UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
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Seattle, WA 98115-0070

NMFS Tracking No.
2000/01345

April 12, 2004

Vikki Whitt
Cultural/Natural Resources Program Manager
Code 106, 1400 Farragut Avenue
Puget Sound Naval Shipyard
Bremerton, Washington 98314-5001

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Dry Dock Operations at Puget Sound Naval Shipyard and Subase Bangor, Puget Sound HUC 17110019

Dear Ms. Whitt:

The Department of the Navy (DON) and NOAA's National Marine Fisheries Service (NOAA Fisheries) consulted under both the Endangered Species Act (ESA), and the Magnuson Stevens Fishery Conservation and Management Act (MSA). The attached document transmits NOAA Fisheries' ESA Biological Opinion (Opinion) and MSA consultation on the Dry Dock Operations at Puget Sound Naval Shipyard (PSNS) and Subase Bangor (SB). These facilities are located in Sinclair Inlet and Hood Canal respectively, Kitsap County, Washington. The DON determined that the proposed action is likely to adversely affect Puget Sound (PS) chinook (*Oncorhynchus tshawytscha*) and Hood Canal summer chum (*O. keta*).

The Opinion reflects the results of formal ESA consultation and contains an analysis of effects covering the PS chinook and Hood Canal summer chum in Sinclair Inlet and Hood Canal. The Opinion is based on information provided when the DON requested consultation and after the agencies initiated formal consultation. A complete administrative record of this consultation is on file at the Washington State Habitat Office.

NOAA Fisheries concludes that implementation of the proposed actions is not likely to jeopardize the continued existence of PS chinook or Hood Canal summer chum salmon or result in destruction or adverse modification of its habitat. In your review, please note the incidental take statement contains Reasonable and Prudent Measures (RPMs) and specific Terms and Conditions to implement the RPMs.

The MSA consultation concluded that the proposed project may adversely affect designated Essential Fish Habitat (EFH) for chinook salmon. The RPMs of the ESA consultation, and the Terms and Conditions identified therein, address the negative effects to EFH resulting from the proposed DON actions. Therefore, NOAA Fisheries recommends that they be used as EFH conservation measures.

If you have any questions, please contact Matt Longenbaugh, Central Puget Sound Branch Chief, Washington State Habitat Office, Lacey, Washington, at (360)-753-7761, matthew.longenbaugh@noaa.gov .

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

Attachment

Endangered Species Act - Section 7 Consultation
and
Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Dry Dock Operations at Puget Sound Naval Shipyard and Subbase Bangor
Sinclair Inlet and Hood Canal, Washington

Agency:	Department of the Navy
Consultation Conducted By:	National Marine Fisheries Service, Northwest Region
Date Issued:	April 12, 2004
	For Michael R Crouse
Issued by:	D. Robert Lohn Regional Administrator
NMFS Tracking No.:	2000/01345

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1.0 INTRODUCTION

This document transmits the NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and Essential Fish Habitat (EFH) consultation based on our review of an action proposed by the Department of the Navy (DON) to conduct dry dock operations at Puget Sound Naval Shipyard (PSNS) and Subbase Bangor (SB) Kitsap County, Washington. The PSNS lies within Sinclair Inlet, Kitsap County, and SB lies within Hood Canal, Jefferson County. In addition, SB lies within the geographic ranges of the Hood Canal summer-run chum evolutionarily significant unit (ESU) and Puget Sound (PS) chinook salmon ESU. The PSNS lies within the range of PS chinook salmon ESU.

The DON Engineering Field Activity Northwest concluded that the proposed action was likely to adversely affect Hood Canal summer chum (*Oncorhynchus keta*) and Puget Sound (PS) chinook salmon (*O. tsawytscha*). Dry docks are large structures that can each enclose an entire ship and are used for the purpose of maintaining Naval vessels on a routine basis.

1.1 Consultation History

This document is based on information provided in the Biological Assessment (BA) and follow-up meetings and correspondence described below. On November 27, 2000, the DON requested formal consultation, providing NOAA Fisheries with a BA describing the proposed action. On April 20, 2001, the agencies visited the site. The visit raised further questions regarding operations and on April 30, 2001, NOAA Fisheries requested more information. On July 16, 2001, NOAA Fisheries received the responses to the April 30, 2001 request for additional information.

The agencies met on October 5, 2001, regarding the possibility of adding security measures to the proposed action at both PSNS and SB. Information necessary to conduct formal consultation was assembled by December 11, 2001. Subsequently, the agencies initiated formal consultation.

The DON sent new information addressing water treatment procedures on June 26, 2002. The agencies conducted additional telephone conversations and electronic mail (e-mail) correspondence.

During preparation of the Opinion, the DON biologist responsible for reviewing the draft document was unavailable to provide review. NOAA Fisheries and PSNS mutually agreed to extend the timeline for the consultation until DON staff could review the incidental take statement of this Opinion.

In October 2003, NOAA Fisheries, SB, and PSNS conferred to resolve residual issues and to set a timeline for completing the Opinion. The DON provided further information on forage fish surveys in and around SB.

1.2 Description of the Proposed Action

The DON proposes to conduct as many as 50 annual dry dock operations, in each of the next five years. The PSNS has six dry docks located within the Controlled Industrial Area (CIA). They are sited in a roughly east to west order. The SB has one dry-dock, operated by the Intermediate Maintenance Facility (IMF). At SB, the dry dock is located 400 feet offshore and is used for Trident Class submarines.

The DON cannot disclose the exact number and timing of individual dry dock operations (cyclings). The approximate number of cyclings will be two per dry dock on a monthly basis for both PSNS and SB. Dry dock cyclings include four activities. These are flooding, caisson removal, caisson replacement, and dewatering ("pump-down"). Caissons are removable watertight walls used to keep water out of the dry docks during cyclings. Ship movement occurs between caisson removal and replacement. Dry docks are swept, washed, and inspected before flooding.

1.2.1 Puget Sound Naval Shipyard

The PSNS uses two flooding techniques at its six dry docks. These are (1) flooding directly through ports on the caisson, or (2) flooding through gated sluice tunnels that discharge through the dry dock floor or side walls. Filling time for each dry dock is approximately two hours. After flooding, the operator removes the caisson and opens the dry dock to the surrounding aquatic environment. Before removing a caisson, the operator activates bubble screens to avoid entraining fish passing near the caisson openings. Bubble screens consist of one inch diameter piping that follows the contour of the opening of each dry dock. Air is forced through small holes placed approximately two inches apart creating a wall of bubbles intended to keep fish from entering the dry dock.

After removal or insertion of a ship, the caisson is replaced and pump-down starts. Pump-down takes two to three hours to complete. Several impeller pumps drain the water through grated sluice tunnels in the dry-dock floor and through small doors on the side walls. Grates range in size and number from two 9- by 14- foot grates to one 12- by 63- foot grate. Spaces between bars on each grate range from one to two inches. The number of side doors in each dry dock range from four to twelve. Spaces between bars on each door is about two inches. Individual impeller pumps discharge 80,000 to 130,000 gallons per minute (gpm) and drain directly into Sinclair Inlet creating a zone of turbulence about 300 feet long.

