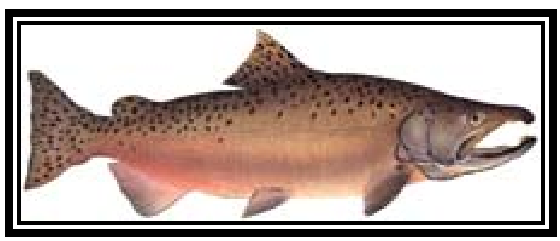
Oregon Salmon Hatcheries and the Clean Water Act



A Report by the
Northwest Environmental Defense Center
Prepared by Mark Riskedahl and Bubba Cook

Introduction

The Pacific Northwest is virtually synonymous with salmon. From the native cultures who depend on them for subsistence, to the coastal fishing communities whose economies hinge on them, to the recreational fisheries that draw anglers from around the country, the Pacific salmonids represent one of the most prominent symbols of the spirit and culture of the Pacific Northwest. Unfortunately, significant obstacles stand in the way of the long-term viability of the salmon. Among other things, continuing habitat degradation, overfishing, and pollution continue to contribute to the demise of these extraordinary creatures.

The following report provides a glimpse at one focal point of the complex relationship between salmon, science, society, and the law- the salmon hatchery. The report begins with a brief background discussion related to the life-cycle of the salmon, the threats that salmon face every step of the way during that life-cycle. Some of the basic differences between wild salmon and hatchery-raised salmon, as well as a discussion of the types of pollution generated by Oregon's state-run hatcheries are then addressed. As there is significant expertise and voluminous research on these topics, our approach has been to provide a general introduction accessible to the layperson. For further reading and more detailed information, please consult the appendices at the end of this report.

The report then analyzes the ongoing and pervasive Clean Water Act violations at Oregon's state-run hatcheries. Mismanagement and decrepit infrastructure at many hatcheries, combined with major revenue shortfalls at the state level, have placed the entire Oregon hatchery program in a precarious position.

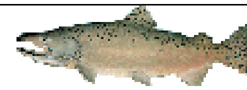
Appendices found at the end of this report provide links to further reading, a copy of a formal Notice of Noncompliance issued by the Oregon Department of Environmental Quality to the Oregon Department of Fish and Wildlife, and also a brief synopsis of legal cases in the Pacific Northwest dealing with fish hatcheries. Finally, the Northwest Environmental Defense Center (NEDC) would like to thank the Bullitt Foundation in Seattle, Washington for a grant in support of our work on this report.

The Miraculous Salmon

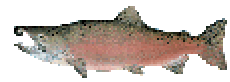
Pacific Salmon are anadromous, meaning they hatch from eggs deposited in rivers, live the first part of their lives in fresh water, and then migrate to the ocean to spend their adult lives. The anadromous species of concern in Oregon include Chinook salmon, Coho salmon, Chum salmon, and Steelhead. Anadromous migrations occur during every season of the year, depending on the location and genetic characteristics of the fish species. Groups of fish that migrate together constitute “runs” or “stocks.” The life cycle of the salmon and the incredible nature of these runs represent one of the most astounding journeys of any creature on the planet.

Amazingly, when Pacific salmon get ready to spawn, they swim hundreds or even thousands of miles to return to the exact stream where they hatched. As a result of biological changes resulting from the drive to reproduce, when they enter fresh water, salmon take on a rough appearance decidedly more pronounced in the males. Their skin changes from a brilliant black and chrome to varied dull hues of red, green, black, and purple and they acquire hooked jaws and humped backs of varying degrees depending on the species. Torn fins, open flesh, bruised skin, and sometimes missing eyes indicate the intensity of the salmonid journey to reproduce. Only a small percentage of salmon that hatch together survive to return to their natal spawning grounds.

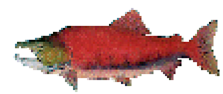
Only a few of the hundreds of eggs deposited by the females survive to become juveniles or “smolts.” Many of the smolts are consumed by predators as they drift downstream. Of those salmon that actually make it to the ocean, even more salmon conclude their journey long before they reach their spawning grounds in fishermen's nets or in the bellies of otters, raptors, or bears. Those that avoid the nets and other predators must swim through polluted waters and struggle past dams and other man-made structures. On their return journey to spawn, salmon do not feed once they leave the ocean, and some simply die along the way because they lack the stored body fat to make the trip. As their journey continues, steep waterfalls and swift rapids cull all but the strongest of salmon. As if the struggle to get there were not enough, once at the spawning grounds, the fish battle each other for places to nest and for available mates.



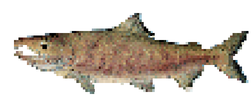
The largest and least abundant of the Pacific salmon, chinook or king salmon (*Oncorhynchus tshawytscha*) average about 24 pounds when they return to their natal river to spawn, most after 2 or 3 years at sea.



