Cooke Aquaculture Pacific, Port Angeles-East Marine Net Pen Relocation
DA File No. NWS-2016-100

Response to Issues Raised in Comments Submitted to the U.S. Army Corps of Engineers

A total of 43 letters were received by the U.S. Army Corps of Engineers on Department of the Army File No. NWS-2016-100. Of these, 13 letters from 9 organizations and 4 individuals spoke favorably in support of the project. Twenty-five letters (14 from organizations and 11 from individuals) expressed concerns regarding potential impacts of the project, or regarding net pen aquaculture in general. Five letters were submitted by regulatory agencies and Tribes. These were essentially neutral. This document groups representative issues and subjects identified in the comments, provides responses, and identifies commenters on each subject. Letters of support and neutral letters are summarized at the end.

ISSUE: CONCERNS REGARDING POTENTIAL IMPACTS TO NATIVE SALMON

Comments	Responses
Comment #1: Escapement, Colonization, and Competition with Native Salmon Stocks Comment − James Hudnall: *Escaped Atlantic salmon from British Columbia net-pen farms have a well-documented history of getting into the rivers of British Columbia and Southeast Alaska, where they compete with wild salmon as they breed in river-gravel beds for the best redd locations. There is also scientific concern that the Atlantic salmon may be interbreeding with wild salmon, thereby altering and possibly weakening genetic stocks of wild salmon.* Comment − Washington Department of Natural Resources: *Escapement of Atlantic salmon from the net pens is a concern; however, current studies show low risk of Atlantic salmon successfully inter-*	The document titled *Common Questions about Atlantic Salmon Net Pen Aquaculture* (American Gold Seafoods, January 2016) provided as Attachment 1 to this response document addresses these issues under the heading ACCIDENTAL RELEASE OF CULTURED FISH STOCK (see pages 5 through 7).[1] This document was also provided with the project application materials as Appendix D to the *Biological Evaluation* (pages 139-148 of that .pdf file). Also see WDNR Comment #4 (March 23, 2016), cited at left. The National Marine Fisheries Service (NMFS) issued an Informal Consultation document in 2011 on the EPA *Biological Evaluation* (2010) that addressed the Washington State Sediment Management Standards Rule as it relates to marine net pen aquaculture. These documents are provided as Attachments 2 and 3 to this response document. The following statements are quoted from page 13 of the

[1] Also see Nash, C.E. (editor) 2001, *The Net-Pen Salmon Farming Industry in the Pacific Northwest*. U.S. Department of Commerce, NOAA Technical Memo NMFS-NWFSC-49, for which the Executive Summary is appended to the AGS *Common Questions* document, both with this submittal and in the permit application documents.

Comments	Responses
breeding with native stocks. Comment − Coalition to Protect Puget Sound Habitat, Coastal Watershed Institute, Sierra Club, Tahoma Audubon Society, Karl Spees: *Our region's fish species should not be exposed to net pen diseases, parasites or escapements of a non-native carnivorous Atlantic salmon*.	NMFS Informal Consultation document: *"These concerns [competition, predation, or interbreeding with escaped Atlantic salmon] are largely unfounded in Washington . . . Atlantic salmon aquaculture poses minimal risk to wild salmon stocks there."* *"During the last NPDES permit cycle [2007], the net pen facilities in Puget Sound installed fish containment nets with a heavier nylon material. Thus, the potential for unintentional release of Atlantic salmon has been reduced in recent years."* It has been demonstrated through laboratory trials using in vitro fertilization that Atlantic salmon gametes did not create viable hybrid offspring when crossed with Pacific salmon species. Previous attempts to introduce Atlantic salmon in the Pacific NW for recreational fishery opportunities by resource agencies were unsuccessful at creating self-sustaining populations of Atlantic salmon despite numerous attempts. Escaped farm-raised Atlantic salmon have never successfully colonized in the Pacific NW or any other environments outside their native range of the north Atlantic. Ecology and WDFW both require net pen operations to report fish escapes within 24 hours of an occurrence as a condition of the NPDES permit and Finfish Aquaculture permit. An *Escape Prevention, Response and Reporting Plan* will be prepared and submitted to WDFW and Ecology for the PA-East relocation site.
Comment #2: Impacts to Native Salmon Runs Comment − Orca Conservancy: *The Strait of Juan de Fuca is an extremely important migratory, rearing, and feeding corridor for many of the region's critically endangered and declining salmon and forage fish stocks*.	See U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-53 (Waknitz et al. 2002): *Review of Potential Impacts of Atlantic Salmon Culture on Puget Sound Chinook Salmon and Hood Canal Summer-run Chum Salmon Evolutionarily Significant Units*, provided as Attachment 4 to this response document. Additional information regarding Pacific salmon stocks is provided in an Addendum to the SEPA Checklist submitted to Clallam County (August

Comments	Responses
Comment − Tahoma Audubon Society: *In Canada, 18 scientists wrote an open letter to the Canadian Government urging a response to the issue of sea lice from salmon farms threatening wild Pacific salmon*.	16, 2016), provided as Attachment 5 to this response document. With regard to the work of Krkošek, Morton, and their coauthors mentioned in comments regarding sea lice impacts to native fish, the EPA BE (2010) states that *"Others have challenged the conclusions in these reports through additional research"* (page 43). If the Corps of Engineers or other regulatory agencies would like to obtain more objective comments regarding the effect of salmon farms on native fish, you are encouraged to contact Dr. Jill Rolland (Center Director) and/or Dr. Jim Winton (Chief, Fish Health Division) at the U.S. Geological Survey, Western Fisheries Research Center (206.526.6282).
Comment #3: Depressed Populations of ESA-listed Puget Sound Salmonids Comment − OnBoard Tours, Puget SoundKeeper: The proposed location of the expansion project is a concern in light of its close proximity to rivers and small lowland streams that have depressed populations of ESA-listed Puget Sound Chinook salmon, steelhead, and bull trout.	See the response to the Ecosystem Processes issue above, and the *SEPA Checklist* Addendum (August 16, 2016), provided as Attachment 5 to this response document. The project-specific/site-specific Biological Evaluation that accompanies the application was prepared by a professional environmental consulting firm experienced in wildlife biology, marine ecosystems, and the analysis of project effects on these resources. The BE has been reviewed by the U.S. Army Corps of Engineers, and will be reviewed by the Federal agencies responsible for protecting ESA-listed species; i.e., NMFS and USFWS.
Comment #4: Consultation with NMFS and USFWS re: ESA-Listed Species, Critical Habitat, and Essential Fish Habitat Comment − Olympic Peninsula Audubon Society, Puget SoundKeeper: *Pursuant to Section 7 of the Endangered Species Act (ESA), all actions that may affect a species listed (or proposed for listing) under the ESA as threatened or endangered, or any designated critical habitat, requires Federal agencies to consult with the National Marine Fisheries Service and/or the U.S. Fish and Wildlife Service*.	To comply with a requirement of the Federal permit for the project, the U.S. Army Corps of Engineers will request ESA consultation with NMFS and USFWS. If the Services determine that mitigation measures are warranted for the protection of ESA-listed species or critical habitat, these conditions will be imposed through the USACE Section 10 Individual permit for the project.

Comments	Responses
Comment #5: Disease Outbreak Reporting Comments − Wild Fish Conservancy, Puget SoundKeeper: *Reporting of pathogen outbreaks in net pen facilities appears to be at the volition of the net pen operators; it does not appear to be required by current State of Federal law*. *Even when outbreaks are reported to State agencies such as Ecology or WDFW, the relevant agency for evaluating the impacts of outbreaks on aquatic organisms (including ESA-listed salmon and steelhead) apparently lacks the authority to conduct on-site inspection or to determine/conduct on-site monitoring to evaluate the severity of the outbreak and assess its impact on aquatic organisms*. *Will the activities of this new proposed net pen be transparent to State and Federal agencies and the public?* Comment − Coalition to Protect Puget Sound Habitat: *The State has no response plan for disease outbreaks or net pen fish escapements. A robust monitoring plan is missing from this proposal*. Comment − Washington Department of Natural Resources: *The proponent should develop a contingency plan, in coordination with resource management agencies, that addresses actions toward protecting migrating salmon should parasite and virus outbreaks occur*.	WDFW has the regulatory authority over aquatic animal health issues for both public and private facilities engaged in cultivating aquatic animals (WAC 220-77-030). Washington State law requires aquatic animal growers (private or public) to immediately notify WDFW of the positive identification of a regulated finfish pathogen at that facility. State-licensed aquatic animal health veterinary services are required by State and Federal law to notify the appropriate agencies if there is confirmed finding of any regulated finfish pathogen identified in samples originating from either public fish enhancement hatcheries or private aquaculture facilities. WDFW regulates the movement of private-sector cultured aquatic products through the Finfish Transfer Permit (RCW 75.58.010). Private fish hatcheries are required to maintain health records and routinely test their cultured stocks for viral and bacterial disease. Fish Transport permits are only issued to stocks of fish shown to be negative for regulated fish pathogens. Licensed veterinary services and accredited veterinary labs are used by aquatic farmers to certify brood stock fish and the resulting fry are free of viral disease. The movement of live salmonids or gametes across State or international borders is strictly controlled by additional Federal regulations enforced by the U.S. Fish and Wildlife Service (USFWS) under Title 50 of the Code of Federal Regulations (Regulation 50 CFR, Part 16.13). These fish health regulations are management standards designed to control risk and reduce the potential of fish pathogens to affect private, public and tribal aquaculture facilities and the natural resources of Washington State. American Gold Seafoods (predecessor to Cooke Aquaculture Pacific, LLD) developed a *Regulated Finfish Pathogen Reporting Plan* (October 29, 2014) that was submitted to WDFW and Ecology for the purpose of facilitating clear communications and creating a better understanding of the management responsibilities in the event of a regulated fish disease event. A copy of this plan accompanies this

Comments	Responses
	response to comments. Copies of this plan are kept at each marine aquaculture farming location and are on file with WDFW and Ecology. Both WDFW and Ecology have legal authority to conduct on-site inspections at any of the farm sites through existing regulation and laws (WAC 220-76-130).
Comment #6: Parasites and Pathogens Comment − Coastal Watershed Institute, Olympic Peninsula Audubon Society, Sierra Club, Puget SoundKeeper and Others: *Marine net pens concentrate and propagate parasites (e.g., sea lice) and pathogens that will be contracted by native salmon stocks (including threatened and endangered salmon runs) and forage fish as they migrate past the net pens*. Comment − Coastal Watershed Institute: *Ecto-parasitic copepods are observed regularly on juvenile herring and sand lance along the central Strait near shore, indicating that impacts from the existing net pen are already occurring*. Comments − Whale and Dolphin Conservation: *In crowded pen conditions, salmon can become infected by a plethora of pathogens, which can be released into surrounding waters*. *Parasites and diseases originating in farm operations are readily passed to wild populations; these infections are often of foreign origin and the native salmon have no adaptations for defense, resulting in a decline in their survival and abundance*. Comment − Washington Department of Natural Resources: *To ensure that migrating Pacific salmon are not exposed to parasites and pathogens, monitoring and reporting of potential parasites and*	Sea lice infestations have historically not been an issue at the Washington marine net pen facilities. The Port Angeles net pen facility has used one treatment in the past 30+ years of growing salmon at this facility to reduce the sea lice levels on the fish stocks. Additional information is provided on these subjects in the document titled *Common Questions about Atlantic Salmon Net Pen Aquaculture* submitted with permit application documents for the proposed Port Angeles-East marine net pen relocation project. These issues are also addressed in the NMFS *ESA Section 7 Informal Consultation* document (2011), and the U.S. EPA *Biological Evaluation* (2010) provided as Attachments 2 and 3 to this response document. The EPA BE (2010) includes the following statements on pages 43 and 45: 1) *"There is little agreement about the factors that influence sea lice propagation and transmission from net pen operations to wild salmon. . . . risk factors, which contribute variability to sea lice incidence and lethality, include geographic location, channel morphology and currents, salinity and temperature, presence of large and healthy runs, and the size of wild salmon populations. In addition, the density of fish in the net pens may also be a contributing factor to sea lice infestation*." 2) *" . . . there is no empirical evidence that sea lice have been a problem in Puget Sound . . ."* 3) *"NMFS confirms this by stating that there have been no known episodes of sea lice outbreaks in Puget Sound affecting wild Pacific salmon*

