WEST COAST GOVERNORS' AGREEMENT on OCEAN HEALTH
CALIFORNIA OREGON WASHINGTON

Marine Debris
Action Coordination Team

Work Plan
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Identified Problem and Opportunity

In September 2006, the Governors of Oregon, Washington and California signed the West Coast Governors' Agreement on Ocean Health. Under this agreement, the three states, by working together and consulting with federal agency leads and stakeholders, developed a bold set of actions to improve the health of our ocean and coastal resources. On July 29, 2008, the three states released a final Action Plan that outlines many activities on a range of issues.

Marine debris was identified as an important component of Priority Area 1: Clean Coastal Waters and Beaches. Action 1.4 asserts that the three states will:

> *Establish baseline estimates of marine debris and derelict gear off the West Coast and set reduction goals. Support state and federal policies for achieving marine debris reduction goals, including debris prevention through expanded recycling, improved trash maintenance, and enforcement of litter laws.*

To coordinate efforts across the three states and achieve these objectives, the Marine Debris Action Coordination Team (ACT) was established. **This work plan identifies the process by which the Marine Debris ACT will develop a tri-state marine debris strategy to fulfill the goals outlined in the WCGA Action Plan.** The strategy, to be finalized by December 2010, will provide a framework to identify, assess, prevent, and reduce marine debris, leveraging existing resources and expertise in the three states and the federal government. Specifically, the strategy will address derelict fishing gear, land and ocean-based debris, debris prevention measures, and public outreach and education on marine debris. The states will then use the strategy to address marine debris cooperatively in years to come.

Purpose of this work plan

This work plan is the blueprint for creation of a comprehensive marine debris strategy. It provides the process and framework by which the ACT and partners will work together to develop a tri-state strategy. This work plan is not intended to provide detailed actions for preventing and reducing marine debris; those suggested activities, timelines, and evaluation measures are anticipated to be included in the forthcoming strategy. Rather, the work plan outlines the steps by which the team will communicate and coordinate across the three states, federal government, and nongovernmental partners to produce an effective strategy.

It should be acknowledged that the actions of the three states alone will be insufficient to abate marine debris on the West Coast and the Pacific Ocean entirely, as illustrated by the growing amount of debris located in the North Pacific Subtropical Convergence Zone, an area in which debris originating from around the Pacific Rim tends to collect. The issue is necessarily linked with federal and international efforts, and it is the hope of the Marine Debris ACT that the strategy will both help to coordinate with and aid future efforts.

Work Plan Deliverables

The ACT identified a number of outcomes as a product of its work. The following items are the deliverables associated with developing the overall marine debris strategy. Each of the subsequent sections of the work plan also includes a table listing specific deliverables for that element of marine debris, i.e., derelict fishing gear, land-based debris, and ocean-based debris. In the event of limited or inadequate funding for this work plan, these deliverables will be prioritized, with an initial focus on the completion of the detailed strategy listed in box number 1 below.

#	Work Plan Deliverable	Timeline *if funding is available*	Resources and Funding Needed	Done by	Research/ Scientific Support
1	A detailed **marine debris strategy** providing the framework for cooperatively addressing land and ocean-generated debris and derelict fishing gear in California, Oregon, and Washington.	December 2010	In-kind commitment and collaboration of all involved. Overall expected cost: $40,000 (for two information-gathering and document drafting workshops; details in section tables below).	Marine Debris (MD) ACT, federal, state, and local agencies, tribal governments, and nongovernmental organizations (NGOs)	n/a
2	**Marine debris project guidelines** to identify and prioritize efforts to address different aspects of marine debris assessment, reduction, prevention, and outreach.	December 2010	In-kind commitment and collaboration of all involved. Overall expected cost: $90,000 (details in section tables below).	MD ACT, federal, state, and local agencies, tribal governments, and NGOs	n/a
3	**An inventory and set of recommendations** for effective programs for addressing marine debris on the West Coast.	December 2010	In-kind commitment and collaboration of all involved. Overall expected cost: $40,000 (details in section tables below).	MD ACT, federal, state, and local agencies, tribal governments, and NGOs	n/a
4	A proposed **implementation plan**, including timelines, potentially available resources, new resource needs, and ways to leverage and direct resources to priority projects.	December 2010 or early 2011	In-kind commitment and collaboration of all involved. Overall expected cost: $290,000 (estimate includes outreach efforts; details in section tables below).	MD ACT, Marine Debris Alliance (see number 5) federal, state, and local agencies, tribal governments, and NGOs	Study of existing research on North Pacific Gyre needed.
5	A permanent **West Coast Marine Debris Alliance** will be established by the three states to oversee the execution of the strategy. It will meet regularly to discuss strategy progress and marine debris issues, share lessons learned, and plan marine debris-related activities.	Launched in or around December 2010 upon the release of the strategy	In-kind commitment and collaboration of all involved, including organizations and industries not currently within the MD ACT. Overall expected cost: $25,000 (details in section tables below).	MD ACT, federal, state, and local agencies, tribal governments, and NGOs, with cooperation from industry partners.	n/a

Objectives

The following objectives apply to the entire work plan. Each of the work plan's sections (Derelict Fishing Gear, Land-based Debris, and Ocean-based Debris) will contribute to the fulfillment of these objectives. The objectives will be achieved through collaboration with state, federal and local agencies, as well as tribal governments, nongovernmental organizations (NGOs), and industry. They provide an overarching set of checkpoints on the road towards significant reduction of marine debris in Washington, Oregon, and California.

