop framework to evaluate programs and provide best practices for incorporating ocean education in K-12 and public education programs.
- Coordinate with state and local education authorities and researchers to develop and adopt ocean-related materials that meet education standards.
- Increase support for professional education for teachers and future ocean professionals.
- Promote partnerships among universities, education centers, local organizations, government, and communities.
- Expand Centers for Ocean Sciences Education Excellence and dedicate more Sea Grant resources to education.

Again, the USCOP highlighted the value of partnerships and participation by local and state educators and researchers in this process.

Relevant Programs and Laws

- Washington state universities provide ocean-related undergraduate and graduate programs including areas such as fisheries, oceanography, marine studies, marine affairs, and marine and estuarine science.
- The Northwest Indian College offers training in fisheries training, cultural resource management, and life sciences.
- Community colleges offer technical degrees related to ocean resources. Grays Harbor Community College offers a fisheries associates degree and Peninsula College offers oceanography.
- University of Washington research centers provide hands-on learning including Friday Harbor Labs, Applied Physics Lab, and Olympic Natural Resources Center.
- Washington SeaGrant conducts research and education on ocean and coastal issues.
- Many coastal tribes offer education and interpretive facilities, services, and programs.
- Interpretive and visitors centers in Port Angeles (Olympic Coast National Marine Sanctuary) and Ocean Shores allow education of visitors and residents alike.
- State Parks provides interpretive signs and programs for visitors.
- Washington State's curriculum supports interdisciplinary instruction on environmental issues at all grade levels. Currently, the Environmental Education Association of Washington is conducting a statewide review of environmental education.
- Many non-governmental organizations provide education to the public. For example, Friends of the San Juans educates San Juan County residents, land managers, school children, realtors and business leaders by holding workshops and publishing a pamphlet, *Living Within the Shoreline*, for all waterfront property owners.

Key Problems

- No formal state requirements for ocean education in the K-12 curriculum.
- No inventory that summarizes the full spectrum of current education efforts.
- No strategic vision that guides ocean education goals and objectives at the various educational levels.
- Need for increased ocean outreach and education efforts in outer coast schools and communities.
- Lack of adequate resources for state agencies to conduct effective ocean education in coastal communities.

Recommendation 4-5

Improve ocean literacy in Washington by developing an ocean education inventory and strategic plan.

Ocean education would be well served by development of a strategic plan. An inventory of current efforts underway would assist development of this plan.

4-5A Commission a report to inventory and assess current ocean literacy efforts at all educational levels. Conduct a comprehensive inventory and assessment of current educational efforts in K-12 and post-secondary programs. The Office of Superintendent of Public Instruction (OSPI) and the Coordinating Board for Higher Education should be tied in to this work with appropriate funding. OSPI determines the standards with which curricula are aligned. A connection should be made with the National Marine Educators Association (NMEA).

K-12 curriculum should be included in future assessments and strategic planning. A sample ocean education curriculum compiled by the Pacific Education Institute (PEI) is included in Appendix F. Recently the state collaborated with Pacific Education Institute, Olympic Coast National Marine Sanctuary, and Environmental Education Association of Washington by jointly submitting a grant proposal to NOAA to develop a K-12 ocean curriculum.

4-5B Develop a statewide ten-year strategic plan to guide ocean education. Washington's K-12 environmental education program should include an oceans component. Educating Washington's children will result in responsible environmental decisions that, in turn, affect the state's future ocean health. Additionally, it will propel more students into ocean-related professional fields. Incorporating ocean studies into the essential academic learning requirements (EALRS) for Washington is one way to introduce ocean education into the K-12 curriculum.

Many environmental education initiatives are underway already including the recent joint grant proposal to develop a K-12 ocean curriculum. The state should collaborate with as many of these entities as possible during compilation of the plan, in order to form cross-linkages and avoid repetition. Some potential partners include OSPI, PEI, state agencies, local school districts, colleges and universities, Puget Sound Partnership, and other environmental education entities. The state ocean education plan should connect with the Environmental Education Association of Washington (EEAW), which is compiling a comprehensive report on environmental education in Washington. During development of the plan, the state should also collaborate with the Olympic Coast National Marine Sanctuary, since they already conduct a great deal of ocean education. Tribal and local government participation is also highly recommended. NOAA has grant funding for ocean literacy strategic planning efforts and a joint state-federal-tribal-local application for funding would increase its potential for success.

The strategic plan should also guide all the other levels of education such as college level, workforce training, and professional education. The plan should identify broad public education issues, including the development of key messages, along with the best methods for communicating each message.

4-5C Conduct an ocean education conference in order to facilitate assessment and strategic planning. In order to facilitate Recommendations 4-5A and 4-5B, the state should hold a one-day conference. The conference should bring together the broad spectrum of educators to identify topics, priorities, and funding needs. The conference theme and organization should facilitate compilation of the summary report and strategic plan (e.g. a combination of presentations and workshops). As mentioned earlier, the OPWG recommends holding this conference in conjunction with a second conference for ocean research, monitoring, and observing (see Recommendation 4-1A).

4-5D Identify links between coastal community education opportunities and socioeconomic needs that may benefit local communities. The state should support successful education programs in local coastal communities to promote their long-term economic and social resiliency. These programs would likely focus on education regarding workforce needs such as economic development or conservation practices. However, programs should also explore education on human interactions with ocean resources including: public health relationships, recreation, navigation safety, and other ocean resource uses.[97] Sponsors for programs could include university extension offices, interpretation centers, and community colleges. See

[97] For example, how pollution impacts water quality, which can affect shellfish and human health.

Recommendations 5-8 and 5-9 for similar suggestions to optimize economic benefits in these efforts.

Recommendation 4-6

Promote ocean education programs for coastal tribes. Reinstitute a program that encourages tribal students to attain science college degrees.

Several years ago, the state sponsored a program with several tribes on the Olympic Peninsula called STEP (Science and Tribes Environment Program) that encouraged teens from a tribe to attend a four-year college. The program taught students about marine and forest resource management and allowed them to participate in fieldwork. The students then spent time at the University of Washington. STEP ran out of funding, but was successful during its time – resulting in increased college attendance. The state should reestablish a program similar to STEP.

Recommendation 4-7

Identify successful public ocean education programs and provide resources to expand them around the state.

Identify successful public education programs, such as 'Beachwatchers' or 'Dockwalkers', for potential statewide expansion. Another successful model is Puget Sound Action Team's Public Involvement and Education (PIE) Fund, which provides grants to support innovative community education and involvement projects. These programs provide important means to educate local volunteers and the general public. In addition, they invest volunteers in protecting marine resources by conducting local projects. Identify areas where similar programs would benefit local communities and support implementation through local involvement and resources (such as Washington State University-Extension).

Recommendation 4-8

Increase public access to educational opportunities through additional interpretive centers. Identify and provide resources to build and maintain interpretive centers in coastal communities.

Washington's coastal communities expressed a common need for interpretive centers. These centers would provide a solid foundation for public, K-12, and other educational opportunities. Interpretive centers attract tourists - providing clear 'take home' ocean stewardship messages and revenue to local communities.

Interpretive centers in urban areas also improve public education on the ocean and coasts. The Seattle Aquarium recently received over half a million dollars to

educate teachers on integrating ocean concepts into classroom instruction, to add classroom and field programs both in Seattle and at the Olympic Coast National Marine Sanctuary's Center in Port Angeles, and to produce an exhibit on ocean concepts.

The state should inventory and map existing interpretive centers, including facilities such as the Seattle Aquarium, Port Townsend Marine Science Center, Olympic National Marine Sanctuary's Visitor Center, Padilla Bay interpretive center, State Parks sites, and other local centers. Washington should explore ways to encourage visitors to visit other centers around the state to learn more about ocean issues - such as a savings on admission, if they purchase an 'ocean education family pass'. One interpretive center could be combined with a Doppler RADAR/weather station, as recommended in the Ocean Research, Monitoring and Observing section. (Note: Recommendation 5-8 supports these facilities as a way to help provide economic sustainability to local communities.).

Chapter 5 - Sustainable and Resilient Coastal Communities

Vision for Sustainable and Resilient Coastal Communities

Coastal communities create and maintain a sustainable and resilient foundation economically, socially, and ecologically. In coastal communities, the state increases the ability of leaders and citizens to plan for a sustainable and prosperous future; and facilitates improvements to the physical infrastructure that simultaneously supports long-term social and economic survivability and growth, and protects the marine environment. Coastal communities are able to retain and expand key businesses; attract appropriate, new businesses; and encourage and support entrepreneurial activity. Coastal communities maximize economic and social benefits by linking with ocean research and education opportunities.

In order to create sustainable and resilient communities, we must consider how Washington's coastal communities arrived at their current economic state, examine their current strengths, and build a future that will respect the social, economic, and environmental values of the communities and cultures populating Washington's outer coast.

As mentioned in Volume 1 of the report, Washington's outer coastal communities face unique economic and social challenges. Traditionally, these areas relied on natural resource-based industries, which remain important today. Industries such as fisheries, shellfish, tourism, wood products, shipbuilding, and marine trade comprise important components of the coastal and state economy.

Achieving sustainability means providing for the long-term economic, social, and environmental survivability of a community. Many coastal communities, however, are struggling to achieve sustainability and resiliency. In most areas, the per capita income remains well below the state average. Poverty levels are higher than the state average. Individuals living below the poverty level ranged between 11.3 and 16.1 percent across outer coastal counties compared to the state average of 10.6 percent.[98] Of these coastal counties, Grays Harbor County had the highest percent of families, individuals, and children under 18 living below the poverty level. Recent growth trends include a growing retirement population and related development, but, with the exception of San Juan and Jefferson counties, these communities tend to grow more slowly than other parts of the state. In many areas, working families have trouble locating affordable housing. The rural and isolated nature of these smaller communities makes it difficult to compete for limited state resources.

[98] U.S. Census Bureau. 2000. Sheets DP-3: Profile of Selected Economic Characteristics.

USCOP Recommendations

The significant value of the ocean and coastal economy nationally was a main driver for many of the USCOP's recommendations. They focused on specific issues and sectors such as fisheries and marine commerce that clearly relate to the ocean and coastal economy. Some examples of economic-related recommendations include:[99]

- Conducting a thorough analysis and assessment of the potential societal and economic benefits of increased short-sea shipping (i.e. barging).
- Incorporating socioeconomic and biological impacts of fisheries management measures in scientific advice to Fishery Management Councils.
- Developing a national program for social science and economic research to examine the human dimensions and economic value of the nation's oceans and coasts.

By the nature of their report, the USCOP recommendations focused mainly on national-level issues, not specific state or local economic and social issues. Consequently, this chapter focuses on the following topics as they relate to specific needs for Washington and its coastal communities:

- Land Use Planning
- Infrastructure
- Business and Industry
- Workforce Development, Training, and Education
- Research

Land Use Planning

Sustainable communities require thoughtful planning to manage development responsibly, offer citizens a high quality of life, protect natural resources, and provide appropriate infrastructure to meet current and future needs. Washington already has several laws and programs that require community land use planning. Yet, many coastal communities struggle to meet these planning requirements. As a result, the state must increase the ability of leaders and citizens in coastal communities to plan for a sustainable and prosperous future.

Many of the coastal communities have aspirations and needs similar to those of larger, more affluent communities. Unfortunately, these communities face unusual barriers to community and economic development not found in more urban areas. Many lack staff with expertise to conceive, plan, develop, and implement projects

[99] See USCOP recommendations 13-4, 19-, and 25-3.

that will bring positive change for the community and its economy. As a general rule, the lack of expertise is directly tied to the inability of the community to pay a commensurate wage to attract and retain staff. Lack of funding and staff expertise limit community capacity for advancing good community plans that can accommodate population growth and development, protect watersheds, manage the coastal zone, upgrade aging infrastructure, and advance a sustainable economy.

While many data sources and state and federal resources exist to assist planning in coastal communities, there simply may not be the local staff expertise to either access or correctly identify resources. In addition, the state lacks consistent compilation and analysis of demographic and economic data on coastal communities. This data is critical to determine the current economic and social state of the coastal communities, as well as identify the needs to achieve a sustainable future.

While data is important, communities need the capacity and expertise to use the data to identify and plan for appropriate economic development. Economic development is locally driven, but smaller communities often need outside expertise to create a vision consistent with their unique needs and circumstances and to develop a strategy to attain that vision.

Relevant Programs & Laws

A number of state laws and programs assist communities in planning for sustainable economic development.

- The Growth Management Act (GMA) requires comprehensive land use planning for sustainable economic development and protection of the environment.[100] The GMA requires all counties and the cities and towns within them to adopt regulations that classify natural resource lands and that designate and protect critical areas: wetlands, areas with a critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas. Other goals of the GMA include encouragement of growth in areas experiencing insufficient economic growth and protection of the state's high quality of life.
- The Shoreline Management Act requires communities to adopt local Shoreline Master Programs for regulation of uses on shorelines. For counties on the outer coast, this includes incorporating ocean resources uses as outlined in the Ocean Resources Management Act.

[100] Pacific, Jefferson, Clallam, and San Juan Counties are fully planning under the GMA – they have adopted comprehensive land use plans designed to encourage development in urban areas where public facilities and services exist or can be provided efficiently.

- The State Environmental Policy Act requires consideration of impacts to the built and natural environment when making planning decisions.

Key problems

- Coastal communities lack staff resources and capacity to plan for sustainable economic development.
- State agencies lack resources to provide adequate technical planning assistance to coastal communities.
- Economic and social data is inadequate for coastal communities' planning.

Recommendation 5-1

Assist coastal communities in implementing high-impact projects that significantly improve the quality of life of their citizens.[101]

During the timber and salmon crisis in the late 1980's and early 1990's, CTED led cross-agency teams to assist local communities' economic development planning to address their unique needs. The strategy of working in partnership with local leaders to chart a new course eventually led to appropriate, strategic investments (both public and private) in the affected timber communities. By creating Community Action Teams in the Department of Community, Trade and Economic Development (CTED), the state can form these partnerships and assist communities with strategic investments.

This new, CTED budget-priority program will use an innovative service delivery approach to community and economic development to improve the effectiveness of the agency's programs. The program, with the support of the Governor and the CTED Director, will leverage the resources of CTED, other agencies, and communities to implement high-impact and high-priority community and economic revitalization projects that are environmentally sustainable. Through this approach, CTED will become a more active partner with coastal communities, involved in all stages of a project from development to completion.

This program will facilitate community revitalization efforts by:

1) Convening community-specific teams, which include representatives from the local community and state and federal agencies that have the collective technical and financial resources to move a project forward.
2) Providing or arranging for intensive project development technical assistance to communities or businesses to help them overcome obstacles that arise.

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[101] This is consistent with the Regional Response Teams Initiative to assist distressed areas in *The Next Washington*, Governor Gregoire's plan to maintain and improve our state's competitive edge. The Community Assistance Teams emerged as a major theme during CTED's strategic planning process and CTED included them in a budget request to the Governor.

3) Helping communities to identify and participate in activities that will increase their ability to develop a project that meets program criteria.
4) Serving as a first point-of-contact for communities and businesses that want to learn more about the housing, community, and economic development programs at CTED. Providing referrals to the appropriate programs.

This new program will facilitate and enable projects that change and strengthen communities. While details will vary for each community, projects will have the following elements in common: lead to significant community and economic revitalization; sustain the environment, the economy, and lead to a better quality of life for community residents; be part of a comprehensive local community and economic revitalization strategy; and be organized and managed by a local team of community leaders and citizens.

CTED will assign a regionally-based staff lead to each coastal region. Regions will be defined in consultation with communities consistent with their needs. The program staff will convene community summits in each of the regions. The summits will provide a list of prospective projects and a good sense of the communities and their local capacity. CTED may select communities that present projects that are not ready, or which do not have adequate local capacity, for assistance with visioning and capacity-building activities. For each community participating in the program, the team will customize a set of services and develop measurable, desired outcomes jointly with the local representatives.

Recommendation 5-2

Target state agency planning dollars and staff resources to coordinate and assist with local planning efforts and to increase communication among planning agencies.

It is essential to help local government understand the multiple layers of planning and opportunities for coordination and to help them meet their mandates. Local government comprehensive planning efforts to implement the Growth Management Act and Shoreline Management Act require technical assistance. Economic development planning also requires coordination and assistance. By adjusting current resources, CTED and Ecology can target more agency resources to coordination and assistance for local planning efforts (Recommendation 2-3 also refers to additional resources for community planning).

Community Infrastructure

Infrastructure encompasses the things a community requires for health, safety, and commerce. In its broadest sense infrastructure includes roads, bridges, sewer, water, electricity, telecommunications, natural gas, docks, and any other publicly-owned facilities. In coastal communities, improvements to physical infrastructure support not only their long-term social and economic survivability and growth, but also the protection of the marine environment. For example, older and rural housing units in coastal communities often have failing septic systems, resulting in water pollution. Updating wastewater treatment with septic upgrades in these areas would enhance treatment of waste and reduce water pollution.

According to recent research by the Office of Financial Management (OFM),[102] Washington has approximately 80 infrastructure funding sources representing 12 state agencies (see partial agency list under "Relevant Programs and Laws" below). This count does not include federal or local infrastructure funding sources.

The ability of Washington's small coastal communities to obtain funding for basic infrastructure requires a fairly sophisticated and dedicated local staff resource. Most small communities simply cannot afford the time or talent to find, sort through, or access infrastructure funds. Additionally, small communities may have completed capital facilities plans that only provide enough money to minimally maintain existing systems and meet regulatory guidelines. Small coastal communities find it difficult to expand services to meet future demands of residential customers. Meeting the demand for expansion of commercial or industrial business often overwhelms small communities. Infrastructure cost does not vary much between urban and rural communities, but coastal communities have fewer people to share the burden of the cost.

Easily identified infrastructure needs in coastal communities include:

- Marine cargo infrastructure: port access and port maintenance, especially docks, floats, piers, and dredging.
- Transportation: better links, especially road improvements, rail upgrades, and improved freight mobility means access to markets, access for tourists, and an ability to evacuate.
- Electricity capacity and service upgrades.
- Sewer and water capacities including water resource management.
- Telecommunications.

[102] Washington State Office of Financial Management. 2005. *Inventory and Evaluation of the State's Public Infrastructure Programs and Funds*.

Relevant Programs and Laws

The state has a number of infrastructure funding programs that address transportation, environmental, and public health and safety issues. They include the following major categories:

- Public Works Trust Fund
- Department of Health/Public Works Board
- Community Economic Revitalization Board
- Community Development Block Grant
- Department of Ecology Water Quality
- Department of Ecology Water Resources
- Department of Ecology Shorelands and Environmental Assistance
- Department of Ecology Solid Waste
- Transportation Improvement Board

Key problems

- Difficult for local governments to obtain access to infrastructure funds.
- Fewer people to share the cost of infrastructure, especially expansion or upgrades.
- Poor infrastructure prevents economic growth.

Recommendation 5-1

Assist coastal communities in implementing high-impact projects that significantly improve the quality of life of their citizens.

This is a repeat of recommendation 5-1 (Land Use Planning). Community Action Teams are essential to coordinate infrastructure needs and opportunities. This will provide Washington's coastal communities with the right infrastructure, at the right time, in the right way. This should include support for coastal communities' participation in the annual Infrastructure Assistance Coordinating Council's[103] conference.

[103] The Infrastructure Assistance Coordinating Council (IACC) is a nonprofit organization made up of staff from federal and state agencies, local government associations, nonprofit technical assistance firms, tribes, and universities. The IACC is dedicated to helping Washington communities identify and obtain resources they need to develop, improve, and maintain public works programs.

Recommendation 5-3

Establish funding targets for infrastructure development in and between coastal communities by appropriate state and federal agencies.

