UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

JUN 28 2010

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act (NEPA), an environmental review has been performed on the following action.

TITLE: Environmental Assessment on the Effects of the Issuance of a Protected Species Cooperative Conservation Grant to the Yurok Tribe (Award No. NA10NMF4720374) to Conduct Studies on Eulachon Smelt in Northwest California.

LOCATION: Research would take place in Northwest California in the Klamath River, Mad River, and Redwood Creek.

SUMMARY: The current EA analyzed the effects of the proposed southern DPS eulachon research, which will be conducted in Northwest California. Specifically, the funded work would 1) determine the population status of eulachon in the Klamath River, Redwood Creek and the Mad River; 2) develop and implement an annual eulachon spawning stock biomass (SSB) estimate for the Klamath River that would allow managers to better track recovery and manage fishery impacts; 3) conduct egg and larvae surveys of known and potential spawning areas in the lower Klamath River, Mad River, and Redwood Creek in California to better characterize current eulachon smelt distribution and to inform NOAA Fisheries critical habitat decisions for the DPS; and 4) to clarify the genetic structure of eulachon populations in the Klamath River, Redwood Creek and Mad River.

The proposed action analyzed in the EA would not have significant environmental effects on the target or non-target species; public health and safety would not affected; no unique geographic area would be affected; and the effects of this study would not be highly uncertain, nor would they involve unique or unknown risks. Issuance of this award would not set a precedent for future actions with significant effects, nor would it represent a decision in principle about a future consideration. There would not be individually insignificant but cumulatively significant impacts associated with the proposed action, and there would not be adverse effects on historic resources. The award would contain mitigating measures to avoid unnecessary stress to the subject animals.

RESPONSIBLE
OFFICIAL:

James H. Lecky
Director, Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910
(301) 713-2332

The environmental review process led us to conclude this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact (FONSI) including the supporting EA is enclosed for your information.

Although NOAA is not soliciting comments on this completed EA/FONSI, we will consider any comments submitted assisting us to prepare future NEPA documents. Please submit any written comments to the responsible official named above.

Sincerely,

Paul N. Doremus, Ph.D.
NOAA NEPA Coordinator

Enclosure

Environmental Assessment
Issuance of a Protected Species Conservation and Recovery Grant to the Yurok Tribe (Award File NA10NMF4720374) to Conduct Studies on Eulachon Smelt in Northwest California

Lead Agency:	USDC National Oceanic and Atmospheric Administration **National Marine Fisheries Service, Office of Protected Resources**
Responsible Official:	James H. Lecky, Director, Office of Protected Resources
For Further Information Contact:	Office of Protected Resources National Marine Fisheries Service 1315 East West Highway Silver Spring, MD 20910 (301) 713-2332
Location:	Northwest California; Klamath River Basin, Redwood Creek, Mad River

CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF PROPOSED ACTION

The National Marine Fisheries Service, Office of Protected Resources (NMFS PR) proposes to provide financial assistance in the form of a grant to the Yurok Tribal Fisheries Program (YTFP) (Michael Belchik, P.I.). This award would be issued through the Protected Species Conservation and Recovery Grant Program (CFDA no. 11.472, Unallied Science Programs) authorized under the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq*.). This financial assistance award is planned to extend for three years (three annual payments) and is subject to semi-annual review by NMFS. The grant would support conservation activities for the ESA threatened eulachon smelt in northwest California.

Purpose and Need
The National Marine Fisheries Service's (NMFS) recognizes the unique importance of many protected species to tribes and values ongoing efforts by tribal nations to conserve and protect species under NMFS' jurisdiction. NMFS is authorized to provide Federal assistance to tribes to support conservation programs for marine and anadromous species under its jurisdiction. Scientific research is an important means of gathering valuable information about protected species to inform conservation and management measures and, ultimately, to recover listed species. In order to fully carry out these responsibilities, NMFS needs to take action in response to a request from YTFP for financial assistance to support a monitoring program in order to assess status and trends to better manage anthropogenic impacts and other threats to recovery of the southern eulachon smelt distinct population segment (DPS). Specifically, the funded work would 1) determine the population status of eulachon in the Klamath River, Redwood Creek and the Mad River; 2) develop and implement an annual eulachon spawning stock biomass (SSB) estimate for the Klamath River that would allow managers to better track recovery and manage fishery impacts; 3) conduct egg and larvae surveys of known and potential spawning areas in the lower Klamath River, Mad River, and Redwood Creek in California to better characterize current eulachon smelt distribution and to inform NOAA Fisheries critical habitat decisions for the DPS; and 4) to clarify the genetic structure of eulachon populations in the Klamath, Redwood Creek and Mad Rivers.

1.2 PROPOSED RESEARCH AREA AND METHODS

The proposed research under Award File NA10NMF4720374 to YTFP would take place in the mainstem lower Klamath River, Mad River, and Redwood Creek in northwest California from 2010 to 2013.

Up to 100 pre-spawned adult eulachon per year would be sampled from the Klamath River, Redwood Creek and Mad River (up to 300 per year total for all three systems). A small fin clip would be taken from the pre-spawned adults for genetic analysis and the fish would be visually sexed (see McCarter and Hay, 2003 for methods) and immediately released. This sampling protocol would take no more than 5 minutes. Whole post-spawned fish (most or all post-spawned fish die) would also be collected for genetics, age composition via otolith analysis; sex ratio through visual examination; and if possible, relative fecundity values. Sampling of adult eulachon in the Klamath River, Mad River, and Redwood Creek would occur from January through April in 2011, 2012, and 2013. Sampling would occur approximately 3 days per week (highly weather dependent) for 8 hours per day at sampling locations yet to be determined but below river mile 30 in the Klamath. In the Mad River, sampling would occur 1 time per week for 8 hours at sampling locations yet to be determined but generally in the tidally influenced portion of the river (lower 5 miles). In Redwood Creek sampling would occur 1 times per week for 8 hours at 1 station located in Redwood Creek estuary (lower 3 miles of Redwood Creek). The adult eulachon would be collected using a combination of seine nets or dip nets (measuring no more than 36 inches across the bag frame). Sampling would be stratified by depth, distance from shore, and time of day. Some night sampling would occur as winter conditions and safety allow. If eulachon are found the applicant would design and conduct spawning stock biomass (SSB) estimate planktonic surveys using the methods described in Hay (2002, 2003).

If eulachon in significant numbers are found in the Klamath Basin, the applicant is proposing the use of the daily egg production method (DEPM)(Parker, 1985; Jackson and Cheng, 2001) to develop a robust SSB estimate for eulachon smelt. One minute plankton tows would be conducted near the top, middle, and bottom of a station along a transect position. The major Klamath River transect is located at approximately river mile 4, near the Highway 101 bridge. The transect position (perpendicular to the river flow) would have at least one station near each shoreline and one in the middle of the channel, for a total of three stations. Up to 90 tows would be made each year, 9 per week for approximately 10 weeks, dependent upon the duration of the eulachon larvae outmigration period. It is estimated that less than 5,000 eulachon larvae would be captured per year, although actual numbers could be far lower. A General Oceanic flow meter, mounted on the net frame, would be used to determine the volume filtered during sampling. Samples would be preserved in 95% ethanol (dilutes to approximately 50% alcohol during rinsing of sample into the bottle). In the laboratory, Rose Bengal would be added to make the larvae more visible for counting. The larval count data would be combined with daily river discharge and eulachon fecundity data to determine an estimate of SSB. The lower Klamath River discharge data would be derived from U.S. Geological Survey (USGS) river discharge data. Fecundity data would be derived from biological sampling of the adult spawners (see below).

