THE OSPREY

A Journal Published by the Steelhead Committee
Fly Fishers International

FLY FISHERS INTERNATIONAL

Dedicated to the Preservation of Wild Steelhead • Issue No. 88 SEPTEMBER 2017

The Case for Managing Skagit River Wild Steelhead

by Nicholas Chambers

— Trout Unlimited—

Nicholas Chambers is Organizer for Trout Unlimited's Wild Steelhead Initiative. Based in Index, Washington, he works to engage anglers, improve steelhead management and increase protections for this iconic species, in turn ensuring angling opportunities for the long term.

To learn more about the TU Wild Steelhead Initiative visit their website at: www.wildsteelheaders.com. You can also sign up to join their advocacy community at: http://www.wildsteelheaders.org/take-the-pledge/

The rivers of Puget Sound were once the Crown Jewels of winter steelheading for Northwest anglers. Heck, they garnered the admiration of steelhead anglers everywhere. Bar none.

Wild steelhead were not only abundant, but they were large. Sometimes very large. The fish and rivers attracted thousands of anglers hoping to catch, and often kill, a wild steelhead. The best and most popular of those rivers? The Skagit, a broad low-gradient river that drains the North Cascades in Washington State, and its largest tributary, the Sauk River. Beginning in the early 1950s and extending into the 1970s, the Skagit's mixed stock of unmarked hatchery and wild steelhead supported a harvest of 10,000-20,000 fish annually.

Puget Sound was a winter steelheader's mecca during the 1950s. Those good times did not last.

While Puget Sound was a winter steelheader's mecca from the 1950s through the 1990s, the good times did not last. Harvest rates began a steady decline in the 1970s, dropping to only a tenth of their previous highs by the early 2000s, all despite a steady increase in hatchery smolt releases (figure 1). After a brief uptick in the 1980s brought on by highly favorable ocean conditions, declines in wild winter steelhead from the mid-1990s through the 2000s (Figure 2) prompted the National Marine Fisheries Service (NMFS) in 2007 to list Puget Sound steelhead as "Threatened" under the Endangered Species Act (ESA). Soon thereafter, to the great disappointment of anglers, the Skagit catch-and-release fishery focused on wild steelhead was shuttered, and it remains closed today.

Washington's Statewide Steelhead Management Plan

Just prior to the ESA listing, the Washington Department of Fish and Wildlife (WDFW) adopted the Statewide Steelhead Management Plan (SSMP) in 2008. The plan's goal was to address all the H's (harvest, hydropower, habitat and hatcheries) to stem the decline and, fingers crossed, rebuild

Continued on Page 4

FROM THE PERCH — EDITOR'S MESSAGE

Will Wild Fish be "Trumped?"

by Jim Yuskavitch

Throughout last year's presidential campaign — all the debates, analysis and opinions — I don't recall hearing anything about wild fish. But it is now apparent that the election of the present administration and its policies have the potential to greatly affect wild Pacific salmon and steelhead conservation. And for the most part, not in a good way.

Here in steelhead country we are already seeing the beginnings of the trouble the Trump Administration may cause us.

The Cascade-Siskiyou National Monument in southwest Oregon and northern California is one of six national monuments that Secretary of the Interior Ryan Zinke has recommended for reducing in size, rolling back at least some of the Obama Administration's 47,000-acre expansion of the previously 65,000-acre national monument. The primary reason for the recommended rollback is to support continued logging and cattle grazing. This region holds some of the country's best, most pristine salmon and steelhead streams, such as the Smith, Rogue and Illinois rivers and their headwaters.

It isn't just salmon and steelhead that may be put at risk by the Administration's proposed national monument rollbacks. Zinke has said that two marine monuments in the Pacific Ocean should also be shrunk — Pacific Remote Islands and Rose Atoll — to make way for increased commercial fishing.

And it seems that the Trump Administration is trying to breath life back into the Pebble Mine, a massive, proposed gold, copper and molybdenum mine in the Bristol Bay region of Alaska that produces the world's greatest runs of sockeye salmon. Conservationists, commercial fishing organizations, local businesses and Native Alaskan groups had been fighting the proposal for more than ten years. When the Obama Administration blocked the mine proposal by denying Northern Dynasty Ltd. the permits it needed to move forward, opponents thought victory had been achieved. But in May of this year, the Trump Administration reversed the Obama ban and will allow the company to apply for the needed permits. That doesn't make it a done deal, but the battle has been rekindled.

Equally disturbing is the Adminstration's hostility to the concept of climate change, something that could have a profound impact on salmon and other coldwater fish in the years ahead and a government that doesn't care won't be of much help.

While what may happen over the next three years is uncertain, one thing isn't — wild fish advocates are in for a rocky ride.

THE OSPREY

Chair
Ryan Smith
(Acting)

Editor
Jim Yuskavitch

Contributing Editors
Pete Soverel • Bill Redman
Doug Schaad • Ryan Smith

Contributors
Nicholas Chambers • Daniel Mesec
Will Atlas • Jim Lichatowich
Bill Bakke • Michael Checcio
David Moskowitz

Design & Layout
Jim Yuskavitch

Letters To The Editor
The Osprey welcomes submissions and letters to the editor. Submissions are welcome but queries in advance are preferred.