1.2.2 Subbase Bangor

The one dry dock at SB, located at the Delta Pier Complex (DPC), is 90 feet wide, 63 feet deep, and 690 feet long. The floor elevation is 43 feet below mean lower low water (MLLW) level. The dry dock is flooded through conduits and floor flooding outlets provided at the entrance and dewatered by pumps which are fed through dewatering inlets. Three 9-foot by 9-foot grates line the dry-dock floor and serve as dewatering exits. A bubble screen is in place at the entrance end of the dry dock, similar to bubble screens at PSNS.

1.3 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action areas for the proposed actions are within two waterways, Hood Canal and Sinclair Inlet. The PSNS is a part of the Bremerton Naval Station Complex (BNC) which lies within Sinclair Inlet. The SB is across the Hood Canal from the Toandos Peninsula.

<u>1.3.1 Puget Sound Naval Shipyard and Sinclair Inlet</u>

Sinclair Inlet is a 3.5-mile long enclosed inlet located on the eastern Kitsap Peninsula in central Puget Sound. Sinclair Inlet is the appropriate area for analysis of the effects of the proposed activities on ESA-listed species.

<u>1.3.2 Subbase Bangor and Hood Canal adjacent to Toandos Peninsula</u>

Hood Canal is a fjord-type body of water in western Puget Sound which exhibits the classic U-shaped cross-sectional profile of a glacial trough. The action area is defined as the 10-mile length of Hood Canal in the vicinity of SB, from Hazel Point on the east shore of Toandos Peninsula to the Hood Canal Bridge (Termination Point and Salisbury Point). This area of Hood Canal is the action area for the existing SB dry dock activities because this area is a segment of Hood Canal defined by natural features that make it the appropriate area for analysis of the effects of the proposed action.

2.0 ENDANGERED SPECIES ACT - BIOLOGICAL OPINION

The ESA of 1973 (16 U.S.C. 1531-1544), as amended, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat on which they depend. An ESU is considered a distinct population segment which can be protected as a species (16 U.S.C. 1532 (16)). Section 7(a)(2) of the ESA requires Federal agencies to consult with FWS and NOAA Fisheries, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their critical habitats. This Opinion is the product of an interagency consultation pursuant to section 7(a)(2) of the ESA, and implementing regulations found at 50 CFR Part 402.

2.1 Evaluating the Proposed Action

The standards for determining jeopardy, as set forth in section 7(a)(2) of the ESA, are defined at 50 CFR 402. NOAA Fisheries must determine whether the action, when taken together with effects from baseline conditions and cumulative effects, is likely to jeopardize the listed species. This analysis involves the initial steps of defining the biological requirements of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of injury and mortality attributed to: (1) the environmental baseline; (2) collective effects of the proposed or continuing action; and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. NOAA Fisheries must identify reasonable and prudent alternatives for the action if it is determined that the action will jeopardize listed fish.

2.1.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements. The biological requirements are those conditions necessary for Puget Sound chinook and Hood Canal summer chum salmon to survive and recover to such naturally reproducing population levels that protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic and spatial diversity of the listed stocks, and enhance their capacity to adapt to various environmental conditions, and allow them to be self-sustaining in the natural environment.

Information related to general biological requirements for Hood Canal summer chum and PS chinook salmon can be found in NMFS 1997 and NMFS 1998, respectively. Five general classes of features or characteristics determine the suitability of aquatic habitats for salmonids. These are: adequate flow regime, good water quality, sufficient habitat structure (rearing and sheltering areas), plentiful food (energy) source, and appropriate biotic interactions (Spence, *et al.*, 1996). For this consultation, water quality, habitat structure, food (energy) source and biotic interactions are biological requirements that NOAA Fisheries believes will be affected by this action.

2.1.2 Environmental Baseline

The environmental baseline represents the current set of conditions in the action area to which the effects of the proposed action will be added. Environmental baseline is defined as "the past and present impacts of all Federal, state, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal actions in the action area that have already undergone formal or informal section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation process" (50 CFR 402.02). The term "action area" is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action."

The proposed action will occur in two distinct waterways: Sinclair Inlet and Hood Canal. The BNC, which contains PSNS, is located on the western shore of Sinclair Inlet. Over 20 streams drain the Sinclair Inlet watershed including Gorst, Blackjack, Anderson, and Ross creeks which all are believed to support low numbers of naturally spawning PS chinook in some years; *e.g.*, with favorable flow conditions and larger numbers of chinook. Hood Canal, saltwater inlet of PS, bounds 4.5 miles of SB to the west. Hood Canal, adjacent to SB, averages 1.5 miles in width, and is bordered on the west by a Navy-owned buffer strip on the Toandos Peninsula.

There are several other actions within both action areas that have already undergone formal or informal section 7 consultation and are considered part of this baseline analysis. These actions are summarized in the following paragraphs. Because dry dock operations are a continuing program, they will overlap in time with all of these actions.

2.1.2.1 Bremerton Naval Complex CERCLA Sediment Remediation

Some of the marine sediments at the BNC have been identified as highly toxic. Approximately 229,000 cubic yards of contaminated sediment have been dredged from some areas for remediation. This dredging was conducted in conjunction with dredging for navigation purposes as part of the CVN (Nimitz-class Aircraft Carriers) home-porting action that has already undergone section 7 formal consultation with NOAA Fisheries on October 25, 1999. The sediments removed under the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) program were disposed of in a confined aquatic disposal (CAD) facility excavated in the floor of Sinclair Inlet offshore of the BNC. A cap of clean sand and native sediment were placed over the CAD. The intent of the sediment remediation action is to improve the quality of aquatic and human habitat in Sinclair Inlet.

2.1.2.2 CVN Dredging and Pier D Replacement

Initiated in June 2000, this action includes dredging of approximately 368,000 cubic yards of sediment from berths at Piers D, B, 3, and from two turning basins off of Pier D. It also includes replacing Pier D (currently 60 feet wide and 1,000 feet long) with a larger structure 150 feet wide and 1,350 feet long. The purpose of the action was to improve facilities for home-porting of Nimitz class aircraft carriers at the BNC. NOAA Fisheries formally consulted on this action on October 25, 1999. Since some of the sediment to be dredged and disposed of in the pit CAD for this action is contaminated, this action is also expected to result in improved habitat quality in Sinclair Inlet.

2.1.2.3 Other Pier and Wharf Upgrades

Over the past few years, NOAA Fisheries has consulted informally with the DON for a series of relatively low-impact actions that involved reconstruction of piers and wharfs and remediation of riprap shorelines at PSNS and SB.