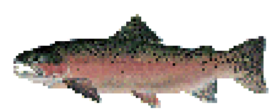
Coho or silver salmon (*Oncorhynchus kisutch*), fourth in Pacific fishery abundance, is the number one sport fish. It spends only one winter at sea, returning the next fall to spawn. It averages about 10 pounds when full grown.



Sockeye or red salmon (*Oncorhynchus nerka*) make up about 25 percent of the West Coast catch. Sockeye salmon must spawn in lakes.



Chum or dog salmon (*Oncorhynchus keta*) make up about 13 percent. Chum and Sockeye follow similar migration paths in the Pacific and reach a common weight of about 12 lbs.



Steelhead (*Oncorhynchus mykiss*) are anadromous rainbow trout. Although not commercially harvested, Steelhead support an important sport fishery. Steelhead can exceed 20 pounds.

The paired fish then engage in a captivating dance once they reach the spawning grounds. The female builds a nest called a "redd" by using her fins and tail to fashion a basin-shaped depression in the gravel. Following the female's creation of a redd, she eases into it and carefully deposits her eggs or "roe." The male approaches alongside and deposits sperm or "milt" over the roe. The female then uses her tail to gently cover the redd with loose gravel and moves upstream to create another redd. The salmon continue this dance until they deposit all their roe and milt. Exhausted from their ancient and timeless ritual, the salmon die shortly after they spawn. Nevertheless, within the gravel beneath all the rotting carcasses lies the next generation of salmon, eager to start the miraculous cycle anew.

The Current State of the Pacific Salmon

All salmonids require pure, highly oxygenated, and cold water to support every stage of their life cycle. As a result, salmon represent one of the first species to suffer when water quality is degraded. The "four H's" constitute the major threats to salmon and include: Habitat destruction, Hydroelectric dams on migratory rivers, over-Harvest of rare stocks, and competition with Hatchery fish. Human-induced threats recently reduced many stocks so severely that government agencies listed them as endangered or threatened species under the Endangered Species Act. Endangered means they are likely to become extinct. Threatened means they are likely to become endangered in the near future. Many more stocks of Oregon salmon are on the verge of being listed as threatened. Some biologists even speculate that all but the hardiest natural salmon runs will be completely extinct within the next 50 years. In any event, Pacific salmonids sit in a precarious position.

A 1991 report by the American Fisheries Society indicated that 214 of about 400 stocks of salmonids in the Northwest and California risk extinction. In 1992, the National Marine Fisheries Service (NMFS) listed the Snake River stock of sockeye salmon as endangered wherever found. The agency also listed spring-summer and fall runs of Chinook originating in Idaho's Snake River as threatened in 1992. NMFS later listed the Lower Columbia River Chinook, Upper Willamette River Chinook, and all Oregon Coast Coho as threatened. This was followed by NMFS' decision to list the Upper Columbia River Spring-run Chinook as endangered. Furthermore, NMFS currently lists all Steelhead stocks in Oregon but the Oregon Coastal Run, which it listed as a "candidate," and the Klamath Mountain stock as either threatened or endangered.

Solutions for an Uncertain Future

Many problems face Oregon's salmon, as outlined by the "four H's." Unquestionably, most scientists indicate that generalized habitat destruction and hydropower represent the greatest threat to salmon populations wherever they occur. Despite variable harvest pressure, the largest historic declines in salmon populations coincide with the construction of large hydropower projects, destruction of habitat through silvicultural and agricultural growth, and increasing pollution resulting from urban and industrial growth. Unfortunately, the complexity of the salmonid life cycle reflects the complexity of addressing the issue of disappearing salmon.

Restoration of salmon habitat represents one of the key methods of improving salmon recovery and production. However, dam removal is politically charged and costly. Additionally, instream improvements are labor-intensive and difficult. Moreover, the demands of a growing population mandate increased power, more timber production, more pollution-generating industry, and more construction, which all adversely affect salmon habitat. Hatchery production was one of the early methods developed to mitigate the effects of habitat loss on salmonid production. However, as the remainder of this article explains, replacement or supplementation of wild stocks with hatchery fish may well do more harm than good.

Salmon Hatchery Production in General

Hatcheries on the Pacific Coast have a history dating back to the establishment of the Baird Station in Northern California in 1872. Livingston Stone, the newly appointed fish culturist for the U.S. Fish Commission, traveled to California to seek out a place to harvest salmon eggs for the purpose of restocking depleted Atlantic salmon stocks on the east coast. The initial operation of supplying salmon eggs to other regions, including the east coast, Hawaii, New Zealand, and Australia, evolved into a local management effort in 1888 as the growth of the commercial cannery industry increased. Thus began the use of hatcheries to manage salmon populations on the west coast. Since then, more than 400 hatcheries have been established from Alaska to California, turning out more than 325 million juvenile fish a year.