The Osprey
69278 Lariat
Sisters, OR 97759
jyusk@bendcable.com
(541) 549-8914

The Osprey is a publication of Fly Fishers International and is published three times a year.

ISSN 2334-4075

Fly Fishers International is a unique non-profit organization concerned with sport fishing and fisheries

Fly Fishers International (FFI) supports conservation of all fish in all waters. FFI has a long standing commitment to solving fisheries problems at the grass roots. By charter and inclination, FFI 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.

FLY FISHERS INTERNATIONAL

THE OSPREY IS PRINTED ON RECYCLED PAPER USING SOY INK

Visit The Osprey on the Web at:

www.ospreysteelhead.org

The Osprey Blog:

www.ospreysteelheadnews.blogspot.com

Fly Fishers International

www.flyfishersinternational.org

GUEST'S CORNER

A Great Victory for Skeena River Salmon in LNG Project Demise

by Daniel Mesec

— *SkeenaWild Conservation Trust* —

When the proposed liquid natural gas terminal on the Skeena River estuary was recently cancelled, a significant threat to the river's wild salmon was neutralized. Daniel Mesec, Communication Coordinator for SkeenaWild Conservation Trust recaps the threat the project posed and reflects on the future of one of Canada's great rivers. Learn more about SkeenaWild by subscribing to their newsletter at: skeenawild.org.

The cancelation of the Pacific Northwest LNG terminal in northern British Columbia was welcome news for the Skeena River and the future of a wild salmon and steelhead stronghold.

Oil and gas conglomerate Petronas, was proposing to build a $36 billion (CDN) liquefied natural gas export facility just south of Prince Rupert, in the heart of what has been called "grand central station" for migrating juvenile salmon in the estuary of the Skeena River, home to Canada's second largest wild salmon and steelhead runs.

Citing economic uncertainty and the downturn in global market prices of liquefied natural gas, Petronas pulled the plug, ending a three-year long battle to save critical salmon habitat near Lelu Island and Flora Bank from a project that would have most certainly left Skeena salmon in peril.

The project would have consisted of three components: an export terminal on Lelu Island, a two kilometre trestle bridge over top Flora Bank connected to a shipping birth, and a 900 kilometre pipeline slated to deliver fracked gas from BC's northeast shale gas fields to the export terminal, destined for Asian markets.

The impact to wild salmon would have been extensive and irreversible, if the project were to go ahead. Light pollution, seismic drilling, underwater pile driving, and the removal of more than a million cubic metres of earth would have effectively dismantled a pristine environment critical for developing salmon throughout the Skeena Watershed.

In the summer of 2015, a group of Indigenous land protectors had already been building a cabin on Lelu Island to keep watch over the sacred territory of the Gitwilgyoots Tribe of the Tsimshian Nation and assert their Indigenous rights. That same year the First Nation community of Lax Kw'aalams turned down a billion-dollar benefit agreement because the risk to wild salmon was just too high.

Local communities and First Nations stood up against Petronas long enough for market conditions to stop it.

That was followed up by a regional summit hosted by Skeena River First Nations and SkeenaWild Conservation Trust. Hundreds attended the summit to voice their opposition to PNW LNG, after the provincial government stanchly supported the project calling its opponents a "ragtag group, and the forces of no."

The Salmon Nation Summit was a defining moment in building opposition towards PNW LNG and ended with the signing of the Lelu Island Declaration in an effort to protect wild salmon and ultimately a way of life for many who live within the Skeena Watershed.

Despite several warnings from the scientific community, including heavyweights like the work conducted by geologist Dr. Patrick McLaren, an expert in sedimentation dynamics, who called Petronas' scientific analysis of PNW LNG fraudulent, as well as Simon Fraser University (SFU) biologist, Jonathan Moore's work on the importance of eel grass beds for developing juvenile salmon, Prime Minister Justin Trudeau's governing Liberal party decided to approve the project anyway.

Still, the resilience of local communities and First Nations that stood up against Petronas forced PNW LNG back again and again, long enough for market conditions to no longer permit such a massive project to be built. This is a huge victory for the Skeena River, but wild salmon and steelhead continue to face numerous pressures.

Although the demise of PNW LNG — and even more recently Aurora LNG, which was proposed for Digby Island just north of the Skeena River Estuary — has given wild salmon and steelhead much needed breathing room, the battle to ensure the long-term sustainability of recreational, commercial and First Nation salmon fisheries is far from over.

A new study conducted by SFU scientists points to major reductions in wild salmon monitoring in BC by the Department of Fisheries and Oceans (DFO) over the past 30 years that is leaving many government policy makers in the dark about the health of wild salmon populations.

Since the mid-1980s, fish monitoring of streams and rivers has dropped by more than 70 percent. The study suggests that if monitoring were maintained it could have helped in deter-

Continued on page 19

Skagit River
Continued from page 1

wild populations to the point where they could once again provide fisheries. A key component of the plan was the concept of wild steelhead gene banks. A gene bank designation was designed to allow wild steelhead to exist in specific rivers without the influence of hatchery fish. Basically, no hatchery fish would be planted in gene bank rivers. The concept was not revolutionary. Similar frameworks had been informally discussed for decades, including within the WDFW, and had officially been recommended by the Hatchery Scientific Review Group (HSRG).

