



DEPARTMENT OF THE ARMY  
SEATTLE DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 3755  
SEATTLE, WASHINGTON 98124-3755

REPLY TO  
ATTENTION OF

CENWS-PM-PL-ER

**Grays Harbor Crab Mitigation Program  
Oyster Spat Placement  
Environmental Assessment and Biological Evaluation  
Grays Harbor Navigation Improvement Project  
Grays Harbor, Washington**

**Finding Of No Significant Impact**

**1. Background.** The Seattle District, U.S. Army Corps of Engineers (Corps) currently places shucked empty oyster shell on mudflats in portions of Grays Harbor as part of an ongoing Dungeness crab (*Cancer magister*) mitigation strategy that was established to compensate for crab impacts due to dredging of the navigation channel. The oyster shell mitigation sites provide rearing habitat for juvenile Dungeness crabs. Shell placement occurs on an annual basis; however, not all plots receive additional shell each year. Additional shell placement is determined based on effective shell coverage calculations obtained from ongoing monitoring of each plot. Shell coverage on the flats is lost as a result of ongoing sedimentation and subsidence that are naturally occurring processes in the Grays Harbor estuarine system.

**2. Purpose and Need.** The purpose of the proposed project is to research the feasibility of establishing a self-sustaining source of oyster shell on the shell mitigation sites, reducing maintenance costs associated with the crab mitigation strategy. The three dimensional aspect of live oysters is greater than that of shucked empty shells spread across the mud surface, and the hope is that the habitat quality as well as the longevity of the habitat, will be enhanced over the current mitigation strategy.

**3. Action.** The Corps proposes to plant live Pacific oyster spat that is attached to empty oyster shell on five to seven 20 x 20 meter plots, covering approximately 2,000-2,800 square meters of ground. The oyster spat are juvenile oysters approximately the size of quarters that have been cultivated on empty oyster shell. Approximately 200-250 bags of oyster spat on shell with a total volume of approximately three cubic meters will be obtained from a licensed supplier and placed on existing crab mitigation shell placement areas at a density of approximately 24 shells per meter squared.

Spat will be spread at approximately 40 bags per plot which is less than the commercial operations place, but greater than experimental plantings done in Willipa Bay (Dumbauld et al., 2000). The empty shells, with overwintered oyster spat on them at the density of about 20 spat per shell, will be placed evenly about the 20 x 20 meter subplots during the last tide in March, 2006. Beginning in May, the young oysters will be measured each month during the four month

field season that the shell mitigation plots are surveyed for shell cover estimates. Quality of habitat will be measured by crab density per meter squared, and longevity will be measured as percent shell cover over time relative to existing plots of the same age without live oysters.

Ongoing monitoring of the spat placement plots will occur for about three years to determine project success. If the project meets expectations and crab habitat quality and longevity are greatly enhanced by the spat placement, we foresee a discussion in the future regarding incorporating the planting of live oysters into the standard crab mitigation protocol.

**5. Summary of Impacts.** Pursuant to the National Environmental Policy Act, an Environmental Impact Statement (EIS) was prepared for the Grays Harbor Navigation Improvement Project. Environmental impacts associated with the Dungeness crab shell placement mitigation activities were fully documented in the 1989 Final EIS Supplement (EISS) for the Grays Harbor Navigation Improvement Project. Information from that EISS is incorporated by reference in the attached EA that has been prepared for the proposed placement of live spat. Environmental impacts specific to the use of live spat are briefly summarized below.

No adverse impacts to water quality as a result of the shell placement are expected. Spat placement will occur in the dry at low tide on established shell plots.

No alterations to bottom bathymetry beyond those described in the EISS and crab mitigation strategy are expected. Spat placement will occur in areas in which the Corps currently conducts shell placement activities, so no new impacts are anticipated.

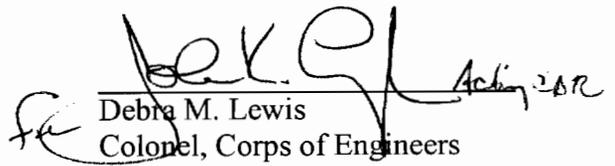
No impacts to flora and fauna are expected as a result of the experimental spat placement. Pacific oysters are widely cultivated around Grays Harbor, and are naturalized in Grays Harbor. Pacific oyster is found scattered around the harbor in areas that are not artificially seeded. The spat will be placed in areas where the Corps already conducts shell placement activities, limiting impacts to eelgrass and mudflat fauna.

Because the experimental placement will occur on existing shell plots that are maintained as part of the ongoing crab mitigation project for which the Corps has already received concurrence, and Pacific oyster cultivation is widespread in Grays Harbor, the Corps believes that this action will have **no effect** on any of the threatened and endangered species or associated critical habitat that may occur in the vicinity.

**6. Finding.** Based on the analysis detailed in the EA (attached), this project is not considered a major Federal action significantly affecting the quality of the human environment and does not require preparation of an environmental impact statement.

