
# THE OSPREY

*A Newsletter Published by the Steelhead Committee*
*Federation of Fly Fishers*

FEDERATION OF FLY FISHERS
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*Dedicated to the Preservation of Wild Steelhead • Issue No. 46 • SEPTEMBER 2003*


# When Hatchery Steelhead Spawn in the Wild
## A Case Study from Forks Creek, Washington

by Jennifer McLean

*— University of British Columbia —*

*This issue's cover story, by Jennifer McLean, outlines her research project looking at the spawning success of hatchery and wild steelhead on an Olympic Peninsula stream. This project was part of her work towards her Doctorate, which she recently received from the University of Washington.*

*Says McLean, now with the University of British Columbia, "The project started when the Forks Creek Hatchery decided to add steelhead to the coho and chinook it already propagated. It was a great opportunity to examine what happens to the wild and hatchery population when a propagation program is started."*

*We're sure you will find it quite interesting.*

### The Wild Salmonid Problem

Wild steelhead and salmon have been decreasing in numbers throughout the Pacific Northwest. Some populations have been severely reduced in size, while others have been lost completely. Many remaining populations have been listed under the Endangered Species Act. Clearly, there is a significant problem with wild salmon. No single factor is responsible for these declines. A combination of issues such as overharvest, habitat degradation, and in some cases, hatchery propagation of salmonids has contributed. For the past four years I have worked on an ongoing project through the University of Washington examining the reproductive success of hatchery and wild steelhead. This article discusses some of the results of my dissertation.

*Interactions between hatchery and wild fish are a pressing issue because hatchery fish make up such a large part of the population in some areas.*

### The Hatchery Problem

Hatcheries are often employed as mitigation for human disturbances to either wild populations or habitat and are designed to augment wild populations. Despite this, they have been implicated in the decline of wild salmon populations. Hatchery releases can affect wild populations through both ecological and genetic interactions.

Ecological interactions can include density-dependent processes, predation and competition. Direct competition between hatchery and wild salmon and trout occurs throughout their life history, in both freshwater and in the ocean. Fish compete for food or territory when rearing in freshwater and at redd sites on the spawning grounds. Resources may be

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**FROM THE PERCH — EDITOR'S MESSAGE**

# Looking to the Past for a Better Future

by Jim Yuskavitch

Editors often produce issues of their publications tied together by a theme designed to highlight an important issue, current event or to reflect the publication's history or purpose. Occasionally, a theme springs forth spontaneously and serendipitously as a publication is crafted, with stories complementing each other in a way not always apparent until you are nearly done. Such its the case with this issue of *The Osprey*.

As it says on our cover, *The Osprey* is "Dedicated to the Preservation of Wild Steelhead." To do that, we focus not only on the science and politics of wild steelhead and salmon conservation, but those intangible reasons why preserving these magnificent wild creatures is so important. Science and politics give us the knowledge, tools and techniques to save wild fish; to assess the state of wild populations in different river systems; and to tell where to focus our efforts. But the past gives us the reason why we should do these things.

In this issue, we examine all four realms that make up the the universe of wild steelhead and salmon conservation and why we must preserve them.

Our cover story, by Jennifer McLean details her recent research delving into interactions between wild and hatchery steelhead in an Olympic Peninsula stream, with a particular focus on the impacts of spawning activity among wild and domestic fish. It is this kind of new, groundbreaking research that gives us the scientific knowledge to eventually secure the future of wild fish. Along a similar vein, Steelhead Committee chairman Bill Redman describes some of the recent political and legal developments involving protections for Columbia River wild salmon and steelhead.

The connection between past and present is to be found in the remaining three articles. The first, by well-known angling writer Steve Raymond, describes his long acquaintance with Pacific Northwest pioneer steelhead angler, photographer and author Ralph Wahl and the gifts of knowledge and friendship Wahl bestowed on him through their mutual love of steelhead angling.

Next comes an assessment of the wild winter steelhead of Washington's Skagit River by Bill McMillan, another familiar name to steelhead anglers and wild fish advocates. McMillan describes the recent crash of wild winter steelhead on the Skagit, what's gone wrong and what might be done to fix it.

Finally, there is a message from the past telling us why the fight for wild fish is worthwhile, through the words of the late Ralph Wahl in a reprint of an essay he wrote for *The Osprey* in 1994 describing his most memorable wild steelhead angling experience back in the "good old days" of abundance. What river did he have that experience on, of all the rivers he fished in his lifetime? The Skagit.

His words, and the words of all authors in this issue, writing both of the past and the present, remind us again why wild fish are worth the fight — a fight that we can win.

## Our Apologies!

The Editorial Board has learned that several financial contributors to *The Osprey* were not acknowledged in our January 2003 Honors List. We are very sorry about this because, frankly, we can't afford to appear ungrateful. In trying to learn why this might have happened we have concluded that some contributor's checks may not have been flagged for *The Osprey*, and thus made their way into FFF's general fund. As the Steelhead Committee no longer handles all these checks it is important that they are properly noted on the Memo line so that the FFF's central office can properly credit them. Thanks for your understanding. The Editors


# THE OSPREY

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The Osprey
P.O. Box 1228
Sisters, OR 97759-1228
jyusk@bendcable.com
(541) 549-8914

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*The Federation of Fly Fishers is a unique non-profit organization concerned with sport fishing and fisheries*

The Federation of Fly Fishers (FFF) supports conservation of all fish in all waters. FFF has a long standing commitment to solving fisheries problems at the grass roots. By charter and inclination, FFF is organized from the bottom up; each of its 360+ clubs, all over North America and the world, is a unique and self-directed group. The grass roots focus reflects the reality that most fisheries solutions must come at that local level.

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**CHAIR'S CORNER**

# Columbia River Bi-Op Lawsuit Update

by Bill Redman

*— Steelhead Committee —*

In his Editor's Message for the May 2003 issue of *The Osprey*, Jim Yuskavitch noted the May 7, 2003 decision by U. S. District Court Judge James A. Redden that the NOAA Fisheries Federal Columbia River Power System Biological Opinion (BiOp) for recovery of Endangered Species Act (ESA) listed steelhead and salmon violates the ESA. Considering the critical nature of this legal action and decision, it seems appropriate to address a few questions. Why did he rule in favor of the 16 plaintiff organizations, one of which is the Federation of Fly Fishers? What has happened since the decision? And what is likely to happen in the next year or so?

In his May $7^{th}$ decision Judge Redden remanded the BiOp (sent it back to NOAA Fisheries for rewrite) because of two specific deficiencies: "NOAA's reliance on federal range-wide, off-site mitigation actions that have not undergone section 7 consultation, and non-federal range-wide, off-site mitigation actions which are not reasonably certain to occur." As he made clear later, this decision did not rule on the validity of the science in the BiOp to bring about recovery of the eight groups of stocks – out of 12 ESA listed groups in the Columbia system — threatened by operation of the hydro system.

In a May $16^{th}$ meeting, it was agreed that NOAA Fisheries would have one year to rework the BiOp. However, the two sides disagreed on what should be done with the BiOp during remand. NOAA wanted it to remain in effect "to provide ESA coverage for operations." The plaintiffs argued that the Court should "vacate, set aside, and enjoin the 2000 BiOp, RPA (Reasonable and Prudent Alternative), and incidental take statement until NOAA complies with the law." Arguments by attorneys for the two sides followed in June.

On June $2^{nd}$, Judge Redden formally remanded the BiOp, which started the clock on both the one year rewrite and the 60 day period during which the government could appeal the decision. He also laid out a requirement for NOAA to provide quarterly progress reports during remand.

On June $5^{th}$ the governors of Idaho, Montana, Oregon and Washington weighed in to support the government's position that the BiOp should remain in place during remand. At the press conference announcing the governors' agreement, Idaho Governor Dirk Kempthorne said: "… we do not want to see federal biological opinion vacated for the one-year period while NOAA addresses the technicalities in regard to the Endangered Species Act …". Reference to the BiOp's shortcomings as "technicalities" was one of several efforts during the late spring to spin the Judge's decision as requiring only minor changes. The plaintiffs argue that the BiOp is fundamentally and substantively flawed. Underneath these discussions are deep divisions on whether breaching of the four lower Snake River dams should stay on the table as an option.

*Fish advocates can be heartened by Judge Redden's expectations.*

On June $25^{th}$, Judge Redden ruled that the BiOp would stay in place during remand. He followed that by releasing two orders during the first week of July, explaining his decision to keep the BiOp in place during remand, and laying out his expectations and deadlines during remand. On the former, he said that, although his May 7th ruling exposed "serious flaws" in the BiOp, "Plaintiffs do not make a convincing argument, however, that an injunction at this stage, while the 2000 BiOp is on remand, will substantially increase the jeopardy to the affected salmon." While this could be viewed as a minor defeat for the fish, the fact remains that the one-year remand is now under way.