Comments	Responses
pathogens should be required on an on-going basis. The proponent should develop a contingency plan, in coordination with resource management agencies, that addresses actions toward protecting migrating salmon should parasite and virus outbreaks occur.	*populations indigenous to Puget Sound."* 4) *"In a recent concurrence letter, NMFS stated that although the salinity levels of Puget Sound vary, the upper surface layers of Puget Sound are well below 25 parts per thousand during most of the year due to the many rivers and streams entering this large estuary. NMFS believes this explains why the levels of sea lice have been much lower in Puget Sound compared to other regions of the world."* The NMFS ESA Section 7 Informal Consultation document (2011) concludes that, in regard to the sea-lice question, the operation of marine net pen facilities would have insignificant and discountable effects on Puget Sound Chinook salmon, Hood Canal Southern Resident chum salmon, and Puget Sound steelhead (page 9). Ecology and WDFW both require net pen operations to report fish escapes within 24 hours of an occurrence, and prior notification if a finfish farm requires treatment to reduce sea lice levels. These requirements are enforced through the NPDES permit administered by Ecology, and through the Finfish Aquaculture permit administered by WDFW. Also see the response to the issue of Disease Outbreak Reporting below.
Comment #7: Pathogenic Amplification Comment − Wild Fish Conservancy and Orca Conservancy: *The "confined animal feeding operation" (e.g., feed lot) will increase the likelihood of rapid parasitic or pathogenic amplification that will result in Infectious Hematopoietic Necrosis Virus (IHNV), Infectious Salmon Anemia Virus (ISAV), Piscene Othoreouvirus (PRV), and Heart and Skeletal Muscle Inflammation (HSMI). Many outbreaks presently go unreported. Rapid spread and release of large numbers of viral and bacterial pathogenic particles into the adjacent aquatic environment*	See the response to Comment #5 above regarding Disease Outbreak Reporting. IHN virus has been studied intensively in the Pacific Northwest. It is endemic (e.g., a disease that occurs with predictable regularity with minor fluctuations in its frequency) in wild Pacific salmon. Because it is endemic, most of the Pacific salmon species have evolved some increased immunity to the virus. Farmed Atlantic salmon stocks are considered to be more susceptible to IHN virus than Pacific salmon, having little to no historic exposure to this virus in their native north

Comments	Responses
will place wild juvenile salmonids at considerable risk of infection.	Atlantic Ocean. In controlled water-borne transmission studies with IHN virus, researchers were unable to cause an infection in Chinook Salmon (*O. tshawytscha*) or Sockeye Salmon (*O. nerka*), but caused infection leading to a 10% mortality rate in Atlantic Salmon (Traxler et al. 1993).[2] Aquaculture operators in both freshwater and marine environments take extraordinary measures to prevent and control IHNV and other diseases through regular health screenings, aquatic animal husbandry techniques, vaccination, and depopulation of the cultivated stock if a virus is ever detected. These measures all work to prevent disease or eliminate pathogen amplification if a disease event should occur. ISA virus has not been found in the Pacific Northwest despite significant screening efforts by the Washington Department of Fish and Wildlife, the Canadian Department of Fisheries and Oceans, U.S. Fish and Wildlife Service and the U.S. Department of Agriculture Animal Plant Health Inspection Service (APHIS). Despite many years of disease screening in both Pacific salmon and Washington farmed Atlantic salmon stocks, this virus has never been found in wild or farmed salmon coming from Washington, Oregon, Alaska or British Columbia. PRV is an innocuous virus that is endemic to the Pacific Northwest and is found in wild salmon in Washington, Oregon, Alaska and British Columbia. Despite its prevalence, it has never been shown to be associated with any clinical signs of disease in the Pacific Northwest, including HSMI (Mark Polinski, Fisheries and Oceans Canada). It is a virus that has adapted to live within fish without causing disease or even stimulating the immune system.

[2] Traxler, G.S., J.L. Roome, and M.L. Kent. 1993. *Transmission of infectious hematopoietic necrosis virus in seawater*. Diseases of Aquatic Organisms 16:111–114.

Comments	Responses
	WDFW has the regulatory jurisdiction over aquatic animal health issues for both public and private facilities engaged in cultivating aquatic animals within Washington State (WAC 220-77-030). State law requires aquatic animal growers (private or public) to immediately notify WDFW of the positive identification of a regulated finfish pathogen at a facility. State-licensed aquatic animal health veterinary services are also required by State and Federal law to notify the appropriate agencies if there is confirmed finding of any regulated finfish pathogen in samples originating from both public fish enhancement hatcheries and/or private finfish aquaculture facilities. American Gold Seafoods (predecessor to Cooke Aquaculture Pacific, LLC) developed a *Regulated Finfish Pathogen Reporting and Response Plan* (October 29, 2014) that was submitted to WDFW and Ecology for the purpose of facilitating clear communications and creating a better understanding of the management and mitigation responsibilities in the event that a regulated finfish pathogen is identified in cultivated fish stocks. This document is provided as Attachment 6 to this response document. WDFW will require preparation of a new *Pathogen Reporting and Response Plan* for the PA-East facility as part of the Finfish Aquaculture Permit application materials for the relocated farm. Managers of private aquaculture facilities prevent and control disease events through implementing strict sanitation and biosecurity protocols; continual fish health monitoring and screening; use of FDA food-animal-approved antibiotics, effective vaccines; rapid and vigilant sick fish and mortality removal from the facility; appropriate nutrition; selective breeding of captive brood stock; maintaining proper rearing densities; and many other proven aquatic animal health and animal husbandry techniques. Fish growers have an economic interest in maintaining the health status of their fish stocks, and the long-term sustainable health of the facilities and environments in which they raise their fish. The proposed new facility will meet and comply with State and Federal rules to prevent the introduction of exotic pathogens into

Comments	Responses
	new regions/zones, or the transmission of endemic pathogens among animals within an area. Disease epidemiology and fish pathogen ecology in the natural environment are extremely complex subjects. The infection by a pathogen organism in fish populations has been studied extensively, and the impact of pathogens on the fish involves several known factors including: pathogen exposure dose; exposure time; susceptibility of the host (e.g., the physiological state and immune status of the fish); and environmental competitiveness of the pathogen. In natural ecosystems, most animal populations have several pathogenic bacteria, viruses, and parasites that live within these populations, only occasionally causing disease or death in the host animal, and rarely if ever threatening the entire population. Disease organisms can behave differently in confined animal feeding operations because it is not the environment into which they have evolved. Farmers must actually keep the pathogen load less than in the wild; otherwise, their livestock and their livelihoods are in danger. This is accomplished through a variety of means, described but not limited to those listed above. Pathogens that can affect Atlantic salmon farm stock come from the wild populations where they naturally occur and have already provoked a certain level of "herd immunity" in the wild populations of the area. Vaccines are effectively used in the prevention of disease within modern agricultural systems (including aquaculture), and are coupled with strict farm bio-security measures to eliminate or minimize pathogen vectors into the cultivated fish population. There are many examples where vaccines have nearly eradicated the targeted pathogenic organisms. Despite these improvements and safeguards, there is always some level of risk for disease within cultivated farm stocks. Disease amplification, however, is unlikely to occur in cultivated stocks and pose a significant threat to wild fish for the following reasons:

Comments	Responses
	1) Wild stocks have evolved a greater level of immunity to endemic pathogens than the farmed fish stocks. 2) All fish will be vaccinated before leaving the hatchery for endemic wild diseases of potential concern. 3) Vaccines are routinely adjusted to be up-to-date for any new important diseases of potential concern, consistent with the recommendations of the company's fish health staff and veterinary consultants. 4) Normal fish mortalities are routinely collected and removed from the rearing environment. In a disease event, increased frequency of mortality removal would be initiated to reduce possible pathogen vectors. 5) The site will be thoroughly fallowed and the nets cleaned and disinfected at the end of each production cycle when the fish are completely harvested out. This planned biological break eliminates the risks of pathogens or parasites being introduced into the next generation of fish from the hatchery. 6) In the event of a significant disease occurrence at a finfish facility, strict quarantine procedures would be implemented; rapid, sanitary removal of the infected fish stocks would occur; and the facility equipment would be disinfected to eliminate the pathogenic organism.
Comment #8: Disease Control Chemicals Comment − Washington Department of Natural Resources: *Disease control chemicals should not be directly introduced into the marine waters of the Strait of Juan de Fuca. State and Federally-approved antibiotics are occasionally used and added to feed*. Comment − OnBoard Tours, Puget SoundKeeper:	Disease control chemicals will not be introduced directly into the water. The cultivated fish stocks will be vaccinated against common fish pathogens prior to their transport from the hatchery to the marine net pen facility. The farms use strict bio-security measures and fish culture practices that are designed to maintain healthy fish stocks and avoid the use of disease control chemicals. Antibiotics are only used if required, and then only administered to the fish in a medicated feed treatment at the prescribed amount. Medicated feed treatments are of short duration

Comments	Responses
Chemicals, antibiotics, and waste impact habitat and native species.	to achieve the proper dosage (typically 5 to 10 days). Medicated feed is used infrequently during the entire course of the growing cycle. Use of disease control chemicals in medicated feed will be reported monthly and annually to WDNR and Ecology. WDFW has the regulatory jurisdiction over aquatic animal health issues for both public and private facilities engaged in cultivating aquatic animals (WAC 220-77-030). Washington State law requires aquatic animal growers (private or public) to immediately notify WDFW of the positive identification of a regulated finfish pathogen at a facility.
Comment #9: Use of Insecticides, Herbicides, and Antibiotics Comments − Coastal Watershed Institute, Orca Conservancy: *Insecticides, herbicides, antibiotics, and high concentrations of fish feed all have impacts to the marine ecosystem*. *Open net cage fish farms and land-based fish farms can discharge significant amounts of wastewater containing nutrients, chemicals, and pharmaceuticals that impact the surrounding environment*. *The contaminants from salmon farms have been linked to elevated levels of mercury in rockfish*.	Insecticides and herbicides are not used in marine finfish aquaculture. Antibiotics are only used if required, and then only added to the fish feed in the prescribed amount, as described above. Computerized feeding systems will be used to accurately keep track of how much the fish population in each fish cage is expected to eat each day. The feeding system keeps track of the actual amounts and rates that feed is being delivered to each pen in real time. Fish technicians will monitor each fish cage during the feeding process using either video or physical observations (or both) from the surface of each pen to observe feeding behavior and appetite response in the fish population. Each pen will also be equipped with underwater video cameras that allow the feeding technicians to observe the feeding response of the fish population underwater while they are feeding. This device ensures the fish population is being fed properly and that feed is not being wasted by being lost into the environment. These cameras allow the feed technicians to recognize and cease the feeding operation when the fish have reached satiation and are no longer actively feeding. Fish feed is one of the most expensive costs in raising salmon. For this reason, the industry has researched and developed improved fish feeds, underwater feeding monitoring equipment, feed distribution equipment, population growth coefficients, optimal feed conversion rates, specific maximum feed rates, and several

Comments	Responses
	other key performance indictors and management methods to maximize feed utilization for the efficient growth of the fish stocks while minimizing the chance of release of uneaten or wasted feed. The proposed relocation site has strong east/west tidal currents that will facilitate rapid assimilation of any uneaten feed pellets and the metabolic waste products by the marine environment. The new facility will be required to obtain an NDPES waste discharge permit from Ecology. The facility will be required to meet the conditions of the permit that set forth and defines State sediment management standards, discharge standards, sediment monitoring procedures and reporting requirements. Mercury occurs naturally in the environment and can also be released to the environment through many types of human activity. Mercury can collect in streams, lakes, and oceans and is turned into methylmercury in the water. Nearly all fish contain at least trace concentrations of methylmercury. Methylmercury tends to build up more in some types of fish than others, especially in larger fish with longer life spans. Tissues sampled from farmed Atlantic salmon, sardines, Pacific oysters and most species of wild Pacific salmon consistently have some of the lowest levels of methylmercury concentrations, and are well below the dietary guidelines set by both the FDA and EPA. The raw ingredients of salmon feed used in aquaculture are tested and required to meet strict guidelines for low contaminant levels. The low incidence of methylmercury found in tests of Atlantic Salmon flesh by the FDA would indicate that salmon farming is not a source for methylmercury in the environment. A recent study in Norway looked into this very question and concluded the following: *"Our results do not support the notion that salmon farms in general increase the concentrations of potentially harmful elements in wild fish, and the distribution of Hg (mercury) and other elements in*