Date

27 MAR 06

  
Debra M. Lewis  
Colonel, Corps of Engineers  
District Commander

**GRAYS HARBOR CRAB MITIGATION PROGRAM  
OYSTER SPAT PLACEMENT**

**ENVIRONMENTAL ASSESSMENT AND BIOLOGICAL EVALUATION**

**Grays Harbor Navigation Improvement Project**

**Grays Harbor, Washington**

**March 2006**



**US Army Corps  
of Engineers®**

Seattle District

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## **1.0 Introduction**

The Seattle District U.S. Army Corps of Engineers (Corps) is proposing to place non-indigenous live Pacific oyster (*Crassostrea gigas*) spat on shell over portions of the existing oyster shell mitigation sites that have been established in Grays Harbor. The placement of empty shucked oyster shell on mudflats in Grays Harbor occurs as part of an ongoing Dungeness crab (*Cancer magister*) mitigation strategy that was established to compensate for crab impacts due to dredging of the navigation channel. The oyster shell mitigation sites provide rearing habitat for juvenile Dungeness crabs. The 1989 Final Environmental Impact Statement Supplement (EISS) for the Grays Harbor Navigation Improvement Project fully describes the Dungeness crab mitigation actions and the associated environmental conditions and consequences. Information from that EISS is hereby incorporated by reference. In addition, in 1998, a Revised Crab Mitigation Strategy Agreement was negotiated and finalized with participants from numerous agencies. Information contained within that document is also incorporated by reference in this environmental assessment (EA). Because the shell placement strategy has not changed since the 1998 Revised Crab Mitigation Strategy Agreement was finalized, no additional EAs describing shell placement strategies have been written in the intervening years.

In accordance with the National Environmental Policy Act (NEPA), this document examines the potential impacts of the proposed live oyster spat placement on the shell mitigation sites.

This evaluation of the environmental impacts of the placement of oyster spat-on-shell applies exclusively to the proposed action, which is taken under the Corps' authority to operate and maintain completed, Federally-authorized water resource projects. The Department of the Army also holds permitting authority pursuant to Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. The Army regulatory policy addressing jurisdictional, conditioning, compliance, and enforcement issues regarding shellfish aquaculture operations is presently under national-level review. Express or implicit conclusions drawn in this document as to the applicability of the various Federal environmental planning and compliance regimes are drawn solely within the context of Federal civil works projects, and do not reflect the present or projected position of the Army on similar issues applied within the regulatory context. The Seattle District intends to continue to apply environmental planning and compliance principles in a consistent manner in both the regulatory and civil works fields, insofar as is appropriate and practicable. This environmental documentation will be modified, if necessary and as applicable, when guidance on regulatory policy underlying permitting of shellfish aquaculture operations is finalized and promulgated.

## **2.0 Project Purpose and Need**

The purpose of the proposed project is to research the feasibility of establishing a self-sustaining source of oyster shell on the shell mitigation sites, reducing maintenance costs associated with the crab mitigation strategy. The three dimensional aspect of live oysters is greater than that of shucked empty shells spread across the mud surface, and the hope is that the habitat quality as well as the longevity of the habitat, will be enhanced over the current mitigation strategy. For the relatively small cost of conducting this experiment, the hope is to save on the considerable placement expenses by being able to stretch the periods between new shell placement, moving

the mitigation project toward a more self-sustaining refuge habitat with reef-like functionality and away from a continual high level of man-power and financial input.

### **3.0 Project Authority**

The original Grays Harbor navigation channel was authorized by Congress in the Rivers and Harbors Act of 1896. The Grays Harbor and Chehalis River Project and regular Department of the Army maintenance dredging were authorized by the Rivers and Harbor Act of 1935, and modified in 1945 and 1954. In 1990, the navigation channel was widened and deepened as part of the Grays Harbor Navigation Improvement Project, which was authorized by the Water Resources Development Act of 1986.

### **4.0 Alternatives Considered**

#### ***4.1 No Action***

NEPA requires that EAs include an analysis of the “no action” or existing conditions alternative, against which the effects of “action” alternative(s) can be compared and evaluated. Under the No Action Alternative, the Corps would continue the crab mitigation shell placement with no alterations to the current operating conditions. No live spat would be placed on the shell plots, and no additional effort would be made to create a self-sustaining source of oyster shell.

The no-action alternative does not meet the project purpose and need. Without conducting the spat placement experiment, it is not possible to determine the feasibility of establishing a self-sustaining source of oyster shell on the shell mitigation sites.

#### ***4.2 Preferred Alternative***

The Corps proposes to plant live Pacific oyster spat that is attached to oyster shell on five to seven 20 x 20 meter plots, covering approximately 2000-2800 square meters of ground. The oyster spat are juvenile oysters approximately the size of quarters that have been cultivated on empty oyster shell. Approximately 200-250 bags of oyster spat on shell with a total volume of approximately three cubic meters will be obtained from a licensed supplier and placed on the new 2006 shell placement areas at a density of approximately 24 shells per meter squared.

Spat will be spread at approximately 40 bags per plot which is less than the commercial operations place, but greater than experimental plantings done in Willipa Bay (Dumbauld et al., 2000). The empty shells, with overwintered oyster spat on them at the density of about 20 spat per shell, will be placed evenly about the 20 x 20 meter subplot during the last tide in March, 2006. Beginning in May, the young oysters will be measured each month during the four month field season that the shell mitigation plots are surveyed for shell cover estimates. Quality of habitat will be measured by crab density per meter squared, and longevity will be measured as percent shell cover over time relative to existing plots of the same age without live oysters.