Fish advocates can be heartened by his expectations. The quarterly reports will be due on October 1, 2003 and January 1 and April 1, 2004. The October 1 report: "shall contain a comprehensive and cumulative assessment of the government's progress … ." He added that the 2000 BiOp itself requires a three year "check-in" at the end of fiscal year 2003 (October 1, 2003), and if implementation is lagging, NOAA Fisheries must give itself a failing grade. He expects NOAA to submit this three year report to him, along with the quarterly status report. He went on to state: "The consequences of insufficient implementation include hydropower mitigation actions, up to and including the breaching of Snake River dams. … The October report shall include the government's consideration of hydropower mitigation action options should the habitat and hatchery options falter."

At the end of the remand period in June 2004, Judge Redden wants to know: "what progress has or has not been made to bring the 2000 Biological Opinion and its RPA into compliance with the requirements of the Endangered Species Act … ." Finally, he wrote: "The parties should keep in mind that, because the remand to the defendant agency was on the basis of threshold preliminary issues, the court has yet to address or make findings as to the science underlying the defendant agency's conclu-

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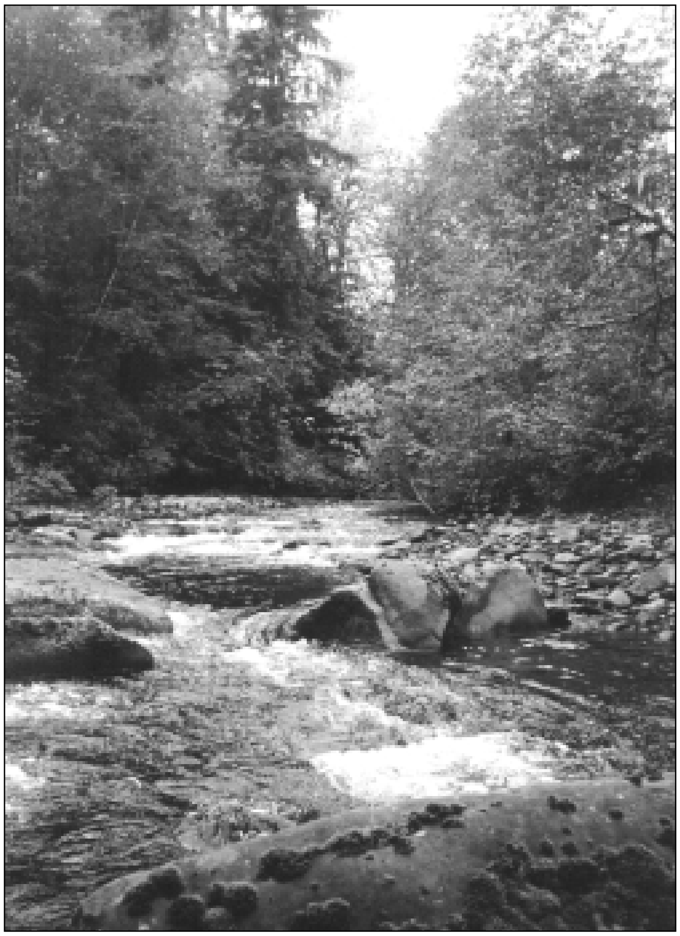
## Spawning in the Wild, Continued from page 1

limited in the ocean as well.

Genetic interactions between hatchery and wild fish are often more difficult to measure, especially after many generations of hatchery releases. Interbreeding between hatchery and wild groups can result in negative genetic effects such as outbreeding depression, loss of inter-population diversity, or even altered selection regimes or reduced effective population size due to competition or predation imposed by the hatchery population. The least productive populations in mixed-population fisheries can be overexploited and often the wild fish are at risk, so mixed-population fisheries that include unmarked hatchery and wild fish can cause wild population declines.

Most interactions between hatchery and wild fish are assumed to be detrimental to the wild populations. However, limited research has been done to test these hypotheses. Investigations of hatchery-wild interactions are constrained because the history of hatchery operations often predates the questions under investigation. Also, it is difficult to evaluate the effects of a hatchery independently of the effects of other human influences.

Interbreeding between wild and hatchery fish is a concern because the hatchery population may develop significant differences from the wild population. Offspring produced from a cross between a hatchery and a wild individual may suffer from reduced ability to survive and produce offspring (outbreeding depression), and decrease the productivity of the naturally-spawning (mixed wild and hatchery) population. This is because hatchery and wild fish are exposed to very different environments during both rearing and spawning, and thus are subject to very different selective pressures. These differences in selection can alter physical, behavioral and genetic traits of the hatchery population, and some of these altered traits may affect the fitness of hatchery fish if they are to spawn in the wild. Juveniles in hatcheries experience very different rearing conditions than do fish in streams (e.g., feeding regimes, density of juveniles, substrate type, exposure to predators, interaction with other fish species), and this 'domestication selection' produces differences in behavioral traits such as predator avoidance and feeding behavior. Adults experience altered selective regimes when spawned in the hatchery, where mate choice and spawning behavior are not determined by the fish, but by the hatchery staff. Selection in the hatchery may by purposeful (e.g., shifting the timing of reproduction over generations by preferentially spawning early returning fish) or inadvertent, through selection of adults that would otherwise be culled by natural or sexual selection in the river.



*Ellis Creek, a wild steelhead-bearing tributary of Forks Creek, lies within Mclean's study area. Photo courtesy Jennifer McLean.*

Interactions between hatchery and wild fish and their relative fitnesses in the wild are a pressing issue for salmonid conservation, because hatchery salmon and trout make up such a large fraction of the total abundance in many areas. It has been estimated that approximately half of the adult steelhead trout in North America are of hatchery origin. In an effort to understand one potential component of the overall salmonid problem, my dissertation examined what happens when hatchery steelhead are released to spawn in the same place and at the same time as wild steelhead. Do hatchery-origin steelhead produce as many smolt or adult offspring as wild steelhead when spawning in the wild? Are there differences between the two groups in marine survival? Do the two groups interbreed?

### The Research Plan

A unique opportunity in which to examine these questions presented itself at a salmon hatchery in southwest Washington State. Forks Creek Hatchery has operated as a salmon hatchery since 1895. In 1994 steelhead trout were added to chinook and coho as propagated species. Prior to 1994, Forks Creek supported a small wild run of winter steelhead that spawned from approximately March through May. In 1994, Forks Creek Hatchery obtained 25,000 smolts from the Bogachiel Hatchery, whose population was derived from a combination of native Bogachiel River steelhead and the Chambers Creek stock. The Chambers Creek stock is a generalized hatchery stock artificially selected for early spawning (November to February), and found in many steelhead hatcheries throughout

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Washington. These released smolts and all subsequent hatchery smolts were marked by the removal of their adipose fins.

The first hatchery adults returned to Forks Creek in the winter of 1995-1996. At Forks Creek Hatchery, returning salmon and steelhead are prevented from migrating upstream of the hatchery by a weir across the creek. The weir allows hatchery staff access to returning fish, so that adult steelhead with an intact adipose fin (i.e., naturally produced) can be released upstream and those missing an adipose fin can be taken for spawning in the hatchery. In the first two years when hatchery adults returned (1995-1996 and 1996-1997), after the hatchery's capacity for steelhead eggs was met, excess hatchery fish were released upstream of the hatchery. This practice was discontinued in 1997-1998, and hatchery fish are no longer allowed upstream. Consequently, the wild population was exposed to a discrete, two-year 'pulse' of hatchery influence.

This limited contact of a known duration between the two groups is what makes Forks Creek such an ideal site at which to answer these questions. Hatchery adults were released upstream of the hatchery in only two spawning seasons, and sampling began before any interbreeding between the two groups could occur in the wild. Samples were taken at the weir at the hatchery, and included all potential parents and offspring; potential parents were the hatchery and wild adults headed upstream in 1995-1996 and 1996-1997, and their offspring were all naturally-produced (i.e., individuals with intact adipose fins but of hatchery and wild parentage) smolts and adults that passed the weir in subsequent years. Smolts were sampled on their way downstream in the spring, and adults were sampled on their way upstream in the winter.

To investigate hatchery-wild interactions and compare the productivity of the two groups, it was necessary to determine who the parents were, who their offspring were, and how many offspring were produced by each parent. This was done by collecting a small tissue sample from each fish along with other data such as age, sex, length, weight and the date the weir was passed. Recently developed genetic techniques were used to 'DNA fingerprint' each fish. By comparing the genetic information obtained from each individual, parent-offspring matches were determined.

## Smolt and Adult Production

Although significantly outnumbered on the spawning grounds (7-9 times more hatchery females than wild females were present), wild females out-produced hatchery females substantially in both of the years examined. When spawning in the wild, hatchery females produced an average of one smolt each and wild females produced an average of 22 smolts each. Smolt production by steelhead varies among populations and among years within a population, and the production by wild fish in Forks Creek was low but within the range observed in other streams. Hatchery fish performed extremely poorly, and although females produced only a few smolt offspring each, the overall production of hatchery smolts was enhanced because there were so many hatchery females.