Comments	Responses
	cod and saithe in Norwegian coastal waters may be more influenced by habitat use, diet, geochemical conditions and water chemistry."[3]
Comment #10: Antifouling Agents Comment − OnBoard Tours: *Antifouling agents used to keep cages and pens clean are highly toxic*.	The *SEPA Checklist* that accompanies the application states that no antifouling agents will be used (Section B.3.d, page 15). The proposed facility will use in-situ net scrubbers to keep fouling organisms from accumulating on the submerged netting materials. No antifouling paints will be used on the nets. The fish containment nets will be frequently rinsed using this method to prevent accumulations of bio-fouling growth from restricting the passive flow of tidal water to the fish stocks. At the end of the growing cycle as the fish pens are harvested and emptied out, all nets will be removed from the water and taken to an approved land-based net washing facility for cleaning, sterilization and service. A vessel with a large lifting crane will remove each fish containment net and predation barrier net from the water and transport them to a dock facility. Nets will be loaded onto a semi-truck for shipment to the land-based net washing and repair facility.
Comment #11: Spacing Between Net Pens Comment − Puget SoundKeeper: *There should be a requirement that specifies a minimum distance between each net pen to reduce the likelihood of parasite and pathogen spread, and a minimum distance should be a requirement in order to protect wild salmon and other species.* Comment − Wild Fish Conservancy: *At present, the international standard recommended by the World Animal Health Organization (WAHO) is a distance of 5 km between net pen facilities. A distance of 10 km between net pens is recommended by*	There appears to be a semantic conflict in comments on the subject of spacing between net pens. WAHO recommends a distance *between net pen facilities*, and reference to Madrones et al. (2011) advocates a larger distance *between each net pen (facility)*. When the replacement Atlantic salmon farm is constructed and stocked at the Port Angeles-East relocation site, the existing farm within Port Angeles Harbor will be decommissioned. With no other salmon net pen operations in the Strait of Juan de Fuca, the Cooke Aquaculture Pacific farm will exceed the recommended 10 km distance. Parasite infestations such as sea lice have not been a historic problem at existing Washington fish farm locations. The proposed PA-East facility

[3] Bustnes, J.O., T. Nygard, T. Dempster, T. Ciesielski, B.M. Jenssen, P.A. Bjørn, and I. Uglemb. 2011. *Do salmon farms increase the concentrations of mercury and other elements in wild fish?* Journal of Environmental Monitoring 13: 1687-1694.

Comments	Responses
Madrones et al. (2011).	will operate under the same bio-security methods and aquatic farm management techniques used at the company's existing facilities. The site will rear a single-stock generation. The juvenile stock will be planted at the same time, grown to maturity, and the farm site will be harvested until it is completely empty. The net pen site will go through a routine fallowing period between the last fish harvested out and the first restocking of the next generation of fish that removes the risk of parasitic or disease cycles from occurring.

ISSUE: CONCERNS REGARDING NATURAL RESOURCE OR ECOSYSTEM IMPACTS

Comments	Responses
Comment #12: Fish Food Manufacturing Comment − Cindy Hansen: *Their food is manufactured through the overfishing of other fish and invertebrates from around the world*.	The world's annual supply of fish meal and fish oil has averaged 4 to 5 million metric tons of meal and around 1+ million metric tons of oil for the last 20 years (International Fish Meal and Fish Oil Organization 2013).[4] Of these total quantities, currently, about 70% originates from "reduction" fisheries targeted at small, wild pelagic fish, such as sardine, anchovy, menhaden, and capelin. The remainder originates from processing wastes from both wild and farmed fish[5] (Jackson 2012;[6] FAO 2012;[7] OECD/FAO 2014).[8] Stocks historically used for reduction fisheries are more and more being used for human consumption, and processing wastes that were historically discarded and are now being used for fish meal and oil production (Jackson 2012; World Bank 2013;[9] OECD/FAO 2014). Partial or total replacement of fish meal and fish oil in fish feeds is fast becoming the norm, but the research to develop and the effort to apply these modifications adds cost to the feed and requires investment in research, processing, and infrastructure (Gatlin et al. 2007;[10] Barrows et

[4] International Fish Meal and Fish Oil Organization. 2013.

[5] Sources cited in footnotes 5 through 17 were reviewed as cited in *Environmental Performance of Marine Net-Pen Aquaculture in the United States*. 2014. M.F. Rust, K. Amos, A. Bagwill, W. Dickhoff, L. Juarez, C. Price, J. Morris Jr., and M. Rubino. Fisheries, Vol. 39, No. 11. November 2014. http://www.fisheries.org

[6] Jackson, A. 2012. *Fishmeal and fish oil and its role in sustainable aquaculture*. International Aquafeed 15(5):18–21.

[7] Food and Agriculture Organization of the United Nations (FAO). 2012. *The state of world fisheries and aquaculture 2012*. Food and Agriculture Organization of the United Nations, Fisheries and Aquaculture Department, Rome. Available: www.fao.org/fishery

[8] Organization for Economic Co-operation and Development (OECD)/FAO. 2014. OEDC/FAO agricultural outlook 2014–2013. OECD Publishing, Paris. Available: www.oecd.org/site/oecd-faoagriculturaloutlook/publication.htm. (July 2014).

[9] World Bank. 2013. *Fish to 2030: prospects for fisheries and aquaculture*. Agriculture and environmental services, discussion paper 3. World Bank Group, Report 83177-GLB, Washington, D.C.

[10] Gatlin, D. M., F.T. Barrows, D. Bellis, P. Brown, K. Daborwski, T.G. Gaylord. R.W. Hardy, E. M. Herman, G. Hu, A. Krogdahl, R. Nelson, K. Overturf, M.B. Rust, W. M. Sealey, D. Skonberg, E. J. Souza, D. Stone, R. Wilson, and E. Wurtele. 2007. *Expanding the utilization of sustainable plant products in aquafeeds: a review*. Aquaculture Research 38:551–579.

Comments	Responses
	al. 2008;[11] Naylor et al. 2009).[12] Over the past several decades, the world supply of fish meal and oil coming from targeted fisheries has been more or less constant, whereas the world supply of fed aquaculture species and products has increased dramatically. Fish oil is increasingly being used as a human dietary supplement (Tacon and Metian 2009;[13] FAO 2012; Jackson 2012). Tacon et al. (2011)[14] and Jackson (2012) predicted that the percentage and the absolute amount of fish meal and fish oil consumed by aquaculture will continue to decrease as they become a smaller component of fish feeds, largely due to the development of lower cost alternative sources of protein (Gatlin et al. 2007; Barrows et al. 2008) and oil (Rust et al. 2011;[15] Ruiz-Lopez et al. 2014).[16] Similarly, fish meal and fish oil are rapidly being replaced in fish feed formulations with plant proteins and oils (Torrissen et al. 2011).[17]

[11] Barrows, F.T., D. Bellis, A. Krogdahl, J.T. Silverstein, E.M. Herman, W.M. Sealey, M.B. Rust, and D.M. Gatlin III. 2008. *Report of the plant products in aquafeed strategic planning workshop: an integrated, interdisciplinary research roadmap for increasing utilization of plant feedstuffs in diets for carnivorous fish*. Reviews in Fisheries Science 16:449–455.

[12] Naylor, R.L., R.W. Hardy, D.P. Bureau, A. Chiu, M. Elliott, A.P. Farrell, I. Forster, D.M. Gatlin, R.J. Goldburg, K. Hua, and P.D. Nichols. 2009. Feeding aquaculture in an era of finite resources. Proceedings of the National Academy of Sciences 106:15103‑15110.

[13] Tacon, A.G.J., and M. Metian. 2009. *Fishing for feed or fishing for food: increasing global competition for small pelagic forage fish*. AMBIO 38:294‑302.

[14] Tacon, A.G.J., M.R. Hasan, and M. Metian. 2011. *Demand and supply of feed ingredients for farmed fish and crustaceans trends and prospects*. Food and Agriculture Organization of the United Nations, Fisheries Technical Paper 564, Rome.

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Comments	Responses
Comment #13: Fish Food Deposition Comment − Tahoma Audubon Society: *The feed and effluent of these fish pens created a toxic mix beneath the fish pens*.	See response to comment #9 above regarding Use of Herbicides, Insecticides and Antibiotics. Washington State *Recommended Interim Guidelines for the Management of Salmon Net-Pen Culture in Puget Sound* (SAIC, December 1986) include guidance for giving consideration to water depth, current velocity, and facility production in order to locate fish farms in areas with adequate circulation to ensure dispersion of feed and feces to minimize potential chemical and biological changes in bottom sediments. The proposed PA-East relocation site will be in deep water (90 to 110 feet) with strong tidal currents. The *Current and Wave Data Report* (RPS Evans-Hamilton, January 2016) identifies the excellent tidal circulation conditions at the AGS Port Angeles-East Marine Net Pen Relocation site.
Comment #14: Currents Comments − Coastal Watershed Institute, Olympic Peninsula Audubon Society: *Currents in the new location should be measured for more accurately predicting potential distribution of organic materials*. *This is a very high-energy open coastal environment with severe currents, wind, fetch, swell, and wave conditions. The net pen structures will fail*. Comment − James Hudnall: *The proposed location lies in an area of unusually strong and often unpredictable currents because of the proximity of Ediz Hook and Morse Creek. When Morse Creek is in or near flood stage, the raging torrent emerging from the mouth of the creek pushes otherwise recognized currents in the vicinity into unpredictable configurations. The combination of unpredictable strong currents and high-velocity wind-driven surf and swell create turbulent sea conditions well beyond what might be expected, thus producing a much higher potential for*	The current velocities and vectors are well known for this area. The RPS *Current and Wave Data Report* (January 2016) prepared for the project area was submitted to WDNR and other permitting agencies along with the application materials on February 1, 2016. The facility will be required to monitor for benthic impacts under the terms of a NPDES permit that will be enforced by the Washington Department of Ecology (Ecology). The facility will be required to meet State Sediment Management Standards (Chapter 173-204 WAC) for organic discharge from marine net pens at the 100-foot perimeter of the cage array. State-of-the-art marine cage gear is proposed for the Port Angeles-East relocation site. Circular cages will be constructed of high-density polyethylene (HDPE) plastic pipe. The anchoring/mooring system will be designed by a qualified engineering firm certified by the International Organization for Standardization (IOS) as an international supplier of equipment and services to marine net pen aquaculture. The anchoring system will be designed with a 200% factor of safety (see additional information provided on page 4 of the AGS June 24, 2016 letter of response to Clallam County). This type of cage and anchoring system has been successfully used for more than 20 years in Maine,

Comments	Responses
accidental fish release than what might be predicted by design considerations.	New Brunswick, Scotland and Norway, in more exposed and high-energy environments than the proposed Port Angeles-East site.
Comment #15: Dissolved Oxygen Comment − Washington Department of Natural Resources: *Studies on oxygen sensitivities to benthic organisms and fish indicate that copepods and amphipods avoid oxygen deficient water and show sub-lethal impacts in low oxygen (<4 mg/L). Lower persistent levels of DO (<3.1 mg/L over 96 hours) were fatal at 20-22 degrees C. Fish sensitivity studies show 50% juvenile Coho die when exposed to persistent DO levels of <3.3 mg/L at 20 degrees C.*	The NPDES permit to be issued by Ecology will require benthic assessments and periodic dissolved oxygen measurements. These requirements will be based on years of actual sampling data collected at existing marine net pens in Washington, along with numerous studies on benthic impacts. The comment does not reflect the current state of knowledge or monitoring standards for marine net pens. DO levels through the water column can vary significantly throughout the year depending on tidal conditions, thermal stratification, salinity variations, plankton levels, upwelling and a number of other factors. The proposed marine net pen relocation site will experience approximately four tidal cycles per day with the tidal currents also changing direction approximately 180 degrees four times a day. The waters of the Strait of Juan de Fuca and the ambient conditions experienced at this site will be widely variable. Discerning 0.5 mg/L dissolved oxygen differences between an upstream and downstream side of the farm would not result in meaningful data with respect to the environmental footprint of the fish growing operation, and would not lend itself well to adaptive management review.
Comment #16: Structural Failure will Result in Marine Debris Comment − Coalition to Protect Puget Sound Habitat, Coastal Watershed Institute: *Structural failure of the marine net pens due to severe currents, wind, fetch, swell and wave conditions, will result in release of derelict gear (e.g., marine plastic debris) that will litter Clallam County beaches.* Comment − Olympic Peninsula Audubon Society:	Experience with the operation of these types of circular fish pens at high-energy sites in Maine, New Brunswick, Scotland and Norway indicates that the loss of nets or structural elements of the marine net pen array is unlikely. These types of cages and equipment are engineered and built to meet the conditions experienced in high energy marine environments. Cooke Aquaculture Pacific will maintain a contact list for local support vessel companies in the unlikely event that emergency assistance is