The oysters are expected to take 2-3 years to reach maturity, and as such we do not expect to know how successful the project is for at least 1.5-2 years after planting. Since this is a novel experimental protocol, there is no guarantee of success and likewise no long-term plan for

repetition. If the project meets expectations and crab habitat quality and longevity are greatly enhanced, we foresee a discussion in the future regarding incorporating the planting of live oysters into the standard mitigation protocol. At the present the plan is for a one-time planting and ongoing monitoring for about three years.

## **5.0 Existing Environment**

Grays Harbor is at the mouth of the Chehalis River on the southwestern coastline of Washington, approximately 110 miles south of the entrance to the Strait of Juan de Fuca and 45 miles north of the Columbia River's outfall. The predominant physical feature of the Harbor is the expansive mudflats that cover 63% of the Harbor's surface area at low tide (MLLW); the water surface ranges from about 94 square miles at mean higher high water (MHHW) to 38 square miles at MLLW. Numerous shallow channels have been cut into the mudflat areas of the North, South, and East Bays by ebbside flows and discharge from the Humptulips, Elk, and Chehalis Rivers, respectively. Harbor sediments are composed of ocean-borne sands in the outer estuary and river-borne silts near river outfalls in the North, South, and East Bays. A mixed transition zones lies between the two in a broad band.

A variety of habitats occur in the Harbor; these habitats and the organisms occupying them were described extensively by USFWS (1982). Deeper subtidal habitat is primarily man-made.

Sub- and intertidal mudflat habitat radiates from the mouths of major rivers emptying into the estuary. Epibenthic green and blue-green algae and diatoms are the predominant flora, while zooplankton is dominated by copepods and mysids. Softshell clams (*Mya arenaria*), bent-nose clams (*Macoma nasuta*), and polychaete worms dominate the benthos. Mudflats support a wide variety of avian species, such as the western sandpiper, sanderling, yellowleg, dunlin, dowitcher, curlew, western grebe, scoter, cormorant, and great blue heron. Starry flounders, staghorn sculpins, and sticklebacks are the most common resident fish species; mudflats are of special value to juvenile salmonids during their outmigration.

At present time, both the inner and outer harbors are on Washington's 303(d) list for fecal coliform. Recent sampling in various areas of the harbor indicate that water temperature, dissolved oxygen, and pH standards are sometimes violated, but that these problems may be the result of natural conditions (e.g., solar heating of shallow water) or nutrient enrichment attributed to wastewater treatment plant effluent.

Potential point and nonpoint sources of contaminants in Grays Harbor are associated with past and existing land uses adjacent to the estuary. Potential sources of contaminants include local pulp and paper mills, city outfalls located near the navigation channel in Aberdeen and Hoquiam, and from past and present activities at boat yards, marinas, and boat docks located around the harbor. In addition, seafood processors, oyster mariculture, and cranberry processors are located in South Bay near Westport. The pesticide, sevin (carbaryl) is used by the oyster culture industry to exterminate the burrowing shrimp that cause oysters to sink and perish.

Extensive information on the existing environment of Grays Harbor has been provided in previous technical studies, as well as environmental and biological evaluations. In particular,

this information is contained in the 1982 Grays Harbor, Chehalis and Hoquiam Rivers, Washington Channel Improvement for Navigation Interim Feasibility Report and Final EIS, Final EIS for the Grays Harbor Navigation Improvement Project, the 1989 Final EISS for the Grays Harbor Navigation Improvement Project, the 1998 Revised Crab Mitigation Strategy Agreement, and the final EA for Fiscal Years 2001-2006 Maintenance Dredging and Disposal, Grays Harbor and Chehalis River Navigation Project, Grays Harbor County, Washington (U.S. Army Corps of Engineers, 2001). These documents are incorporated herein by reference. Only new and updated information is included in this brief assessment.

### ***5.1 Oyster Culture***

The Washington Department of Natural Resources currently leases approximately 2,231 acres of state-owned aquatic lands in Grays Harbor for the purpose of oyster culture. An additional 500 acres of private and county-owned aquatic lands are also used to grow oysters for commercial harvest. However, the acreage in cultivation varies widely over time due to sand movement, high wave energy, invasion by ghost crabs, and fluctuating industry economics. At this time, approximately 1,000 acres around Grays Harbor are in oyster cultivation (pers. comm. Brady Engvall, 2006). The Pacific oyster is the primary species in cultivation.

The Pacific oyster was introduced in the early 1900's from Japan, and quickly grabbed a foothold in North America's growing aquaculture industry. Pacific oyster constitutes 99% of the total West Coast oyster production, and is Washington's most valuable shellfish resource (PSMFC, 1996). Shellfish cultivation in the Willapa Bay/Grays Harbor area generates approximately \$30,360,000 in total annual sales and provides employment for approximately 600 individuals (LongLines Online, 2002). Grays Harbor sales and employees are approximately 25% of the total, or \$8,000,000 in total sales and approximately 150 employees (pers. comm., Brady Engvall, 2006).

