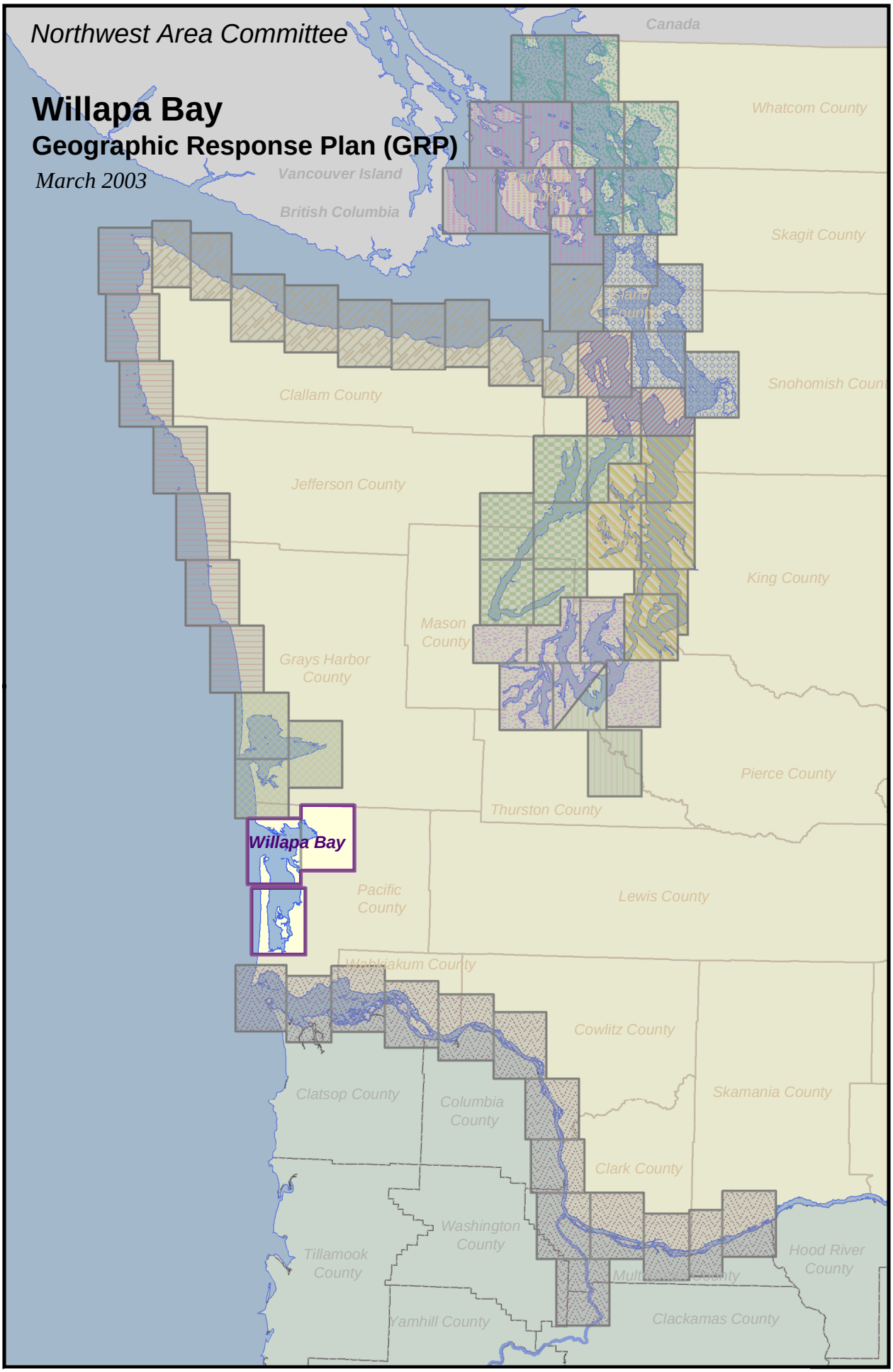
Washington State Department of Ecology Publication No. 03-08-009



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SPILL RESPONSE CONTACT SHEET

Required Notifications For Hazardous Substance or Oil Spills

USCG National Response Center ..... **(800) 424-8802**
In Oregon:
Department of Emergency Management ..... **(800) 452-0311**
In Washington:
Emergency Management Division ..... **(800) 258-5990**
Department of Ecology Northwest Regional Office ..... **(425) 649-7000**
Department of Ecology Southwest Regional Office ..... **(360) 407-6300**

U.S. Coast Guard

National Response Center	**(800) 424-8802**
Marine Safety Office Puget Sound:	
Watchstander	**(206) 217-6232**
Safety Office	(206) 217-6232
Marine Safety Office Portland:	
Watchstander	**(503) 240-9301**
Safety Office	(503) 240-9379
Pacific Strike Team	**(415) 883-3311**
District 13:	
MEP/drat	(206) 220-7210
Command Center	(206) 220-7001
Public Affairs	(206) 220-7237
Vessel Traffic Service (VTS)	**(206) 217-6050**

Environmental Protection Agency (EPA)

Region 10 Spill Response	**(206) 553-1263**
Washington Ops Office	(360) 753-9083
Oregon Ops Office	(503) 326-3250
Idaho Ops Office	(208) 334-1450
RCRA/ CERCLA Hotline	(800) 424-9346
Public Affairs	**(206) 553-1203**

National Oceanic Atmosphere Administration

Scientific Support Coordination	(206) 526-6829
Weather	(206) 526-6087

Canadian

Marine Emergency Ops/Vessel Traffic	(604) 666-6011
Environmental Protection	(604) 666-6100
B.C. Environment	(604) 356-7721

Department of Interior

Environmental Affairs	(503) 231-6157
	(503) 621-3682

U.S. Navy

Naval Shipyard	**(360) 476-3466**
Naval Base Seattle	(360) 315-5440
Supervisor of Salvage	**(202) 695-0231**

Army Corps of Engineers

Hazards to Navigation	(206) 764-3400

Shoalwater Bay Tribe

Tribal Office	(360) 267-6766
After Hours Emergencies	(360) 267-6766 ext. 139

Federal O.S.R.O./ State Approved Response Contractors

All Out Indust. & Env. Services	(360) 414-8655
Certified Cleaning Services, Inc.	(253) 536-5500
Clean Sound Cooperative, Inc.	**(425) 783-0908**
Cowlitz Clean Sweep, Inc.	(360) 423-6316
FOSS Environmental	**(800) 337-7455**
Global Diving and Salvage	(206) 623-0621
Guardian Industrial Services, Inc.	(253) 536-0455
Matrix Service, Inc.	(360) 676-4905
MSRC	(425) 252-1300
National Response Corporation	(206) 340-2772
Tidewater Environmental	(503) 289-4274
&	(360) 695-8088

Washington State

Department of Ecology Headquarters	(360) 407-6900
Southwest Region	**(360) 407-6300**
Northwest Region	**(425) 649-7000**
Central Region	**(509) 575-2490**
Eastern Region	**(509) 456-2926**
Department of Fish and Wildlife	**(360) 534-8233**
Emergency Management Division	(360) 438-8639
	(800) 258-5990
State Patrol	
Bellevue	(425) 455-7700
Tacoma	(253) 536-6210
Bremerton	(360) 478-4646
Vancouver	(360) 260-6333

Oregon State

Department of Environmental Quality	(503) 229-5733
Emergency Management	**(503) 378-6377**
	(800) 452-0311

*** Boldface type are 24 hour numbers**

HOW TO USE THIS GEOGRAPHIC RESPONSE PLAN

Purpose of Geographic Response Plan (GRP)

This plan prioritizes resources to be protected and allows for immediate and proper action. By using this plan, the first responders to a spill can avoid the initial confusion that generally accompanies any spill.

Geographic Response Plans are used during the emergent phase of a spill which lasts from the time a spill occurs until the Unified Command is operating and/or the spill has been contained and cleaned up. Generally this lasts no more than 24 hours. The GRPs constitute the federal on-scene coordinators' and state on-scene coordinators' (Incident Commanders) "orders" during the emergent phase of the spill. During the project phase, the GRP will continue to be used, and the planned operation for the day will be found in the Incident Action Plan's Assignment List (ICS Form 204). The Assignment List is prepared in the Planning Section with input from natural resource trustees, the Incident Objectives (ICS Form 202), Operations Planning Worksheet (ICS Form 215), and Operations Section Chief.

Strategy Selection

Chapter 4 contains complete strategy descriptions in matrix form, response priorities, and strategy maps. The strategies depicted in Chapter 4 should be implemented as soon as possible, following the priority table in Section 2 with the "Potential Spill Origin" closest to the actual spill origin. These strategy deployment priorities may be modified by the Incident Commander(s) after reviewing on scene information, including: tides, currents, weather conditions, oil type, initial trajectories, etc.

It is assumed that control and containment at the source is the number one priority of any response. If, in the responder's best judgment, this type of response is infeasible then the priorities laid out in Chapter 4, Section 2 take precedence over containment and control.

It is important to note that strategies rely on the spill trajectory. A booming strategy listed as a high priority would not necessarily be implemented if the spill trajectory and booming location did not warrant action in that area. However, the priority tables should be followed until spill trajectory information becomes available, and modifications to the priority tables must be approved by the Incident Commander(s).

The strategies discussed in this GRP have been designed for use with persistent oils and may not be suitable for other petroleum or hazardous substance products. For hazardous substance spills, refer to the Northwest Area Contingency Plan, Chapter 7000.

Standardized Response Language

In order to avoid confusion in response terminology, this GRP uses standard National Interagency Incident Management System, Incident Command System (NIIMS, ICS) terminology and strategy names, which are defined in Appendix A, Table A-1 (e.g. diversion, containment, exclusion).

Willapa Bay
Geographic Response Plan

Record of Changes

Date	**Change Number**	**Summary of Changes**	**Initials of Person Making Change**
	N/A	Origianl Release	N/A
March 1994	1	Entire GRP replaced w/ up-dated, reformated version	
March 2003	2nd Change	Update of Chapter 4 using GIS based maps, and new priority tables based on trajectory modeling.	D Davis

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GEOGRAPHIC RESPONSE PLAN

1. INTRODUCTION: SCOPE OF THIS PROJECT

Geographic Response Plans are intended to help the first responders to a spill avoid the initial confusion that generally accompanies any spill. This document serves as the federal and state on-scene-coordinators "orders" during a spill in the area covered by this GRP (see Chapter 3 for area covered). As such, it has been approved by the U.S. Coast Guard Marine Safety Office and the Washington State Department of Ecology Spills Program. Changes to this document are expected as more testing is conducted through drills, site visits, and actual use in spill situations. To submit comments, corrections, or suggestions please refer to Appendix C.

GRPs have been developed for the marine and inland waters of Washington, Oregon, and Idaho. They are prepared through the efforts and cooperation of the Washington Department of Ecology, Washington Department of Fish and Wildlife, Oregon Department of Environmental Quality, Idaho State Emergency Response Commission, the U.S. Coast Guard, the Environmental Protection Agency, tribes, other state and federal agencies, response organizations, and local emergency responders.

GRPs were developed through workshops involving federal, state, and local oil spill emergency response experts, response contractors, and representatives from tribes, industry, ports, environmental organizations, and pilots. Workshop participants identified resources which require protection, developed operational strategies, and pinpointed logistical support. A similar process has been used for major updates.

Following the workshops, the data gathered was processed and reproduced in the form of maps and matrices which appear in Chapters 4 through 6. The maps in Chapters 5 and 6 were generated using Canvas. Maps for Chapter 4 were generated using ArcView GIS. The matrices were created using MS Excel, and the balance of each GRP was produced using MS Word.

The first goal of a GRP was to identify, with the assistance of the Washington State Natural Resource Damage Assessment Team, resources needing protection; response resources (boom, boat ramps, vessels, etc.) needed, site access and staging, tribal and local response community contacts, and local conditions (e.g. physical features, hydrology, currents and tides, winds and climate) that may affect response strategies. Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

Secondly, response strategies were developed based on the sensitive resources noted, hydrology, and climatic considerations. Individual response strategies identify the amount of boom necessary for implementation. The response strategies are then applied to Potential Spill Origins and trajectory modeling, and prioritized, taking into account factors such as resource sensitivity, feasibility, wind, and tidal conditions.

Draft strategy maps and matrices were sent out for review and consideration of strategy viability. Field verification was conducted for some strategies, and changes proposed by the participants were included in a semi-final draft, which was offered for final review to all interested parties and the participants of the field verification.

Finally, the general text of the GRP was compiled along with the site description, reference maps, and logistical support.

Items included in Logistical Support:

- Location of operations center for the central response organization;
- Local equipment and trained personnel;
- Local facilities and services and appropriate contacts for each;
- Site access & contacts;
- Staging areas;
- Helicopter and air support;
- Local experts;
- Volunteer organizations;
- Potential wildlife rehabilitation centers;
- Marinas, docks, piers, and boat ramps;
- Potential interim storage locations, permitting process;
- Damaged vessel safehavens;
- Vessel repairs & cleaning;
- Response times for bringing equipment in from other areas.

2. Site Description

Willapa Bay is a 100 square-mile estuary situated along the southern coast of Washington and is one of the most important estuaries on the West Coast. The bay has an ideal oyster growing habitat, and supports a wide diversity of wildlife.

Willapa Bay is considered to be one of the most productive bays along the Pacific. Salmon, bottom fish, oysters, crabs, clams, and shrimp are harvested from bay waters. The bay features mud and gravel beaches and saltgrass shores interspersed with wetlands and tidal flats. 20,000 acres of the bay has been set aside as a National Wildlife Refuge for habitat protection.

2.1. Physical Features

Steeply rising uplands border the bay to the north and east. To the south, across a low ridge, lies the Columbia River. The western margin of the bay is formed by a long, narrow sand spit – North Beach Peninsula – apparently formed by deposits from the Columbia River.

