To: _Decision Maker, Position_

From: _ Staff Member, Position_
River Steward, watershed

Re: Native Fish Society comments on_Comment opportunity_

Dear_Decision Maker_,

Thank you for the opportunity to provide comments on the *_policy_*. The Native Fish Society (NFS) is a 501(c)3 conservation non-profit, dedicated to utilizing the best available science to advocate for the protection and recovery of wild, native fish and promote the stewardship of the habitats that sustain them. NFS has *_ 3,300 _* members and supporters and _90_ River Stewards and grassroots advocates who help safeguard fish across the Pacific Northwest. In the _*name of watershed*_ we have _*#*_locally based River Stewards covering the _watershed(s)_.

Despite a century and a half of use, fish hatcheries (hereafter referred to as fish factories) remain an unproven method to sustain the viability and biodiversity of native fish populations, preserve the culture of commercial and recreational fishing, and uphold treaty obligations and subsistence fishing for indigenous peoples and sovereign nations. There is an overwhelming scientific consensus that fish factories have a myriad of direct negative consequences for fish including **infrastructural**, **ecological,** and **genetic** impacts, although these categories interact considerably. There is also a growing public awareness of the **indirect** impacts fish factories cause within the socio-ecological interface within watersheds and socio-economic dimensions of fisheries. The aesthetic and emotional state of communities who are impacted by factory fish and the ways in which fish factories detract from the protection of the natural environment also threaten the recovery and protection of wild fish throughout the Pacific Northwest.

In the *__name of watershed__*, there are *_#_* native fish species that are listed under the Endangered Species Act: *_list species (i.e. Winter Steelhead)_*. First listed in *_year_* the viability of these fish populations is considered _(in decline, stable, increasing)_ as determined in the most recent status review, the _cite source_. Regardless of this trend, fish factories in the _watershed_ continue to rear _list all species artificially produced_ in spite of the numerous, documented, negative consequences resulting from these programs.

The negative impacts resulting from fish factories can occur within facilities at the species level, on the natural environment within and beyond the fish factory, and to ecosystems far beyond where those factory fish are reared and released. The negative effects of factory fish are severe enough that courts have recognized "stray [factory] fish as low as one or two percent...may pose unacceptable risks to natural populations"[1].

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[1] Native Fish Soc'y, 992 F. Supp. 2d at 1104 (quoting the administrative record) (internal citations omitted).

In light of the condition of these fish _(ESA status)_, and the continued impacts fish factories cause, we request that the _action agency_ certifies they are following all applicable _list all applicable juristictions_ environmental laws when taking action, including, but not limited to the:

- Endangered Species Act,
- National Environmental Policy Act,
- Administrative Procedure Act,
- Clean Water Act

Within these policies there is a clear standard to incorporate the best available science and to consider cumulative impacts, socioeconomic, and environmental justice concerns. In light of the following considerations we recommend the _decisionmaker, agency_ adopt _ select preferred alternative_

In these comments we detail five main impact/risk categories that have been previously recognized, studied, and reviewed. Within each of these five areas, we also detail subcategories and cite specific examples of how those impacts have contributed to increased extinction risk for fish and to impacts on the people who depend heavily on these species.

1. Infrastructural impacts

Infrastructural impacts arise from the captive rearing of fish in a factory setting including the (a.) *physical location of the facility*, (b.) *operation and resource consumption of the facility*, (c.) *potential for general facility failure,* and (d.) *demographic and collection impacts*.

(a.) Often fish factories are located in or adjacent to important floodplain habitat, causing ongoing impacts to fluvial geomorphological processes including preventing active channel migration. Many fish factories also rely upon weirs, traps, or other infrastructure within the stream channel that negatively impacts downstream habitats, impedes aquatic organism migration and negatively effects spawning and rearing behavior.