Additional plankton net sampling to document eulachon larvae presence in Redwood Creek and Mad River would occur during January-April 2011-2013. Estimated numbers of plankton net sets by river per year are 10 each in Redwood Creek and Mad River. Plankton net sets in both Mad River and Redwood Creek would take place in the lower tidally-influenced portion of the river; generally below river mile 5 in Mad River and river mile 1 in Redwood Creek. While the potential larval density in these locations is unknown, it is expected to be low. The take from these secondary study areas would likely be less than a 600 larvae per year.

1.3 APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, as well as who is responsible for obtaining them. Even when it is the applicant's responsibility to obtain such permissions, NMFS is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

National Environmental Policy Act
The National Environmental Policy Act (NEPA) was enacted in 1969 and its Environmental Impact Assessment requirement is applicable to all "major" federal actions significantly affecting the quality of the human environment. A major federal action is an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. The procedural provisions outlining federal agency responsibilities under NEPA are provided in the Council on Environmental Quality's implementing regulations (40 CFR Parts 1500-1508).

NOAA has, through NOAA Administrative Order (NAO) 216-6, established agency procedures for complying with NEPA and the implementing regulations issued by the Council on Environmental Quality. When a proposed action that would otherwise be categorically excluded is the subject of public controversy based on potential environmental consequences, has uncertain environmental impacts or unknown risks, establishes a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have an adverse effect upon endangered or threatened species or their habitats, preparation of an EA or EIS is required.

This EA is prepared in accordance with NEPA, its implementing regulations, and NAO 216-6. It has been prepared to evaluate the effects of the proposed action on marine species of wildlife likely to be impacted.

Endangered Species Act
Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service) for federal actions that "may affect" a listed species or adversely modify critical habitat. NMFS issuance of an award affecting ESA-listed species or designated critical habitat, directly or indirectly, is a federal action subject to these Section 7 consultation requirements. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. NMFS is further required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of habitat for such species. Regulations specify the procedural requirements for Section 7 consultations (50 Part CFR 402).

Marine Mammal Protection Act
The MMPA prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. The act defines "take" to mean "to hunt, harass, capture, or kill" any marine mammal or attempt to do so.

National Marine Sanctuaries Act
The NMSA (32 U.S.C. 1431 *et seq*.) authorizes the Secretary of Commerce to designate and manage areas of the marine environment with special national significance. The National Marine Sanctuary Program, operating under the NMSA and administered by NOAA's National Ocean Service (NOS) has the authority to issue special use permits for research activities that would occur within a National Marine Sanctuary. Obtaining special use permits is the

responsibility of individual researchers. However, as a courtesy, the Office of Protected Resources consults with NOS when proposed research would occur in or near a National Marine Sanctuary.

Magnuson-Stevens Fishery Conservation and Management Act
Under the MSFCMA Congress defined Essential Fish Habitat (EFH) as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802(10)). The EFH provisions of the MSFCMA offer resource managers means to accomplish the goal of giving heightened consideration to fish habitat in resource management. NMFS Office of Protected Resources is required to consult with NMFS Office of Habitat Conservation for any action it authorizes, funds, or undertakes, or proposes to authorize, fund, or undertake that may adversely affect EFH. This includes renewals, reviews or substantial revisions of actions.

Redwood National Park
A Scientific Research and Collecting Permit is required for most scientific activities pertaining to natural resources or social science studies in National Park System areas that involve fieldwork, specimen collection, and/or have the potential to disturb resources or visitors. All science research and data collection in a park requires a Scientific Research and Collecting Permit and will be allowed only pursuant to the terms and conditions of the permit. The collection activities in Redwood Creek take place within the boundaries of Redwood National Park.

California State Collection Permit (SCP)
An SCP is required for the take of wildlife and marine plants for bona fide scientific, educational or propagation purposes under Section 650(b), Title 14, of the California Code of Regulations (CCR).

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Alternative 1 - No Action Alternative

Under the No Action alternative, Award File NA10NMF4720374 would not be approved. This alternative would not fund research that supports a monitoring program to assess status and trends to better manage anthropogenic impacts and other threats to recovery of the southern eulachon smelt distinct population segment (DPS). Existing and approved future research would continue to occur.

2.2 Alternative 2 - Grant Approval for Research as Proposed

Under the Proposed Action alternative, as more fully described on pages 2-3, Award File NA10NMF4720374 would be approved. This approval would allow financial assistance to be used to support the conservation of the southern DPS of eulachon smelt. Best practice sampling including avoidance of listed species and marine mammals in research vessels, and live release of bycatch when possible would help ameliorate any adverse impacts on the environment.

CHAPTER 3 AFFECTED ENVIRONMENT

The following discussion identifies resource areas that may be directly or indirectly affected by the proposed research activities.

3.1 SOCIAL AND ECONOMIC ENVIRONMENT

Although economic and social factors are listed in the definition of effects in the CEQ regulations and NAO 216-6, the definition of human environment states that "economic and social effects are not intended by themselves to require preparation of an EIS." However, an EIS or EA must include a discussion of a proposed action's economic and social effects when these effects are interrelated with effects on the natural or physical environment. The social and economic environment is not described in detail because there is no potential for social and economic effects because communities do not depend socially or economically on the target or non-target species which may be affected by the action. There are no significant social or economic impacts of the proposed action interrelated with significant natural or physical environmental effects.

3.2 ***BIOLOGICAL AND PHYSICAL ENVIRONMENT***

Eulachon

Background
Eulachon (commonly called smelt, candlefish, or hooligan) are endemic to the eastern Pacific Ocean, ranging from northern California to southwest Alaska and into the southeastern Bering Sea. In the portion of the species' range that lies south of the U.S./Washington–Canada border, most eulachon production originates in the Columbia River Basin. Other river basins in the United States where consistent runs of eulachon have been documented include: Mad River and Klamath rivers in northern California; and infrequently in Oregon and Washington coastal rivers and tributaries to Puget Sound (Emmett *et al*., 1991). Within the Columbia River Basin, the major and most consistent spawning runs return to the mainstem of the Columbia River (from just upstream of the estuary, river mile (RM) 25, to immediately downstream of Bonneville Dam, RM 146) and in the Cowlitz River. Periodic spawning also occurs in the Grays, Skamokawa, Elochoman, Kalama, Lewis, and Sandy rivers (tributaries to the Columbia River) (Emmett *et al*., 1991; Musick *et al*., 2000). Throughout the species' range, the historic major production areas in the United States were the Klamath, Columbia, and Cowlitz rivers. Major production areas in Canada are the Fraser and Nass rivers (Willson *et al*., 2006). There are undocumented observations of eulachon occasionally using numerous other rivers for spawning. Many sources note that runs tend to be erratic, appearing in some years but not others, and appearing only rarely in some river systems. Some rivers have two eulachon runs per year.