Because spawning depends on a rise in water temperatures above eighteen degrees Celsius, it only spawns erratically in west coast estuaries. As a result, cultured "spat" is used to seed oyster beds. The Washington State Department of Fish and Wildlife presently seeds enhanced beds around Puget Sound with Pacific oysters (WDFW, 2006), and seeding is normal practice among cultivators on the Washington coast. When natural spawning does occur, it occurs primarily in July and August. Eggs and larvae are planktonic distributed throughout the water column in estuarine waters. Later stage larvae settle out of the water column and crawl on the bottom searching for suitable habitat before settling. Juveniles and adults are sedentary and are found in lower inter-tidal areas of estuaries. Oysters prefer firm bottoms, and usually attach to rocks, debris or other oyster shells. However, they can also be found on mud or mud-sand bottoms (PSMFC, 1996).

In 1994, a small, unreplicated trial was conducted by researchers from the University of Washington in the south channel of Grays Harbor, whereby live oyster spat were planted, survived, and grew. The area where they were planted could still be identified by the presence of live oysters as of summer 2005 (pers. comm., Visser, 2006). There has been intermittent natural set of oysters in the South Channel shell mitigation area over the past several years as well, indicated by live oysters on the 1995 Island, where spat have never been planted. Both of these

factors suggest that conditions are favorable in South Channel and that, when placed on top of inert shell, oysters can keep ahead of sedimentation.

### 5.2 *Threatened and Endangered Species*

The December 2000 Programmatic Biological Evaluation for Fiscal Years 2001-2006 Maintenance Dredging and Disposal Grays Harbor Navigation Project Grays Harbor County, Washington fully documents the presence of threatened and endangered species that may occur in the vicinity of the Grays Harbor navigation channel and all associated activities, and is hereby incorporated by reference. Since the completion of that document, the Aleutian Canada Goose has been de-listed, and critical habitat was designated for both snowy plover and bull trout. There have been no other additions or changes to the list of threatened and endangered species that may occur in the area. Table 1 summarizes the threatened and endangered species and associated critical habitat that may occur within the project vicinity.

**Table 1. Threatened and Endangered Species that may occur in the Project Area.**

<b>Species</b>	<b>Listing</b>	<b>Critical Habitat</b>
Bald Eagle	Threatened	None designated
Brown Pelican	Endangered	None designated
Western Snowy	Threatened	Designated in project area
Marbled Murrelet	Threatened	None in project area
Bull Trout	Threatened	Designated in project area
Humpback Whale	Endangered	None designated
Steller Sea Lion	Threatened	None in project area
Blue Whale	Endangered	None designated
Fin Whale	Endangered	None designated
Sei Whale	Endangered	None designated
Sperm Whale	Endangered	None designated
Leatherback Sea	Endangered	None in project area
Loggerhead Sea	Threatened	None designated
Green Sea Turtle	Threatened	None in project area
Olive Ridley Sea	Threatened	None designated

Bull trout critical habitat for marine nearshore areas extends to the depth of 33 feet relative to the mean low low-water line (MLLW) for the purpose of encompassing the photic zone. Within this designated area, the Primary Constituent Elements relevant to the marine nearshore habitat are water temperature from 32 to 72 °F (0 to 22 °C); migratory corridors with minimal physical, biological, or water quality impediments; an abundant food base; and permanent water of sufficient quantity and quality (70 FR 56266).

#### *Known Occurrences of Snowy Plover in the Project Vicinity*

When plovers are in the area during nesting season, they generally forage on natural dunes along the ocean beaches and on ephemeral sand spits within the Oyhut Wildlife area (Richardson, 1999). Plovers nest on recently accreted, unvegetated areas of Damon Point. Up to six adults and

four nests were found in a 1994 survey at Damon Point and Oyhut Wildlife Area (WDFW 1995). Vegetation density is likely a limiting factor for nest site placement on Damon Point; only when accretion outpaces pioneering vegetation is there a net gain of potential plover nesting habitat (WDFW 1995). Damon Point State Park and the Oyhut Wildlife Area, which borders the Ocean Shores sewage treatment facility, have been designated as critical habitat for the Western snowy plover.

The northernmost record of wintering snowy plovers on the Pacific coast was on Cape Shoalwater on the northern mouth of Willapa Bay (USFWS 1995). Plovers are not known to over-winter on Damon Point or within the Oyhut Wildlife Area (USFWS 1999).

Of 32 snowy plover breeding sites on the Pacific coast three occur in Washington, one at Leadbetter Point in Willapa Bay, another at Damon Point in Grays Harbor, and a third at Midway Beach in Pacific County. In December 1999, the USFWS designated the Leadbetter Point and Damon Point nesting sites as Western snowy plover critical habitat (USFWS, 1999) and Midway beach was added in 2005 (USFWS).

### ***5.3 Essential Fish Habitat (EFH)***

The project area is part of the Washington State Estuarine EFH composite, and has been designated as EFH for various life stages of 24 species of groundfish, 5 coastal pelagic species, and 2 species of Pacific salmon according to the NMFS Fisheries Management Plans (PFMC 1998, PFMC 2003, PFMC 2004).

## **6.0 Environmental Consequences of Proposed Action**

The effects of the proposed actions are compared against the baseline conditions associated with the no-action alternative. Unless otherwise indicated in the following discussion of environmental effects, the no-action alternative will not affect water quality, bathymetry, or biological resources at the project site beyond those impacts described in the 1989 final EISS and the 1998 crab mitigation strategy agreement.