*Although significantly outnumbered on the spawning grounds, wild female steelhead easily outproduced hatchery females.*

Hatchery-origin steelhead spawning in the wild were also outperformed by native wild steelhead in terms of adult production. Wild females produced nine times (in 1995-1996) and 42 times (in 1996-1997) more adult offspring per capita than did hatchery females spawning in the wild. The wild steelhead population more than met replacement requirements (replacement would be two returning adults per female spawner), but hatchery steelhead spawning in the wild did not approach replacement (overall, they produced less than 0.5 adults per female spawner). A number of similar investigations have also found inferior performance of artificially propagated (hatchery or farmed) salmon and trout spawning in the wild compared to wild fish (Atlantic salmon, steelhead trout, brown trout).

## Marine Survival

While the results for smolt and adult production were consistent over the two years examined (wild fish outperformed hatchery fish in both years), markedly different marine survival (smolt-adult survival) results were obtained from the two different years. Marine survival for the two groups in 1995-1996 was 38 percent for the hatchery fish and 15 percent for the wild fish. In 1996-1997 the opposite pattern occurred: marine survival was 12 percent for the hatchery fish and 38 percent for the wild fish. Taken together, there was no clear difference between wild and hatchery fish. If hatchery fish are inferior in the wild, how can this be?

Wild fish should have an advantage over hatchery fish in freshwater because these two groups experience radically different environments during all freshwater life history stages (spawning, incubation of embryos, growth of juveniles). However, both groups experience similar ocean environments and regimes of natural selection, so their survival rates at sea should be similar. In salmon and trout, the marine survival of an individual may be influenced by its size as an emigrating smolt, its timing of entry into the ocean, or a combination of these factors. In Forks Creek, however, the wild and hatchery smolts were similar in both timing and size at emigration, so differences in marine survival could not be explained by these characteristics. With only two years of data, it is not clear which, if either, year best represents the marine survival rates of the two populations. With further data, a more definite answer to this question is anticipated.

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### Interbreeding Between Hatchery and Wild Steelhead

When differential fitness between hatchery and wild groups favors wild fish, as in Forks Creek, there is a danger to the wild population when hatchery males mate with wild females. The number of eggs available for fertilization is a limiting factor in the propagation of a population, and in crosses involving wild females, the wild eggs are 'lost' to the wild population, especially when hybrids have intermediate or lower fitness than the wild fish. For small populations such as Forks Creek, a reduction in the potential number of offspring produced could be extremely detrimental. More than 25 percent of the matings for which both parents were known occurred between hatchery and wild individuals. Almost half of these matings occurred between wild females and hatchery males, and in populations where there may only be 10 or 15 wild females such as Forks Creek, the proportion of total eggs available to propagate the wild population can be substantially reduced by hybridization.

However, there are two factors working in favor of the wild Forks Creek population. Hatchery steelhead spawn earlier in the season than do wild steelhead, which appears to decrease their fitness. Although many more hatchery steelhead than wild steelhead spawned in Forks Creek in 1995-1996 ad 1996-1997, more adult offspring of these two brood years were of wild origin than hatchery origin. Selection against hatchery steelhead spawning during a time of unfavorable conditions may remove these fish from the population over the next few generations. Also, hatchery steelhead were released for two years only, and the lack of further hatchery releases may provide the wild population with the opportunity to resist introgression.

### Hatchery Steelhead Spawned in the Hatchery

After examining the outcomes of hatchery and wild steelhead spawning in the wild, a natural addition to the project was to examine reproductive success and survival over different life history stages within the hatchery. Salmon and steelhead mating systems and reproductive success are shaped by natural and sexual selection in the wild, but in the hatchery, different factors are responsible for reproductive success as selection is no longer imposed by natural habitats and the preferences of the opposite sex. As a result of these differences, patterns of survival in the wild and in the hatchery were expected to be dissimilar.

*Jennifer Mclean (left) and Todd Seamons record data after electrofishing for juvenile steelhead in Forks Creek. Photo courtesy Jennifer McLean.*

*Three size classes of wild steelhead in Forks Creek — young of the year, one-year-old and two-year-old. Photo courtesy Jennifer McLean.*

Both egg to smolt survival and smolt to adult (marine) survival were very different in the hatchery than in the wild. For the fish spawning in the wild, egg to smolt survival was approximately 0.03 percent (hatchery parents) to 0.5 percent (wild parents), and marine survival ranged from 15 percent to nearly 40 percent (hatchery and wild). In the hatchery where the juvenile rearing environment is highly controlled, steelhead produced offspring with 100 to 1,000 times the egg to smolt survival (64 – 95 percent over the three years examined) of fish produced in the wild. When hatchery smolts were released into the wild, however, their marine survival was approximately 100 times lower than the survival of offspring of either hatchery or wild fish spawning naturally.

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Perhaps the most surprising result from the hatchery population was the degree of variation among individuals in terms of producing offspring. An examination of the parent-offspring relationships in the hatchery revealed unequal representation of the individuals spawned in the hatchery in the next generation of adults. Many fish produced no offspring that survived to adulthood, while others produced many. When the numbers over the complete life history of these fish are considered, hatchery adults spawned in the hatchery produced as many or more offspring as did wild fish spawning in the river, and hatchery fish spawning in the river had much lower reproductive success than either hatchery fish in the hatchery or wild fish in the river.

### Conclusions

Hatchery fish in the hatchery produce, on average, a similar number of adults to the numbers produced by wild fish spawning in the wild. When hatchery fish are released to spawn in the wild, however, they have limited success and through interbreeding may endanger the persistence of wild populations. What's the solution to the hatchery problem? In order to establish a solution, the problem must be defined. Hatcheries often have two conflicting goals: one is to produce fish for commercial or sport fisheries, and the other is to increase the number of spawners in the wild for conservation or restoration purposes. These goals cannot be met simultaneously in the same hatchery with the same strategies. Individual hatcheries must define their purpose and design appropriate protocols.

Production hatcheries aim to increase the number of fish available to commercial or sport fisheries. Although hatchery fish are successful at producing offspring when they are spawned and their progeny are reared in the hatchery, there are many examples of the negative outcomes that occur when hatchery fish spawn sympatrically with wild fish. A solution to this problem is to keep wild and hatchery fish separate, allowing only wild fish into spawning grounds and taking all hatchery fish into the hatchery for spawning. This practice may not currently be practical in many large scale hatchery operations, as each hatchery smolt must be visibly marked before release (e.g., by removal of the adipose fin) and sorted when they return.

As a small-scale model of this strategy, Forks Creek meets its goal of increasing steelhead availability for fishing without impacting the wild steelhead population. Forks Creek Hatchery does not currently allow hatchery steelhead access to the spawning grounds. All hatchery steelhead smolts have their adipose fins removed before release, and on return, all adult steelhead are identified at a fish trap near the mouth of the creek. These fish are sorted and wild fish are released upstream of the trap, and hatchery fish are taken into the hatchery for propagation of the hatchery population. This way, a greater number of fish are available for the downstream sport fishery, but the wild population is protected from the ecological or genetic interactions with hatchery fish. This practice may function better in Forks Creek, where the trap is below the spawning areas, than in other rivers, where hatchery fish might spawn below the hatchery with wild fish.

*The proportion of eggs available to propagate the wild population can be greatly reduced by hybridization.*

If the goal of a hatchery is to increase numbers of naturally spawning fish, the approach to propagation would have to be very different. Conservation hatcheries must minimize differences between hatchery and wild spawning and rearing environments so that the physical, behavioral and genetic differences that often arise between hatchery and wild populations are reduced. Issues such as artificial and domestication selection, mate choice, inbreeding and outbreeding depression, and effective population size should be considered carefully when designing propagation strategies.

*Jennifer McLean (right) and a field assistant electrofish for juvenile steelhead in Forks Creek. Photo courtesy Jennifer McLean.*

# Ralph Wahl Remembered

by Steve Raymond

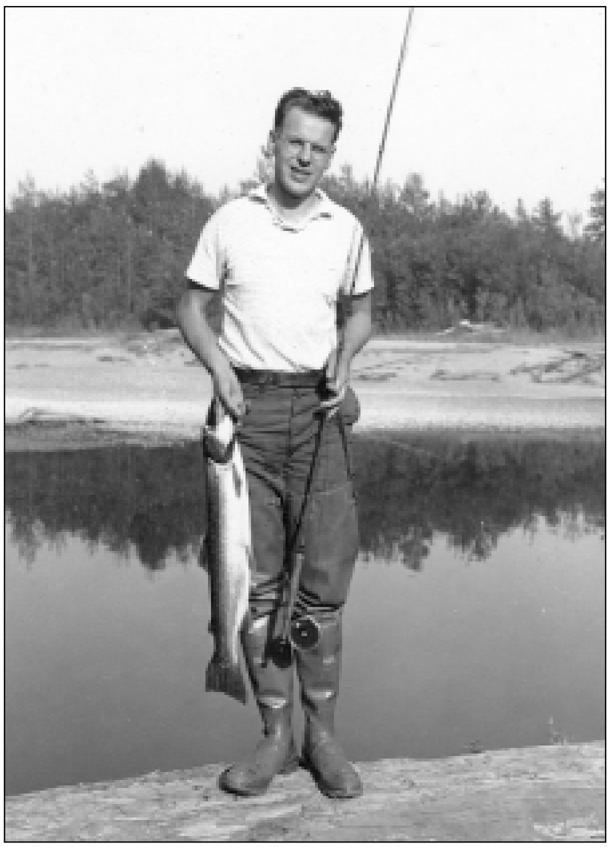
*— Whidbey Island, Washington —*

*Fly fisherman and photographer, Ralph Wahl was a legend among Pacific Northwest anglers. Born in 1906, his family owned the Grand Theatre and J.B. Wahl department store in Bellingham, Washington. He took over management of those family enterprises in 1937.*