1. Assess existing efforts to address marine debris in the three states.
    a. Develop an inventory of funding and support needs for existing, effective marine debris projects.
    b. Identify gaps and needs for new marine debris projects, listing specific tasks, to ensure that effort is directed to where it is most needed.
    c. Prioritize existing and needed efforts by urgency and effectiveness.
2. Identify marine debris baselines in the three states for land-generated debris and derelict fishing gear, and set target reduction levels for each in order to minimize marine debris impact.
3. Develop a comprehensive implementation plan to achieve reduction targets by removal of existing debris and prevention of additional debris from entering the marine environment.
4. Augment existing public and industry outreach and education efforts to reduce marine debris through reducing, reusing, and recycling of fishing gear, consumer and industrial packaging, and plastic stock material, as well as litter control.
5. Estimate potential costs, existing resources, and additional resources needed to implement the action strategy. Identify any regulatory constraints.
6. Identify where overlaps occur with other ACTs (e.g. Seafloor Mapping, Nonpoint Source Pollution, Ocean Awareness and Literacy) and which specific task elements have multiple benefits or need coordination.
7. Establish a West Coast Marine Debris Alliance comprised of state, federal, local, and tribal governments, as well as NGOs and industry representatives to meet regularly, monitor progress of the strategy and implementation plan and facilitate its execution. This group will also identify appropriate local knowledge contacts, exchange information and lessons learned to maximize cooperation and identify best use of resources for addressing marine debris issues.
8. Facilitate the appointment of a single point of contact for marine debris in each state, with a vested authority and resources to coordinate marine debris assessment and reduction efforts.

Specific Tasks

I. Derelict Fishing Gear

Background

Derelict fishing gear is lost or abandoned commercial and recreational fishing nets, lines, pots, and traps that sit on the seafloor, get caught on rocky and coral reefs, or float on the ocean surface. The majority of fishing gear is made of synthetic materials that can remain in the marine environment for decades and negatively impacts (1) the marine environment by entangling and trapping marine organisms and by damaging habitat upon which it snares; and (2) human safety by posing a navigational hazard for mariners and by similarly endangering humans, especially divers[1]. Derelict fishing gear can also negatively impact the economy: designed to catch or trap commercially available stock, it continues to do so after becoming abandoned and reduces the available catch to commercial and recreational fishers.

Washington, Oregon, and California are impacted by derelict fishing gear in ways that vary from state to state and region to region. While in the Puget Sound, for example, there is high density of legacy gillnets and relatively little accumulation of new nets, along the Pacific Coast fishing nets of different type drift in, sometimes from many miles away. Likewise, while in some areas of Oregon and the Washington Coast derelict nets and crab pots may be retrieved by grappling, in Puget Sound and in California's National Marine Sanctuaries this method is not feasible, and removal has to rely on divers.


Gillnet removal in Puget Sound, WA
Photo: Northwest Strait Commission

Along the West Coast, efforts to prevent, assess, and remove marine debris have been on-going for years. In **Washington State,** derelict fishing gear is a significant problem especially in the Puget Sound, due to the strong historic fishing effort and the high degree of gillnetting combined with the rocky shoreline geography. The Northwest Straits Commission and partner agencies started a Puget Sound derelict fishing gear program in 2002. The program includes a no-fault reporting system, a database of reported items, state-approved protocols for removal, research and training and on-going removals.

The issue of greatest concern in Washington State is legacy gillnets that were lost during the 1970's - 1990's that are found to be still actively fishing. Approximately 4,000 nets are estimated to still be in Puget Sound waters. As of December 2008, the Commission removed nearly 1,000 nets. Derelict crab

[1] From: Reducing marine debris: derelict fishing gear removal programs in Hawaii, Washington, and California. K. Gilardi, R. Brainard, T. Cowan, M. Donohue, and J. June. 2006

pots (commercial and sport) also litter the floor of Puget Sound. The Commission estimates 14,000 – 20,000 derelict crab pots in Puget Sound, the majority lost due to vessel traffic conflicts and inappropriate placement. The Northwest Straits Commission has a goal to remove 90 percent of the nets in Puget Sound by 2012 at a cost of approximately $4.5 million. The Olympic Coast Sanctuary did some surveys and removals but did not find a high density of gear in the region as the higher wave dynamics move lost gear to the shoreline. Columbia River and Grays Harbor are areas that may have high quantities of gear.

In 2008, legislation passed that initiated a new state program allowing crab pots to be recovered after the crab season. In addition, lost gear must be reported to Department of Fish and Wildlife. The first year of this program resulted in recovery of 331 state commercial crab pots from the outer coast. An additional 30 tribal pots were inadvertently recovered; these were returned to the owners. Washington Department of Fish and Wildlife also has current grant funding for removing crab pots on the outer coast, which so far has recovered 138 state-owned and 37 tribal pots. Both crab pot efforts involve recording the marine life retrieved with the gear.

In **Oregon**, a joint project involving Oregon Sea Grant, the Oregon Fishermen's Cable Committee, and the Oregon Dungeness Crab Commission has designed and tested new ways of finding and retrieving derelict gear. The project, primarily focused on retrieving lost crab pots, coordinated a diverse group of fishermen, regulators, and agencies to use a modified "trawl/grapple" technique to retrieve lost fishing gear.


Crab pot removal in Oregon
Photo: OR Cable Commission

A successful initial test was conducted in 2006. Two vessels, sailing out of Warrenton and Charleston, retrieved 59 crab pots, 600 feet of abandoned trawl cable, various old ropes, fishing hooks, and segments of fishing net in one day of work. Crab pots designed with "escape cord" made of cotton twine, intended to prevent "ghost fishing" by lost pots by disintegrating quickly if the pot is lost, proved to work just as planned, and the only dead crab recovered was in the a pot that for some reason did not have an escape cord.

In partnership with this project, the Oregon Dungeness Crab Commission and Oregon Department of Fish and Wildlife (ODFW) chartered crab vessels to evaluate pulling and pumping techniques to retrieve lost pots during 2006 and 2007. During eleven chartered trips, 268 pots were retrieved from all along the Oregon coast. The condition of pots, including escape mechanisms, and any marine life retrieved with the pots were recorded.

Escape cords and annual identification tags are now required in all commercial crab gear in Oregon. ODFW has implemented a free recycling program for the plastic identification tags. Further efforts to refine retrieval techniques as well as ways to provide incentives for fishermen

and their boats to take part in crab pot recovery are being pursued by ODFW, the Oregon Crab Commission, and Oregon Sea Grant.

In **California**, there is currently no comprehensive statewide effort addressing derelict fishing gear. The primary program in the state is the SeaDoc Society's California Lost Fishing Gear Recovery Project, which began in 2005. This program encourages ocean users to report lost fishing gear and utilizes SCUBA divers to remove gear from nearshore sites. The program is largely focused around the California Channel Islands; nearly 11 tons of gear has been removed from this area since May 2006. The program uses volunteers to remove monofilament line and other gear from public fishing piers throughout the state. Recycling bins have also been installed at many of these piers to encourage proper disposal of unwanted gear.