### ***6.1 Water Quality***

No adverse impacts to water quality as a result of the shell placement are expected. Spat placement will occur in the dry at low tide on established shell plots. The experimental plots will be established in the south channel of Grays Harbor within the shellfish harvest closure area. This area is closed to shellfish harvest due to high levels of water pollution, including elevated levels of fecal coliform (WDOH, 2006). Although bivalve shellfish filter vast quantities of water, and in the process, help counteract eutrophication and reduce the presence of other pollutants, it is highly unlikely that the amount of spat being placed will create noticeable water quality improvements, even if a self-sustaining population becomes established.

### ***6.2 Bathymetry***

No alterations to bottom bathymetry beyond those described in the (EISS) and crab mitigation strategy are expected. Spat placement will occur in areas in which the Corps currently conducts shell placement activities, so no new impacts are anticipated. If a self-sustaining population of oysters does become established, it will reduce the quantity and frequency of shell placement,

but will not necessarily result in extensive changes in bathymetry; rather, it should stabilize the sediments at approximately the desired elevations for crab mitigation shell placements.

### **6.3 Biological Resources**

Because Pacific oysters are widely cultivated around Grays Harbor, no impacts to flora and fauna are expected as a result of the experimental spat placement. The Pacific oyster is naturalized in Grays Harbor and is found scattered around the harbor in areas that are not artificially seeded. The spat will be placed in areas that the Corps already conducts shell placement activities in, limiting impacts to eelgrass and mudflat fauna.

#### **6.3.1 Threatened and Endangered Species and EFH**

Effects to threatened and endangered species as a result of dredging activities and associated mitigation actions (e.g. shell placement) were evaluated as part of the Fiscal Years 2003-2006, Continued placement of oyster shell at intertidal juvenile Dungeness crab habitat sites in Grays Harbor County, Washington Endangered Species Act, Section 7 consultation memo. The Corps received letters concurring with the determinations made in the Section 7 consultation memo on February 26, 2003 (USFWS) and February 27, 2003 (NMFS).

The placement of live spat will occur in areas in which the Corps currently conducts shell placement activities. The Pacific oyster is naturalized in Grays Harbor and is found scattered around the harbor in areas that are not artificially seeded. Because the experimental placement will occur on existing shell plots that are maintained as part of the ongoing crab mitigation project for which the Corps has already received concurrence, the extent of the placement is minor, and Pacific oyster cultivation is widespread in Grays Harbor, the Corps believes that this action will have **no effect** on any of the threatened and endangered species that may occur in the vicinity. For the same reasons, the Corps believes that there will be **no adverse effects** to EFH.

Since bull trout and snowy plover critical habitat was not designated or discussed in the 2000 programmatic BE, we have analyzed the potential effects to these resources from the proposed project.

##### **6.3.1.1 Bull Trout Critical Habitat**

The proposed project will have **no effect** on designated bull trout critical habitat. The experimental placement will occur on existing shell plots that are maintained as part of the ongoing crab mitigation project, the extent of the placement is minor, and Pacific oyster cultivation is widespread in Grays Harbor. The bathymetry and hydrology of the nearshore area will not be altered as a result of the spat placement beyond those effects associated with the current shell placement activities. Shell placement has occurred on these particular areas of the mudflats for between seven and ten years, and the shell placement program has been underway in this vicinity since the early 1990's. Effects to the bathymetry of the site as a result of oyster reef development, if such development occurs, will largely be limited to maintaining the bathymetry contour created from the original shell placement activity. Spat placement will not result in water temperature changes. There will be no impact to migratory corridors or the bull trout food base.

### 6.3.1.2 Snowy Plover Critical Habitat

The Corps has determined that the proposed project will have no effect on Snowy Plover critical habitat. There is no Snowy plover designated critical habitat within several miles of the shell placement areas. The proposed work will have no effect on the snowy plover food base, and no physical impacts of the proposed work on recent plover nesting areas are anticipated as all of the work will occur several miles from designated critical habitat. Finally, construction noise associated with the shell placement activities is typical of the shipping channel traffic, and is unlikely to carry to Damon Point, so there should be no effect on nesting behavior. The proposed project would have no effect on plover predator populations.

## 7.0 Environmental Compliance

LAWS AND REGULATIONS RELATING TO THE PROPOSED ALTERNATIVES	ISSUES ADDRESSED	CONSISTENCY OF PREFERRED ALTERNATIVE
National Environmental Policy Act (NEPA) 42 U.S.C. 4321 et seq.	Requires all federal agencies to consider the environmental effects of their actions and to seek to minimize negative impacts.	Consistent per FONSI and EA document.
Clean Water Act (CWA) 33 U.S.C. 1251 et seq.; Section 404	Requires federal agencies to protect waters of the United States. Disallows the placement of dredged or fill material into waters (and excavation) unless it can be demonstrated that it is the least environmentally damaging practicable alternative. This restoration activity is proposed under the authority of a Nationwide 4 permit.	Consistent with the requirements of Nationwide Permit (NWP) 4 for fish and wildlife harvesting, enhancement, and attraction devices and activities, so an evaluation under the 404(b)(1) Guidelines is not required.
Clean Water Act Section 401	Requires federal agencies to comply with state water quality standards.	State 401 water quality certification is approved under NW 4. Additionally, no long-term negative impacts to water quality are expected as a result of the spat placement.
Section 10 of the Rivers and Harbors Act	Requires federal agencies to protect and preserve the navigability of navigable waters	Consistent -- no work or alteration is taking place that will have more than negligible impact on or obstruction of the course, location, condition, or capacity of the navigable waters, as compared with placement of shell alone.