2.1.2.4 Sinclair Inlet

Sinclair Inlet is located in central Puget Sound and is a relatively flat and shallow 3.5 mile-long estuary located on the eastern Kitsap Peninsula. Currents in Sinclair Inlet are primarily tidal and weak, thus the substrate is predominantly mud and muddy sand (URS Greiner, 1999b). Tidal currents and winds are the primary sources of water circulation in Sinclair Inlet, which has irregular, semi-diurnal tides, typical of the Puget Sound area. Weak tidal currents move water in and out of the inlet with a maximum velocity of 0.2 to 0.3 knots. The inlet is primarily depositional, with sedimentation rates ranging from 0.5 to 2 centimeters per year (McLaren, 1998) (cited in the BA).

Much of Sinclair Inlet has been armored with quay-wall and riprap. The generally steep armoring extends down to approximately the MLLW elevation, with less steep slopes and a range of sediment types (sand to cobble and rubble) below. Armoring has largely eliminated shallow intertidal zones. The south shore of Sinclair Inlet is characterized by residential areas, commercial activities, shoreline highway, and steep slopes. Bathymetry for Sinclair Inlet shows a generally flat bottom, averaging 30 to 40 feet MLLW. Water depths are deepest at the mouth of the inlet, ranging from 45 to 60 feet and west of PSNS, water depths are generally less than 30 feet. Within the BNC, dredging has created water depths ranging between 30 to 45 feet, increasing to 50 to 60 feet in berthing areas adjacent to the piers.

Sinclair Inlet is defined as a Class "A" water according to the Washington State Department of Ecology (DOE) Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A) (cited in the BA). Class "A" waters must achieve the following criteria for turbidity: "Turbidity shall not exceed 5 nephelometric turbidity units (ntu) over background when the background turbidity is 50 ntu or less or exceed the background by more than 10% when the background turbidity is more than 50 ntu" (Ecology, 1997).

Sinclair Inlet has been and continues to be affected by many point and non-point pollution sources including wastewater treatment plant effluent, septic tank drain fields, stormwater runoff, combined sewer overflows, and fuel spills (URS Greiner, 1999b). Based on sediment data, Sinclair Inlet is listed on the 1998 303(d) list for impaired water bodies.

2.1.2.5 Hood Canal

Tides in Hood Canal are twice-daily with a mean tidal range of 8 to 5 feet near SB. Cooler, denser ocean water enters the bottom of Hood Canal from Admiralty Inlet, north of the SB complex. The tide is the dominant force establishing current flow in the Hood Canal region, although currents are also affected by winds, bathymetry, freshwater inflow, and density gradients. Current patterns are less predictable in nearshore areas along the Hood Canal.

Drift studies near SB described in the BA identified localized eddies near the piers during both flood and ebb tides. For example, clockwise eddies form south of the large pier complex containing the dry dock during ebb tides, and counterclockwise eddies form north of the pier complex during flood tide. Maximum flows measured within ebb eddies were slightly less than 0.5 knots while maximum flows within a flood eddy were closer to 0.4 knots.

The water in Hood Canal is typically stratified with less saline, warmer water overlying colder, saline bottom waters. The depth of the pycnocline, the region of rapid salinity and temperature change between the upper and lower water masses, varies due to seasonal conditions such as freshwater input, wind-induced mixing, and solar heating. The salinity of the upper surface layer ranges from 23 to 30 parts per thousand (ppt). According to the BA, water temperature averages 52˚F and varies between 45˚F and 62˚F. In the vicinity of SB, salinity and temperature in the lower layers of Hood Canal remain fairly constant throughout the year. Artesian springs located within the restricted waters surrounding SB lower salinity near the shorelines (T. James, pers comm., 2000). The south end of Hood Canal, outside the action area, is noted for seasonally low-dissolved oxygen and threats to benthic life during late summer.

Hood Canal is relatively long (67 miles) and narrow (average 1.5 miles) and has the classic U-shaped cross-sectional profile of a glacial trough. The bathymetry in Hood Canal is typical of fjord estuaries, with relatively steeply sloping walls and a relatively flat bottom. The waters in the Hood Canal are deep, ranging from150 to 600 feet. Two shallow transverse sills (approximately 100 feet deep) exist north and south of SB. Depths along the axis of Hood Canal west of SB range from 200 to 400 feet. The narrow nearshore areas slope gently until reaching the steep walls of the main channel. Several small spits extend from the shore into water depths of 100 feet. Between these spits are relatively shallow embayments with gentler bottom slopes.

2.2 Status of the Species

NOAA Fisheries considers the current status of the listed species taking into account population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list Puget Sound chinook and Hood Canal summer chum salmon for ESA protection and also considers new data available that is relevant to the determination.

2.2.1 Puget Sound Chinook Salmon

Puget Sound chinook salmon were listed as threatened on March 24, 1999 (64 Fed. Reg. 14307). The species status review identified several limiting factors: the high level of hatchery production which masks severe population depression in the ESU; severe degradation of spawning and rearing habitats; and restriction or elimination of migratory access (NOAA Fisheries, 1998a, and 1998b). The ESU for PS chinook includes chinook populations from all rivers in Puget Sound and Hood Canal.

Virtually all of the 22 extant PS populations of chinook salmon are far below what are believed to be their historic numbers. A recent review of the ESU reiterated and updated some of the factors contributing to low numbers in this ESU: hatchery effects; harvest; habitat blockages; diking; sedimentation; hydropower; and flood control and flow effects (NOAA Fisheries Feb. 2003).

Chinook are generally classified as ocean or stream type. Ocean-type fish are characterized by a short juvenile fresh water residence time and normally migrate to estuarine areas within the first year, usually within three months after emergence from spawning gravel. They typically return to their natal stream a few days or weeks before spawning in the fall. Stream-type chinook typically spend one or more years in fresh water before migrating to the sea and often return to their natal streams beginning in early summer, several months prior to spawning. The majority of PS chinook salmon, including those found in Sinclair Inlet and Hood Canal, are ocean-type fish which emigrate to the ocean as sub-yearlings.

Chinook smolts, which are sub-yearlings that are becoming adapted to saltwater and generally migrating to the ocean, are the life stage of chinook that appear to be most vulnerable to impacts from the proposed actions. Puget Sound, including nearshore areas within the actions areas, provides important rearing habitats for chinook juvenile during their first few months or year as they leave fresh water to begin their ocean life phase.

There are no substantial populations of chinook salmon in streams draining to Puget Sound from the east side of the Kitsap Peninsula including Sinclair Inlet and its tributaries. Fall-run chinook salmon in Sinclair Inlet are supported almost entirely by hatchery production of chinook in the Gorst Creek hatchery/rearing pond facility operated by the Suquamish Tribe in cooperation with the Poggie Club and City of Bremerton. The hatchery has been in operation since 1982 and currently releases over 2 million juvenile chinook salmon into Gorst Creek annually. The stock is of Soos Creek (Green River, Washington) origin, via the Grovers Creek hatchery on Miller Bay.