In November 2008 the California Ocean Protection Council approved an Ocean Litter Strategy with recommended actions to prevent and reduce marine debris. This plan recommends a deposit system to better manage derelict fishing gear within the state, as well as improved outreach regarding SeaDoc Society's reporting hotline. Senator Simitian has also introduced legislation, SB 21, for the 2009 session that would create a statewide program to manage derelict fishing gear, including a lost gear reporting hotline and associated database, the establishment of removal targets, and tagging of gear.


Entangled sea lion in California
Photo: Whale Rescue Team

Ports and the maritime industry have also recognized that derelict fishing gear poses a severe threat to the marine environment. In 2008, for example, the Port of Seattle launched a trawl net recycling program through a grant received by NOAA Marine Debris Program through the National Marine Fisheries Service. This grant allowed the Port of Seattle to develop a sustainable recycling program at little to no cost to the fishing industry. This program is supplemented by a gill net recycling program already in place at the Port of Seattle. The Port of Seattle plans to continue its recycling program and hopes to expand its footprint to the Port of Seattle's Terminal 91 facility in the near future.

Future Action

To integrate current successful efforts with future action, the marine debris strategy, when developed, will seek to establish guidelines for a comprehensive program to address derelict fishing gear on a state-by-state and/or regional basis, and take initial actions as listed below and further detailed in Table 1.

1. Identify and catalog the activities of entities currently involved with derelict fishing gear survey and removal activities in Washington, Oregon, and California.

2. Identify gaps (physical locations, gear types, etc.) not covered by existing activities.

3. Develop the guidelines for a database to track the elements of the derelict fishing gear survey and removal program, including areas impacted, derelict fishing gear identified, derelict fishing gear removed, and marine resource effects. To the degree possible, incorporate existing databases. The database may be centrally maintained and run, or be decentralized into regional but compatible databases.

4. Provide guidelines to a) identify areas potentially impacted by derelict fishing gear, and b) estimate the accumulation rate of fishing gear in these areas.

5. Provide direction to verify the location of derelict fishing gear accumulation by methods appropriate for the gear type, such as users survey, side scan sonar, divers or underwater photography, and quantify the density of derelict fishing gear in the area surveyed. Collaborate with other survey efforts (e.g., WCGA Seafloor Mapping ACT) to enable use of the collected data for marine debris removal.

6. Based on the assessment and survey listed above and in consultation with the states, provide priorities for removal of derelict fishing gear based on its impact to human safety, navigation, and natural resources and commerce. Consult with the states to set realistic target reduction levels.

7. Promote the removal of existing derelict fishing gear and plan for conducting ongoing prevention and maintenance activities to maintain the areas free of derelict fishing gear in the future. The reduction of derelict fishing gear should be driven by its impact on humans and the environment (see above), should leverage successful efforts, and should emphasize cross-state operation, sharing of technology, guidelines, and lessons learned.

8. Identify prevention measures to reduce the occurrence of derelict fishing gear and reduce its impact, and provide guidelines for execution of these measures. Prevention measures may include modifying fishing gear to render it harmless once it becomes lost, fishing practices that reduce the occurrence of derelict fishing gear, and best management practices to minimize derelict fishing gear.

9. Through the tri-state Marine Debris Alliance, conduct public education and outreach through public meetings, informational products, and a website, provided funding becomes available. Collaborate with other education and outreach efforts (e.g., WCGA Ocean Awareness and Literacy ACT).

10. Develop criteria for prioritizing derelict gear survey and removal projects, and list three to five major derelict fishing gear-related projects to pursue in each state and/or region.

Table 1: Deliverables, schedule, and resources for derelict fishing gear (DFG) efforts

#	Derelict Fishing Gear Deliverable	Timeline *if funding is available*	Resources and Funding Needed	Done by	Research/ Scientific Support
DFG1	List of current derelict fishing gear survey and removal activities	In advance of the marine debris strategy (which is anticipated by December 2010). DFG workshop will be held in Spring 2010.	Require in-kind efforts (time commitment) and cooperation from all involved. $20,000 for workshop of Marine Debris ACT and DFG experts to execute items 1 and 2.	Marine Debris (MD) ACT, federal, state, and local agencies, tribal governments, nongovernmental organizations (NGOs), and industry	
DFG2	Identified gaps in DFG activities	In advance of the marine debris strategy (which is anticipated by December 2010)	In-kind time commitment from all involved	MD ACT, federal, state, and local agencies, tribal governments, NGOs, and industry	
DFG3	Guidelines for database	In advance of the marine debris strategy (which is anticipated by December 2010)	In-kind effort. $15,000 for setting up the database	MD ACT to collaborate with states and NGOs to provide guidelines for database.	
DFG4	Guidelines to ID areas impacted by DFG; estimates of accumulation rate of DFG in these areas	In advance of the marine debris strategy (which is anticipated by December 2010)	Collaboration of all involved. Input from NMFS and state resource agencies. Data from fishing industry on rate of gear loss. Data from divers on location of DFG. $35,000 for contract services to coordinate input and draft the guidelines	MD ACT, federal, tribal, state, and local entities, industry, commercial and recreational fishing groups, recreational and commercial divers	Scientific support from NOAA, state, and tribal scientists to estimate DFG accumulation rates
DFG5	Guidelines for survey for DFG	In advance of the marine debris strategy (which is anticipated by December 2010)	Collaboration with NGO, Fed, state, tribal agencies and divers on survey and data collection. $10,000 for contract services to draft the guidelines	MD ACT will provide guidelines. Survey to be done by other entities.	
DFG6	Guidelines for setting DFG removal priority	In advance of the marine debris strategy (which is anticipated by December 2010)	Collaboration with state agencies. Additional $10,000 for contract services to draft the guidelines for removal priorities.	MD ACT will consult with states and provide guidelines and reduction goals. states will prioritize removal.	