The SSMP establishes several criteria for determining whether gene bank status is appropriate, including extinction probabilities, population status and trends, hatchery genetic impacts, and the prevailing habitat conditions. The Skagit is part of the North Cascades sub-group (other sub-groups include Central and South Sound and Hood Canal and Strait of Juan de Fuca)). The North Cascades sub-group includes several other major rivers, including the Snohomish/Skykomish, Snoqualmie, Stillaguamish/North Fork Stillaguamish, Samish and Nooksack River basins. At least one river must be designated a wild steelhead gene bank in each subgroup.

Pursuant to the SSMP, WDFW has designated several gene banks in western Washington since 2008, including the Elwha River (Hood Canal and Strait of Juan de Fuca sub-group) and Nisqually River (Central and South Sound sub-group), but no decision has been made regarding a gene bank in the North Cascades sub-group despite strong public support for designating the entire Skagit Basin as a gene bank expressed during the WDFW's public process for designating gene banks in Puget Sound (more on that later).

Ranking the Skagit Using SSMP Criteria

How does the Skagit stack up as a wild steelhead gene bank candidate? Let's take a look.

First, the wild steelhead population is in pretty good shape by current standards. Analyses by NMFS and WDFW indicate that the probability of Skagit wild steelhead going extinct over the next hundred years is essentially zero. It also is by far the most abundant population of wild steelhead in the North Cascades sub-group (Figure 2), and, in fact, in all of Puget Sound. And it has been increasing in recent years. After bottoming out in 2009 like many other populations, annual returns of Skagit steelhead grew strongly and have remained relatively high since (Figure 2). In fact, since 2010 it has averaged over 7,000 wild steelhead per year, and is currently home to nearly 50% of all