2.2. Hydrology

The drainage basin of Willapa Bay encompasses approximately 720 square miles, including most of Pacific County and portions of Grays Harbor, Lewis, and Wahkiakum counties. Rivers that flow into the bay include the Cedar, North, Willapa, Bone, Niawaikum, Palix, Nemah, Naselle, and Bear. Freshwater inflow into the bay from tributaries is low. The combined average daily runoff of all the rivers is approximately 0.004% of the bay volume.

2.3. Currents and Tides

A majority of Willapa Bay is broad and shallow with about 55 percent of the area exposed at lower tides. The difference in the volume of water between highest tides and lowest tides is approximately 45 percent of the bay volume. At mean high water, Willapa Bay covers about 79,000 acres, while at mean lower low water about 32,000 acres of bottom are exposed and 11,600 acres are shallower than six feet.

Conditions in the ocean determine how much water leaving the bay will return on the next incoming tide. According to the Army Corps of Engineers (1976), periods of ocean upwelling in summer promote thorough mixing of bay water and ocean water. Mixing may occur during storm periods with high wave actions. At other times, a plume of water from the Columbia River, acting as a discrete mass of water, tends to prevent mixing from occurring. Water from the bay can then move back and forth for several days.

The ocean current along the Washington coast reverses direction between summer and winter; the California current moves south in the summer and the Davidson inshore current moves north in the winter.

2.4. Winds

During the fall and winter, there is a prevailing flow of warm, moist air from a southwesterly direction. During the winter, weather disturbances crossing the North Pacific follow a southerly course that results in an increased number of storms striking the Washington coast. The frequency of storms over the North Pacific decreases in the spring, and the prevailing wind shifts to westerly, and then northwesterly by early summer. In the fall, the winds again come from a westerly direction.

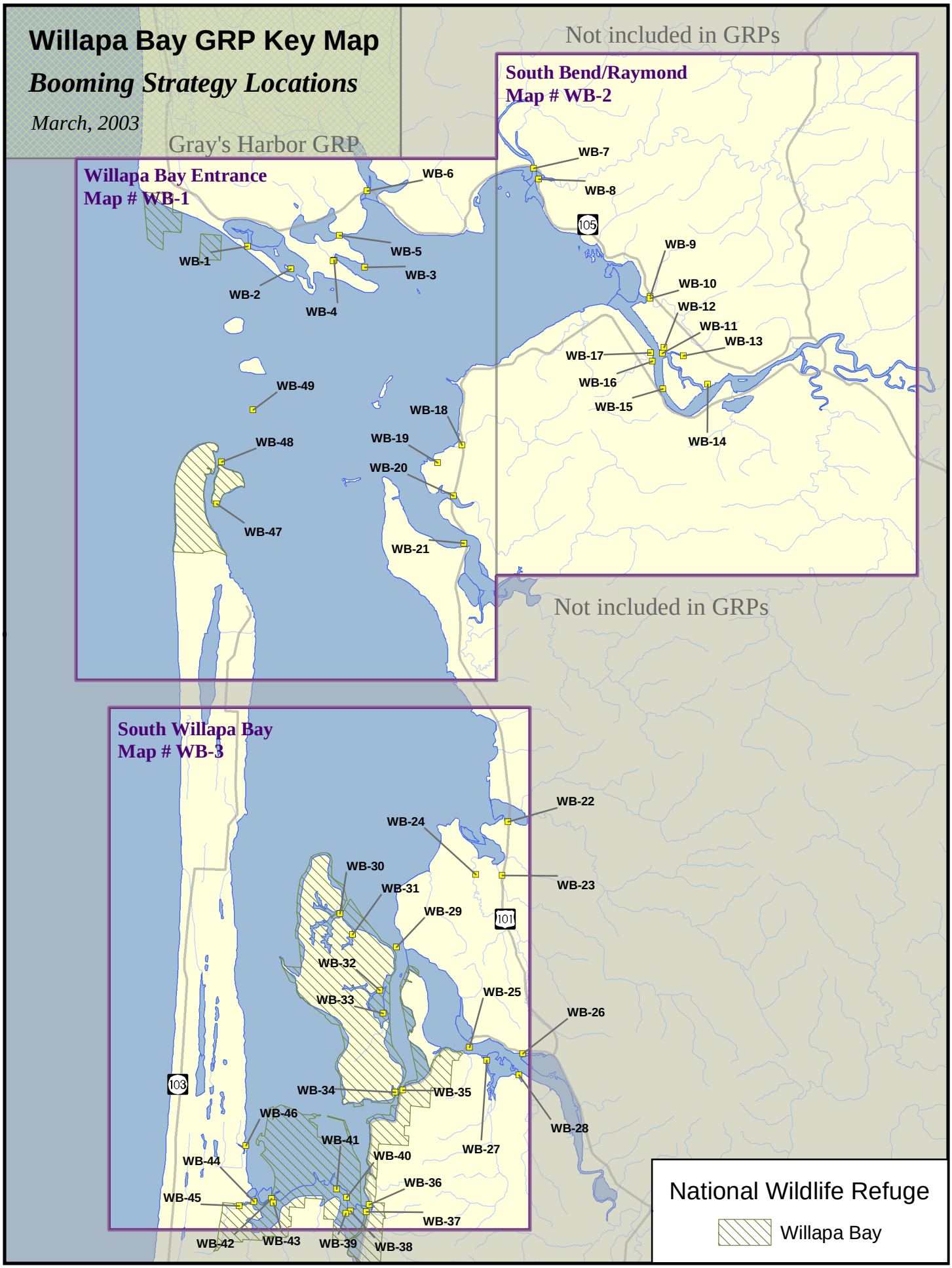
If oil is spilled offshore, prevailing winds will play a role in spill direction depending on the season:

In the winter, the predominant winds are from the south and the current is circulating north. If oil is spilled offshore south of Willapa Bay, and it enters the mouth, it can be expected to hit the northern shore of the bay. If the spill does not enter Willapa Bay, the North Coast shoreline will be vulnerable.

In the summer, the predominant winds are from the north. The summer winds are persistent, but not as strong as the winter winds. Oil may enter Willapa Bay from the north and spread south. The increasingly variable nature of the winds in the spring, summer, and fall may reduce the predictability of the spill direction once it enters Willapa Bay.

2.5. Climate

The climate of the Willapa Bay basin is the marine west coast type, characterized by cool, dry summers and moderate winters with heavy rainfall ranging from 65 to 120 inches per year, depending on location.


Willapa Bay GRP Key Map
Booming Strategy Locations
March, 2003
Gray's Harbor GRP
Not included in GRPs
Not included in GRPs
Willapa Bay Entrance
Map # WB-1
WB-1
WB-2
WB-3
WB-4
WB-5
WB-6
WB-47
WB-48
WB-49
WB-18
WB-19
WB-20
WB-21
South Bend/Raymond
Map # WB-2
WB-7
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South Willapa Bay
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National Wildlife Refuge
Willapa Bay

4. GENERAL PROTECTION/COLLECTION STRATEGIES

4.1. Chapter Overview

This chapter details the specific response strategies and resources to protect as outlined by the participants of the GRP workshop for the Willapa Bay area. It describes the strategies determined for each area and the prioritization of those strategies. Note that GRPs only address protection of sensitive **public** resources. It is the responsibility of private resource owners and/or potentially liable parties to address protection of private resources (such as commercial marinas, private water intakes, and non-release aquaculture facilities).

Maps & Matrices

The maps in this chapter provide information on the specific location of booming strategies. They are designed to help the responder visualize response strategies. Details of each booming strategy are listed in corresponding matrix tables. Each matrix indicates the exact location, intent and implementation of the strategy indicated on the map. The "Status" column describes whether the strategy has been visited or tested in the field, and the date of the visit/test. Most strategies include a number for the corresponding shoreline photo, which is available on the Washington Department of Ecology's internet site at http://www.ecy.wa.gov/apps/shorephotos/.

Major Protection Techniques

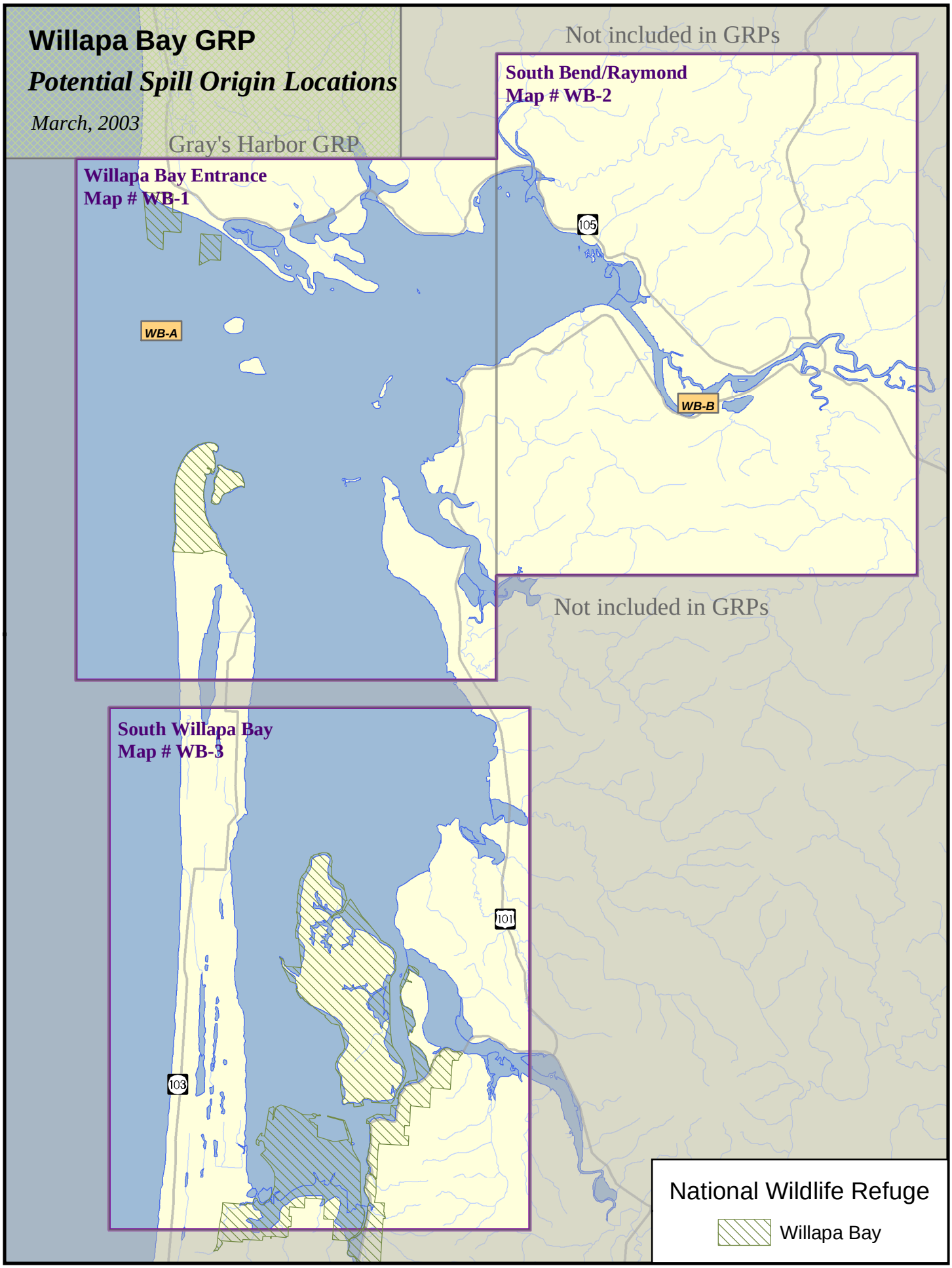
All response strategies fall into one of three major techniques that may be utilized either individually or in combination. The strategies listed in Section 4.2 are based on the following techniques, and are explained in detail in Section 4.3:

Dispersants: Washington State Policy currently does not allow use of dispersants in this area. Certain chemicals break up slicks on the water. Dispersants can decrease the severity of a spill by speeding the dissipation of certain oil types. Their use will require approval of the Unified Command. Dispersants will only be used in offshore situations under certain conditions, until further determinations are made by the Area Committee and published in the Area Contingency Plan.

In Situ Burning: Approval to burn in this area is unlikely due to the proximity of population to a potential burn site. Burning requires the authorization of the Unified Command, who determine conformance of a request to burn with the guidelines set forth in the Area Plan. This option is preferable to allowing a slick to reach the shore provided that population areas are not exposed to excessive smoke. Under the right atmospheric conditions, a burn can be safely conducted in relative close proximity to human population. This method works on many types of oil, and requires special equipment including a fire boom and igniters.

Mechanical Recovery and Protection Strategies: If a spill is too close to shore to use In Situ burning or dispersants, the key strategies are skimming and use of collection, diversion, or exclusion booming to contain and recover the oil, and prevent it from entering areas with sensitive wildlife and fisheries resources. These options are described in detail in Appendix A. Specific skimming strategies are not listed in the maps and matrices, but skimming should be used whenever possible and is often the primary means of recovering oil and protecting resources, especially when booming is not possible or feasible.

Priorities: The strategy priority tables (Section 4.2.) were developed using specific locations where spills are likely to occur. Trajectory modeling was used for each of these "Potential Spill Origins" to identify sensitive resources that would likely be impacted within the initial hours of the spill. A booming strategy priority table was developed for each of the "Potential Spill Origins" based on the sensitivity of resources, feasibility, etc. **Booming strategies should be deployed following the priority table for the "Potential Spill Origin" closest to the actual spill origin.** The map on page 4-2 shows the locations of all Potential Spill Origins for the Willapa Bay GRP. The booming strategies indicated in the priority tables are explained in detail in the Maps & Matrices section (Section 4.3.). It is implied that control and containment at the source is the number one priority of any response. If in the responder's best judgment this is not feasible, then the priorities laid out in the priority tables take precedence over containment and control.