*But his business duties didn't interfere with his passion for fly fishing for steelhead and photography. His collection of photographs documented the Northwest steelhead fly fishing experience in the early and mid-1900s. His photographs were widely published. Wahl's "One Man's Steelhead Shangri-La", published in 1989, is well known to today's steelheaders.*

*In this essay, Steve Raymond pays tribute to his friend Ralph Wahl, who died at the age of 90 in 1996.*

*Bellingham native Steve Raymond has fished the Northwest all his life. He is author of "The Year of the Angler," "The Year of the Trout," "Steelhead Country," "Rivers of the Heart" and other fly-fishing books. His newest title, "Blue Upright," will be published next spring by The Lyons Press. A past editor of* The Flyfisher *and* Fly Fishing in Salt Waters *magazines, Raymond also is a recipient of the Roderick Haig-Brown Award for significant contributions to angling literature. He retired after a 30-year career as an editor and manager at the Seattle Times and now lives on Whidbey Island, Washington.*



*Ralph Wahl poses with his catch along an unknown river in this undated photograph. Photo courtesy of The Ralph E. Wahl Photograph Collection, Center for Pacific Northwest Studies, Western Washington State University, Bellingham, WA 98225-9123*

Time passes so quickly that it's hard now for me to realize I may be the last of all the anglers who fished often with Ralph Wahl. From Ralph and Enos Bradner I learned more about steelhead fly fishing than all other sources combined. Ralph guided me to my first steelhead and many others that followed, and I always considered it a privilege to fish in his company.

I knew him all my life. He was in the same high-school graduating class as my parents, and many years later one of Ralph's sons was in mine. As a boy I remember going into Wahl's Department Store in Bellingham and seeing him there. I also remember sitting through a lot of lurid Westerns at Bellingham's old Grand Theater while Ralph ran the projector (his family owned the store and theater).

Perhaps it was because of these early connections that Ralph took me under his wing when I began fishing for steelhead. He soon guided me to my first steelhead on a fly, although--in keeping with Ralph's legendary closed-mouth tradition--I'm not going to tell you where I caught it.

We fished together often after that. We always went in Ralph's Alaskan camper and he would drive while I rode shotgun. He was a quiet man and I tend to be that way myself, so we never said very much on these trips. Instead we listened to some of the remarkable tape recordings Ralph had made--the awesome chorus of an endless flight of sandhill cranes passing over Peterhope Lake, or conversations with fly-fishing giants such as Tommy Brayshaw and Roderick Haig-Brown, or seminars at some of the early conclaves of the Federation of Fly Fishers. Some of the latter were intensely interesting--some, but not all, and more than once I dozed off to the monotonous drone of voices from the past.

When we got where we were going and set up camp I would always get a little nervous because Ralph was a very fastidious man; everything in his camper had a specific place and there was a specific place for everything, and if you didn't know where something belonged and put it in the wrong spot you were sure to incur his displeasure. He would rarely say anything about it, but his body language was very clear and left you in no doubt that you had screwed up. I was always relieved when breakfast was over and the dishes had been washed and put away--each in its own very particular place--and we could go fishing.

Ralph was the most accurate fly caster I have ever seen. Even at a great distance or in a nasty wind, he could place his fly exactly where he wanted it nearly every time. It was an ability I envied, although I remember one occasion when something distracted him and he didn't notice that his fly had landed on a log. As he started gathering line the hook caught momentarily in the log's bark, then popped free and fell in the water.

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Ralph felt the momentary resistance and exclaimed: "There! I had a strike!" I smiled and said nothing; it was simply proof that even Ralph was human.

He coached me carefully and passed along many tips and suggestions, not as a teacher lecturing to a student but simply in a matter-of-fact, straightforward manner that was easy to accept and remember. Those lessons remain vivid and I continue to follow his advice religiously. It has paid dividends many times, with only one exception: I remember Ralph emphasizing the importance of getting your fly under a log jam whenever possible, because steelhead will often hold under the shelter of the logs. I've done that faithfully at every log jam I've ever encountered, but have yet to hook a single fish that way. However, I expect to keep doing it and have no doubt the day will come when that piece of advice also will bear fruit.

Ralph was noted for a couple of fly patterns, the Wahlflower and the Lady Godiva, although he used to say the latter wasn't really a pattern because he never tied it the same way twice. I never saw him use either pattern very often; he had others, not so well known, that he used more frequently. Some had been developed for use in specific situations or places, and they worked with a high degree of success. One in particular worked so well that I tied copies for my own use, and it still works well today--although, again in keeping with Ralph's reticent tradition, I'm not going to tell you what it is.

What about that reputation for reticence? Ralph had a wide circle of angling friends but he shared his secrets with very few of them. Some people resented his reluctance to reveal favorite spots or the dressings of some of his best flies. Perhaps they failed to realize the effort it took him to find those places or develop those patterns--a great investment of time, toil, sweat, and maybe sometimes even tears. When you have paid such a price it teaches you the value of things, and I understood Ralph's reluctance to share his secrets with others who had not paid the price. He was generous with me because I knew what these things had cost him, and because he knew I would value them as much as he did--and keep my mouth shut.

Even though Ralph is now gone and many of his favorite spots are gone, too victims of the ravages of time, nature and "progress"--I still guard the few I know are left, not just out of respect for Ralph but also with regard for their fragility in a world that seems bent on squeezing the best out of everything. But these places don't belong to me, so I have shared them with a few other anglers whose discretion I trust. It will be up to them to guard Ralph's secrets when I am gone.

*He was generous with me because I knew what his secrets cost him, that I would value them — and keep my mouth shut.*

Like most men, Ralph sought a means of expression and found it in photography, a hobby he combined with fishing. He started working in color but discovered he could capture more feeling in black and white. He had a true artist's eye for composition, a way of seeing to the heart of every scene, and his remarkable darkroom skills brought each image to sensitive fruition. The result is a wonderful photographic legacy of a Northwest most of us are too young to have known--vistas of great, gray unfettered rivers flowing under great, gray unblemished skies; clear, swift torrents bordered by ancient stands of timber towering into mist; snow-speckled winter riverscapes, and images of bright fish fresh from the sea. His photos were published in Time and Life and numerous outdoor publications, and during my years as editor of the FFF magazine, *The Flyfisher*, I published many of them in the magazine and on its cover.

Ralph's first book, "Come Wade the River," published in 1971, included many of his best images matched to excerpts from Roderick Haig-Brown's classic "A River Never Sleeps." A second book, "One Man's Steelhead Shangri-La," was published in 1989. It is an account of one of Ralph's secret spots, a slough at the mouth of Day Creek on the Skagit River, and the wonderful steelhead fishing he experienced there. He felt safe writing about it because by that time the place had been destroyed by floods.

The wear and tear of old age forced Ralph into a wheelchair for the last several years of his life, but he bore these circumstances with little complaint. He spent his last days surrounded by his fishing books, tape recordings, photographs, memories, and friends. He always kept a box of flies near his wheelchair--the last flies he tied--and pressed several of them into the hands of nearly every visitor. The last time I saw the box, just before Ralph died, it was nearly empty.

I visited him often during those last days because we were working together on a fly-fishing exhibit at the Whatcom Museum of History and Art in Bellingham. Many of Ralph's photos had been selected for display and he was enthusiastic and excited at the prospect. He was looking forward to the exhibit's opening and it seemed to give him a reason to keep going--that, plus his oft-stated wish to outlive his old friend Bradner, who had passed away at age 92.

But it was not to be. Ralph passed away June 4, 1996, at age 90, just a short time before the exhibit was due to open. The museum dedicated the exhibit to his memory.

When Come Wade the River was published, Ralph told me: "This book is my monument." In truth, it is only one monument among many. Ralph not only left us his wonderful photos, but also his fine words on paper, his wisdom on recording tape, and his own legendary place in the steelhead fly-fishing traditions of the Pacific Northwest.

For me, he also left the enduring memory of a warm and trusted friend.

# Skagit River Winter Steelhead Their Past, Present and Future

by Bill McMillan
— *Sedro Woolley, Washington* —

*A well-known figure in Pacific Northwest fish circles, Bill McMillan has been writing about steelhead fly fishing and fish conservation for the past 30 years. A part-time field biologist for Washington Trout, he documented the "Thanksgiving Day Massacre" in 2000 when Puget Sound Energy dewatered hundreds of chum salmon redds in the Skagit River. "During the past four years I was part of the Washington Trout team that collected the data demonstrating very high prespawning mortality of coho salmon related to storm runoff and lethal water quality in Seattle and Bellevue urban creeks," says McMillan. "We also found surprising high coho prespawning mortality in a number of Snoqualmie Valley tributaries." This fall Washington Trout received an EPA grant to further pursue the extent of the water quality issue and the effects on fish outside Seattle in which they will be working closely with NOAA Fisheries to monitor the range of the problem and the cause(s).*

*For this issue of* The Osprey, *McMillan has combined his writing and research talents to produce the following report on the wild winter steelhead of Washington State's renowned Skagit River.*

The Skagit River was historically one of the most productive winter steelhead rivers on the West Coast. For those of you who have fished it over the past four years, you know that is no longer the case. The Skagit's decline has been a 130 year process for which there are steelhead records for only the past 50 years or so.