Continued on next page

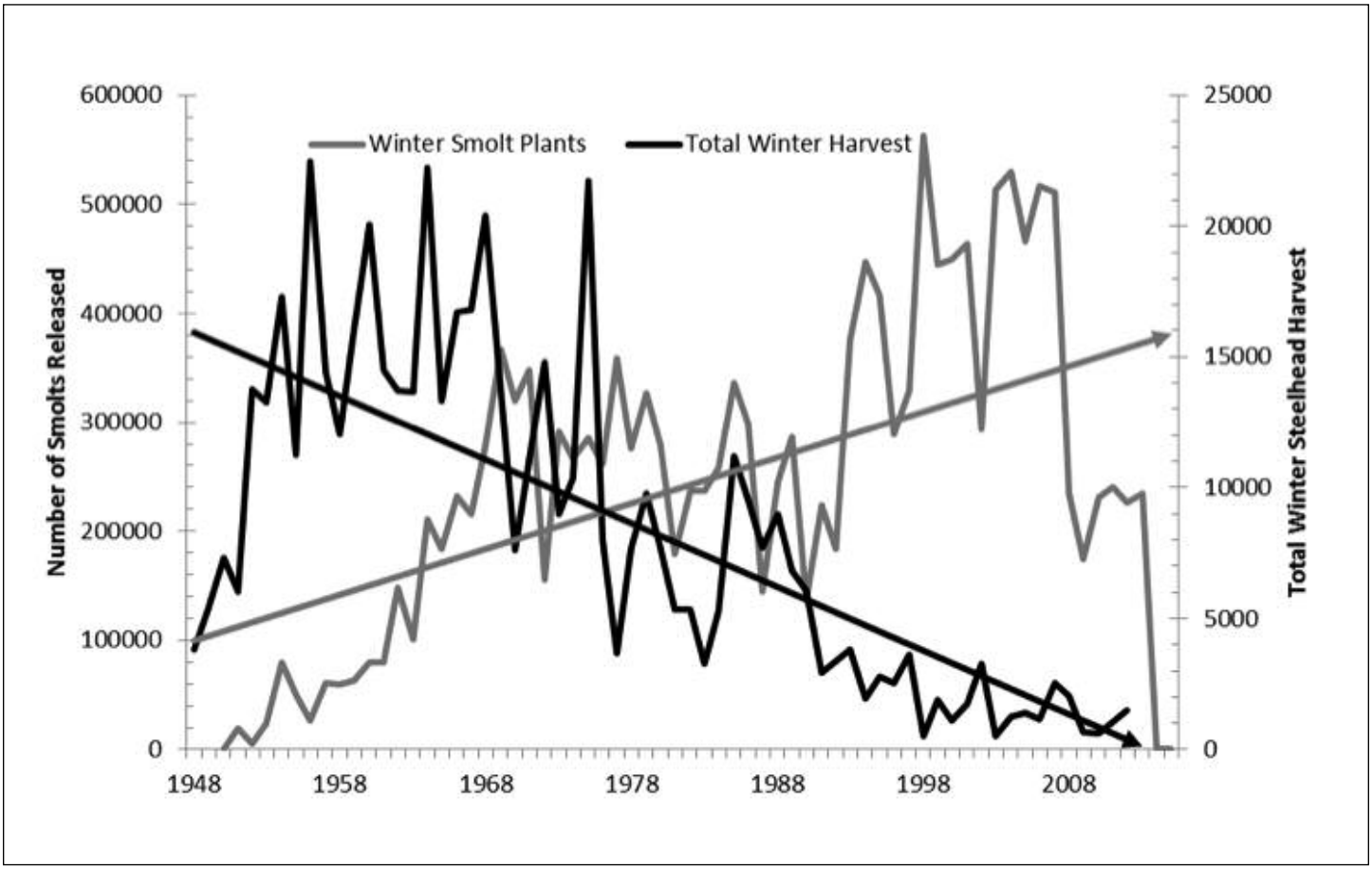

Figure 1. Relationship of winter steelhead smolt plants to total winter steelhead harvest on the Skagit River for the period of record.

Continued from previous page

the wild winter steelhead that return to Puget Sound annually. Think about that for a minute. The Skagit is producing almost as many wild steelhead as all the other rivers combined in the Sound. All of them.

Second, it is a diverse population, including both summer and winter runs, a broad spatial distribution, and a protracted spawning season from early-timed spawners in Nookachamps Creek and lower river tributaries to later-timed spawners in the upper Skagit and Sauk. Because of that diversity the Skagit is home to four of the 16 "demographically independent populations" of steelhead found in the North Cascades sub-group.

Third, research by WDFW (Warheit et al. 2014) examined the extent to which releases of hatchery fish had genetically affected several wild populations of steelhead in the North Cascades. The vast majority of hatchery steelhead released into Puget Sound were part of WDFW's long-standing winter steelhead hatchery program, which used stock derived from Chambers Creek steelhead, an early-returning and spawning steelhead population that was developed in an attempt to segregate hatchery and wild fish. Warheit found hatchery genetic effect was very low in the Skagit and was easily under WDFW's recommended threshold of 2%. In short, this means that the genetics of the Skagit's wild steelhead remain very much intact.

In terms of habitat, the Skagit River is the largest river basin and contains a wide array of habitats. This is important because larger watersheds tend to have higher life history diversity owing to greater habitat variation (Kendall and McMillan et al. 2015). It also has high elevation, snow-fed headwaters that are protected from development, which means that the Skagit is likely to maintain high quality, cold water habitat despite the projected rise in air temperatures in the decades ahead (Wade et al. 2013).

Although the Skagit watershed has been degraded by land use practices, it is further north and away from the major urban centers. Consequently, it is more sparsely populated, particularly in the upper watershed. This probably helps explain why the percentage of developed land cover in the Skagit has not changed nearly as much as other nearby watersheds since 1986 (Bartz et al. 2015). In addition, many of the most damaging land use practices, such as massive industrial clearcutting of uplands and riparian zones, has been greatly reduced in recent decades and watershed health is consequently improving.

Furthermore, since 2000 over $80 million has been invested in habitat restoration in the Skagit to restore important ecosystem functions and boost wild salmonid populations.

Because of the Skagit's large size and diversity of habitat, it holds four of the 16 demographically independent steelhead populations in the North Cascades sub-group. Photo courtesy Trout Unlimited

Public Support for Managing the Skagit Basin for Wild Steelhead

In 2015 WDFW launched a public process for designating wild steelhead gene banks in Puget Sound in accordance with the SSMP. They hosted a series of public meetings throughout Puget Sound and received oral and written comment from the interested public. There was overwhelming public support for designating the entire Skagit a gene bank — more than 90% of comments favored that outcome. Despite that public support, WDFW has yet to decide on whether the Skagit Basin will be managed as a wild steelhead gene bank.

It is noteworthy that WDFW's 2015

Continued on next page

Continued from previous page

public process for designating the entire Skagit as a wild steelhead gene bank was not the first time strong support for wild steelhead management in the Skagit basin was expressed by a diverse group of stakeholders. In 2011, WDFW convened the Puget Sound Hatchery Action Advisory Committee (PSHAAC) to advise it on implementation of hatchery reform, including rivers that should be managed exclusively for wild fish.

Committee members evaluated several criteria, including the condition of the freshwater habitat, extinction probability, hatchery gene flow with wild fish, and the status of the wild steelhead population. Based on those criteria, the PSHAAC voted 6-2 in favor of managing the Skagit solely for wild steelhead. But because WDFW decided to require consensus decision-making, the Committee did not officially recommend the Skagit as a WSGB despite a strong majority vote of support for such a designation.

The Skagit stands head-and-shoulders above all other rivers in Puget Sound for its fishable, wild steelhead populations.