Hatchery operation primarily consists of four phases: 1) collection of eggs; 2) incubation; 3) growth; and 4) release. Generally, fishery managers place fish hatcheries alongside streams to facilitate a "flow through" system that provides a constant source of high quality water from the stream. Biologists then collect male and female salmon as they travel upstream and "strip" roe and milt from the individual fish and mix them together to fertilize the eggs. Next, biologists place the fertilized roe in trays in a climate-controlled incubation room where they hatch into fry. Eventually, the biologists transfer the fry to holding ponds where the fry grow into "parr." While in the holding ponds biologists feed the parr a processed pellet food comparable to dog or cat food made up of ground fish, various binders, and nutritional supplements. When the salmon reach a certain size, biologists release them into either the stream on which the hatchery is located or another designated location. The process of rearing salmon generally lasts approximately 1/3 of its lifespan depending on the species.

Hatcheries: Salmon Friend or Foe?

Initially, fishery managers and biologists viewed hatcheries as an ideal means to manage diminishing salmon populations on the east and west coast. However, as technical knowledge increased regarding the biology of salmon, genetics, and general ecology, biologists began to question the role of hatcheries in salmon management. Subsequent studies revealed numerous problems associated with the use of hatcheries to manage wild fish populations. Moreover, no matter how many fish the hatcheries produced, the runs continued to decline. As a result, theories by biologists and fishery managers that hatcheries were the ultimate solution to failing salmon populations began to diminish. Currently, government scientists, academic scientists, and some of the top fisheries biologists in the nation recognize the introduction of hatchery fish as counterproductive to the recovery of most stocks and that hatcheries themselves represent significant sources of pollution to the waterways they sit alongside.

Hatchery Fish

Research by numerous fish biologists over the past three decades revealed a host of problems associated with the production of salmon in hatcheries. As a result, many began to abandon the view that "a fish is a fish." "While hatcheries are good at producing fish for people to catch, they are not as good at producing fish to survive in the wild," according to Reg Reisenbichler, a biologist for the U.S. Geological Survey. The reason for this distinction lies in the idea of "survival of the fittest." A salmon raised in a hatchery fails to undergo the trials of life a wild fish must endure. Consequently, as many scientists have recognized, hatchery salmon exhibit biological and behavioral traits inferior to their wild counterparts.

The differences between hatchery-reared and wild fish break down into three basic categories that include physical (habitat and ecology), biological (body shape and genetics), and behavioral differences. The physical habitat differences between hatchery and wild stocks represent the root of the problem. First, hatchery fish return to hatcheries while wild fish return to their natal streams. With salmon, death represents an extremely important part of the cycle of life. The decaying salmon carcasses provide nutrients which the young salmon, as well as other aquatic species, depend on for growth and survival. Hatchery fish, however, get caught by fishermen or return to the hatchery where they were born, often far below the spawning grounds of a stream. Therefore hatchery fish fail to complete the cycle of life necessary to maintain wild stocks of salmon. Additionally, wild fish hatch and mature in a wild environment that naturally selects the "fittest" individuals. On the other hand, hatchery fish hatch and mature in an artificial environment designed and regulated by humans, learn to eat commercially produced feed, congregate in larger numbers than they would in the wild, and fail to learn how to avoid predators. As a result, hatcheries allow fish that normally get removed in the wild to grow to their next stage, thus affecting the biological health of the population as a whole.

Although hatchery fish fare better between the egg and smolt stages because of the protected environment in which they mature, up to 99% fail to survive once the hatcheries release them. Wild fish, on the other hand, are three times more likely to survive migration and ocean conditions. Additionally, differences in color and kype size may affect the breeding success of salmon in favor of the wild fish. Even more differences in shape, swimming speed and capability, and susceptibility to stress appear to favor wild fish over hatchery fish. Because hatchery fish fail to be selected out on the basis of "bad" biological traits, they tend to pass on their defective genetics to their offspring resulting in "genetic dilution" of the species as a whole.

The genetic differences that result from biological and physical environmental differences tend to contribute to behavioral differences that favor wild fish. For instance, hatchery fish tend to feed at the surface as a result of feeding techniques in hatcheries thus increasing the possibility of getting picked off by predators while wild fish tend to feed in deeper, safer zones. Additionally, hatchery fish seem less successful in breeding compared to wild fish. A fish that cannot breed is a dead fish indeed! Hatchery fish also exhibit poor social behavior due to being raised in crowded hatchery conditions such as a tendency to congregate which increases the likelihood of predation. Furthermore, hatchery fish are sometimes a bad influence on wild fish because they can cause wild fish to follow them out to sea too early in a phenomenon known as the "Pied Piper" effect. Consequently, the combination of biological, physical, and behavioral traits of hatchery fish threatens the continued existence of natural salmon runs directly through competition and indirectly through genetic pollution.

Other additional problems of hatchery fish include the attraction of predators and the similar process of "harvest pump priming." Large concentrations of fish released from hatcheries attract predatory animals which raise the death rates of self sustaining populations of wild fish. Similar to the attraction of wild predators, "pumping out" hatchery fish encourages human fishing and increases the catch of wild fish. As a result, more wild fish in the mixed population are removed than had there been no stocking at all. At any rate, the immediate effects of hatchery fish on natural runs of salmon briefly outlined above are only part of the problem with hatcheries.