<b>LAWS AND REGULATIONS RELATING TO THE PROPOSED ALTERNATIVES</b>	<b>ISSUES ADDRESSED</b>	<b>CONSISTENCY OF PREFERRED ALTERNATIVE</b>
Clean Air Act, 42 USC 7401 et seq.	Requires states to develop plans, called State implementation plans (SIP), for eliminating or reducing the severity and number of violations of National Ambient Air Quality Standards (NAAQS) while achieving expeditious attainment of the NAAQS. The Act also requires Federal actions to conform to the appropriate SIP.	Consistent -The area is in attainment or is unclassified for all pollutants. Emissions of pollutants from the limited equipment used will be negligible.
Endangered Species Act 16 U.S.C. 1531 et seq.;	Requires federal agencies to protect listed species and consult with US Fish & Wildlife or NOAA Fisheries regarding the proposed action.	The proposed action will have no effect on threatened and endangered species. No further consultation is necessary.
Magnuson Fishery Conservation and Management Act	Requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) regarding actions that may adversely affect Essential Fish Habitat (EFH) for Pacific coast groundfish, coastal pelagic species, and Pacific salmon.	The proposed action will not change EFH characteristics of the project area. No consultation is required.
National Historic Preservation Act 16 U.S.C. 461;	Requires federal agencies to identify and protect cultural and historic resources.	Consistent – The Corps prepared a memorandum for record that determined that the proposed action has no potential to cause effects to historic properties. No further action is necessary.
Coastal Zone Management Act (CZMA), 16 USC 1451 et seq.	Compliance with CZMA for protection of the coastal zone; may need certification by state.	Consistent – CZMA consistency is approved under the NW 4 permit.
Fish and Wildlife Coordination Act (16 USC 470)	Requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. This goal is accomplished through Corps funding of U.S. Fish and Wildlife Service habitat surveys evaluating the likely impacts of proposed actions, which provide the basis for recommendations for avoiding or minimizing such impacts.	Consistent - A Fish and Wildlife Coordination Act Report was prepared for the Navigation Improvement Project.

LAWS AND REGULATIONS RELATING TO THE PROPOSED ALTERNATIVES	ISSUES ADDRESSED	CONSISTENCY OF PREFERRED ALTERNATIVE
Hydraulic Project Approval	Requires proponents of developments, etc to protect state waters, wetlands and fish life.	An HPA from the WDFW is not required for federal work that involves construction within state waters, since there has been no waiver of sovereign immunity by the Federal government to require or allow such regulation of Federal agencies by local governments. An advisory HPA was issued for shell placement activities on January 28, 2003. To the extent possible, the Corps will abide by the provisions of this HPA.
Executive Order 12898: Environmental Justice	Requires federal agencies to consider and address environmental justice by identifying and assessing whether agency actions may have disproportionately high and adverse human health or environmental effects on minority or low-income populations.	Consistent due to lack of adverse human health or environmental effects on minority or low-income populations in local area.

This EA was not distributed for public review or comment, but a Notice of Preparation (NOP) was issued to interested parties. An electronic copy of the document is available on the Seattle District homepage at:

[http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=ERS&pagename=ERS\\_Home](http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=ERS&pagename=ERS_Home)

Copies of the Notice of Preparation were provided in an electronic format to the following organizations for review and comment:

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Environmental Protection Agency
- Washington State Department of Ecology
- Washington State Department of Fish and Wildlife
- Washington State Department of Natural Resources
- Chehalis Confederated Tribes
- Chinook Tribe
- Muckleshoot Tribe
- Shoalwater Tribe
- Friends of Grays Harbor
- Port of Grays Harbor

In addition, the Notice of Preparation was sent out to selected interested parties as identified by the Corps Environmental Resources Section. The parties were identified from their previous participation in public meetings regarding Corps projects in Grays Harbor. The Notice of Preparation was also distributed via the Seattle District Regulatory Branch electronic distribution list for public notices.

The Notice of Preparation was circulated for 15 days. One written comment letter was received from the Pacific Coast Shellfish Growers Association (Appendix A). The Pacific Coast Shellfish Growers Association supports the project, and provided an extensive discussion of the habitat benefits that shellfish beds provide in their comment letter. No response is necessary.

## 8.0 References

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## **APPENDIX A**



**US Army Corps  
of Engineers.**

Seattle District

# Notice of Preparation

Navigation Section  
P.O. Box 3755  
Seattle, WA 98124-3755  
ATTN: Hiram Arden (OD-TS-NS)

Notice Date: March 1, 2006  
Expiration Date: March 16, 2006  
Reference: CENWS OD-TS-NS-25  
Name: Grays Harbor Crab Mitigation Program

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Interested parties are hereby notified that the U.S. Army Corps of Engineers, Seattle District (Corps) plans to prepare, pursuant to the National Environmental Policy Act, an environmental assessment (EA) for a proposed experimental oyster spat placement as part of the Grays Harbor Dungeness crab (*Cancer magister*) mitigation strategy. Dungeness crabs are adversely impacted entrainment during routine maintenance dredging. Entrainment occurs when aquatic organisms are trapped in the uptake of sediments and water being removed by the dredging equipment. The crab mitigation program provides compensatory rearing habitat for Dungeness crabs through the regular placement of oyster shell on mudflats in Grays Harbor. The purpose of this Notice is to solicit information on the environmental impacts of the proposed experimental oyster spat placement.