DFG7	DFG removal best practices	In advance of the marine debris strategy (which is anticipated by December 2010)	Collaboration with state agencies and entities conducting removal. $20,000 for contract services to draft the best practices.	MD ACT will provide guidelines for MD removal best practices. Removal to be done by other entities, such as local NGOs or local/state agencies	
DFG8	Prevention measures	December 2010 or early 2011	Collaboration from all involved. Initiate discussion at initial DFG workshop.	MD ACT, federal, state, and local agencies, tribal governments, NGOs, and industry	Research needed to identify best prevention measures
DFG9	Outreach and prevention	TBD	Collaboration and coordination of multiple entities involved in outreach. $20,000 for contract services to coordinate outreach, and for outreach material	MD ACT, other WCGA ACTs (including Ocean Awareness and Literacy), and federal, state, and local agencies, tribal governments, NGOs, and industry	
DFG10	Develop criteria for prioritizing derelict gear survey and removal projects	December 2010 or early 2011	Time commitment from all involved. $20,000 for workshop to finalize DFG efforts, and generate the criteria for future projects	MD ACT, federal, state, and local agencies, tribal governments, NGOs, and industry	

II. Land-based Debris

Background

Land-based debris is any debris that originates on land and ultimately makes its way to the marine environment. This can include debris from a wide variety of sources: urban runoff, combined sewer overflows, beach visitors, solid waste disposal and garbage management, industrial activities, ports and marinas, construction, and illegal dumping or littering. Urban runoff is the primary source of marine debris, and littering is the source of most trash in urban runoff.[2] Litter can be either intentionally or unintentionally discarded in watershed drainage areas and washed out to sea. Plastic makes up the largest percentage of marine debris by

[2] Los Angeles Regional Water Quality Control Board, *Trash TMDLs for the Los Angeles River Watershed*, September 19, 2001.

composition: estimates range from 60 to 80 percent world-wide. Single-serving goods and packaging make up the largest percentage of land-based marine debris by product type.

Due to its wide variety of sources, there are a similarly wide variety of statutes and agencies that are meant to address land-based marine debris. Litter laws are one example, as are beverage container redemption programs, stormwater regulations designed to address trash in urban runoff, and bans on specific products such as expanded polystyrene and plastic grocery bags. Each of the three states has various regulations and agencies that handle pieces of the land-based debris puzzle; however, none of the states has a specific agency tasked with a mandate for addressing this type of marine debris. Additionally, lack of specific, strong regulation addressing land-based marine debris is a common problem across the three states.

Each of the three states has activities geared towards addressing land-based marine debris. In **California,** land-based debris poses significant problems, due to the large population, most of which is located within 50 miles of the coastline; and multiple highly urbanized metropolitan areas located up and down the coast. Several studies have shown that upwards of 80 percent of the marine debris originating from California is land-based[3], and ranges in size from everyday consumer goods to micro-plastic particles (those smaller than five millimeters).


Litter in Los Angeles River
Photo: Algalita

California has a number of long-standing programs designed to address land-based debris. Some examples include the state's Adopt-A-Beach Program and California Coastal Cleanup Day, which have harnessed the power of volunteers to clean up debris along the shorelines of the state every year since 1985. In 2008, 73,461 volunteers removed more than 1.6 million pounds of debris from the coast and shorelines of California during a single cleanup in September.[4] Additionally, a number of the state's laws specifically call for the restriction of litter, although enforcement of litter laws is widely seen as inadequate. There has also been a growing movement to ban or otherwise limit products on beaches or in coast-side cities that have a tendency to become marine debris, such as cigarette butts and expanded polystyrene. Apart from the statewide volunteer cleanups, these efforts have been uncoordinated, haphazard, and lacking an overarching legislative mandate.

In response, the California Coastal Commission and Algalita Marine Research Foundation conducted a joint project during 2004-2006 entitled "Plastic Debris, Rivers to Sea," a project designed to study plastic marine debris, its sources, its best management practices, and its

[3] US EPA, *Assessing and Monitoring Floatable Debris*, August 2002.
[4] California Coastal Commission, *California Coastal Cleanup Day 2008*, September 20, 2008.

potential solutions. The resulting report, "Eliminating Land-based Discharges of Marine Debris in California: A Plan of Action from The Plastic Debris Project," provided a menu of potential solutions to the marine debris problems in California (available for download at http://www.plasticdebris.org). After the report was published in June 2006, the California Ocean Protection Council chose 13 of the report's 63 recommendations around which to draft its own Resolution on Marine Debris. That Resolution, and the subsequent Implementation Strategy (approved by the Ocean Protection Council in November 2008), specify the major activities the California State Government should pursue to bring marine debris under control.

The Implementation Strategy includes 16 specific recommendations, but focuses on three primary objectives: the development and implementation of a system of Extended Producer Responsibility for packaging waste, by which producers would be responsible for the entire life cycle of their products; bans on specific products that are more likely to become marine debris and for which substitute materials or products are readily available; and fees on other products whose impact to the marine environment is considered significant but for which substitute products are not readily available. (The whole text of the Implementation Strategy can be found here: http://www.opc.ca.gov/webmaster/ftp/pdf/opc_ocean_litter_final_strategy.pdf). The Strategy has become the state's roadmap for future activities on land-based debris, and has already attracted significant attention; legislation based on the strategy's recommendations has been introduced for the 2009 session. This includes legislation addressing single-use plastic bag reduction, cigarette butt litter, polystyrene food packaging, and extended producer responsibility. Recognizing the work that has already been accomplished on this Implementation Strategy, the Marine Debris ACT intends to examine this effort as a potential starting point for a unified guidance document on land-based debris across the West Coast.

In **Oregon**, much of the land-based marine debris is associated with recreational use of its beaches. Oregon enjoys 360 miles of marine shoreline extending from the Columbia River south to the California border. All beaches within the ocean shore are publicly owned and managed for a range of public values centered on recreation. This is reflected in an extensive network of parks and open space along coastal shores. In general, the Oregon coast is sparsely populated with the majority of residents living near the coastline or in narrow coastal river valleys, ending at its 22 estuaries. Historically, coastal economies have relied on tourism and resource-based activities such as fishing, farming, and logging. Consequently, marine debris associated with large, urban populations and industrial activities is less common, although some is undoubtedly carried downriver to the ocean from cities and towns from interior parts of Oregon.