The use of marine and estuarine waters of Sinclair Inlet by chinook is believed to be predominately as a migration corridor with seasonal rearing along the nearshore.

2.2.2 Hood Canal Summer Chum

Hood Canal summer chum salmon were listed as threatened on March 24, 1999 (64 Fed. Reg. 14508). Threats to the continued existence of these populations include degradation of spawning habitat, low water flows, and incidental harvest in salmon fisheries in the Strait of Juan De Fuca and coho salmon fisheries in Hood Canal (NOAA Fisheries Feb. 2003). This ESU contains nine extant summer chum populations in Hood Canal, and in Discovery and Sequim Bays on the Strait of Juan De Fuca.

Chum salmon (*Oncorhynchus keta*), are widely distributed anadromous salmon. Chum are ocean-type fish with a short juvenile freshwater residence time (up to three months). Fry typically migrate seaward immediately after emergence and generally enter estuaries (February to mid-May) when they are 1.2 to 2 inches (Emmett *et al.* 1991). The estuarine habitat is used by chum smolts for rearing, refugia from predators, and as a physiological transition area (Simenstead *et al*. 1982).

Hood Canal summer chum have been in serious decline over the past 30-plus years. According to the recent review (NOAA Fisheries Feb. 2003), an extensive hatchery rebuilding program since 1992 has resulted in substantial increases in abundance of two populations (Discovery Bay and Quilcene), with numbers of summer chum (5-year geometric mean) of the other seven populations each ranging from fewer than 10 to a few hundred.

The early timing (early August into October) of returning summer chum creates a temporal separation from the more abundant fall chum which spawn in the same area, allowing for reproductive isolation between summer and fall chum stocks in the region. The summer chum spawning tributaries of Hood Canal and the eastern Strait of Juan de Fuca, are also spatially separated from other fall chum populations in other Puget Sound streams. The principal juvenile salmon emigration through Hood Canal is believed to be February through mid-July (Salo et al, 1980).

Juvenile and sub-adult summer chum salmon use estuarine and marine areas in Hood Canal and the Strait of Juan de Fuca for rearing and seaward migration. The fish spend two to four years in the northeast Pacific Ocean feeding areas prior to immigrating to their natal streams. After arriving near their natal streams, adults may delay immigration to freshwater for up to several weeks before entering the streams to spawn. Spawning occurs in the lower reaches of each summer chum stream.

2.3 Factors Affecting Species in the Action Area

2.3.1 Sinclair Inlet

There are a variety of man-made alterations to the shoreline of Sinclair Inlet. Shoreline roads, riprap, bulkheads, quay-walls, overwater structures (piers, ramps, floats), and large-sized moored vessels all contribute to diminished function for rearing PS chinook. The southern shore of Sinclair Inlet has been modified, yet contains some of the remaining shallow shoreline habitat in the inlet. Small amounts of marsh and intertidal habitat is at the mouths of Blackjack, Anderson, and Ross creeks. Along the north shore of Sinclair Inlet in the vicinity of PSNS, deeper water and mostly rip-rapped shorelines provide limited rearing habitat for juvenile salmonids. In addition, a marina is located north of PSNS in the City of Bremerton, and eight marinas exist along south Sinclair Inlet, in the City of Port Orchard. One noted functional shoreline is a restored segment about 1,000 feet long, Charleston Beach, on north Sinclair Inlet on the west end of BNC.

Fine-sized sediment accumulates in the PSNS. Generally, once mud has been deposited, it is difficult for further transport to take place. However, resuspension and redeposition occurs in the berthing areas of the shipyard, presumably as a result of propeller wash associated with vessel activity around the docks (McLaren, 1998) (cited in the BA).

2.3.2 Hood Canal

There are several factors affecting salmonid species around SB. A major factor is the number of piers within the action area. The Service Pier is located just north of Carlson Spit towards the southern end of the DON's Bangor property. The Magnetic Silencing Facility is located at the north end, near Cattail Lake and Floral Point. Several other piers and wharves are also present between Carlson Spit and Floral Point, including K/B Dock, Delta Pier, Marginal Wharf, and the Explosives Handling Wharf. All pier structures built after 1975, which excludes K/B dock and Marginal Wharf, were designed in consultation with state and Federal agencies to reduce impacts to salmonid migration (T. James, pers. comm.). Juvenile chum have been observed to move offshore around the wharves as they migrate north out of Hood Canal (Salo *et al.* 1980). The entrainment of salmon during cyclings of the SB dry dock also represents a type of physical barrier to salmon movement and is discussed below in (section 2.7.1, number 5).

In addition, ecological processes have been altered by adjacent land management practices and direct actions within the Hood Canal watershed. The lack of stormwater controls at SB has affected local substrate sediment stability, quality and composition. In addition, the northern end of SB was once used for pyrotechnics testing, dumping of miscellaneous solid and liquid wastes, and municipal waste land filling (U.S. Navy 1983). This area has, however, undergone extensive reworking to restore it to a more natural shoreline.

2.4 Status of the Species within the Action Area

2.4.1 Puget Sound Chinook Salmon

Fall-run chinook salmon in Sinclair Inlet are supported by a combination of natural spawning and mostly hatchery production of chinook in the Gorst Creek hatchery. In some years, as many as 2,000 naturally spawning chinook have been observed in Gorst Creek. Spawning chinook have also been documented in Blackjack Creek (SIWMC 1995) (cited in the BA.) The practice of the tribal hatchery on Gorst Creek is to rear juveniles in ponds to smolt stage which are then released for downstream emigration. The juvenile salmon emigration season in freshwater is thought to be within the period from mid-February through mid-July.

The Suquamish Tribe Fisheries Department (S. Pozarycki, pers. comm., 1999) reports that approximately three percent of the adult chinook caught annually in the tribal fishery in Area 10E (Sinclair Inlet, Port Orchard, Rich Passage and Liberty Bay) consists of tagged fish from hatcheries other than the Gorst Creek hatchery. In addition, chinook salmon from stocks that spawn elsewhere in the PS basin may occur in Sinclair Inlet on occasion during migration or other movements. Until the past year or so, Gorst fish have not been tagged and cannot be distinguished from progeny of naturally spawning fish. Therefore, it has not been possible to differentiate hatchery chinook from other stocks that occur in Sinclair Inlet.

Immigrating adult salmon use deeper areas of the inlet prior to moving into the tributary creeks to spawn. Spawning takes place from late August to late October (SASSI 1994).

In Hood Canal, PS chinook have similar timing to Sinclair Inlet for juvenile emigration along the nearshore, beginning in later April, peaking in May and finishing in early July (Salo etal. 1980). Adult chinook are present in several streams in Hood Canal outside the action area. Their use of the nearshore near SB is unknown. Studies of juvenile chum have not detected many chinook (Salo et al. 1980, Simenstad et al.1982).