Willapa Bay GRP
Potential Spill Origin Locations
March, 2003
Not included in GRPs
Gray's Harbor GRP
Willapa Bay Entrance
Map # WB-1
WB-A
South Bend/Raymond
Map # WB-2
105
WB-B
Not included in GRPs
South Willapa Bay
Map # WB-3
101
103
National Wildlife Refuge
Willapa Bay

4.2.2 Booming Strategy Priority Tables

Table 4-1

Potential Spill Origin: WB-A - Oil entering Willapa Bay on a flood tide from a source outside of the bay			
BOOMING PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
1	WB-1	4-5	
2	WB-2	4-5	
3	WB-47	4-5	
4	WB-48	4-5	
5	WB-3	4-5	
6	WB-4	4-5	Tide Gate
7	WB-5	4-5	Tide Gate
8	WB-6	4-5	
9	WB-7	4-6	
10	WB-8	4-6	
11	WB-18	4-5	
12	WB-19	4-5	
13	WB-20	4-5	
14	WB-21	4-5	
15	WB-12	4-6	
16	WB-15	4-6	
17	WB-9	4-6	
18	WB-10	4-6	Tide Gate
19	WB-16	4-6	
20	WB-17	4-6	

Table 4-4

Potential Spill Origin: WB-B - Oil entering Willapa Bay on an ebb tide from a source in the Willapa River			
BOOMING PRIORITY	STRATEGY NUMBER	MAP PAGE NUMBER	COMMENTS
1	WB-15	4-6	
2	WB-14	4-6	
3	WB-12	4-6	
4	WB-16	4-6	
5	WB-17	4-6	
6	WB-3	4-5	
7	WB-5	4-5	
8	WB-2	4-5	
9	WB-1	4-5	
10	WB-48	4-5	