In Oregon the amount of land-based debris and its impacts are largely unknown, although the problem is likely not as large as in California and Washington. Oregon's beach litter problem is reportedly at significantly lower levels than the national average (Oregon Coastal Management Program 2006 draft). During a volunteer beach cleanup of nine miles of ocean beaches in 2007, three tons of debris was collected. About two-thirds of the items came from land-based activities, such as picnics, festivals, sporting events and beach outings (Ocean Conservancy 2008). Smoking-related products accounted for an additional 23% of the debris items found. Ocean and water-based activities, such as boating and fishing, accounted for 11%.


Marine Debris Cleanup in Oregon. Photo: SOLV

Oregon has benefited from a number of long-term efforts to address land-based debris. Of particular note, SOLV (Stop Oregon Litter and Vandalism), in partnership with state agencies, has conducted large-scale beach cleanups involving thousands of volunteers each fall and winter for over 20 years. During the two cleanups in 2008, SOLV volunteers collected over 75 tons of marine debris from all along Oregon's beaches.

Also, Oregon's pioneering container-deposit laws effectively reduce litter throughout Oregon, including its shorelines, and increase recycling. Currently, cans, bottles, and other containers of water, soft drinks, and beer are covered. In 2004, return rates for these containers averaged 90 percent, about three times the level of return in states without such laws (Dept. of Environmental Quality, Bottle Bill Fact Sheet, 2004). The container-deposit laws were expanded to include water containers in 2009, which promises to reduce the amount of plastic beverage bottles deposited on ocean beaches. In the 2007 nine-mile clean-up cited above, plastic beverage bottles accounted for nine percent of the marine debris items collected (Ocean Conservancy 2008).

The Oregon Marine Board, in partnership with other agencies, sponsors an active Clean Marina program to promote a cleaner marine environment. The program provides some incentives for voluntary compliance with environmental regulations and high use of best management practices, including solid waste management, by marinas, boatyards, yacht clubs or similar facilities.

A variety of state and local programs also address solid waste management and encourage recycling. These programs and activities likely directly and indirectly reduce the amount of marine debris on Oregon's shorelines.

Washington State is unique in that a large percentage of its marine shorelines are located in Puget Sound. The Puget Sound region consists of a complex network of waterways and shorelines that are connected to the Pacific by the Strait of Juan de Fuca. Many beaches in Puget Sound are privately owned, which makes monitoring and removing land-based marine debris challenging. The central and south Puget Sound region is heavily urbanized with a high distribution of industrial sites in the vicinity of the marine shoreline. The Pacific coastal beaches are highly to moderately developed from the mid-Olympic Peninsula south to the Oregon coast. Despite much focus on toxic pollution and habitat restoration, litter and solid waste are a real problem for Washington waterways. While most people recognize recreational and commercial boats as major sources of marine debris, debris from land-based activities is often the largest and most overlooked source, particularly in Puget Sound.


Marine Debris Cleanup in Washington
Photo: Coast Savers

Rising populations in coastal areas, particularly in central and south Puget Sound, have increased the potential for land-based marine debris introduction. Trash and debris is being littered and washed into streams from combined sewer systems and storm drains and is eventually carried to marine waters. These systems frequently become overwhelmed during periods of heavy rain causing debris in the pipes to be diverted away from treatment plants to the nearest receiving waters. Coastal population growth has also led to a higher density of landfills and transfer stations, which contributes to land-based marine debris when trash is improperly transported and contained. By-products from industrial production are another common source of land-based marine debris. Implementation of best management practices (ACC and SPI 2007; http://www.opcleansweep.org/manual/OCSmanual.pdf) by industry in regard to transport of pre-production plastic resin pellets has helped reduce this source of debris, as it has in similar efforts in California. The Environmental Protection Agency worked with the plastics industries of Washington State to determine how these pellets enter the environment and partnered with the Society of Plastics Industries, Inc. on "Operation Clean Sweep" to reduce the incidence of plastic debris. Natural events such as floods are also creating large amounts of land-based debris in the marine environment. Recent winter flood events in Washington contributed a noticeable, but undocumented amount of debris to both Puget Sound and Pacific coast shorelines.

In Washington State, assessing and managing land-based marine debris is primarily addressed through its state litter program at the Washington Department of Ecology (http://www.ecy.wa.gov/programs/swfa/litter/). The litter program organizes litter clean-up crews along roadways and at illegal dump sites, educates the public to prevent littering, and provides grants to other local and state government litter efforts, which have included cleaning up illegal dump sites and supporting beach clean-ups. The litter program also periodically characterizes Washington's litter to evaluate littering trends, gauge the effectiveness of cleanup efforts and its advertising campaign and adapt future efforts as needed. The estimated amount of litter on Washington roadways decreased from 8,322 tons in 1999 to 6,315 tons in 2004, while the estimated amount of litter on interchanges in Washington decreased from 617 tons in 1999 to 443 tons in 2004.

The Washington State Parks and Recreation Commission also provides education to visitors about preventing littering, collaborates on clean-ups at coastal state parks, and educates boaters about pollution prevention through its Boater Program. In addition, a marine plastics law provided authority to the Department of Natural Resources to implement a marine plastics plan, but no funding was provided to implement it.

It is apparent from shoreline cleanup events that this type of debris is substantial in urbanized areas of Puget Sound as well as coastal beaches that are heavily developed. According to the 2007 International Coastal Cleanup report for Washington State (http://www.oceanconservancy.org\coastalcleanup), 31,817 pounds of trash was removed from 232 miles of shoreline, 62 percent of which came from land-based activities. To date, there have been no statewide efforts that incorporate Puget Sound to document what percentage of marine debris is land-based in origin or what type of land-based debris is present in the largest concentrations.

A large number of organizations and citizens' groups are involved in beach cleanup events, but there is no standardized method for managing these volunteer efforts for land-based marine debris. Beach cleanup and monitoring activities are individually organized and are sporadic in timing and location. Groups such as the Washington State University Beach Watchers and the Northwest Straits Commission and associated Marine Resource Committees coordinate and participate in beach debris cleanup. The Puget Soundkeeper Alliance conducts multiple cleanup events each year, involving hundreds of volunteers from dozens of workplaces and organizations. The Friends of the San Juans' Marine Refuse Project is a coordinated effort to remove both land and ocean-based debris from 25 sites in the San Juan Islands. This project demonstrates how to efficiently coordinate marine debris management activities.