The state should seek cooperation from appropriate state and federal agencies to participate in a targeted and strategic infrastructure-funding program for coastal communities. Funding infrastructure repairs and upgrades is challenging in rural communities. By collaborating with federal agencies and providing a strategic approach, the state agencies can maximize effectiveness and efficiency of infrastructure development in and between coastal communities. Infrastructure repairs are integral to achieving improvements in public health and the environment. However, infrastructure development must be done strategically to ensure the long-term sustainability of communities: economically, socially, and ecologically.

Recommendation 5-4

Connect coastal communities with infrastructure programs that are appropriate to their needs. The state should identify appropriate ways to facilitate training and assistance on infrastructure programs for coastal communities.

Small, coastal communities find it difficult to navigate the 270 state infrastructure funding programs. The Infrastructure Assistance Coordinating Council (IACC) connects local communities with the appropriate resources. One way the IACC accomplishes this is through an annual conference that stimulates networking, and educates and connects communities to relevant programs. Small communities often lack the resources to attend the IACC conference or similar training opportunities. The state could assist by providing scholarships or other funds to support these opportunities for coastal communities.

Business and Industry

Business and industry is fundamental to the sustainability of coastal communities. Thus, it is important to retain and expand key businesses; attract appropriate new businesses; and encourage and support entrepreneurial activity.

In the past, Washington's coastal communities had primarily resource-based economies. Seasonal tourism coincided with recreational fishing, but the primary industries were related to forest products and commercial fisheries. Historically, both of these resource-based industries faced declines in productivity. As a result, most communities added value to existing resource-based economies to achieve new economies and success. Recently, the forest product industry restructured and has begun a slow resurgence. Meanwhile, the commercial fishing industry has not

yet realized its full economic potential. In addition, tourism-related businesses have increased. More needs to be done with Washington's coastal community economies to attain a long-term sustainable and resilient future.

One way to sustain coastal businesses and industries is through data collection and analysis to support strategic economic planning. Clallam County Economic Development Council gathered data to identify existing and expanding businesses on the Olympic Peninsula (primarily in Clallam County). Additionally, Clallam County Economic Development Council has started to identify businesses to recruit to the region. Not only do other coastal communities need this type of data collection and analysis, but coastal communities also require a comprehensive business retention and expansion plan. This plan entails an accurate inventory of available infrastructure, feasibility and marketing analysis, and a long-term economic strategy.

Coastal communities should plan for retention and expansion opportunities of current major economies including: wood products, marine industry, fishing industry, tourism, health care, and small businesses. The following summaries highlight opportunities for business retention and expansion in a couple of these sectors.

Marine industry

The importance of marine industries has expanded in the coastal communities. Marine industries include commercial boat and shipbuilding, pleasure craft such as yachts, boat and ship repair of both commercial and pleasure craft, manufacturing of deck equipment, and an increasing potential for marine cargo handling and storage of grains for the bio-fuel industry.

A project between the Port of Grays Harbor and Ag Processing Inc highlights the importance of expanding marine cargo. These two entities will construct a state-of-the-art bulk export facility at the Port. If a storage facility for grain products is constructed near the current marine loading facility, Ag Processing, Inc may commit to additional leases and operating agreements with the Port. However, meeting soil stability and additional rail requirements for this storage facility poses a challenge to the Port.

Fishing industry

The fishing industry includes commercial and sport fishing of shellfish, finfish, and ground fish. Fish and seafood processing includes aquaculture. Some current examples of efforts to retain and expand the fishing industry include the following:

- The Pacific Coast Shellfish Growers Association and the Mason County Economic Development Council are conducting a study to explore the current world market for manila clams, blue mussels, and Pacific oysters,

while estimating the total economic effect of the industry on local, regional, and state economies.

- Quileute Indian Tribe Fish Plant and Marina Project – This two-part project would expand a fish plant by adding a cold storage facility for preserving fresh fish, crab, and local agricultural products. To meet an increasing demand for marine facilities, the Quileute marina at the Port of La Push will construct additional off loading capability by expanding the docking facility and installing a new loading crane.

Small Businesses

Since the population in many small coastal communities is aging, many traditional businesses such as retail, banking, and other commercial activities have a difficult time maintaining an adequate work force to meet needs and remain competitive. Small businesses need assistance to find a different business model that will enable them to compete regionally.

A critical issue for small and emerging businesses on the coast is the access to capital. Large commercial banks send local loan documents to a central loan-processing center where, by policy or formula, the bank approves or denies loans. Local small entrepreneurs find it difficult to establish trust and relationships with large lenders. On the other hand, local community banks that may know and trust the local businesses have recently become more risk averse. A few public sector lending entities, including Cascadia, Shorebank, and CTED's small business lending programs, attempt to fill this gap; but they face resource constraints.

Relevant Programs and Laws

CTED administers a number of programs to provide assistance for business development, retention, and expansion:

- Business Development helps manufacturing and food-processing companies locate in Washington or relocate within Washington. The Business Development unit also administers the Cluster-based Approach to Economic Development Program, a competitive grant program assisting communities to develop, in partnerships, regional economic development and industry cluster strategies.
- Business Finance provides technical assistance, financing services, and targeted lending to assist small and medium-sized businesses in obtaining loan capital for start-up and expansion projects that create or retain jobs, stimulate private investment, increase the local tax base, and strengthen community economic vitality.[104]

[104] CTED's finance programs are only available to businesses operating in Washington State.

- Business Retention and Expansion works to retain and expand manufacturing and processing firms to reduce the number of business closure layoffs and failures that result in significant job loss.
- Business Development works with domestic and international companies on all aspects of due diligence support and public-private deal structuring and site locating decisions. The group's partners include economic development organizations in every community in Washington.
- The Tourism Program provides travel information in addition to interactive maps, links to travel businesses and wildlife-watching opportunities, and a host of other useful features at www.experiencewa.com. The tourism industry website provides industry news, research reports, and marketing/public relation program information.

Key issues

- Industry sectors need focused retention and expansion.
- Small businesses require extra support.
- Attracting new, appropriate businesses depends on strengthening existing economy and providing additional technical support.

The following recommendations apply to all the economic sectors mentioned above.

Recommendation 5-1

Assist coastal communities in implementing high-impact projects that significantly improve the quality of life of their citizens.

This is another repeat of recommendation 5-1 (Land Use Planning and Community Infrastructure). Planning and infrastructure investment are key to growing business and industry. Forming Community Action Teams in CTED will facilitate the planning and access to infrastructure funding that communities need to become economically and environmentally sustainable.

Recommendation 5-5

Enhance the strength of local businesses by expanding the cluster-based approach to economic development in coastal communities. CTED should provide short and mid-range economic development through adjusted current resources or additional resources to local communities. This includes the research needed to correctly identify existing industry clusters in the local regions.

Industry clusters are groups of competing, collaborating, and interdependent businesses in similar or linked industries concentrated in a geographic region. Access to shared infrastructure, appropriately skilled workers, and increased knowledge enhance the competitiveness of clustered businesses.

Industry clusters provide a successful method to: foster innovation by promoting the exchange of knowledge; attract talented, creative, and appropriately skilled workers; promote the coordination of industry activity; offer a focus to attract new investment, encourage local expansion, and stimulate startups; and represent the specialization and comparative advantage of a region.

Examples of industry clusters are wood products, tourism, commercial fishing, and value-added agriculture. Coastal communities would benefit from such economic planning. Currently, CTED's program for cluster identification contains a small budget. Providing additional resources to coastal communities would require adjusted or additional funds.

The 2006 legislature tasked CTED with undertaking a cluster strategy with local and regional organizations and governments. This strategy may prove an effective method of sustaining coastal community economies and providing for growth into the future. CTED, via the cluster effort, solicited for the first round of grant applications for locally based cluster work beginning in October 2006. Since the current amount of money available for clusters is small (approximately $250,000), the OPWG supports increasing cluster efforts in coastal communities as an additional priority for the upcoming legislative session.

Workforce Development, Training, and Education

The Governor's Workforce and Economic Development Conference in September 2006 highlighted the necessity of collaborating between workforce, education, training, and economic development. It is essential for coastal communities to plan, design, and follow through with workforce development connected to the locally identified industrial clusters that will sustain and grow into the future. Many local industries provide good paying jobs that require technical training, not advanced degrees. Community colleges, high schools, and perhaps middle schools should align with these local industry opportunities. By improving ocean literacy in K-12 and the general public, people will recognize greater opportunities for employment in ocean-related fields. Additionally, emphasis should be placed on entrepreneurial development. Future business owners are the creative force behind any successful and sustainable economy.

Relevant Programs and Laws

- The Employment Security Department provides training and services for the unemployed to find employment.
- The Workforce Training and Education Coordinating Board is a tripartite partnership of business, labor, and government. The Workforce Board advises the Governor on workforce development policy, ensures that the state's workforce preparation services and programs work together, and evaluates performance. The Board also advocates for the non-baccalaureate training and education needs of the workers who account for about 75 percent of Washington State's workforce.
- Local Workforce Development Councils develop a strategic plan for the local area's workforce development system. They link local area workforce development activities and plans with local economic development strategies.
- CTED's WorkFirst Community Jobs Program provides funding to train and help recipients of Temporary Assistance to Needy Families find employment.
- Community colleges and state universities provide vocational training and higher education to citizens.
- The Washington State Office of Superintendent of Public Instruction leads, supports, and oversees K-12 education to prepare students for work.

Key problems

- Need for coordination and prioritization among various workforce development programs.
- Education should be aligned with local employment opportunities.
- Need to support entrepreneurial development.

Recommendation 5-6

Create a focused, coordinated, and targeted effort for workforce development in coastal communities with existing resources.

Many existing programs influence workforce readiness through training and education. Better coordination among Employment Security Department, the community college system, CTED, and the public school system is essential for the future vitality of Washington's coastal communities. The Workforce Training and Education Coordinating Board would be a good organization to lead or co-lead this effort. By targeting resources and training, coastal community residents will have the opportunity to gain appropriate skills for local industries (See related Recommendation 4-5d).

Research

Economic and social data provides an important guide for understanding the state of coastal communities and targeting resources appropriately. Research on potential ways to boost the value of current industries or produce new items can diversify and strengthen local economies. Finally, as discussed in Chapter 4, connecting job opportunities with expanding scientific research and ocean education is another way to create more resilient and sustainable coastal communities.

Current economic and social data is critical for decision-making. Gaps or outdated economic and social data prevents communities from adequately addressing their current, local issues. For example, the National Ocean Economics Program (NOEP) provides useful data on coastal communities. However, complete data is not available for all of Washington's coastal counties. In addition, demographic and economic data analysis at the sub-county level may provide more useful information than those data that are combined across the county.[105]

In addition, economic and social research is often isolated from planning and economic opportunities. By conducting key research and connecting it to the planning needs and economic opportunities, coastal communities will be able to identify and maximize economic opportunities and sustainability. In addition, scientific information on resources can also facilitate economic development decision-making and planning.

Relevant programs & laws

- Academic institutions, including state universities and community colleges, conduct research.
- CTED (economic vitality index), Washington State Department of Revenue, Employment Security Department, Office of Financial Management, and other state agencies collect economic, social, employment and revenue data.
- Pacific Northwest Coastal Ecosystems Regional Study (PNCERS) conducted a social and economic study of selected coastal counties in Oregon and Washington. PNCERS, along with other similar organizations provide useful economic and social data and analysis.
- Washington SeaGrant supports a variety of coastal research.
- The National Ocean Economics Program (NOEP) provides data on activities and resource trends in coastal areas nationwide. Databases include information on market values, living marine resources, federal marine

[105] For example of this type of research, see Washington State University, Department of Community and Rural Sociology, Professor Annabel Kirschner's September 2004 report at: http://www.crs.wsu.edu/outreach/ark/onrc/index.html.

expenditures, and non-market values. However, some data is incomplete for Washington's coastal counties.

Key problems

- Lack of current economic and social data on Washington's coastal counties.
- Need for better connection to ocean science and education opportunities.
- Need to strengthen existing industries and increase diversity of economic opportunities.

Recommendation 5-7

To support economic decision-making and community planning, CTED should update the economic vitality index for the coastal counties.

Four years ago CTED created and measured an economic vitality index for Washington's rural counties. The data needs updating, especially for sound decision-making in the coastal communities. The vitality index is based on ten measures of performance: population growth, income differences, employment growth, unemployment rate, labor force participation rate, per capita income, per capita growth, public assistance, productivity, and assessed value per capita. The result is a composite "score" of relative overall economic vitality. This data proved useful in decision making and planning for community and regional economic strategies, and correctly allocating resources.

Recommendation 5-8

Establish better links between economy and ocean research and education. Expand work at existing centers such as Friday Harbor Labs and Olympic Natural Resource Center and explore establishing new research centers.

Expanding existing laboratories and fully utilizing and funding the laboratories will aid in the development of longer-term economic strategies using marine resources. Additional marine-related research needs identified included: developing better weather forecasting for marine industry safety; continuing or expanding support for the Olympic Natural Resource Center; developing a marine interpretive center on the Olympic Peninsula; and improving public outreach programs to further the public's understanding of our ocean and coastal environments. In particular, local groups highlighted the opportunity to develop a weather-related marine research station. Filling these research and education gaps will: 1) diversify and strengthen local economy; 2) improve understanding and wise use of ocean and coastal resources; and 3) increase marine safety and public health. Where appropriate, community colleges and state universities should be incorporated in efforts to expand ocean research and education.

Recommendation 5-9

Diversify and strengthen local coastal economies by supporting new research on emerging coastal industries for expanded or new production through entities such as CTED, state universities, and the Washington State Department of Agriculture.

Diverse economies are more resilient to a downturn in one particular industry sector. Research will improve local communities' ability to develop emerging coastal industries and, at the same time, sustain the traditional natural resource industries. In some coastal communities, researchers are conducting studies for increased wool, lavender, and wine grapes. Coastal communities, however, need a much broader effort to understand alternative opportunities that are commercially viable. Examples of research include: 1) micro-climate studies for cooler climate wine grapes; and 2) a feasibility study for local or regional cold storage facilities for agricultural products and/or fish and shellfish products. This research will benefit coastal communities by maximizing the value of products and developing sustainable, resilient economies.

Chapter 6 – Governing Washington's Ocean & Coastal Resources

Vision for Governing Washington's Ocean and Coastal Resources

Washington's character, quality of life, economic stability, and ecological health depend on maintaining and managing the use of our ocean and coastal resources. In order to successfully govern the range of ocean and coastal issues, the state must: establish flexibility to address new and emerging issues; close management gaps; facilitate state agency coordination; partner with federal agencies, West Coast states, British Columbia, and regional entities; encourage participation by local stakeholders; consult/collaborate with tribal governments; and identify appropriate funding sources.

Washington's ocean and coastal resources are among the state's most valuable assets. These resources support coastal and state economies and livelihoods; provide places of enjoyment and recreation for numerous residents and visitors; encourage research, inspiration, and innovation; and help retain cultural and historical heritage. Mismanagement or degradation of ocean and coastal resources can threaten our quality of life, economic viability, public health and safety, and ecological sustainability. Thus, effective management of our coastal waters should be a top priority for Washington State.

For years, coastal tribes, local governments, and ports in Washington State have successfully managed ocean and coastal issues directly affecting their interests. These activities greatly contributed to the marine resource management of the state, and will continue to do so. Given the extent of marine waters, policy and funding tend to focus on the more heavily populated Puget Sound region.

As a result, no clear mechanism exists for coastal tribes and local governments on the coast to interact with the many state policy decision processes on specific ocean issues. The state has ample room for improving coordination of these activities and enhancing participation between the state and these entities. Many participants in OPWG outreach requested increased state involvement and an easier mechanism for local and tribal participation in state policy and access to state assistance. Some participants expressed reservations regarding creating new bureaucracies at either the state or local level.

Traditional and emerging ocean and coastal resource issues often require and involve a variety of state authorities and interests. As earlier recommendation chapters discussed, often these various agencies lack adequate coordination, which

can result in fragmented, absent, or contradictory state policies and inefficient use of state resources. Thus, the state needs to increase opportunities for these agencies to develop and discuss policy issues with input from stakeholders.

Washington's Coastal Zone Management Program (CZMP) is one way the state coordinates some ocean and coastal authorities and issues. The following provides a brief summary of Washington's CZMP:

Coastal Zone Management Program

Congress passed the federal Coastal Zone Management Act (CZMA) in 1972 to encourage the appropriate development and protection of the nation's coastal and shoreline resources. The Coastal Zone Management Act gives states the primary role in managing these areas. To assume this role, the state prepares a Coastal Zone Management Program (CZMP) document that describes the state's coastal resources and how these resources are managed. Washington was the first state to receive federal approval of a Coastal Zone Management Program in 1976. The Department of Ecology's Shorelands and Environmental Assistance Program implements Washington's Program.

Washington's Program defines the state's coastal zone to include the 15 counties with marine shorelines: Clallam, Grays Harbor, Island, Jefferson, King, Kitsap, Mason, Pacific, Pierce, San Juan, Skagit, Snohomish, Thurston, Wahkiakum, and Whatcom counties. The CZMP applies to activities within the 15 counties as well as activities outside these counties, which may impact Washington's coastal resources. Most, but not all, activities and development outside the coastal zone are presumed to not impact coastal resources.

The CZMA requires states to identify their "enforceable policies," those laws and policies by which a state exerts control over private and public land and water uses and natural resources in the coastal zone. Washington's enforceable policies consist of six state laws:

- the Shoreline Management Act (including local government shoreline master programs)
- the State Environmental Policy Act (SEPA)
- the Clean Water Act
- the Clean Air Act
- the Energy Facility Site Evaluation Council (EFSEC)
- the Ocean Resource Management Act (ORMA)

Activities and development affecting Washington's coastal resources, which involve the federal government, are evaluated for compliance with the CZMP through a process called "federal consistency." The CZMA federal consistency requirement requires that federal agency activities be consistent to the maximum extent practicable with the enforceable policies of a state's federally approved management program. It also requires non-federal activities requiring federal permits or funding to be fully consistent with the program. The consistency requirement is an important mechanism to address coastal impacts, ensure federal consideration of state management programs, and avoid conflicts between states and federal agencies by fostering early consultation and coordination.

The CZMA provides states with special funding to assist in making improvements to their state CZM Programs through the Coastal Zone Enhancement Program. Washington State has used these funds primarily to update and amend the Shoreline Master Program Guidelines under the state's Shoreline Management Act.

Coastal water quality has always been an important part of the federal – state coastal zone management program. In 1992, Congress provided for increased emphasis on coastal nonpoint pollution. Washington, along with other states in the national CZM program, is developing a Coastal Nonpoint Pollution Management plan.

As mentioned earlier, Washington's CZM program also participants in a federal program for protecting sensitive coastal and estuarine lands (CELCP).

The USCOP recognized the importance of the CZMA and recommended Congress reauthorize the CZMA with amendments to strengthen its effectiveness including requiring resource assessments, measuring and reporting on goals and performance measures, expanding coastal boundaries, and providing incentives for good performance.

Many policy developments at the federal level and throughout the West Coast will directly affect Washington's ocean resources. Through the Ocean Resources Management Act (ORMA), the state expressed an interest in the management of ocean resources in federal waters (from 3 to 200 nautical miles offshore). It also mandates that the state "participate in federal ocean and marine resource decisions to the fullest extent possible."[106] The U.S. Congress's energy and aquaculture bills both concern development in the offshore areas of coastal states, requiring immediate state involvement and response. Other federal efforts related to the USCOP recommendations require state input including development of offshore

[106] Revised Code of Washington 43.143.010 (6).

renewable energy licensing by the Minerals Management Service, creation of a national framework for a system of marine protected areas by NOAA, research planning and prioritization by the Joint Subcommittee on Ocean Science and Technology's (JSOST), and potentially other federal ocean planning and policy work by the Subcommittee for Integrated Management of Ocean Resources (SIMOR) and the Committee on Ocean Policy. Additionally, the recent West Coast Governors' Agreement on Ocean Health signed by Washington, California, and Oregon will require sustained involvement and partnership from the state. Ocean resource policy issues involving British Columbia require collaboration as well.