Comments	Responses
The applicant has not included an adaptive management plan for the instance of a structural failure of their system.	required to secure damaged components of the net pen array.
Comment #17: Risk of Release of Hazardous Materials Comment − Tahoma Audubon Society: *Net pen service vessels equipped with diesel propulsion and hydraulic systems present the potential for release of oil, fuel, and hydraulic fluid into the environment. Hazardous materials are planned to be stored at the site, including diesel, gas, lubricants, antifreeze, bleach, iodine, household cleaners, paints, and solvents. The net pen facility should have an oil spill response plan for preventing and containing spills*.	The NPDES permit to be issued by Ecology will prohibit the discharge of toxic materials, and regulate allowable discharges from the fish farm. It will be a requirement of this permit for Cooke Aquaculture Pacific to prepare a site-specific Spill Prevention and Response Plan (SPP) and Pollution Prevention Plan (PPP) based on Best Available Technology (BAT) and Best Management Practices (BMPs) for marine net pen aquaculture. Net pen operations in Washington are required to have double-walled containment fuel tanks and chemical storage areas. Oil spill response kits are kept on the farm sites, and employees are trained in spill response and the proper handling of hazardous materials.
Comment #18: Existing Farm a Source of Marine Debris Comment − Coastal Watershed Institute: *Existing Port Angeles Harbor net pen facility one of the top sources of marine debris in early Clallam MRC/NWS Commission derelict gear cleanup efforts*.	There has been no communication from the Clallam County MRC or any other government agency to Cooke Aquaculture Pacific or its predecessor American Gold Seafoods regarding past operation of the Port Angeles Harbor farm being a significant source of marine plastic debris. If the statement were true, the applicant believes that an effort to bring this to the company's attention would have been made at some point over the years. There is no record of this, and the applicant is not aware of any reports generated by the NW Straits Commission identifying the Port Angeles net pen facility as a major source of marine debris. The farm management and staff make every effort to properly handle, contain and dispose of waste materials generated at the farm. The existing AGS farm in Port Angeles was certified by a third-party auditor in November 2015 as meeting global standards for farm operations under the BAP (Best Aquaculture Practices) program of the Global Aquaculture Alliance. Among the certification standards required is the frequent removal of trash and recyclables from the farm, and appropriate handling and disposal. We believe the existing farm does an excellent job of controlling waste, and we expect that

Comments	Responses
	operations at the new farm will be equivalent or better. A copy of relevant sections of the BAP standards is provided as Attachment 7 to this response document. The Port Angeles-East Marine Net Pen Relocation project will fully replace aging structures within the harbor with state-of-the art materials designed and manufactured to withstand degradation in a high-energy marine environment. State-of-the-art marine cage gear is proposed for the Port Angeles-East relocation site. Circular cages will be constructed of high-density polyethylene (HDPE) plastic pipe. The anchoring/mooring system will be designed by a qualified engineering firm certified by the International Organization for Standardization (IOS) as an international supplier of equipment and services to marine net pen aquaculture. The anchoring system will be designed with a 200% factor of safety. This type of cage and anchoring system has been successfully used for more than 20 years in Maine, New Brunswick, Scotland and Norway, in more exposed high-energy environments than the proposed Port Angeles-East site. *Mooring Analysis Reports* were prepared for the proposed marine net pen array and feed support barge (Aqua Knowledge, January 2016). These documents were submitted with the permit application package (see Documents 9 and 10 on the CD of electronic files). Additional data collection will occur to produce a final mooring system design after the acquisition of permits has been confirmed to proceed with the project.
Comment #19: Beach Clean-up Proposal Comment − Coalition to Protect Puget Sound Habitat: *Beach cleanup of plastics twice per year is certainly not sufficient in a high-energy environment*.	The application documents describe the company proposal to conduct a sweep of the beach twice per year to remove *general man-made debris that washes ashore from various sources*. The company proposes to conduct a beach walk and general beach clean-up from the Morse Creek area, eastward approximately four (4) miles to the outer (westerly) boundary of the Dungeness Wildlife Refuge.

Comments	Responses
	Additional clarification regarding the beach clean-up proposal has been provided to Clallam County in the response to comments submitted by Cathy Lear, Clallam County Habitat Biologist (Cooke Aquaculture Pacific letter to Steve Gray dated August 16, 2016), as follows: *Plastic, trash and litter will be collected in large bags by the beach clean-up crew, removed from the beach area using work skiffs or other methods, and transported to an approved upland waste collection facility. The company plans to coordinate their beach clean-up efforts with the local Clallam County Marine Resources Committee and other organizations. Records of the amount of marine debris and litter collected and removed each year from this stretch of beach will be provided to these local organizations*.
Comment #20: Adequacy of Proposed Mitigation Comment − Coalition to Protect Puget Sound Habitat, Coastal Watershed Institute: *The proposed mitigation is grossly inadequate to address the harm these structures do to our coastal systems*.	The U.S. Army Corps of Engineers/Washington Department of Ecology Joint Public Notice of AGS application NWS-2016-0100 (April 28, 2016) unfortunately identified only the voluntary beach clean-up proposal and the AGS *Wildlife Interaction Plan* as mitigation for the Port Angeles-East farm relocation proposal. The *SEPA Checklist* and JARPA describe a large number of measures proposed by the company and required by applicable local, State and Federal permits and regulations that will avoid or minimize potential adverse impacts. These are listed in an 8-page AGS letter submitted to Clallam County on June 3, 2016 (provided with this response to comments as Attachment 8). Implementation of this comprehensive list of mitigation measures will assure the sustainability of Cooke Aquaculture Pacific farming practices in the Strait of Juan de Fuca, as evidenced by the record of performance of these practices at the eight existing Puget Sound farms operated by the company's predecessor (American Gold Seafoods).
Comment #21: Microplastics Comment − Coalition to Protect Puget Sound Habitat:	The new cage system will be constructed of high-density polyethylene (HDPE), not PVC. While no documentation is provided with the comments regarding marine net pen plastic debris on shorelines, it is

Comments	Responses
Ingestion of microplastics by fish and other marine organisms due to the presence of PVC netting and other plastic materials routinely used.	our understanding that micro plastics have been identified more as an international issue associated with illegal dumping of plastics into the oceans and/or plastic litter on land being transported into rivers, water ways and drainages out into the oceans, rather than originating from state-of-the art marine net pen aquaculture operations.
Comment #22: Ecosystem Processes Comment − Coalition to Protect Puget Sound Habitat, Coastal Watershed Institute, Tahoma Audubon Society: *The proposed location is just offshore of the eastern edge of the Elwha drift cell and at the beginning of the Dungeness drift cell. Both reaches support world-scale ecosystem processes, including sediment delivery, forage fish and salmon migration, forage fish spawning, whale and bird migration.* Comment − Puget SoundKeeper, Wild Fish Conservancy, and Others: *The proposed project is in close proximity to salmon bearing streams and migratory paths, specifically the Dungeness and Elwha Rivers as well as several other salmon and steelhead-bearing streams. Chinook salmon, steelhead and bull trout are all ESA-listed species.*	Commercial net pen salmon farming in the Pacific Northwest has been a contentious issue since it began in the 1980s. Potential and perceived environmental impacts have been reviewed over the past 35 years with respect to natural resources and the environment in Washington State. From the Programmatic EIS completed in 1986 to the more recent NOAA Risk Assessment (Nash et al. 2005, Attachment 9 to this response document); and EPA *Biological Evaluation* (2010, Attachment 2 to this response document), risks have been shown to be minimized through the adoption of new regulations, additional monitoring requirements, technological improvements, adaptive farm management practices and improved fish culturing techniques. The proposed floating net pen aquaculture facility, located 1.5 miles offshore from the nearest shoreline, will have no affect on littoral drift (sediment transport) along the shoreline. The *Biological Evaluation* (BE) submitted with the project application package (Document 6 on the CD of electronic files) describes the occurrence of forage fish, salmon, whales and birds within the project action area. In all cases, the BE effects analysis is: *may affect, not likely to adversely affect* species listed as threatened or endangered under the Federal Endangered Species Act. The National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) will review the BE effects analysis and provide consultation comments to the U.S. Army Corps of Engineers related to issuance of the Department of the Army permit for the project. Eulachon/smelt have been occasionally reported in coastal Washington

Comments	Responses
	rivers. The Elwha River is considered an irregular run location (Gustafson et al. 2010, in RPS ASA January 2016). Pacific herring spawn in shallow areas along shorelines, between the subtidal and intertidal zones. Eggs are deposited on kelp, eelgrass, and other available structures. The nearest documented herring spawning grounds to the project action area are in Dungeness Bay and Sequim Bay, approximately 14 to 20 miles east of the project area, respectively (WDFW 2014, in RPS ASA January 2016). Pacific salmon species migrate through the Strait of Juan de Fuca and return to Clallam County streams and rivers to spawn. Juvenile salmonids use the nearshore areas for feeding and cover during migrations to sea. The project action area overlaps with Chinook salmon (Puget Sound ESU) critical habitat, which is along the coastline out to a depth of approximately 98 feet (compared to the off-shore location of the proposed marine net pen operation in water depths of 90 to 110 feet). Additional information regarding Puget Sound salmon species occurrence and restoration efforts in the Elwha and Dungeness Rivers, and in Jimmycomelately Creek, is provided in an Addendum to the *SEPA Checklist* submitted to Clallam County (August 16, 2016), provided as Attachment 5 to this response document. The *Biological Evaluation* prepared for the project indicates that gray whale, green sturgeon, Pacific salmon species, and post-breeding loons migrate through the proposed action area (RPS ASA, January 2016). Also see *SEPA Checklist* Section B.5.c (page 21).
Comment #23: Prevailing Off-Shore Currents Comment − Olympic Peninsula Audubon Society: *The proposed site is in direct line of the prevailing off-shore currents that flow east from the mouth of the Strait of Juan de Fuca*.	This comment is unclear with regard to offshore currents versus offshore winds. Offshore winds would be more accurate in the context of the statement. Either way, the predominant direction of offshore flow in the Strait of Juan de Fuca is toward the west, not toward the east. The proposed net pen facility will occupy a surface area of approximately 9.7 acres. The Strait of Juan de Fuca has a total surface

Comments	Responses
	area of approximately 1,087,264 acres or approximately 1,700 square miles, and an average depth of approximately 700 feet. The structure will occupy a very small fraction (less than 0.001%) of the total surface area in the Strait of Juan de Fuca, and is not likely to affect prevailing tidal currents.
Comment #24: Dungeness National Wildlife Refuge Comment − Coastal Watershed Institute, Sierra Club: *DNWR is one of the nation's most important wintering littorals for migratory waterfowl, and a key nesting shoreline for shorebirds and water birds. It is located approximately 7 miles east of the proposed net pen site.*	The project action area is defined and illustrated in Section 1.2 of the *Biological Evaluation* (pages 2 through 4). The Dungeness watershed is approximately 14 miles east of the area of physical, chemical, or biological effects from construction or operation of the proposed Port Angeles-East Marine Net Pen Relocation project.
Comment #25: Salmon Recovery Programs and Habitat Restoration Projects Comment − Trout Unlimited: *Marine net pen impacts will negate salmon recovery and habitat restoration efforts that have been implemented in Strait of Juan de Fuca watersheds.* Comment − Coastal Watershed Institute: *The State of Washington and Federal government have spent billions of dollars over the past two decades to restore the ecosystem and fisheries resources of Puget Sound (e.g., the Elwha dam removal and efforts to restore and protect the Dungeness River and Dungeness Bay for salmon and forage fish species). The proposed site is located in the middle of these littoral cells.*	Additional information regarding salmon recovery programs implemented within Clallam County has been added to the *SEPA Checklist* by means of an Addendum submitted to the County August 16, 2016. The SEPA Addendum is provided as Attachment 5 to this response document.
Comment #26: Elwha River Comment − Coalition to Protect Puget Sound Habitat, Tahoma	The project action area is defined and illustrated in Section 1.2 (pages 2 through 4) of the *Biological Evaluation* prepared for the project. The Elwha River is approximately 12 miles west of the site, outside the area