WILLAPA BAY ENTRANCE

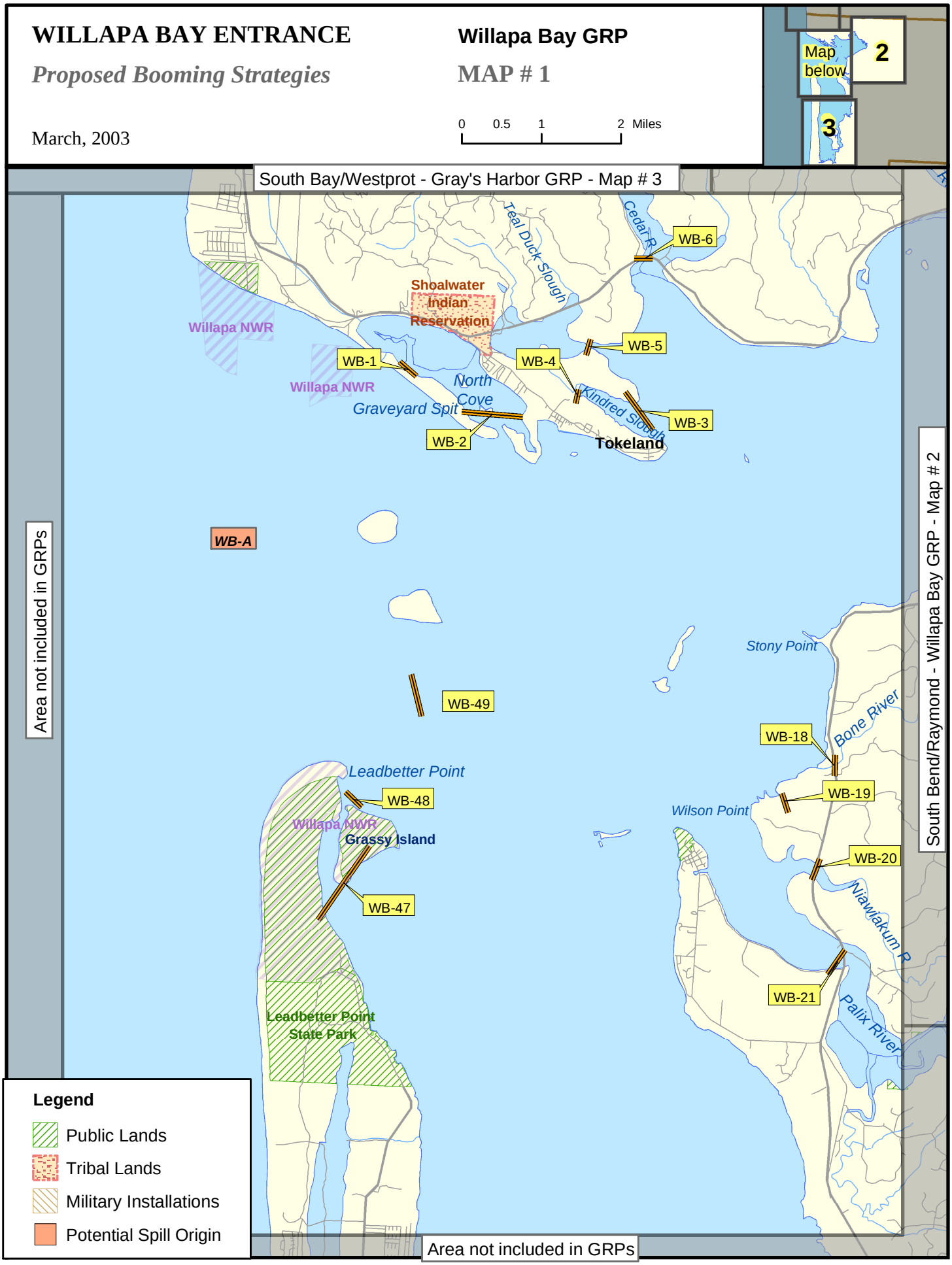
Proposed Booming Strategies

March, 2003

Willapa Bay GRP

MAP # 1

0 0.5 1 2 Miles



SOUTH BEND/RAYMOND

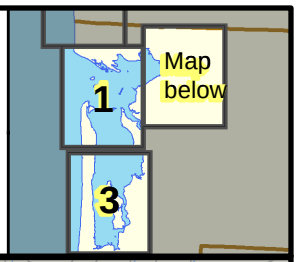
Proposed Booming Strategies

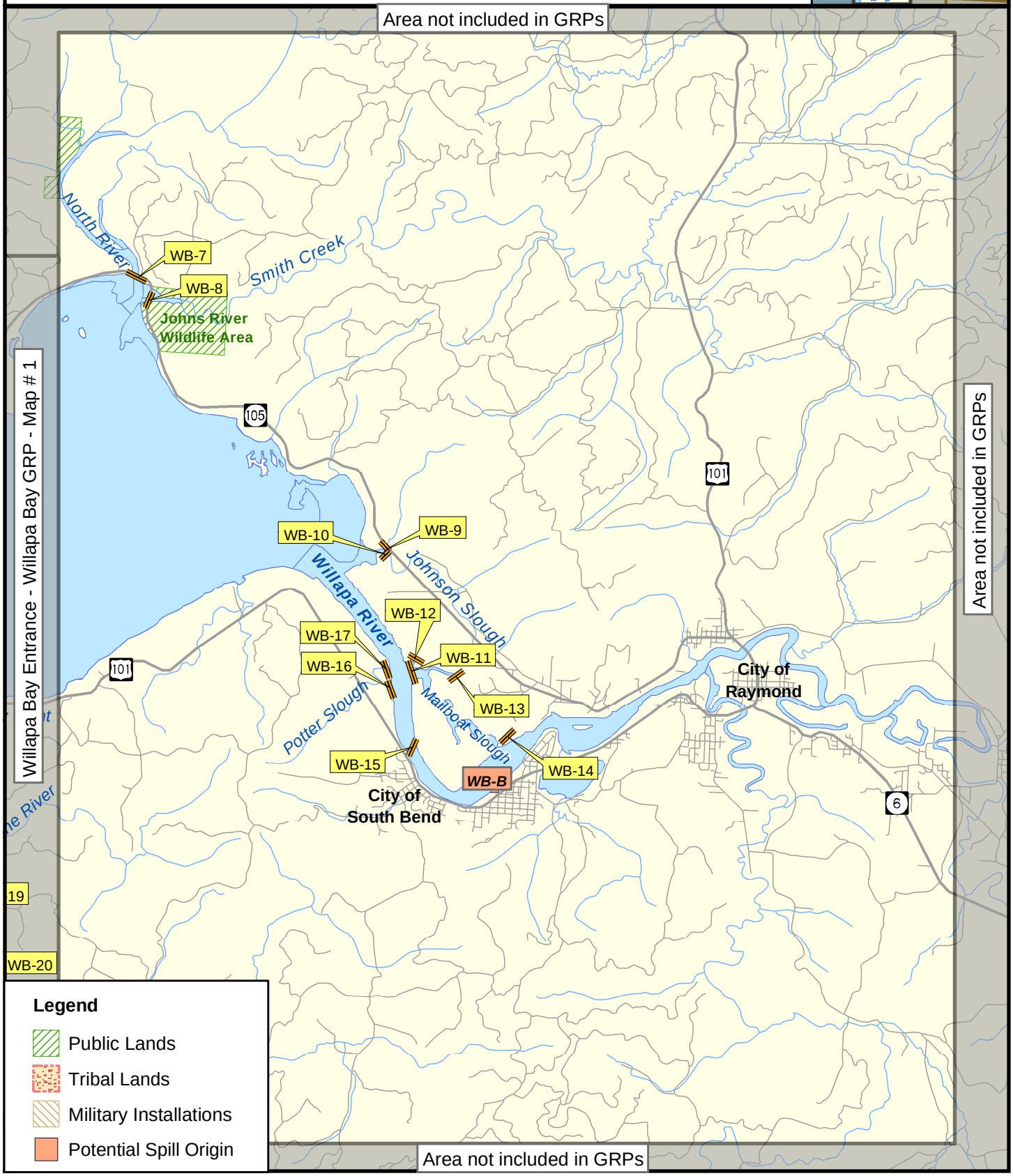
March, 2003

Willapa Bay GRP

MAP # 2

0 0.5 1 2 Miles





SOUTH WILLAPA BAY

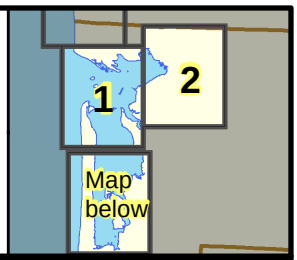
Proposed Booming Strategies

March, 2003

Willapa Bay GRP

MAP # 3

0 0.5 1 2 Miles



4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-1		North Cove PAC0023 46º-43.153'N 124º-02.392'W	Exclusion - Prevent oil from moving into marsh.	900'	Deploy boom across the west opening to marsh. Area nearly dry at low tide.	Tokeland Marina (PAC0042).	By boat only from Tokeland Marina.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-2		North Cove 46º-42.456'N 124º-00.738'W	Exclusion - Prevent oil from moving into marsh.	1500'	Deploy boom at angle to close off east entrance to marsh. Place boom during flood tide or will need ATV's or helicopter. Area nearly dry at low tide.	Tokeland Marina (PAC0042).	By boat only from Tokeland Marina.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-3		Kindred Slough PAC0048 46º-42.562'N 123º-58.268'W	Exclusion - Prevent oil from moving into slough.	2400'	Install boom at an angle across slough entrance. Site can only be boomed at high tide.	Tokeland Marina (PAC0042).	By boat only from Tokeland Marina.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-4		Kindred Slough Tide Gate PAC0047 46º-42.917'N 123º-59.482'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Tokeland Marina (PAC0042).	Must cross private farm land to get to tide gate, access from Highway 105 at north end of levee road. Permission is required or use helicopter.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-5		Teal Duck Slough Tide Gate PAC0053 46º-42.398'N 123º-59.326'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Tokeland Marina (PAC0042).	Must cross private farm land to get to tide gate, access from Highway 105 at north end of levee road. Permission is required or use helicopter.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-6		Cedar River PAC0060 46º-44.398'N 123º-58.570'W	Exclusion - Prevent oil from moving up river.	300'	Install boom at an angle across river mouth downstream of bridge at Highway 105. River may have tide gate (need to verify).	Stage on Hwy 105 at site.	Take Hwy 105 from Raymond toward Tokeland.	Salmon, waterfowl concentrations.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-7		North River PAC0083 46º-45.040'N 123º-53.187'W	Exclusion - Prevent oil from moving up river.	600'	Install boom at an angle across river at bridge on Highway 105.	North River Resort or Smith Creek. Both sites have launch ramps.	Take Hwy 105 west from Raymond to North River Bridge, 10.5 miles.	Salmon, waterfowl concentrations.
WB-8		Smith Creek PAC0083 46º-44.815'N 123º-53.085'W	Exclusion - Prevent oil from moving up creek.	400'	Install boom at an angle across creek at bridge on Highway 105.	Smith Creek boat launch.	Take Hwy 105 west from Raymond to Smith Creek Bridge, 10 miles.	Salmon, waterfowl concentrations.
WB-9		Fleiss Creek PAC0098 46º-42.387'N 123º-49.389'W	Exclusion - Prevent oil from moving into slough/ creek mouth.	200'	Install boom at an angle across slough/ creek at bridge on Highway 105.	Stage along Hwy 105.	Take Hwy 105 from Raymond toward Tokeland. Go 5.4 miles from turnoff of Hwy 101 onto Hwy 105.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-10		Johnson Slough Tide Gate PAC0098 46º-42.337'N 123º-49.345'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Stage along Hwy 105.	Take road from Highway 105 to Willapa Bay Airport, dike access road is off airport road.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-11		Mailboat Slough (west entrance) PAC0103 46º-41.150'N 123º-48.935'W	Exclusion - Keep oil out of slough.	1300'	Deploy boom across slough entrance. Must install during high tide.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-12		Mailboat Slough (middle channel) PAC0103 46º-41.115'N 123º-48.250'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-13		Mailboat Slough (north channel) PAC0103 46º-41.285'N 123º-48.885'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if it leaks.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-14		Mailboat Slough (east entrance) PAC0112 46º-40.422'N 123º-47.589'W	Exclusion - Prevent oil from moving into slough.	200'	Deploy boom at an angle across slough entrance.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-15		Willapa River PAC0144 46º-40.283'N 123º-48.908'W	Exclusion/ Collection - Prevent oil from moving up or down river.	1000'	Deploy boom at an 45-60 deg. angle across river. Use boat launch for collection. This strategy can also be used for spills upstream to keep oil out of the bay.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-16		Potter Slough (south entrance) PAC0147 46º-40.955'N 123º-49.269'W	Exclusion - Prevent oil from moving into slough.	250'	Deploy boom across slough entrance. Must install at high tide.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-17		Potter Slough (north entrance) PAC0148 46º-41.138'N 123º-49.269'W	Exclusion - Prevent oil from moving into slough.	250'	Deploy boom across slough entrance. Must install at high tide.	Helen Davis Memorial Park at west end of South Bend. Park has boat launch. (PAC0145).	From Raymond, go west on Hwy 101 to South Bend. Boat ramp is at west end of town.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-18		Bone River PAC0174 46º-38.936'N 123º-55.169'W	Exclusion - Prevent oil from moving up river.	300'	Deploy boom at an angle across river on west side of bridge on Highway 101.	Stage at north end of Bone River Bridge just off Hwy 101.	Take Hwy 101 south from Raymond to Bone River.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-19		Wilson Point Marsh PAC0177 46º-38.536'N 123º-55.892'W	Exclusion - Prevent oil from moving into marsh.	100'	Deploy boom at an angle across marsh entrance near old BLM road.	Stage near site where BLM logging road crosses marsh.	Take Hwy 101 13.5 miles south from Raymond. Turn west onto BLM logging road and follow to marsh.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-20		Niawiakum River PAC0185 46º-37.821'N 123º-55.475'W	Exclusion - Prevent oil from moving up river.	800'	Deploy boom at an angle across river west of bridge on Highway 101.	Stage just off Hwy 101 at small oyster company on west side of Hwy, north side of river.	Take Hwy 101 14.5 miles south from Raymond to Niawiakum River.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-21		Palix River PAC0191 46º-36.752'N 123º-55.059'W	Exclusion - Prevent oil from moving up river.	1200'	Deploy boom at an angle across river west of bridge on Highway 101.	Stage at boat launch just south of Palix River bridge.	Take Hwy 101 15.8 miles south from Raymond to Palix River. Site is on north side of river.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-22		North Nemah River PAC0239 46º-30.753'N 123º-53.581'W	Exclusion - Prevent oil from moving up river.	750'	Deploy boom at an angle across river mouth west of bridge on Highway 101. Difficult to boom at low water.	Stage near Hwy 101 at N. Nemah River.	Take Hwy 101 south from Raymond to N. Nemah River bridge.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-23		Middle Nemah River PAC0242 46º-29.628'N 123º-54.096'W	Exclusion - Prevent oil from moving up river.	200'	Deploy boom at an angle across river west of bridge on Highway 101.	Stage off Hwy 101 on dirt road (Lagergren Ranch).	Take Hwy 101 south from Raymond to Nemah River area.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-24		South Nemah River PAC0242 46º-29.627'N 123º-54.106'W	Exclusion - Prevent oil from moving up river.	200'	Deploy boom at an angle across river at bridge for Lagergren Ranch.	Stage off Hwy 101 on dirt road (Lagergren Ranch).	Take Hwy 101 south from Raymond to Nemah River area.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-25		Naselle River PAC0272 46º-25.952'N 123º-53.945'W	Exclusion/ Collection - Prevent oil from moving up river.	2000'	Deploy boom at an angle across river on east side of bridge at Highway 101 to collection site on north shore at old Mill Ranch.	Stage at old Mill Ranch site (north side of Naselle Bridge).	By boat only from the Willapa NWR ramp near the south end of Long Island.	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-26		Roaring Creek Slough 46º-25.709'N 123º-52.457'W|	Exclusion - Prevent oil from moving into slough.	600'	Deploy boom at an angle across slough entrance.	Stage at old Mill Ranch site (north side of Naselle Bridge).	By boat only from the Willapa NWR ramp near the south end of Long Island.	Shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-27		Ellsworth Slough 46º-25.590'N 123º-53.599'W	Exclusion - Prevent oil from moving into slough.	600'	Deploy boom across slough entrance north of bridge at Parpala Road.	Stage at Ellsworth Slough just off of Parpala Road.	Take Hwy 101 south from Raymond to Naselle River Bridge. Cross bridge and take first left (Parpala Road).	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-28		Smith Creek 46º-25.310'N 123º-52.472'W	Exclusion - Prevent oil from moving up creek.	400'	Deploy boom across creek mouth north of bridge at Parpala Road.	Stage along Parpala Road.	Take Hwy 101 south from Raymond to Naselle River Bridge. Cross bridge and take first left (Parpala Road).	Salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-29		Sunshine Point PAC0261 46º-27.936'N 123º-56.203'W	Exclusion - Prevent oil from moving into Naselle River or Long Island Slough.	2400'	Deploy boom at an angle across channel from Sunshine Point to Paradise Point.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-30		Lewis Slough PAC0318 46º-28.535'N 123º-58.328'W	Exclusion - Prevent oil from moving into slough.	1000'	Deploy boom at an angle across slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-31		Kaffee Slough PAC0315 46º-28.185'N 123º-57.896'W	Exclusion - Prevent oil from moving into slough.	450'	Deploy boom at an angle across slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-32		Baldwin Slough (north entrance) PAC0311 46º-27.036'N 123º-56.945'W	Exclusion - Prevent oil from moving into slough.	400'	Deploy boom at an angle across north slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-33		Baldwin Slough (south entrance) PAC0309 46º-26.513'N 123º-56.878'W	Exclusion - Prevent oil from moving into slough.	400'	Deploy boom at an angle across south slough entrance. Need high tide to boom. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-34		Long Island Slough PAC0300 46º-24.731'N 123º-56.249'W	Exclusion - Prevent oil from moving into slough.	900'	Install boom across slough . Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	By boat only at high tide from the Willapa NWR ramp near the south end of Long Island.	National Wildlife Refuge - shorebird and waterfowl concentrations, seal haulouts, slough and marsh habitat.
WB-35		Lake at Willapa National Wildlife Refuge Headquarters PAC0295 46º-24.841'N 123º-56.139'W	Exclusion - Keep oil out of lake.	100'	Block culvert with boom or plywood. Discharge from lake will normally keep oil out. Could enter only at high tide.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond to Willapa NWR Headquarters near south end of Long Island.	National Wildlife Refuge - waterfowl concentrations.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-36		Tidal marsh at mouth of Bear River PAC0355 46º-22.298'N 123º-57.067'W	Exclusion - Prevent oil from moving into tidal marsh.	400'	Deploy boom across tidal marsh entrance west of bridge at Highway 101.	Stage at Highway 101.	Take Hwy 101 south from Raymond. Deploy boom at bridge at mouth of Bear River. Boat access at high tide only from the refuge ramp.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-37		Bear River (main channel) PAC0355 46º-22.321'N 123º-57.035'W	Exclusion - Prevent oil from moving up river.	350'	Deploy boom across river mouth near bridge at WB-36.	Stage at Highway 101.	Take Hwy 101 south from Raymond. Deploy boom near bridge at mouth of Bear River. Boat access only from the refuge ramp.	National Wildlife Refuge - salmon, waterfowl concentrations.
WB-38		Bear River (west channel) PAC0361 46º-22.171'N 123º-57.654'W	Exclusion - Prevent oil from moving up river.	150'	Install boom at an angle across river entrance. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road. Boat access at high tide only.	National Wildlife Refuge - salmon, shorebird and waterfowl concentrations, slough and marsh habitat.
WB-39		WBNWR Tide Gate #1 PAC0362 46º-22.277'N 123º-57.756'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-40		WBNWR Tide Gate #2 PAC0362 46º-22.465'N 123º-57.761'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-41		WBNWR Tide Gate #3 PAC0363 46º-22.635'N 123º-57.045'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom infront of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to dike access road.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-42		Parker Slough PAC0368 46º-22.378'N 124º-00.188'W	Exclusion - Keep oil out of slough.	900'	Deploy boom at an angle across slough entrance. Need Refuge permission to access site.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 south from Raymond. After crossing bridge at mouth of Bear River, take Jeldness Road to Parker Slough.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-43		Parker Slough Tide Gate PAC0368 46º-22.220'N 124º-00.384'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks. Refuge permission required.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Follow directions for WB-44, continue on dike access road to tide gate.	National Wildlife Refuge - shorebird and waterfowl concentrations, slough and marsh habitat.
WB-44		Tarlatt Slough Tide Gate PAC0370 46º-22.202'N 124º-01.091'W	Exclusion - Keep oil out of slough.	100'	Close tide gate. Deploy boom in front of tide gate if gate cannot be closed or if the gate leaks.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Take Hwy 101 to Peninsula Highway, go north to dirt road 1300' past Pioneer Road, dirt road leads to tide gate.	Shorebird and waterfowl concentrations, slough and marsh habitat.

4.3.2 Proposed Booming and Collection Strategies: Matrices

Strategy	Status	Location	Response Strategy	Length of Boom	Strategy Implementation	Staging Area	Site Access	Resources Protected
WB-45		Tarlatt Slough PAC0369 46º-22.410'N 124º-00.532'W	Exclusion - Prevent oil from moving into slough.	480'	Deploy boom at an angle across slough entrance.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Boat access only at high tide, use ramp at Willapa Bay NWR Headquarters or Nahcotta. Need Willapa NWR permission to access site.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-46		Giles Slough PAC0375 46º-23.505'N 124º-00.965'W	Exclusion - Prevent oil from moving into slough.	900'	Deploy boom at an angle across slough entrance.	Stage at Willapa Bay NWR Headquarters and boat launch area (PAC0295).	Boat access only at high tide, use ramp at Willapa Bay NWR Headquarters or Nahcotta. Need Willapa NWR permission to access site.	Shorebird and waterfowl concentrations, slough and marsh habitat.
WB-47		Grassy Island (south) PAC0438 46º-37.556'N 124º-02.961'W	Exclusion - Keep oil from moving into marsh area.	1700'	Deploy boom at south end of Grassy Island, high tide only.	Stage at Nahcotta Marina (PAC0403), west of Ocean Park.	Boat access only at high tide, use ramp at Nahcotta or Tokeland. Need Willapa NWR permission to access site.	National Wildlife Refuge - shorebird and waterfowl concentrations, marsh habitat.
WB-48		Grassy Island (north) PAC0438 46º-38.251'N 124º-02.765'W	Exclusion - Keep oil from moving into marsh area.	1000'	Deploy boom at north end of Grassy Island, high tide only. Entrance to marsh is variable and may be blocked with sand.	Stage at Nahcotta Marina (PAC0403), west of Ocean Park.	Boat access only at high tide, use ramp at Nahcotta or Tokeland. Need Willapa NWR permission to access site.	National Wildlife Refuge - shorebird and waterfowl concentrations, marshes.
WB-49		Gunpowder Sands 46º-38.359'N 124º-0.996'W	Deflection - Deflect oil into main channel.	2000'	Angle boom southeast from east side of Gunpowder Sands to deflect oil away.	Stage at Nahcotta Marina (PAC0403), west of Ocean Park.	Boat access only at high tide, use ramp at Nahcotta or Tokeland. Need Willapa NWR permission to access site.	Shorebirds and waterfowl.

5. Shoreline Information

5.1. Shoreline Types and Sensitivity

The type of shoreline, degree of exposure to waves and currents, and biological sensitivity are the main criteria for selecting appropriate treatment techniques. Each shoreline type has particular properties (including vegetation types) which facilitate or resist the penetration and persistence of oil. Areas of comparatively uniform sediment type and grain size experience a deeper penetration of oil. Grain size definitions are:

Mud	<0.0625 mm
Fine Sand	0.0625 - 2 mm
Medium to Coarse Sand	2 - 4 mm
Pebble/Cobble	4 - 256 mm

Persistence of oil in a particular area is directly related to the intensity of wave action, tides, and currents. Based on numerous oil spill studies of shoreline characteristics, treatment, and oil impact, the matrices in Chapter 5 were formulated following the basic prototype of the Environmental Sensitivity Index Atlas.

The environmental sensitivity index (ESI) system ranks coastal environments on a scale of 1-10 or 11 (less sensitive to more sensitive) with respect to oil spill sensitivity and potential biological injury. ESI is being used for mapping extensive areas of the coastline of the U.S. Generally speaking, areas exposed to high levels of physical energy, such as wave action and tidal currents, rank low on the scale while sheltered areas have the highest ranking. The shoreline types used in this manual are a combination of the two similar systems used for the Delaware/Pennsylvania/New Jersey ESI Atlas, and the Maryland and Virginia atlases. The numbering system for the Countermeasure Manual Shoreline Types does not correspond exactly to either atlas; however, the corresponding shoreline types can be identified easily from the ESI maps and reassigned the appropriate number (after field verification.) The shoreline ranking system provides a useful first step in the design of contingency plans because it identifies the priority areas that require maximum effort for protection and cleanup. Strike teams and contractors with this document can focus their activities on environmental priorities, particularly during the first few hours and days of the spill.[8]

[8]Regional Response Team III. Draft, *Shoreline Countermeasures Manual*. (Department of the Interior, March 22,1991).

5.3 Shoreline Countermeasure Matrices

The matrices included here show which shoreline countermeasure techniques have been considered for the fourteen shoreline types described in Chapter 2 of the “Shoreline Countermeasures Manual & Matrices”, Northwest Area Plan, Chapter 9650, Page 9-37. Four matrices have been constructed for the major categories of oil (heavy, medium, light, very light).

Countermeasure methods are described in Chapters 3 and 4 of the manual. Countermeasures in Chapter 3 are traditional or conventional techniques that the OSC can use without any additional concurrence. However, the cutting of vegetation countermeasure should be used only during specific seasonal windows under specific conditions and with landowner approval. Countermeasures in Chapter 4 are described under a separate section called “Shoreline Countermeasure Methods Using Alternative Technology” may be useful in certain situations. These methods are considered more experimental and controversial in their application and potential impacts and require more formal review and consultation before implementing. The exact requirements are spelled out in the National Contingency Plan and the Northwest Area Plan. The Shoreline Countermeasures Matrices are a particularly dynamic component of the manual and should continue to be revised as the existing techniques are used and evaluated, and as both old and new techniques are refined.