Another good example is The Washington Clean Coast Alliance, which formed in 2008 to increase public awareness of the threats and causes of marine debris and coordinate and expand upon the many successful beach cleanup events that happen each year along Washington's Pacific coast. In addition to the one-day cleanups, the alliance hopes to develop year-round programs including adopt-a-beach, classroom activities, debris awareness for businesses and community groups, and a Debris Tracker. One partner of the alliance, the Olympic Coast Cleanup, has recruited 3,856 volunteers to remove an estimated 187 tons of debris since 2000.

Other than the Clean Coast Alliance, there has been no large scale tracking effort of land-based marine debris or source identification on the state's shorelines. Yet, the state does track generation and composition of litter along roadways and at dump sites through its litter program. Washington primarily enforces its litter law through a partnership with the Washington State Patrol. Yet enforcement at the local-level could be improved. Washington State could benefit from a comprehensive, standardized approach to land-based marine debris management along the shoreline. Accessibility of Puget Sound beaches needs to be addressed and outreach and prevention measures need to be coordinated and incorporated into all shoreline cleanup activities.

Future Action

To integrate current successful efforts with future action, the marine debris strategy, when developed, will seek to provide guidelines for a comprehensive program to address land-based debris on a state-by-state and/or regional basis, and take initial actions as listed below and further detailed in Table 2.

1. Assess current efforts in addressing land-based debris, including efforts at source reduction, litter prevention, enforcement of existing law, education, and cleanup across all sectors, including producers (industry), consumers (retail and individual), and collection (local government and private industry) in the three states.

2. Identify data gaps where further study of pertinent marine debris issues would be useful, or geographic or issue gaps in which groups working on marine debris do not currently exist. At the same time, assess existing efforts to highlight those considered to be most effective.
    a. Examine list of current efforts for gaps in the following sectors:
        i. Geographic regions of the coastline across the three states where more marine debris information could be useful, focusing first on population centers.
        ii. Information about the potential source of the surveyed marine debris. Source can be both location within the watershed and activities that likely resulted in that piece of debris.
        iii. Information about the composition of the surveyed marine debris.
    b. Highlight current, new or innovative marine debris programs that have been proven effective by the resulting data.

3. Identify areas impacted, highlighting "hot spots" of debris accumulation along the coasts of the three states. Assess composition of debris by product type, package type, and material, and if possible, by potential source. Include enforcement surveys of these areas to determine whether existing laws are being adequately enforced.
    a. Provided funding becomes available, develop a map of the coastline of the three states that can be used to illustrate the accumulated information and better identify gaps and hot spots.

4. Develop guidelines for evaluating most effective solutions, including potential legislation, that are implemented and best ideas that are not yet implemented for prevention of land-based debris, assessment of quantities and impact, and removal strategies. California's Resolution on Marine Debris and associated Implementation Strategy, passed November 2008 by the California Ocean Protection Council, will serve as a starting point for these guidelines. These guidelines will specifically include a collection of legislative, regulatory, and policy ideas, both existing and proposed, that could be implemented as a necessary part of any comprehensive marine debris approach.

5. Provide direction for the enactment of land-based debris cleanup and prevention activities highlighted in the guidelines and solutions listed above, including the development and recommendation of a slate of legislation, targeting "hot spots" identified in number 3 above and source reduction across the three states.

6. Through the West Coast Marine Debris Alliance (described in Section IV), and provided funding becomes available, develop and maintain a regional database of marine debris

collected during cleanup activities onshore to assess what is present and evaluate the effect of marine debris educational and reduction efforts over time.

7. Through the West Coast Marine Debris Alliance, partner with existing outreach and education campaigns to the general public, such as the Thank You Ocean campaign and website, www.thankyouocean.org, to reduce, reuse, recycle, participate in marine debris cleanup, and engage in litter prevention and control. Focus can be on the use of existing messages or campaigns to create a unified approach to marine debris outreach on the West Coast.

Table 2: Deliverables, schedule, and resources for land-based debris (LBD) efforts

#	Land-based Debris Deliverables	Timeline *if funding is available*	Resources and Funding Needed	Done by	Research/ Scientific Support
LBD1	List of current efforts addressing land-based debris in Washington, Oregon and California	In advance of the marine debris strategy (which is anticipated by December 2010)	Require in-kind efforts (time commitment) and cooperation from all involved and $20,000 for workshop with MD ACT and LBD experts for items 1 and 2. (Funding for both this and the DFG workshop are separated in these tables. Total cost estimate for both workshops, which will enable to completion of the final strategy, is estimated at $40,000.)	Marine Debris (MD) ACT, federal, state, and local agencies, tribal governments, and nongovernmental organizations (NGOs)	
LBD2	Identify gaps in LBD efforts and highlight current effective programs	In advance of the marine debris strategy (which is anticipated by December 2010)	Require in-kind efforts (time commitment) and cooperation from all involved	MD ACT, federal, state, and local agencies, tribal governments, and NGOs	
LBD3	Identify LBD hotspots	In advance of the marine debris strategy (which is anticipated by December 2010)	Mapping will require financial resources and coordination with Sea Floor Mapping ACT, and $20,000 for contract services to complete map.	MD ACT, Seafloor Mapping ACT, and federal, state, and local agencies, tribal governments, and NGOs	
LBD4	Guidelines for addressing LBD through best ideas	In advance of the marine debris strategy	Require in-kind efforts (time commitment) and	MD ACT, federal, state, and local agencies, tribal governments, and	

	and practices, using CA Strategy as starting point and including potential legislative ideas.	(which is anticipated by December 2010)	cooperation from all involved; includes needed input from additional outside groups and $10,000 for contract services to finalize guidelines.	specific NGOs and industry partners with significant experience in LBD activities.	
LBD5	Guidance for enactment of LBD prevention and cleanup activities	December 2010 or early 2011	Require in-kind efforts (time commitment) and cooperation from all involved; includes needed input from additional outside groups who will enact most programs. $20,000 needed for contract services to print guidelines and distribute widely throughout region.	MD ACT, federal, state, and local agencies, tribal governments, and specific NGOs and industry partners with significant experience in LBD activities.	
LBD6	Regional database of marine debris collected during cleanup activities	TBD	Requires commitment from entity to house and maintain database. Regional database expected to cost $200,000.	MD ACT will provide guidelines for database to be created by other entities.	Scientific support needed for creation of scientifically sound data collection device.
LBD7	Outreach and education around LBD	TBD	Collaboration and coordination of multiple entities involved in outreach. $20,000 for contract services to coordinate outreach, and for outreach material	MD ACT, Ocean Awareness and Literacy ACT, federal, state, and local agencies, tribal governments, and NGOs	