Eulachon typically spend 2–5 years in saltwater before returning to fresh water to spawn from late winter through mid-spring (Barraclough, 1964; Parente and Snyder, 1970; Langer *et al*., 1977; Barrett *et al*., 1984; Hay and McCarter, 2000), although some adults can reach 9 years old (WDFW and ODFW, 2001). Spawning grounds are typically in the lower reaches of larger rivers fed by snowmelt (Hay and McCarter, 2000). Spawning occurs at night. Willson *et al*. (2006) concluded that the age distribution of eulachon in a spawning run probably varies among rivers and also varies between sexes in some years and among years in the same river system. Males typically outnumber females by 2:1 or more. Spawning occurs at temperatures from 4° to

10°C over sand, coarse gravel, or detrital substrates. The sexes must synchronize their activities closely, unlike some other group spawners such as herring, because eulachon sperm remain viable for only a short time, perhaps only minutes (Hay and McCarter, 2000). Some researchers report that males lie next to females, either beside or on top of them, in riffles (Lewis *et al*., 2002). Langer *et al*. (1977) report that males congregate upstream of groups of females, releasing milt simultaneously, and females lay eggs as the milt drifts over them. Eggs are fertilized in the water column, sink, and adhere to the river bottom typically in areas of gravel and coarse sand. Most or possibly all eulachon adults die after spawning.

In many rivers, spawning is limited to the part of the river that is influenced by tides (Lewis *et al*., 2002), but some exceptions exist. Eulachon once ascended more than 160 km in the Columbia River system. There is some evidence that water velocity greater than 0.4 m/sec begins to limit the upstream movements of eulachon (Lewis *et al*., 2002).

Entry into the spawning rivers appears to be related to water temperature and the occurrence of high tides (Ricker *et al*., 1954; Lewis *et al*., 2002; Spangler, 2002). Spawning occurs in January, February, and March in the Columbia River. Attempts to characterize eulachon run timing are complicated further by marked annual variation in timing. Willson *et al*. (2006) give several examples of spawning run timing varying by a month or more in rivers in British Columbia and Alaska.

Although spawning generally occurs at temperatures from 4 to 10 °C, runs can occur in colder water (Langer *et al*., 1977; Franzel and Nelson, 1981). In the Cowlitz River, temperatures during spawning ranged from 4 to 7 °C (Smith and Saalfeld, 1955). High water temperatures can be lethal to spawning eulachon. For fish acclimated to 5 °C, an increase to 11 °C for several days resulted in 50 percent mortality and spawning failure. Langer *et al*. (1977) suggested that the contrast between ocean and river temperatures might be more critical than river temperatures *per se*.

Eulachon eggs are approximately 1 mm in diameter, averaging about 43 mg; however, mean weight often varies by river (Hay and McCarter, 2000). Eggs are enclosed in a double membrane; after fertilization in the water, the outer membrane breaks and turns inside out, making a sticky stalk by which the egg adheres to sand grains and small gravels (Hart and McHugh, 1944; Hay and McCarter, 2000). Eulachon eggs hatch in 20–40 days with incubation time dependent on water temperature. Shortly after hatching the larvae are carried downstream and dispersed by estuarine and ocean currents. Similar to salmon, juvenile eulachon are thought to imprint on the chemical signature of their natal river basins. However, juvenile eulachon spend less time in these freshwater environments compared to juvenile salmon, and researchers believe that eulachon's short freshwater residence time may cause eulachon to stray at higher rates when they return to fresh water to spawn (Hay and McCarter, 2000).

After leaving estuarine rearing areas, juvenile eulachon move from shallow nearshore areas to deeper areas. Larvae and young juveniles become widely distributed in coastal waters, with fish found mostly at depths up to 15 m (Hay and McCarter, 2000) but sometimes as deep as 182 m (Barraclough, 1964). There is currently little information available about eulachon movements in nearshore marine areas and the open ocean. Willson *et al*. (2006) summarize the results of surveys showing concentrations of eulachon off Vancouver Island, in the Bering Sea, in the Gulf of Alaska, in Prince William Sound, and in the Coastal Fjords of Southeast Alaska. The amount of eulachon bycatch in the pink shrimp fishery seems to indicate that the distribution of these organisms overlap in the ocean.

Eulachon feed on plankton, chiefly eating crustaceans such as copepods and euphausiids, including *Thysanoessa* (Barraclough, 1964; Hay and McCarter, 2000), unidentified malacostracans (Sturdevant *et al*., 1999), and cumaceans (Smith and Saalfeld, 1955). Eulachon larvae and post-larvae eat phytoplankton, copepods, copepod eggs, mysids, barnacle larvae, worm larvae, and eulachon larvae (WDFW and ODFW, 2001). Adults and juveniles commonly forage at moderate depths (15 to 182 m) in inshore waters (Hay and McCarter, 2000).

It is difficult to compare eulachon body lengths among reports because researchers have used different length measures (i.e., standard, fork, and total length). As expected, both length and body mass increase with age. Eulachon in the Kemano, Kitimat, Nass, Stikine, and Columbia rivers have similar distributions of size-at-age, but the increase in size-at-age is small for both sexes (10 mm from age 3 to 4 and 4 mm from age 4 to 5; Lewis *et al*., 2002).

Eulachon generally spawn in rivers that are glacier-fed and have a pronounced peak freshet in spring. Some researchers hypothesize that the rapid flushing of eggs and larvae due to these freshets may cause eulachon to imprint and home to an estuary rather than to individual spawning rivers (Hay and McCarter, 2000). Thus, the estuary has been invoked as the likely geographic stock unit for eulachon (Hay and McCarter, 2000; Hay and Beacham, 2005).

Variation in spawn timing among rivers has also been cited as indicative of local adaptation in eulachon (Hay and McCarter, 2000), although the wide overlap in spawn timing among rivers makes it difficult to discern distinctive patterns in this trait. In general, eulachon spawn earlier in southern portions of their range than in rivers to the north. River-entry and spawning begin as early as December and January in the Columbia River Basin. Eulachon have been known to spawn as early as January in rivers of the Copper River Delta of Alaska and as late as May in northern California.

Coastwide, there appears to be an increase in both mean length and weight of eulachon at maturity with an increase in latitude. Mean eulachon fork length and weight at maturity range to 175 mm and 37 g in the Columbia River. This pattern is typical of many vertebrate poikilotherms (i.e., cold-blooded animals), for which higher rearing temperatures result in reduced size at a given stage of development (Lindsey, 1966; Atkinson, 1994). This pattern of larger body size at age in more northern populations is also apparent in Pacific herring (Stout *et al*., 2001a). A study by Clarke *et al*. (2007) found that the age at maturity, based on otolith chemistry, is older for northern populations of eulachon.

McLean *et al.* (1999) examined mtDNA variation in 285 eulachon samples collected at 11 freshwater sites ranging from the Columbia River to Cook Inlet, Alaska, and also in 29 ocean-caught fish captured in the Bering Sea. They concluded that, overall, there was little differentiation in mtDNA among eulachon collected from distinct freshwater locations throughout the eulachon range, consistent with the hypothesis that eulachon dispersed from a single glacial event. However, McLean *et al.* (1999) noted that association of geographic distance and genetic differentiation among eulachon populations suggested an emerging population subdivision throughout the range of the species.

In a later study, McLean and Taylor (2001) used five microsatellite loci to examine variation in the same set of populations as McLean *et al*. (1999). The populations in the Columbia and Cowlitz rivers were represented by 2 years of samples with a total sample size of 60 fish from each river. However, several populations were represented by very few samples, including just five fish from the three rivers in Gardner Canal and just 10 fish from the Fraser River. Results from a hierarchical analysis of molecular variance test were similar to those of the McLean *et al.* (1999) mtDNA study, with 0.85 percent of variation occurring among large regions and 3.75 percent among populations within regions. In contrast to the mtDNA analysis, genetic distances among populations using these five microsatellite loci were not correlated with geographic distances. Overall, however, McLean and Taylor (2001) concluded that their microsatellite DNA results were mostly consistent with the mtDNA findings of McLean *et al.* (1999) and that both studies indicated that eulachon have some degree of population structure.