Comments	Responses
Audubon Society: *The site is closely located to the Elwha drift cell and the beginning of the Dungeness drift cell which support essential ecosystem process for forage fish and salmon migration, forage fish spawning, whale and bird migration. The Elwha dam removal and nearshore restoration efforts should not be minimized by this proposal*.	of physical, chemical, or biological effects from construction or operation of the proposed marine net pen.
Comment #27: Southern Resident Killer Whale Comment − Cathy Lear, Clallam County Habitat Biologist, and Whale and Dolphin Conservation: *This area is a whale migration corridor. The BE should be more explicit in its discussion of possible interaction with the net pen operation when predators (i.e., orca whales) are pursuing prey (i.e., Chinook salmon).* Comment − Orca Conservancy, Whale and Dolphin Conservation, and Others: *The Strait of Juan de Fuca is within the designated critical habitat, core summer area, and third core feeding area of the endangered SRKWs*. Comment − Whale and Dolphin Conservation: *The top threat to Southern Resident orcas is the decline of Chinook salmon in the orcas' historic foraging grounds, and any activity that increases threats to Chinook salmon also threatens the survival of the Southern Residents*.	The company retained the services of Mark G. Pedersen, M.S., American Fisheries Society Certified Fisheries Professional (Margenex International) and former WDFW Deputy Assistant Director, Marine Fish and Shellfish, to respond to this issue. Southern Resident (SR) killer whales have been documented in the vicinity of the project action area with varying frequency throughout the WDFW-authorized in-water work window between July 16 and October 14, but mostly during the summer months when adult Chinook salmon are migrating through the Strait of Juan de Fuca (Federal Register 2008). Killer whales in the project vicinity would likely temporarily avoid the area during the short duration of in-water work. The proposed work does not involve pile driving or drilling that would produce loud, long-duration noise or vibration. Anchors will be deployed by a crane barge and then tensioned using other smaller work boats. Disturbance associated with the extra vessel activity will be minimal and of short duration. In 2011, the National Marine Fisheries Service (NMFS) prepared the *Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Proposed Approval of Finfish Rearing Facility Provision Contained in the Sediment Management Standards Rule Promulgated by the Washington State Department of Ecology* (NMFS 2011). A copy of this document is provided with this response to comments as Attachment 3. The analysis

Comments	Responses
	in the NMFS consultation document considers the effects of existing marine net pen aquaculture operations on Southern Resident (SR) Killer Whale and Puget Sound Chinook salmon (among other species). NMFS concludes that the potential for the net pens to interfere with SR killer whale passage is discountable and insignificant, because the footprint of the net pens is small relative to the surrounding area (page 15). There are no known interactions between whales and net pens, and NMFS does not anticipate that the physical presence of the net pen facilities would cause more than potential minor deviations of course to avoid the structures, with insignificant effects. Vessel operations associated with servicing the net pen facilities may cause temporary disturbance; however, such disturbance is likely to be short-term and localized, with no lasting effects, and therefore insignificant. With regard to effects on Chinook salmon, see the response to comments in the CONCERNS REGARDING POTENTIAL IMPACTS TO NATIVE SALMON section of this document.
Comment #28: Marbled Murrelet Comment − Olympic Peninsula Audubon Society: *The endangered marbled murrelet depends on forage fish to survive, with sand lance having been identified as a major portion of their diet*.	Marbled murrelet occurrence within the project action area is described in the *Biological Evaluation* (BE) prepared for the application (RPS ASA, January 21, 2016, pages 39 and 68-69). Additional information regarding potential interactions between these diving seabirds and the proposed marine net pen operation is provided in BE Addendum #3 (Hamer Environmental, October 13, 2016). Both the BE and BE Addendum #3 conclude that the PA-East marine net pen operation may affect, but will not likely adversely affect marbled murrelet during construction or in the operational condition of the farm. This determination will be reviewed by the USFWS for concurrence. If the Federal agency determines that mitigation measures are warranted for the protection of marbled murrelet, these conditions will be imposed through the USACE Section 10 Individual permit for the project.

Comments	Responses
Comment #29: Entanglement Comment − Cathy Lear, Clallam County Habitat Biologist, and Tahoma Audubon Society: *Risk of bird and marine mammal entanglement; acquisition of permits to kill animals that become entangled*.	Additional information regarding the entanglement concern is provided in BE Addendum #3 (Hamer Environmental, October 13, 2016). Proposed mitigation measures described in *SEPA Checklist* Section B.5.d (page 22) describe measures to minimize or avoid the potential for birds or marine mammals to become entangled in nets associated with the marine finfish net pen operation: • Tightly tension mooring lines to minimize the potential for entanglement of marine mammals. Tensioned anchor lines separated by a horizontal distance of approximately 100 feet to 197 feet from each other will make it highly unlikely that marine mammals could become entrapped between two or more of these lines. • Tightly tension predation barrier nets and fish containment nets using a net weighting system to keep the net walls and floors tight and in a circular shape (see page 6 of the JARPA drawings). This feature will also minimize the potential for underwater entanglement of marine mammals or diving birds. • Efficiently plan vessel trips to minimize vessel traffic to and from the marine net pen site to reduce potential wildlife interactions or disturbance. • Observe Federal regulations that implement a no-approach zone for killer whales and all other whales, dolphins, and porpoises when operating crew vessels approaching or leaving the marine net pen operation. Comply with the more restrictive requirements of the AGS *Wildlife Interaction Plan* (August 2015) that requires crew vessel operators to slow down and alter course to maintain a distance of at least 400 yards away from the direction of travel of whales. The AGS *Wildlife Interaction Plan* is provided as Appendix A to the *Biological Evaluation*. • Use a passive predator barrier netting for both avian and marine

Comments	Responses
	mammal deterrence (described below). AGS (Cooke Aquaculture Pacific) will implement non-lethal means of predator control consistent with Washington State regulations. The floating marine net pen operation will be equipped with a double netting system around each fish pen (see pages 3 and 6 of the JARPA drawings). The inside net will be 50 feet deep and contain the fish. A larger-mesh, heavy-duty net will be installed around the outside of each fish containment net to a depth of approximately 60 feet to serve as a passive marine mammal barrier to protect cultured stocks from predation by seals and sea lions. There will be a 3-foot separation between the side walls of the predator barrier net and the inner fish containment net. The heavy-duty predator net will be both a visual barrier and a physical deterrent. This type of marine mammal predator barrier net system is used around the world for marine aquaculture. Light-weight black polypropylene netting will be suspended across the top of fish rearing units and sewn tightly to the hand railing around each circular pen as a physical and visual barrier to seabirds that might attempt to feed on food pellets being distributed within the fish pens, or prey on the cultured fish. Both of these barrier net systems have been developed over the past 30 years of marine aquaculture in Puget Sound, and have proven effective in deterring wildlife interactions with the cultured fish stocks. The predation barrier nets and the fish containment nets will be made of colored black/blue and yellow polypropylene twine which makes them a visible deterrent to birds and marine mammals. Marine fouling organisms and algae will colonize the underwater portions of the fish containment nets, predator nets and mooring lines also increasing their visibility to diving birds and marine mammals.
Comment #30: Underwater Sound Devices/Acoustic Deterrents Comment − Tahoma Audubon Society: *Methods to drive away the seals with underwater sound devices are*	PA-East application documents are clear about the proposal for marine mammal deterrents using passive predator barrier nets around the cages. Marine mammals are protected in the United States, and the marine finfish aquatic farms in Washington are required to use non-lethal

Comments	Responses
harmful to Orca whales and other wildlife that depend on eco-location to find their prey.	predator control methods. Predator barrier nets are used to keep seals and sea lions away from the fish stocks. The *Biological Evaluation* prepared for the project confirms in Section 4.2.1.4 (page 44) that *"Acoustic harassment devices are not used by AGS at any of their marine net pen facilities."*
Comment #31: Operational Noise Comment − Four Seasons Ranch Community, James Hudnall: *Noise pollution and diesel-particulate pollution from the proposed pen-associated barge must be taken into consideration and evaluated for their impact on waterfront residents between Morse Creek and Green Point, especially in the low-lying Four Seasons Ranch area*.	Noise and air quality are addressed in *SEPA Checklist* Sections B.7.b (pages 26-27) and B.2 (pages 12-13), respectively. Additional information on the subject of noise and mitigation for potential noise impacts was provided in a June 24, 2016 letter of response to a Clallam County request for additional information, as follows: The SEPA Checklist identifies the primary source of noise in the operational condition of the marine net pen project as an electrical generator that will provide power for the feeding system and other electrical needs of the support barge. The generator will run for approximately 12 hours each day. A bank of batteries will be used to store excess electrical output from the generator while it is operating. The battery bank will be used to power auxiliary equipment (e.g., interior lighting, computers, and communication devices) when the generator is not running. Secondary sources of noise will include the feeding process, and use of small-engine equipment used to rinse nets. Net rinsing occurs daily during summer months. Feed pellets will be blown by air through plastic pipes that will extend from the barge to each fish pen, which may make a rattling or whooshing sound as the feed pellets travel through the feed pipe. Feeding is expected to take approximately 8 to 10 hours per day. The company operates this type of feed system at two of their existing farm sites in Puget Sound. When standing next to the feed pipes located on top of metal net pen walkways, the sound is noticeable but not loud enough to inhibit normal conversation. Residents of homes located within one-

Comments	Responses
	quarter mile of the company's Hope Island farm have not requested mitigation for the small amount of noise generated from the sound of this type of feeding system. *Mitigation Measures for Noise*: The diesel generator to be housed in the feed support barge will be a new piece of machinery, constructed to meet all current State and Federal standards for emissions to the air and fuel containment. It will be built into the hull of the barge, within an enclosed engine room, and with a muffler system specifically designed to attenuate engine noise. AGS will specify acquisition of a hospital-grade generator for the quietest type of operating conditions. Small solar panels may also be installed to help maintain battery charging capability and/or to power other small devices such as dissolved oxygen meters, temperature probes and security camera systems.
Comment #32: Clean Water Act (CWA) Comment − Orca Conservancy: Congress passed the Clean Water Act to *"restore and maintain the chemical, physical, and biological integrity of the Nation's waters"* (33 USC §1251(a), the national goal being to achieve *"water quality that provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water"* (33 USC §1251(a)(2).	Sustainable aquaculture as practiced by Cooke Aquaculture Pacific, LLC and its predecessor, American Gold Seafoods, is consistent with the provisions of the CWA. National policy also informs the statewide interest in aquaculture. The National Aquaculture Act of 1980 states that it is *"in the national interest, and it is the national policy, to encourage development of aquaculture in the United States."* The National Marine Aquaculture Policy of 2011 calls for promotion of aquaculture use and environmental protection, including an overall policy to: *Encourage and foster sustainable aquaculture development that provides domestic jobs, products, and services and that is in harmony with healthy, productive, and resilient marine ecosystems, compatible with other uses of the marine environment.*[18] The Washington Department of Ecology (Ecology) will be responsible for determining that issuance of the Corps permit for the proposed Port

[18] NOAA 2011, page 1-2; Online at: http://www.nmfs.noaa.gov/aquaculture/docs/policy/noaa_aquaculture_policy_2011.pdf.

Comments	Responses
	Angeles-East marine net pen relocation project is consistent with the State's Coastal Zone Management Program (CZMP). The State's CZMP integrates the requirements of the Shoreline Management Act (SMA), State Environmental Policy Act (SEPA), Water Pollution Control Act, and Ocean Resources Management Act (ORMA). Aquaculture is intrinsically dependent on use of the water. Water-dependent uses are preferred uses under the SMA, which establishes as preferred uses those that are *"consistent with control of pollution and prevention of damage to the natural environment, or are unique to or dependent upon use of the state's shoreline"* [RCW 90.58.020]. Aquaculture is identified as a water dependent use in the SMP Guidelines, and its water dependent status has been affirmed in cases before the Washington State Shorelines Hearings Board. The SMP Guidelines recognize aquaculture as an **activity of statewide interest** and a **preferred use**: *This activity is of statewide interest. Properly managed, it can result in long-term over short-term benefit and can protect the resources and ecology of the shoreline. Aquaculture is dependent on the use of the water area and, when consistent with control of pollution and prevention of damage to the environment, is a preferred use of the water area* [WAC 173-26-241(3)(b)(i)(A)].
Comment #33: Cultural Resources Comment − Jamestown S'Klallam Tribe: *With respect to cultural resources, the Jamestown S'Klallam Tribe has no information regarding offshore sites in this area*. Comment − Four Seasons Ranch Community: *Morse Creek and Clallam County reflect a long-standing of significant dependency on the natural resources that are unique to both the prairie/basin, freshwater and sea. Where are the cultural resource*	The U.S. Army Corps of Engineers will assess potential effects to cultural resources as an element of the Federal permit decision. It is notable that comments on the Port Angeles-East marine net pen relocation were received from the Lower Elwha and Jamestown S'Klallam Tribes, neither of which express opposition to the project. The Lower Elwha Tribe letter notes environmental benefits to the relocation site (e.g., better flushing characteristics). The Jamestown S'Klallam letter states that the Tribe has no information regarding offshore cultural resource sites in the proposed project area.