Pollution

Throughout the process of rearing salmon in a hatchery, introductions of various natural and chemical pollutants occur. Because hatchery fish are raised in abnormally concentrated conditions, they are highly subject to disease. It is a problem in itself that hatcheries serve as breeding grounds for fish diseases that they ultimately pass into the rivers they sit alongside. Additionally, hatcheries frequently apply formalin, or formaldehyde, to salmon eggs and juvenile salmon to prevent the growth of different types of aquatic parasites. Unfortunately, formalin is a particularly potent chemical, and has the potential to harm both aquatic insects and juvenile fish where discharged.

Hatcheries, like all types of modern confined animal feeding operations, also commonly use antibiotics, often the same types prescribed for human use. Recently, the United States Geological Survey (USGS) conducted water quality sampling at the Cole M. Rivers Hatchery on the Rogue River in Southern Oregon and found antibiotics passing through the hatchery into the Rogue River. The phenomenon of residual antibiotics passing through hatcheries is fairly common, though not particularly well documented due to the expense of conducting sampling and analysis.

In the concentrated conditions of a hatchery, the fish themselves secrete a significant amount of digestive wastes including ammonia and fish feces, which can kill the salmon in the rearing ponds if not flushed into the river. Excess feed and feces flushed from hatcheries carry various forms of bacteria including *E. coli* and contribute to excess nutrient levels which can cause receiving streams to turn from sparkling clear into a cloudy green, filled with algae.

Many Oregon streams and rivers are also simply too hot for salmon. Once heat is added to water, it is very difficult to remove. Hatcheries contribute to this problem because they use unshaded ponds and raceways lined with dark concrete, asphalt, or black plastic which absorbs heat from the sun. The heat absorbed in the pond liners transfers to water passed over it and returns to the stream or river on which the hatchery resides, thus increasing the heat in the stream. Additionally, many hatcheries use high capacity pumps that generate significant amounts of heat which ends up in the stream. The relative amount of heat contributed by hatcheries to Oregon's streams might be proportionally low, but it nonetheless represents an addition of heat to an already overheated system.

One of the major sources of pollution in hatchery production is feed given to hatchery fish. Commercially prepared feeds contains large amounts of fish oil and fish meal. These additives are generally purchased on the open market and are of unknown origin and derivation. Precisely what chemicals are used as "binding" or "wetting" agents, common commercial feed components, is simply unknown. The composition of the feed is considered proprietary by the commercial feed producers, resulting in a final product known as "closed-formula" feed. The state of Oregon neither tests nor is provided with information as to the actual content of the 5 million pounds of feed it procures for use in state-run hatcheries every year.

Independent research conducted by Canadian scientists, however, raises serious questions about numerous ingredients common in commercial hatchery feed. The scientists analyzed feed obtained from Bio-Oregon, one of the main suppliers used by the state of Oregon. Their analysis showed elevated levels of a laundry list of contaminants including PCBs, polybrominated diphenylethers (PBDEs), organochlorine pesticides (OPs), polycyclic aromatic hydrocarbons(PAHs), and methyl and inorganic mercury. These findings are particularly troublesome due to the fact that aquatic environments enhance the ability of persistent organic pollutants to biomagnify. The principle of biomagnification refers to the fact that persistent organic pollutants, such as PCBs or dioxins, concentrate as they move up the food chain, and organisms at the top invariably end up with the highest levels of contamination.

Processing fish meal or fish oil into commercial salmon feed can not only result in a contaminated product, but it may also detrimentally affect other fish as well. Our oceans serve as the repositories for all the chemicals that flow into and out of our lakes and rivers. Plankton and other small oceanic creatures ingest these chemicals. In turn, large schools of small fish act like giant filters, swimming through the water with their mouths open and straining out and ingesting the plankton and the chemicals they contain. These fish, which include smelt, anchovetta, and menhaden, possess very high oil or fat content as well as a high protein content making them very desirable for animal feeds. Ocean fishers use enormous nets for collecting huge amounts of these small oily fish. Fish feed producers then grind up the fish to make fish meal or fish oil. Unfortunately, the chemicals ingested by the fish tend to permanently attach to their oily and fatty tissues. The end product is a high energy, high protein food that salmon like to eat, but which also contains concentrated amounts of unhealthy chemicals.

The presence of toxic substances in commercial fish feed only represents one problem with using ocean fish to make the feed. About one third of the annual ocean fish catches end up in fish feed which currently sits at about 24.5 million metric tons. Moreover, it takes about four times as much ocean caught fish to produce the same amount of hatchery fish. Sadly, many of the ocean fish populations used in producing feed are already depleted or exist on the verge of collapse. Therefore, by trying to solve the salmon problem using hatcheries we simply contribute to another problem in our oceans.