Dungeness crab mitigation actions (i.e. oyster shell placement) and the associated environmental conditions and consequences were previously evaluated in the 1989 Final Environmental Impact Statement Supplement (EISS) for the Grays Harbor Navigation Improvement Project. In addition, in 1998, a Revised Crab Mitigation Strategy Agreement was negotiated and finalized with participants from numerous agencies. Information contained within those documents will be incorporated by reference in the environmental assessment (EA) for the proposed spat placement.

## AUTHORITY

The original Grays Harbor navigation channel was authorized by Congress in the Rivers and Harbors Act of 1896. The Grays Harbor and Chehalis River Project and regular Department of the Army maintenance dredging were authorized by the Rivers and Harbor Act of 1935, and modified in 1945 and 1954. In 1990, the navigation channel was widened and deepened as part of the Grays Harbor Navigation Improvement Project, which was authorized by the Water Resources Development Act of 1986.

## PROPOSED ACTION

The Corps proposes to plant live Pacific oyster spat on five to six 20x20 meter plots, covering approximately 2000-2800 square meters of ground. 200-250 bags of shell containing live oyster spat with a total volume of 65-80 cubic meters will be obtained from a licensed supplier and placed on the new 2006 shell placement areas at a density of approximately 24 shells per meter squared.

Spat will be spread at approximately 40 bags per plot which is less than the commercial operations place. The empty shells, with overwintered oyster spat on them at the density of about 20 spat per shell, will be placed evenly about the 20 x 20 subplot during the last tide in March, 2006. Beginning in May, the young oysters will be measured each month during the four month field season that the shell mitigation plots are surveyed for shell cover estimates. Quality of habitat will be measured by crab density per meter squared, and longevity will be measured as percent shell cover over time relative to existing plots of the same age without live oysters.

Ongoing monitoring of the spat placement plots will occur for about three years to determine project success. If the project meets expectations and crab habitat quality and longevity are greatly enhanced by the spat placement, we foresee a discussion in the future regarding incorporating the planting of live oysters into the standard crab mitigation protocol.

#### ANTICIPATED IMPACTS

No adverse impacts to water quality as a result of the shell placement are expected. Spat placement will occur in the dry at low tide on established shell plots.

No alterations to bottom bathymetry beyond those described in the EISS and crab mitigation strategy are expected. Spat placement will occur in areas in which the Corps currently conducts shell placement activities, so no new impacts are anticipated.

No impacts to flora and fauna are expected as a result of the experimental spat placement. Pacific oysters are widely cultivated around Grays Harbor, and are naturalized in Grays Harbor. It is found scattered around the harbor in areas that are not artificially seeded. The spat will be placed in areas that the Corps already conducts shell placement activities in, limiting impacts to eelgrass and mudflat fauna.

Because the experimental placement will occur on existing shell plots that are maintained as part of the ongoing crab mitigation project for which the Corps has already received concurrence, and Pacific oyster cultivation is widespread in Grays Harbor, the Corps believes that this action will have **no effect** on any of the threatened and endangered species or critical habitat that may occur in the vicinity.

No significant adverse impacts to water quality, flora and fauna, bathymetry, or threatened and endangered species are anticipated as a result of this experimental spat placement.

The Corps has made a preliminary determination that the environmental impacts of the proposal can be adequately evaluated under the National Environmental Policy Act through preparation of an environmental assessment (EA). Preparation of an EA addressing potential environmental impacts associated with the experimental spat placement is currently underway.

The Corps invites submission of factual comment on the environmental impacts of the proposal. The Corps will consider all submissions received before the expiration date of this notice. The nature or scope of the proposal may be changed upon consideration of

the comments received. The Corps will initiate an Environmental Impact Statement (EIS), and afford all the appropriate public participation opportunities attendant to an EIS, if significant effects on the quality of the human environment are identified and cannot be mitigated.

Comments should reach this office, Attn: Navigation Section, not later than March 16, 2006 to ensure consideration. Requests for additional information should be directed to Hiram Arden, Project Manager, at 206-764-3401.

Hiram Arden  
Project Manager  
Navigation Section

## **APPENDIX B**

March 13, 2006

U.S. Army Corps of Engineers  
 Attn: Hiram Arden  
 Navigation Section  
 P.O. Box 3755  
 Seattle, Washington 98124-3755  
 Re: CENWS OD-TS-NS-25  
 Grays Harbor Crab Mitigation Program



Dear Mr. Arden,

This letter is written in response to the solicitation for information on environmental impacts on the proposed placement of oyster spat on shell in the Notice of Preparation for the Grays Harbor Crab Mitigation Program.

We concur with the findings in the notice under "Anticipated Impacts," that the placement of oyster spat on shells in the bay will have no negative effect on threatened or endangered species or critical habitat. On the contrary, there is every reason to believe that the placement of oysters in the harbor will prove beneficial to crab as well as other species and critical habitat in general.