Each matrix has a written explanation of how it is to be used as a countermeasure advisability matrix. The matrices are only a general guide for removing oil from shoreline substrates. They must be used in conjunction with the entire “Shoreline Countermeasures Manual” plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the State OSC operating with the FOSC's authorization has the responsibility for and authority to determine which countermeasure(s) are appropriate for the various situations encountered.

Selection of countermeasure techniques to be used in each spill is based upon the degree of oil contamination, shoreline types, and the presence of sensitive resources. Extremely sensitive areas are generally limited to manual cleanup methods. It is important to note that the primary goal of countermeasure implementation is the removal of oil from the shoreline with no further injury or destruction to the environment. The three categories of guidance used in the matrices are defined as follows:

R	Recommended	May be the preferred method that best achieves the goal of minimizing destruction or injury to the environment
C	Conditional	Viable and possibly useful but may result in limited adverse effects to the environment
	Shaded	Not applicable or not generally recommended.

SHORELINE COUNTERMEASURES MATRIX

Heavy Oil (Heavy Crude Oils, Intermediate Fuel Oils, Bunker C & Heavily Weathered Medium Crudes)

- Heavy oils with little or no evaporation or dissolution
- Water-soluble fraction likely to be <10ppm
- Heavy contamination of intertidal areas likely
- Severe impacts to waterfowl and fur-bearing mammals (coating and ingestion)
- Long-term contamination to sediments possible
- Weathers very slowly
- Dispersion seldom effective
- Shoreline cleanup difficult under all conditions

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads)
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C		C					C	
Ambient water flooding (Deluge)			C	C	C	R	R	R		R	R		C	C
Amb water flush <50 psi	C	C			C	R	C	R		C	C		C	C
Amb water flush <100 psi	C	C					C	C		C	C			
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	C	C	C	C	C	C		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C	C		C						
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

SHORELINE COUNTERMEASURES MATRIX

Medium Oil (Most Crude Oils & Some Heavily Weathered Light Crudes)

- About 1/3 will evaporate within 24 hours
- Maximum water-soluble fraction is 10-100ppm
- Oil contamination of intertidal areas can be severe and long-term
- Impact to waterfowl and fur-bearing mammals can be severe
- Chemical dispersion is an option within 1-2 days
- Cleanup most effective if conducted quickly

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads)
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	C	C	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil	C	R	R	R	R	C	C	C		R	R		C	C
Passive collection of oil	R	R	R	R	R	R	R	R	C	R	R	R	R	R
Oiled debris removal	C	R	R	R	R	R	R	R	C	R	R	C	R	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C							C	
Ambient water flooding (Deluge)			C	C	C	R	R	R		R	R		C	C
Amb water flush <50 psi	C	C			C	R	C	R		R	R		C	C
Amb water flush <100 psi	C	C					C	C		C				
Warm water flush <90°F	C						C	C		C				
Hot water flush >90°F	C									C				
Vacuum removal of oil	C	C	R	R		C	R	R		C	C		C	C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C	C		C			C			
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement			C	C	C	C	C	C			C			C
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

This countermeasure advisability matrix is only a general guide for removal of oil from shoreline substrates. It must be used in conjunction with the entire Shoreline Countermeasures Manual plus field observations and scientific advice. The countermeasures listed are not necessarily the best under all circumstances, and any listed technique may need to be used in conjunction with other techniques (including ones not listed herein). The Federal On-Scene Coordinator (FOSC) or the state OSC operating with the FOSC's authorization has the responsibility for and the authority to determine which countermeasure(s) are appropriate for various situations encountered. Selection of countermeasures is based on the degree of oil contamination, the shoreline type, and the presence of sensitive resources.

SHORELINE COUNTERMEASURES MATRIX

Light Oil (Diesel, No 2 Fuel Oils, Light Crudes)

- Moderately volatile; will leave residue (up to 1/3 of spilled amount)
- Moderate concentrations of toxic (soluble) compounds
- Long-term contamination of intertidal resources possible
- Potential for subtidal impacts (dissolution, mixing, sorption onto suspended sediments)
- No dispersion necessary
- Cleanup can be very effective

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)
2 - Exposed wave-cut platforms
3 - Fine to medium grained sand beaches & steep unvegetated river banks
4 - Course grained sand beaches
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material
6A - Gravel beaches - pebbles to cobble
6B - Gravel beaches - cobbles to boulders
6C - Exposed rip rap
7 - Exposed tidal flat
8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks, bulkheads)
8B - Sheltered rubble slope
9A - Sheltered sand and mud flats
9B - Sheltered vegetated low bank
10 - Marshes

SHORELINE TYPES

COUNTERMEASURES	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	R	R	C	C	C	C	C	C	R	C	C	R	C	R
Manual removal of oil			C	C	C	C	C	C		R	R		C	
Passive collection of oil	C	R	R	R	R	R	R	R	C	R	R	C	R	R
Oiled debris removal	C	C	R	R	R	R	R	R	C	R	R	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal			C	C	C	C								
Ambient water flooding (Deluge)			C	C	C	R	R	R			C			C
Amb water flush <50 psi		C			C	C	C	C		R	C			C
Amb water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil							C	C						C
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement			C	C	C									
Cutting oiled vegetation							C	C		C	C		C	C
ALTERNATIVE METHODS*														
In-situ burning of shore														
Chemical stabilization, protection, cleaning														
Nutrient enhancement			C	C	C	C	C	C						C
Microbial addition														

R Recommend - May be Preferred Alternative
C Conditional (Refer to NW Shoreline Countermeasures Manual)
Shaded areas are Not Applicable or Not Generally Recommened
***** Follow approved process defined in NCP and NW Area Plan

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SHORELINE COUNTERMEASURES MATRIX

Very Light Oil (Jet fuels, Gasoline)

- Highly volatile (should all evaporate within 1-2 days)
- High concentration of toxic (soluble) compounds
- Result: Localized, severe impacts to water column and intertidal resources
- Duration of impact is a function of the resource recovery rate
- No dispersion necessary

SHORELINE TYPES CODES

1- Exposed rock shores and vertical, hard man-made structure (e.g. seawalls)	6B - Gravel beaches - cobbles to boulders
2 - Exposed wave-cut platforms	6C - Exposed rip rap
3 - Fine to medium grained sand beaches & steep unvegetated river banks	7 - Exposed tidal flat
4 - Course grained sand beaches	8A- Sheltered vertical rock shores and vertical, hard man-made structures (e.g. seawalls, docks,
5 - Mixed sand and gravel beaches, including artificial fill containing a range of grain size and material	8B - Sheltered rubble slope
6A - Gravel beaches - pebbles to cobble	9A - Sheltered sand and mud flats
	9B - Sheltered vegetated low bank
	10 - Marshes

COUNTERMEASURES	SHORELINE TYPES													
	1	2	3	4	5	6A	6B	6C	7	8A	8B	9A	9B	10
CONVENTIONAL METHODS														
No action	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Manual removal of oil														
Passive collection of oil			C	C	C	C	C	C						
Oiled debris removal	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Trenching/recovery wells			C	C	C									
Oiled sediment removal														
Ambient water flooding (Deluge)														C
Amb water flush <50 psi														
Amb water flush <100 psi														
Warm water flush <90°F														
Hot water flush >90°F														
Vacuum removal of oil														
Sediment reworking			C	C	C	C								
Sediment Removal-cleaning-replacement														
Cutting oiled vegetation														
ALTERNATIVE METHODS*														
In-situ burning on shore														
Chemical stabilization, protection, cleaning														
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Purpose of Chapter 6

The information presented in this chapter highlights some of the more significant environmentally sensitive areas within the GRP region that could be impacted as a result of an oil spill. Consistent with the overall purpose of the GRP's, this information is only intended to provide a level of detail required during the initial phase of spill response. During an actual event, additional resource information will be available from the resource trustee agencies supporting the Environmental Unit in the Planning Section. Specific resource concerns for areas that already have designated protection strategies in Chapter 4 of the GRP may be found in the "Resources Protected" column in the matrix describing the individual strategies.

The information provided in Chapter 6 is intended for use in:

- Preparing an initial ICS 232 form (Resources-at-Risk summary) for Incident Command
- Identifying those sites where it may be necessary to implement Flight Restriction Zones in order to prevent disturbance/injury to sensitive wildlife species.
- Identifying sensitive shoreline habitats to assist SCAT teams in their initial assessments and to help personnel in the Environmental Unit in developing appropriate cleanup strategies.

Chapter 6 consists of two sets of maps and tables - one for wildlife and the other for fish, shellfish and selected sensitive marine habitats. These data are presented separately, both for ease of reading and because each of the two data sets has slightly different applications within the context of spill response.

The wildlife maps and tables present information on the location and seasonal sensitivity of key wildlife resources. Types of data included here are concentration areas for waterfowl, marine birds and shorebirds; seabird colonies; nesting areas for sensitive species such as eagles, herons and falcons; and marine mammal haulout sites. This information is intended for the rapid identification of areas where significant wildlife oiling impacts could be anticipated and to denote areas where flight restriction zones may be required to protect sensitive wildlife. Each site depicted on these maps is identified by a unique number in order to facilitate the process of communicating Flight Restriction Zone recommendations to the Operations Section in ICS. The tables accompanying the wildlife maps present information on the season(s) during which sites may be particularly sensitive to disturbance.

The fish/shellfish/marine habitat maps present general information on the location of baitfish spawning beaches, herring spawning areas, streams used by anadromous salmonids, hardshell clam concentrations, and kelp and eelgrass beds. This information will be most useful to personnel involved in assessing initial risks to fish and shellfish resources and to those conducting initial beach reconnaissance, pending availability of more detailed resource information and the formation of SCAT teams.

Because the operational uses of this information differ from those of the wildlife data, individual site identification numbers have not been assigned. Tables associated with these maps will identify the seasonal sensitivity of each resource. In addition, notes accompanying each table will provide information on the general distribution and seasonal sensitivity of those resources that are not mapped but may occur anywhere in the GRP region (ex. juvenile salmonids in shallow nearshore waters).

6.0 Sensitive Resource Description

6.1 Fisheries

A series of maps representing the current knowledge of some of Washington Department of Fisheries' trust resources appear in Appendix A. The maps focus on nearshore resources of high commercial, recreational, or ecological value.

Willapa Bay contains a wide variety of fisheries resources. These include Pacific salmon; baitfish resources such as Pacific Herring, and surf smelt; shellfish resources such as native oysters; Pacific oysters; crabs; cockle clams; Eastern clams; Manila; Horse clams; and other species of aquatic life.[11]

Adult and juvenile life stages of a number of ecologically and economically important species including salmon, marine fish, baitfish, and shellfish as well as the plankton community are considered to be ubiquitous in distribution and therefore, are not displayed on maps.

Additional information provided in Appendix A includes habitat association and timing tables. These tables display information on temporal and spatial distribution, preferred habitat, and relative abundance of various life history stages.[12]

6.2 Wildlife

Marine Mammals

Both Grays Harbor and Willapa Bay play a significant role in the life history of our state's harbor seal population. Both estuaries are used year–round as resting and feeding areas. Two features make these estuaries unique: the presence of numerous haulout sites scattered among the islands and tidal flats, and an abundant year–round food supply. Seals are most abundant here during spring and summer months; roughly April through September. During this period of peak abundance, these estuaries account for almost 40% of Washington's statewide population. Analysis of 1992 aerial survey data yielded a peak population estimate of over 11,000 seals (including over 2400 pups) for the two estuaries combined.

Pupping occurs from April through July with the peak occurring in late May and early June. Maximum numbers of haulout sites are occupied during this season as females move to peripheral areas throughout the estuaries to give birth and nurse their young. Closely associated mother/pup pairs may still be present through early August. During the period from July to September seal numbers in the estuaries remain high as adults go through their annual molt and recently weaned pups learn to feed on their own. Seal numbers begin to decrease in September as many animals begin to leave the estuaries and migrate to the Columbia River where they will overwinter.

The only other marine mammal which commonly uses these estuaries is the gray whale. This species is most frequently found just outside the mouths of the estuaries during the northward spring migration which lasts from March through May. During this period, it is common for some individuals to enter the mouths of both estuaries to feed.[13]

Shorebirds, Waterfowl, and Raptors

Grays Harbor and Willapa Bay play a critical role for migrating and wintering shorebirds, waterfowl and raptors. Over a million shorebirds stop in the bays to rest and feed each spring before continuing their migration from wintering grounds as far south as South America to breeding grounds in the Arctic. Bird numbers peak during the second half of April as western sandpipers and numerous other species pass through on their way north. Shorebirds are virtually absent from the estuaries in June, but quickly increase as they begin their southward migration from the breeding grounds. While most shorebirds pass through to points farther south, thousands of dunlin and black–bellied plovers spend the winter in the estuaries.

More than twenty–five species of waterfowl occur in these estuaries including brant, pintail and American wigeon. Eelgrass beds play a crucial role in supporting hundreds of thousands of ducks and geese from mid–September through mid–May.