Puget Sound Steelhead Advisory Group

Regardless of the past, it appears a decision on whether the Skagit will be managed exclusively for wild steelhead is on the horizon. This year, WDFW convened the Puget Sound Steelhead Advisory Group (PSSAG), a diverse group of steelhead anglers tasked with a mission to:

"*Develop a broadly supported vision with forward-looking watershed-specific strategies that provides for the conservation and recovery of steelhead and, in a manner consistent with achieving conservation objectives, a diversity of sustainable recreational fishing opportunities across the rivers of Puget Sound." (WDFW 2017)*

Beginning with the Hood Canal and Strait of Juan de Fuca sub group, the members have been piecing together a vision for management intended to maximize both conservation and fishing opportunity within the constraints of current policy and the health of wild steelhead populations. Rather than focusing solely on single rivers as gene banks, the PSSAG will advise the Department on how to establish and

Continued on next page

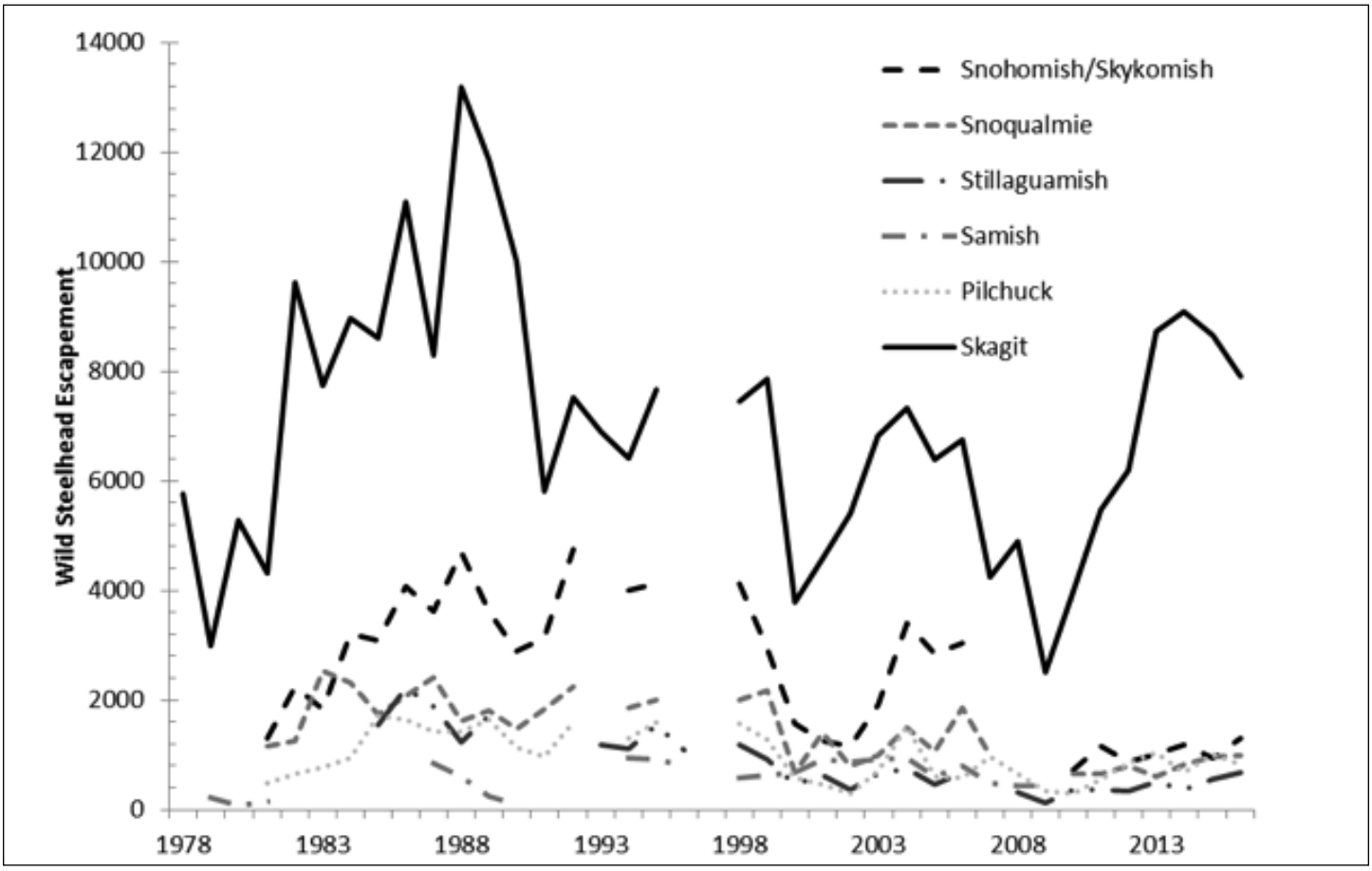

Figure 2. Annual abundance of steelhead in North Cascades Puget Sound streams including the Skagit River for periods of record.

Continued from previous page

implement a portfolio of steelhead management approaches, which includes rivers that will be managed for wild steelhead and rivers on which hatcheries will be operated.

The final step for the group will be to address North Puget Sound and make one last attempt at finding a broadly supported path forward for the Skagit. While this will be no easy task, the collaboration shown by the group so far shows promise, for both anglers and wild steelhead.

A Skagit River angler tails a steelhead. Photo courtesy Trout Unlimited

Conclusion

The Skagit River basin stands head-and-shoulders above all others in Puget Sound for its potential to support a healthy, resilient, fishable population of wild steelhead. It has the habitat, the wild steelhead genetics, and the wild fish abundance to make it a wild steelhead stronghold and the cornerstone of wild steelhead recovery in Puget Sound.