Comments	Responses
statements regarding this permit?	
Comment #34: Cumulative Impact Analysis Comment − Tahoma Audubon Society: *We recommend that you require a Cumulative Impact Analysis to review the difficulty of mitigating this proposal*.	A cumulative impact analysis was submitted to the U.S. Army Corps of Engineers on April 28, 2016, and to Clallam County on March 4, 2016. The document is part of the project file posted on the County's website.

ISSUE: GENERAL CONCERNS REGARDING NET PEN AQUACULTURE

Comments	Responses
Comment #35: Shoreline Master Program Restrictions on Marine Net Pens Comment − Coalition to Protect Puget Sound Habitat, Coastal Watershed Institute, Tahoma Audubon Society, Pearl Hewett: *Washington counties severely restricting and/or banning net pens in their Shoreline Master Program updates: City of Bainbridge Island, Pierce County, San Juan Island, Whidbey Island, Whatcom County, and Jefferson County*.	Whatcom County banned marine net pen aquaculture in their 2007 Shoreline Master Program (SMP) update. The addition of the ban to the Whatcom SMP came late in the update process. It was not fully realized by the finfish aquaculture industry at that time that a preferred water-dependent use (aquaculture) identified in the State Shoreline Management Act (SMA) would be completely prohibited in this one county. Since that time, the industry is on record objecting to SMP updates that include language banning outright marine finfish aquaculture. Ecology has concurred with these objections on the grounds that the SMA and SMP Guidelines do not support the out-right prohibition of a "preferred water-dependent use of state-wide significance." Subsequent to the Whatcom County SMP update, Ecology issued Aquaculture Interim Guidance for SMP updates (2012), then finalized the Aquaculture chapter of the *Shoreline Master Programs Handbook* (Chapter 16; December 2015), in which legal interpretations confirm that aquaculture is a water-dependent use, an activity of statewide interest, and a preferred use under the regulations of the Washington State Shoreline Management Act. The procedure for cities and counties to update their local Shoreline Master Programs requires review and approval by Ecology. Since the Whatcom County update, Ecology has not allowed an outright or permanent ban on marine net pen aquaculture in other SMP updates. Rather, aquaculture can be regulated by a local Shoreline Conditional Use Permit (subject to Ecology's final decision-making authority on this type of permit) to impose conditions to make these operations compatible with local environmental conditions.

Comments	Responses
Comment #36: Ban on Fish Pens in Alaska, Oregon, and California Comment − Tahoma Audubon Society, Coastal Watershed Institute: *Alaska, Oregon, and California have banned fish pens*.	Factors such as overfishing, past logging practices and the building of dams that blocked salmon spawning habitat are widely identified as the main causes of declining salmon populations in California, Oregon, Washington and British Columbia. Alaska, prior to statehood in the 1950s, saw dramatic declines in salmon returns due to inadequate resource management that allowed this resource to be overfished. The great salmon runs of the Sacramento, Columbia and several other rivers began to decline as early as the 1920s due to overfishing, logging and the negative effects of freshwater habitat loss caused by dams and industrial development along river ways and important estuary environments. The development of commercial salmon aquaculture during the 1990's embodied a new form of global seafood market competition that challenged historic wild salmon fishing industries and the traditional seafood production systems of some states. Some of those states responded by implementing bans on commercial salmon net pen aquaculture. Marine net pen aquaculture in Washington State has been evaluated by fisheries experts and wildlife habitat agencies, and has been identified as having a low risk of negatively impacting native salmon runs. Citations for these studies are provided in the document titled *Common Questions about Atlantic Salmon Net Pen Culture and Responses* (January 2016) submitted with this application (document number 14 on the CD of application files).
Comment #37: Impacts of Marine Net Pens in British Columbia Comment − Tahoma Audubon Society: *Over the past 30 years, there has been a proliferation of fin fish pens in estuaries, coves, and back eddies along the shores of the Inside Passage between Vancouver Island and the mainland. In the Sechelt area of Salmon Arm, the proliferation of aquaculture not only led to the decline of the native salmon runs but to the collapse of the entire fishery in the*	"Estuaries, coves and back eddies" are poor locations for fish farms due to poor flushing characteristics. None of the existing marine net pens in Washington State are located in areas with poor flushing characteristics, and all eight facilities are in compliance with the sediment monitoring requirements and State Sediment Management Standards set forth by their NPDES permits. Washington State *Recommended Interim Guidelines for the Management of Salmon Net-Pen Culture in Puget Sound* (SAIC, December 1986) include guidance for giving

Comments	Responses
inlet. The feed and effluent of these fish pens created a toxic mix beneath the fish pens.	consideration to water depth, current velocity, and facility production in order to locate fish farms in areas with adequate circulation to ensure dispersion of feed and feces to minimize potential chemical and biological changes in bottom sediments. The proposed PA-East relocation site will be in deep water (90 to 110 feet) with strong tidal currents. The *Current and Wave Data Report* (RPS Evans-Hamilton, January 2016) identifies the excellent tidal circulation conditions at the AGS Port Angeles-East Marine Net Pen Relocation site.
Comment #38: Worldwide Impacts of Marine Net Pens Comment − Coalition to Protect Puget Sound Habitat: *We cannot close our eyes to the serious impacts of net pen aquaculture seen around the world*. Comment − Tahoma Audubon Society: *Worldwide fish pens have damaged native salmon runs in countries where they were permitted*.	The majority of the reference documents cited in the comments on this issue are generalized and out of date (most more than 10 years old); describe practices that are inconsistent with current farm management practices; describe sites in poorly-flushed areas; and describe feed composition and use of chemicals that differ from those used by Cooke Aquaculture Pacific. Cooke Aquaculture Pacific (through its predecessor, American Gold Seafoods) has 30+ years of experience operating all existing marine net pen farms in Puget Sound. The company has a historical record of compliance in meeting the NPDES permit conditions and monitoring requirements at all their Washington marine net pen sites. Finfish aquaculture, and more specifically marine net pen aquaculture, has been well-researched since the industry began in the 1970s in Washington. Environmental effects that could occur in Washington's waters are well known by the regulatory agencies and monitored through the current operational permit regulations for each facility. Comparing the proposed Port Angeles-East operation to possible impacts in other parts of the world is not appropriate for multiple of reasons; for example: • Significant regulatory differences in other parts of the world compared to Washington's regulatory system. • The relative size of the net pen industry in Washington compared to elsewhere in the world (e.g., annual Norwegian salmon net pen

Comments	Responses
	production volumes are more than 100 times greater than the annual salmon net pen production of Washington State). • Different environmental and oceanographic conditions. • Different site-specific water quality conditions. • Diverse biological influences on the farms. • Company and regional differences in fish culturing techniques. The EPA BE (2010) that is the basis for the NMFS *Informal Consultation* document (2011) − provided as Attachments 2 and 3 to this response document − reports that while indirect effects commonly associated with marine net pen facilities (e.g., dissolved oxygen reduction, phytoplankton blooms, disease transmission, antibacterial usage, sea lice, escapement, hybridization, and competition) *" . . . are admittedly problems in other areas of the world, they cannot be readily applied to Washington's situation due to the regulatory framework, site location restrictions, small quantity of net pen facilities, and geographical features of Puget Sound"* (pages 41-47).
Comment #39: Regulatory Oversight/Enforcement Comment − Tahoma Audubon Society: *Clallam County will not have adequate resources to supervise this industry. Unlike commercial fishing, no state department will help enforce the rules. And your department doesn't collect license fees and other means to pay for the increased cost of boats and personnel to properly inspect and police this new industry*.	Several State agency operational permits will be in-place that establish regulatory conditions and the operational requirements of the facility. The environmental and biological performance standards of the aquaculture activity will be enforced by the agencies that issue these permits. These will include the NPDES waste discharge permit administered by the Department of Ecology, and three permits administered by WDFW: Aquatic Farm Registration, Fin Fish Aquaculture Permit, and Fin Fish Transport Permit. The Department of Natural Resources will issue an Aquatic Use Authorization (e.g., an Aquatic Land Lease) that will also incorporate enforceable conditions on the use of aquatic lands. State and local taxes will be generated from the economic activity of the farming operations and the local business community in Clallam

Comments	Responses
	County. The existing farm operations in Port Angeles Harbor employs ten (10) full time employees. The proposed new facility is expected to require the same number of employees.
Comment #40: Farmed Salmon Differ from Wild Salmon Comment − Sierra Club: *Recycling of industrial wastes unintended by nature due to penned fish dying in the marine environment, or being eaten and expelled in human waste*. Comment − Darlene Schanfald: *Half of all farmed fish have hearing loss due to deformed ear bones*.	Atlantic salmon is rich in long-chain omega-3 fatty acids, EPA and DHA, which reduce the risk for cardiovascular disease. Data also indicate that EPA and DHA can reduce the risk for a large number of other health issues. Farmed salmon is popular with retailers as it is produced in a controlled environment and is stable in supply throughout the year (not subject to seasons). Salmon is nutritious, rich in micronutrients, minerals, marine omega-3 fatty acids, very high quality proteins and several vitamins, and represents an important part of a varied and healthy diet. The substantial library of evidence from multiple studies on nutrients present in seafood indicates that including salmon in one's diet will improve one's overall nutritional status, and may even yield significant health benefits. The U.S. Department of Agriculture recommends eating fish at least twice a week, and specifically consuming seafoods that are high in omega 3s such as salmon, trout and herring (U.S. Department for Agriculture, and Health and Human Services 2016). The statement regarding fish ear bone (otoliths) deformity in farmed fish comes from a recently published study. The researchers looked for differences between farmed (including hatchery-produced enhancement salmon and other fish) and wild (natural reproduction) fish populations, primarily in Norway. Hearing loss due to the presence of a different form of calcium carbonate known as vaterite in the ear bone was calculated to be from 28% to 50% compared to the hearing of a wild salmon ear bone which is composed of mostly aragonite (a form of calcium carbonate). Some of the media headlines that came out after this study was first published made statements such as: “Half of all farmed salmon have hearing loss.” This is a mischaracterization of the actual results and discussion in the paper presented by the researchers.

Comments	Responses
	The study abstract states the following: *"Sagittal otoliths are normally composed of aragonite, a polymorph of calcium carbonate, but otoliths with inclusions of vaterite, an alternate polymorph, also occur. These 'vaterite otoliths' are transparent and larger than their aragonite counterparts. Vaterite otoliths typically occur in fewer than 10% of wild fish,* ***although there are exceptions****. Prevalence of vateritic otoliths in farmed fish may differ markedly from wild populations; several studies report vaterite in 50–60% of otoliths from hatchery-reared fish. However, comparisons between the prevalence of vaterite otoliths in farmed and wild populations* ***are few****. No large-scale sampling has yet determined if vaterite is consistently more common in farmed populations, nor if the phenomenon is localized or widespread."*[19] In this study, the term farmed fish includes hatchery enhancement fish that are released as juveniles into the wild for recreational and commercial fisheries. The loss of hearing for hatchery reared juvenile fish being released into the wild may affect their ocean survival rates which can have implications for fishery managers.
Comment #41: Triploids Comment − Karl Spees: *I don't know if Icicle raises triploids, but there have been multiple escapes of Atlantic salmon without establishing a sustainable exotic species salmon population on the West Coast*.	Atlantic salmon raised by the company are not triploid (i.e., they do not have 3 sets of chromosomes that would render them reproductively sterile). The company raises natural diploid production fish that come from a captive (i.e., raised in captivity their entire life) brood stock program. Also see the response to Comment #1 on the issue of Escapement.
Comment #42: Upland, Closed Systems Comment − Coalition to Protect Puget Sound Habitat, Coastal Watershed Institute, Sierra Club, Tahoma Audubon Society:	The Tal et al. (2009) article cited in the comments describes a small-scale recirculating aquaculture system (two 12 m^3 fish tanks) used to rear 5,000 gilthead seabream (*S. aurata*) fingerlings at an undisclosed

[19] Reimer, T., T. Dempster, F. Warren-Myers, A.J. Jensen, and S.E. Swearer. 2016. *High prevalence of vaterite in sagittal otoliths causes hearing impairment in farmed fish*. Science Report 6, Article No. 25249.