Clean Water Act Non-Compliance at Oregon State Hatcheries

The Oregon Department of Fish and Wildlife (ODFW) manages hatchery operations at 41 sites throughout Oregon. Each of these facilities requires a National Pollution Discharge Elimination System (NPDES) permit in order to discharge hatchery effluent to the waters of the state. These NPDES permits are required by the Clean Water Act and contain effluent limitations each hatchery must meet in order to be in compliance with the permit. Managers at each hatchery must sample effluent leaving the hatchery for specific parameters, including Total Suspended Solids (TSS), Settleable Solids, pH, flow and temperature.

NPDES permits for Oregon hatcheries are written by another state agency, the Oregon Department of Environmental Quality (DEQ). Rather than crafting individual NPDES permits tailored to the site-specific requirements and problems associated with each individual hatchery, Oregon DEQ issues the vast majority of Oregon state-run hatcheries (37 of 41 total permitted operations) a general NPDES permit known as the 300-J permit. This one-size-fits-all general permit contains virtually identical monitoring, recording and record-keeping obligations for each of the 41 separate state-run hatcheries it covers. The 300-J general permit is a relatively lenient and under-protective permit. It requires water quality monitoring only once per week during the month of highest production at each hatchery. In other words, these discharges are not monitored or sampled at all during eight months of every year. In fact, effluent from ODFW hatcheries is entirely unregulated for 349 days during any given year. Despite the relatively lenient permit conditions, ODFW has consistently been unable to comply with the terms of the permit.

Oregon DEQ clearly recognizes that permit compliance has been a problem at ODFW hatcheries for many years, and in 2001 DEQ issued ODFW a formal Notice of Noncompliance detailing the extensive permit violations, characterizing them as "systemic." A copy of this formal notice can be found in Appendix B to this report. In response to this formal notice, ODFW distributed an internal memorandum to all of its hatchery managers which stated that the Notice of Noncompliance was "a very serious matter" and that the Department had zero tolerance for permit violations. Unfortunately, these violations have continued largely unabated. Several other formal Notices of Noncompliance have been sent over the past two years by Oregon DEQ detailing the continued problems with permit violations at ODFW hatcheries across the state.

Mismanagement, poor record keeping, sampling and reporting at hatcheries across the state has resulted in a pervasive and ongoing pattern of Clean Water Act noncompliance. After conducting extensive file review, interviews and investigative research, NEDC has learned that NPDES permit violations at Oregon hatcheries are the norm, rather than the exception.

Some of these problems are clearly related to the inadequate physical infrastructure at many Oregon hatcheries. The use of basic primary treatment systems such as sedimentation basins, common at hatcheries in Oregon's neighboring states, are rare at Oregon hatcheries. Installation of primary treatment systems, at a bare minimum, will be necessary if Oregon truly intends to bring these facilities into compliance with the Clean Water Act. However, funds for these necessary upgrades will not be forthcoming any time soon, given major budget shortfalls in Oregon. The simple, and perhaps only economically feasible alternative given Oregon's financial woes, may well be to cease hatchery operations at problem facilities.

In addition to the necessary upgrades, there are basic maintenance expenses required at many of these decrepit facilities that are going unfunded as well. The Oregon Secretary of State performed an audit in 2002 addressing the scope of the deferred maintenance problem at Oregon's hatcheries. The last official figure for the maintenance backlog was $27 million, but could be as high as $100 million. The audit determined that certain deferred maintenance must be completed “in order to operate effectively and in compliance with applicable state, federal and agency rules and policies.” ODFW, however, has historically placed a higher value on simply keeping all of these facilities open and operating on basic life-support, rather than retrofitting the facilities that are salvageable and simply closing those that are not.

This mismanagement has not only led to environmental degradation well beyond levels permitted by the Clean Water Act, but has also created significant legal exposure for the state of Oregon. On the same day that this report was released, NEDC and several other conservation organizations sent ODFW formal notice of our intent to file a Clean Water Act citizen suit to remedy these violations. The notice details over 1,500 separate

Clean Water Act violations at Oregon state-run hatcheries in the two years since DEQ's original 2001 Notice of Noncompliance. The coalition of conservation organizations is being represented by the Cascade Resources Advocacy Group (CRAG), a non-profit public interest law firm in Portland, Oregon. A copy of the Clean Water Act 60-day notice is available on NEDC's website at www.nedc.org.

Conclusion

> *"Hatcheries are the easy way, the politically safe way. Dependence on hatcheries reduces the will to solve the real problems of natural production, and absorbs far too much money that otherwise might be directed to these ends." Roderick Haig-Brown, renowned statesman, conservationist, and fish biologist from British Columbia.*

"If hatcheries were the solution, there wouldn't be a problem," said James Schmidt of the Yakima River Alliance in opposing a new hatchery on the Columbia River. In light of the numerous problems they cause, such as pollution, competition with natural stocks, and continuing depletion of ocean fish, hatcheries may well be causing more harm than good. More importantly, continually pumping fish into streams and rivers creates the illusion that everything is OK. This illusion allows us to avoid the root of the problem which includes overfishing, habitat destruction, damming, excessive irrigation, overgrazing, urban streamside development, logging, mining, and pollution. Pollution generated by state-run hatcheries in Oregon has led to environmental degradation well beyond what is allowed under the Clean Water Act. It is simply time for the Oregon Department of Fish and Wildlife to recognize that compliance with the law is mandatory and not optional. The health of Oregon's streams and watersheds depends upon it.