The most extensive genetic study of eulachon, in terms of sample size and number of loci examined, is that of Beacham *et al.* (2005). Beacham *et al*. (2005) examined microsatellite DNA variation in eulachon collected at 9 sites ranging from the Columbia River to Cook Inlet, Alaska, using the 14 loci developed in an earlier study by Kaukinen *et al*. (2004). Sample sizes per site ranged from 74 fish from the Columbia River to 421 from the Fraser River. Samples collected in multiple years were analyzed from populations in the Bella Coola and Kemano rivers (2 years of sampling) and also in the Nass River (3 years of sampling). Beacham *et al*. (2005) observed much greater microsatellite DNA diversity within populations than that reported by McLean and Taylor (2001), and all loci were highly polymorphic in all of the sampled populations. Significant genetic differentiation was observed among all comparisons of the nine populations in the study. A cluster analysis of genetic distances showed genetic affinities among the populations in the Fraser, Columbia, and Cowlitz rivers and also among the Kemano, Klinaklini, and Bella Coola rivers along the central British Columbia coast. In particular, there was evidence of a genetic discontinuity north of the Fraser River, with Fraser and Columbia/Cowlitz samples being approximately 3–6 times more divergent from samples further to the north than they were to each other. Similar to the mtDNA study of McLean *et al*. (1999), the authors also found that genetic differentiation among populations was correlated with geographic distances.

Beacham *et al*. (2005) found stronger evidence of population structure than the earlier genetic studies, and concluded that their results indicated that management of eulachon would be appropriately based at the level of the river drainage. In particular, the microsatellite DNA analysis showed that populations of eulachon in different rivers are genetically differentiated from each other at statistically significant levels. The authors suggested that the pattern of eulachon differentiation was similar to that typically found in marine fish, which is less than that observed in most salmon species.

Although Beacham *et al*. (2005) found clear evidence of genetic structure among eulachon populations, the authors also noted that important questions remained unresolved. The most important one in terms of identifying DPSs for eulachon is the relationship between temporal and geographic patterns of genetic variation. In particular, Beacham *et al*. (2005) found that year-to-year genetic variation within three British Columbia coastal river systems was similar to the level of variation among the rivers, which suggests that patterns among rivers may not be temporally stable. However, in the comparisons involving the Columbia River samples, the variation between the Columbia samples and one north-of-Fraser sample from the same year was approximately 5 times greater than a comparison within the Columbia from 2 different years.

Ecological Boundaries
The fidelity with which eulachon return to their natal river, estuary, or inlet implies some association between a specific stock and its freshwater and/or estuarine environment. Differences in life-history strategies among eulachon populations or stocks may have arisen, in part, in response to selective pressures of different freshwater/estuarine environments. If the boundaries of distinct freshwater or estuarine habitats coincide with differences in life histories, it would suggest a certain degree of local adaptation.

Historically, the distribution of eulachon in Washington, Oregon, and California corresponds closely with the Coastal Range Ecoregion as defined in Omernik (1987). Extending from the Olympic Peninsula through the Coast Range proper and down to the Klamath Mountains and the San Francisco Bay area, this region is influenced by medium to high rainfall levels because of the interaction between marine weather systems and the mountainous nature of the region. Topographically, the region averages about 500 m in elevation, with mountain tops under 1,200 m in elevation. The region is heavily forested, primarily with Sitka spruce, western hemlock, and western red cedar. Streams occupied by eulachon within this region generally follow two distinct annual flow patterns: (1) Streams draining coastal watersheds, where winter rain storms are common, have high flow periods coinciding with these storms; (2) streams draining more interior areas, such as the Columbia and Cowlitz Rivers, have a distinct spring freshet period coinciding with snow melt. Eulachon production is highest in these latter systems. Ecological features of the ocean environment also affect eulachon ecology. Ware and McFarlane (1989) built upon previous descriptions of oceanic domains in the northeast Pacific Ocean by Dodimead *et al*. (1963) and Thomson (1981) to identify three principal fish production domains: (1) a Southern Coastal Upwelling Domain, (2) a Northern Coastal Downwelling Domain, and (3) a Central Subarctic Domain (the Alaskan Gyre). The boundary between the Coastal Upwelling Domain and Coastal Downwelling Domain occurs where the eastward flowing Subarctic Current (also called the North Pacific Current) bifurcates to form the north-flowing Alaska Current and the south-flowing California Current in the vicinity of a Transitional Zone between the northern tip of Vancouver Island and the northern extent of the Queen Charlotte Islands (an archipelago off the northwest coast of British Columbia, Canada, just south of the Nass River outlet). Similarly, Longhurst (2006) identifies an Alaska Downwelling Coastal Province and a California Current Province within the Pacific Coastal Biome.

Within Longhurst's (2006) Pacific Coastal Biome, ocean distribution of eulachon spans the Alaska Downwelling Coastal Province and the northern portion of the California Current Province. Longhurst (2006) places the boundary between the Alaska Coastal Downwelling Province and the California Current Province between the Queen Charlotte Islands at 53° N. and the northern end of Vancouver Island at 47–48° N. latitude, where the eastward flowing North Pacific Current encounters the North American continent and bifurcates to form the north-flowing Alaska Current and south-flowing California Current.

Eulachon from Washington, Oregon, and California are part of a newly listed DPS that extends beyond the conterminous United States and that the northern boundary of the DPS occurs in northern British Columbia south of the Nass River. This is based on the evidence indicating that eulachon occurring in this area are discrete from eulachon occurring north of this area based on differences in spawning temperatures; length- and weight-at-maturity in the species' range; ecological features of both the oceanic and freshwater environments occupied by eulachon; and genetic characteristics. This DPS is significant to the species as a whole because it constitutes over half of the geographic range of the entire species' distribution and includes three of the major production areas (Klamath, Columbia, and Fraser rivers) for the entire species.

Historically important spawning areas for eulachon south of the Nass River included the Klamath, Columbia, and Fraser Rivers, and numerous coastal rivers in British Columbia. The Columbia River and its tributaries support the largest known eulachon run. Although direct estimates of adult spawning stock abundance are unavailable, records of commercial fishery landings begin in1888 and continue as a nearly uninterrupted data set to the present time (Gustafson *et al*., 2008). A large recreational dipnet fishery for which catch records are not maintained has taken place during the commercial fishery (WDFW and ODFW 2001).

In addition to concerns over range-wide declines in abundance, there is concern that the current abundance of the many individual populations within the DPS is sufficiently low to be an additional risk factor, even for populations (such as the Columbia) where the absolute population size may be considered "large" when compared to other animal population sizes. Several aspects of eulachon biology indicate that large aggregations of adult eulachon are necessary for maintenance of normal reproductive output. Eulachon are a short-lived, high-fecundity, high-mortality forage fish, and such species typically have extremely large population sizes. There is likely a biological requirement for a critical threshold density of eulachon during spawning to ensure adequate synchronization of spawning, mate choice, gonadal sterol levels, and fertilization success. Since eulachon sperm may remain viable for only a short time--perhaps only minutes--sexes must synchronize spawning activities closely. Large spawning aggregations of adult eulachon are also necessary to withstand predation pressure associated with large congregations of predators that target returning adults, and to produce enough eggs and pelagic larvae to overwhelm predators in the ocean (Bailey and Houde, 1989).