(b.) In order to rear fish, factories withdraw water from the stream channel or local groundwater sources to use in the facility. Factors such as flow reductions, displacing other stream-dwelling organisms crucial to the aquatic food web, and dewatering the spawning and rearing areas can all occur from extracting water from the environment surrounding the artificial propagation infrastructure. If water is returned to the stream, effluent discharges consisting of modified water temperature, pH, suspended solids, ammonia, organic nitrogen, total phosphorus, and chemical oxygen demand in the receiving stream's mixing zone can all negatively affect the fish (Kendra 1991). It is also possible for bacteria, parasites, and viruses to be introduced through this effluent discharge. Fish factory operations are required to comply with the Clean Water Act, and specifically be covered under a National Pollutant Discharge Elimination permit. The Clean Water Act accomplishes this regulation by requiring a permit for each and every point source discharge, with effluent limits based on the more stringent of technology-based standards and standards necessary to protect water quality and existing water uses. If hatcheries are permitted with an NPDES, their permits are often administratively continued and no longer reflect current federal and state water quality standards as the Clean Water Act requires. Often, it is not known how a fish factory impacts water quality, and often the magnitude of impacts depend upon the flow volume of the hatchery effluent relative to the total flow of the stream. In some circumstances, relatively small amounts of toxic discharges from fish factory effluent can cause significant harm stemming from residual chemical reagents, salts, and chlorinated water[2]. If permits do reflect current standards, data is not presented to verify the claim that "303(d) listings are not affected in any way by the operation of the [factory] programs" (DEIS Page 30). These water quality permits are intended to protect aquatic life and public health and ensure that all artificial propagation facilities adequately treat their wastewater. Regardless of the cause of water quality impairments, fish factories may not exacerbate water quality problems in impaired watersheds.

(c.) Time and again, fish factories have been subject of artificial propagation failures that cause massive die offs in captive populations. Risks exist in water intake screens becoming plugged, the facility losing electrical power, or catastrophic loss of fish through environmental disaster such as fire, debris torrent, and flooding. Additionally, poor artificial propagation and facility maintenance is a common reason fish are unintentionally killed in fish factories.

(d.) Injury can be caused to fish populations through the collection of fish for artificial propagation in the hatchery. Usually this impact is imposed on adult fish returning to the stream to spawn, but these impacts can also be imposed through the collection of eggs, emerging fry, and juvenile fish. By taking fish into captivity the phenology of their upstream migration and subsequent life history is disrupted. This disruption in timing occurs primarily through the use of weirs, fish traps, and seines, which contribute to wild fish falling back into less preferable spawning and rearing areas, and fish becoming injured while trying to jump barriers within and mandated by the artificial propagation facility. (Hevlin and Rainey 1993, Spence *et al.* 1996). Risk is also posed to wild fish by the need to continually extract natural-origin individuals from the population to counteract domestication effects caused by the fish factory. This removal of individuals from the population removes nutrients from upstream reaches (Kapusinski 1997) and contributes to the decline in abundance, productivity, diversity, and spatial distribution of the threatened and endangered populations.

Infrastructural impacts are often assumed to be offset through investments in equipment or changes in artificial propagation procedures. However, the physical existence of the factory represents a permanent, negative impact on the surrounding environment and can also pose serious harm to fish populations both in and outside of the facility. In addition, the cost it takes to offset these impacts into the indefinite future is always greater than the cost of restoring watershed function and further delays investment in the root causes of decline for natural fish.

2. **Ecological Impacts**

Ecological impacts occur on an inter and intraspecies basis both inside and outside the artificial production facility. Ecological interactions occur whether or not inter-breeding occurs and are magnified if resident life histories are being produced. Ecological impacts include: a.) disease, b.) competition, c.) behavioral modification, and d.) marine

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[2] Center for Environmental Law and Policy; and Wild Fish Conservancy Case 2:15-cv-00264-SMJ

derived nutrients. Review papers by Pearsons (2008) and Kostow (2009) document numerous, serious, negative ecological consequences as a direct result of the artificial propagation of fish.