Managing the Skagit Basin for wild steelhead will not only be good for wild steelhead conservation, it will be good for anglers, too. The science is crystal clear that wild steelhead produce more offspring and survive at a much higher rate than hatchery fish. So as long as we have the habitat to support a robust, fishable wild population — which is the case in the Skagit — maximizing the number of wild fish in the system will provide the best and most sustainable fishing opportunity as long as the fishery is well managed. At the outset, the non-tribal sport fishery will almost certainly have to be catch-and-release, but over time, as the wild population grows, there may be some opportunity for limited sport harvest as well.

Time and again wild steelhead have proven themselves to be incredibly resilient and sustainable if well managed. The rebound of wild steelhead in Washington's Toutle River after the eruption of Mount Saint Helens is perhaps the most dramatic example of their resilience. Rivers such as the Skeena in British Columbia, Situk in Alaska, and John Day and North Umpqua in Oregon, are just a few examples of productive wild steelhead systems that provide reliable fishing opportunity. The time has come to add the mighty Skagit River to that list.

Literature Cited

Bartz K.K., Ford M.J., Beechie T.J., Fresh K.L., Pess G.R., Kennedy R.E., et al. 2015. *Trends in Developed Land Cover Adjacent to Habitat for Threatened Salmon in Puget Sound, Washington, U.S.A.* PLoS ONE 10(4): e0124415. doi:10.1371/journal.pone.0124415

Kendall, N.W., McMillan, J.R., Sloat, M.R., Buehrens, T.W., Quinn, T.P., Pess, G.R., Kuzishchin, K.V., McClure, M.M., and R.W. Zabel. 2014. *Anadromy and residency in steelhead and rainbow trout Oncorhynchus mykiss: a review of the processes and patterns*. Canadian Journal of Fisheries and Aquatic Sciences. Published on the web 05 November 2014, accessed at: http://www.nrcresearchpress.com/doi/abs/10.1139/cjfas-2014-0192#.VLYvCivF-Sp.

Wade, A.A., Beechie, T.J., Fleishman, E., Mantua, N.J., Wu, H., Kimball, J.S., Stoms, D.M., and J.A. Stanford. 2013. *Steelhead vulnerability to climate change in the Pacific Northwest*. Journal of Applied Ecology 50:1093-1104.

Warheit, K. 2014. *Measuring reproductive interaction between hatchery-origin and wild steelhead (Oncorhynchus mykiss) from northern Puget Sound populations potentially affected by segregated hatchery programs*. Unpublished Final Report, Washington Department of Fish and Wildlife October 10, 2014.

WDFW. 2008. *Statewide Steelhead Management Plan: Statewide policies, strategies, and actions*. Ed., James B. Scott, Jr., William T. Gill. Prepared by the Washington Department of Fish and Wildlife. Olympia, WA. 42 p.

WDFW. 2013. *Puget Sound Hatchery Action Advisory Committee Final Report*. Prepared by the Hatcheries Division, Washington Department of Fish and Wildlife. Olympia, WA. 33 p.

Traditional Knowledge Meets Science for Monitoring and Managing Wild Salmon

By Will Atlas

— *Heiltsuk First Nation* —

Will Atlas is a biologist living in coastal British Columbia. Over the past six years he has worked with the Heiltsuk First Nation developing a monitoring program that supports sustainable food fisheries for sockeye salmon. He holds a BSc in Aquatic and Fisheries Sciences from the University of Washington and an MSc in Biological Sciences from Simon Fraser University. He is also a former member of The Osprey's *editorial committee.*

Fifteen thousand years ago, most of coastal British Columbia was covered in ice. As the climate warmed and glaciers receded, salmon quickly colonized rivers unlocked from beneath the ice, and people were not far behind. Archeological evidence from the Central Coast of BC shows human occupation dating back at least 13,000 years with salmon remains being commonplace in middens found at ancient village sites. What followed this early period of salmon and human colonization of the coast was the evolution of locally adapted salmon populations and the emergence of indigenous societies for whom salmon was a central component of their survival and identity. Over millennia of trial and error, systems of management and strict traditional laws evolved to reduce the risk of overharvest and ensure the sustainability of salmon fisheries. These practices reflected deep insight into the basic biology of salmon and the need for a certain number of fish to pass unharvested onto the spawning grounds to guarantee the future viability of the population. The imperative of sustainable management was reinforced by the life and death reality that if you took too many fish you'd starve in the coming years.

Weirs — picket fences built across a river allowing the selective harvest of returning fish — were a ubiquitous tool for harvest and management across the North American range of salmon. The simple genius of the technology is that it allows fishers to harvest fish while simultaneously gauging the strength of the run, precolonial adaptive management! Since the harvest is occurring within a single river, the fish are from a known population, eliminating the risks associated with mixed-stock fisheries and their well-documented impact on more fragile populations. With the arrival of Europeans on the Pacific Coast and the emergence of the commercial fishing industry, intensive subsistence fisheries were viewed as posing a threat to the economic interests of the colonists, and weirs were outlawed under the federal Fisheries Act in the late 19th century. What followed was a century of colonial control of salmon fisheries and suppression of indigenous fishing rights under the law. In the rush to exploit British Columbia's salmon and other natural resources, colonial society failed to learn from their indigenous forbears.