In addition, the effective population size of eulachon may be much lower than the census size. In marine species, under conditions of high fecundity and high mortality associated with pelagic larval development, local environmental conditions may lead to random "sweepstake recruitment" events where only a small minority of spawning individuals contribute to subsequent generations (Hedgecock, 1994). Available information (disjunct spawning distribution, differences in spawn timing, genetics, life history diversity) suggests that population structure of eulachon roughly conforms to the classical concept of a metapopulation, in which local subpopulations are linked demographically by at least episodic migration, and extinction and recolonization of local subpopulations are common over ecological time frames. In this type of system, at any given point in time, some local subpopulations are expected to be increasing and some declining, and some suitable habitat patches are expected to be uninhabited. Eulachon are in decline throughout the DPS, current population trajectories are out of the range of historic patterns, and there are no identified eulachon runs in the DPS that could be considered healthy. The disappearance and recolonization of sub-populations is a natural occurrence in functioning metapopulations; however, it would be difficult for eulachon to re-establish viable populations in rivers in northern California, after 20 years of low abundance, when the closest viable population is in the Columbia River.

Other Affected Species- Biological and Physical Environment
In addition to eulachon located within the study region, a wide variety of non-target species could be found within the action area, including marine mammals, invertebrates, teleost and elasmobranch fish, and sea birds. Since merely being present within the action area does not necessarily mean a marine organism will be affected by the proposed action, the following discussion focuses not only on the distribution and abundance of various species with respect to the timing of the action, but also on whether and by what means the proposed research activities may affect the non-targeted species. Due to the nature of netting, the researchers would expect to have some non-target species interactions, including interactions with listed species.

ESA Listed Species- Fish

Southern Oregon/Northern California Coast Coho Salmon
Listed as threatened on May 6, 1997. The ESU includes all naturally spawned populations of coho salmon in coastal streams between Cape Blanco, Oregon, and Punta Gorda, California, as well as three artificial propagation programs in the Cole River Hatchery (ODFW stock #52), Trinity River Hatchery, and Iron Gate Hatchery.

California Coastal Chinook Salmon
Listed as threatened on September 16, 1999; threatened status reaffirmed on June 28, 2005. The ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River to the Russian River, California, as well as seven artificial propagation programs: the Humboldt Fish Action Council (Freshwater Creek), Yager Creek, Redwood Creek, Hollow Tree, Van Arsdale Fish Station, Mattole Salmon Group, and Mad River Hatchery fall-run Chinook hatchery programs.

Northern California Steelhead
Listed as a threatened species on June 7, 2000; threatened status reaffirmed on January 5, 2006. The DPS includes all naturally spawned anadromous O. mykiss (steelhead) populations below natural and manmade impassable barriers in California coastal river basins from Redwood Creek southward to, but not including, the Russian River, as well as two artificial propagation programs: the Yager Creek Hatchery, and North Fork Gualala River Hatchery (Gualala River Steelhead Project) steelhead hatchery programs.

Green Sturgeon
The Southern DPS of green sturgeon was listed as threatened in April 7, 2005 (71 FR 17757). The Northern DPS and Southern DPS are distinguished based on genetic data and spawning locations, but their distributions outside of natal waters generally overlap with one another (Chadwick, 1959; Miller, 1972; California Department of Fish and Game (CDFG), 2002; Erickson and Webb, 2007; Moser and Lindley, 2007; Lindley *et al.*, 2008). Both Northern DPS and Southern DPS fish occupy coastal waters from southern California to Alaska and are known to aggregate in the Klamath River estuary and Washington estuaries in the late summer (Israel *et al.*, 2004; Moser and Lindley, 2007; Lindley *et al.*, 2008). Thus, green sturgeon observed in coastal bays, estuaries, and coastal marine waters outside of natal rivers may belong to either DPS. However, the Northern DPS of green sturgeon found in the Klamath River is not classified

as a listed species under the ESA.

ESA and/or MMPA Listed Species- Marine Mammals

Pacific Harbor Seal

Since enactment of the Marine Mammal Protection Act of 1972, northwest populations of Pacific harbor seals (*Phoca Vitulina*) have steadily increased. They are now considered by NMFS to be healthy, productive, and growing. Harbor Seals are opportunistic feeders, preying on a wide variety of cephalopods (squid and octopus), and benthic and epibenthic fish. Their diet varies as they take advantage of food that is seasonally and locally abundant (NMFS 1997). In the Washington outer coastal estuaries and Klamath River, harbor seals have been found to feed primarily on eulachon (*Thaleichthys pacificus*), other smelt (*Osmeridae spp.*), northern anchovy (*Engraulis mordax*), Pacific herring (*Clupea pallasi*) codfish (*Gadidae spp.*), flatfish, crustaceans, lamprey (*Lamptera spp.*), and staghorn sculpin (*Leptocottus armatus*).

California Sea Lion

Since enactment of the Marine Mammal Protection Act of 1972, northwest populations of Pacific harbor seals (*Phoca Vitulina*) have steadily increased. They are now considered by NMFS to be healthy, productive, and growing (Emmett 1997). California sea lions are opportunistic feeders, preying on a wide variety of fish and squid. Their diet is diverse, varying by location as well as seasonally and annually. During the non-breeding season, sea lions move into specific areas in response to local abundance of prey (NMFS 1997). In the Klamath River, they feed primarily on eulachon, rockfish (*Sebastes spp.*), Pacific herring, lamprey, and Pacific sand lance (*Ammodytes hexapterus*) (Brown *et al*., 1995). Based on studies along the Oregon and California coasts (Riemer and Brown 1996), Pacific mackerel (*Scomber japonicus*), cephalopods, codfish, skates (*Rajidae spp.*), and spiny dogfish are also significant parts of the sea lion diet that may show up in the Washington outer coastal estuaries. During the late winter/early spring of 2006 and 2007, California sea lions have been observing the behavior of the larger Steller sea lions below Bonneville Dam.

Steller Sea Lion eastern DPS

The eastern DPS Steller sea lion is found from Southeast AK to Central California. Although this DPS has been doing well it is still listed as threatened under the ESA. Stellers breed and use haulouts in Oregon and only use haulouts in WA. Beach *et al.* (1985) obtained gastrointestinal tract samples from beach-cast specimens in the Klamath River, year-round for 1980 and 1981. Prey included Pacific Whiting (*Merluccius productus*), rockfish, eulachon, anchovy, Pacific herring, staghorn sculpin and lamprey.

Critical Habitat

No critical habitat for any listed species occurs within the sampling area for eulachon in the lower Klamath River. Redwood Creek and Mad River are critical habitat for Southern Oregon/Northern Coastal California coho salmon, California coastal Chinook salmon, and northern California steelhead. Maps of the specific proposed or designated critical habitat areas can be found at: http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm.

Essential Fish Habitat (EFH)

Congress defined essential fish habitat for federally managed fish species as "those waters and substrate necessary for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802(10)). As such, EFH varies by species, geographic location, life stage, etc. A description of specific designated EFH for species within the action area can be found at: http://www.nmfs.noaa.gov/habitat/habitatprotection/profile/htm

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 EFFECTS OF ALTERNATIVE 1: No Action

An alternative to the proposed action is no action, i.e., denial of the grant. This alternative would eliminate any potential risk to the environment from the proposed research activities. However, the no action alternative would not allow research to be conducted and would deny the opportunity to benefit from both the research and management pursued in this proposal.