Comments	Responses
Atlantic salmon aquaculture should be limited to land-based, upland, closed systems.	location. Seabream is commonly produced in net pen farms across the Mediterranean Sea; there is currently no commercial production of seabream in the United States. This small-scale experimental operation is not comparable to the existing Port Angeles Harbor farm in which Cooke Aquaculture (through its predecessor American Gold Seafoods) produces up to 6 million pounds of fresh Atlantic salmon every 18-month growing cycle. There are no land-based facilities in existence today that are capable of producing the same volume of Atlantic salmon in an economically-competitive manner. Up-front capital costs for a land-based facility capable of producing 3,000 tons is estimated at nearly twice the cost of a marine net pen facility[20] (citation below). The carbon footprint of a land-based closed-containment salmon production facility using electricity to operate the equipment is also calculated in this same study to be twice the carbon footprint of net pen-produced salmon. Cooke Aquaculture understands upland, closed-system aquaculture technology well. Our fish spend one-third of their lives (juvenile stages) in a land-based hatchery system as they are reared from an egg weighing 0.25 gram to a smolt weighing 100 grams, before they are transferred to the marine net pen site. We can state with certainty that this technology, when applied to raising adult salmon to market size in production volumes, is still at the experimental stage. There is no single business that we know of that is producing land-based, market-sized Atlantic salmon at the volumes required to make it a cost-competitive and economically-sustainable operation. A recent (April 4, 2016) article that appeared in *Aquaculture Magazine* reviews the performance of a major land-based aquaculture pilot project currently underway in British Columbia. This pilot facility has been

[20] Liu, Y., T.W. Rostena, K. Henriksena, E.S. Hognesa, S. Summerfelt, and B. Vincib. March 2016. *Comparative Economic Performance and Carbon Footprint of Two Farming Models for Producing Atlantic Salmon (Salmo salar): Land-based Closed Containment System in Freshwater and Open Netpen in Seawater*. ASINTEF Fisheries & Aquaculture, Trondheim, Norway. The Conservation Fund, Freshwater Institute, West Virginia, USA.

Comments	Responses
	funded from the start by Canadian government research money and NGO grant funds. The facility has been operational for several years now, and is operating at a financial loss to date. Provided as Attachment 10 to this response document, the title of this article is *"Land-based Salmon Still Not Investor-Ready."* While applying this technology to adult Atlantic salmon may prove successful in the future, it is not successful to-date on a large commercial scale. One letter of comment on the subject of land-based, closed systems for marine finfish aquaculture references a study (*Closed Containment May Not Be a Solution"* by Nathan W. Ayer) that questions the merits of land-based aquaculture in their own materials.

ISSUE: NAVIGATION CONCERNS

Comments	Responses
Comment #43: Navigation Comment − Karl Spees: *The offshore location in the Strait of Juan de Fuca poses a concern for navigation*. Comment − James Hudnall: *The currently proposed location for the new Atlantic salmon net-pen, well beyond the sheltered waters of Port Angeles Harbor and Ediz Hook, will be a hazard to navigation. Outbound ships of all sizes use these waters for discharge of Sound pilots before turning northward to join the outbound shipping lane*.	The preferred location for the Port Angeles-East marine net pen relocation site was vetted with the U.S. Coast Guard, U.S. Navy, and Puget Sound Pilots Association. At the request of the Pilots Association, the site was moved approximately 1.8 miles further east to avoid any potential conflict with the pilot drop-off area for vessels headed back out to sea. The new facility will require a Private Aids to Navigation Permit (PATON) from the U.S. Coast Guard (USCG). The exact farm location will be delineated on new NOAA Navigational Charts, and the new net pen array and feed barge will be equipped with electronic navigational aids after the PATON Permit is issued. Mariners will see on the charts that there is an object moored in this location, along with information regarding the aids to navigation to look for. These will be multiple 6-second interval flashing yellow navigational lights. All floating fish pens in Washington are required to be marked with these navigational aids. The steel support barge to be moored at the east end of the net pen array will be easily visible with radar. Radar reflectors may also be installed on buoys around the outside corners of the floating fish pens to further enhance the radar signature of the facility.
Comment #44: Commercial Boat Traffic Comment − Wild Fish Conservancy: *Will this facility cause increased commercial boat traffic? If so, how will the increase of commercial boat traffic impact marine mammals?*	Vessel traffic associated with the proposed marine net pen relocation site is described in SEPA Checklist Section B.14.f (page 34), as follows. Regarding measures to avoid vessel traffic conflicts with marine mammals, see *SEPA Checklist* Section B.5.d (page 22), or refer to the response to the Entanglement issue above. An estimated two (2) to four (4) boat trips per day will transport employees and supplies to and from the off-shore net pen facility. Farm personnel will be transported to the site in the morning, and returned to the harbor at the end of their shift. A crew boat approximately 30 feet in

Comments	Responses
	length will be used to transport staff and equipment out to the site. Moorage for this vessel will be sought at an existing marina within Port Angeles Harbor after operations move out of the existing site at the west end of Ediz Hook. Approximately once per week, a marine freight vessel will visit the floating net pen operation to deliver fish feed and water, and to remove wastes (sewage and trash) for disposal at existing, permitted land-based facilities. Diesel fuel deliveries to operate the generator will likely occur approximately once per month. At the beginning of the fish stocking cycle, a larger marine fishing vessel will transport the juvenile fish from the company-owned hatchery to the net pen facility near Port Angeles. The estimated number of trips to stock the site completely is approximately 12 round trips that would occur over a period of 2 months. Approximately 18 months later, harvesting of the fish would begin. A similar large fishing vessel will be used to transport the harvested fish to a fish processing plant currently located in Seattle. Harvesting would occur 2 to 3 times per week and would take approximately 4 months to complete. Once harvesting is completed, the site would be fallowed for approximately 2 months before receiving the next generation of smolts.

ISSUE: OTHER CONCERNS

Comments	Responses
Comment #45: Cooke Aquaculture Acquisition of Icicle Seafoods Comment − Sierra Club: *How will the Cooke Aquaculture, Inc. acquisition of Icicle Seafoods/American Gold Seafoods affect the current application?*	Icicle Seafoods, Incorporated, the parent company of Icicle Acquisition Subsidiary, LLC (American Gold Seafoods), was acquired by Cooke Aquaculture, Incorporated in June of 2016. The Corps of Engineers, Clallam County and Ecology were notified of this, and are aware of the name change of the subsidiary company from Icicle Acquisition Subsidiary, LLC to Cooke Aquaculture Pacific, LLC. This was a change in the name of the business only; all other aspects of the LLC remain the same. Cooke Aquaculture, Inc. is one of the largest seafood companies in the world, and brings a strategic, long-term investor to Icicle's farming activities in Washington State and the wild seafood production coming from Alaska. The Cooke family shares a commitment to sustainable aquaculture and wild seafood production. The company's salmon farming operations in North America have achieved 4-star certification through the Best Aquaculture Practices (BAP) program of the Global Aquaculture Alliance. In addition, farmed Atlantic salmon from Maine was recently recognized as a good alternative by the Seafood Watch program of the Monterey Bay Aquarium. All of Maine's salmon farms are owned and operated by Cooke Aquaculture USA. Cooke fully supports the Port Angeles-East marine net pen relocation proposal. If the Corps of Engineers or any other permitting agency would like to have a direct communication with a Cooke representative, Kevin Bright, the company's local Permit Coordinator, can facilitate this.
Comment #46: Details Missing from the Corps/Ecology Public Notice Comment − Puget SoundKeeper, Wild Fish Conservancy: *The joint public notice issued by the Corps and Ecology failed to*	It is apparent that the vast majority of comments submitted to the U.S. Army Corps of Engineers and Ecology are based only on review of the 4-page Joint Public Notice dated April 28, 2016, rather than the large number of documents included in the application package. The information requested at left can be found in the following documents:

Comments	Responses
include several details vital for public awareness: • *A detailed description of the boundaries of the 52-acre lease area including the precise location within the lease area where the 9.7-acre facility will be constructed.* • *A list of the species and habitat that currently reside in, migrate through, or in any way use the 52-acre lease area. This should include any endangered or threatened species whose range is known to be in the area where the project will be constructed.* • *The number of Atlantic salmon each pen will hold, the ages and size of these salmon, and the total annual number of salmon the facility plans to rear.* • *A statement that provides for which agency will be designated as having jurisdiction over the operation of the net pens.* • *Monitoring requirements for issues such as disease, parasitic fish outbreaks and fish escapes, along with the frequency requirements for monitoring, reporting requirements and entities required to monitor.* • *The cost (e.g., public financial obligation) of the additional agency oversight and monitoring that will be required in order to implement all necessary requirements.* • *Total nutrient output to waters of the United States.*	LEASE AREA: The location and boundaries of the aquatic land lease area are shown on Sheets 1 and 2 of the JARPA drawings appended to the Joint Public Notice. The latitude and longitude location of the site is provided in the title block along the left margin of each drawing. The location of the net pen array in the mooring grid within the 52-acre lease area is shown on Sheet 2 of the JARPA drawings. LIST OF SPECIES AND HABITAT: See JARPA Sections 9L and 9M (pages 15-16), and the *Biological Evaluation* that accompanies the application (RPS ASA, January 2016). NUMBER AND AGE OF ATLANTIC SALMON: See the AGS Supplemental Information #2 document: *Salmon Farming Overview* (December 5, 2015). Each cage will be capable of rearing approximately 70,000 fish to harvest size. The farm will be planted with a single generation (or single stocking) of smolts from the hatchery. Average weight of fish at entry into the proposed facility will be approximately 200 grams (~ 7 ounces). The fish will be grown for approximately 16 months until they reach the targeted harvest size of approximately 10 to 12 pounds. The entire farm (all 14 cages) will be harvested until the entire facility is emptied out. The site will then lay fallow for a period of time before the next generation of smolts is transported to the cages. AGENCIES WITH JURISDICTION OVER THE NET PEN OPERATION: See the list of permits required in *SEPA Checklist* Section A.10 (page 3) and Section B.5.d (page 23); and the narrative description of regulatory authority associated with each permit in the AGS Supplemental Information #3 document: *Aquaculture Permitting and Regulatory Oversight* (December 5, 2015). MONITORING REQUIREMENTS: See *SEPA Checklist* Section B.3.d (pages 15-16), B.4.d (page 16), and B.5.d (page 23). COST OF AGENCY OVERSIGHT AND MONITORING: Since the existing farm within Port Angeles Harbor is subject to agency oversight and

Comments	Responses
	monitoring, and the proposal is to relocate the existing farm to a site east of the harbor within the Strait of Juan de Fuca, there will likely be no significant change in the cost of agency oversight or monitoring. NUTRIENT OUTPUT: The new facility will be required to obtain an NPDES permit from DOE. The conditions of the NPDES permit will require monitoring the sediments around the fish pen perimeter for signs of excess nutrient build up. Marine net pens in Washington State manage nutrient waste with best management practices, efficient feeds and feeding practices, and optimal farm locations and pen configurations. The facility will be required to meet State Sediment Management Standards that safeguard against exceeding the natural assimilative properties of the surrounding environment.
Comment #47: Purpose of the New Facility Comment − U.S. Army Corps of Engineers: *The Corps of Engineers/Ecology Joint Public Notice (April 28, 2016) states that the purpose of the new facility is to increase production of Atlantic salmon by 20% within the vicinity of Port Angeles.*	The applicant's statement of purpose for the project is provided in Section 6b (page 5) of the Joint Aquatic Resources Permit Application (JARPA). The applicant does not identify an increase in production as a primary purpose for the project. Rather, proposed installation of a U.S. Navy pier adjacent to the existing Port Angeles net pen farm necessitates the relocation to avoid use conflicts and potential hazards to employees and farm operations presented by the Navy's new operations. The Navy has not formally required Cooke Aquaculture to remove the PA Harbor pens because to do so would make the Federal government liable for all lost future production and revenues to the company from the displaced farming operation. State-of-the art cages that will withstand the high-energy environment of the Strait of Juan de Fuca have larger capacity than the existing cages within the harbor. The PA-East proposal includes 14 larger cages compared to the 20 smaller cages in the existing farm. There will be more rearing volume in the new cage complex compared to the existing net pen complex. Operational efficiencies will be achieved by reducing the number of individual units from 20 smaller cages to 14 larger cages.