(a.) *Disease:* Common diseases within hatcheries of the Northwest include Furunculosis (*Aeromonas salmonicida), Saprolegnia spp.,* Cold Water Disease *(Flavobacterium psychrophilum), Trichodinids,* bacterial kidney disease (*Renibacterium salmoninarum),* among others. Bartholomew *et al.,* 2013 is often cited as a source claiming hatcheries do not pose a risk to surrounding watersheds from artificially amplifying pathogens and parasites. However, through regular monitoring conducted by state and federal agencies, we know that disease is a constant problem when artificially rearing fish in high densities (Saunders 1991). Rearing facilities expose captive fish to increased risk of carrying pathogens because of the increased stresses associated with simplified and crowded environments. It is probable that fish transferred between facilities, adult fish carcasses being outplanted into the watershed, and other fish released from factories, have acted as a disease vectors to wild fish and other aquatic organisms. These diseases, amplified within the factory, contribute to the mortality of fish at all life stages and can travel rapidly to areas well beyond where effluent pipes are discharged. The outplanting of juvenile and adult fish can transfer disease upstream of the rearing site, and there is the potential for lateral infection through the travel of avian, mammalian, and other terrestrial predators which overlap with the distribution of artificially propagated fish.

The release of artificially produced factory fish into the wild also poses a risk of introducing pathogens and parasites to wild populations that can result in temporary epidemics or permanent reductions in wild populations. While this risk is more difficult to quantify than genetic and competitive effects, they are unlikely to be negligible. Even an individual fish released from a pathogen-laden factory environment can transfer the infection to areas where wild fish are susceptible, leading to devastating consequences. This is especially of concern with regard to local wild populations, including the majority of threatened fish populations, that are already at depressed levels of abundance. These dynamics contribute to disease driven mortality at all life stages in wild fish populations.

b.) *Competition:* In watersheds which have a diminished fish population, competition for resources limits the abundance, productivity, diversity, and spatial distribution of wild fish populations. Competition occurs when the demand for a resource for two or more organisms exceeds that which is available. Negative impacts result from direct interactions (i.e. interference of wild fish foraging by artificially propagated fish) and through indirect means (i.e. factory fish diminish the availability of aquatic insects available as forage to wild fish). Direct and indirect impacts may arise through competition for: food resources within the stream, juvenile rearing habitat, food resources within the estuary and ocean (Levin et al. 2001) and competition for spawning sites (Buhle *et al.* 2009). These impacts are especially significant between steelhead, chinook, and coho (on an interspecific and intraspecific basis) because of the considerable overlap in habitat and foraging preferences between these species (SWIG 1984). Of great concern are the competitive ecological interactions where wild fish are displaced by artificially propagated and reared fish introduced into the same habitat.

c.) *Behavioral Modification:*

(1) *Predation by other fish & wildlife:* Fish produced in factories also bear maladaptive behaviors due to the strong selection within the artificial production facility. Due to the food distribution and rearing strategies necessary to make artificial production cost effective, factory fish become hyper-aggressive and surface oriented, causing them to become more susceptible to predators (Hillman and Mullan 1989). Artificially produced fish also exhibit less diversity in their behaviors and life histories, allowing for predators to key in on migration timing. Especially during *en masse* factory smolt releases, wild fish can be preyed upon by pinniped, avian, and other piscivorous predators attracted to the high number of factory fish concentrated in a given area. The modification of wild fish behavior can increase vulnerability and susceptibility to predation. This dynamic can occur during juvenile releases in the freshwater environment, during estuary rearing phases, and especially when adult hatchery fish return to spawn and congregate in restricted areas such as below dams and partial migratory barriers.

(2) *Predation by factory fish:*Factory fish have also been documented directly preying upon smaller wild fish. This direct consumption of fry and fingerlings is highest in areas where artificially produced fish and wild fish commingle. Direct predation of wild fish by factory fish is likely highest when artificially produced smolts encounter naturally produced, emerging fry or when they are disproportionately larger than wild fish. Cases of direct predation have been documented where factory fish consume wild fish ½ of their total size once they have been released (Pearsons and Fritts 1999). Hawking and Tipping (1998) observed artificially produced age 1 coho salmon and steelhead trout predating on other salmonid fry appearing to be chinook. Seward and Bjornn (1990) have also documented substantial predation impacts by artificially produced chinook preying upon their own species. In instances such as these, factory fish preying directly upon wild fish results in the direct take of ESA listed species.