One nearshore area, adjacent to SB, that is used by juvenile salmonids is Devil's Hole. This is a shallow, man-made lake that resulted from road construction and the installation of a water level control structure on the culvert draining Devil's Hole Creek (BA). It includes a variety of wetland habitats, and is fed by perennial streams, that support a variety of juvenile salmonids other than chum, *i.e.*, coho, chinook, steelhead and cutthroat. A fish ladder installed in 1981 has allowed this watershed to support anadromous fish. Winter storms of 1995 caused a large landslide into the stream system, resulting in silting of the spawning habitat. Returns of salmon have since diminished substantially. According to the BA, the DON has been working with the Washington Department of Fish and Wildlife (WDFW) to reestablish salmonid access to productive habitat within the Devil's Hole watershed (U.S. Navy 1999).

2.4.2 Hood Canal Summer Chum Salmon

Hood Canal summer chum migrate through the action area, and represent a mix of hatchery and natural production: no spawning is known in the action area. There are nine remaining populations with another seven extirpated.. Summer chum salmon have been produced at the Quilcene National Fish Hatchery (QNFH) for many years. Since 1992, about one-half of the annual return of summer chum salmon to the Quilcene River has been spawned artificially (Cook-Tabor 1994). Harvest rates have dropped from highs of around 10% (ranging from 7 to 12%) in 1972, to an average of 5% (ranging from less than one to 14%) from 1997 to 2002.

Juvenile summer chum salmon are one of several species of salmonids that utilize the nearshore habitat along SB. Juvenile chum salmon migrate through these waters from late February to late July, peaking in May and June (Salo et al. 1980. Simenstad et al. 1982).

2.5 Effects of the Proposed Action

Because the portions of Sinclair Inlet and Hood Canal, in and around PSNS and SB respectively, may support rearing areas for juvenile listed salmonids, the DON had determined its proposed dry dock operations at Puget Sound Naval Shipyard and Subbase Bangor are likely to adversely affect PS chinook and Hood Canal summer chum salmon. The ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline."

The proposed dry dock operations at PSNS and SB will maintain habitat indicators for ESA-listed fish and thus not degrade the ecological functions of the environmental baseline at the action areas. As such, the primary adverse effects of the proposed action are the direct effects of the dry dock operations.

2.5.1 Direct Effects

Direct effects are the immediate effects of the action on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated actions and interdependent actions. Future Federal actions that are not interrelated or interdependent with the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated, because they are obliged to be evaluated in future section 7 consultations.

Juvenile and adult chinook and chum salmon are likely to be present in the action areas during the proposed operations. Generally, the degree of direct effects is related to the extent, duration, and time of year that the listed fish are exposed to the proposed operations, in or adjacent to

Sinclair Inlet and Hood Canal. The negative effects associated with the proposed operations are likely to be short in duration and can be minimized through Best Management Practices and timing of operations.

The effects of the proposed dry dock operations at PSNS and SB were evaluated in terms of their effect on specific indicators of estuarine function. These are summarized below with effects for both action areas addressed for the affected indicators. Each element of the effects analysis is discussed for both action areas (Sinclair Inlet and Subbase Bangor).

2.5.1.1 Turbidity: Sinclair Inlet (PSNS) and Hood Canal (Subbase Bangor)

Water discharged during dewatering of the dry docks is emptied directly back into adjacent marine waters. Water is discharged near the surface with the dewatering tunnels approximate 10 to 15 feet below the surface. At the quaywall, the elevation of the sea floor is approximately minus 20 feet MLLW, or 15 feet below the bottom of the tunnel opening. Depths increase with distance away from the quaywall from minus 20 to 30 feet MLLW. When all pumps are running, the dry docks discharge into the surface waters near the dry docks creating a turbulent tailrace about 300 feet long. Short-term turbidity effects could occur from re-suspending bottom sediments. However, dewatering of the dry docks purposely occurs at high tide, lessening the potential for bottom sediment to be re-suspended. The dewatering tunnels are set as high as practicable off the bottom (about 16 feet) to minimize impacts from turbulence. Furthermore, there were no turbidity plumes observed at the surface over the period of sampling. Dry dock operations would likely not result in short- or long-term increases in turbidity, due to the short length of time and low frequency of dry dock operations. Therefore, turbidity from dry dock operations is not likely to degrade salmon habitat on either a short or long-term basis. This holds true for SB to a greater extent as the dewatering process is the same, but with a one-third less volume of water per minute, the tunnel sits further off the sea floor and it is outside the intertidal zone.

2.5.1.2 Sediment Contamination

As stated above, dry dock pumpdown is expected to have little potential for the resuspension of contaminated bottom sediments. Therefore, dry dock operations are not expected to affect sediment contamination conditions in the action areas.

The SB has a sophisticated water treatment system. All dry dock process water (water generated through ship maintenance and other dry dock operations) is collected and treated in the "SUBBASE" treatment system to meet standards set by the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) permit prior to discharge. In addition, particulates and other residuals on the floor of the dry dock are removed prior to flooding for each cycling. Therefore, very little in the way of chemical contaminants is discharged upon pumpdown, and dry dock operations are not expected to affect water contamination conditions in Hood Canal.

2.5.1.3 Substrate/Armoring, Depth/Slope, Tideland Condition, Marsh Prevalence and Complexity, and Refugia

Dry-dock operations will have no effect on shoreline armoring conditions, or on general substrate conditions in the action areas. Dry-dock operations do not involve any deepening, filling or changes to the slope of the seafloor in the action areas. There will be no effect on existing tidelands since no tidelands exist withing the immediate areas surrounding PSNS and SB. Proposed operations will not affect marsh prevalence or complexity at both bases and dry-dock operations will not affect refugia for juvenile salmon, forage fish, or other organisms.

2.5.1.4 Physical Barriers, (Entrainment/ Puget Sound Naval Shipyard)

Entrainment is the voluntary or involuntary movement of fish from the parent water body into a surface diversion, a man-made structure or installation for diverting water. All PSNS dry docks are perpendicular to the shoreline and the opening of the dry docks are at the quaywall, which defines the shoreline. It is known that juvenile salmonids migrate along this shoreline towards the open ocean (SAIC 1999, and data cited in the BA).

Fish may enter the dry docks through two possible routes: the caisson valves during flooding, or the main opening of the dry dock. It is considered likely that the majority of the fish enter through the main opening when the caisson is off (Lt. Cmdr. Chris Warren, pers. comm., April 2001). Fish that enter the dry docks are unavoidably exposed to potentially harmful structures as the dry dock is emptied. Small fish, including juvenile salmonids and forage fish, get entrained through the grates or side doors, travel through 100 or more yards of 6-foot diameter tunnels, then pass through six-veined 5-foot diameter impeller pumps, and finally back into Sinclair Inlet. Larger fish that are entrained are removed by hand when the water level in the dry dock is between 1 to 2 feet deep. The fish are manually removed by dip-nets, examined for an adipose fin, placed in water-filled containers, and returned to the adjacent water body. The DON would report the number, species and disposition of adult ESA-listed salmon to NOAA Fisheries.