4.2 EFFECTS OF ALTERNATIVE 2: Issue grant with standard conditions

Any impacts of the proposed action would be limited to the biological and physical environment. The impacts of the plankton tows, gill netting, seine netting, and dip netting would have negligible impacts on the physical environment. Sample collections and fish handling would be conducted by trained personnel according to standard scientific protocols. The type of actions proposed in this grant application would be unlikely to adversely affect the socioeconomic or physical environment or pose a risk to individual and/or public health or safety. There are no significant social or economic impacts of the proposed action interrelated with significant natural or physical environmental effects.

Environmental Consequences to the Biological Environment

Eulachon Interactions
While the freshwater activities of this project would lethally take eulachon, the impacts are not expected to have population level effects. Although it is uncertain how many, if any, eulachon larvae would be taken, plankton tows are likely to lethally take less than 5,000 larvae per year. Given the typical low larvae to adult survival rate for forage fish, this amounts to just a few adult equivalents. About 100 adult fish total would be lethally taken (not including post spawned fish) from the Klamath River for the duration of the study and it is possible (but unlikely) that up to 100 would be taken from Mad River and Redwood Creek. While eulachon are listed as threatened under the ESA, NMFS has not issued a rule prohibiting their take.

Salmon and Steelhead Interactions
Although ESA listed salmon and steelhead could be taken by this proposed research, interactions are expected to be rare. The use of seines and/or small mesh gill nets to capture adult eulachon samples from the mainstem Klamath River, Mad River and Redwood Creek have only a small potential to entangle fish other than smelt given that this gear is non-selective to larger species. Adult or juvenile salmonids captured in seining operations will be immediately released. Given the low water temperatures at the time of year that sampling occurs, capture during eulachon sampling is not expected to cause any harm or mortality to these fish. Although adult winter steelhead are running during the project sampling period of January through April, they would not likely be gilled in the 2-inch stretch mesh gear, and likely would notice the net before getting

entangled. If one of these fish is captured in the seining, it will be immediately released unharmed. With regard to the larval sampling, plankton nets are easily avoided by adult salmon and no juvenile salmon have been recorded in previous work so no take is expected from those sampling activities.

Other Fish and Invertebrate Species Interactions
While some non-target fish species may be captured in this study, it is anticipated that take would be extremely limited. Few fish other than eulachon smelt spawn at this time, so few interactions are expected. Based on the USACE shipping channel assessment in the Columbia River, the applicant is confident that only smelt eggs would be collected with that equipment. A few three-spine sticklebacks have been taken in plankton tows in the past, but no other species have been noted. No fish other than smelt are expected to be captured in dip netting activities. The small mesh gillnet could in theory entangle a Northern DPS green sturgeon (Klamath sample sites only) (maximum 1 per year), though this is extremely unlikely. No direct or post-handling mortality is expected for green sturgeon or other species incidentally caught. If a green sturgeon or any other non-target fish were to be captured, it would be quickly released alive, hence no green sturgeon or other non-target mortalities are expected.

Bird Species Interactions
While interactions are expected to be limited, there is the possibility that bird species would be impacted by the proposed research. Listed species, such as the Marbled Murrelet, are not likely to be observed, let alone encountered. The dipnet, seine net, plankton net, and spawning substrate frames are not a threat to birds. NMFS, in consultation with the applicant, is confident that no birds would be harmed in the execution of this study.

Marine Mammal Interactions
Small mesh gillnet operations in the mainstem Klamath River might pique the curiosity of harbor seals and sea lions, but entanglement is unlikely. Harbor seals and sea lions (both Steller and California) have been known to follow the smelt run into some rivers; however, the equipment used there would not pose a threat to the marine mammals. The applicant would monitor and report any take of marine mammals or ESA listed species to the NMFS Northwest Region Office of Protected Resources. Given previous experience sampling in these areas with similar protocols, no take of marine mammals is expected.

Environmental Consequences to the Physical Environment

While the researcher’s boats would pass through and over the water column of the area, this portion of the research activities would not likely impact the physical environment (including any portion that is considered critical habitat or EFH).

4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

Compliance with Endangered Species Act: To comply with Section 7 of the ESA Regulations (50 CFR 402.14(c)), a Section 7 consultation was initiated by the NMFS PR, under the ESA. In accordance with Section 7 of the ESA of 1973, as amended (16 U.S.C. 1531 et seq.), a biological opinion was prepared for this proposed action and it concluded that after reviewing the current status of the southern DPS eulachon, the environmental baseline for the action area, the effects of the take, and probable cumulative effects, it is NMFS' finding that issuance of Award No. NA10NMF4720374, as proposed, is not likely to jeopardize the continued existence of eulachon smelt, green sturgeon, any listed salmonid found in the study areas, or any other NMFS ESA-listed species and is not likely to destroy or adversely modify designated critical habitat.

*Compliance with the Marine Mammal Protection Act**:*** NMFS has determined that while the award creates the possibility of interactions with marine mammals, the possibility of incidental take (by harassment or otherwise) through such interactions is considered remote. The awarding of the grant, therefore, should not require the recipient to obtain authorization for incidental take under the MMPA in order to conduct the research activities.

*Compliance with the Magnuson-Stevens Act***:** Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) requires NMFS to complete an EFH consultation for any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by the agency that may adversely affect EFH. The issuance of the proposed award would not impact designated EFH. The Office of Habitat Conservation was contacted and concurred via email that the proposed action as it would be conditioned would have minimal impacts on EFH. Therefore, no further consultation was necessary.

*Compliance with the National Marine Sanctuaries Act***:** The actions in the applications for Award No. NA10NMF4720374 would not occur in a National Marine Sanctuary.

Redwood National Park
A Scientific Research and Collecting Permit has been requested by the applicant and it is anticipated that this request will be granted.

California State Collection Permit (SCP)
A California State Collection Permit has been requested by the applicant and it is anticipated that this request will be granted.

4.4 MITIGATION MEASURES

The activities authorized under proposed Award NA10NMF4720374, if approved, would follow certain procedures in order to minimize and mitigate effects of the proposed action. If the grant is awarded, the following Special Award Conditions (SACs) would be placed on the award to ensure compliance with appropriate research protocols.

To minimize the potential adverse effects of the award activities, mitigating measures are included in the conditions of the grant award. Specifically, these conditions include:

Salmon, Steelhead, and Green Sturgeon
Should any of the above species be taken incidentally during the course of netting, researchers will notify and consult with NOAA Fisheries Northwest Region Protected Resources Division within 24 hours of any capture. These species will be released alive back to the river or estuary.

Marine Mammals
In all boating and research activities within the study area, a close watch will be made for marine mammals to avoid interaction and harassment. In areas where marine mammals may be present, nets will not be deployed when animals are observed within the vicinity of the research; nets will be monitored in areas where marine mammals are known to occur; and animals will be allowed to either leave or pass through the area safely before net setting is initiated. Researchers will adhere to the marine mammal approach and viewing guidelines online at http://www.nero.noaa.gov/prot_res/mmv/.

In the unlikely event a marine mammal is captured, the animal will be assessed and, if possible, and if safe for the researchers and animal, the animal must be supported to prevent it from drowning. The NMFS Northwest Regional Office, Protected Resources Division must be immediately contacted as well as the appropriate local stranding partner, listed at http://www.nmfs.noaa.gov/pr/health/networks.htm.