### Early Non-Native American Skagit History

Non-Native American colonization of the Skagit began about 1867 when La Conner was first established near the mouth of the river, as explained in "Hamilton 100 Years," written by members of the Hamilton Pioneer Museum. "In the early history of Skagit County the white people and the Indians made a treaty that the white people were to come no farther than a large log jam which extended across the river at Mount Vernon." Under pressure from an expanding white population, the log jam and others like it were eventually removed.

The removal of that river-spanning logjam was perhaps the first major blow to the Skagit River's anadromous fish. Logjams, we now know, provide some of the most vital attributes for fish in forested rivers. So ever since the 1870s, non-native American colonization of the Skagit Valley has been whittling away at salmon and steelhead productivity.

*A late winter snowfall on the Skagit River.*
*Photo by Bill McMillan*

### The Recent Steelhead Crash

The most recent drop in Skagit wild steelhead numbers has occurred over the past four years, beginning in the winter of 1999/2000. The sudden crash caught both fishermen and managers off guard. The general recent coastal trend has been increasing returns, with some rivers experiencing modern historical highs in both salmon and steelhead numbers. Given the continuing wild steelhead crash on the Skagit River in the winter of 2000/2001, Washington Department of Fish and Wildlife (WDFW) made a biologically appropriate response, albeit a year late, by closing the spring catch-and-release steelhead fishery. The response was appropriate because it indicated the gravity of the situation — good general ocean conditions, yet a plummeting steelhead population. WDFW was wisely calling a "timeout" to try and determine an appropriate course.

But what followed has been a perplexing series of decisions which sug-

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gest that Skagit River steelhead are being managed purely for social and political convenience, with little or no basis in biology or history.

### The Skagit Escapement "Shell Game"

In September of 2001, WDFW quietly demonstrated an unusual response to the Skagit River steelhead crash. At the Washington Steelhead Symposium held in Seattle, WDFW's Bob Gibbons projected onto a screen the steelhead escapement goals used to manage steelhead on a number of Washington rivers. Among them was the Skagit at 6,000 steelhead.

It was only through a question from the audience that clarification was provided on how the past Skagit River wild winter steelhead escapement goal of 10,300 steelhead as set in 1984-85 had suddenly come to be reduced to 6,000. The apparent WDFW solution to the wild steelhead crash on the Skagit seemed to be: "A steelhead crash, hey, no problem, just reduce the escapement goal." Bob Gibbons and Bob Leland answered that the altered escapement goal had been a compromise necessitated by WDFW being only one of two steelhead co-managers, along with the Western Washington Treaty Tribes.

However a very different picture emerged in the November 22, 2001 edition of the Skagit Valley Herald newspaper. The lead article on the recreational page was entitled, "Steelhead are Back." In the article, Washington Department of Fish and Wildlife (WDFW) biologist Pete Castle indicated that the wild steelhead return of 2000/2001 was 4,300 fish, and he considered the 5,022 estimated return for 2001/2002 to be "a sizable increase;" thus the headline "Steelhead are Back." The 2000/2001 wild steelhead return to the Skagit created a minor social crisis when the catch-and-release fishery was closed for the spring season. The 1999/2000 steelhead return was even lower, as indicated by Castle's newspaper quotation, "When you only have 4,000 fish or 3,000 fish the last couple of years, then we really got scared. This is a huge system. It can accommodate a lot of spawners and to the best of our knowledge it can produce a lot of wild smolts ....."

### But Just How Bothersome Did It Prove to be?

In the article, WDFW's Chuck Phillips indicated there absolutely would be a catch and release season in 2002 based on Castle's estimates. WDFW's Bob Leland was quoted, "The year before was totally unanticipated. The fish that came back, the numbers fell off the face of the earth. And we didn't expect that." In the article Castle indicated that prior to 2001 there had been no set run size target to base a Skagit season on, but that he and the Skagit System Cooperative of tribes (Swinomish, Upper Skagit and Sauk-Suiattle) had come to a mutual agreement for the best interim goal for the optimum production of wild steelhead.

*WDFW's apparent solution to the wild steelhead crash on the Skagit is to reduce the escapement goal.*

Prior to this, he indicated they had been managing without a wild steelhead spawning escapement goal. He indicated the interim escapement goal they had agreed to was 6,000 steelhead. He further explained that a normal fishery can occur if a run is 80 percent or more of the escapement goal. By those numbers, at the minimum, the run would have to be 4,800 steelhead for a fishing season to occur. Castle indicated 6,000 steelhead escapement gives good numbers to rebuild the Skagit run. Phillips was then quoted, "The escapement goal gives you a good thing. It might be incorrect but it can be changed. It gives you a number of very good things in my mind."

The combination of the quiet disclosure at the Washington Steelhead Symposium, followed by the article in the Skagit Valley Herald, suggests that WDFW and the treaty tribes have shifted steelhead numbers and escapement goals around beneath walnut shells. The apparent reason is to accommodate fisheries for tribal and sports fishermen with as little disruption as possible.

This is not to say that a catch and release steelhead fishery can't be legitimately provided through a brief season on the Skagit River, given the numbers of 3,000-6,000 wild steelhead as estimated the past four years. This is the very purpose of catch-and-release -- to provide some form of angling opportunity on fish species, races, or stocks that are above dire levels of depletion but still well below desired goals. While the intent of maximized survival of steelhead that are caught and released may sometimes be compromised in high water temperature conditions, that is not an issue on the cold Skagit River. Even a brief tribal fishery with carefully monitored harvest remains defensible, provided everyone understands something has gone wrong with the steelhead population, and efforts are being committed toward identifying and solving the problem(s). But reducing the escapement goal, and thereby avoiding the responsibility to invest in development of a real game plan for addressing the Skagit River steelhead crash, is not legitimate fishery management.

### Skagit River Available Habitat

One necessity in the determination of escapement goals is quantifying the available habitat for the species, race, or stock of fish being targeted. The Skagit River is second in size only to the Columbia River in the State of Washington. As indicated on the U.S. Geological Survey (USGS) website, the Skagit River drainage area upstream of the Mount Vernon gauging station is 3,093 sq. miles. The Skagit's average flows since 1941 record keeping have annually ranged from a low in 1944 of 10,930 cfs to a high of 22,500 cfs in 1997. By any measure, the Skagit is one of the largest streams that native steelhead have historically returned to around the North Pacific Rim.

However, 1,175 sq. miles of the Skagit drainage upstream of Newhalem and 297 sq. miles of the Baker River drainage are no longer accessible to steelhead due to dams. Much of this lost habitat area may once have only been

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accessible to steelhead. That leaves 1,621 sq. miles of the Skagit drainage as potentially accessible to steelhead, although in reality some uppermost drainage areas are blocked by waterfalls and/or steep gradients. Perhaps somewhere between 1,200-1,400 sq. miles of the drainage now remain steelhead accessible, which includes several large tributaries such as the Sauk, Suiattle, Whitechuck and Cascade, as well as large creeks such as Day, Finney, Nookemchamps and Bacon. In other words, the Skagit system still has a lot of steelhead and salmon habitat.

### Skagit River Historic Steelhead Numbers

As might be expected from a river with available habitat of such magnitude, the Skagit has a history of producing large numbers of wild steelhead. In the winter of 1953/54, 16,170 steelhead were caught from the Skagit River, as documented by Washington Department of Game (WDG), as it was called at the time. The Sauk River's 1953/54 steelhead catch was not included in the Skagit catch. It would likely have added another 1,000 steelhead to the Skagit catch for 1953/54, based on its catch from the 1964/65 WDG records of 1,416 winter steelhead (the earliest data for the Sauk to which I had access).

The 1953 date of the Skagit catch record is significant because it was prior to 1962, when steelhead hatchery numbers suddenly jumped in Washington. The Skagit River 1953/54 harvest would have been primarily wild steelhead. This is suggested by a tagging program in 1953/54 on the Satsop River, where it was found that seven percent of the winter run of steelhead were of hatchery origin and 93 percent were wild.

Adding the Sauk winter catch and subtracting the seven percent hatchery component of the catch (1,132 hatchery steelhead), would mean that the total wild winter steelhead catch for the Skagit River in 1953/54 would have been about 16,000 fish. The Skagit River drainage area available to steelhead at the time was about the same as it is today. If steelhead were not being significantly overharvested, one might assume that at least an equal number of steelhead escaped to spawn in the spring of 1954 as were caught in the winter of 1953/54. This would suggest a total run size of at least 32,000 steelhead.

Since that time, the wild steelhead of the Skagit system have been in steady decline. And it is possible the 1953/54 catch was already well into decline. There are no catch records earlier than 1947, when the punchcard system was initiated in Washington.