(3) *Residualization:* In steelhead trout, and to a lesser extent within Chinook and coho, modified feeding behavior can affect residualization, meaning that they will not migrate to salt water, but will instead remain in the river as resident fish. Residualization is a common occurrence with artificially produced steelhead (Naman 2008, Hausch and Melnychuk 2012, Melnychuk *et al.* 2014). The addition of these residualized factory fish constitutes a significant modification to the habitat of wild salmonids. These residualized factory fish will harm, displace, and most likely prey upon other juvenile salmonids . In some areas of the Northwest, residualization rates are as high as 20-80% (Snow and Murdoch 2013, McMichael *et al.* 2014). Residualized factory fish are also not limited to the areas surrounding the factory, Schuck *et al*. (1998) reported residualized factory steelhead approximately 20 kilometers below and 10 kilometers above release sites.

d.) *Marine derived nutrients:* As noted in the _policy, program being consdiered_, fish are managed for _state purpose of artificial production program_ and _(are/not)_ intended to provide conservation benefits to natural populations from intentional supplementation or captive breeding. Fisheries, which meet management objectives, will result in the harvest of as many factory fish as possible to limit genetic and ecological interactions. If adhering to pHOS performance targets, factory fish do not naturally contribute marine derived nutrients. It is estimated that just 6-7% of the marine derived nitrogen and phosphorus once delivered to rivers of the Pacific Northwest currently reach watersheds (Gresh et al. 2006). Artificial propagation has been shown to negatively influence the spatial distribution, productivity, diversity, and abundance of wild fish populations and thus also continues to exacerbate the deficit of marine derived nutrients to watersheds throughout the Northwest. The long term reliance of out-planting post-mortem factory fish is expensive, unable to predict and account for how nutrients are naturally distributed throughout the watershed, and constitutes a dangerous vector for hatchery borne diseases to spread. As noted in Kohler *et al.* (2013), nutrient fluxes are not always unidirectional, and especially in cases with poor juvenile survival, nutrient exports through emigration to the ocean can be greater than marine derived nutrients returning through adult anadromous fish migrations.

Overall, the ecological risk of artificial propagation is the replacement of wild fish by factory fish (Hilborn & Eggers 2000, Quiñones et al. 2012). When fish produced through artificial production interact with wild fish in a limited carrying capacity, factory fish may replace rather than augment wild populations (Hilborn 1992).

3. Genetic Impacts

Wild fish throughout the Northwest are defined by their sense of place, or their high fidelity to return to their birthplace. Their ability to migrate to the ocean and return to their natal stream has profound implications on population structure and has encouraged fine scale genetic adaptations to specific habitats used throughout their lifecycle and geographic range. The genetic risks that artificial propagation poses to wild populations can be broken down into: a.) *loss of genetic variability,* b.) *outbreeding and inbreeding effects,* c.) *domestication selection* and e.) *Epigenetic Impacts.* These genetic effects are caused by removing the ability of natural mate selection when gametes are artificially inseminated in the factory.

a.) *Loss of genetic variability:* The loss of diversity occurs both within populations and between populations. Within populations, loss of genetic diversity occurs when mass artificial insemination reduces the quantity, variety, and combinations of alleles present (Busack and Currens 1995). Genetic diversity within a wild population changes from random genetic drift and from inbreeding depression. The process of genetic drift is governed by the effective population size, rather than the observed number of breeders. Although many fish might be present on the spawning grounds the effective population size is smaller than the census size. Artificial propagation has been found to reduce genetic diversity and cause higher rates of genetic drift due to small effective population sizes (Waples *et al.* 1990). Negative impacts of artificial propagation on population diversity often manifest as changes in morphology (Bugert *et al.* 1992) and behavior (Berejikian 1995).