In the unlikely event a captured marine mammal dies or is severely injured, all activities will cease and researchers will contact the NMFS Office of Protected Resources.

The sampling of adult eulachon smelt will not exceed 600 adults for the duration of the 3 year study unless authorized by the Program Officer. All sampling will be conducted in compliance with any new 4(d) rules or relevant regulations regarding the taking of eulachon. If significant eulachon populations are found, pre-spawned adult collections may be authorized after re-initiation of ESA Section 7 consultation and subsequent findings that such action would not likely jeopardize the future existence of the species or adversely modify any designated critical habitat.

4.5 CUMULATIVE EFFECTS

Effects of past and ongoing human and natural factors occurring in or near the action area have contributed to the current status of the species. Below is a brief discussion of relevant threats to the species.

Climate change may negatively impact eulachon. Marine, estuarine, and freshwater habitat in the Pacific Northwest has been influenced by climate change over the past 50–100 years, and this change is expected to continue into the future. Average annual Northwest air temperatures have increased by approximately 1 ^{o}C since 1900, or about 50 percent more than the global average warming over the same period (ISAB, 2007). The latest climate models project a warming of 0.1 to 0.6 ^{o}C per decade over the next century (ISAB, 2007). Analyses of temperature trends for the U.S. part of the Pacific Northwest (Mote *et al*., 1999); the maritime portions of Oregon, Washington, and British Columbia (Mote, 2003a); and the Puget Sound-Georgia Basin region (Mote, 2003b) have shown that air temperature increased 0.8 °C, 0.9 °C, and 1.5 °C, in these respective regions during the twentieth century. Warming in each of these areas was substantially greater than the global average of 0.6 °C (Mote, 2003b). This change in surface temperature has already modified, and is likely to continue to modify, freshwater, estuarine, and marine habitats of eulachon, having myriad impacts on eulachon.

Dams and water diversions affect eulachon in the Klamath River where hydropower generation and flood control are major activities. Dams and water divisions alter the natural hydrograph of river systems, in many cases reducing the magnitude of spring freshets with which eulachon have evolved. Dams can also impede or alter bedload movement, changing the composition of river substrates important to spawning eulachon.

There are currently no harvest regulations for eulachon in the Klamath River, Mad River, or Redwood Creek. However, eulachon abundance has dropped off so dramatically in these rivers that there is practically zero fishing effort for eulachon.

In the Pacific Ocean, eulachon can be harvested year-round using any method otherwise authorized to harvest food fish in the open ocean.

Bycatch of eulachon in commercial marine fisheries poses a moderate threat to eulachon in Oregon and Washington and California. In the past, protection of forage fishes has not been a priority when developing ways to reduce shrimp fishing bycatch. Eulachon are particularly vulnerable to capture in shrimp fisheries in the United States and Canada as the marine areas occupied by shrimp and eulachon often overlap. In Oregon, the bycatch of various species of smelt (including eulachon) has been as high as 28 percent of the total catch of shrimp by weight (Hannah and Jones, 2007).

In response to NMFS declaring canary rockfish overfished, the states of Oregon, Washington, and California enacted regulations to reduce canary rockfish bycatch that require bycatch reduction devices (BRDs) on trawl gear used in the ocean shrimp fishery. The BRDs were successful in reducing bycatch of all finfish species (Hannah and Jones, 2007). In Oregon, these devices have been shown to reduce the smelt (including eulachon) bycatch to between 0.25 and 1.69 percent of the total catch weight (Hannah and Jones, 2007).

Little is currently known about collateral damage (physical injuries suffered by fish as they pass through BRDs) eulachon may experience as a result of shrimp BRDs. Suuronen *et al*. (1996a; 1996b) found that herring passing through mesh and rigid trawl net sorting devices (similar to BRDs) often die (mortality estimates ranging from 30-100 percent depending on herring size and season caught). Although eulachon bycatch rates in shrimp fisheries have declined significantly, it is not certain what percent of eulachon traveling through BRDs survive.

The aforementioned activities and threats are expected to continue. Synthesis of the information about the status of the species, past and present activities affecting the species, possible future actions that might affect the species, and effects of the proposed action provide a basis for determining the additive effects of the activities supported by the proposed grant. Given the cumulative threats information and the known effects of the proposed action, NMFS concludes that the proposed action would not likely reduce the species' likelihood of survival and recovery in the wild by adversely impacting eulachon at the population level. The DPS includes fish from several watersheds along the West Coast. The actions proposed are directed on only a portion of the DPS—mostly those fish associated with the Klamath River. Where possible, the proposal makes use of post-spawn adult fish. The likely impact of this proposed study a few hundred adult smelt is much smaller than existing foreign and domestic fishery impacts (of several tons).

This EA considers the cumulative effect the research would have on live animals that are occupying freshwater, estuarine and marine waters. NMFS expects the take of eulachon from the proposed research to have negligible effects on the population of eulachon and will not likely jeopardize the continued existence of the species. The award would contain conditions (see mitigation measures) to mitigate potential adverse impacts to eulachon smelt. Other work is in the lab and office and will not have any appreciable impacts. Overall, the proposed actions would be expected to have no more than short-term effects on both the listed eulachon population and populations of bycatch species. The incremental impact of the action when added to other past, present, and reasonably foreseeable future actions discussed here would be minimal and not significant. The data generated by the research activities associated with the proposed action would help improve monitoring of trends in abundance, and distribution, allowing for more targeted management measures that lessen impacts from human activities. The new information on the timing and geographic extent of spawning would inform future permits and federal regulations including critical habitat and 4(d) rules. The proposed action would not be expected to have any more than short-term adverse effects any species or other portions of the environment and would not result in any cumulatively significant effects.

CHAPTER 5 LIST OF PREPARERS AND AGENCIES CONSULTED

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Finding of No Significant Impact
for Issuance of a Protected Species Conservation and Recovery Grant to the Yurok Tribe (Award File 4720374) to Conduct Studies on Eulachon Smelt in Northwest California

National Marine Fisheries Service

The National Marine Fisheries Service, Office of Protected Resources (NMFS PR) proposes to provide financial assistance in the form of a grant to the Yurok Tribal Fisheries Program (YTFP) (Michael Belchik, P.I.). This award would be issued through the Protected Species Conservation and Recovery Grant Program (CFDA no. 11.472, Unallied Science Programs) authorized under the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*). This financial assistance award is planned to extend for three years (three annual payments) and is subject to semi-annual review by NMFS. The grant would support conservation activities for the ESA threatened eulachon smelt in northwest California.

In accordance with the National Environmental Policy Act (NEPA), as implemented by the regulations published by the Council on Environmental Quality and NAO 216-6, NMFS prepared an Environmental Assessment (EA) analyzing the impacts on the human environment associated with award issuance (*Issuance of a Protected Species Conservation and Recovery Grant to the Yurok Tribe (Award No. NA10NMF*4720374*) to Conduct Studies on Eulachon Smelt in Northwest California, June 2010).* The analyses in the EA support the following findings and determination.

The applicant is requesting funds to 1) determine the population status of eulachon in the Klamath River, Redwood Creek and the Mad River; 2) develop and implement an annual eulachon spawning stock biomass (SSB) estimate for the Klamath River that would allow managers to better track recovery and manage fishery impacts; 3) conduct egg and larvae surveys of known and potential spawning areas in the lower Klamath River, Mad River, and Redwood Creek in California to better characterize current eulachon smelt distribution and to inform NOAA Fisheries critical habitat decisions for the DPS; and 4) to clarify the genetic structure of eulachon populations in the Klamath, Redwood Creek and Mad Rivers.