Appendix A: Links to further online resources

Federation of Fly Fishermen articles on Hatchery Salmon

Annotated Bibliography of Interactions Between Wild and Hatchery Salmonids by Bill Bakke of the Native Fish Society

NOAA Fisheries: Genetic effects of Hatchery Fish on Natural Populations

Bioaccumulation, Bioconcentration, and Biomagnification: Ecotoxicology for the Citizen

Oregon Department of Fish & Wildlife Background on Salmon and Hatcheries (requires Adobe Acrobat)

Oregon Department of Fish & Wildlife Hatchery Facts (requires Adobe Acrobat)

Oregon Trout's Hatchery Reform in the Northwest Report

Jim Lichatowich and Seth Zuckerman's The Problem with Hatcheries

Trout Unlimited's Threats and Solutions: Hatcheries

Appendix B
Copy of Oregon DEQ formal Notice of Noncompliance issued to ODFW in 2001

May 21, 2001

STEVE WILLIAMS, ACTING ASSISTANT DIRECTOR
OREGON DEPARTMENT OF FISH AND WILDLIFE
2501 SW 1ST STREET
PORTLAND OR, 97207

RE: DEQ-NWR-WQ
05-21-2001 @ 1300
NWR-WQ-2001-055
NOTICE OF NONCOMPLIANCE

Dear Mr. Williams

On Tuesday May 2, 2001 the Department received a request from the Oregon Department of Fish and Wildlife (ODFW) that DEQ participate in a tour of selected hatcheries scheduled for Saturday May 6, 2001. On Saturday, May 6, 2001 the Department attended tours of the ODFW Cedar Creek and Salmon River hatcheries. During that tour participants raised several questions regarding ODFW's compliance with their NPDES permits. The ODFW has been assigned coverage for 39 facilities under the general 300J permit and has three individually permitted facilities. The complaints focused on solids management and the discharge of residual chemicals from the treatment of fish disease or parasites.

In response to the complaints raised during the tour the Department reviewed the discharge monitoring reports (DMR's) for the last five years for all ODFW hatchery facilities. Review of these reports revealed several permit violations. Since the complaints were systemic this notice covers all the violations that have been identified. The permit violations are summarized in the attached table and are discussed in five sections: solids, pH, non-reporting, tardy reporting, and chemical residuals.

Permit limit violations were observed for suspended and settleable solids. These are Class II violations. The violations appear related to two conditions, the generation of solids within the hatchery, and the transport through the hatchery of solids generated by high influent suspended solids.

The permit limits for solids are technology-based limits. The permit violations resulting from solids generated within the hatcheries are an indication of improper operation and maintenance. Permit condition B.1 required proper operation and maintenance at all times.

The permits allow high influent suspended solid concentrations to be subtracted from the effluent concentrations prior to determining compliance with the permit limits.   Even with this allowance elevated suspended solids associated with high influent suspended solids were observed. Our review of notations on the DMR's suggest these exceedances appear to be related to two conditions. The influent monitoring is not always taken to allow adjustment for inflow.   These samples must be collected coincidentally to meet the permit allowance for influent solids. It also appears that the hydraulic residence time in the hatchery results in suspended solids being discharged after the influent suspended solids have dropped.   The extent that hatchery practices can control this sediment discharge is not clear. The permit conditions allowing adjustment for influent solids will be evaluated during the current permit renewal.

The pH violations are principally non-reporting and occasional exceedance of the pH limits.   These are class II violations.   The reporting requirements are defined in Schedule B of the permits and are not discretionary.

Non reporting, or failing to monitor are class II violations of schedule B of your permits. The chronic and ubiquitous problems indicate confusion with the existing discharge monitoring report forms.   As you are aware the Department has recently approved new DMR forms designed to address this problem. These forms should be used.

The submittal of late or incomplete DMR's are class III violations. Although these are not considered serious violations of Oregon law, dischargers are required to comply with all permit conditions.

From the preliminary information provided by ODFW some hatchery discharges of formalin are inconsistent with the environmental precautions stated in the label for application of fish disease control chemicals. The general and individual permits state that:

> Chemical residuals from the treatment of fish disease or parasites are permitted to discharge provided that: (a) the chemicals are applied in accordance with EPA labeling requirements; and (b) the residuals are at concentrations which would not create acute toxicity within the mixing zone or chronic toxicity outside the mixing zone.