Comments	Responses
Comment #48: Request for Public Hearing and EIS Comment − Four Seasons Ranch Community: *We request a public hearing regarding this agency's application for a permit for both decommission and removal of existing net pen structures and installation of a new commercial net pen facility for rearing Atlantic salmon offshore in the Strait of Juan de Fuca. Our opposition is in regards to the lack of a full environmental impact study that addresses concerns regarding Morse Creek critical habitat, Essential Fish Habitat, cultural resources, and mitigation*. Comment − James Hudnall: *Schedule public hearings to allow for in-person public comment*. Comment − Tahoma Audubon Society: *We urge you to require an environmental impact statement to examine the adverse effects of this industry to justify why these fish farming operations should be relocated to an upland closed system facility where their water pollution can be monitored, mitigated and contained*. Comment − Puget SoundKeeper and OnBoard Tours: *If the U.S. Army Corps of Engineers and Ecology do not reject this proposed project outright, an EIS and the public process that accompanies it is required*.	A public hearing will be held in Port Angeles before the Clallam County Hearing Examiner at the time of the County's SEPA Threshold determination and decision on the Shoreline Substantial Development permit application. Clallam County is considering all documentation prepared and submitted by the applicant (including considerable information based on independent technical studies and documents prepared by agencies responsible for regulating marine net pen operations), as well as comments received on the application, prior to making its Threshold Determination under the State Environmental Policy Act (SEPA). WAC 197-11-360(1) requires the SEPA Responsible Official to determine that a proposal may have a probable significant adverse environmental impact in order for an EIS to be required. There is no evidence of significant adverse environmental impacts occurring from the existing Washington salmon growing operations, most of which have been in operation for more than 30 years. For this reason, and based on the written record submitted with the application for Shoreline Substantial Development permit, there is no anticipation of significant adverse impacts from the proposed PA-East Marine Net Pen Relocation project. The proposed action does not meet the definition of a "major Federal action" to require an EIS under the National Environmental Policy Act (NEPA).

LETTERS OF SUPPORT

Comments	Responses
Comment #49: Production of a High-Quality Protein Source for Human Consumption Comment − HUBBS Sea World Research Institute, Aquarium of the Pacific, Soy Aquaculture Alliance, Washington Fish Growers Association: *The U.N. Food and Agriculture Organization (FAO) estimates that food production will have to increase by 70 percent to feed the growing population while adapting to climate change and combating global hunger and poverty. Currently, more than half of the ice-free land has been modified for human use, the majority of which is used for agriculture. The ocean covers more than two-thirds of the Earth's surface, yet capture fisheries and a small marine aquaculture sector produce less than 2 percent of global food supply. Seafood is a healthy protein source with great potential to meet an increasing need for protein-rich foods while minimally impacting the environment. Relative to other forms of animal protein, seafood production typically has a smaller carbon footprint and requires fewer land and freshwater resources.* Comment − Feiro Marine Center Port Angeles: *We have facilitated several educational opportunities, such as a panel on the Future of Fish, where we explore the relationship between increasing global protein demands from wild seafood, as well as how advancing aquaculture technologies may address some of those pressures on wild fish stocks, while reducing the environmental impact to their immediate surroundings. With the proposed relocation, we see an opportunity to decrease the immediate effect of the salmon net pens on Port Angeles Harbor, as well as an opportunity for Icicle to implement new standards in net pen design, while continuing to*	Comments noted and acknowledged.

Comments	Responses
contribute positively to our local economy in terms of jobs and services. Comment − Port Angeles Business Association, Arrow Marine Services, and Others: *Aquaculture is identified by both governmental and non-governmental organizations as critical to meeting the future seafood demands of an increasing human population. The U.S. is one of the largest seafood markets in the world, importing more than 90% of the seafood it consumes. The proposed net pen relocation project will increase local production, on home soil, and contribute national domestic food supply goals*.	
Comment #50: Employment and Economic Benefits to the Community Comments − Port Angeles Business Association, Arrow Marine Services, and Others: *The Port Angeles Business Association is writing in support of the application to relocate its Port Angeles marine net pen farm to a new location in the Strait of Juan de Fuca. The existing farm in Port Angeles Harbor has been in operation for many years and has been an important source of stable, family-wage employment in a rural area where good jobs can be hard to find. The aquaculture operations are an important consumer of local goods and services, and it is an economic benefit to the community that resonates throughout the Olympic Peninsula*. *The decision by the U.S. Navy to build a pier that encroaches on the Aquatic Land Lease occupied by Icicle's current marine net pen farm puts both jobs and area-wide community economic benefits at risk.* *Without the Port Angeles farm, Icicle would be unable to supply its customers with US-grown and a locally-produced fresh salmon product on a year-around basis and will likely lose customers to imported fresh*	Comments noted and acknowledged.

Comments	Responses
salmon products. *The new proposed facility will be assembled using local contractors and result in local economic benefits.*	
Comment #51: Environmental Stewardship and Benefits of Relocation Comments − HUBBS Sea World Research Institute, Aquarium of the Pacific, Soy Aquaculture Alliance, Washington Fish Growers Association: *Proper siting that accounts for current speed, depth, sensitive habitats, and competing uses coupled with best management practices can produce high quality seafood without unacceptable impacts.*[21] *Marine aquaculture producers must meet stringent standards to operate in U.S. waters. The proposed relocation project is an important step toward increasing our domestic seafood supply without unacceptable environmental impacts and while supporting rural coastal communities*. Comment − Port Angeles Business Association, Arrow Marine Services, and Others: *The farm will be built to modern, international standards and will include equipment to ensure the safety of employees, the containment of livestock, and sustainable environmental performance*. Comment − John Forster, Port Angeles: *The existing farm in Port Angeles Harbor has operated successfully, without serious incident and with a good record of environmental compliance for over 30 years. I have no reason to doubt that the proposed new farm site and farming operations will continue to achieve*	Comments noted and acknowledged.

[21] Price, C.S. and J.A. Morris, Jr. 2013. *Marine Cage Culture and the Environment: Twenty-First Century Science Informing a Sustainable Industry*. National Oceanic and Atmospheric Administration. Technical Memorandum NOS-NCCOS-164. Silver Spring, MD.

Comments	Responses
those same high standards. Comment − Puget Sound Pilots Association: *Icicle has worked diligently with the Navy and other stakeholders in the community to address concerns around the Navy project, and has recognized that relocating its farm would constitute the best outcome for the environment of the harbor, the local economy, employment, navigational safety of waterborne commerce, and the supply of farmed salmon in the region.* Comment − Randy Hodgin, Existing Port Angeles Net Pen Site Manager: *We will continue to work very hard to be good stewards of the sea. We work closely with State, Federal and local governmental organizations to ensure no adverse impacts are occurring on the environment we work in and around*.	
Comment #52: Mitigation Comment − Jim McEntire, Port Angeles: *Icicle has voluntarily proposed to enhance the shoreline area for public use in the vicinity of the proposed marine net pen relocation site by conducting a sweep of the beach twice per year to remove general man-made debris that washes ashore from various sources. This will be a benefit to our community not presently experienced on a regular basis*.	Comments noted and acknowledged.
Comment #53: Navigation Comment − Puget Sound Pilots Association: *Icicle has met with the Puget Sound Pilots twice to address navigational safety concerns of the barge and its location. We are satisfied that these concerns have been met*.	Comments noted and acknowledged.

Comments	Responses
Comment #54: Adjacent Shoreline Property Owner Concerns Comment − Karl Spees: *My neighbors brought this [application] to my attention with a petition in which the concerns are incorrect and misleading. The objection was that the relocation site would theoretically have a negative impact on the Four Seasons Ranch Homeowners Association on the terminal reach of Morse Creek, impairing our view and the traffic to/from the pen being intrusive/detrimental/disruptive. After reviewing the map location, this does not seem to be a problem. I'm not sure anyone in the 150 homes would even be able to see the fish pen.*	Comments noted and acknowledged.

NEUTRAL LETTERS RECEIVED FROM AGENCIES AND TRIBES

Comments	Responses
Comment − U.S. Coast Guard, Commander M.L. Schallip: *I have no objection to the proposed work. However, I see that this project will include a change to the Private Aids to Navigation (PATON) that mark the present pens and the installation of a new pen which will be required to be marked with PATON as well. Be aware that the placement of a PATON on your new pen, including the discontinuance of our presently installed PATON, will require prior approval from the Coast Guard.*	Comments noted and acknowledged.
Comments − Lower Elwha Klallam Tribe, Doug Morrill, Natural Resource Director: *We have not reviewed the proposal in great detail, but in comparison to where they operate presently, this new site seems to offer some benefit.* *The new location will feature new state-of-the-art net pen design that should withstand the additional stresses associated with the proposed site and prevent/minimize any accidental release of non-native fish into the immediate vicinity.* *The new site is expected to have a higher flushing rate, and the greater water depth should keep the ocean bottom sediments from being impacted by excess fish food and fish waste accumulations.* *The greater depth should also allow transport of waste products into waters further offshore, and the active geoduck harvest sites just east of Green Point are expected to remain unaffected.* *Fishing activities for crab and shrimp are located to the east, near Green Point, adjacent to Dungeness Spit, and in waters further north and east.*	Comments noted and acknowledged.

Comments	Responses
Fisheries are not expected to be adversely impacted. *The Tribe will continue to review this proposal, and retains the right to comment further at a later date.*	
Comment − Jamestown S'Klallam Tribe, David Brownell, Cultural Resources Specialist: *With respect to cultural resources, the Jamestown S'Klallam Tribe has no information regarding offshore sites in this area. However, should the scope change or if new data is revealed during implementation, please let us know.*	Comments noted and acknowledged.

ATTACHMENTS:

1. American Gold Seafoods. January 2016. *Common Questions about Atlantic Salmon Net Pen Aquaculture (with References)*. Supplemental information provided with Department of the Army permit application NWS-2016-100 and Clallam County permit application SHR2016-00002. Also see appended to the *Common Questions* document:

   Nash, C.E. (editor). 2001. *The Net-Pen Salmon Farming Industry in the Pacific Northwest*. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-49. Executive Summary.

2. U.S. EPA. December 13, 2010. *Update to the Biological Evaluation Submitted April 17 and August 6, 2008, Regarding EPA Action on Washington's Marine Finfish Rearing Facility Provision Contained in the Sediment Management Standards*.

3. National Marine Fisheries Service (NMFS). 2011. *Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Proposed Approval of Finfish Rearing Facility Provision Contained in the Sediment Management Standards Rule Promulgated by the Washington State Department of Ecology*.

4. Waknitz, F.W., T.J. Tynan, C.E. Nash, R.N. Iwamoto, and L.G. Rutter. 2002. *Review of Potential Impacts of Atlantic Salmon Culture on Puget Sound Chinook Salmon and Hood Canal Summer-run Chum Salmon Evolutionarily Significant Units*. U.S. Department of Commerce, NOAA Technical Memo. NMFS-NWFSC-53.

5. *SEPA Checklist Addendum* submitted to Clallam County (August 16, 2016).

6. American Gold Seafoods (AGS). October 29, 2014. *Regulated Finfish Pathogen Reporting Plan*. Prepared for the Washington Department of Fish & Wildlife and the Washington Department of Ecology.

7. *Best Aquaculture Practices* excerpt re: Standard 8. Storage and Disposal of Farm Supplies.

8. American Gold Seafoods. June 3, 2016. *Summary of Mitigation Measures*. Letter to Steve Gray, Clallam County SEPA Responsible Official.

9. Nash, C.E., P.R. Burbridge, and J.K. Volkman (editors). 2005. *Guidelines for Ecological Risk Assessment of Marine Fish Aquaculture*. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-71, 90 p.

10. *Aquaculture Magazine* (April 4, 2016) article: *"Land-based Salmon Still Not Investor-Ready."*