The National Oceanic and Atmospheric Administration's Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) NEPA implementing regulations at 40 C.F.R. 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to making a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the NAO 216-6 criteria and CEQ's context and intensity criteria. These include:

1. Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat (EFH) as defined under the Magnuson - Stevens Act and identified in Fishery Management Plans?

   Response: The project's proposed research activity, including boating and netting activities, would not take place in national marine sanctuaries. Also, no coral reef ecosystems occur in the action area and thus none would be affected. However, designated EFH would overlap with a section of the proposed action area. Although researcher's boats would pass through and over the water column in the action area where EFH does exist, NMFS determined this portion of the researcher's activities would not adversely impact the physical environment, including any portion considered EFH.

   NMFS PR requested concurrence on whether the proposed action as conditioned would have adverse impacts or not on designated EFH in the action area. The NMFS, Southwest Office of Habitat Conservation was contacted and agreed by email that the proposed boating and netting activities would have no more than minimal impact to EFH.

2. Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?

   Response: No substantial impact on biodiversity or ecosystem function within the affected area is expected. The impact from the use of boat anchors is expected to be minimal.

   Due to the nature of netting, the researchers would expect that other non-target species may become enmeshed. Other non-target species collected in the past during netting activities include salmonids and three-spine sticklebacks. Non-target fish would be released if captured, minimizing any impacts.

3. Can the proposed action reasonably be expected to have a substantial adverse impact on public health or safety?

   Response: Issuance of this award is not expected to have substantial adverse impacts on public health or safety that could reasonably be expected by the proposed research activities. This action would involve the use of ethanol pre-measured in vials for preservation, storage, and transportation of tissue samples. All handling would be conducted by trained personnel.

4. Can the proposed action reasonably be expected to adversely affect endangered or threatened species, their critical habitat, marine mammals, or other non-target species?

   Response: The proposed research activities will cause mortality of some individual eulachon, but the effects are not expected to have adverse population-level impacts.

   The award activities require the applicant to follow NMFS research and mitigation protocols to minimize mortality, stress, and harmful effects. NMFS determined in a BiOp issued by the Office of Protected Resources after completion of a formal ESA Section 7 consultation that eulachon, salmon, steelhead, and green sturgeon would be adversely affected but not jeopardized by this action, nor would critical habitat be adversely modified.

It is possible that this action may have adverse impacts on salmonids although nets would be checked at short intervals to ensure the quick release of any salmon, steelhead, or green sturgeon. NMFS believes that salmonids captured in a net during eulachon research would result in short-term stresses and pose a potential risk to the individual salmon or steelhead but are not likely to result in serious injury or mortality.

In the unlikely event that marine mammals or marine birds are encountered while netting, researchers would be directed by award conditions to avoid contact with these animals. If researchers do come into contact with any of the aforementioned animals, either through boating or netting activities, the Office of Protected Resources suggested appropriate precautionary measures that would be required. Namely, netting would not be deployed when animals are observed within the vicinity of the research; and animals would be allowed to either leave or pass through the area safely before net setting is initiated. Also, in all boating activities, researchers would be advised to watch for marine mammals to avoid harassment or interaction.

5. Are significant social or economic impacts interrelated with natural or physical environmental effects?

   Response: There would be no significant social or economic impacts interrelated with natural or physical environmental effects because communities are not dependent upon the target and non-target species within the scope of the proposed action. Therefore, there are no social or economic impacts interrelated with natural or physical environmental effects.

6. Are the effects on the quality of the human environment likely to be highly controversial?

   Response: The effects on the quality of the human environment are not likely to be controversial. This project is similar to other existing projects that have negligible effects on the human environment and are not controversial.

7. Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers, essential fish habitat, or ecologically critical areas?

   Response: The activities in this proposed award would not be expected to result in significant impacts to any unique areas mentioned above. Similar research has been conducted in the proposed area that has not impacted unique areas.

8. Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

   Response: Potential risks of proposed research methods are not unique or unknown, nor is there significant uncertainty about impacts. Monitoring reports from other projects of a similar nature, and published scientific information of impacts on eulachon and other ESA listed species indicate the proposed activities would not result in significant adverse impacts to the human environment or the species affected. There is considerable scientific information available on the likely impacts for the proposed action.

9. Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

   Response: Overall, the proposed action would be expected to have no more than short-term effects on eulachon populations and few effects on other aspects of the environment. The incremental impact of the action when added to other past, present, and reasonably foreseeable future actions discussed in the environmental assessment would be minimal and not significant.

10. Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

    Response: The action would not adversely affect any district, site, highway, structure, or object listed in or eligible for listing in the National Register of Historic Places. The proposed action would also not cause loss or destruction of significant scientific, cultural or historical resources. The proposed action will not occur in the aforementioned areas.

11. Can the proposed action reasonably be expected to result in the introduction or spread of a non-indigenous species?

    Response: The U.S. Geological Survey has documented several aquatic nuisance species occurring in the action area having potential to be spread by the actions of the proposed research. However, the applicant has agreed to follow certain conditions proposed by NMFS to minimize the potential spread of these aquatic nuisance species. Therefore, the proposed research activities would not be expected to result in the introduction or spread of non-indigenous species to other watersheds.

12. Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

    Response: The decision to issue this award would not be precedent setting and would not affect any future decisions. NMFS has issued numerous awards to study eulachon. Issuance of an award to a specific individual or organization for a given research activity does not in any way guarantee or imply NMFS would authorize other individuals or organizations to conduct the same research activity. Any future request received, including those by the applicant, would be evaluated upon its own merits relative to the criteria established in the MMPA, ESA, and NMFS' implementing regulations.

13. Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

Response: Issuance of the proposed award is not expected to violate any Federal, State, or local laws for environmental protection. This award would not relieve the applicant of the responsibility to comply with other Federal, State, local, or international laws or regulations.

14. Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?

    Response: The proposed procedures would have adverse impacts on individual eulachon, however the population effects are not anticipated to be significantly adverse. Because eulachon have high natural mortality and sampling would only target a small percentage of the total population, the cumulative effects on the species are not likely long-term or significant.

    Likewise, it is possible that this action may have adverse impacts on individual salmon, steelhead or green sturgeon although such interactions are expected to be minimal. Because there are award conditions placed on the researchers to minimize impacts to salmonids and green sturgeon, NMFS believes that salmonids or green sturgeon captured in a net during this research would be subject to short-term stress which could pose a potential low-level risk, but is not likely to result in serious injury or mortality.

    NMFS also considered impacts of potential marine mammal and seabird interactions during eulachon research. Although interactions with marine mammals or marine birds would be considered rare based on historical records in the river, the award conditions state that nets would not be set if marine mammals are seen in the vicinity of the research, and also mandates that animals must be allowed to leave the area before the nets are set, minimizing potential adverse impacts to these species.

    A BiOp was prepared for this award and found that this action would not jeopardize the existence of any listed species nor result in adverse modification or destruction of designated or proposed critical habitat.

DETERMINATION

In view of the information presented in this document and the analysis contained in the Environmental Assessment (EA) prepared for Issuance of Award No. NA10NMF4720374 it is hereby determined that the issuance of Award No. NA10NMF4720374 will not significantly impact the quality of the human environment as described above. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an Environment Impact Statement for this action is not necessary.

James H. Lecky
Director, Office of Protected Resources

JUN 24 2010
Date