Ocean Resource Management Act (ORMA)

- Expresses state interest in management of federal waters due to impacts on Washington's economy and environment.
- Prioritizes renewable resource uses over those with adverse impact on renewable resources.
- Establishes state policy and criteria for permitting activities that may adversely impact state resources.
- Prohibits oil and gas exploration, development, and production in the state's outer coast waters.

Revised Code of Washington: 43.143

USCOP Recommendations

As mentioned throughout this report, the USCOP recommendations focused primarily on federal actions, but emphasized the importance of state involvement and consultation in ocean resource management. Regional ocean councils were the main mechanism they promoted for improving management of ocean resources. The West Coast Governors' Agreement on Ocean Health may serve as a foundation for regional ocean governance. However, Washington still needs to improve mechanisms to formulate and prioritize state policy and fill management gaps at the state and local level.

Relevant Programs and Laws

- Governor's Executive Policy Office
- State agencies: Ecology (Coastal Zone Management Program), WDFW, DNR, CTED, State Parks, Department of Health
- State Water Resource Inventory Areas (WRIAs) and lead entities
- Counties: Clallam, Jefferson, Grays Harbor, Pacific, San Juan
- Tribes: Makah Tribe, Quileute Tribe, Quinault Indian Nation, Hoh Tribe, Jamestown S'Klallam Tribe, Lower Elwha Klallam Tribe, Shoalwater Tribe.
- NW Indian Fisheries Commission

- Federal resource managers: Olympic Coastal National Marine Sanctuary (NOAA), Olympic National Park, U.S. Fish & Wildlife Service – National Wildlife Refuges
- Puget Sound Partnership, Northwest Straits Commission
- West Coast Governors' Agreement on Ocean Health

Federal agency and committee work on ocean policy issues including: Minerals Management Service, NOAA, Joint Subcommittee on Ocean Science and Technology's (JSOST), Subcommittee for Integrated Management of Ocean Resources (SIMOR), and the Committee on Ocean Policy. Other federal agencies will likely become more active as they begin to make progress on USCOP recommendations.

Key Issues

- No mechanism to coordinate state ocean policy on emerging issues.
- Need to respond and provide state input to new federal and regional initiatives regarding ocean issues.
- Need to provide a way to continue coordinating and involving local and tribal stakeholders in ocean resource issues.
- Need to promote better coordination among state agencies, since ocean and coastal issues often involve multiple state authorities and interests.
- Need to coordinate with Puget Sound restoration efforts and entities.
- Need a mechanism to ensure follow-up and prioritization of OPWG recommendations.

Governance Principles for Washington's Ocean & Coastal Resources

1. Manage the state's ocean and coastal areas to protect valuable marine resources and maintain ecosystem health while ensuring the vitality of coastal communities, through: effective, sustainable fisheries management; development of a state marine aquaculture policy; use of ecosystem-based management; and investigation of developing renewable ocean energy technologies sensibly.
2. Protect the coastal environment and its communities from the threats of marine hazards, such as storm surge and tsunamis, the effects of global climate change, and increased erosion, through improved research and management and increased planning efforts. Through state work, ensure continued coordination to prevent and manage pollution and marine debris.
3. Enhance the sustainability and resiliency of outer coast communities through appropriate economic development practices that honor the historical practices of the past, maintain present successes, and plan for future uses to maximize benefits to the state's residents.
4. Increase state attention on ocean-related scientific research and observation practices that satisfy coastal management needs while furthering integrated and coordinated scientific knowledge of the state's marine environment.
5. Inform all state citizens of the vital importance of the state's ocean resources by collaborating on ocean literacy programs in state K-12 education and expanding public outreach on ocean issues.
6. Create a state interagency team on ocean policy to coordinate state policy and consult and collaborate with tribes, local government, ports, and interested citizens.

Recommendation 6-1
Establish the WASHINGTON INTERAGENCY OCEAN POLICY TEAM

The OPWG recommends initiating a clearly defined collaborative process involving core ocean and coastal state agencies, that includes regular consultation and collaboration with federal agencies, neighboring states and provinces, tribes, local governments, ports, industry, non-profit organizations, schools, colleges and universities and interested citizens. This will allow Washington to appropriately address a wide range of ocean issues and enhance ocean and coastal management practices of the state. To achieve this goal, the OPWG recommends the following:

The Governor or her designee shall convene the Washington Interagency Ocean Team. The team will:

- Include participants from key state agencies, local government, and tribes.
- Invite other participants as necessary to ensure broad consideration and enhanced coordination of ocean and coastal issues.
- Regularly consult and collaborate with federal agencies, neighboring states and provinces, tribes, local governments, ports, private sector and non-profit organizations, schools, colleges, universities, and interested citizens.
- Establish and implement the Washington Ocean Action Plan based on the recommendations of the Ocean Policy Work Group, which will include an investigation of the Northwest Straits Commission's Marine Resource Committee model as a proven way to provide local constituents direct participation in these processes.
- Collaboratively develop methods to facilitate involvement and consultation with local communities and tribes.
- Design solutions to relevant policy problems, share information, coordinate the state management of ocean resources, and make policy recommendations, as appropriate, to the Governor and Legislature.
- Work to advance all of the governance principles for ocean resource management outlined above.

<u>Administration</u>
State agency members must appoint their own staff to represent agency interests on the team and support team activities. The team will receive administrative support from the State Dept. of Ecology, to collaborate closely with Washington's Coastal Zone Management Program.

<u>Functions</u>
The team will create and conduct its activities in accordance with an 'Ocean Action Plan.' The team will base its first ocean action plan on the findings of the Washington State Ocean Policy Work Group (OPWG August 2005 - December 2006). The Ocean Action Plan will prioritize, initiate, and pursue implementation of the recommendations of the OPWG. The team shall develop responses to state

ocean policy needs, and clearly designate whether a specific issue is to be addressed through the group as a whole, a subcommittee of team members and additional non-member participants, or recognition of a single state agency as lead on an issue. Within 12 months of the team's inception, the team will provide a report on the progress of the first Ocean Action Plan to the Governor.

The Ocean Action Plan shall accomplish the following:

- Clarify the short-term and long-term policy objectives of the team.
- Prioritize the steps to be addressed by the team.
- Investigate a mechanism to formally involve local and tribal governments on the coast in team activities, through inviting these parties to propose, review, and evaluate potential mechanisms as appropriate. This includes reviewing the Northwest Straits Commission/MRC model.
- Include budget recommendations as appropriate for team activities.
- Further review and recommend legislation to implement the OPWG recommendations.

The team's main focus shall be on achieving state ocean policy goals. The team should report on an updated plan at least every 2 years.

Recommendation 6-2

Provide intergovernmental collaboration within Washington State.

Ocean and coastal resource management requires relationships with many important governments. This collaboration will be achieved in three main ways:

1. The Governor, with the assistance of the team, should continue to work with tribal governments on developing a structure and process to work together on ocean issues that continues to recognize tribal sovereignty.
2. The team will continue to support the development or identification of local, multi-stakeholder organizations to improve and focus management on local issues. With local communities, the team should continue to explore the best method for collaborating with local groups including coordinating local ocean resource priorities and performing local projects.
3. The team should seek out and stay apprised of the ocean-related management and policy planning activities taking place in Washington State. Collaborate, where appropriate, with the efforts of local coastal governments, the Northwest Straits Commission, the Puget Sound Partnership, and any other appropriate entities.

Recommendation 6-3

Promote and enhance relationship between State-Federal government.

The team, working with the Governor, Legislature, and Congressional Delegation, shall use all available tools to ensure the state's priorities and capabilities regarding ocean and coastal affairs are fully recognized and utilized by the federal government and its agencies. The team should strive to develop positive working relationships with all federal agencies with a stake in ocean and coastal issues in Washington State. Examples of these relationships include:

- Utilize federal technical expertise (Olympic Coast National Marine Sanctuary, NOAA, etc.) on issues such as habitat mapping, environmental monitoring, all similar activities, and any new federal research approaches.
- Where state policies are similar with those of federal agencies, the state should work to clearly align state policy priorities with those of federal agency operating plans. This will put the state in a better position for access to federal funding.

Recommendation 6-4

Collaborate with the West Coast governments on ocean policy issues.

The team, working with the Governor, Legislature, and other appropriate entities, should continue collaborating with neighboring West Coast states and British Columbia on developing regional policies and pursuing common goals regarding shared ocean and coastal issues.

Recommendation 6-5

Review existing ocean related laws, including the Ocean Resources Management Act (ORMA), and offer recommendations for updating laws to align with contemporary ocean issues.

The Ocean Policy Team (OPT) should examine what changes in state law are necessary to achieve the recommendations of the OPWG, through collaboration with agency representatives and legislative representatives and staff. The OPT should ensure ongoing consideration of how existing state laws reflect the findings of the group and any future changes that might be necessary.

For example, an early action item for the ocean policy team should be to examine in detail current state laws that relate to ocean affairs, particularly the Ocean Resources Management Act (ORMA). Through this examination, the team should create a set of recommendations for legislative action that enhance the state's ocean management structure and practices.

As it stands now, ORMA focuses on ocean policy issues that were most relevant at the time of its passage in the late 1980s, namely offshore oil and gas development. Today, this policy issue is only one area of focus related to Washington State's offshore ocean policy. ORMA has not been updated to reflect Washington State's present-day, and potentially beneficial, offshore ocean resource uses such as

marine research, sediment management, sustainable fisheries, and renewable energy development. Revising this law would assist in achieving the OPWG's short term goals and better prepare the state to address long-term ocean policy issues as they arise in the future.

Recommendation 6-6

Examine the enforceable policies of Washington's Coastal Zone Management Program for purposes of federal consistency determinations. In particular, assess gaps in coverage and the feasibility of adding applicable state coastal and ocean resource laws to the Coastal Zone Management Program's enforceable policies.

Currently, Washington's Coastal Zone Management Program (CZMP) encompasses six state laws relating to ocean affairs: Shoreline Management Act; State Environmental Policy Act; Clean Water Act; Clean Air Act; Energy Facility Site Evaluation Council; and Ocean Resources Management Act. The enforceable policies within these laws are used by the CZMP for federal consistency determinations, the primary avenue for the state to oversee and influence activities in ocean areas from 3-200 miles offshore.

Many of the recommendations put forward by the OPWG deal with a number of issues that are regulated by state laws and agencies that fall outside of the current coastal zone program authorities. Some examples of these additional laws and administering agencies, that are relevant to the recommendations of the OPWG and future state ocean affairs are: Aquatic Lands Program and related laws, administered by DNR; laws relating to living resource management and habitat enhancement, overseen by WDFW and the DNR; statutes relating to state Seashore Conservation Areas, administered by State Parks; and laws relating to Critical Areas Ordinances under the Growth Management Act, administered by counties and overseen by CTED; and others. The potential inclusion of the authority of additional agencies would not change state law or alter existing administrative structures, but merely includes the new authorities to broaden the state's federal consistency powers. Such a program change would probably require additional administrative support to coordinate with state agencies that have enforcement authority of these laws.

Ecology should institute a study process, aided by the ocean policy team and all relevant state agencies, to investigate potential changes that might be made to the state's CZMP that would enhance the state's authority to effectively implement its ocean policies. Broadening the scope of agencies and statutes under the CZMP's authority would expand the state's enforceable policies relating to uses offshore. This would potentially allow the state more effective management of future activities that impact the state's marine environment. Ultimately, the decision to

allow inclusion of additional agencies and laws in the state's CZMP falls to the federal government through NOAA.[107]

Recommendation 6-7

Review funding mechanisms and provide update on potential and recommended funding for various OPWG recommendations, as appropriate.

An early action item of the state ocean policy team must be to determine appropriate financing mechanisms for the state's new ocean policy activities, and specify both sources of funds and amounts needed that would sustain a long-term effort. The list below highlights some general approaches to funding, with specific examples of sources, as a preliminary discussion:

Federal Resources

- *Ongoing Federal Funding*
  - Coastal Zone Management Program §306 Grants: Program Implementation Funds

    These funds are used to implement programs that are explicit components of a state's coastal zone management program. However, these funds are strained due to a recent cap on availability of §306 funds combined with increased demands on use of those resources.[108]

  - Coastal Zone Management Program §309 Grants: Program Enhancement Funds

    These funds are used to provide federal assistance to state programs to enhance and update program efforts. To best benefit ocean policy activities, this form of assistance would require that a state's coastal zone management program strategic assessment include ocean management as one of its primary areas.

  - National Sea Grant Program

    The Sea Grant Program often partners with state coastal management programs, focusing mainly on public outreach, education, and general advisory services related the state's ocean and coastal affairs.

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[107] NOAA must approve changes that states recommend making to their coastal programs including routine changes and amendments. A change to the enforceable policies of the state's CZMP would be considered an amendment. NOAA follows a specific process for approving or denying amendments including specific information required in the submittal and review process.

[108] Currently, the Coastal States Organization, representing the nation's 35 coastal states, commonwealths and territories, is working on proposals to increase the overall funding amounts for state Coastal Zone Management Programs around the U.S.

- NOAA Coastal Services Center
  This branch of NOAA funds management enhancement projects that pursue specific practices to enhance management activities in the ocean or coastal zone. This source of funding often emphasizes the use of new management tools that have not been used elsewhere.

- NOAA Fisheries Restoration Center
  NOAA Fisheries runs a Community-based Restoration Program, providing funds for individual projects or partnerships that focus on marine and fishery habitat restoration around the country. The program works to provide federal technical expertise at the local level, promote public-private partnerships, and provide funding to projects that show successful results in protecting and restoring habitat.[109]

- *One-Time Federal Funding Examples*
  - Southwest Washington Coastal Erosion Study (SWCES)
    SWCES is a federally funded cooperative research project, conducted by the U.S. Geological Survey and Ecology. SWCES conducts research to develop a regional-scale understanding of coastal process around the Columbia River littoral cell.

  - Pacific Northwest Coastal Ecosystems Regional Study (PNCERS)
    PNCERS is a research and outreach program based in Washington and Oregon's coastal areas, focusing on nearshore and estuarine ecosystem responses to natural environmental variability and human activities. The project is a joint program between Washington Sea Grant, Oregon's Coastal Management Program, and the National Marine Fisheries Service, with funding provided by NOAA's National Centers for Coastal Ocean Science.

  - Olympic Region Harmful Algal Bloom Partnership (ORHAB)
    ORHAB is a collaborative research project formed through partnerships between federal, state, tribal, and local management entities, along with industry, public representatives, and academia. The project focuses its work on harmful algal blooms, tracking their occurrence and effects on shellfish populations. The NOAA National Centers for Coastal Ocean Science's project on Monitoring and Event Response for Harmful Algal Blooms (MERHAB) funds the ORHAB partnership.

[109] More information available at:
http://www.nmfs.noaa.gov/habitat/restoration/projects_programs/crp/index.html

- *Potential New Federal Funding Sources*
  - Two bills introduced in the latest session of the US Congress, HR 2939 and S 1224, included provisions for revenue sharing with states for ocean affairs. While it is unlikely these bills will receive any further action during the current Congressional session, the state should closely follow these and any future national developments for potential links to Washington State's ocean policy activities.

  - The recently announced West Coast Governors' Agreement on Ocean Health has gained national attention for state ocean affairs. At present, the effort has received no dedicated funding for carrying out the regional partnership. However, if funding materialized for the regional partnership from federal sources, the state should explore potential for overlap with the state's ocean activities.

  - The Northwest Association of Networked Ocean Observing Systems (NANOOS) is a proposal for implementing an integrated ocean and coastal observing system in the Pacific Northwest. The federal National Office for an Integrated and Sustained Ocean Observing System (Ocean.US), a cooperative effort between ten federal agencies. This federal office pursues implementation of regional ocean observation system proposals around the country - NANOOS is the Pacific Northwest component.

- *Special Congressional Appropriations & Earmarks*
  The US Congress will often include funding items in legislative activities, based on the requests of specific lawmakers. Examples of these special appropriations could include installation of Doppler RADAR facilities or expanded ocean observation systems, both of which are recommendations in the OPWG final report.

State Funding Resources

- *State General Fund*: The general fund is a source of state funds used for ongoing and new activities. Typically, the Legislature allocates funds to various state agencies to implement aspects of state law and policy.

- *State Debt Funding*: Unlike many other states, Washington does not often use debt funding except in the case of capital facility projects. Debt funding may be appropriate for some of the OPWG recommendations. Debt funding may also be appropriate for projects that require state matching funds, such as federal capital projects like ocean observing systems or erosion and sediment management projects.

- *Specialized State Funds*
  Many special funds already work to support marine environmental

protection and resource conservation such as:

- Aquatic Lands Enhancement Account
- Oil Spill Prevention Account
- Water Quality Account
- Water Pollution Control Revolving Fund
- Vessel Response Account
- Washington Wildlife Recreation Program

A draft preliminary review of potential links between current OPWG recommendations and specific marine-related funding sources, including the list above and others, is still in development. The ocean policy team should further study whether it might be appropriate to expand and pursue use of these funds for the outer coast.

The Governor's Puget Sound Partnership has extensively investigated funding mechanisms, both present and future, for marine policy and restoration efforts in the Puget Sound marine environment. The ocean policy team should review the Partnership's reports for any overlap with outer coast issues that might be appropriate for long-term outer coast efforts.[110]

- *State Conservation Strategies*: Washington State has a number of programs to conserve marine lands and resources. Two examples are the state aquatic preserves program and conservation leasing of state-owned aquatic lands through the Department of Natural Resources. In some states, environmental non-governmental organizations have initiated activities for long-term resource protection through use of their own financial resources. One example is The Nature Conservancy and Environmental Defense purchasing fishing vessels and retiring trawling permits in California, to protect the marine environment and conserve fishery resources. The conservation strategy funding mechanism deserves further detailed exploration by the ocean policy team.

[110]For example, DRAFT Proposed Budget Enhancements, Puget Sound Partnership, available at: http://www.pugetsoundpartnership.org/meetings/meetings/090706/07-08PSProposedEnhance1.pdf

Action for Washington's Oceans and Outer Coast

Ocean and coastal resources face many issues. This final report examined the status of Washington's ocean resources and coastal communities and found that what they offer to our state is priceless – jobs, food, culture, a sense of place, traditions, a place to relax and recreate, beautiful vistas, and much more. Coastal hazards, pollution, and climate change are just some of the threats to coastal communities and the resources on which they rely. Over the past century, our state has witnessed massive declines in some marine fish and wildlife populations. While some populations are on their way to recovery, others continue to struggle. Washington must act to protect, restore, and sustain our ocean and coastal ecosystems before they suffer irreparable harm.

Already, the state is doing a great deal to manage ocean and coastal resources effectively. The Ocean Policy Work Group, however, found much room for improvement. Common themes emerged such as improving coordination and technical assistance, forming partnerships, supplying effective communication and education, increasing research, setting priorities, and providing efficient governance. Important issues identified included fisheries; aquaculture; ecosystem-based management; ocean energy; erosion and sediment management; coastal hazards; climate change; derelict fishing gear; oil spills; ocean research, monitoring, and observing; ocean education; sustainable coastal communities; and governance. The Ocean Policy Work Group's recommendations are just the beginning – they form an initial plan for action and will require continued work to implement them fully.

Washington's ocean resources are essential to our culture, quality of life, and economic health. They provide abundant opportunities, yet face a myriad of threats. We have the chance to steer a better course for our oceans and ourselves. As we face new and emerging issues, managing our ocean resources effectively for the next century and beyond will take action including: a renewed commitment, new management paradigms, sustained research and monitoring, better coordination and cooperation, education, and planning. We must renew our vow to protect and restore Washington's ocean resources and create sustainable, resilient coastal communities – the future of our state and its resources depend on it.