Formalin under the trade name PARASITE-S is labeled by the Food and Drug Administration (FDA) not the Environmental Protection Agency (EPA) as implied by the permit condition. The FDA label incorporates environmental precautions as required by the USEPA.   The label states in part:

Environmental Precautions

Do not discharge the contents of fish treatment tanks into natural streams or ponds without thorough dilution (greater than or equal to 10X). Do not discharge the contents of egg treatment tanks without a 100X dilution. This will avoid damage to PARASITE-S sensitive phytoplantkon, zooplankton, and fish populations and avoid depletion of dissolved oxygen.

Formaldehyde is identified by the U.S. Environmental Protection Agency (EPA) as a toxic pollutant and hazardous substance and is required by regulation (40 CFR Part 122) to be identified as a discharge for NPDES permits for aquatic animal production facilities, aquaculture projects.

The NPDES permit limits refer to a non-existent USEPA label. However, the intention of the permit condition is clear. Compliance with label instructions is required for the discharge of formaldehyde under the NPDES permit. Any violation of a permit limit is a class II violation.
The class II violations are considered a serious violation of Oregon Law.

The Department appreciates the efforts already taken by ODFW to address these problems. In order to assure compliance with the 300J permit and a timely review of the 300J permit the ODFW is hereby required to:

1. Immediately start using the new Discharge Monitoring Forms for all 300J permits. Fill out the forms completely. Identify to this Department any issues with the new monitoring forms by 5:00 PM June 29, 2001.

2. Conduct a review and evaluation of solids control operations and management practices for each hatchery. This review should identify those practices that are currently employed or will be implemented at each hatchery to manage solids. Provide a copy of this review to DEQ by 5:00 PM June 15, 2001.

3. For any event where the influent samples may cause permit limit exceedance, the influent suspended should be sampled during the event. For this event you must coincidentally monitor effluent suspended solids during the event. In the explanation of the high effluent suspended solids identify where and for how long the solids accumulated within the hatchery, the amount of time the solids were retained in the hatchery and those actions taken to minimize suspended solids discharged.

4) For hatcheries where the pH exceedences are attributed to the influent water supply, the facilities should measure and report influent pH on the DMR and note the influent pH with the reason for violations. These hatcheries should conduct quality assurance (QA) verification of their monitoring to assure accurate pH measure are being taken and note the (QA) review on their DMR’s.

5) Review and list the chemicals used at each hatchery. This review should describe:

a) The volume and application rates for each chemical used at each hatchery;
b) The methods and treatments used as described in the labeling instructions (e.g., eggs, raceways and earthen ponds);
c) The discharge volume and concentrations;
d) The ability of the hatchery to comply with Environmental Precautions identified on the label.

This report should be provided to DEQ by 5:00 PM June 15, 2001

6. For those hatcheries that can comply with labeling instructions described in the environmental precautions should do so immediately.

7. Those hatcheries that can not comply with the environmental precautions on the labeling instructions the ODFW must determine:

a) If the operations requiring extra-label application can either be shifted to hatcheries that are capable of compliance with the environmental precautions on the label instructions; or

b) If alternative products can reasonably be used consistent with label instructions.

8) Hatcheries exist that can not either immediately comply with the environmental precautions on the label instruction or switch those operation to another facility then ODFW must submit a report to DEQ that:

a) Identifies those hatcheries;
b) Defines chemicals used;
c) Defines applications rates;
d) Defines when the seasonal use of chemicals;
e) Identifies the method and treatment of use as described in the labeling instructions (e.g. eggs, raceway, earthen ponds)
f) Defines receiving stream and relative dilutions for the receiving stream at times appropriate for the discharge;
g) Identifies a schedule for the evaluation and selection of strategies or engineering modifications to bring these hatcheries into compliance with labeling instructions

For these latter hatcheries the Department expects that ODFW will mitigate any potential environmental impact by undertaking every available opportunity to reduce chemical use and assure adequate dilution with hatchery water or within the assigned mixing zone where possible. This information will be used to determine if any other action is needed to assure compliance.

This report should be submitted to DEQ by 5:00 PM June 15, 2001

All correspondence should be directed to:

Robert Baumgartner
ODEQ
2020 SW 4th Ave.,
Portland, OR 97201-4987

ODFW's prompt response and attention to these issues is greatly appreciated. Your attention to this matter will assure compliance with the NPDES permits and assist in the in the current review of the 300J permit.

If you have any questions please contact: Robert Baumgartner at (503) 229-5323 or (Baumgartner.robert.p@DEQ.state.or.us)