To ascertain the effects of the dry docks on juvenile salmonids and forage fish, sampling was done by the DON to determine the species and number of fish entrained in the dry docks. Science Applications International Corporation (SAIC) contracted with the DON to conduct this study, which screened the dewatering grates and doors to capture fish that normally would pass through. Also, PVC-coated hardware cloth was manufactured to fit and cover each grate door. The openings in the cloth are one-half inch in diameter. These screens were found to be effective in retaining juvenile salmonids and forage fish. At the completion of pumpdown (less than 3 feet of water remaining), a team entered the dry dock and collected impinged fish from all the screens. Unavoidably, impinged fish showed 100% mortality due to velocity of flow. The suction of the pumps upon the fish is far greater then the ability of the juvenile fish to swim away. Most dry docks, at both PSNS and SB, have a trench (approximately 2 to 10 feet across the width of the dry dock) on the caisson end of the dry dock that traps live fish. No adult salmonids were entrained during any of the sampling events. This was likely due to cyclings occurring outside the adult migration season. Entrained salmonids included chinook, chum and coho juveniles, while forage fish included herring, sand lance, surf smelt and anchovies.

Tables 1 and 2, below, show the catch per unit effort (CPUE), calculated as the number of fish entrained per hour the caisson was off, the status of the bubble screen, and the total time that the caisson was removed. Herring schools are known to be reluctant to swim through a curtain of bubbles even when frightened. Sharpe and Dill 1996 and Arimoto *et al.* 1993 confirmed the herding effect of a moving air bubble curtain on jack mackerel.

Table 1. Juvenile salmonid capture results from SAIC sampling at PSNS dry docks (March-July 2000).

Date	Dry Dock (DD #)	Caisson Removal (hours)	Chinook	Chum	Coho	Total	Bubble Screen Status	CPUE (fish/hour caisson off)
3/29/00	**DD4**	2.75	0	0	0	**0**	**OFF**	0
5/1/00	**DD4**	70.0	0	628	71	**699**	**ON**	10
5/6/00	**DD6**	2.0	32	0	11	**43**	**OFF**	21.5
5/24/00	**DD6**	1.5	57	21	19	**97**	**ON**	64.7
6/8/00	**DD5**	2.75	24	7	23	**54**	**OFF**	19.6
6/29/00	**DD5**	5.5	69	172	22	**263**	**OFF**	52.6
7/27/00	**DD6**	1.75	0	4	206	**210**	**ON**	120

Table 2. Forage fish capture results from SAIC sampling at PSNS dry docks (March-July 2000).

Date	DD#	Caisson Removal (hours)	Herring	Sand Lance	Surf Smelt	Anch ovies	Total	Bubble Screen Status	CPUE fish per hour, caisson off
3/29/00	**DD6**	2.75	0	0	140	0	**140**	**OFF**	50.9
5/1/00	**DD4**	70.0	242	45	0	0	**287**	**ON**	4.1
5/6/00	**DD6**	2.0	15	750	0	0	**765**	**OFF**	382.5
5/24/00	**DD6**	1.5	0	0	0	0	**0**	**ON**	**0**
6/8/00	**DD5**	2.75	200	3	0	2	**205**	**OFF**	74.5
6/29/00	**DD5**	5.5	780	43	4	0	**827**	**OFF**	165.4
7/27/00	**DD6**	1.75	78	20	1	0	**99**	**ON**	**56.6**

2.5.1.5 Physical Barriers, (Entrainment/ Subbase Bangor)

The process of entrainment for the dry dock located at SB is similar to entrainment processes for PSNS dry docks. Flooding at the SB dry dock occurs through ports in the caissons. The dry dock at SB is some 220 feet offshore on the north end and 500 feet offshore on the south end. The dry dock is also oriented parallel to shore with its opening facing north. These specifications were engineered in part to minimize impacts to northward migrating juvenile salmon.

Results from these sampling events confirmed the entrainment of salmonids and forage fish by the SB dry dock operations, and are summarized in Tables 3 and 4, below. It was not possible to place screens on the dewatering grates for the first two cyclings (April 18 and May 18, 2000), and it was possible to screen only one (of a total of three) dewatering grates on the final cycling (June 20, 2000). As a result, there is little information from the fish entrainment studies of juvenile salmon and forage fish in the SB dry dock

Table 3. Juvenile salmonid capture results from SAIC sampling at SB dry dock (April-June 2000).

Date	Caisson Removal (hours)	Chinook	Chum	Coho	Total	Bubble Screen Status	Screen On Outlets
4/18/00	2.0	0	0	0	**0**	ON	**NO**
5/18/00	5.0	0	0	0	**0**	ON	**NO**
6/20/00	1.5	25	10	0	**35**	OFF	**YES**

Table 4. Forage fish capture results from SAIC sampling at SB dry dock (April-June 2000).

Date	Caisson Removal (hours)	Herring	Sand Lance	Smelt	Ancho vies	Total	Bubble Screen Status	Screen On Outlets
4/18/00	2.0	0	0	0	0	**0**	ON	**NO**
5/18/00	5.0	0	1500	0	0	**1500**	ON	**NO**
6/20/00	1.5	0	100	0	0	**100**	OFF	**YES**

Analyses of these limited studies did not reveal a discernable pattern of fish entrainment with bubble screen or hours of caisson off time. Apparently, other unmeasured factors may affect entrainment of fish into the dry docks. these factors include the number of salmon and other fish present near the dry dock opening at the date and time of each cycling, the large variation in dry dock operational factors, and the limited number of observations are all likely factors.

2.5.1.6 Conclusions for 2000 DON/PSNS Juvenile Salmon and Forage Fish Study

The PSNS study concluded the total number of salmonids captured per cycling weakly correlated with longer hours of caisson removal. As for the bubble, there is a weak correlation with the forage fish data, which showed that sometimes fewer fish were entrained when the bubble screen was on. This pattern was not seen for juvenile salmonids. The bubble screen was on for the largest CPUE and off for the lowest CPUEs.

By far, the largest fraction of chinook in Sinclair Inlet is of hatchery origin. Adult chinook returns to Sinclair Inlet streams, *i.e.*, natural spawners, for 1998 was estimated at 2,516 fish (Baranski 1999). With this escapement and a 1.5 to1 sex ratio (Smith and Castle 1994), approximately 3,774,150 eggs would have been deposited (average 4,500 eggs/female) (Beauchamp 1983, Groot and Margolis 1991). Since there are no reliable freshwater emigration survival rates for chinook, the average freshwater survival rates for other species of salmonids (13.5%) will be used here. These numbers estimate that 56,000 smolts enter Sinclair Inlet. Furthermore, the Suquamish Tribe released an estimated 1,500,000 chinook smolts from Gorst Creek rearing ponds in early May 2000 (S. Pozarycki, pers. comm). An estimated 182 combined hatchery and naturally produced chinook smolts were caught in PSNS dry docks during the 2000 juvenile salmon migration period. This equates to less than 0.1% entrainment of the total chinook smolts entering Sinclair Inlet from local streams.