Appendices

Appendix A
Summary of OPWG Recommendations

Draft Recommendation	Who implements?
SUSTAINABLE FISHERIES Recommendation 1-1 *Support groundfish management on a regional level, which could have a smaller geographic scope than West Coast-wide, by: 1) collaborating to increase data collection and analysis and 2) encouraging the Pacific Fishery Management Council to incorporate regional differences into fisheries management on the West Coast.*	WDFW
Recommendation 1-2 *Collaborate on benthic habitat research efforts, including nearshore and shelf habitat characterization and mapping.*	WDFW
AQUACULTURE Recommendation 1-3 *Organize a stakeholder process on all issues of finfish aquaculture through the William D. Ruckelshaus Center or other appropriate consensus facilitator.*	Gov.
Recommendation 1-4 *Continue to pursue state agency, legislative, and public input in order to provide clear state input on the development of national aquaculture policy, such as the National Offshore Aquaculture Bill.*	Team
Recommendation 1-5 *The state, tribes, and academia should pursue increased research on the potential physical and socioeconomic effects of marine fish enhancement and finfish aquaculture.*	Team coordinates

ECOSYSTEM-BASED MANAGEMENT Recommendation 1-6 *Assess coastal and ocean resources and trends to facilitate an ecosystem-based approach in management of ocean and coastal resources. Develop performance measures and key indicators to evaluate progress toward ecosystem health.*	Team
Recommendation 1-7 *Over the long-term, the state should continue to explore and consider using various management tools for coastal and ocean resources through a collaborative state, tribal, and federal process.*	Team
OCEAN ENERGY Recommendation 1-8 *The state should support extension of the offshore oil and gas moratorium in perpetuity.*	Gov.
Recommendation 1-9 *Integrate policy for marine and ocean renewable energy among state agencies. Interact with the Minerals Management Service on offshore energy issues. Evaluate potential impacts on existing uses and investigate developing comprehensive guidelines for renewable ocean energy such as through a Programmatic Environmental Impact Statement.*	Team
Recommendation 1-10 *Promote only environmentally responsible marine renewable energy development and solicit further input from stakeholder groups from Washington, Oregon, and British Columbia.*	Team
COASTAL HAZARDS Recommendation 2-1 *Increase coordination for coastal hazard planning and preparedness among state agencies including partnering with federal, tribal, and local governments to prioritize data collection, improving outreach and dissemination of resources for local communities, and strengthening communication.*	Team/ Ecology (EMD, DNR, DOT)

Recommendation 2-2 *Enhance public education on tsunamis and other coastal hazards with additional resources from the state and federal government. NOAA's tsunami program and workshops in communities are examples of successful models for education.*	Team/ Ecology (EMD & DNR)
Recommendation 2-3 *Address gaps in hazards research and planning. Advance baseline data and research on coastal hazards conducted by state agencies. Improve technical and financial assistance provided by state agencies to coastal communities for land-use planning.*	Ecology
Recommendation 2-4 *Analyze effectiveness of shoreline policies, regulations, and education at reducing hazard risks.*	Ecology
Recommendation 2-5 *The federal government should adjust coastal hazard programs to reduce hazard risk such as reducing incentives, improving coordination, and modernizing flood mapping.*	Gov.
Recommendation 2-6 *The state should evaluate current programs and take actions needed to reduce impacts of coastal hazards including: prioritizing grant applications for projects that provide flood mitigation, conducting workshops on "No Adverse" impact, and considering changes to state guidelines and laws.*	Team
Recommendation 2-7 *Fix aging and critical infrastructure on outer coast through additional resources for Washington State Department of Transportation (WSDOT) bridge retrofit program.*	WSDOT
Recommendation 2-8 *Encourage the state and federal government to complete the All Hazards Alert Broadcast network for Washington's outer coast and straits. This network will warn of a hazard event and enable a timely response.*	Gov.

EROSION & SEDIMENT MANAGEMENT Recommendation 2-9 *The state should adopt the following goals and principles on erosion and sediment management:* 1) Require beneficial use of dredged materials where appropriate to deal with chronic erosion. 2) Minimize impacts to navigation and other marine resources. 3) Enforce permit conditions set out for projects. 4) Use a regional approach in order to increase efficiency and effectiveness of sediment management. 5) Use best available science on coastal sediment processes as a key component for management and planning.	Team
Recommendation 2-10 *Through the Governor's office, the state should actively participate in and represent the state's interests in the Lower Columbia Solutions Group.*	Gov.
Recommendation 2-11 *Provide dedicated resources to participate in and represent the state's interests in regional sediment management and permitting issues through the Department of Ecology. Tasks should include:* a) Assisting in developing dredge disposal sites that keep sediment in the littoral drift cell. b) Engaging the Army Corps of Engineers in achieving the U.S. Commission on Ocean Policy's recommendations on improving regional sediment management.	Ecology
Recommendation 2-12 *Conduct long-term sediment and erosion monitoring and support the Department of Ecology's Coastal Monitoring and Analysis Program.*	Ecology
Recommendation 2-13 *Provide independent analysis of sediment transport modeling tools as called for by the U.S. Commission on Ocean Policy.*	Ecology

Recommendation 2-14 *The state should engage the US Army Corps of Engineers to provide resources to maintain navigability of smaller ports and related infrastructure in coastal communities.*	Team
CLIMATE CHANGE Recommendation 2-15 *Improve state climate change coordination by elevating a lead agency or individual and clarifying roles and responsibilities.*	Gov.
Recommendation 2-16 *Develop and implement effective climate change education and outreach.*	Gov.
Recommendation 2-17 *Conduct climate research necessary to predict impacts and vulnerabilities and adapt resource planning, mitigation, and management.*	Gov.
Recommendation 2-18 *Continue addressing the threat of climate change by promoting development of renewable energy sources, including offshore sources such as wave and wind energy; reducing greenhouse emissions; improving energy efficiency; and increasing regional alternative transportation.*	Gov.
MARINE DEBRIS – DERELICT FISHING GEAR Recommendation 3-1 *Establish a statewide program approach to identifying and removing derelict fishing gear.*	Team
Recommendation 3-2 *The Northwest Straits Commission and DNR's dive team should provide derelict fishing gear removal training and resources to local communities on the outer coast.*	NW Straits/DNR
Recommendation 3-3 *WDFW should supply targeted education to recreational and commercial fishers regarding derelict fishing gear reporting and prevention.*	WDFW

Recommendation 3-4 *DNR should re-examine the marine plastics program and provide recommendations on potential dedicated funding sources.*	DNR
OIL SPILLS Recommendation 3-5 *The Oil Spills Advisory Council (OSAC) should continue its process and detailed work on improving the state's oil spill prevention, preparedness, and response.*	OSAC
Recommendation 3-6 *Maintain a year-round response and rescue tug at Neah Bay.*	OSAC
Recommendation 3-7 *Eliminate the backlog of commercial vessels identified by DNR's Derelict Vessel Program.*	OSAC/DNR
OCEAN RESEARCH AND OBSERVING Recommendation 4-1 *Develop an ocean research, monitoring, and observing summary report and strategic plan which summarizes current and prioritizes future research, monitoring, and observing efforts.*	Team
4-1A Conduct an ocean research, monitoring, and observing conference to prioritize, plan, and coordinate future Washington's observing, monitoring, and research needs.	Team
4-1B Collaborate with other West Coast states, Olympic National Marine Sanctuary, tribes, local governments, and Sea Grant on strategic research planning work.	Team
4-1C Report on the status of Washington's observing systems and explore potential for federal partnership for long-term ocean observations.	Team
4-1D Identify key biodiversity and ocean ecosystem health indicators. Monitor indicators and management actions over the long-term.	Team
4-1E Identify new scientific research and observing needs for the state's programs, policies, and planning.	Team
4-1F Examine the feasibility of a scientific advisory committee or similar structure for future state ocean policy efforts.	Team

Recommendation 4-2 *Collaborate with Oregon and California on ocean research, monitoring, and observing.*	Team/Gov
Recommendation 4-3 *Pursue installation of Doppler RADAR facility on Washington's outer coast and promote placement of additional buoys and sensors on outer coast. Integrate observing networks.*	Gov.
Recommendation 4-4 *The state should support installation and expansion of the proposed NEPTUNE cabled observatory project to improve ocean research, monitoring, and observation on the outer coast.*	Gov.
OCEAN EDUCATION Recommendation 4-5 *Improve ocean literacy in Washington by developing an ocean education inventory and strategic plan.*	Team
4-5A Commission a report to inventory and assess current ocean literacy efforts at all educational levels.	Team
4-5B Develop a statewide ten-year strategic plan to guide ocean education.	Team
4-5C Conduct an ocean education conference in order to facilitate assessment and strategic planning.	Team
4-5D Identify links between coastal community education opportunities and socioeconomic needs that may benefit local communities.	Team
Recommendation 4-6 *Promote ocean education programs for coastal tribes. Reinstitute a program that encourages tribal students to attain science college degrees.*	Gov.
Recommendation 4-7 *Identify successful public ocean education programs and provide resources to expand them around the state.*	Team
Recommendation 4-8 *Increase public access to educational opportunities through additional interpretive centers. Identify and provide resources to build and maintain interpretive centers in coastal communities.*	Gov.

SUSTAINABLE AND RESILIENT COMMUNITIES Land Use Planning Recommendation 5-1 *Assist coastal communities in implementing high-impact projects that significantly improve the quality of life of their citizens through creation of Community Action Teams in the Department of Community, Trade and Economic Development (CTED).*	CTED
Recommendation 5-2 *Target state agency planning funds and staff resources to coordinate and assist with local planning efforts and to increase communication among planning agencies.*	CTED
Infrastructure Recommendation 5-1 *Assist coastal communities in implementing high-impact projects that significantly improve the quality of life of their citizens through creation of Community Action Teams in the Department of Community, Trade and Economic Development (CTED).*	CTED
Recommendation 5-3 *Establish funding targets for infrastructure development in and between coastal communities by appropriate state and federal agencies.*	Team
Recommendation 5-4 *Connect coastal communities with infrastructure programs that are appropriate to their needs. The state should identify appropriate ways to facilitate training and assistance on infrastructure programs for coastal communities.*	CTED/Team
Business & Industry Recommendation 5-1 *Assist coastal communities in implementing high-impact projects that significantly improve the quality of life of their citizens.*	CTED

Recommendation 5-5 *Enhance the strength of local businesses by expanding the cluster-based approach to economic development in coastal communities. CTED should provide short and mid-range economic development through adjusted current resources or additional resources to local communities. This includes the research needed to correctly identify existing industry clusters in the local regions.*	CTED
Workforce development, training, & education Recommendation 5-6 *Create a focused, coordinated, and targeted effort for workforce development in coastal communities with existing resources.*	Team/CTED
Research Recommendation 5-7 *To support economic decision-making and community planning, CTED should update the economic vitality index for the coastal counties.*	CTED
Recommendation 5-8 *Establish better links between economy and ocean research and education. Expand work at existing centers such as Friday Harbor Labs and Olympic Natural Resource Center and explore establishing new research centers.*	Team
Recommendation 5-9 *Diversify and strengthen local coastal economies by supporting new research on emerging coastal industries for expanded or new production through entities such as CTED, state universities, and the Washington State Department of Agriculture.*	CTED

GOVERNANCE Recommendation 6-1 *Establish the WASHINGTON INTERAGENCY OCEAN POLICY TEAM* The OPWG recommends initiating a clearly defined collaborative process involving core ocean and coastal state agencies, that includes regular consultation and collaboration with federal agencies, neighboring states and provinces, tribes, local governments, ports, industry, non-profit organizations, schools, colleges and universities and interested citizens.	Team
Recommendation 6-2 *Provide intergovernmental collaboration within Washington State.*	Gov./Team
Recommendation 6-3 *Promote and enhance relationship between State-Federal government.*	Gov.
Recommendation 6-4 *Collaborate with the West Coast governments on ocean policy issues.*	Gov.
Recommendation 6-5 *Review existing ocean related laws, including the Ocean Resources Management Act (ORMA), and offer recommendations for updating laws to align with contemporary ocean issues.*	Team
Recommendation 6-6 *Examine the enforceable policies of Washington's Coastal Zone Management Program for purposes of federal consistency determinations. In particular, assess gaps in coverage and the feasibility of adding applicable state coastal and ocean resource laws to the Coastal Zone Management Program's enforceable policies.*	Team
Funding Recommendation 6-7 *Review funding mechanisms and provide update on potential and recommended funding for various OPWG recommendations, as appropriate.*	Team

Appendix B
U.S. Commission on Ocean Policy's Guiding Principles

From: USCOP. 2004. *An Ocean Blueprint for the 21st Century*. Final Report

- *Sustainability:* Ocean policy should be designed to meet the needs of the present generation without compromising the ability of future generations to meet their needs.

- *Stewardship:* The principle of stewardship applies both to the government and to every citizen. The U.S. Government holds ocean and coastal resources in the public trust—a special responsibility that necessitates balancing different uses of those resources for the continued benefit of all Americans. Just as important, every member of the public should recognize the value of the oceans and coasts, supporting appropriate policies and acting responsibly while minimizing negative environmental impacts.

- *Ocean–Land–Atmosphere Connections:* Ocean policies should be based on the recognition that the oceans, land, and atmosphere are inextricably intertwined and that actions that affect one Earth system component are likely to affect another.

- *Ecosystem-based Management:* U.S. ocean and coastal resources should be managed to reflect the relationships among all ecosystem components, including humans and nonhuman species and the environments in which they live. Applying this principle will require defining relevant geographic management areas based on ecosystem, rather than political, boundaries.

- *Multiple Use Management:* The many potentially beneficial uses of ocean and coastal resources should be acknowledged and managed in a way that balances competing uses while preserving and protecting the overall integrity of the ocean and coastal environments.

- *Preservation of Marine Biodiversity:* Downward trends in marine biodiversity should be reversed where they exist, with a desired end of maintaining or recovering natural levels of biological diversity and ecosystem services.

- *Best Available Science and Information:* Ocean policy decisions should be based on the best available understanding of the natural, social, and economic processes that affect ocean and coastal environments. Decision makers should be able to obtain and understand quality science and

information in a way that facilitates successful management of ocean and coastal resources.

- *Adaptive Management:* Ocean management programs should be designed to meet clear goals and provide new information to continually improve the scientific basis for future management. Periodic reevaluation of the goals and effectiveness of management measures, and incorporation of new information in implementing future management, are essential.

- *Understandable Laws and Clear Decisions:* Laws governing uses of ocean and coastal resources should be clear, coordinated, and accessible to the nation's citizens to facilitate compliance. Policy decisions and the reasoning behind them should also be clear and available to all interested parties.

- *Participatory Governance:* Governance of ocean uses should ensure widespread participation by all citizens on issues that affect them.

- *Timeliness:* Ocean governance systems should operate with as much efficiency and predictability as possible.

- *Accountability:* Decision makers and members of the public should be accountable for the actions they take that affect ocean and coastal resources.

- *International Responsibility:* The United States should act cooperatively with other nations in developing and implementing international ocean policy, reflecting the deep connections between U.S. interests and the global ocean.

Appendix C

U.S. Commission on Ocean Policy Chapters, Washington State Ocean Policy Work Group Report Chapters, State Laws, and Web Resources

The table below matches the U.S. Commission on Ocean Policy's report chapters to the corresponding Washington State Ocean Policy Work Group's final report chapters. The state laws and web resources provide a partial summary list. These are not intended to be comprehensive, but are for reference only.

*The USCOP chapter contains a summary of USCOP recommendations and existing state laws. At this time, the OPWG does not provide further recommendations on these USCOP issue areas.
N/A means not applicable.

USCOP Chapter Title	USCOP Chapter	OPWG Chapter	Applicable State Laws (RCWs)	Web Resources
Enhancing Ocean Leadership and Coordination	4	6	N/A	Joint Ocean Commission Initiative http://www.jointoceancommission.org CEQ Committee on Ocean Policy http://ocean.ceq.gov/
Advancing a Regional Approach	5	6	N/A	West Coast Governors' Agreement on Ocean Health http://www.governor.wa.gov/news/2006-09-18_Ocean_Agreement.pdf
Coordinating Management in Federal Waters	6	6	N/A	Washington State Coastal Zone Management Program
Promoting Lifelong Ocean Education	8	4	HB 2910 Environmental Education Study 28A.230.020 Common School Provisions, associated WAC 392-410-115	Olympic Coast National Marine Sanctuary: http://olympiccoast.noaa.gov/welcome.html Washington SeaGrant http://www.wsg.washington.edu/
Managing Coasts and Their Watersheds	9	USCOP*	90.58 Shoreline Management Act 90.82 Watershed Planning Act 86.16 Floodplain Management Act 36.70A Growth Management Act 77.85 Salmon Recovery Act	Ecology's Shorelands and Environmental Assistance Program http://www.ecy.wa.gov/programs/sea/shorelan.html Growth Management Hearings Boards: The Growth Management Act http://www.gmhb.wa.gov/gma/index.html

Guarding People and Property Against Natural Hazards	10	2	36.70A Growth Management Act 90.58 Shoreline Management Act 86.16 Floodplain Management Act	Washington State Emergency Management Division: http://emd.wa.gov/ Federal Emergency Management Agency http://www.fema.gov
Conserving and Restoring Coastal Habitat	11	USCOP*	77.55.111 Habitat incentives agreement 77.55.171 Watershed restoration projects 79.70 Natural area preserves 90.74 Aquatic resources mitigation 90.84 Wetlands mitigation banking	WDFW Habitat: http://wdfw.wa.gov/habitat.htm Coastal and Estuarine Land Conservation Program: CELCP Grant
Managing Sediment and Shorelines	12	2	79.105 Aquatic Lands 77.55 Hydraulic Code	Southwest Washington Coastal Erosion Study Ecology's Coastal Monitoring Analysis Program
Supporting Marine Commerce & Transportation	13	5	90.58 Shoreline Management Act	
Addressing Coastal Water Pollution	14	3; and USCOP*	70.95 Solid waste management 70.105 Hazardous waste management 70.142 Chemical contaminants 70.146 Water pollution control 77.55 Construction in state waters 77.55.161 Stormwater discharges 90.48 Water pollution control 90.50 Water pollution control facilities 90.52 Pollution disclosure act of 1971 90.54 Water resources act of 1971 90.82 Watershed planning 90.88 Aquatic rehabilitation zones	Ecology's Water Quality Program http://www.ecy.wa.gov/programs/wq/wqhome.html
Limiting Vessel Pollution and Improving Vessel Safety	16	USCOP*	70.105 Hazardous Waste management 90.48 Water Pollution Control 90.56 88.46 70.105 Hazardous Waste Act 70.105D Model Toxics Control Act 88.40, Transport of Petroleum Products 88.46 Vessel Oil Spill Prevention and Response 90.48 Water Pollution Control 90.56 Oil and Hazardous Substance Spill Prevention and Response	Puget Sound Clean Air Agency: http://www.pscleanair.org/news Ecology's Cruise Ship MOU Ecology's Spills Prevention, Preparedness and Response Program: http://www.ecy.wa.gov/programs/spills/spills.html Washington State Oil Spill Advisory Council: http://www.governor.wa.gov/osac/links/default.htm DNR Derelict Vessel Removal Program

Preventing the Spread of Invasive Species	17	USCOP*	17.26 Control of spartina and purple loosestrife 77.120 Ballast water management 77.55.051 Spartina & purple loosestrife 77.55.081 Removal or control of aquatic noxious weeds 77.60.110 Zebra mussels and European green crabs 77.60.130 Aquatic nuisance species committee	WDFW Washington State Aquatic Nuisance Species Management Plan http://www.wdfw.wa.gov/fish/nuisxsum.htm WDFW Ballast Water Program DNR Nearshore Habitat Program http://www2.wadnr.gov/nearshore/
Reducing Marine Debris	18	3	77.12.865 and .870 79.105 Aquatic Lands 79.145 Marine Plastic Debris Task Force 79A.60 recreational vessels	Northwest Straits Commission: http://www.nwstraits.org/PageID/142/default.aspx WDFW gear reporting: http://wdfw.wa.gov/fish/derelict/derelict_gear.htm
Achieving Sustainable Fisheries	19	1	77.04 Department of Fish and Wildlife 43.143 ORMA	Pacific Fishery Management Council http://www.pcouncil.org
Protecting Marine Mammals and Endangered Marine Species	20	USCOP*	77.04 Department of fish and wildlife 77.15 Fish and wildlife enforcement 77.50 Commercial fisheries –limits 77.85 Salmon recovery 77.90 Salmon enhancement facilities 77.95 Salmon enhancement program 77.100 Fish & wildlife enhancement 77.110 Salmon and steelhead trout	Salmon Recovery Office: Statewide Strategy to Recover Salmon WDFW Salmon Recovery: http://wdfw.wa.gov/recovery.htm WDFW Species of Concern: http://wdfw.wa.gov/wlm/diversty/soc/concern.htm
Preserving Coral Reefs and Other Coral Communities	21		N/A	Olympic Coast National Marine Sanctuary http://olympiccoast.noaa.gov/
Setting a Course for Sustainable Marine Aquaculture	22	1	15.85.010 Aquaculture as part of state agriculture industry	Pacific Aquaculture Caucus http://www.pacaqua.org
Connecting the Oceans and Human Health	23	USCOP*	77.115 Aquaculture disease control 90.72 Shellfish protection districts	Olympic Region Harmful Algal Blooms: http://www.orhab.org/ DOH Food Safety and Shellfish Programs Biotoxin Program: http://www.doh.wa.gov/ehp/sf/BiotoxinProgram.htm
Managing Offshore Energy and Other Mineral Resources	24	1	90.58 Shoreline Management Act 43.143 ORMA	Minerals Management Service http://www.mms.gov
Creating a National Strategy for Increasing Scientific Knowledge	25	4	43.30.800 UW Olympic Natural Resource Center	NSTC Joint Subcommittee on Ocean Science and Technology http://ocean.ceq.gov/about/sup_jsost_prioritiesplan.html
Achieving a Sustained, Integrated Ocean Observing System	26	4	N/A	NEPTUNE Program http://www.neptune.washington.edu/ Northwest Association of Networked Ocean Observing Systems (NANOOS) http://www.nanoos.org

Appendix D
Detailed Public Comments by Location

The following bulleted lists summarize the comments heard by location visited. These lists offer a greater level of detail to the issues as they relate to different areas of Washington's coast.