Sincerely

Robert P Baumgartner

WQ Manager NWR

Enclosures: Attachment 1 DMR Review Summary

C/C: Copy to file
Complaints file

Appendix C: Table accompanying DEQ's 2001 formal notice

Attachement 1: DMR review summary							
Hatchery	DMR review Summary						Comment
	Solids		pH		Non Reporting	Other	
	TSS	SS	Exceed	Non Reporting			
Bandon	Occasional	Rare		Rare			SS always 0.1
Cole Rivers	Rare						
Butte Falls					Rare		
Bonneville	Rare	Rare	Rare				No DMR's since 3/2000
Cascade				Rare			No DMR's since 12/2000
Elk River				Rare			All prior to 1997
Cedar Cr	Frequent	Rare		Rare	Rare		Influent TSS problems DMRs at times unclear
CEDC	Occasional						Operated by ODFW
Umatilla	Rare				Rare		
Irrigon	Rare						
Looking Glass	Rare	Rare					
Big Canyon							
Wallowa River	Rare		Frequent				May be a high pH influent
Imnaha							No Reporting < 20,000 Lbs
Little Sheep							No Reporting < 20,000 lbs
Salmon River	Rare			Frequent			
Trask	Frequent			Frequent	Occasional		
Trask Pond	Rare			Rare	Rare		No reporting required < 20,000 lbs
Gnat Creek	Rare	Rare		Rare	Occasional		
Santiam	Occasional						
Willamette holding	Rare						
Big Cr	Rare	Rare					
Klaskanine	Occasional			Rare			Monitoring sheets do always match DMRs
Clackamas	Rare						Weekly avgs. Not reported
Sandy							Weekly avg.s not always reported
Roaring River	Occasional					Occasional	Tardy DMRs
Fall Cr	Rare					Occasional	Tardy DMRs
Alsea	Rare						
Rock Cr 30	Rare						Files incomplete
Nehalem	Occasional				Frequent		Files Incomplete
Dexter Pond							
Leaburg	Frequent						Often appear related to influent
Herman Cr	Rare						
Oak Springs	Rare	Rare					
Wizard Falls							
Klamath							Flow from upper to lower pond is the same for the past 5 years
Fall River				Rare	Frequent		Failed to report for year 2000
Oxbow							
McKenzie	Frequent						
Marion Forks						Frequent	Appears only 1 sample taken per quarter
Stayton Pond							Not being used
Pelton Ladder				Rare			
Round Butte				Rare			
	Rare = 1- 5 Occasional = 6-10 Over the 5 years record Frequent = > 10						

Appendix D: Brief Synopses of recent Ninth Circuit cases (and district court cases in this circuit) dealing with fish hatcheries

1) **The Wilderness Society v. United States Fish & Wildlife Service**, 316 F.3d 913 (9th Cir. 2003).

The court ruled that USFWS's decision to allow a commercial salmon enhancement project to operate in an Alaskan wilderness area warranted Chevron deference. However, Judge Betty Fletcher's lengthy and well-reasoned dissent recognizes the ecological and behavioral risks associated with hatchery salmon.

2) **Friends of the Cowlitz v. FERC**, 2001 U.S. App. Lexis 28368 (9th Cir. 2001)

In this case, the court addressed hydropower licensing deficiencies and prosecutorial discretion executed by FERC regarding its non-enforcement of alleged violations. The primary reference to fish hatcheries in this case involved their use as mitigating factors in compensating for the death of fish resulting from dam construction.

3) **Pacific Northwest Generating Cooperative v. Brown**, 38 F.3d 1058 (9th Cir. 1994)

This case dealt primarily with the ESA, standing, and mootness issues. However, hatcheries are referenced in dicta. The court refers to the "4-H's" – hydropower, harvesting, habitat, and hatcheries – [that] all play a part in the healthy continuation of the listed species. The court states it is "plausibly argued that the hatcheries where salmon are artificially propagated are in need of regulation, because hatchery fish compete for food with wild fish; hatchery fish can interbreed with wild fish and dilute the stock; hatchery fish may have lost some desirable genetic properties and may be more subject to disease, all with the final result that hatcheries, instead of preserving a species, can be a source of danger to it." Importantly, the court recognizes that "resolution of [the preceding] question is largely a scientific one." Nonetheless, it found the issue moot.

4) **Alsea Valley Alliance v. Evans**, 143 F. Supp. 2d 1214 (D.Or. 2001), 161 F. Supp. 2d 1154 (D.Or. 2001)

These cases focused primarily on the designation of a distinct population segment (DPS) under the Endangered Species Act (ESA). Judge Hogan determined that the differences failed to establish segregation of the two groups as a DPS under the ESA and NMFS "Hatchery Policy." See *58 Fed. Reg.17,575*. In reference to the issue regarding hatcheries, he stated, "Here, hatchery spawned coho are likely not "substantially reproductively isolated" from naturally spawned coho because, once released from the hatchery, it is undisputed that "hatchery spawned" coho and "naturally spawned" coho within the Oregon Coast ESU share the same rivers, habitat and seasonal runs." In his rulings on these cases, Judge Hogan minimized the differences between hatchery and wild salmon.

5) **National Wildlife Fed'n v. Cosgriffe**, 21 F.Supp.2d 1211 (D.Or. 1998).

While this case focused specifically on the alleged failure of the BLM to produce a river plan under WSRA and an EIS under NEPA, the case contains a reference to fish hatcheries in the "Undisputed Facts" section. In dicta, Judge Stewart states when referring to the John Day River, "It is one of the most important river systems in the Columbia River Basin for wild salmon…The genetic integrity of these wild salmon runs is enhanced because there are no fish hatcheries…"