### Distribution of Skagit System Steelhead Sport Harvest and Smolt Releases

Steelhead Harvest and Hatchery Planting Summaries available through the WDFW website provide the steelhead harvest statistics and the numbers of hatchery smolts released between 1995 and 2001 (see Table 1). As can be seen from that data, smolt release numbers increased by about 165,000 from 1998 onward. A future sustained release of 534,000 steelhead smolts is indicated in the Marblemount Winter Steelhead Program Hatchery Genetic Management Plan for the Skagit. This increase in smolt release numbers into the Skagit system was part of the Grandy Creek Hatchery Plan from the mid-1990s. Although the hatchery was never built due to a successful court challenge, the increased numbers of hatchery steelhead smolts planned for that facility have been subsequently released into the Skagit system nevertheless by using the Marblemount Hatchery facility on the Cascade River for increased rearing.

### Hatchery Steelhead Smolt Releases and the Recent Skagit Wild Steelhead Crash

As is evident from the data, the increase in hatchery winter steelhead smolt releases from an average of 324,000 into the Skagit basin annually between 1995-1997 to an average of 490,000 since then (a 51 percent increase) has not resulted in an increase in the sport harvest of hatchery steelhead. Increased harvest (both sport and tribal) was the intent of the increased hatchery steelhead smolt releases. For instance, the 354,100 hatchery winter steelhead smolts released into the Skagit system in the spring of 1995 provided a sport harvest of 1,837 hatchery

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## Table 1. Skagit River System Smolt Releases and Sport Winter Steelhead Catch

| Year | Total |
|---|---|
| **1994** | |
| smolts* | --- |
| **1995/1996** | |
| wild winter | 465 |
| hatchery winter | 1007 |
| **1995** | |
| smolts | 354,100 |
| 1996/97 | |
| wild winter | 1632 |
| hatchery winter | 1837 |
| **1996** | |
| smolts | 289,000 |
| **1997/98** | |
| wild winter | 49 |
| hatchery winter | 347 |
| **1997** | |
| smolts | 328,400 |
| 1998/9 | |
| wild winter | 1030 |
| hatchery winter | 561 |
| **1998** | |
| smolts | 562,700 |
| **1999/00** | |
| wild winter | 361 |
| hatchery winter | 497 |
| **1999**** | |
| smolts | 445,200 |
| **2001** | 463,500 |
| win smolts | |

*No smolt release data available on WDFW Website prior to 1995.
**No harvest data was available on the WDFW website after 1999-2000, and no smolt release data for after 2001.

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winter steelhead in 1996/97. But the release of 562,700 hatchery winter steelhead smolts in the spring of 1998 (a 59 percent smolt increase from 1995) resulted in only 497 hatchery steelhead subsequently harvested by sports fishermen in the winter of 1999/00 (only 27 percent of the sport harvest in 1996/97).

The same Harvest Summaries indicate the tribal steelhead harvest has not benefited from the increased hatchery smolt releases either. During the same comparative five-year period, the tribal harvest high was 1,182 steelhead in the winter 1995/96. In the winter of 1998/99 it was 276 steelhead caught, and in 1999/00 it was 224.

More importantly, not only did the increase in hatchery winter steelhead released into the Skagit system not provide the intended harvest increases, it may well be a contributor to the wild steelhead crash that has occurred since. It may not be coincidental that the release of 562,700 winter steelhead smolts smolts in 1998 (the single largest hatchery smolt outplanting I could find in recent Skagit history) coincided with the sudden crash in wild winter steelhead returning to the Skagit system in 1999/2000, with an estimated escapement of between 3,000 and 4,000. And this has been during a period of time when steelhead populations outside Puget Sound in Washington, Oregon, Idaho and California are generally experiencing increases due to more productive ocean conditions than have previously occurred.

WDFW's own research has indicated the threats that hatchery steelhead releases pose to wild steelhead. McMichael et al. studied the behavioral interactions among hatchery-reared steelhead smolts and wild rainbow and steelhead rearing in the same Yakima River tributary: "Hatchery steelhead displaced wild *O. mykiss* in 79 percent of the contests observed between these groups. Our results indicate that the behavior of hatchery steelhead can pose risks to preexisting wild O. mykiss where the two interact. Strategies to minimize undesirable risks associated with behavior of released hatchery steelhead should be addressed if protection and restoration of wild *O. mykiss* stocks is the management goal."

WDFW's Skagit River strategy of lowering the wild steelhead escapement goal, combined with continued emphasis on increased hatchery steelhead smolt production, is far from the type of strategy suggested by McMichael et al. to address the protection and restoration of wild steelhead.

*Angler Harry Lemire releases a wild winter steelhead on the Skagit (top photo). Misty morning sunrise on the Skagit (above).*
*Photos by Bill McMillan*

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## Developing a Skagit System Wild Steelhead Restoration Strategy

There is presently a Skagit system model already in place that has shown benefits for stemming the decline of chinook, chum, and pink salmon in the Skagit River upstream of Rockport. In 1980 and again in 1990, Seattle City Light (SCL) radically changed the operation of the Upper Skagit dams, with increased commitments of flow to better accommodate salmon spawning and rearing. It is now apparent there has been a shift of ESA-listed wild Skagit chinook production increasingly into that section upstream of Rockport (with a similar pattern for chum and pink salmon). Between 1974 and 1984 the percentage of the overall wild Skagit chinook population that spawned upstream of Rockport was 62 percent; between 1985-1993 it was 73 percent; and between 1994-2001 it was 78 percent. This data came from WDFW.

It is further shown by Connor and Pflug that this sub-stock of chinook is the only one in the watershed that has remained stable in the period of spawning survey records between 1974 and 2001. These data indicate that the percentage of change in mean escapement between the 1974-1984 time period and the 1985-2001 time period was plus three percent for the Upper Skagit, while it was minus 41 percent for the Lower Skagit and minus 52 percent for the Lower Sauk River, the major wild chinook spawning tributary to the Skagit. Also of interest, the overall average wild Skagit chinook escapement has remained about the same between 1974 and 2001. Between 1974 and 1984 it was 12,112; between 1985 and 1993 it was 10,279; and between 1994 and 2001 it was 11,526. This is only thanks to wild chinook productivity increasingly carried by the Upper Skagit.

*There is presently a Skagit River system model in place that has shown the benefits for stemming the decline of salmon.*

Also beginning about 1980, SCL mitigation investments became increasingly focused on habitat acquisitions with related habitat protection, habitat restoration, or habitat re-creation projects as explained by SCL's Dave Pflug. This contrasts with hydroelectric dam mitigation for fish losses more commonly realized in the form of hatchery programs elsewhere. While upper Skagit wild chinook have remained stable — primarily from stream flow stabilization, and with habitat investments a priority over hatchery releases — the rest of the Skagit basin has remained in a wild chinook decline similar to the levels of other Puget Sound area streams, where habitat investments have most often been lower and hatchery emphasis a higher priority.

To date WDFW has made no investments in time, money and energy into Skagit system approaches for steelhead restoration similar to what have been employed by SCL for salmon in the upper Skagit. As long as WDFW continues to reduce the wild steelhead escapement goals, there will never be a need to do so. On paper it will appear that Skagit River steelhead 'are doing just

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## Table 2. Recent Skagit Steelhead Catch Distribution by Month

There has been a great change in wild steelhead numbers in the Skagit River since 1953/54. The WDFW website provides the Steelhead Harvest Summaries from the winter of 1995/96 through the winter of 1999/2000 (five years) broken out for both hatchery and wild steelhead harvested in Washington rivers. The mainstem Skagit River winter steelhead catch for each month and year from 1995-96 through 1999-2000 (not including tributaries) was:

| Year | Origin | Nov. | Dec. | Jan. | Feb. | March | April | Total Catch |
|---|---|---|---|---|---|---|---|---|
| 1995/96 | Wild | 3 | 3 | 105 | 290 | 15 | 0 | Wild 416 |
| | Hatchery | 6 | 192 | 417 | 294 | 53 | 6 | Hatch 968 |
| 1996/97 | Wild | 14 | 42 | 210 | 1036 | 68 | 0 | Wild 1370 |
| | Hatchery | 36 | 341 | 662 | 338 | 73 | 0 | Hatch 1450 |
| 1997/98 | Wild | 0 | 15 | 17 | 0 | 11 | 0 | Wild 43 |
| | Hatchery | 17 | 22 | 130 | 57 | 46 | 0 | Hatch 298 |
| 1998/99 | Wild | 4 | 41 | 154 | 676 | 24 | 0 | Wiild 899 |
| | Hatchery | 8 | 142 | 159 | 53 | 33 | 0 | Hatch 395 |
| 1999/00 | Wild | 0 | 10 | 147 | 127 | 0 | 0 | Wild 284 |
| | Hatchery | 6 | 40 | 200 | 173 | 18 | 0 | Hatch 437 |

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fine, thank you. We're close to meeting our escapement goals, and on top of that we're pumping in half a million extra hatchery steelhead smolts.' Never mind that the steelhead adult numbers, both hatchery and wild, continue to dwindle.