Relative numbers of hatchery and naturally produced juvenile chinook were confirmed by tribal surveys conducted by the Suquamish Tribe from April through September of 2001. Six sites chosen around PSNS from a total of 22 within Sinclair Inlet. On average, 11 beach seines were conducted at each site. Shores were characterized by being either natural, rip-rapped or bulk-headed. The six sites had a representative of each shoreline characteristic (Suquamish, 2001).

Table 5. Suquamish juvenile salmonid study for Sinclair Inlet (April-September 2001).

Site	Number of Seines	# of Chinook (natural)	# of Chinook (hatchery)
Charleston Beach	12	6	24
CTC/U.S.S. Turner Joy	10	0	5
Natural Beach	11	11	42
Ross Point	12	20	154
Tatoo Point	11	8	37
Windy Point	12	34	325
Totals	69	79	587

The highest CPUE for juveniles from the hatchery was for the month of June, (16.0-18.0), with an almost equal distribution in CPUE for both the north and south sides of Sinclair Inlet. The lowest CPUE was for the month of September, (0.0). The highest CPUE for naturally produced juveniles was for the months of April and June, (1.6), with an equal distribution for both the north and south sides of Sinclair Inlet. Again, the lowest CPUE was for the month of September. The study also found that seining conducted at night yielded a much higher CPUE (Suquamish, 2001).

2.5.1.7 Conclusions for 2000 DON/SB Juvenile Salmon and Forage Fish Entrainment Study

Results from these three sampling events confirmed the entrainment of salmonids and forage fish by the SB dry dock operations. However, it was not possible to place screens on the dewatering grates for the first two cyclings and it was possible to screen only one (of a total of three) dewatering grates on the final cycling. Because of the offshore location of the dry dock at SB, in deeper water. it is likely that the SB entrains relatively few migrating juvenile salmon. However, this cannot be substantiated with the limited data available for the SB dock. No trends or patterns could be identified from the available data, and the effectiveness of the bubble screen could also not be determined.

2.5.1.8 Mortality Rates at both PSNS and SB

The few cyclings studied and relatively few numbers of fish caught did not allow observers to calculate juvenile salmonid mortality rates during pump-down. Therefore, mortality was estimated using data from studies of juvenile salmon mortality during passage through similar systems. The mortality rate of juvenile salmon through dry dock pump-down system at PSNS and SB is expected to be roughly comparable to mortality from passage through turbines at hydroelectric dams with similar revolutions per minute. Although typically larger, Francis turbines, found at most dams, are similar to the Worthington General Electric impeller pumps used at PSNS (John Ferguson, pers. comm.). Available estimates of mortality of salmonids traveling through turbines range from 2.3 to 19% (Whitney *et al.* 1997). Reports have shown an average of 13% of the total run of juvenile salmonids have been consumed by gulls alone below the turbine of dams (www.psmfc.org 2000). Other reports have shown that predation on disoriented juvenile salmonids after passing through turbines can reach up to 23% from birds, up to 10% from other fish, with seals and seal lions adding another one percent of total juvenile salmonid runs in river stretches below Columbia River dams (BPA 2000). Avian predation and predatory fish have been observed in the immediate areas of PSNS and SB dry docks. Therefore, a total mortality rate of 25% is considered reasonable for passage through the dry dock system, taking into account the potential for increased predation due to juveniles being disoriented upon discharge. Based on entrainment estimates and total salmon production described above, a 25% mortality rate for the dry docks at PSNS and SB translates into mortality of substantially less than 0.5% of the total smolt numbers of chinook and summer chum in Sinclair Inlet and Hood Canal, respectively.

2.5.2 Indirect Effects

Indirect effects are those that are caused by the proposed action, are later in time, but are still reasonably certain to occur (50 CFR 402.02). Indirect effects may occur outside of the area directly affected by the action. Indirect effects might include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or they are a logical extension of the proposed action. For this consultation, there are no indirect effects associated with the proposed action.

2.6 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. For purposes of this Opinion, there are no cumulative effects expected to occur within the action area for the proposed action. Federally controlled actions dominate current and future impacts in the respective action areas.

2.7 Conclusion

The DON's dry dock operations are likely to kill or injure fish. Even so, the proposed action is not likely to jeopardize the continued existence of Puget Sound chinook or Hood Canal summer chum salmon. The determination of no jeopardy is based on the extremely small effect on the numbers of fish likely to be entrained during operations. Furthermore, the DON will continue to follow measures to minimize the killing of PS chinook ESU and Hood Canal chum ESU. In addition, the distance from shore of SB operations and infrequent numbers of dry dock cyclings, at both PSNS and SB, during seasons when listed fish are most likely present, would be expected to reduce the likelihood and extent of fish exposure to proposed operations.

2.8 Incidental Take Statement

The ESA at section 9 [16 U.S.C. 1538] prohibits take of endangered species. The prohibition of take is extended to threatened anadromous salmonids by section 4(d) rule [50 CFR 223.203]. Take is defined by the statute as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." [16 U.S.C. 1532(19)] Harm is defined by regulation as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering." [50 CFR 222.102] Harass is defined as "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." [50 CFR 17.3] Incidental take is defined as "takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant." [50 CFR 402.02] The ESA at section 7(o)(2) removes the prohibition from any incidental taking that is in compliance with the terms and conditions specified in a section 7(b)(4) incidental take statement [16 U.S.C. 1536].

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize take, and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures. The terms and conditions must be adhered to by the Federal agency, the applicant, or both, for the exemption from the take prohibition to apply.

2.8.1 Amount or Extent of the Take

Puget Sound chinook and HC chum use the action area as described in section 2.4. Individuals of these ESUs are likely to be exposed to operations under the proposed action, and incidental take of individual fish is reasonably certain to occur. The exposure of PS chinook and HC chum will be minimized through the use of BMPs in the continued operations of dry docks at PSNS and SB. The extent of expected take has been estimated (mortality of as much as 0.01% for chinook and 0.3% for chum of the total annual smolt numbers in Sinclair Inlet and Hood Canal, respectively).

2.8.2 Reasonable and Prudent Measures

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of PS chinook and Hood Canal summer chum salmon:

1. The DON shall minimize take during the flooding and dewatering processes.

2. The DON shall minimize take associated with water quality issues.

3. The DON shall minimize take through managing caisson off-time during the peak juvenile salmon migration window, generally, March through June for chinook and February through mid-July for summer chum.

2.8.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the prohibitions of ESA section 9, the DON must comply with the terms and conditions that implement the reasonable and prudent measures. There terms and conditions are non-discretionary.

1. To implement RPM No. 1, the DON shall continue to use a bubble curtain screen for any dry dock cyclings at PSNS and SB. The details of this condition can be found in section 1.2.1 of this Opinion and in 5.1.5 of the BA.