There are undoubtedly important lessons to be drawn from traditional fish management systems if we hope to protect wild salmon.

The failure to learn from the lessons of past has given rise to the problems British Columbia's commercial salmon fisheries face today. Treated like a gold-rush, salmon were subjected to high harvest rates, mixed-stock fisheries, and habitat destruction wrought by logging, mining and urbanization. A century and a half later, salmon populations have declined across most of the province and with them have gone many of the jobs in the fishing industry. Once the dominant source of employment in coastal communities, the commercial fishing sector is much diminished. The fishing industry today makes up a continually declining slice of British Columbia's economic pie, and is dominated by old timers and a handful of large operators who own many licenses, limiting the economic benefits to once prosperous fishing communities. Further, populations of wild salmon continue to decline in many parts of the province, with near record-low returns for sockeye and Chinook returning to the Fraser River this summer. In less than two centuries, our colonial society has driven a seemingly inexhaustible resource to the brink of collapse. These results contrast sharply with the experience of indigenous communities, who undoubtedly learned hard lessons over their ten-thousand-year history of intensive fishing. Given the sustainability of the resource at the time of European contact and the deep history of cultural learning, there are undoubtedly important lessons to be drawn from traditional management systems if we hope to improve the way we manage and protect wild salmon.

Salmon populations are extremely resilient and capable of swift recovery when environmental conditions and conservation measures align, and British Columbia is blessed with some of the most intact salmon habitat remaining anywhere in the world. In the continental US, a reliance on industrial scale hatchery supplementation has severed the link between habitat and resource stewardship and the perceived sustainability of the fishery. In BC, hatcheries are only a small part of the conversation, and community leaders remain focused on protecting habitat and ensuring that wild populations

Continued on next page

Continued from previous page

are not overharvested. Given the stagnant and declining nature of BC's commercial salmon fishery, fishing dependent communities and fisheries managers increasingly realize that new and innovative approaches to fishing are required if wild salmon are to remain a part of the province's economic mix. Since the 1980s, a series of high profile legal decisions has also reshaped the political and legal landscape in Canada, affirming the First Nations right to manage natural resources within their traditional territories and conduct Food, Social, and Ceremonial (FSC) fisheries. The ramifications of these changes have been many, but one outcome that has been transformative is the increased participation of First Nations communities in monitoring and management of salmon and other fisheries resources. In the early 1990s, the federal government moved to develop the Aboriginal Fisheries Strategy (AFS), which provides funding to First Nations communities to support their participation in monitoring. While many community leaders will say the federal funding is insufficient, most communities have brought additional resources through grants or other revenue streams to support monitoring programs.

It was with this as a backdrop that I was hired by QQs Projects Society – a Heiltsuk First Nation driven non-profit – to work in Bella Bella on the Central Coast of BC. The goal was straightforward; build a monitoring program that can provide insight into the status of salmon populations that support FSC fisheries. Of particular interest was improving monitoring data for the sockeye population in the Koeye River. Sockeye are the most important species for both subsistence and commercial fisheries in BC, and the Koeye River supports one of the largest populations in Heiltsuk Territory. However, the watershed is entirely roadless and the population had been monitored only sparsely due to its remoteness. When considering our options for monitoring sockeye we quickly landed on the idea of building a traditional-style weir as a means of capturing and tagging migrating sockeye. Archeological findings suggested that historically the Heiltsuk had used weirs for salmon harvesting, however there was no living memory of their use within the community. The project therefore served the dual purpose of reviving the cultural practice of weir building and providing a platform for a population monitoring program.

Built from locally harvested and hand split cedar, the weir has been installed in the lower Koeye River every summer since 2013. Sockeye enter the Koeye during June and July, spending the summer in the cool depths of Koeye Lake before entering the spawning areas in September and October. Each year we tag between three and six hundred fish with a visually identifiable tag and pass them upstream of the weir to continue their migration. During the fall spawning season we make multiple visits to the spawning areas above Koeye Lake, counting both tagged and untagged sockeye to produce what population biologists call a mark-resight estimate of spawner abundance. Over the past four years, estimates of abundance have ranged from 4,500 to 15,000, suggesting the population is relatively stable and healthy.

The Koeye River has never been logged and is entirely protected in conservancy, so it is no surprise that the population is doing relatively well.