III. Ocean-based Debris

Background

Ocean-based debris is debris that originates from activities that take place in the marine environment. Ocean-based marine debris comes from a number of sources, including vessels of all types (merchant shipping, ferries, cruise liners, fishing vessels, and recreational vessels), offshore oil and gas platforms and drilling rigs, and aquaculture installations. Ocean-based debris includes both debris that is indistinguishable from land-based debris (e.g., plastic bottles, other types of litter) and debris that is specific to maritime activities (e.g., light sticks, buoys, lines, lost cargo). This section of the work plan focuses on debris from vessels that does not fall into the category of derelict fishing gear. The work plan and the strategy that will be developed address the vessels themselves and the ports, terminals and marinas that serve these vessels.

Assessing the scope of debris generated from ocean-based sources is challenging, as some types of garbage from vessels cannot be differentiated from garbage generated on land. Since litter from the ocean-based activities washes ashore, and litter from land-based activities washes out to sea, debris location is not an accurate indicator of the debris' source. Moreover, limited data exists on debris that ends up in the sea and on the seabed. These circumstances make establishing a baseline for ocean-generated debris challenging. As such, while the ACT recognizes the importance of understanding the scope of ocean-based debris, this work plan does not prioritize assessment.

Legal Framework for Addressing Marine Debris

Two primary international conventions address garbage pollution at sea – the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972, and the 1996 Protocol to the Convention, and the International Convention for the Prevention of Pollution from Ships (MARPOL), 1973, as modified by the Protocol of 1978 Annex V. Annex V deals with the prevention of pollution by garbage from ships; it bans all overboard disposal of plastics and limit discharges of other types of solid waste. When the U.S. ratified Annex V in 1987, it also enacted the Marine Plastics Pollution Research and Control Act (MRPRCA). The United States Coast Guard (USCG) is responsible for enforcing Annex V and the MPPRCA.

Source Reduction Efforts

To reduce the amount of trash that enters the marine environment from vessels, the National Research Council's Committee on Shipborne Wastes identified a need for better waste management systems both onboard vessels and at port facilities. Several carriers are employing waste minimization, source reduction and zero discharge concepts in their onboard waste management systems. The International Organization for Standardization (ISO) has developed standards for environmental management systems (ISO 14000) which have been adopted by members of the Cruise Lines International Association, Inc.

A comprehensive approach to source reduction also requires that greater attention be paid to assuring that shore-side trash reception facilities at marinas, terminals, and ports are adequate and convenient, and integrated into the regional solid waste management system. While the Coast Guard issues Certificates of Adequacy to large commercial and fishing ports and requires that facilities be provided at many other ports, there are no technical standards for judging adequacy. Developing and implementing adequacy standards for shoreside trash reception facilities would help to reduce the amount of trash that is dumped at sea.

International Efforts

The United Nations General Assembly has asked the International Maritime Organization (IMO) to review and assess the effectiveness of MARPOL Annex V in addressing ocean-based sources of marine debris. As such, the IMO's Marine Environmental Protection Committee (MEPC) has established a correspondence group. As of the drafting of this work plan, the group is currently conducting its review and will provide recommendations for future actions including amendments to Annex V.


Marine debris collects on the coast in Hawaii.
Photo Credit: State of Hawaii

One major issue of international scale is floating ocean- and land-based debris that has accumulated in the North Pacific Ocean. The Subtropical Convergence Zone (STCZ), an area which moves seasonally between 23 and 37° N latitude, is a known "hot spot" of debris accumulation. Many different types of plastics can be found in this "trash vortex", including small pieces of plastics and micro-plastics that pose serious cleanup challenges. Because of their proximity to the STCZ, the Hawaiian Islands, including the recently designated Northwestern Hawaiian Islands Marine National Monument, are prone to accumulating floating debris. Debris can snag on and harm coral reefs and possibly raft invasive species into these pristine environments. International efforts like the Pacific Ocean 2020 Challenge seek to bring global attention to this issue of debris accumulation in the North Pacific Ocean.

Future Action

To integrate current successful efforts with future action, the marine debris strategy, when developed, will seek to provide guidance for a comprehensive program to address ocean-based debris on a state-by-state and/or regional basis, and take initial actions as listed below and further detailed in Table 3.

1. Review existing laws, especially the Act to Prevent Pollution from Ships (APPS), the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex V: pollution by garbage from ships, and the Marine Plastics Pollution Research and Control Act (MPRRCA).

2. Explore new tri-state collaboration with the USCG on enforcement activities to prevent unlawful disposal of debris into the ocean.

3. Work with existing Clean Marina Programs to ensure that standards set by these programs meet or exceed the established adequacy standards for shore-side trash reception facilities.[5]

4. Provide recommendations to the Maritime Administration to identify best management practices (BMPs) for on-board waste stream management for different vessel types/ industries, including cruise industry, cargo shipping industry, fishing industry, public vessels and recreational vessels.