Forks – 5/10/06

Education & Research

- Need to integrate economic and environmental values w/ research and education - Social/economic analysis of coastal communities (local resource) - Validation monitoring of fisheries conservation strategies

-ORHAB project:

- Collaborative research project on Harmful Algal Blooms.
- Still challenges remain: identify baseline data, more money (NOAA, congress), understand economic costs to coast region & state, develop local capacity for affordable monitoring, secure long-term state commitment (bill enacted in 2003 for permanent account for monitoring)

Economic Sustainability

- Living wage jobs and diversification of economic base, fighting for survival
- Economic development for Forks, Sekiu and Clallam Bay
- Natural resource based economy still. In transition, but will still be tied to resources.
- Transportation (Port of Port Angeles) – maintain water dependent base
- Short-sea shipping (barging) add infrastructure for barging network among smaller ports. DOT analysis of benefits of barge network.
- Energy issues (port)
- National Park limits tourism capabilities (compare land use to OR Coast)

La Push: Quileute Tribe

- Fishing seasons are important to economy, but very involved, difficult, and short. Watch fisheries, especially ones where fish take a long time to get to reproductive age.
- Fisheries allocation for rockfish and lingcod based on whole west coast. Locally abundant, numbers could be increased with regional management for some of these fisheries (WDFW). Research proposal to get funding to do regional management?
- Tsunamis are big threat to low-lying community.

-Landslide may result and block exit from community.

Coastal hazards

- Wind waves from storm and high tide surge. Last year one predicted at 38 feet, reduced in size to 16-20 feet, but still water came up to head start building. Marina was hard-hit by storms, needs to be improved and requires more money.
- Have a siren and PA warning system to protect people. Coast Guard Emergency Team
- Attempting to move school to higher ground, negotiating w/ National Park to exchange land for access to 2nd Beach.
- Future communications needs, such as cell phone access.

Education

Problem: STEP (Science and Tribes Environmental Program) program at UW eliminated. Inspired students to go to college by involving them with marine and forest intensive field classes.
Needs: Better funding and programs to inspire students to work in natural resources

Research

Problem/Need: Erosion and sedimentation impacts to blue mussels. 71% of sedimentation from road building and logging, but better forestry methods now, so not as bad.
- Tourism is of number 1 importance: new buildings & accommodations.

Problems: North jetty is not high enough to protect river/estuary, boat basin, and village from storms
- Corp has minimal amount of $ allocated for dredging.
- Boat basin is badly damaged; lost pilings and planks; needs to be raised up and dredged. Insurance won't cover it all. Port up to par to meet needs of commercial and sport fishing.
- Timing of dredging (WDFW standards) lacks research on impact to fisheries. They can't begin until October, not enough time to dredge before stormy conditions. Lost 2 dredges last year.
- All 5 river systems influence erosion/sedimentation.
- Logging caused increased sedimentation and reduced kelp beds (which used to go the entire length of coastline) reduces buffering of shoreline and increases coastal erosion.
- Needs: Corps to have more funding to do more than minimal dredging. Need money to fix/dredge boat basin, raise/secure jetty, and increase dredging.
- WDFW to research timing of dredging on fisheries. It can occur earlier.
- Sovereignty of tribe related to sanctuary. The sanctuary is w/in tribal areas, not the other way around.
- Tribe must have access to usual and accustomed areas. Uphold treaty rights.
- Rockpile is popular fishing area for ground fish, but lots of lead balls are lost from trawl gear.
- Lost crab pots are also a problem.

Needs/recommendations:
- Work with Marine Resources Committee to pursue options for lost fishing gear.
- DNR dive training to tribe for removal.
- Expand existing Puget Sound projects and Northwest Straits Commission. Most grant driven, need consistent funding.
- Use Sanctuary Remotely Operated Vehicle to identify, recover derelict gear

Neah Bay: Makah Tribe

Fisheries/Aquaculture

Fishing fleet is main economic driver, largest tribal fishery
Problem/Need:

- Rockfish – tribe believes there is enough biomass, but bycatch is a problem. Need gear changes, currently researching traditional hooks/hook design to limit types of fish caught.
- Regional stock structure rather than whole coast – Need to research (WDFW) in order to support.
- Aquaculture – tough issue, very skeptical, because of competition. But increased consumption increases prices. No official tribal position.

Energy

Resource:
- Tribal wave energy (AquaEnergy) project in FERC licensing process. 4 buoys = 1 MW closed system, no oil leaks. Harness energy and interconnect with Clallam County Public Utility

Education/management -Summer youth environmental and marine resource program

Research

Issue: Tribal research plays large role in fishery: bycatch reduction, water quality, stock genetics, seafood safety, air quality (detects impacts from ship traffic).

Needs: More support for scientific study (EPA, Universities, others). -Inventory of research on-hand, better coordination on range of issues (NOAA, tribes, WDFW, UW, etc.)

Comprehensive Tourism Plan
- Makah Museum will be anchor
- Loop road to connect in to Forks via southern boundary of reservation would help, but no official tribal stance on it. May need to go that way to increase tourism and offer emergency route.
- Treaty is covenant to protect ocean resources that tribe relies on. Historically ocean-going from CA to Aleutian Is. Large usual and accustomed place (UA) Columbia River issues impact resources that Makah use. Area is congregation of large biomass/mixed stock Tribe is steward of timber, fish and ocean.
- Oil spill and other pollution (hood canal) worries.
- Economic development: mini-mart, clinic, building cabins, buying land to south.
- Tsunami – working on getting out of zone.

Oil Spills

Issues: -Outer coast is underfunded and underprotected from oil spills (Ecology's response plan). Major concern for tribe.
-1991 review did not incorporate natural and cultural resource values.
-1991 Tenyo Maru spill directly impacted resources. Oil spill would impact tourism along whole coast.

Needs:
- Integrate into regional response team (RRT) – tribal rep is from Department of Interior. Tribe is underrepresented on team and in economic analysis.
- By formally recognizing tribal interest, would: 1) improve safety standards 2) have high volume port line designated move from Port Angeles to Cape Flattery will result in more dedicated gear and quicker response time.
- Spills (Ecology) emergency response system for strait entrance, integrate w/ Makah "all hazards plan"
- Pursue emergency response plan issues (Ecology)
- Permanent funding for year-round rescue tug, currently only 9 months. - Funding for all hazards plan & emergency response plan

Miscellaneous Management
- Updating coastal zone management plan (89) revising to current science - Sanctuary & Makah involved in derelict fishing gear removal
-Need: Protect upstream and downstream – all interconnected

Port Angeles – 5/11/06

Stakeholder Panels:

Education & Research

Research

- Not enough activity on habitat characterization, ecosystem health and monitoring
- WA Sea Grant doesn't fund monitoring (in large part)
- Need funding for characterization and monitoring
- Aquaculture research hard to get money to assess.
- Centers for Excellence conducts research and education, R&D on Environmental Resources and Marine Trades.

Issue: - Research is fragmented, usually looks at one small set of larger problem

Needs:

- Sets of Consortia (multi-agency) - many scientists can collaborate and provide input to management and policies from research. Efficient and dynamic administrative structure (e.g. Western Regional Aquaculture Consortium)
- Focus on ecosystem/human interaction in order to understand future
- Grant should require education and outreach, involve K-20 education and scientists in classroom.

Education

- Ocean resources provide spark for future scientists. Important.
-Not enough money, not many field trips any more. Academic learning requirements and testing takes up too much time.
- Enrollment declines, growing population, but aging population

Governance

NOAA Olympic Coast National Marine Sanctuary

Goal: cultural, historical, ecological and natural resource protection & compatible uses

- Overlapping boundaries with state, tribes and Olympic National Park
- Banned oil & gas within sanctuary
- 7 regulated uses minimize seafloor disturbance, minimize overhead flights, etc.
- Oil spill biggest threat
- Good to focus on outer coast
- Build on existing governance infrastructure. Already 3 federally protected levels and tribes. State should acknowledge federal designation and get involved
- Recommend local gov't buy-in - Involve tribes as co-manager
- Range of issues are the same for the sanctuary as OPWG. Some overlap w/ existing and future programs. Need partnerships w/ state
- Coordinated research & education plan

Olympic National Park
Goals: protect natural and historic values; allow access & enjoyment for current and future generations
- Park & state work well together; working to improve relationship with tribes
- Sets limits for non-tribal fish w/in park - General Management Plan is guiding document for park

USFWS – National Wildlife Refuges
-Goal is set out in designation/enabling legislation for each refuge: conservation & restoration of fish, wildlife, & bird species. Conservation comes first.
Current Issues/Partnerships:
- DNR leases land to refuges - Dungeness – rogue creosote log removal (w/ DNR)
- Derelict Fishing Gear – support Marine Resource Committees & Northwest Straits Commission's work; 3 ½ feet of bird and mammal bones found under gear recently.
- Research and Monitoring: Parks, NOAA, Universities & others - Education: wide range of partners

NW Straits Commission
Goal: protect and restore marine waters of species & habitat through sustainable approach
Marine Resource Committees (MRCs):
- Set local community priorities - Sponsor projects to address priorities
- Advisory body oversees work - Not the end-all, need regulatory and non-regulatory approaches
- Commission prefers current role, work to replicate
- Jefferson and Clallam not covering outer coast – possible to use WRIA-based for coastal issues like the Salmon Recovery Funding Board?

Other issues: Business and Local Interests
-Ecotourism is not a panacea. Need other industries like aquaculture, bio-diesel, R&D. Need $ to convince to build infrastructure for something new. E.g. Partners for Innovation is an example program.
- Growth is restricted by limited and slow access to water rights.
- Proliferation of exempt wells and septic tanks, causing nitrate pollution through sandy soils.
- Need: cluster development w/ sewer satellites.
- Used to be salmon exclusively, declines forced diversification into black cod, halibut, Dungeness crab and rockfish.
- Need: good, clean water to protect ocean resources.
- Regulation and economic development rely on good policy, which requires good research, which needs $.
- Port benefits from sound management of oil transit and double-hulled tankers. - Support OPWG efforts.

Lower Elwha Tribe*
-Aquaculture: guarded about impacts to wild fish harvest and pollution associated with aquaculture.
-Marine protected areas: Careful site location, but not against them; More work and research needed.
-Research: Basic research needed: e.g. resource assessments (e.g. urchin population, rockfish, eelgrass, kelp beds).
-Estuary assessments – Elwha Chinook: Restoration projects with Marine Resource Committee are very important.

-Tourism: Very important to tribe; Want to share culture and helps their economy too.
-Usual and accustomed area covers all of Strait of Juan de Fuca.
- Reconnecting w/ language, diets, and culture which relied on finfish, shellfish, abalone, octopi, halibut, salmon, geoduck, crab and shrimp.
-Supermarket and pharmacy of tribes came from ocean resources.
-Now tribe faces increasing cancer and diabetes from poor diets.
- Concern about trends in marine environment; Toxics in fish; alarming problems (mercury).
-Development impact on water quality. -Sediment impacts on eelgrass and habitat. -Cleanup is important.

Jamestown S'Klallam Tribe*

- Aquaculture: how to make it safe, need good information to do assessment, can be done very well or very bad, a lot of federal and state level (Manchester lab) assistance.
- Crab pot (small ones pose a particular problem) do something with regulation on crab pots and removal of fishing gear.
- **Research:** coordination and linkages also needed, tribes do great research.
- **Education:** tribe has park and nature center, critical role to educate citizens on how to care for environment/ocean resources.
- Cultural Map of Olympic Peninsula.
- Partnerships are important: tribe has many partnerships (only 11 acres of land!) e.g. bacterial study w/ EPA on problem in Dungeness.
- Processes: NOAA/MPA effort underway, NW Straits Commission, MRC (works great!), challenge how to pitch recommendations and coordinate with existing partnerships (shared strategy, 2014 water rights, Puget Sound Partnership).
- Water used to be clean and clear, very few red tides. Now much more frequently, contaminated water from septic tanks.
- Need clean water and good policy, but answers are not difficult. It takes political will and money.
- Lots of development in area.
- The tribe wants to pass on hunting, fishing skills to children, but difficult b/c stress on resources and short seasons. Stress comes from land and ocean.
- Wanted to be commercial fisher in retirement, but not enough fish. -Lost culture, fish and water quality.
- Time to quit talking and start doing – irresponsible people, we have a part and duty to take care of it and clean it up.
- Ocean resource direct economic impact on tribe.
- Treaty right retained right to hunt and fish in UA.- Tribe doing restoration.
- Water quality is very important, since tribe has much higher consumption rates, federal standards do not protect tribal health.

General Public

Aquaculture:

-Many against offshore, priority should be rebuilding wild stocks.
- Offshore aquaculture is a problem: fishing from bottom of food chain.
- Some support aquaculture, use ocean zoning to address issues.
- Aquaculture is a supplement; industrial development is replacing wild stocks, escapes/disease issues are unknown, should be done correctly.
- Pollution, farming, repairing habitats should be cohesive approach.
- AmeriGolds Seafood: 200 employees, farmed and wild salmon, uses vegetable protein and small, unusable fish.
- AmeriGold: concerned about fish meal, but Peru will use for hogs, chicken feed or fertilizer. Fish converts protein more efficiently and demand is too high.

Coastal Vulnerabilities:
-Plan development appropriately – don't build in harm's way
-Habitat restoration as economic development.
-Are Geographic Response Plans (GRPs) being updated (2000 is last year). Tribes and many communities don't have a copy of the GRP.
-Coastal County Workshop Group Tsunami focus with Rep. Inslee and Sen. Cantwell – alarms for all coastal communities working w/ DNR.
-First county considered Tsunami-Ready.
-Not enough workshops (DNR/UW) experts to educate people.
Education:
-County-level education, collaboration-coordination needed, need cultural value of resource use education, Ocean literacy program (tie-in with funding for NOAA).
-Early education is important, we don't have good early marine resource education.
Research
-Different methodologies. -Need bigger picture strategic plan. -Collaboration should be a priority.
-Aquaculture zoning, tourism, need ice and freezer ships, better education/research, improve communication, Need Marine Resource Interpretive Center.

Ocean Shores — 5/19/06

Olympia Coast Nat'l Marine Sanctuary Advisory Council

- Ecology data layers are old for IDing resources at risk for oil spill planning. Need to be updated ($).
- Role for Coastal Zone Management program to bring stakeholders together.
- Need mechanism for tackling/solving the problem that's consistent through levels of government, idea of ocean policy go-to point person (users frustrated about communication, who at state can help local people).
- Need money to update resources at risk GIS data layers for oil spill planning.
- Research: benthic habitat mapping is important, important to preserve biodiversity.
- Upland areas and impact on ocean resources is important.
- Need clear definition of marine protected areas/reserves – update inventory and solicit feedback, also need to incorporate in evaluation of effectiveness w/ rigorous monitoring.
- Constituents feel need for permanent ban on oil/gas.
- How track and interact with offshore aquaculture (NOAA), is there a mechanism for state involvement?
- Research: need for aquatic acoustic research, sound impacts on biological resources, need long-term general monitoring and research, bring researchers together to collaborate (colloquiams), create a brash and bold blue-print for research ->get consensus and find funding, central clearinghouse for research, sensors and moorings -> need to know what's all out there (lots of groups and activities).
- Need better coordination w/ tribes; already have lots of research, management information (mandate to protect cultural resources).
- Education – Joint Interpretive Center on the Coast; ONRC trains teachers to incorporate natural resources into their curriculum; need strategic plan for funding and collaboration.
- Access to clean fresh water is important to community.
- Local Projects – AquaEnergy, Pacific Cable Crossing, SeaBreeze- Canadian hydro, wind, wave project, AquaVenture – underwater net pens.

Education & Research

Public Schools

- Lots of students live with grandparents or other relatives, fixed incomes and limited resources.
-Housing prices are too much for working families.
- Transient student population.
- Distance a challenge for services, running start students.
- Economic, culture, psychological influence WASL scores (science WASL not required for graduation until 2010 – influence on what students study).
- Drop-out rate – working on vocational training w/ woodshop, computer technology, business program need auto shop program

OCNMS

- Education/outreach and heritage preservation = lots of face time in community to assess needs and tried many different things
-Need: a Puget Sound like process for regional approach to education/outreach. -Recalibrate and fresh-look at opportunities through collaborative planning process. -ID unique qualities and needs of communities.

Grays Harbor CC

- Has opportunities for natural resource education including: habitat restoration site; fish/aquaculture technical teaching; water quality testing
- Becoming demonstration site for renewable energy.
-Most students as GHCC have poor science/math skills which leads them to low enrollment in these classes, putting them on paths that don't lead to science careers.
- Gov't needs to do a better job on policy side that links regulations with the impacts in a community.
- Interpretive center.
-Difficult to communicate w/ gov't efforts, no $ for state agencies to do education; need agencies to fund printing of pamphlets
- Urban grade school education doesn't include natural resources of ocean, yet many visit area.
- Local schools can't afford field trips.
-Ocean safety an important topic for education to visitors.

WSU Extension

-Work w/ education, research, & technical assistance. Industry sectors: - Fishing (3rd largest in U.S. by value). -WSU does Commercial fishing Vessel Safety Training. - Commercial crabber/Towboat land project minimizes interference of fixed crab gear with shipping traffic.
- Shellfish Culture (25% of U.S. production).
-Burrowing shrimp – control w/ carbaryl, but need new alternative…
-Spartina invasive cordgrass, having success w/ Habitat (Imazypyr).
Weather Forecasting -Need better forecasts for better safety for industry currently a few buoy systems, satellite data -No Doppler weather radar west of coast -Ongoing work -> need more buoys, voluntary observation program

Discussion

- Need strategic plan to mesh all groups together (connect opportunities, pathways and audiences. Need to investing heritage/sense of place, it's the glue that holds things together.
- Distance is a problem for coastal communities.
- Quinault Nation does a lot for its students – razor clam counts, Taholah instill heritage.