2. To implement RPM No. 2, the DON will ensure that the process water collection system that is employed at both PSNS and SB be properly maintained to minimize deleterious contaminants entering the adjacent water body.

3. To implement RPM No. 3 above, the DON will minimize the off period for caissons during cyclings at times of peak juvenile salmonid migration. Department of Navy personnel should contact local tribal and state WDFW habitat biologists to determine when the migrations are occurring. The details of this condition can be found in section 5.1.5 of the BA.

2.8.4 Conservation Recommendations

Section 7(a)(1) of the ESA mandates all Federal agencies to implement programs, consistent with their authorities, for the conservation of listed species. The following recommendations by NOAA Fisheries are designed to assist the DON to identify conservation methods for salmonids. These recommendations are discretionary to the DON:

1. Dry docks should be swept, washed and inspected prior to flooding with a third party inspection of the dry dock cleaning procedures. The details of this measure can be found in section 5.1.5 of the BA.

2. The DON should employ manual removal of adult salmonids before the dock is completely empty, and transport in water-filled containers to minimize harm before the fish are released to the adjacent water body. The details of this measure can be found in section 5.1.5 of the BA and V. Whitt, pers. comm., May 30, 2002.

3. The DON should perform maintenance and checks of all bubble screens to ensure proper operation. The details of this measure can be found in section 5.1.5 of the BA.

4. The DON should continue to conduct further studies to understand the extent of, and learn how to further minimize mortality associated with entrainment. Multiple seining and otter-trawl surveys conducted locally at PSNS and SB could reveal species, size classes, and other details of community structure of salmonids and forage fish along the PSNS and SB shorelines. Data collected would give a better idea of salmonid migration timing and fish availability within PSNS and SB waters. Further data would also provide a better understanding of impacts of dry dock operations on salmon, and how these might be further reduced. The details of this measure can be found in section 5.1.5 of the BA.

5. The DON should follow the BMPs set forth in the routine operations and maintenance manuals for PSNS and SB. Some general BMPs have been used for other DON actions requiring measures to minimize the incidental taking of a listed species. Given the context of the proposed action those BMPs the DON deems appropriate for routine operations and maintenance shall be employed during dry dock operations as well. The details of this measure can be found in section 5.1.5 of the BA.

2.8.5 Reinitiation of Consultation

Exemption from the prohibition against take can be extended to the DON for up to five years, on the basis of the analysis of effects in the BA and Opinion above. After five years, the DON is expected to have acquired additional information that will enable a fresh look at the consultation. If the new analysis of effects at that time supports another five years exemption from take prohibitions, and no other triggers for reinitiation (described below) occur, then NOAA Fisheries will likely extend the exemption.

Consultation must be reinitiated by the DON if: (1) the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or, (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (MSA section 305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or state activity that may adversely affect EFH (MSA section 305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency must explain its reasons for not following the recommendations (MSA section 305(b)(4)(B)).

The term "EFH" means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA section 3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Essential Fish Habitat consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km) (PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years) (PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and on information provided by the DON.

3.3 Proposed Actions

The proposed action and action areas are detailed above in sections 1.2 and 1.3 of this document. The action areas include habitats that have been designated as EFH for various life-history stages of 46 species of groundfish, four coastal pelagic species and three species of Pacific salmon (Table 6).

3.4 Effects of Proposed Action

As described in section 2.7 of this document, the proposed action may result in detrimental short- and-long-term impacts to a variety of habitat parameters. These adverse effects are:

1. Short-term degradation of water quality due to dewatering processes during dry-dock operations at PSNS and SB on a continual basis through increased turbidity and resuspension of bottom sediments.

2. In addition to the short-term degradation of water quality described above in number 1, the effects of prop-wash from the continued movement of naval vessels in and out of dry docks has the potential to resuspend bottom sediments as well as disrupt the benthic fish community in and around the action areas.

3.5 Conclusion

NOAA Fisheries believes that the proposed action may adversely affect EFH for those species in Table 6.

3.6 Essential Fish Habitat Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. However, because the adverse effects to designated EFH have been minimized, to the maximum extent practicable, by the conservation measures that the DON included as part of the proposed action to address ESA concerns, conservation recommendations are not required.

3.7 Statutory Response Requirement

Since NOAA Fisheries is not providing conservation recommendations at this time, no 30-day response from the DON is required (MSA section 305(b)(4)(B)).

3.8 Supplemental Consultation

The DON must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(k)).

4.0 REFERENCES

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Table 6 Fish species with designated EFH in Puget Sound

Groundfish Species	redstripe rockfish *S. proriger*	Dover sole *Microstomus pacificus*
spiny dogfish *Squalus acanthias*	rosethorn rockfish *S. helvomaculatus*	English sole *Parophrys vetulus*
big skate *Raja binoculata*	rosy rockfish *S. rosaceus*	flathead sole *Hippoglossoides elassodon*
California skate *Raja inornata*	rougheye rockfish *S. aleutianus*	petrale sole *Eopsetta jordani*
longnose skate *Raja rhina*	sharpchin rockfish *S. zacentrus*	rex sole *Glyptocephalus zachirus*
ratfish *Hydrolagus colliei*	splitnose rockfish *S. diploproa*	rock sole *Lepidopsetta bilineata*
Pacific cod *Gadus macrocephalus*	striptail rockfish *S. saxicola*	sand sole *Psettichthys melanostictus*
Pacific whiting (hake) *Merluccius productus*	tiger rockfish *S. nigrocinctus*	starry flounder *Platichthys stellatus*
black rockfish *Sebastes melanops*	vermilion rockfish *S. miniatus*	arrowtooth flounder *Atheresthes stomias*
bocaccio *S. paucispinis*	yelloweye rockfish *S. ruberrimus*	
brown rockfish *S. auriculatus*	yellowtail rockfish *S. flavidus*	Coastal Pelagic Species
canary rockfish *S. pinniger*	shortspine thornyhead *Sebastolobus alascanus*	anchovy *Engraulis mordax*
China rockfish *S. nebulosus*	cabezon *Scorpaenichthys marmoratus*	Pacific sardine *Sardinops sagax*
copper rockfish *S. caurinus*	lingcod *Ophiodon elongatus*	Pacific mackerel *Scomber japonicus*
darkblotch rockfish *S. crameri*	kelp greenling *Hexagrammos decagrammus*	market squid Loligo opalescens
greenstriped rockfish *S. elongatus*	sablefish *Anoplopoma fimbria*	Pacific Salmon Species
Pacific ocean perch *S. alutus*	Pacific sanddab *Citharichthys sordidus*	chinook salmon *Oncorhychus tshawytscha*
quillback rockfish *S. maliger*	butter sole *Isopsetta isolepis*	coho salmon *O. kisutch*
redbanded rockfish *S. babcocki*	curlfin sole *Pleuronichthys decurrens*	Puget Sound pink salmon *O. gorbuscha*