b.) *Outbreeding and inbreeding depression:*

(1) Inbreeding depression: the interbreeding of individuals related to one another, occurs in the wild when populations experience significant declines due to habitat destruction, overharvest, or other factors that limit the number of fish. In fish factories, the practice of artificial insemination does not differentiate between related individuals during the fertilization process, so the likelihood of inbreeding depression is increased regardless of the population size. Inbreeding depression does not directly lead to changes in the quantity and variety of alleles, but instead homogenizes the population which is then acted upon by the environment. The fish factory rearing environment, consisting of either concrete raceways or circular tanks, likely contrasts significantly to the natural

selection in the stream environment, thus leading to an increase of deleterious alleles and a reduction in the fitness of the population (Waldman and McKinnon 1993). There is substantial data on the effects of inbreeding depression in rainbow trout (Hard and Hershberger 1995, Meyers et al. 1998) and in steelhead trout, this factor alone has been attributed to a 1-4% decline in productivity (Christie *et al.* 2014).

(2) *Outbreeding depression*, or the fitness and/or diversity loss associated with gene flow from other, genetically distinct fish populations, can also pose significant consequences for native fish. Fine-scale local adaptations occur through random genetic drift and natural selection (Taylor 1991, McElhany *et al.* 2000). Even with a high degree of homing behavior, some fish do return to spawn in watersheds other than where they were born. When fish successfully reproduce in watersheds in which they were not born, they are considered to have “strayed.” Stray fish result in gene flow between populations. Outbreeding depression impacts natural fish populations when artificially produced fish stray at rates many times higher than natural fish, leading to interbreeding with distant wild population and causing their offsprings to exhibit a lower fitness in the natural environment. Outbreeding depression is exacerbated by the factory setting because the artificial infrastructure inhibits olfactory (Dittman et al. 2015) and geomagnetic (Putman *et al* 2014) imprinting on a home stream. Straying in native fish populations is a natural process which counteracts the loss of genetic diversity and helps to recolonize vacant habitat but usually occurs at very low levels (Quinn 2005). Fish artificially raised in factories can create unnatural gene flow in terms of the sources of stray fish and the high proportion of fish that stray. The more outbreeding depression acts, associated with an increase of exogenous spawners, even if immediate consequences are concealed, populations will possess less adaptive capacity to face new environmental challenges (Gharrett *et al.* 1999). It is important to note that effects arising from the interbreeding of artificially and naturally raised individuals from within the same population arise from domestication selection, which impacts act differently than outbreeding depression.

(3) *Domestication Selection* occurs when fitness loss and changes occur due to differences between the factory and natural environments. The process of domestication occurs, intentionally or unintentionally,
when there are changes in the quantity, variety, and combination of alleles between artificially inseminated fish and naturally produced fish as a consequence of captivity. The National Marine Fisheries Service defines domestication as the selection for traits that favor survival within a [factory] environment (Busack and Currens 1995). Domestication selection impacts natural fish when they interbreed with artificially produced fish adapted to the factory environment and suffer a reduced fitness (Ford 2002). This can occur in three principle ways: intentional or artificial selection, biased artificial propagation, and relaxed selection

A. Intentional or artificial selection is the attempt to change the population to meet management needs, such as spawning time, return time, out outmigration time. Natural populations are impacted when hatchery adults spawn with wild fish and the performance of the population is reduced. This is also a form of outbreeding depression.

B. Biased artificial propagation is caused during the selection and rearing of captive fish. Factory operations are always a source of biased sampling when groups of fish are fed, reared, sorted, and treated for disease.
C. Relaxed selection occurs through artificially high juvenile survival rates during early life stages. Factories are a simplified, sheltered environment that is meant to increase survival relative to the natural environment, and allows deleterious genotypes to move into later life history stages and future generations which wouldn't otherwise be expressed.