Ilwaco — 5/23/06

Fishing

- Predators on salmon, need control (sea lions, cormorants, terns)
- Many fisherman/processors do not like Individual Fishing Quotas or more restrictions -> these cause consolidation of the fishery and pushes the little boats out.
- Need a diverse fishery to make a living.
- Salmon 75% loss -> access to fish resources is important.
- More/better research on stocks such as sardines, groundfish, albacore, mackerel.
-International agreements are important for some stocks (albacore tuna).
- Support infrastructure improvements (dredging, docks, float maintenance).
- Secure water rights for salmon (dam/agriculture issue). Access to ground fishery.
- Not another study, but need real-time data.

Salmon

- WDFW "wild salmon" policy means less brood stock for restored streams, lack of returns are probably linked to fewer eggs places. Hatcheries need to be run (Mitchell funds).
- Research burrowing shrimp/chum link (more shrimp due to fewer predators e.g. chum).
- WRIA didn't update plan to meet Salmon Recovery Funding Board's needs, thus no longer working well with the fisheries enhancement projects
- Fisheries Enhancement Projects in Willapa watershed: removing blockages, restoring streams, tossing carcasses, and planting brood stock. Gillnet fishery needs diversity of other permits and regions to survive.
- Loss of traditional fisheries resulting in significant negative social, economic and health indicators.
- Access to resource is key (what about hydro, habitat and hatcheries). - Fisherman have given enough.
- Sport/commercial divide is artificial: need to focus on mutual value of resource (both/and).

Aquaculture

- Not in favor of NOAA's net pen aquaculture proposal

Shellfish

- Clean water needed for oyster production, must protect clean water.
- Burrowing shrimp control is important for oysters/shellfish (signed agreement to phase out use of carbaryl – need a replacement)
- Willapa is premier habitat for oysters and crab, nursery for anchovies, flatfish
- Winning the battle against *Spartina* invasive wetland vegetation.
- Local channel dredging/float/dock facilities need upgrading, infrastructure is critical to fishing industry and community. Hampered by tonnage issue for U.S. Army Corps funding.
- Local ports (6) forming a co-operative to work together, because Corps is no longer doing the permitting – all have big needs for continued dredging, marina basins and channels; updates to docks, floats, and pilings
-Regional Dredging Team may be the way to fill this gap.
- Concern about the small window of time for dredging due to juvenile salmon and other natural resources.
- Ports need: 1) have some money to scope out plan this summer need resources to make plan work 2) Hold Corps' accountable

Columbia River dredging/erosion/sediment management
- Coastal Zone Management Program need to assert a strong inter-state authority
- Keep NEPA in place – (only interface for public on many important issues).
- Support Benson Beach project (nearshore and offshore disposal sites won't keep sediment in littoral system). Site sediment appropriately.
- Value-added products (smoking, etc.) make for stronger economic return
- Eco-tourism (emerging) may provide benefits: increases demand for local, high quality products. Concerns: 1) not a replacement, but an adjunct to rest of economy; 2) traditionally lower income & seasonal jobs; 3) loving the resource to death.
- Distance to market and road infrastructure hamper business.
- Labor shortage.
- Water Resources Council – bottom up group, not doing what it was originally intended, lost diversity.
- One day a year joint natural resource legislative committee local community forum.
- Fishing is backbone of county's economy (25% of permanent income comes from fishing).
- Shellfish largest industrial producer on the west coast.
- Long history of oyster/fish families, more than $, social importance.
-Large community of retirees – source of income is social security.
- Must sustain ocean resources for multiple uses.
- Derelict gear a problem at times, tugboats grab up a lot and deposit. Not as much right now.
Immigration reform
-Heavy reliance on Hispanic population for processing fish and crabs, picking oysters, etc. Need appropriate immigration reform that allows them to fill their labor shortage.

Westport — 5/24/06

Salmon
- Columbia R. produces bread and butter. Toule River stock makes up 75% of catch off of Grays Harbor.
- Hatcheries; run them. Flat-funded Mitchell Act. Less $ now available. Use good science and enhance traditional fisheries. Goals should be: 1) rebuild wild stocks 2) produce fish for harvest (commercial, sport, tribal). Ask for money to create sustainable fisheries.
Groundfish
- One size management doesn't fit all; would like regional management for certain species (yelloweye).
- State has done a better job managing fisheries than feds. But could use better communication of open/closing seasons.
- Crabs: Would like money for reducing historical fleet (federal buyout). Jump start money to get feds help. State assistance w/ lobbying feds.
- Marine Reserves: Not the answer, essential fish habitat covers many areas already.
Jetty/Dredge
- Corps $ to maintain groins (better relationship w/ Corps, but will need $ in future)
- Potentially need more dredging to handle more barge traffic.
-Ocean Shores needs to be dredged. Ferry service has trouble running to Ocean Shores. Didn't qualify for Corps feasibility b/c not commercial. Quinault now own and in contact w/ other small SW WA ports. Need authorization and permits (not a $ issue necessarily).

- Negative impacts from the deep-draft channel. Caused greater energy into the bay, eroding spits that used to protect mudflats and shellfish. Now harder to establish shellfish.

Sediment/Erosion

- "Coastal Communities of SW Washington" works on coastal erosion issues projects include half moon bay and Hwy 105 stabilization. Working to find a permanent solution to erosion at jetty.
- Solutions to erosion shouldn't exacerbate the problem in other areas.
- Need state involvement on erosion and solutions w/ Corps. Half Moon Bay and jetty/groin maintenance. Corps is trying to walk away (no longer a navigation issue). No agreement on fix, permit problems.
- Coastal erosion task force (1999 final report was shelved) had good workable policy that balanced the approach to development planning and soft uses where necessary. Corps did long-term management study to resolve piecemeal approach.
- Sustainable development means managing resources into the future; not development at any cost.
- Real estate is highly sought after.
- Need to enforce Shoreline Management Act.
- A state position articulated to "step development out of the dynamic zone".

Coastal hazards

- Tsunamis = educate and prepare. Money for school district readiness plan that includes supplies and provisions.
- Last alert was bad, only one road out! Disorganized warning and emergency management. Recognize limited response small, rural communities have. Need to 1) educate the public on response and 2) have a realistic drop support network established. Vertical evacuation for tsunamis w/ tsunami-resistant buildings/community structures.

Education

-Educate people about natural resources, their importance and what impacts people cause

Research

- $ to know more, credible research, and manage fish stocks better. WDFW should have more $, especially. Population surveys and regional surveys.
- Support increased money for licenses to support groundfish research as long as it doesn't take away from existing research and it's not the only source of money.
- Coastal Weather Doppler needed to improve weather information
- Identify broader regional erosion, sediment, energy issues
- Two Ocean-Gold projects 1) Cold storage facility and 2) Deepwater loading/unloading at firecracker point. Important for community, will need permits.
- Immigration reform, 2/3 of Ocean Gold Seafood's workers are Hispanic.
- #5 in Nation for fish poundage landings.
- Nickelson Act prohibits landing of foreign caught fish into state. Working to reform.

Marine Resource Committees

-CON: not another committee, already lots of groups
-PRO: it might work though.
- Bottom-line it's important to include locals as an advisory at a minimum.
-Unique Estuary Management Plan zoned the estuary for different uses. However enforcement tends to be a political decision.
- Impacts of governance on cities and counties, 1 representative doesn't cut it.

Oil Spill Response
-New regulation under development
1) Fuel Transfer containment, need toned down requirements for booming
2) Spill Response: a. Is it effective for ocean situation? Difference in containment needs to be reflect in rule.
b. Onerous b/c can't afford provisions required (shared equipment?)
-Marine Safety Response Program (MSRP) doesn't have enough resources for locals
- Prevention is key, inclimate weather response is hard
Water Quality and Habitat
- Good habitat is key to shellfish
- TMDL on fecal coliform and clean up plan. Shouldn't be taken off list until it's cleaned up
- OPWG should extend reach to coastal estuaries. Ocean policy should influence watershed management (land uses impact sustainable ocean resources).
- Better buffers and set backs. Protect agricultural and forest land. Some things are so valuable they shouldn't be developed (dunal wetlands, etc.)

Friday Harbor — 6/7/06

Ecosystem Based Management
-Marine Stewardship Areas all marine waters designated by county.
-Marine Resource Committee doing strategic planning process with The Nature Conservancy looks at whole ecosystem
-Challenges: 1) information/data – how do we measure the whole system 2) Education – tourist-based visitors, need to broadcast message better 3) Communicate, Collaborate, shared vision – can bring people together, but tough.
-Major reservations about net-pens/fin-fish aquaculture (pollution, disease, escapement, safety (navigation), health PCB contamination, use of public resources for private gain, not-sustainable). Don't do anything to degrade the environ. Ecology water quality permits – allow more pollution than west point. 9 pens already permitted. Use precautionary principle, not enough data burden of proof on proponent.
-Concerns about amount of crab – is it sustainable.
-PFMC is too close to fishing industry -> [example of pacific seafoods 50% whiting proposal, conflict of interest]
opposition to dedicated connection between processors and fishers.
-Need to include pollution, oil spills, and habitat restoration under this topic – too heavy fisheries focus
-Ecosystem Based Management…need to examine effectiveness of management tools such as a network of marine protected areas. Monitoring and evaluation of ECBM is necessary. Should include uplands and entire watershed: sediment transport, species & habitat, pollution. Should use ecosystem approach to management.
-Marine protected areas – interest in using, but needs to be simple and easy to enforce.
-More $ for research, but need focus on not just harvestable species.
-Poaching abalone when fishing for sea cucumbers.
-Regulations exist – need to enforce, especially DFW Hydraulic Project Approvals permits – should be granted on best available science; haven't turned down a bulkhead permit.
-Promote alternative energy – big resource for region, corrosive action on machinery, need for pilot projects.

-Tsunami preparedness, not a big thing; individually probably not prepared.
-Critical Area Ordinance not enough info on geologically hazardous areas; need run-up model of tsunami.

Erosion

-Cattle Point might lose road; working on solutions. -Shoreline owner education – carrot and stick; use precautionary principle for bulkheads - burden of proof onto owners that it won't cause a problem.

Climate Change

-Research retrospective and probabilistic (what's coming?). Impacts from disease and spread of exotic spp.
-Adaptation of development and ecosystem changes. Deal w/ reducing emissions.

Research

Science gives a powerful story and helps us manage our resources.
-Needs to be a priority; fund it! w/o it we reach a point where there's a problem and we don't have the data we need.
-Need a better link between science and policy.
-Share data and ask the right questions.
-WDFW forage fish funding -> restore program, b/c can't protect spawning areas w/o data.

Education

-Huge issue w/ transient population -> 40% turn-over every 4 years. -20% growth rate -> infrastructure issues (16k to 250k during peak).
-Transfer ideas to other areas: 1) shoreline education pamphlet to new property owners 2) Continue state agency $ to do work/enforcement, especially code enforcement is important.
-Shifting baseline -> challenge to educate on what we think of as pristine is not the same as historical abundance…
-Whale watching is a big industry as are construction/retirement.
-78% of pop. growth is in over 45 age.. Non-wage income is much higher -> shrinking middle class/young people Lowest income index for affordability need family wage jobs. Looks viable but social issues are huge -> need to preserve sense of community.
- Busy tourist moorage for port. Used to be bigger fishing, now just 1 boat.
- Port Study on port industry cluster -> marine tech center to work on research, education, develop curriculum.
-Concentrated resources – total community awareness/involvement; marine resources are critical.
- Friday Harbor Labs -> declining state $ for labs, but perfect place to build on for research/economic synergy.
-Tourism is economy ($113.5 million in 2004) -> variety of tourists, elder hostel-students/whale museum -> working to enhance shoulder seasons.
- Rapid shoreline development, infrastructure, cost of living expensive -> social impacts, boat building center, desalinization plant.

Marine Resource Committees (MRCs)

-What's the connection to upland issues?
-MRC model would be good for outer coast, but needs high level of interest from local community (which exists); $$ success directly related to federal $ received; still need state and federal role/involvement.
-The middle (state) is missing; need a fatter state role/voice in Olympia or Governor's office.
-MRC's would like more direct influence on state programs. Issues cross different agencies -> agencies need to coordinate on related issues provide focus to acquire $ for programs.
-Acknowledge local differences in best available science; forage fish/work in water approved during local spawning times.
-Lots of concern about federal aquaculture proposal – 1) circulation from E. Strait impacts San Juans 2) restore natural fisheries economy instead, aquaculture is contradictory to Ecosystem-Based Management.

Governance.
-NW Straits - $ funneled through Straits Commission -> MRCs to work on their priorities.
-Who's looking at whole thing? Many piecemeal efforts (state/federal)…MRCs are! Used Marine Managers Work Sessions to bring state and federal reps together and work past narrow mandates.
-Need authority to conserve state waters; land covered, but tidelands/marine environment often left out.
-Refuges have little enforcement mechanisms.
-How will state policies change w/ climate change (e.g. foresee problem of increasing bulkhead permits).
-Need for overlap btwn Ocean policy Work Group/PS Partnership; basin-watershed influence.
-Climate change and oil spill/water pollution threats are too big for MRCs to handle on their own.
-Canada's discharge of raw sewage (Victoria/Fraser River); pollution should be included in marine resource stewardship.
-Habitat Restoration is important.
Tulalip tribe
- Protect what remains. Monitoring for restoration is important. Tribal consortium (strait of Georgia/straits/sound) to address both sides of border.
-Invasive species – doing better w/ ballast water but more each year. Need to prevent in the 1st place.

Olympia — 6/9/06

No public comments received.

Appendix E
Washington Coastal Fisheries Management Status and Update

Pacific Fishery Management Council Overview

The Pacific Fishery Management Council is one of eight regional fishery management councils established by the Magnuson Fishery Conservation and Management Act of 1976 for the purpose of managing fisheries 3-200 miles offshore of the United States of America coastline. The Pacific Council is responsible for fisheries off the coasts of California, Oregon, and Washington.

The Council consists of the States of California, Oregon, Washington, and Idaho and has authority over fisheries in the Pacific Ocean seaward of such states. The Council is organizationally structured with Council members that include a Chair and Vice Chair, a Council staff, and various committees and advisory bodies. There are a total of 19 Council members, 14 of which are eligible to vote on matters brought before the Council. Voting members include representatives from NMFS, the states of Washington, Oregon, California, and Idaho, and the coastal treaty tribes.

The Council staff is responsible for the administration and execution of Council operations. Standing committees consist of Council members, and ad hoc committees may be composed of Council members and non-Council members; both committee types serve the purpose of providing recommendations to the Council on matters of Council business. Advisory bodies are composed of individuals knowledgeable about West Coast fisheries matters and serve the purpose of providing expert advice to the Council on matters related to the Council purpose.

The Council manages coastal fisheries on a species-specific basis through Fishery Management Plans (FMPs). The Council currently has FMPs for salmon, groundfish, coastal pelagic species (e.g., sardines, anchovy, market squid), and highly migratory species (e.g., tunas, billfish, and pelagic sharks).

As a side note, Pacific halibut are not included in the groundfish FMP, but are managed by the International Pacific Halibut Commission and they set the annual catch limits by management area. The Pacific Council has a Catch Sharing Plan for halibut, which prescribes how the annual catch limit is shared among all sectors (tribal, commercial, recreational) within Area 2A (which encompasses Washington, Oregon, and northern California).

Coastal Marine Fish Fisheries

Groundfish Fisheries – Overview

Groundfish are managed through a number of measures including harvest guidelines, quotas, trip limits, area restrictions, depth restrictions, size limits, seasonal closures, and gear restrictions (such as minimum mesh size for nets and small trawl footrope requirements for fishing on the continental shelf). All sectors of the groundfish fishery are constrained by the need to rebuild groundfish species that have been declared as overfished. Because of the low biomass of some species, and the co-occurrence of healthier stocks with overfished stocks, the overall groundfish harvest has been significantly reduced.

Groundfish – Status of Stocks

There are over 85 species covered under the Pacific coast groundfish FMP, and at present, there is little or no biological data on a large number of these species. There is a need for comprehensive, timely and credible data for priority species to aid in the conservation and rebuilding efforts for these stocks.

Seven species of West Coast rockfish are currently declared overfished by NMFS. The include bocaccio, canary, cowcod, darkblotched, Pacific ocean perch, widow, and yelloweye. Rockfish are long-lived, late maturing, and slow-growing species. These traits make them particularly vulnerable to becoming overfished. The status of being "overfished" is defined in the Pacific Coast Groundfish FMP for each species or species complex. According to the FMP's definition, a stock (or fish population) is overfished when its spawning stock abundance declines to 25% of its estimated "virgin biomass" (the spawning population size if the stock had never been fished). Once a stock is declared overfished, measures must be taken to rebuild stock abundance to a level that supports maximum sustainable yield; for most West Coast groundfish stocks, that level is defined as 40% of the stock's virgin, unfished abundance. Given the life history characteristics of rockfish, rebuilding an overfished stock from less than 25% up to at least 40% of its unfished state will likely take somewhere in neighborhood of 50+ years. Fish with more resilient life history characteristics might be rebuilt more easily. In fact, lingcod and Pacific whiting were both declared overfished and have been rebuilt over the past few years.

Since 1998, the Pacific Council has initiated rebuilding plans for overfished species. Critical to these rebuilding plans and to the overall improvement of groundfish management is the need for more and better scientific data. Fishery dependent data that is needed includes amount of total catch and catch location, as well as biological data (e.g., age and sex). Fishery independent data that is needed include standardized estimates of relative abundance, or direct estimates of absolute abundance.

Canary and yelloweye rockfish harvest limits have also severely constrained Washington's recreational bottomfish fisheries in recent years. Through the Pacific Council process, the West Coast states have developed and agreed to manage their respective sport fisheries to stay within harvest targets that are determined preseason. For 2005 and 2006, the Washington harvest target for canary and yelloweye rockfish has been 1.7 mt and 3.5 mt, respectively. To put these amounts into perspective, a few years ago, the Washington sport fishery was catching about 13 mt of yelloweye and 11 mt of canary per year. The Department adopted a "C-shaped" Yelloweye Rockfish Conservation Area off the northern coast to provide protection for areas that had historically produced yelloweye, while still providing an area for targeted sport halibut fisheries out of the port of La Push.

As targeting of these species has been discouraged by not allowing their retention, collecting catch estimates of discarded fish has been done through port interview programs. Recreational data are collected, summarized, and available for management use approximately one month later (i.e., catches for the month of June are available at the end of July)—while this near real-time data production is needed given the low harvest targets, it results in reduced stability and predictability for anglers.

Arrowtooth Flounder

Arrowtooth flounder is an extremely important species in Washington groundfish bottom trawl fisheries. A stock assessment was attempted in 1993, but the model results were weak. However, the stock is thought to be healthy and Washington fishers and processors have worked aggressively to develop strong markets for this species. A large component of the Washington trawl fleet, and at least one major processor located in Bellingham, are heavily dependent upon arrowtooth flounder.

In recent years, commercial fishermen targeting arrowtooth flounder have been constrained by their assumed bycatch of canary rockfish. To provide protection for overfished stocks, including canary rockfish, NMFS implemented rockfish conservation areas (RCAs), which are large areas closed to fishing with designated gear types. The boundaries of the RCAs change, depending upon the fishing period. The trawl RCA generally encompasses the area from 75 or 100 fms to 200 fms off Washington and a selective type of gear that is effective at excluding rockfish is required when fishing shoreward of the trawl RCA. As arrowtooth flounder are available on the continental shelf during the spring and summer months, the implementation of the RCA and trawl gear restrictions has greatly affected this fishery.

Spiny Dogfish

Spiny dogfish has not been formally assessed on the West Coast. A formal stock assessment for West Coast spiny dogfish is planned for the next assessment cycle (2007). Even in the absence of a formal assessment, life history information indicates that characteristics of the spiny dogfish (slow growing, late maturing, low fecundity) make it

susceptible to overfishing. Dogfish populations have been depressed as a result of fishing in areas of Puget Sound and have been declared overfished off the East Coast.