Grays Harbor and Willapa Bay are used by many other species for nesting and feeding including bald eagles, double–crested cormorants, great blue herons, Caspian terns and western gulls. Other species that breed elsewhere but spend a portion of their life in the estuaries include brown pelicans, common terns, marbled murrelets, common murres, rhinoceros auklets and several species of loons, grebes and gulls.[14]

6.3 Archeological Sites

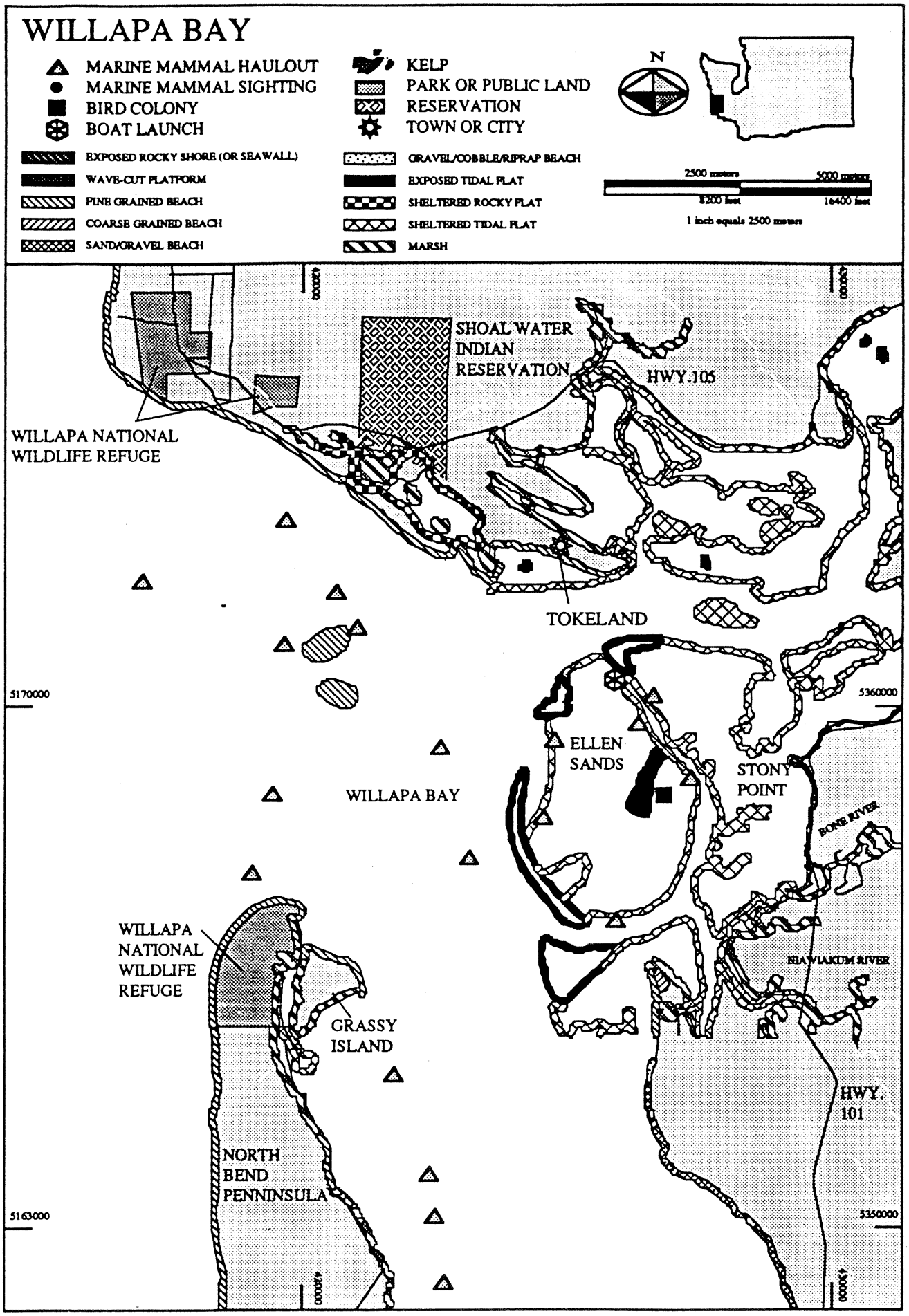
Geographic Site Locations

(1) East side of Long Beach Peninsula from Oysterville to point west of Jensen Point, Long Island
(2) Nemah River mouth
(3) Seal Slough
(4) Sunshine Point
(5) Stanley Peninsula
(6) Beachside, Sandy Point to Bay Center
(7) East side of Palix River mouth
(8) Both sides of Bone River mouth

General Resources:
Potential archaeological; village sites; shell middens; camp sites; food gathering sites. Remains of fish weirs in intertidal zone and in deeper water.

Seasonal Sensitivity:
Sensitive at all times of the year.

Recommendations:
Areas identified on overlay (see map display) are generalized sensitive areas; it is theorized that archeological sites are likely to be located at mouths of freshwater streams or adjacent upland areas. Cleanup crews should stay on established access routes (roads, trails, etc.) and avoid disturbance to adjacent areas. Fish weirs in Grays Harbor are very sensitive and booming or skimming operations should avoid if possible or use extreme care in these areas. Recommend Office of Archeology and Historic Preservation staff or cultural resource person on board if necessary.[15]


WILLAPA BAY
MARINE MAMMAL HAULOUT
MARINE MAMMAL SIGHTING
BIRD COLONY
BOAT LAUNCH
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
KELP
PARK OR PUBLIC LAND
RESERVATION
TOWN OR CITY
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH
N
2500 meters
5000 meters
8200 feet
16400 feet
1 inch equals 2500 meters
SHOAL WATER INDIAN RESERVATION
HWY.105
WILLAPA NATIONAL WILDLIFE REFUGE
TOKELAND
5170000
5360000
ELLEN SANDS
STONY POINT
WILLAPA BAY
BONE RIVER
WILLAPA NATIONAL WILDLIFE REFUGE
NIAWIAKUM RIVER
GRASSY ISLAND
HWY. 101
NORTH BEND PENNINSULA
5163000
5350000

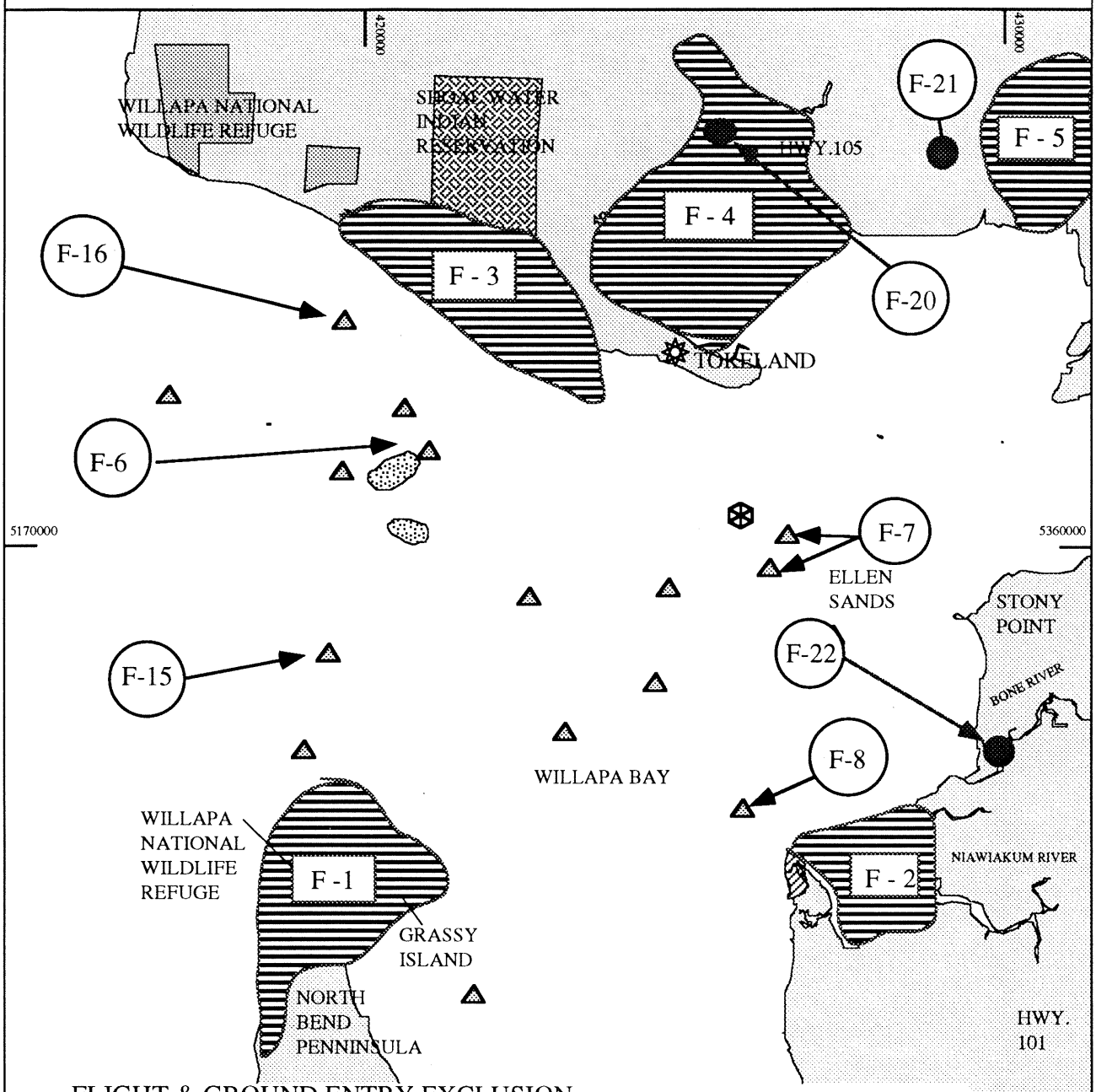
WILLAPA BAY

MARINE MAMMAL HAULOUT
MARINE MAMMAL SIGHTING
BIRD COLONY
BOAT LAUNCH
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH

KELP
PARK OR PUBLIC LAND
RESERVATION
TOWN OR CITY
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH

N

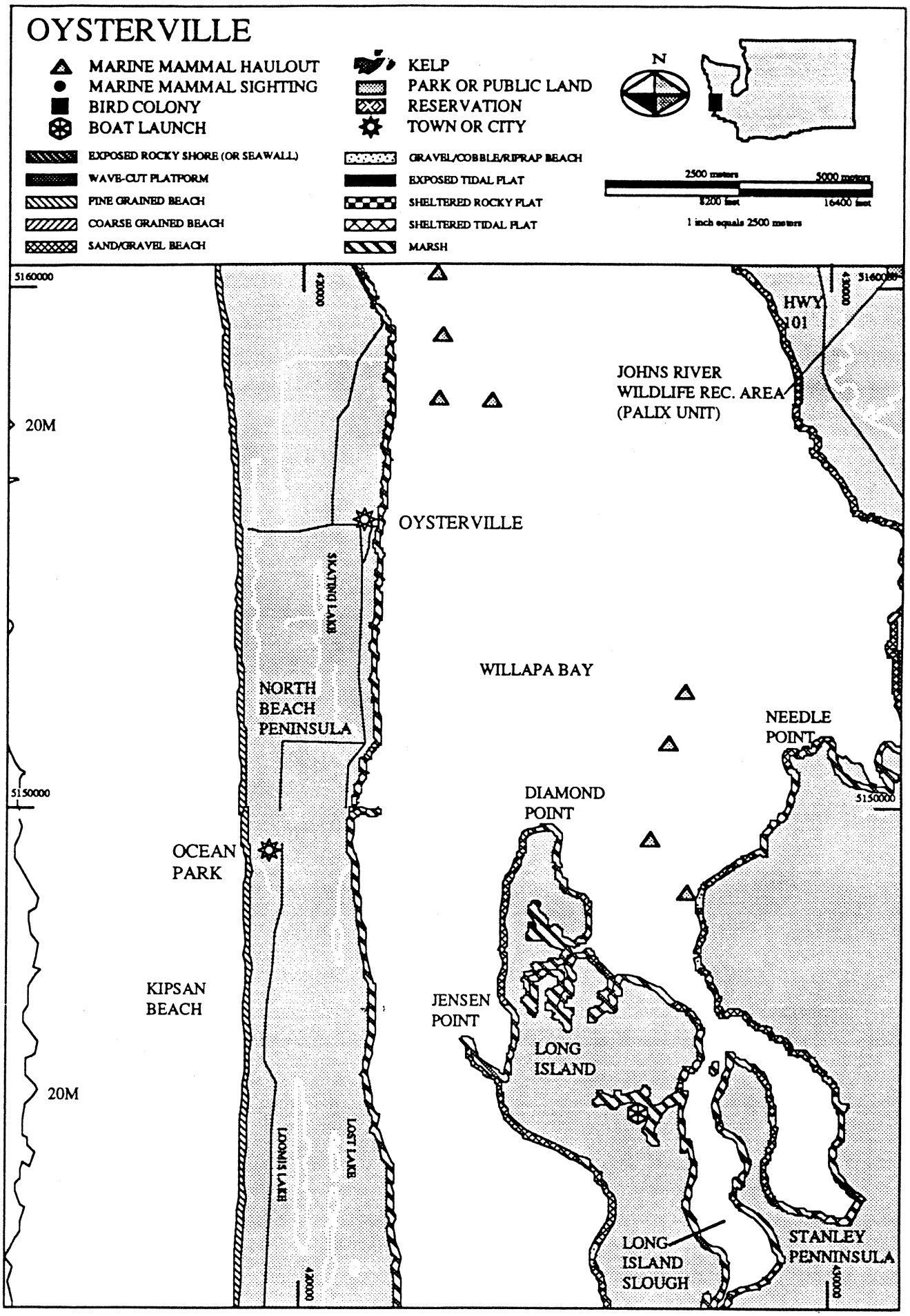
2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters



FLIGHT & GROUND ENTRY EXCLUSION

All F designations have the following entry exclusions unless relaxed by the Wash Dept. of Wildlife or USFWS On-scene Coordinator thru the NRDA process:

1. A 1000 foot overflight buffer
2. All ground entry in ▬ areas
3. A 1500 Foot buffer around designated marine mammal haulouts and bird colonies