Shellfish beds provide three-dimensional structure that forms important habitat for a number of marine organisms, including crab. Brett Dumbauld (1997), described species abundance, biomass and diversity as often being enhanced in areas where oysters are cultured, versus open mud or eelgrass dominated habitat. Oysters provide structure for macroalgal attachment as well as mussels and barnacles, which in turn provide protection and food for juvenile Dungeness crab (*Cancer magister*), shore crabs (*Hemigrapsus*), tube building gammarid amphipods such as *Amphithoe* and *Corophium*, caprellid amphipods, tanaids, and some anelids such as the scaleworm *Harmothoe*.

Brooks, 1995, found that *Corophium acherusicum*, a critical prey resource for fish, was enhanced in oyster beds and indicated greater densities of gammarid amphipods and small tellinid clams as prey for 0+ (age) Dungeness crabs. Dungeness crab have been found to prefer oyster habitat over other habitat as small 0+ crab in their first year of life. (Dumbauld, Ruesink, Holsman, Semmens, Li, Armonstrong, Poulton, Cheney, 2003). Oyster habitat exhibits higher levels of decapod crustacean biomass and density compared to sand bottom, providing refuge from predation and dessication as well as high quality substrate for egg laying and nesting (Tolley and Volety, 2005).

Oysters also have positive impacts on specific components of epibenthic communities and share many of the same attributes as those described for eelgrass beds, including providing habitat for a number of fish species (Breitburg and Miller 1998, and Coen,

### Pacific Coast Shellfish Growers Association

120 State Avenue NE #142 ♦ Olympia, Washington 98501 ♦ (360) 754-2744 ♦ Fax 754-2743 ♦ [pcsga@pcsga.org](mailto:pcsga@pcsga.org)

Handwritten note: (1) ER, (2) ... (3) ...

Luckenback, and Breitburg 1998). Oyster beds modify tidal flow and sedimentary processes and can serve as important nursery and refuge habitats for juvenile crab, fish, shrimp, and other invertebrates. (Ambrose and Anderson 1990; Doty, Armstrong, and Dumbauld 1990; Breitburg and Miller 1998; Dumbauld, Armstrong, and McDonald 1993; Eggleston and Armstrong 1995; and Simenstad and Fresh 1995.)

Oyster beds can also be beneficial to outmigrating juvenile salmon. Simenstad, Cordell, and Weitcamp (1991) found that densities of the harpacticoid copepod *Tisbe* spp., which is an important prey item for some juvenile salmonids (e.g., chum salmon *Oncorhynchus keta*), were enhanced in areas of oyster culture compared to bare mudflat.

As part of an effort to estimate estuarine habitat values, Ferraro and Cole (2001) conducted estuary-wide studies in Washington's Willapa Bay, and Oregon's Tillamook Bay, in 1996 and 1998. Their research determined benthic macrofauna-habitat relationships for eight intertidal habitats in Pacific Northwest estuaries: (1) eelgrass, *Zostera marina*, (2) Japanese eelgrass, *Zostera japonica*, (3) Atlantic cordgrass, *Spartina alterniflora*, (4) mud shrimp, *Upogebia pugettensis*, (5) ghost shrimp, *Neotrypaea californiensis*, (6) bottom culture Pacific oyster (*Crassostrea gigas*) (7) mud, and (8) sand; and a subtidal, unharvested habitat. On average, the rank order of the habitats in terms of the number of species was: oyster = *Z. japonica* > *Z. marina* > *Upogebia* > *Spartina* > sand = mud = *Neotrypaea* = subtidal, unharvested. On a relative basis they found macrofauna-habitat relationships for a number of metrics (species, abundance, biomass) were fairly consistent across time in Willapa, however they differed somewhat between estuaries.

In addition to the benefits oysters provide in terms of structure, they also significantly enhance water quality and clarity in their role as filter feeders, accruing an ecosystem-wide benefit. A single oyster filters up to 50 gallons of water a day, consuming organic matter than can otherwise interfere with light penetration (Best, Buzzelli, Bartell, Wetzel, Boyd, Doyle, and Campbell 2001, and Koch and Beer 1996). Studies reveal that oysters also exert top-down control on phytoplankton and particulate organic matter, thereby reducing turbidity and increasing light penetration (Newell, Cornwell and Owens, 2002). In the phenomenon known as benthic-pelagic coupling, as shellfish consume phytoplankton in the water column, nitrogen, phosphorous, carbon and other nutrients from the water column are conveyed to the benthos. Fixed nitrogen, through shellfish feces and pseudofeces, are then deposited onto the sediment, becoming more readily available to, and effectively fertilizing, seagrasses. (Peterson and Heck 1999 and 2001; Short 1987 and 1983) The mechanistic explanation has been demonstrated in a study conducted in Florida with mussels (*Modiolus americanus*) and seagrass (*Thalassia testudinum*). The mussel pseudofeces and feces increase nutrient levels in sediment porewater (Reusch and Williams 1998, and Peterson and Heck 2001), enhancing the nitrogen and phosphorus content of seagrass blades, leading to faster growth.

Given the growing body of scientific literature that confirms the myriad environmental benefits provided by oysters, in tandem with long-held observations of these benefits from oyster growers themselves, we believe that the placement of oyster spat on shell in Grays Harbor as a mitigation strategy will be successful and will not pose any negative environmental effects.

Thank you for the opportunity to comment on this project.

Sincerely,

A handwritten signature in black ink that reads "Robin Downey". The signature is written in a cursive style with a large, sweeping initial "R".

Robin Downey  
Executive Director