(4) *Epigenetic change* has also recently been pinpointed as another impact causing the depletion of biological diversity associated with fish factories. Epigenetics is the study of changes in organisms caused by modification of gene expression rather than alteration of the genetic code itself. It is now well-known that the vast share of any organism's DNA remains latent and unexpressed as the organism develops and lives its life. Epigenetics is the means to study which portions of an organism's DNA are in fact expressed, and what environmental, physiological, behavioral, and other factors cause differences in gene expression as organisms develop (Gavery and Roberts 2017). The DNA of the genome confers to an organism its potential capacity to express variation and range of traits; epigenetic study provides us with the tools to understand how environmental influence controls the realized expression of DNA-determined traits, thus determining the actual health, survival and fitness of the organism. Le Luyer at al. (2017) and Gavery and Roberts provided compelling evidence for epigenetic changes in factory-reared fish and shellfish compared to their wild counterparts.

Given the overwhelming evidence of genetic impacts factories cause on wild fish, we also cite numerous studies showing the intersection between the four factors outlined above:
Reisenbichler and Rubin (1999) reference five other studies which find that hatchery programs which captively rear fish for over 1 year, (i.e. steelhead, stream-type chinook, and coho salmon) genetically change the population and consequently reduce survival for natural rearing. In the study, the authors found substantial genetic change in fitness resulting from traditional artificial propagation when fish were held in captivity for more than 25% of their life span. Building off of these findings, morphological and behavioral changes were found in artificially produced, adult, spring Chinook including a reduced number of eggs relative to wild fish (Bugert *et al 1992).* (Leider *et al* 1990) reported diminished survival and reproductive success for the progeny of artificially produced steelhead when compared to naturally produced steelhead in the lower Columbia River. The poorer survival observed for the naturally produced offspring of factory fish was likely due to the the long term artificial and domestication selection in the factory produced steelhead population as well as mal-adaptation of the fish population within the factory to the native stream environment. In a paper on the reproductive success of hatchery fish in the wild, it was reported that factory fish did not produce fish that could match the survival or reproductive success of wild fish, even with the use of predominantly wild-origin broodstocks (Christie 2014). These findings were consistent despite differences in geographic location, study species, artificial propagation methods, and artificial rearing practices. Recent

research has also documented an epi-genetic impact fish factories pose on wild fish through reduced recruitment on populations that consist of artificial production (Christie 2016). Even within a single generation, domestication selection altered the expression of hundreds of genes to rapidly favor the artificial spawning and rearing environment. Moreover, these traits could be passed along to wild populations if factory fish spawned with natural fish.

4. Indirect impacts

Because factory fish intersect considerably with naturally produced fish, they also pose indirect impacts from activities and decisions stemming from their presence. These impacts include: *Direct and Indirect take through fisheries*, *Monitoring, and Opportunity costs.*

a.) *Direct/Indirect take:* Fisheries directed on artificially produced fish can also harm and/or cause wild fish mortality. Depending on how the fishery is structured, the commercial and recreational pursuit of artificially produced fish can lead to a taking of wild populations in excess of what would be compatible with their minimum viability.

b.) Monitoring: Under the endangered species act, monitoring and evaluation of artificial production is mandated to ensure that activities associated with captive rearing do not limit the recovery of listed populations. Monitoring activities themselves are identified as actions associated with various levels of take on listed species.

c.) *Opportunity costs:* The opportunity costs for funding hatchery programs instead of other fish creating investments like habitat restoration continue with integrated as well as segregated broodstock programs. Ogston et al. 2015 found that habitat restoration opportunity cost in natural fish vs artificial producti were comparable on a single brood year basis. However, habitat restoration then continues to naturally produce fish in subsequent generations while artificial rearing practices require indefinite, continued funding to support subsequent brood years.