OYSTERVILLE
MARINE MAMMAL HAULOUT
MARINE MAMMAL SIGHTING
BIRD COLONY
BOAT LAUNCH
KELP
PARK OR PUBLIC LAND
RESERVATION
TOWN OR CITY
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH
N
2500 meters
5000 meters
8200 feet
16400 feet
1 inch equals 2500 meters
5160000
5150000
20M
20M
HWY 101
JOHNS RIVER WILDLIFE REC. AREA (PALIX UNIT)
OYSTERVILLE
SKAITING LAKE
WILLAPA BAY
NORTH BEACH PENINSULA
NEEDLE POINT
DIAMOND POINT
OCEAN PARK
KIPSAN BEACH
JENSEN POINT
LONG ISLAND
LONG ISLAND SLOUGH
STANLEY PENNINSULA
LOST LAKE
LOONIS LAKE

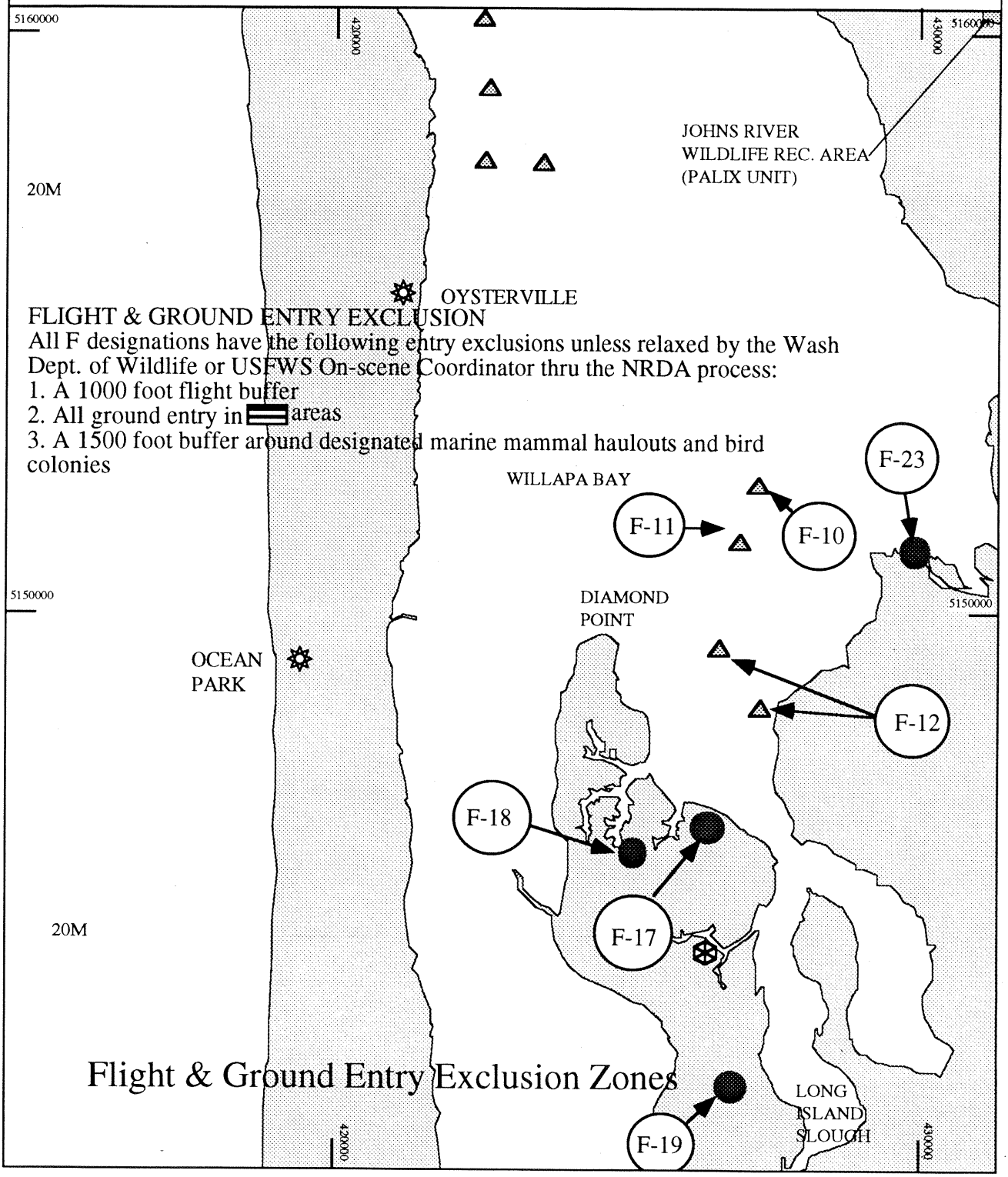
OYSTERVILLE

MARINE MAMMAL HAULOUT
MARINE MAMMAL SIGHTING
BIRD COLONY
BOAT LAUNCH
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH

KELP
PARK OR PUBLIC LAND
RESERVATION
TOWN OR CITY
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH

N

2500 meters 5000 meters
8200 feet 16400 feet
1 inch equals 2500 meters



FLIGHT & GROUND ENTRY EXCLUSION

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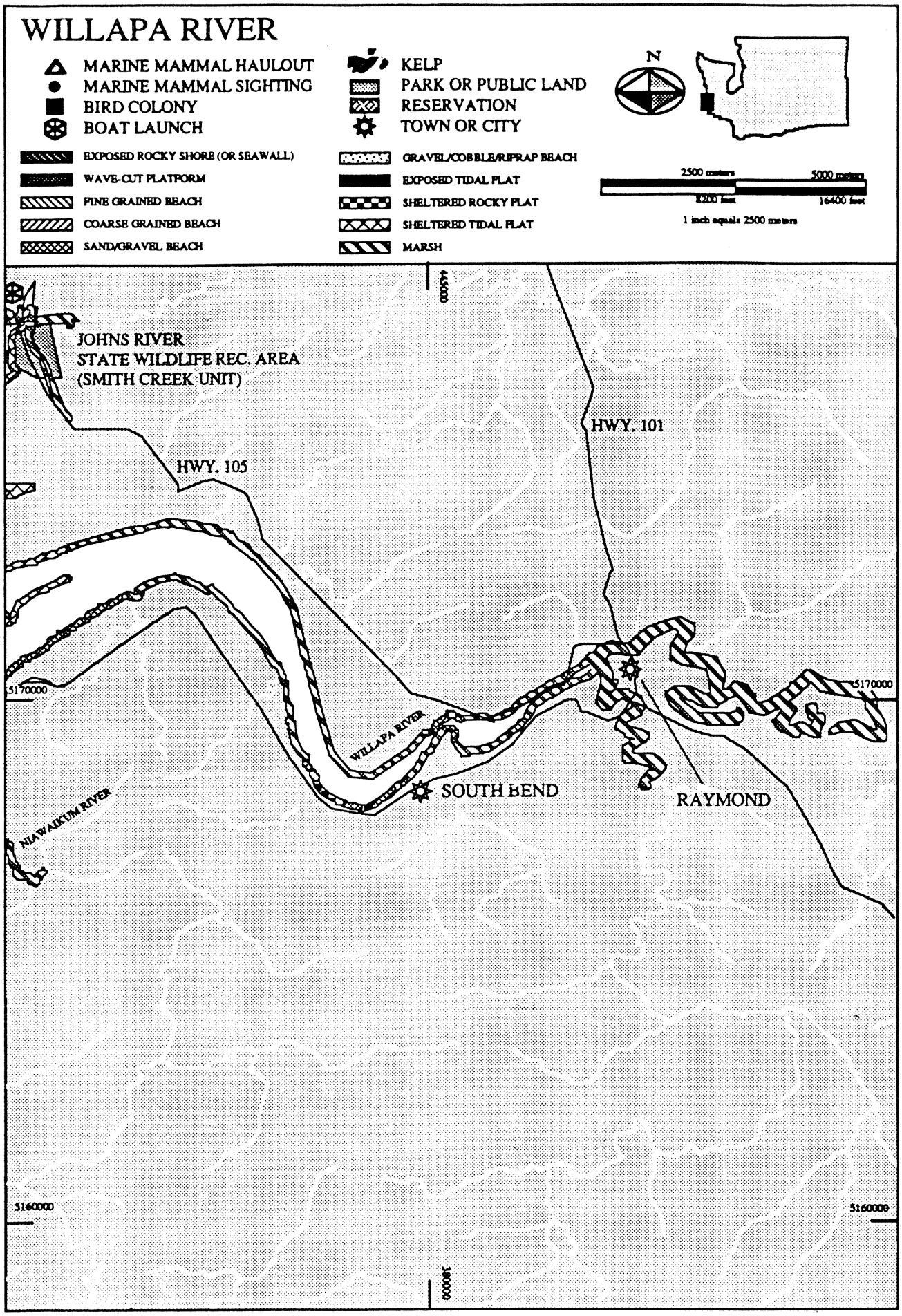
2. All ground entry in areas
3. A 1500 foot buffer around designated marine mammal haulouts and bird colonies

Flight & Ground Entry Exclusion Zones


WILLAPA RIVER
MARINE MAMMAL HAULOUT
MARINE MAMMAL SIGHTING
BIRD COLONY
BOAT LAUNCH
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH
KELP
PARK OR PUBLIC LAND
RESERVATION
TOWN OR CITY
GRAVEL/COBBLE/RIPRAP BEACH
EXPOSED TIDAL FLAT
SHELTERED ROCKY FLAT
SHELTERED TIDAL FLAT
MARSH
N
2500 meters
5000 meters
8200 feet
16400 feet
1 inch equals 2500 meters
445000
JOHNS RIVER
STATE WILDLIFE REC. AREA
(SMITH CREEK UNIT)
HWY. 101
HWY. 105
5170000
5170000
WILLAPA RIVER
SOUTH BEND
RAYMOND
NIAWAIKUM RIVER
5160000
5160000
380000

WILLAPA RIVER

MARINE MAMMAL HAULOUT
MARINE MAMMAL SIGHTING
BIRD COLONY
BOAT LAUNCH
EXPOSED ROCKY SHORE (OR SEAWALL)
WAVE-CUT PLATFORM
FINE GRAINED BEACH
COARSE GRAINED BEACH
SAND/GRAVEL BEACH

KELP
PARK OR PUBLIC LAND
RESERVATION
TOWN OR CITY
GRAVEL/COBBLE/RIPRAP BEACH
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SHELTERED TIDAL FLAT
MARSH

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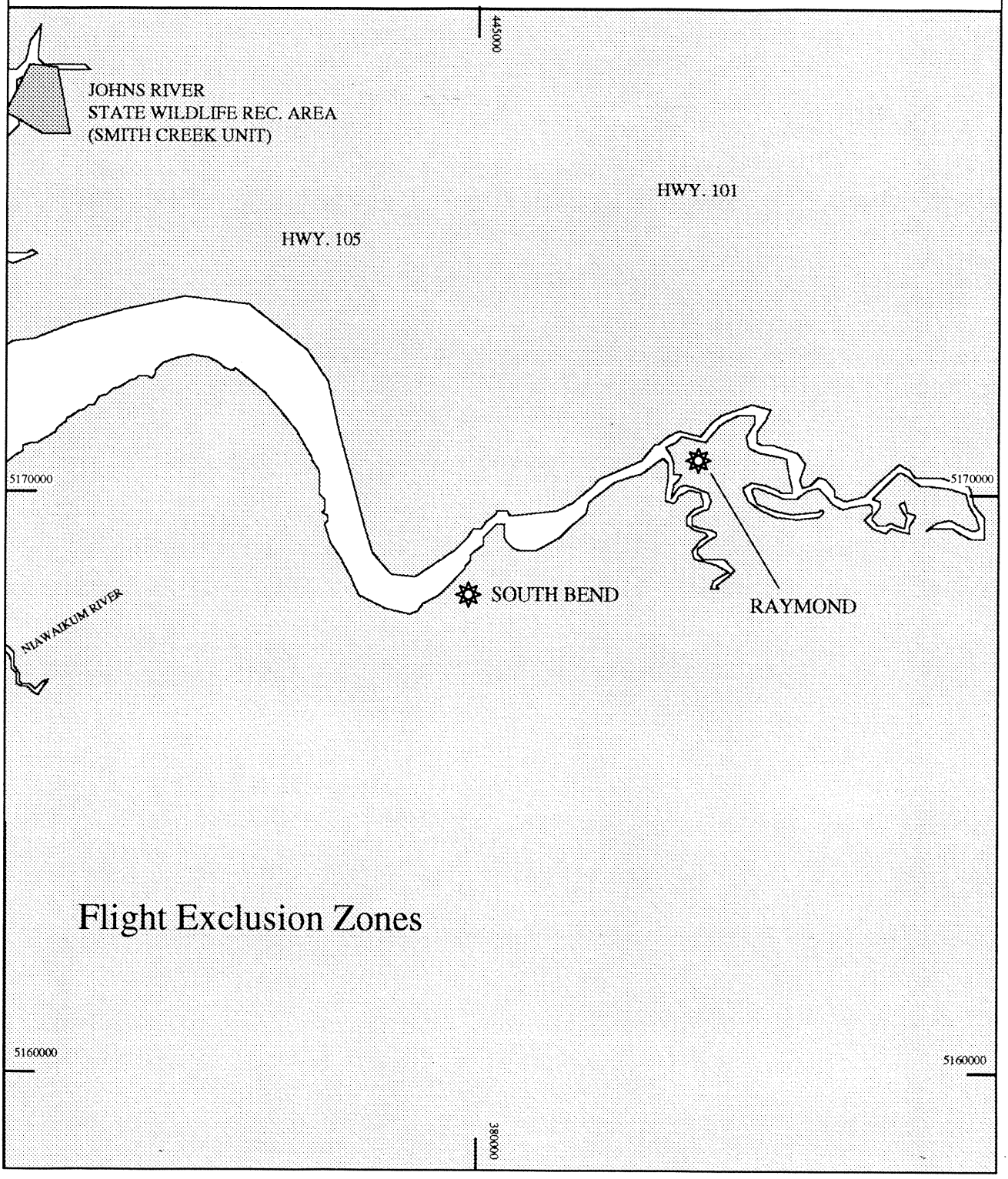