### Early Winter Wild Returns

From Table 2 on the opposite page, it is apparent from the WDFW records that significant numbers of wild steelhead were harvested in January and February right up to that initial year of the crash in 1999/2000. For instance, in February of 1997, 1,036 wild steelhead were killed in the mainstem Skagit, while only 338 hatchery steelhead were killed in the same month. Overall in 1996/1997, 1,370 wild steelhead were killed and 1,450 hatchery steelhead. Obviously, wild steelhead were still supporting a significant burden of the steelhead harvest by sportsmen on the Skagit until the winter of 2000/2001.

The early component of the wild steelhead run has been targeted for depletion now for 50 years. This may have long-term consequences we are now beginning to experience as a loss in wild steelhead numbers due to altered run timing, spawning timing, and loss of genetic and life history diversity. This potentially leaves certain watershed areas with a dearth of wild steelhead that return, spawn and emerge early as the best survival strategy.

### Aquaculture

It is also possible that Puget Sound, or the migration corridor commonly used by Puget Sound steelhead enroute to the Pacific, is creating a limiting factor during their ocean migration. The east coast of Vancouver Island steelhead rivers have suffered similar wild steelhead depletions for nearly 20 years now. But Vancouver Island steelhead populations on the West Coast have remained steady.

A Washington Trout newsletter recently included a map with the location of the aquaculture sites in British Columbia and Washington that encircle the migration routes out of Puget Sound. The oldest and densest concentration of these sites lines the narrow corridor of Johnstone Strait between northern Vancouver Island and the Mainland. It is now known that sea lice infestations around the Atlantic salmon containment pens are significantly impacting juvenile pink salmon. To date it is unknown if there might be similar effects to juvenile steelhead that may linger near these same pens. Amongst the millions of juvenile pinks, trying to identify a few thousand steelhead would be a daunting task — a needle in a haystack, so to speak.

*Misha Skopets traveled from Magadan, Siberia to land this 37.5" x 21.5" Skagit River system wild winter steelhead, estimated to weigh about 22 pounds. Photo by Bill McMillan*

It is known that the wild sea trout smolts of western Ireland and western and northern Scotland have been killed by great densities of sea lice living in and around the offshore salmon farms. Malcolm Greenhalgh in "Freshwater Fish" indicates: "Thousands of sea trout once fed around the Shetland Islands; today, consequent to intensive salmon farming, there are none." It seems possible that East Coast Vancouver Island and Skagit River steelhead are suffering a similar fate if they share the Georgia and Johnstone Strait migration corridor. One means of determining this would be to track steelhead smolts on release by implanting a miniature transmitter that could be tracked by satellite just as migrating songbirds are. If the net-cages and related sea lice are impacting steelhead, then WDFW, Washington sport fishermen and environmental groups, and the tribes need to focus efforts on joining the growing coalition to modify the operation and contain the spread of net-cages.

### Baker River Dams

One of the limiting factors on the mid- and lower Skagit regarding both salmon and steelhead is the operation of Puget Sound Energy's (PSE) Baker River dams, with radical flow fluctuations a daily occurrence in the Skagit River downstream of Concrete. These flow fluctuations (presently without Skagit River minimum flow agreements) commonly dewater salmon redds by the hundreds or thousands, depending on species and year. It is among the reasons Skagit salmon remain in decline in the lower Skagit but are stable in the upper Skagit. However, when the so-called energy crisis and drought in the fall and winter of 2000/2001 occurred, with the dewatering of hundreds or thousands of chum redds in the mid- and lower Skagit due to the operation of the PSE dams, it was left entirely to Washington Trout and a few other non-profit friends of salmon to put legal pressure on PSE to alter the way it does business.

In January and February of 2003, PSE flow fluctuations again impacted the lower Skagit, stranding thousands of emerging juvenile salmonids seeking the shallows for refuge and food. I personally collected a dozen of these juvenile salmon, steelhead and even sculpins and whitefish by trying to beat the crows and gulls to them early in the morning after their overnight strandings. This went on daily for three weeks at the peak of chum and chinook emer-

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gence. The juvenile salmonid toll had to be minimally in the tens of thousands, if the flocks of birds along the bars were any indicator.

A focused presence by WDFW, the Tribes, and NOAA Fisheries is critical in the negotiations with PSE during the present Baker Dam relicensing process. Protective minimum flow agreements and less dramatic ramping rates will need to be implemented to accommodate an improved wild steelhead future. And as has occurred on the upper Skagit, increased emphasis must be placed on more creative mitigation for the dams than through hatchery production. The purchase of land along the mid- and lower Skagit and its tributaries is the key to initiating the long slow process of recreating a river system whose large drainage area can once again be productive for salmon and steelhead.

However, this will never occur when the primary investment driver is a Grandy Creek Hatchery, a Grandy Creek Rearing Pond, a Barnaby Slough filled with hatchery smolts, or a redesigned and upgraded Marblemount Hatchery. The Skagit hatchery steelhead program has to be significantly reduced or eliminated in order to effectively restore the wild steelhead to a population size that can adequately fulfill well managed sport and tribal fisheries.

*The Skagit hatchery steelhead program has to be significantly reduced or eliminated in order to restore wild steelhead.*

It is hatchery focus that has brought the Skagit River steelhead population to where it is — a pitiful remnant of that 1953/54 example of at least 32,000 returning wild steelhead. That historical number is what we must minimally aim for as a restoration target, with the creation of escapement goals that can provide the stimulus that will take us there. It is a matter of doing those things that will once again make the available steelhead habitat productive rather than investing in worn-out tools that only further jeopardize wild steelhead and salmon populations.

## Support Wild Skagit Steelhead Recovery

We hope that readers will give careful attention to Bill McMillan's fine piece on Skagit River wild steelhead. Despite its many problems, the Skagit remains a river of enormous potential, one that *The Osprey* has been writing about since its very first issue in January 1987. Stan Young, our first editor, wrote at that time, "The committee believes that in the future virtually all rivers having anadromous fish should be managed for their wild fish populations, with increased reliance on natural reproduction and less dependence on hatcheries." In that same first issue, Stan reported that the Committee had already recommended to the Washington Fish and Game department that Skagit rules for wild steelhead catch and release be applied to the month of March.

In the intervening 16 years of living history -- most of it bad for wild fish -- enough data has emerged to allow McMillan now to document the hard facts and figures about Skagit wild steelhead. That he has used data collected by the river's "keeper," the Washington Department of Fish and Wildlife, says volumes about the success of that enterprise. If the Department were a profit-supported business, the managers overseeing the Skagit would long ago have been fired.

One of the most damning facts appearing in Bill's report is the continued hammering of the "front end" of returning wild winter Skagit steelhead, i.e. the regulations that permit harvest of wild fish in January, February and half of March, the months of their highest rate of return. The Steelhead Committee has from its very first days pointed out the absurdity of such rules, which allow perhaps as many as half the available spawners to be killed. And as Bill points out, the Department deals with this problem by simply reducing the escapement goals to coincide with whatever numbers they expect to see, not with scientifically-supported targets which would be much higher.

McMillan is absolutely right to conclude that Skagit wild steelhead management is driven by political and social concerns which have nothing to do with the fish. Over the years *The Osprey* has documented the political atmosphere in Olympia, named the guilty players, and urged corrective measures on readers who have the authority to fix things. Sadly, these folks continue to bow to the pressures of the kill-fishery constituency, those who argue that a river must be closed if its fish cannot be eaten. And not all of this lies at the feet of the Department. The Fish and Wildlife Commission shares equally as do elected representatives in the state legislature.

We fervently hope that Bill's piece will command the attention — and influence the decisions -- of those steelhead managers who can make a difference. But unless a lot of our readers react by demanding real changes in Olympia, we won't count on it.

John Sager
For the Editorial Committee
*The Osprey*

# Ralph Wahl on the the Skagit

by Ralph Wahl
— *Bellingham, Washington* —

*In 1994, staff of* The Osprey *asked Ralph Wahl, then in his late 80s, to write an essay describing an angling experience that showed what steelhead fishing was like in the Pacific Northwest when wild runs were still healthy, many dams had not yet gone in and habitat was still largely intact. Of all the waters he fished over the years, he chose to write about Washington State's Skagit River.*

*Below, we reprint Wahl's essay, first published in the September 1994 issue of* The Osprey.

What was fishing like in the so-called Golden Years? Was it really as good as some old-timers claim? These questions were posed to me by The Osprey. They were looking for nostalgic recollections of thirty or more years ago by some of the old guys.

I meet both requirements. Age 88, and I have fly fished for steelhead for almost sixty years. So, if they mean fishing in clear, uncrowded rivers, some of the stories are true. Recalling my most memorable day is not easy, as there were so many special ones, but I will give it a try.

It happened 55 years ago on the Skagit. I had been confined at home for three weeks with a serious bout of the 'flu.' The family had endured my frustration and grumpiness until mid-April, when the weather turned warm and I was finally able to again get out. I drove my wife Jean and two young sons to the river and parked at the old fish hatchery below Grandy Creek. From there we took a dim trail to a rocky bar where the creek flowed for a couple of hundred yards over knee-deep riffle before mixing in a deep pool below a booming rapids that could be heard a mile away.