5. Environmental Justice

Environmental Justice and its principles (Taylor 2000) has been largely ignored while considering the impacts of artificial production programs as related to fish. One example of this is the apparent role such programs play facilitating and justifying the continued degradation of the natural environment and control of minority peoples. Fish factories concentrate power within limited government systems (agencies, decision making processes, and knowledge banks). The condensed number of voices deciding on these issues continue to reinforce the status quo without regard to other interests and perspectives- those of which would both alleviate pressures on the environment as well as open enjoyment and use of public resources to more than than the few elite. The current rhetoric maintains that fisheries are not possible without continued factory operation. Every year, _$cost of program$_ is spent in the _watershed name_ alone on artificially producing, captively rearing, and releasing fish because of the loss of fishing opportunity associated with human-caused _cite reason for decline _habitat, hydropower, harvest, hatcheries_. Disproportionately, the artificial production of fish has benefited _recreational and commercial_ fishers as compared to _tribal fishers_ while the impacts (1-4 above) and funding burden have been externalized to other members of society (non-fishers). However, if this type of investment in public resources currently being funneled into factory operation was reallocated to habitat restoration, these fisheries as a whole would be healthier and self-sustaining and more beneficial to all members of our society, eliminating the "need" for continued artificial production.

Communities of color that value fish and the habitats that support them for non-extractive direct use (tourism), for indirect values (ecosystem services), and for non-use purposes (existence, intrinsic, and bequest values) have and continue to be displaced. Continuing to operate fish factories in the _watershed name_ for fishery augmentation purposes adds an additional biological impact which contributes risk to _ESA status_ wild _list species_. Adding additional risks for these species by bombarding them with artificially mass produced fish (which impose the above impacts 1-4) detracts from the transition towards a sustainable wild fishery, and exacerbates the ongoing inequity disadvantaged communities experience (as discussed in Phedra, Pezzullo and Sandler 2007). The financial resources fish factory facilities require to operate also allocates resources away from solving the root problem of species and ecosystem decline, including, but not limited to, habitat restoration and pollution abatement.

In the case of the _watershed name_, hunting, foraging, and fishing was traditionally conducted by members of the _name all tribes/indigenous peoples_. Many other nations not considered here likely intercepted the fish of the _name watershed_ in the _name other locations of interception downstream_, estuarine, and ocean habitats. Wild fish constituted a significant portion of tribal people's diets. In addition, wild fish represented, and continue to represent, significant spiritual meaning. Tribal participation, as sovereign nations, in decision making is important to artificial fish production considerations. To some peoples, fish factories are an expression and representation of exploitative capitalist tactics that have contributed to undermining species integrity and further contributing to the oppression of minorities.

Non-fishers should also be provided the ability to assert decision-making power on fisheries, as significant public financial resources are allocated to hatchery production that only benefits a few.

Place Based Experiences

Name, NFS _watershed name_ River Steward

For the past __ years of my life I have _nature of experience in watershed of concern_. During that time I have come to know native fish populations, including _list species present in watershed_.Native fish populations are important to me because_direct use, bequest, intrinsic value, During my involvement with _watershed of concern_ I have participated in many conservation actions, including _list examples_

1.) Describe personal observations of infrastructural impacts
2.) Describe personal observations of ecological impacts
3.) Describe personal observations of genetic impacts
4.) Describe Observations of indirect impacts
5.) Describe personal observations of environmental justice impacts

As an engaged, local, fish activist, I have survey published reports and studies and find the information cited below to be the most current and relevant to the resources questions being asked. Above, I have related those studies back to the site-specific resource conditions in the project area, and I have cited internal agency reports and studies.

Given my experience in _watershed of concern_

Conclusion:

In conclusion, we believe a healthy river is the best hatchery for wild fish. Mass producing fish in a factory setting with the goal of enhancing population health cannot operate indefinitely because of their dependence on naturally produced fish. Due to the numerous impacts of the artificial production of fish and the substantial environmental justice concerns, we encourage _action agency_ to conduct a throughout viability analysis, such as that done in the AHA model, to determine how threatened fish in the _watershed_ are affected by the proposed action and make the analysis available to the public.

Thank you for the opportunity to voice our concerns about this critically important issue. We hope that _action agency_ values the comments raised in this letter and heeds our strong recommendation to develop an exit plan for artificial production facilities in the _watershed_.