Spiny dogfish is an important species to West Coast groundfish fisheries, primarily off the Washington coast, and fishermen and processors have worked aggressively to develop and maintain strong markets for this species. A number of trawl and longline fishers and at least one major processor are heavily dependent upon spiny dogfish.

In recent years, commercial fishermen targeting spiny dogfish have been constrained by their assumed bycatch of yelloweye and canary rockfish. As mentioned above, the boundaries of the RCAs change, depending upon the fishing period. The non-trawl RCA, which pertains to other gears, such as longline and pot fisheries, extends from the shore seaward to 100 fms year-round off Washington. (Note: The 100-fm RCA boundary is about 3-12 miles off the northern coast and about 15-25 miles offshore further south.) The spiny dogfish fishery occurs around the 100-fathom isobath, and dogfish are targeted by both trawl and non-trawl gears. While there are limited entry programs in place for trawl and fixed gear, there is also an open access fishery, which is allowed to target groundfish with fixed gear.

Since effort is not limited, there is a potential to overharvest dogfish and/or exceed the projected bycatch associated with the fisheries inseason, even with the RCAs in place. To address the potential of exceeding the estimated amounts of canary and yelloweye rockfish bycatch, which was anticipated for the open access fishery in 2005, NMFS adopted an emergency rule to set bycatch limits for the directed groundfish open access fishery. These limits were originally set at 1.0 mt for canary rockfish and 0.6 mt for yelloweye rockfish; these limits were raised inseason to 3.0 mt of each species, based on updated projections using NMFS West Coast Groundfish Observer Program data.

Given the life history characteristics of dogfish and their status in other areas, the Council adopted harvest control regulations (i.e., trip limits), beginning in 2006. (Note: Spiny dogfish has not had management measures, such as trip limits, specified in the past, which was a potential management concern given the conservation issues of this stock.) Given that a dogfish assessment is likely to occur in 2007, the Council decided to set a separate ABC and OY for dogfish following the next assessment cycle (i.e., for the 2009-2010 management period).

Experimental Sardine Fishery

Since 2000, the Washington Department of Fish and Wildlife has had an emerging commercial purse seine fishery for Pacific sardines. Following an extensive public process which included establishing and meeting with a formal Sardine Advisory Board, the Director decided to advance the sardine fishery from a trial fishery to an experimental

fishery in 2003, under the Emerging Commercial Fisheries legislation, in which permits would be limited.

Pacific sardines are managed under the Pacific Fishery Management Council's Coastal Pelagic Species (CPS) fishery management plan. The Pacific Council develops and adopts a coastwide annual harvest guideline, which takes into account the biological and ecological impacts of harvesting forage fish, and the amount of fish available in U.S. waters. Earlier this year, the Pacific Council replaced the geographical allocation with a strategy to provide for the seasonal release of the harvest guideline as the stock is fished along the West Coast during different times of the year.

Concurrent with the reappearance of sardines off the Pacific Northwest, the Washington and Oregon sardine fisheries have rapidly expanded over the past few years, which was the primary reason the Department decided to convert from a trial to an experimental fishery. In 2000, there were 4,791 mt of sardines landed into Washington; since then, the Washington landings increased to a high of 15,212 mt in 2002, and have averaged around 9,000 mt per year since. The amount of sardines landed into Oregon has dramatically increased from its inception in 1999 (771 mt) to 45,008 mt in 2005. As the Northwest fishery occurs at the same time and in relatively the same areas, landings into Washington vs. Oregon depend upon market availability in the two states.

The Department's goals for the Washington experimental sardine fishery are (note: these are not listed in priority order):

- Meet conservation goals
- Collect scientific data for fishery management
- Minimize inseason actions—promote stability
- Maintain July-September season length at a minimum
- Have permit holders who actively participate in the fishery
- Meet Washington market demands
- Maximize value of the fishery

Albacore Tuna Fisheries

In 2003, the Pacific Fishery Management Council adopted a federal fishery management plan for highly migratory species (HMS) (tunas, billfish, and pelagic sharks) off the West Coast. The primary HMS fishery that occurs in Washington is the albacore fishery—there are commercial troll and recreational albacore fisheries that occur primarily out of the ports of Westport and Ilwaco. It is important to note that, with the exception of the pelagic shark species, most of the HMS stocks migrate throughout the Pacific Ocean and are therefore subject to international harvest. There are a few international forums (with overlapping jurisdictions, in some cases), in which the United States is a participant, that serve to address harvest of these stocks by international fisheries.

The Pacific Council's Highly Migratory Species Management Team just completed its first stock assessment and fishery evaluation (SAFE) document, which is an annual report that includes an update on the status of the stocks managed under the plan. For albacore tuna, there was an assessment done in 2004, which indicates that, while the stock is fairly healthy, overfishing is occurring on a stockwide basis (i.e., the fisheries are catching higher amounts than what would yield a sustainable fishery over the long-term). The Pacific Council is currently exploring to what extent, if any, participation in the albacore fishery should be constrained.

Beginning in 2005, to implement the provisions of the Council's fishery management plan, the NMFS adopted federal regulations for HMS, including permit requirements, logbook requirements, and mandatory at-sea observer programs, for all commercial and charter vessels. The permits and commercial logbooks were issued by NMFS, and the charter logbooks were issued by the states to all charter permit holders. Currently, a recreational angler is not required to obtain a federal or state permit or license to fish for albacore (i.e., albacore and smelt are currently exempt from state recreational license requirements). However, the Washington Department of Fish and Wildlife is requesting legislation, which would require a state license for albacore fishing. This state license would satisfy any federal requirement that may occur in the future.

Observer programs are in place for several HMS fisheries, including albacore troll, but only on a limited basis, as funding for these programs is limited. Observer programs are not yet in place for state charter tuna fisheries in Washington and Oregon; however, a charter boat observer program may begin in 2006.

Recreational Halibut Fisheries

Pacific halibut are managed by the International Pacific Halibut Commission (IPHC) which is an international entity established by treaty with participants from the U.S. and Canada. IPHC staff annually survey and assess the halibut stock abundance off the coasts of Alaska, British Columbia, and the U.S. West Coast (referred to as Area 2A). Area 2A includes the Washington state waters (Puget Sound and Strait of Juan de Fuca) and coastal waters off Washington, Oregon, and northern California (which encompasses the southern extent of the Pacific halibut range). IPHC meets each January to review the results of the surveys, catch data, stock assessments, and current research and uses that information to set the annual total allowable catches (TACs), or quotas, by area. These TACs take into account targeted commercial and recreational fisheries, incidental catches of halibut and bycatch in fisheries targeting other species (such as groundfish directed trawl fisheries).

The West Coast halibut fisheries (commercial, recreational, and tribal) are then managed under the Pacific Fishery Management Council's Pacific Halibut Catch Sharing Plan for Area 2A. The catch sharing plan specifies how the Area 2A TAC as adopted by IPHC is allocated or "shared" among various fishing sectors. The Pacific Council annually

considers changes to the Catch Sharing Plan through a two-meeting public process (in September and November) for the following season. The Washington Department of Fish and Wildlife (WDFW) sponsors annual meetings to solicit changes to the Catch Sharing Plan from the public and, following the guidance in the Commission's Management Policy for Pacific Halibut (C-3601 – copy attached), forwards appropriate changes to the Pacific Council for consideration.

The Fish and Wildlife Commission has delegated the authority to the Director to adopt regulations consistent with the federal and/or international actions taken by the Pacific Fishery Management Council and International Pacific Halibut Commission. Following the adoption of changes to the Catch Sharing Plan by the Pacific Council, WDFW staff prepare conforming state regulations for the following fishing season.

As specified in the Catch Sharing Plan, WDFW manages its recreational fisheries by subarea. These subareas are:

1. Puget Sound (inside waters east of the Sekiu River, including Puget Sound)
    a. Eastern Region (inner Sound waters east of Low Point)
    b. Western Region (Strait waters west of Low Point)
2. North Coast (waters in the Strait of Juan de Fuca west of the Sekiu River and Pacific Ocean waters south to the Queets River)
3. South Coast (Pacific Ocean waters south of the Queets River to Leadbetter Point)
4. Columbia River (Pacific Ocean waters south of Leadbetter Point to Cape Falcon, Oregon)

The primary coastal recreational halibut fishery management challenge WDFW is currently facing is with regard to the North Coast (Neah Bay and La Push) subarea and its short season. There has been a significant increase in fishing effort in this area over the past few years, resulting in earlier quota attainment. In 2001, the North Coast halibut season lasted a total of 29 days—in 2005, it was less than one-third of that amount at 9 days long. Additionally, the Area 2A TAC has decreased to 1.3 million pounds (from 1.48 million pounds in 2004). Of that amount, the North Coast recreational fishery was allotted 115,437 pounds this year (down from 126,857 pounds in 2004), which exacerbated the problem of the short season. It is anticipated that the TAC for 2006 will be around the same level as this year.

WDFW sponsored a series of recreational halibut meetings over the past two years to develop and discuss management measures for the North Coast halibut fishery, which the meeting attendees agreed to implement beginning in 2006. These new measures include reducing the number of days open per week from five consecutive days to three staggered days in the North Coast with a statewide catch record card requirement. (Note: Currently,

the catch record card is required only in Puget Sound; the new sportfishing rules require the catch record card in all marine areas.)

Ocean Salmon Fisheries

The Pacific Fishery Management Council's Salmon Fishery Management Plan (FMP) focuses primarily on Chinook and coho salmon, although small numbers of pink salmon are also harvested, especially in odd-numbered years. There are no directed fisheries for other salmon species such as sockeye, steelhead and chum in Council-managed waters; therefore, these species are not covered under the Council's Salmon FMP. The Council's management area is divided into regions along the West Coast. The northern-most region extends from the U.S./Canada border south to Cape Falcon, Oregon. Each year, WDFW and the treaty tribes, in conjunction with the Oregon Department of Fish and Wildlife, work through a pre-season management process, commonly referred to as "North of Falcon," to develop management measures for the salmon fisheries north of Cape Falcon.

Management measures for Chinook fisheries in the U.S./Canada border to Cape Falcon area are to comply with federal Endangered Species Act (ESA) consultation standards for ESA-listed stocks, meet treaty Indian sharing obligations, and to the extent possible, provide for viable ocean and in-river fisheries while meeting natural stock escapement objectives and hatchery fall Chinook brood stock needs. Lower Columbia River hatchery and Spring Creek hatchery fall Chinook have historically been the major contributors to ocean fishery catches in the Council area north of Cape Falcon. Management constraints for ESA-listed stocks, especially Snake River fall Chinook and Columbia Lower River natural tules, constrain ocean fisheries in this area.

In addition to Chinook constraints, coho fisheries in the north of Cape Falcon area are constrained by management objectives and treaty Indian obligations for individual stock management units, treaty Indian/non-Indian and ocean/in-river sharing agreements, stocks listed under the ESA, and requirements of the Pacific Salmon Treaty.

The Pacific Salmon Commission was established to implement the 1985 Pacific Salmon Treaty between the United States and Canada. Because many of the stocks managed by the Pacific Council are significantly affected by management action taken in Canadian and Alaskan waters, considerable interaction between the Council and the Pacific Salmon Commission occurs at both the policy and technical levels.

Compared with 2004, Chinook harvest (by weight) in 2005 was down 31% in California, and down 6% in Oregon and Washington. The 2005 coho harvest (by weight) was down 71% in Oregon and 89% in Washington, compared to 2004 (no coho were harvested in California in either year).

Salmon Troll Fishery

In 2005, 1,219 vessels participated in the West Coast commercial salmon fishery, which is down 6% from the 2004 level of 1,297, and up 10% from the 2003 total of 1,113. The active fleet in Washington increased by five vessels for a total of 91 vessels landing salmon in 2005. The 2005 ex-vessel value for the Washington ocean commercial catch ($1.3 million) was 6% above the 2004 value ($1.2 million). Over the last three years (2003-2005), ex-vessel values of Washington landings have been the highest since 1992, but were still 83% below the 1979-1990 inflation-adjusted average of $7.5 million. Coastal treaty tribes' salmon troll fishery accounts for a significant portion of the ocean salmon catch.

Recreational Salmon Fisheries

In 2005, 90,600 ocean angler trips were taken on vessels on the Washington coast, a decrease of 17% from 109,500 angler trips taken in 2004, but still well above effort levels observed from 1994 through 2000. The relatively high level of activity observed in recent years is primarily due to management of under mark-selective fishery regulations for coho. The proportion of Washington angler trips taken on charter vessels increased slightly to 35% in 2005, from 33% in 2004, but was still low relative to previous years.

Angler success rates (in terms of retained fish per angler trip) declined to 0.97 in 2005, down from 1.26 in 2004 and 1.44 in 2003. The average retention rate between 1979 and 2000 was 1.41 salmon per trip.

In-River Salmon Fisheries

North Coastal Fisheries

The salmon resources of the northern Washington coastal rivers are co-managed by the State of Washington's Department of Fish and Wildlife and the resident Indian tribes with treaty rights. In-river harvest opportunities are shared between the treaty tribe and non-treaty sport anglers. Annual management plans are forged through the "North of Falcon" management process that brings together federal, state, and tribal management entities in March of each year. The Tribes use gill nets to harvest their in-river treaty shares for commercial, ceremonial, and subsistence purposes, while non-treaty sport fisheries employing traditional hook and line methods are used to target the non-treaty shares. The primary rivers in the northern coastal area include the Quillayute, Hoh, Queets, and Quinault systems, each including one or more major and numerous smaller tributaries. Olympic National Park provides protection for the headwaters of each of these rivers, which continue to produce some of the healthiest natural runs of Pacific salmon, including steelhead, to be found in the state. The National Park Service exercises regulatory control of waters within Olympic National Park. Other smaller independent rivers and streams that empty directly into the ocean also produce salmon and steelhead, and in some cases provide for limited recreational and occasional treaty harvest.

Quillayute River System

The Quillayute River system is made up of the Sol Duc, Bogachiel, Calawah, and Dickey rivers, and is home to natural runs of summer and fall Chinook, summer and fall coho, and winter and summer steelhead. Hatchery programs also support returns of spring Chinook, summer and fall coho, and summer and winter steelhead. Harvest opportunities are shared between the Quileute Tribe and non-treaty sport anglers. During most years both treaty and non-treaty fisheries occur in each month of the year.

Hoh River System

The Hoh River system includes the Hoh River and its largest tributary, the South Fork Hoh. Natural runs of spring/summer and fall Chinook, fall coho, and summer and winter steelhead return to the system, and an annual release of hatchery winter steelhead also returns. Fisheries are focused on all but the small population of natural summer steelhead, and fisheries are conducted in all months of the calendar during most years, though the sport fishery closes for about a month from mid-April to mid-May, and the Treaty gillnet fishery conducted by the Hoh Tribe is generally closed during April.

Queets River System

The Clearwater River and the Salmon River are major tributaries to the Queets River. Harvest opportunities in this system are shared by the Quinault Indian Nation and non-treaty anglers. Natural runs of spring/summer and fall Chinook, fall coho, and summer and winter steelhead reside in the system, along with hatchery runs of fall coho, fall chinook, and winter steelhead. Fisheries are focused on the coho, fall chinook, and winter steelhead, while avoiding the small population of spring/summer Chinook from May through August.

South Coast Fisheries

Similar to that of the northern coast, Grays Harbor fish populations are co-managed with the Quinault Indian Nation, a federally recognized treaty tribe. This tribe and the Department of Fish and Wildlife meet annually to set rules in accordance with treaty rights. The non-treaty elements, 1) Recreational, 2) Commercial and 3) The Chehalis tribe. The Chehalis tribe, unlike the Quinault Nation, is not recognized by the federal government. The State however does recognize the Chehalis tribe but fishery allocation must be within the non-treaty share (50% of the harvestable).

Unlike the Grays Harbor system, the Willapa Bay area has no treaty tribe that shares in the harvestable number of fish. Therefore, the harvestable number is split three ways: 1) Escapement, 2) Recreational, and 3) Commercial. All in-river harvest is managed by Fish and Wildlife and the various fishing groups (e.g. commercial gill-netters, guide services, and fishing groups that represent a larger group, - like Trout Unlimited). Planning documents are developed and signed annually within the “North of Falcon” management

process (as described above). In the same way that the tribes[111] use gill nets to harvest their in-river treaty shares for commercial, ceremonial, and subsistence purposes, so goes the Grays Harbor system. Non-treaty sport fisheries utilize traditional hook and line methods to selectively harvest based on pre-season planning. The primary rivers in the South coast area are the Chehalis and Humptulips Rivers within the Grays Harbor system and the Willapa and Nasselle Rivers, among others, in the Willapa system.

Similar to the North Coast Rivers, these South Coast Rivers and streams offer some of the healthiest populations in the State. Chinook, Coho, and Chum Salmon as well as Steelhead and Trout are found in most areas with varying degree of density and spawning success.

Within The Willapa Bay and Grays Harbor systems, both hatchery and wild stocks are present. There is an on-going focused management effort designed to protect wild fish spawning in the wild as-well-as provide for minimum return to the hatchery. Those stocks that are vulnerable to in-season variation, special management attention can be given where appropriate focus is needed. For example, in order to monitor catch of vulnerable stocks, WDFW has the ability to 1) Place observers on-board fishing vessels, 2) Increase enforcement emphasis, and 3) Close an area(s) to fishing through emergency closure.

Coastal Shellfish Fisheries

Recreational Razor Clam Fishery

Washington's razor clams live on the sixty miles of sandy beaches located along the open Pacific coastline. The fishery is managed on each of five management beaches: the Long Beach Peninsula, Twin Harbors (between Willapa Bay and Grays Harbor), Copalis (between Grays Harbor and the Copalis River), Mocrocks (between the Copalis and Moclips rivers) and Kalaloch (within the Olympic National Park).

In 1999, WDFW began using a new technique to determine razor clam abundance, the "Pumped Area Method." Each year, during the late spring and summer months, WDFW uses this sampling technique to conduct a comprehensive coast-wide razor clam stock assessment, requiring a total of sixty days of field sampling to complete. Following the field collection of data, abundance estimates are generated for both recruits clams (clams greater than or equal to 76 mm) and pre-recruits clams (clams less than 76 mm) on each of the five management beaches.

[111] This, in addition to the Quinault Nation, Includes the Chehalis tribe. Gillnets are used to harvest in the area within and above their usual and accustomed area.

In general, there can be wide inter-annual variations in the abundance of razor clam stocks. For example, between 1999 and 2006 the average coast-wide abundance is estimated at 19.6 million recruit clams, ranging from 9.7 million recruit clams in 1999 to 33.6 million recruits clams in 2002. These differences in abundance are most likely a result of the variability in spawning success as driven by varying environmental conditions.

Values for the total allowable catch (TAC) are set annually, using an exploitation rate of 30% applied to the estimate of recruit clams. Recreational seasons are set following a series of public meetings held each fall, intended to gather input from various stakeholders on season structure. The seasons generally occur one weekend per month between October and May and generate an average estimate of 240,000 digger trips per season.

Each year Fishery Management Plans (FMP) are signed between WDFW and tribal governments having harvest rights within adjudicated usual and accustomed (U&A) harvest areas. These tribal governments have rights, as confirmed by federal court decision, to harvest up to 50% of the razor clams within their U&A. FMPs are signed with the Quinault Indian Nation (QIN) for the Copalis and Mocrocks management beaches. In addition, an FMP is signed with both the QIN and the Hoh tribe for the Kalaloch management beach. Technical staffs from both QIN and the Hoh Tribe participate in the annual razor clam stock assessment on the beaches within their respective U&A.