[5] Team will partner with the Sustainable Communities ACT to improve pollution prevention infrastructure at marinas

5. Support ongoing international efforts to address ocean-based debris. Review recommendations made by the Committee on the Effectiveness of International and National Measures to Prevent and Reduce Marine Debris and Its Impacts for the International Maritime Organization's amendment of MARPOL Annex V.[6]

6. Pursue collaborative international efforts through Pacific 2020 and other avenues to develop innovative solutions to removing trash in the North Pacific Gyre and initiate widespread education efforts. Next steps will include:
   a. The Marine Debris Alliance will assess the present knowledge-base of the issue, including what we know and what we need to know to move forward
   b. The Governors of Washington and Oregon will consider joining the Pacific 2020 Initiative. Although the initiative focuses primarily on curbing global climate change, the North Pacific Gyre is a chronic international issue that would benefit from increased visibility and multi-national collaboration

Table 3: Deliverables, schedule, and resources for ocean-based debris (OBD) efforts

#	Ocean-based Debris Deliverables	Timeline *if funding is available*	Resources and Funding Needed	Done by	Research/ Scientific Support
OBD1	Fact sheets detailing compliance activities, enforcement actions, to be distributed to shipping, fishing, port publications, websites, large regional newspapers, etc.	TBD	Existing resources; time commitment	Marine Debris (MD) ACT or Marine Debris Alliance in collaboration with the U.S. Coast Guard	Needed
OBD2	Review of refuse and recycling standards for Clean Marina Program and suggest revisions	In advance of the marine debris strategy (which is anticipated by December 2010)	Existing resources; time commitment	MD ACT (or Marine Debris Alliance as necessary) in collaboration with various West Coast marinas	Needed
OBD3	Provide marine debris prevention guidelines to the Sustainable Communities ACT for that ACT's grants for pollution prevention infrastructure at marinas	In advance of the marine debris strategy (which is anticipated by December 2010)	Existing resources; in kind efforts; $20,000 for contract services	MD ACT (or Marine Debris Alliance as necessary) in collaboration with Sustainable Communities ACT	Needed
OBD4	Recommendations to Maritime Administration (MARAD) for a set of best management practices for onboard	TBD	Existing resources; time commitment	Marine Debris Alliance in collaboration with the Maritime Administration and	Needed

[6] These recommendations are presented in the report "Tackling Marine Debris in the 21st Century," available at: http://www.nap.edu/catalog/12486.html

	solid waste stream management for identified maritime sectors			identified maritime sectors	
OBD5	Briefing to the WCGA Executive Committee on MARPOL Annex V and recommended amendments	TBD	Existing resources; time commitment	Marine Debris ACT or Marine Debris Alliance	Needed
OBD6	Letter from the Executive Committee supporting the amendments be incorporated (based on outcomes of briefing)	TBD	Existing resources	Marine Debris ACT or Marine Debris Alliance and Executive Committee	n/a
OBD7	Gather existing information that will lead to better understanding of trash accumulating in the North Pacific Subtropical Convergence Zone	2011	Additional staff needed; $10,000 for contract services	Marine Debris Alliance	Needed
OBD8	Oregon and Washington will consider joining the Pacific 2020 Initiative	TBD	Existing resources	Executive Committee and Governors of Washington and Oregon	n/a

IV. West Coast Marine Debris Alliance

Background

The Marine Debris ACT recommends the establishment of a West Coast Marine Debris Alliance that will convene groups addressing marine debris to pursue a coordinated effort to address the priorities identified in this work plan and the marine strategy. Although other alliances to address marine debris issues exist in other parts of the US, there is at this time no body encompassing the principle marine debris leaders and stakeholders across the three West Coast states.

The WCGA Marine Debris ACT will sunset with the establishment of the Alliance. The Alliance will continue the work of the ACT, and will initially be tasked with implementation of the tri-state strategy and ensuring the continuing and maintenance of products (e.g., a long-term database) that benefit the three states. In general, the Alliance is anticipated to be comprised of state, federal, local, and tribal governments, as well as NGOs and industry representatives. They will meet regularly, monitor progress of the strategy and implementation plan, and facilitate its execution. This group will also identify appropriate local knowledge contacts, exchange information and lessons learned to maximize cooperation and identify best use of resources for addressing marine debris issues.

Future Action

The West Coast Marine Debris Alliance will be established after the release of the ACT's marine debris strategy. Alliance membership may differ from the present ACT, to support the level, contribution, and expertise needs of a sustained regional coordinating body. The Alliance's composition and functions will be further defined at or before the time of the release of the marine debris strategy, anticipated in December 2010.

Table 4: Deliverable, schedule, and resources for Marine Debris Alliance

#	Marine Debris Alliance Deliverable	Timeline *if funding is available*	Resources and Funding Needed	Done by	Research/ Scientific Support
MDA1	Establishment of the Marine Debris Alliance	Launched in or around December 2010 upon the release of the strategy	In-kind time commitment from all involved; Start-up costs for Marine Debris Alliance estimated at $25,000. Funding for subsequent years will be sought by the Alliance itself	Marine Debris ACT, federal, state, and local agencies, tribal governments, and nongovernmental organizations (NGOs)	

Expected ACT Duration

November 1, 2008 through December 31, 2010. The ACT intends to cease at the time of the establishment of the West Coast Marine Debris Alliance.

Stakeholders

The list of stakeholders (anyone affected by and/or interested in the project) is extensive. It includes:

- Governors of California, Oregon and Washington, and concerned state Agencies
- West Coast Governors Agreement Co-Leads
- Local Municipalities in OR, CA, and WA: Counties, cities, towns, and port districts
- Tribal Governments
- Recreational and Commercial Fishing Industry
- NOAA Marine Debris Program, NOAA Sanctuary, and NOAA Fisheries
- Washington, Oregon, California, and University of Southern California Sea Grant Programs
- NGOs
- Members of Industry (e.g. Consumer Product Companies, Retailers, and Suppliers)
- Recreational and Commercial Boaters
- Coastal Users
- General Public

Risks

Below is a sample of the risks the project may encounter:

- Project's products are inadequate and/or behind schedule
- Scope expansion beyond the ability of the ACT to complete the strategy
- Poor communication impedes project's progress
- Project sponsor (state Governors) withdraw support for the project
- Legislative hurdles appear or prove unmanageable
- Project team member(s) leave the project
- Lack of cooperation from key participants
- Lack of regulatory support
- Lack of funding available for key projects

Success Criteria

The project is successful when:

1. Project objectives have been achieved within time and budget, if allotted. The West Coast Marine Debris Strategy is completed and the Marine Debris Alliance is established.

2. WCGA Executive Committee and state Governors are satisfied with the project deliverables.

3. Project execution is efficient and professional.