In five years of searching this was the only riffle in which I had hooked a steelhead and lost everyone! But just being on the river that day, even if no steelhead were present, was reason enough to be there. The temperature was high enough so that gloves were not needed. Snowy mountains rose majestically upriver. I stood there for a long time, absorbing the pristine scene. Then I went fishing.

I waded down slippery rocks to the riffle and took a stand well back from the water's edge. I tied on a Cummings fly, a bucktail pattern from Ray Bergman's book "Trout." My first cast was to the bubbly slick where fast and slow currents meet, and waited for some action.

*An angler casts his fly into the famed Washington river where Wahl caught his Field and Stream trophy steelhead in 1939. Photo by Jim Yuskavitch*

I had taken enough steelhead that I was familiar with their quick strikes and aerial acrobatics, but I was not prepared for the jolt as a big steelhead grabbed the fly. In seconds the line and thirty yards of backing were stripped from the reel. The fish swirled to the surface and the fly came free. My bad luck at this location from previous years was still with me.

I checked the hook for sharpness, then cast again. Another eager steelhead took the fly. It bolted downstream in heavy water and jumped several times before it, too, returned the fly to me. My untrained eye estimated its weight at eighteen pounds. My 'hook them and lose them' performance haunted me again.

Could there be another fish lurking in the current? I made several casts as I worked down the riffle a step at a time. Fifty feet below my starting place I felt a momentary touch. I cast again. This time I was ready as the fish took. I struck back ... hard! And the hook held! For twenty minutes it was give-and-take until I was able to bring the big male fish over the gravel and up to a sandy beach. After five years the jinx was broken and with a BIG steelhead.

Back on shore, the boys were running along the beach screaming for Jean to bring the camera. After she came with it we looked about for something to show off the huge size of the steelhead as it was photographed. We found a five-foot-long beaver cutting and strung the fish from the center of it and hoisted it to balance it on the ten- and eight-year-old boys' shoulders. They struggled to hold it up, but they could not keep the tail from dragging in the sand.

We were a tired but happy family as we drove home. The trophy fish was safe in the trunk, and there would be pictures to prove it. By 1939 standards, it was a trophy fish. After being out of the water for 24 hours (it had taken that much time to locate an accurate scale) it still weighed 16 pounds 9 ounces. The fish probably was actually a pound or two more when fresh.

It was entered in the 1939 Field and Stream awards listing and took second place. Those innocent young boys are now ages 64 and 62, and have grandkids of their own.

# NOAA Fisheries Extends Steelhead ESA Status Review

In October 2001, a coalition of agricultural, timber and development interests, filed a petition with the federal government to delist 14 populations of salmon and steelhead currently under the protection of the Endangered Species Act. In response, NOAA Fisheries decided to conduct a status review of all 26 West Coast populations of listed salmon and steelhead. This includes three populations of coho salmon, nine stocks of chinook salmon, two stocks of chum salmon, two stocks of sockeye salmon and 10 stocks of steelhead.

This summer NOAA Fisheries delayed the decision date on their rulings. The status review and and any proposed new rules will be completed by March 2004, with a final rule to be announced within the following year.

Fish or other animals are listed as “Endangered” under the ESA if they are presently in danger of extinction, and “Threatened” if they are likely to become at risk of extinction in the future if no protections are provided. ESUs, or Evolutionarily Significant Units, are used by NOAA Fisheries to determine distinct populations of salmon, trout and steelhead based on their reproductive isolation from other stocks and their importance to the species genetic diversity.

A draft of the status review document “Preliminary conclusions regarding the updated status of listed ESU’s of West Coast salmon and steelhead” is available at http://www.nwfsc.noaa.gov/trt/brtrpt.htm.

This draft document identifies Upper Columbia steelhead, Southern California steelhead and Central California Valley steelhead “in danger of extinction” while finding Snake River steelhead, Middle Columbia River steelhead, Lower Columbia River steelhead, Upper Willamette River steelhead, Northern California steelhead, Central California Coast steelhead and South-Central California Coast steelhead as “likely to become endangered in the foreseeable future.”

These findings match the current ESA status of listed West Coast steelhead (see table below).

## Current Endangered Species Status of West Coast Steelhead

| Steelhead Stock | Current Listing | Decision Date |
|---|---|---|
| Southern California ESU | Endangered | August 1997 |
| South-Central California Coast ESU | Threatened | August 1997 |
| Central California Coast ESU | Threatened | August 1997 |
| Upper Columbia River ESU | Endangered | August 1997 |
| Snake River Basin ESU | Threatened | August 1997 |
| Lower Columbia River ESU | Threatened | March 1998 |
| California Central Valley ESU | Threatened | March 1998 |
| Upper Willamette ESU | Threatened | March 1999 |
| Middle Columbia River ESU | Threatened | March 1999 |
| Northern California ESU | Threatened | June 2000 |
| Oregon Coast ESU | Candidate | March 1998 |
| Southwest Washington ESU | Not Warranted | August 1996 |
| Olympic Peninsua ESU | Not Warranted | August 1996 |
| Puget Sound ESU | Not Warranted | August 1996 |
| Klamath Mountains Province ESU | Not Warranted | April 2001 |

Source: NOAA Fisheries
Updated May 2, 2003

## Chair's Corner, Continued from page 3

sions as to each of the threatened or endangered salmon species. The court therefore does not intend to delve into the science during the remand period."

Several additional workings of the remand process became clear at a July 21st status conference called by Judge Redden. He asked that the parties to the suit form a committee of no more than ten lawyers to report directly to him on BiOp rewrite progress.

Fred Disheroon, the U. S. Justice Department attorney representing NOAA Fisheries, told the Judge that the redo is pursuing two tracks. The first, as expected, is to finalize consultations with other federal agencies and firm up commitments by states, tribes, and private parties, in order to address the specific BiOp shortcomings pointed out in the Judge's decision.

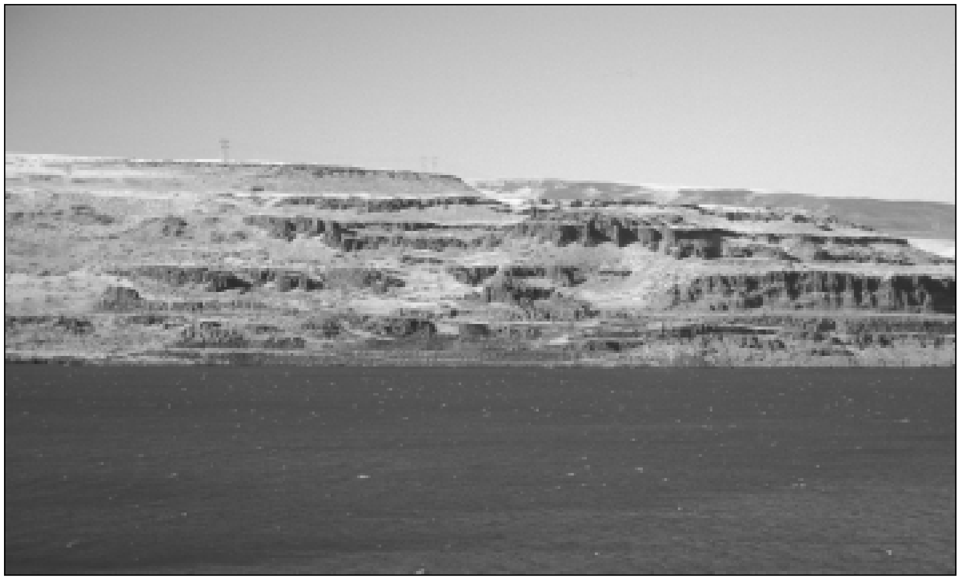
The second track is to "refresh" the extinction analysis of December 2000 that led to the conclusion that the hydro system operations plan jeopardizes eight of the 12 ESA listed Columbia basin steelhead and salmon stocks. The revisions will include data on the larger returns of the last three years. Todd True of Earth Justice Legal Defense Fund, attorney for the plaintiffs, immediately challenged the second track, stating: "That puts the questions of science back on the table." He added that three years of improved returns do not signal recovery.

From my perspective, the second track looks like a dose of opportunistic politics.

At the same meeting the attorney for the Yakama Nation, Tim Weaver, raised the issue of funding of the BiOp's off-site actions, along with Bonneville Power Administration's 2003 spending cap of $139 million for recovery programs. To that, Judge Redden commented: "That is something that has concerned me all along. It is going to cost a lot of money for habitat restoration and hatcheries and that sort of thing."

It should also be noted that the government's 60 day window to appeal the decision has expired; NOAA is working on rewrite.

It may be dangerous to assume anything about legal issues of this complexity, but my sense is that the Court takes Endangered Species Act protection of Columbia basin steelhead and salmon very seriously. That would be good news for the fish.



*Hydroelectric dams have reduced the once-mighty Columbia River, seen here above the John Day Dam, to a series of slow-moving impoundments. Photo by Jim Yuskavitch*

***THE OSPREY***


***Federation of Fly Fishers***
***P.O. Box 1595***
***Bozeman, MT 59771-1595***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