Commercial Razor Clam

The coastal commercial razor clam fishery dates back to the early 1900's. Since 1968 the commercial fishery has been conducted only at the Willapa Spits, following the closure of ocean beaches to commercial harvest. Commercially harvested clams are important primarily as a source of crab bait but clams of good quality will be sold to the fresh market. The Quinault Indian Nation has the only razor clam commercial fishery approved for human consumption in Washington State. These clams are harvested on the beaches north of Grays Harbor with the exception of Kalaloch.

The commercial fishery typically lasts about six weeks, commencing in late spring or early summer. Each year roughly 100 fishers participate in the fishery. Most are residents of Grays Harbor and Pacific counties. The primary buyers, about six or seven, are also located in these two counties. About 100,000 pounds of razor clams are harvested in a typical season. Prices paid fishers range from $1.00 to $1.50 per pound.

Historically there has only been limited population sampling on the Willapa Spits where the commercial razor clam fishery occurs. Constant changes in the physical make-up and location of the spits and time and staff limitations preclude thorough stock assessments. Stock abundance on the Spits is assumed to mirror that of the coastal beaches.

The Willapa Spits are used exclusively for the non-treaty commercial fishery, as they are not part of any tribal usual and accustomed harvest areas. Access to the Spits is granted to the WDFW on behalf of the commercial diggers by the Department of Natural Resources through a right of entry permit. The commercial razor clam fishery season is scheduled to open annually, following the end of the spring recreational fishery. Generally the season runs for six weeks pending acceptable toxin levels. Although the criteria are the same, biotoxin sampling and monitoring of the Spits is conducted independently of the coastal beaches. Management of the commercial fishery is flexible: lost opportunity resulting from toxin closures can be made up; seasons can be extended if clam abundance and quality is exceptional.

Commercial Spot Shrimp

The coastal commercial spot shrimp (prawn) fishery is a relatively new, still developing industry. The fishery was pioneered in early 1990's through the efforts of a couple of Westport based commercial Dungeness crabbers. In response to lucrative markets the number of vessels participating in the fishery increased and expanded to include trawlers. Concern for the potential for over-harvest and over-capitalization of the fishery led the WDFW to designate the fishery as an experimental fishery under the Emerging Commercial Fishery Act in 1998. A total of 15 permits (10 pot, 5 trawl) were issued based on historical catch criteria. Later, to address bycatch concerns, trawl gear was banned and trawl permits were converted to pot permits in 2003. Currently only ten permits are still active. The majority of permit holders are Washington residents with most living in coastal communities.

Spot shrimp are sold both live and frozen-at-sea to a variety of markets. Most of the coastal spot shrimp harvest goes overseas, primarily to Japan. Fresh spot shrimp are also sold dockside and to local retail outlets. Fishers are paid from $5 to $8 per pound for live, whole shrimp and from $7 to $10 per pound for "tailed" shrimp. Recent, annual harvest since 2000 has ranged from a low of 64,000 pounds in 2005 to 160,000 pounds in 2000.

The stock status of spot shrimp off the coast of Washington is unknown but is assumed to be stable. Due to the newness of the spot shrimp fishery and the concomitant lack of harvest data, stock assessment tools and models are still rudimentary. The fishery is managed under a coast-wide harvest cap of 250,000 pounds. Fishers are required to maintain logbooks and carry observers upon request. Through a dockside data collection program about 30 to 50 percent of landings are observed.

Commercial Pink Shrimp

The coastal Washington pink shrimp fishery is well established and offers a stable commercial harvest opportunity when compared to commercial salmon or groundfish fisheries. The pink shrimp fishery consistently opens April through November each year. The majority of the coastal Washington pink shrimp fleet is based in Westport; a couple of

vessels operate out of Ilwaco. Pink shrimp are sold to buyers and processors in Westport, Tokeland and Ilwaco.

Pink shrimp abundance off the coast of Washington is unknown but is assumed to be stable. Reductions in force in 1993 eliminated active pink shrimp management and a mandatory logbook program was discontinued. Catch data is available but by itself is insufficient for assessing stock strength.

The coastal commercial pink shrimp fishery has landed between 5 and 10 million pounds annually in recent years. The prices paid fishers have been improving, going from around 25 cents per pound to 35 or 50 cents per pound, but are still comparatively low due to strong pink shrimp production, particularly off eastern Canada.

Coastal Dungeness Crab

One of the most important commercial fisheries in Washington, the commercial Dungeness crab fishery has an average (1990-2002) ex-vessel value of approximately $19.9 million. The season typically starts on December 1 if WDFW pre-season shell condition testing shows that the majority of the male crabs have recovered from the fall molt period and runs through September 15. The main ports of landing for the coastal commercial Dungeness crab fishery are Ilwaco, Chinook, Westport, Tokeland and La Push where the economic impact of this fishery is substantial.

In 1994, the Legislature passed a limited entry regime for the coastal commercial Dungeness crab fishery limiting the number of licenses to 232. In 2002, three licenses were purchased and retired as part of the federal groundfish buyback program and another license owner did not renew their license leaving 228 coastal Dungeness crab licenses. Private individuals own all of the coastal commercial Dungeness crab licenses and are required to pay an annual renewal fee; if the renewal fee is not paid the license is retired. Coastal crab licenses are transferable with some restrictions on the length of vessel that can be designated. Approximately 190-200 of the 228 license owners actively participates in this highly competitive fishery.

Status of the Stock

Dungeness crabs exist in commercial quantities from Alaska to south of San Francisco, California. Along the Pacific coast, Dungeness crab live in the intertidal zone out to a depth of 170 meters. Washington's coastal commercial crab grounds extend from the Columbia River to Cape Flattery near Neah Bay and include the estuary of the Columbia River, Grays Harbor, and Willapa Bay.

There is no stock assessment work conducted on coastal crab populations. Dungeness crab management on the coast is based on a minimum size limit of 6 ¼ inches, prohibition of harvest of female crab and a season closure during the primary male molt

period. The minimum size limit assumes that male crab that are harvested have been sexually mature and have mated at least once before reaching legal size. Male crabs 6 ¼ inches or larger are assumed to be harvestable surplus; it is assumed that as much as 95% of the legal sized male crabs are harvested annually. In order for crab to grow they must shed their shell and expand to fill a new shell, this is referred to as molting. During the early stage of the molt period crabs are soft and vulnerable to mortality due to handling; therefore, the coastal commercial fishery is closed from September 15 to early December. A Summer Fishery Management Plan was implemented in June of 2000 to protect crab that molt prior to the closure of the crab fishery in September. The plan is based on an intensive on-board sampling program designed to alert fishery managers if a large portion of the population begins molting prior to September 15.

Management Authority

Rather than shifting the management of the coastal crab fishery to a federal management plan, the U.S. Congress in 1997 granted the states of Washington, Oregon and California jurisdiction to manage Dungeness crab fisheries outside state waters (3 to 200 miles offshore). This expanded jurisdiction enabled Washington to implement a pot limitation program affecting all crab fishers in coastal Washington waters beginning with the 1999-2000 season. This move was an effort to slow the expansion of the fishery that began in the mid-1980s. This rapid expansion lead to an extremely competitive fishery where 50% of the season total is landed in the first 3-4 weeks of the 9-month season. In addition, in December 1994, Federal District Judge Edward Rafeedie upheld tribal shellfish harvest rights in Washington, ruling that Washington treaty tribes can harvest up to 50% of the harvestable shellfish in their usual and accustomed fishing grounds (U & A). Tribal U & A fishing grounds encompass approximately 50% of the Washington coastline.

Dungeness Crab Harvest

Washington coastal Dungeness crab landing data back to 1950 shows a large fluctuation in harvest, ranging from a low of 2.5 million pounds in 1981 to a high of 25 million pounds in 2004-05 averaging at 9.5 million pounds. It is believed that this large fluctuation in landings is not a result of harvest patterns, but likely due to varying ocean conditions including, water temperature, food availability, and ocean currents.

Shellfish Aquaculture - Pacific Oysters

The Pacific Oyster is the dominant oyster species commercially harvested in the coastal estuaries of Washington State. This non-native species from Japan was introduced into Washington State in the early 1900's after the collapse of the native Olympia oyster fishery. The Pacific oyster now comprises 99% of the total West Coast oyster production. Nearly all the Pacific Coast production of oysters is shucked and sold as fresh or frozen product. Only 5%-10% is sold in the shell for shucking by the consumer for the half shell

trade. Oyster production on the coast occurs in Willapa Bay and Grays Harbor and accounts for 55-60% of the state's production.

Pacific oysters reach sexual maturity during the first year. Pacific oysters broadcast sperm or eggs into the water, where fertilization, hatching, and larval development take place. In Washington, this process occurs in mid to late summer, when water temperatures reach about 70° F. Once in the water, larvae spend three to four weeks as part of the plankton community and gradually undergo several changes until the larvae are ready to settle and attach to suitable substrates. At this time, various kinds of catching material (usually old oyster shells) are placed into the water to provide a substrate for the young oysters to attach.

Natural spawning and setting of Pacific oysters in Washington State is unpredictable. Only a few areas in the state reach the required spawning temperature and have the hydrology that retain the larvae until they reach setting size. The best coastal area for collecting natural oyster spat is in Willapa Bay where catches of oyster spat can range from over fifty per shell to zero. To overcome this natural variability, oyster growers developed techniques of remote setting in tanks. Tanks of seawater are aerated, heated to favorable levels, and filled with bags of clean shell (called cultch) to catch the setting larvae. Free-swimming larval oysters are purchased from a shellfish hatchery and added to the cultch-filled tanks where they soon attach. Before the remote raising and setting of Pacific oysters in hatcheries was developed in the 1980's oyster seed was imported directly from Japan, with the last seed imports occurring in 1982. The introduction of remote setting was a major revolution in how oysters are produced in Washington State since it removed the uncertainty in obtaining seed oysters and insured a steady supply of seed oysters

Oyster seed attached to cultch is either placed directly onto growing beds or held in bags on nursery beds for the first year. The majority of the Pacific oyster culture on Washington's coast is conducted on intertidal beds with gravel, sand, or mud bottoms. The selection of ground suitable for oyster culture is based mainly on three factors: tidal level, bottom consistency, and protection from wave action. Most of the oysters grown in Washington coastal estuaries occur on the estuary bottom because it is most economical and requires a minimum of labor. Other methods of oyster cultivation utilized on the coast are stake culture, longline culture, and rack and bag culture. These alternative methods are often used in areas where the substrate is too soft to support on bottom culture.

Oysters are usually transferred after 1 or 2 years to better growing beds to improve their condition for market. Growth to market size in the coastal estuaries ranges from to 2 to 5 years depending upon environmental conditions and market demands. Oysters are harvested either by hand at low tide or by various dredges at high tide, then transported to shucking houses for processing.

The Washington Department of Health inspects and classifies all oyster growing areas to insure a safe product goes to the consumer. Since Pacific oysters are filter feeders capable of concentrating chemicals, bacteria, viruses, or marine biotoxins, an ongoing evaluation of commercial shellfish growing areas, certified harvest sites, and licensed facilities is essential to protect the shellfish-consuming public. Once classified, all active commercial shellfish growing areas are regularly monitored.

Pacific oysters face a variety of challenges during their lifetime. Crabs, starfish, flatworms and other predators feed on oysters while mussels, barnacles, slipper shells and sponges often compete for space and food. The biggest problem facing the aquaculture industry in the coastal estuaries is from ghost and mud shrimp. Their burrowing and feeding activities increase sedimentation and soften the substrate causing the oysters to sink and smother. These shrimp pose such a problem that since the aquaculture industry has utilized the pesticide Carbaryl to control burrowing shrimp in the coastal estuaries. A recent challenge by environmental organizations to the use of this pesticide resulted in an out of court settlement that phases out the use of Carbaryl by the year 2012. An Integrated Pest Management plan for burrowing shrimp has been devised and is currently investigating alternative methods of shrimp control in the estuaries.

Appendix F
Sample Ocean Curriculum

Recently the state collaborated with Pacific Education Institute, Olympic Coast National Marine Sanctuary, and Environmental Education Association of Washington by jointly submitting a grant proposal to NOAA to develop a K-12 ocean curriculum. The ocean curriculum will combine national curriculum resources customized to Washington's local areas and local curriculum resources available through local non-formal education providers. As a result, the ocean curriculum will develop experiences described in lessons for teachers to address educational gaps.

The following is a **draft sample ocean curriculum** prepared by Pacific Education Institute (PEI) in fall 2006. It offers a general idea of the types of activities that should be included in a comprehensive ocean curriculum.

September 18, 2006

Ocean Systems Curriculum Development and Implementation Proposal Submitted by the Pacific Education Institute

Background:

Proposal: This concept paper proposes an option for K-20 education to strengthen ocean systems education through existing public private consortia with established partnerships to provide rigorous research based environmental studies programming for ocean systems education. This proposal addresses the need to strengthen institutional and public education about oceans through

- Developing and implementing ocean systems curriculum
- Including ocean systems topics in teacher training programs
- Enhancing and funding existing ocean systems education programs

Strategy to address Ocean Systems Education: The Pacific Education Institute proposes to engage its partners who include educators from natural resource and education agencies and organizations to develop an ocean systems curriculum for Washington State, and implement the ocean systems curriculum through proven rigorous research based programs serving entire school districts.

The Pacific Education Institute is a public private consortium of leading natural resource managers and educators and a driving force for academic research based environmental education in Washington State. PEI works closely with teachers and administrators across a school district to improve student achievement. Students are empowered when they see

the results of their field studies benefit the community. The unique nature of PEI's public and private science and education expertise positions PEI to provide leadership in curriculum design for specific resource management education initiatives.

PEI provides curriculum development services aligned to state standards using natural and social systems understanding, inquiry, civic participation and effective communication as the curriculum framework for teaching and learning. PEI public private partners use these frameworks as benchmarks against which to evaluate student learning through assessments (formative assessments and powerful classroom assessments). This research provides teachers and partners with information on student performance, and assists teachers with preparing students for state standards tests. PEI actively works with OSPI's standards test developers to include conceptual understanding of ocean systems. Beginning in 2007, state science tests (WASL's) will include field science inquiry. PEI will continue to work with OSPI science test development to ensure testing includes ocean systems understanding.

PEI's will engage the curricula and field science resources of its partners (including WDFW's Aquatic WILD and citizen science, WFPA's Project Learning Tree, DNR's Students in the Watershed, DOE's Education Programs including Project WET, Audubon and TNC's field studies, University of Washington's NatureMapping field inquiry and SeaGrant, NOAA) and local providers to customize a ocean systems curriculum for Washington State regions. PEI's approach to customizing curriculum development and implementation ensures that the program becomes systemic within each school district. Teams of teachers design an approach to thematically connect each grade level of environmental study to meet their school districts learning goals for students.

PEI along with key partners, WDFW, WFPA, DNR, DOE and UW (WSU) are prepared to create a sampler curriculum for consideration of the Oceans Policy Group, along with a detailed program plan for curriculum implementation.

Ocean Systems Curriculum Development will include:

1. Developing a ocean systems curriculum using existing proven curricula resources available from local and national sources
2. Following an established PEI framework of natural and social systems understanding that includes an analysis of stakeholders roles and responsibilities
3. Field inquiry through a NatureMapping citizen science component to measure ocean systems health indicators determined by the Oceans Policy Group.
4. Protocols, techniques and tools to observe, record and report flora and fauna.
5. NatureMapping training on field use of a hand held computer with Washington specific Cybertracker software to record site location using an GPS unit attached and detailed observations, creating a data set useful for GIS studies.

6. Advanced studies in research design and analysis using Geographical Information Systems (GIS) supported by the NatureMapping Network
7. A civic participation component based on problem solving through systems understanding and inquiry. Students will develop and implement a stewardship plan that includes community ocean systems stakeholders.
8. Follow a performance or outcome based design reflecting what we want students to know and be able to do. The design will include education's recognized best practice principles of place-based learning involving inquiry and problem solving through real world projects.
9. Aligning the ocean systems curriculum to state learning standards preparing students for WASL's
10. Incorporating curriculum benchmarks and creating credible assessments of student ocean systems literacy

Ocean Systems Curriculum Program Development will include:

- Creating age appropriate roles for students in elementary school, middle school and high school.
  a) Focus on observation of components affecting ocean systems in elementary school
  b) Develop comparative field studies of components affecting oceans systems in middle school
  c) Provide substantial opportunities for culminating senior projects in high school
- Creating a Journal of Environmental Ocean Systems Studies for high school students
- Providing annual regional conferences/summits for K-12 students from high risk to highly capable to share their investigations of environmental systems, including ocean systems through inquiry and stewardship with civic participation

Ocean Systems Curriculum program delivery will include:

- Oversight provided by PEI's Education Advisory Committee for curriculum development and final product quality. The committee will also guide program implementation and promote the importance of the ocean systems curriculum to their respective organizations. Key people include:
  1. Dr. Kathy Kimball, Director, Center for Education Leadership, University of Washington providing professional development to superintendents and principles
  2. Dr. Paul Rosier, Executive Director of Washington Association of School Administrators, representing superintendents, and leaders of the Association of Washington School Principles to engage school principals participation
  3. Martharose Laffey, Executive Director of Washington State School Directors Association to engage school board participation

4. Dr. Dennis Sterner, member and former Chair of Washington Association of Colleges of Teacher Education, to engage the universities preparing teachers

- Engaging whole school districts supported by superintendents and principals to develop teacher teams to undertake PEI facilitated curriculum and instruction planning with the ocean systems curriculum
- Building the capacity of local entities including outdoor learning centers and university extension offices (UW, WSU) and community colleges to support ocean systems inquiry field studies, providing training, technical support and data management services.
- Education research conducted by PEI to evaluate ocean systems curriculum implementation in terms of:
    - School district systemic changes
    - Teacher practice change to provide ocean systems learning experiences
    - Community support e.g. through learning centers and university extensions
    - Student learning progress towards ocean systems literacy and research on how ocean systems studies contribute to performance in the required subject areas.
- Representing ocean systems as a key K-12 theme in other statewide initiatives including the Biodiversity Initiative and the Puget Sound Partnership Initiative that also expect to develop a K-12 curriculum.

PEI is uniquely prepared to develop and implement an ocean systems curriculum:

- Directors of natural resource agencies and OSPI actively participate on PEI's Board of Directors for the purpose of conserving natural resources through K-12 education.
- PEI has a track record of rigorous research on student learning through the environment. PEI reports their research through local and national education research conferences and peer-reviewed journals.
- PEI developed the field inquiry model for OSPI to include in science inquiry grade level expectations and assessments that will be needed for K-12 ocean systems field studies.
- PEI's partners are the primary sources for lesson plans that will be used to develop the curriculum package for ocean systems.
- PEI demonstration school districts (Tahoma, Cle Elum and West Valley in Spokane) are proven models for systemic curriculum development and will participate in field-testing the ocean systems curriculum. Tahoma School District attributes its best-in-the-state 2006 WASL scores in elementary science to the role PEI played in providing their teachers with science inquiry professional development to engage their students in field studies opportunities.
- PEI's partners are also members of the Governor's Council on Environmental Education now working as an interagency workgroup, and PEI will engage these participating agencies to develop and implement the ocean systems curriculum.

- As a key partner and advisory council member of the Environmental Education Association of Washington's Comprehensive Plan E3 (co-chaired by Governor Chris Gregoire and William Ruckelshaus), PEI will work on behalf of the Oceans Policy workgroup to include the ocean systems curriculum as an essential component of the E3 plan (due in 2008), and recommend program implementation criteria.
- Partnership with University of Washington's NatureMapping program and the growing NatureMapping network prepared to support schools in ocean systems studies.
- PEI actively partners with Teachers of Teachers of Science (TOTOS) consisting of 18 of the 22 colleges preparing K-12 science teachers. PEI is providing TOTOS professors professional development in field inquiry at the Washington Science Teachers Association conference October 2007. TOTOS professors have expressed a keen interest in including environmental systems curriculum and field studies in teacher training.

Pacific Education Institute
Education Committee 2006

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Dennis Sterner, Dean of School of Education, Whitworth College

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