Flight Exclusion Zones

Table 4–2 Flight Exclusion Zones for Willapa Bay

Zone #	Location	Resource	Season	Comments
F-1	Willapa Bay Refuge	Shorebird and waterfowl concentrations	winter/ spring/ fall	nesting and feeding
		Snowy Plover	spring/ summer/ fall	nesting - threatened
		Sensitive Nesting Area	all year	feeding
F-2	Mouth of the Palix River	Shorebird and waterfowl concentrations	winter/ spring/ fall	resting, feeding
F-3	North Cove	Shorebird and waterfowl concentrations	winter/ spring/ fall	resting, feeding
F-4	Inside Toke Point, Kindred and Teal Duck Sloughs	Shorebird and waterfowl concentrations	winter/ spring/ fall	resting and feeding
F-5	North River Mouth, area Northeast of Hawks Pt.	Shorebird and waterfowl concentrations	winter/ spring/ fall	resting, feeding
F-6	Island in the Mouth of Willapa Bay	Haul out - harbor seal only	May - August	exclusion when present
F-7	Pine Island Channel	Haul out - harbor seal only	May - August	exclusion when present
F-8	Deadheads, Bay Center Channel	Haul out - harbor seal only	May - August	exclusion when present
F-9	Southwest of Hawks Pt.	Haul out - harbor seal only	May - August	exclusion when present
F-10	Northeast of Diamond Point	Haul out - harbor seal only	May - August	exclusion when present
F-11	Southeast of Diamond Point	Haul out - harbor seal only	May - August	exclusion when present
F-12	Approx. 2,000 yards east of Diamond Point	Haul out - harbor seal only	May - August	exclusion when present
F-13	West side of Shoalwater Bay	Haul out - harbor seal only	May - August	exclusion when present
F-14	Middle of Shoalwater Bay, end of Nahcotta Channel	Haul out - harbor seal only	May - August	exclusion when present

Table 4-2 Flight Exclusion Zones for Willapa Bay, continued

Zone #	Location	Resource	Season	Comments
F-15	Leadbetter Channel	Haul out - harbor seal only	May - August	exclusion when present
F-16	Southwest of North Cove	Haul out - harbor seal only	May - August	exclusion when present
F-17	Northwest of Paradise Point, Long Island	Sensitive Nesting Area	Winter conc., Feb - July nesting	nesting
F-18	South of Kaffee Slough, Long Island	Sensitive Nesting Area	February - August	nesting
F-19	Southeast end of Long Island	Sensitive Nesting Area	February - August	nesting
F-20	South of Norris Slough	Sensitive Nesting Area	February - August	nesting
F-21	Northwest of Hawks Point	Sensitive Nesting Area	February - August	nesting
F-22	Bone River Mouth	Sensitive Nesting Area	February - August	nesting
F-23	Lynn Point	Sensitive Nesting Area	February - August	nesting

ALL ZONES IDENTIFIED ARE SUBJECT TO 1200' FLIGHT EXCLUSION AND 1000'–1500' ACCESS EXCLUSION.

Spring: March/April/May
Summer: June/July
Fall: August/September/October/November
Winter: December/January/February

IF IT IS NECESSARY TO ENTER A WILDLIFE ZONE, CONTACT THE WASHINGTON DEPARTMENT OF WILDLIFE.

7.0 Logistical Information

The following list was compiled at the Outer Coast Geographic Response Plan Workshop, held in Montesano, Washington on February 23, 1993. Areas of information include: command posts; communications; equipment cache locations; inventory of local support equipment; air support; access points to the Bay; and other pertinent logistical support.

Subject	Name	Characteristics	Contact	Phone #
Command Posts	Camp Rilea			
	USCG Station Willapa Bay (old)			
	Long Beach Fire Hall (Heli access)			
	USCG Station Cape Disappointment			
	Port of Ilwaco Marina Yard			
	Surfside Inn			
	KOA Chinook			
	County EOC (South Bend)			
	Port of Ilwaco			
	Port of Willapa (Raymond)			
	National Guard Unit – Long Beach			
	Golf Course/ Breakers Motel			
	Ocean Spray Plant			
Communications	US West Cellular, spotty in south			
	US Cellular			
	Ham Operators	VHF, HF, Sideband		
	Clean Sound UHF Repeater	454,000 Mhz, Naselle Ridge		
	FEMA Ridge			
Equipment Cache Locations	WDOE Equipment Database			
	Asoria–Riedel	2000' 12x18 Hard Boom		
	Weyerhauser	1–2,000' Hard Boom		

7.0 EQUIPMENT, CONTINUED

Inventory of Local Support Equipment	See Equipment Forms			
	Fire Trucks			
	Vacuum Truck			
	Evergreen Septic			
	Turner & Son	Fuel Tanks		
Helicopter Support/Air Support	Port of Ilwaco			
	Westport	Complete in June 93		
	Willapa Bay/South Bend	1600' strip		
	Heliport Cosmopolis Weyerhauser Saw Mill	Jet A fuel (Thom Davis will work with Wey on Fuel)		
	Bowerman Field	C–130's		
	Astoria	C–130s		
	Clipson Airfield Helo	small fixed wing, no facilities		
Access Points to Willapa Bay	Neah Walka			
	Port of Ilwaco			
	Nahcotta			
	Tokeland			
	South Bend			
	Port of Willapa			
	Port Dock – Raymond			
	Grays River next to ferry			
	Harold's Place (oyster facility)			
	Bay Center			
Access Points to Willapa Bay	Hwy 101/Palix RV Junction			
Property Access Information and Contacts				

7.0 EQUIPMENT, CONTINUED

Staging Areas	Raymond South Bend Coastline area			
	Port of Ilwaco			
	Nahcotta			
	Tokeland			
	South Bend			
	Port of Willapa			
Recreational Activities	Memorial through Labor Day, heavy tourist season			
	Summer – Kite Festival, Longbeach Peninsula			
	October – Cranberry Festival			
	Buoy 10 – August, Salmon fishing			
Key Local Elected Officials	County Commissioners			
	Long Beach Administrator			
	Mayor of Ilwaco – Toby Baird			
	Jolene Unsoeld			
	Sid Snyder – State Rep.			
Local Personnel Support	Ham Radio Operators			
	Youth Camp – Naselle			
	Sons of the Beaches (Jeep Club)			
Volunteers	Long Beach Beach Cleanup			

7.0 EQUIPMENT, CONTINUED

Wildllife Rehab Facilties	Fire Hall – Ocean Park			
	Fort Canby			
	Willapa Wildlife – Naselle			
	Raymond/ South Bend Area			
	Hampton Hardware			
	Harbor Rock			
	East Port Seafood			
	Coast Oyster			
Marinas/Port Docks	Willapa National Wildlife Refuge	Small boat ramp		
	Palix River, Route 101 Bridge	Improved boat ramp		
	Mill Ranch, Naselle River	boat ramp		
	South Bend (West End)	boat ramp		
	Raymond (Ellis Slough)	boat ramp		
	Willapa Harbor office and dock	crane		
	South Bend (East End)	boat ramp		
	Nahcotta	Port of Peninsula boat lift		
	Toke Point	boat ramp		
	Long Island	boat ramp/cable ferry		
	Bay Center	boat ramp		
Memorandums of Agreement*				
Housing/Feeding/Response Community Support*				
Interim Storage/Permits*				
Fishing Fleets & Affiliated Organizations*				
Boat Cleaning Capability*				

APPENDICES

Appendix A: Summary of Protection Techniques

Protection Techniques	Description	Primary Logistical Requirements	Limitations
ONSHORE			
Beach Berms	A berm is constructed along the top of the mid-inter tidal zone from sediments ex-cavated along the downgradient side. The berm should be covered with plastic or geo-textile sheeting to minimize wave erosion.	• Bulldozer/Motor grader -1 • Personnel - equipment operator & 1 worker • Misc. - plastic or geotextile sheeting	• High wave energy • Large tidal range • Strong along shore currents
Geotextiles	A roll of geotextile, plastic sheeting, or other impermeable material is spread along the bottom of the supra-tidal zone & fastened to the underlying logs or stakes placed in the ground.	• Geotextile - 3 m wide rolls • Personnel - 5 • Misc. - stakes or tie-down cord	• Low sloped shoreline • High spring tides • Large storms
Sorbent Barriers	A barrier is constructed by installing two parallel lines of stakes across a channel, fastening wire mesh to the stakes & filling the space between with loose sorbents.	Per 30 meters of barrier • Wire mesh - 70 m x 2 m • Stakes - 20 • Sorbents - 30 m^2 • Personnel - 2 • Misc. - fasteners, support lines, additional stakes, etc.	• Waves > 25 cm • Currents > 0.5 m/s • Tidal range > 2 m
Inlet Dams	A dam is constructed across the channel using local soil or beach sediments to exclude oil from entering channel.	• Loader - 1 • Personnel - equipment operator & 1 worker or several workers w/shovels	• Waves > 25 cm • Tidal range exceeding dam height • Freshwater outflow

NEARSHORE			
Containment Booming	Boom is deployed in a "U" shape in front of the oncoming slick. The ends of the booms are anchored by work boats or drogues. The oil is contained within the "U" & prevented from reaching the shore.	For 150 meters Slick: • Boom - 280 m • Boats - 2 • Personnel - boat crews & 4 boom tenders • Misc. - tow lines, drogues, connectors, etc.	• High winds • Swells > 2 m • Breaking waves > 50 cm • Currents > 1.0 m/s
Exclusion Booming	Boom is deployed across or around sensitive areas & anchored in place. Approaching oil is deflected or contained by boom.	Per 300 meters of Boom • Boats - 1 • Personnel - boat crew & 3 boom tenders • Misc.- 6 anchors, anchor line, buoys, etc.	• Currents > 0.5 m/s • Breaking waves > 50 cm • Water depth > 20 m
Deflection Booming	Boom is deployed from the shoreline away from the approaching slick & anchored or held in place with a work boat. Oil is deflected away from shoreline.	Single Boom, 0.75 m/s knot current • Boom - 60 m • Boats - 1 • Personnel - boat crew + 3 • Misc. - 3 anchors, line, buoys, recovery unit	• Currents > 1.0 m/s • Breaking waves > 50 cm
Diversion Booming	Boom is deployed from the shoreline at an angle towards the approaching slick & anchored or held in place with a work boat. Oil is diverted towards the shoreline for recovery.	Single Boom, 0.75 m/s knot current • Boom - 60 m • boats - 1 • Personnel - boat crew + 3 • Misc. - 3 anchors, line, buoys, recovery unit	• Currents > 1.0 m/s • Breaking waves > 50 cm
Skimming	Self-propelled skimmers work back & forth along the leading edge of a windrow to recover the oil. Booms may be deployed from the front of a skimmer in a "V" configuration to increase sweep width. Portable skimmers are placed within containment booms in the area of heaviest oil concentration.	Self-propelled (None) Towed • Boom - 200 m • Boats - 2 • Personnel - boat crews & 4 boom tenders • Misc. - tow lines, bridles, connectors, etc. Portable • Hoses - 30 m discharge • Oil storage - 2000 liters	• High winds • Swells > 2 m • Breaking waves > 50 cm • Currents > 1.0 m/s

Appendix B: Original Geographic Response Plan Contributors

Local Representatives
William Bush, Pierce Co. Fire Dist. 3
Larry Claiborne, Pierce Co. Fire Dist. 5
Frank Hamilton, Thurston Co. DEM
Timothy Lemon, Pierce Co. Fire Dist. 16
Bill Lokey, Pierce Co. DEM

Industry and Response Contractors
Tim Clark, Clean Sound
John Crawford, FOSS
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Washington State Department of Corrections
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Office of Marine Safety
Roy Robertson

State Representatives (con't)

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Sara LaBorde
Jeff Skrilitz
Barry Troutman

Washington Department of Natural Resources
David Jamison

Oregon Department of Environmental Quality
Paul Slyman

Other

Trout Unlimited
Don Schluter

Appendix C: Geographic Response Plan Comments/Corrections/Suggestions

If you have any questions regarding this document or find any errors, please notify one of the following agencies: or use tear out sheet (page C-3)

- Washington Department of Ecology, SPPR program, Natural Resources Unit
- USCG Marine Safety Office Puget Sound, Planning Department
- USCG Marine Safety Office Portland
- Oregon Department of Environmental Quality
- Idaho Emergency Response Commission
- Environmental Protection Agency Region 10

Phone Numbers:

Washington DOE	(360) 407-6972
USCG MSO Puget Sound	(206) 217-6213
USCG MSO Portland	(503) 240-9307
Oregon DEQ	(503) 229-5774
Idaho ERC	(208) 334-3263
EPA	(206) 553-6901

Bulletin Board System (BBS):

USCG MSO Puget Sound	(206) 217-6216
USCG MSO Portland	(503) 240-9308

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SPPR Program
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Olympia, WA 98504-7600

Oregon Department of Environmental Quality
Water Quality Division
811 SW Sixth Avenue
Portland, OR 97204

Office Of The Governor
Idaho Emergency Response Commission
1109 Main
Statehouse
Boise, ID 83720-7000

Environmental Protection Agency
Emergency Response Branch
1200 Sixth Avenue
Seattle, WA 98101

Geographic Response Plan

Comments/Corrections/Suggestions

Directions:
Fill in your name, address, agency, and phone number. Fill in the blanks regarding the location of information in the plan being commented on. Make comments in the space provided. Add extra sheets as necessary. Submit to: Dale Davis
Department of Ecology
Spills Program
300 Desmond Drive
P.O. Box 47600
Olympia, WA 98504-7600
dald461@ecy.wa.gov

Name:_____ Title:_____ Agency:_____

Address:_____

City: _____ State/Province:_____ Zip/Postal Code:_____

Phone: (____) _____ E-Mail:_____

GRP:_____ Page Number:_____

Location on page (chapter, section, paragraph) (e.g. 2.1, paragraph 3):_____

Comments:_____

Northwest Area Committee
c/o Washington Department of Ecology
Spills Program
Natural Resources Unit - GRP
Corrections
P.O. Box 47600
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