Continued on next page

A traditional First Nations fish weir proved the best way for the resesrchers to capture sockeye salmon on the Koeye River for tagging and monitoring. Photo by Bryant DeRoy

Continued from previous page

However, in recent decades sockeye have undergone a pronounced decline in productivity and abundance across most of the southern half of their range, likely due to climate-driven changes in the marine environment. Further adding to the climate challenge for sockeye are our increasingly warm and dry summers. Sockeye are the most temperature sensitive of the Pacific salmon, with mortality spiking when water temperatures exceed 18 degrees Celsius (64 F). In the Fraser River this has led to mass mortality events in the warmest years, where up to 95% of fish from some populations die while migrating to their spawning areas. The degree to which climate driven pre-spawn mortality may be impacting sockeye in coastal rivers like the Koeye is less well known. Their migration between tidewater and the lake in Koeye is only 7 kilometers (4.3 miles), meaning that fish can and often do traverse the whole lower river in only a day or two. This short migration duration means fish are exposed to stressful elevated temperatures for a relatively brief time. However, if water levels drop and fish are unable to continue their migration they may be stranded in the lower Koeye, where summertime water temperatures regularly exceed 20 degrees Celsius (68 F).

Understanding the impact of a warming climate on survival across the life cycle of sockeye and other species is critical if we hope to support sustainable fisheries into the 21st century. In light of this challenge we are continuing to build our research and monitoring program to address key uncertainties including: (1) what is the rate of marine survival for sockeye and coho salmon from Koeye, and how does variability in the marine climate mediate survival and; (2) how does river temperature and elevation affect survival from river entry to spawning in adult sockeye? To answer these questions we've teamed up with the Hakai Institute, the Heiltsuk Integrated Resource Management Department (HIRMD) and Hakai Energy Solutions to develop a network of Radio Frequency Identification (RFID) stations across the Koeye watershed. These stations are powered by solar and methanol fuel cell generators that support streambed spanning RFID antennas. Fish are tagged as out-migrating smolts or at the weir as returning adults, with Passive Integrated Transponder (PIT) tags. Each tag has a unique magnetically encoded 12-digit ID number and when the fish swims over the antenna that tag number and time is recorded. This data is allowing us to estimate migration rates and survival for fish from the outset of their marine migration as smolts, back to the river as adults, as well as their survival to the spawning grounds during their in-river breeding migration.

Researcher with a sockeye salmon on the Koeye River. Photo first published to illustrate the research paper on this subject in "Ecosystem Health and Sustainability" Volume 3, 2017 Issue 6

Over the coming years, ongoing monitoring at the weir and RFID network will produce new and important insights into the effects of climate variability on sockeye salmon in the Koeye River and beyond. This information will ultimately contribute to the development of a Heiltsuk management and climate adaptation plan for sockeye salmon fisheries. While the project has been exciting from a scientific standpoint it has also served as a platform for learning and community building around traditional systems of management and salmon stewardship. We hold several field trips each year with the Bella Bella community school, and host young campers from the Koeye summer camp at the weir. It's all part of QQs and the Heiltsuk Nation's multigenerational vision for cultural and natural stewardship. An approach which emphasizes working with youth and community to foster a connection to the land and resources which sustain the Heiltsuk people, ensuring the long-term integrity of the cultural values and traditions that underpin the relationship between people and the ecosystems that support them.

Times are changing in Canada. With increasing legal and societal recognition, First Nations are experiencing a cultural and political renaissance, asserting their place as decision makers and leaders in Canadian society. However, no society exists in a vacuum and modern indigenous communities are rooted in their traditions and culture while being continually shaped by the changing world. In many ways, the weir project offers a simple and elegant symbol of this reality by drawing on an ancient technology to provide scientific information for the management of salmon, which remain at the heart of our shared coastal identity. Salmon face many challenges over the coming decades, and fishing and monitoring populations in ways that merge traditional knowledge with relevant tools from modern science gives us the best chance of seeing sustainable fisheries through an era of change and uncertainty.

For more information about the weir project check out our recently published research paper at http://www.tandfonline.com/doi/abs/10.1080/20964129.2017.1341284

And our documentary "Sitting on Water: A Season on the Koeye River" at https://vimeo.com/85332920

A Primary Biological Program for Wild Salmon and Steelhead Conservation and Recovery

By Bill Bakke and Jim Lichatowich
— *The Conservation Angler, Alder Creek Consulting* —

Bill Bakke is Director of Conservation for The Conservation Angler. Jim Lichatowich is the principal at Alder Creek Consulting. Learn more about The Conservation Angler at: www.theconservationangler.com

Any program for the conservation and recovery of wild salmon and steelhead must first and foremost have a strong foundation that recognizes wild salmon and steelhead are part of the public trust and that the population in its home river is the basic management unit. Consistent with those elements of the foundation are management practices such as adequate river and population specific escapement that meet egg deposition criteria; maintenance of habitat complexity and conditions that support the life history diversity; nutrient targets from salmonid carcasses, protection of rearing juveniles, and hatchery impacts including competition, predation, predator attraction and interbreeding between hatchery and wild salmon and steelhead.

Management of salmon and steelhead is a failure and the proof of that is the number of extinct salmonid populations and the protection of most wild salmonids as Threatened through the Endangered Species Act. Management of salmon and steelhead for the last 100 years focused on providing a product for commercial, sport and subsistence fisheries based on hatchery production. Management defined by artificial production is not ecological. This means that present management by state, federal and tribal governments will not be consistent with the public trust doctrine, and conservation and recovery of wild salmonids is an impossible goal.

Foundational principles that sustain wild salmon and steelhead:

Nature's trust and the public doctrine: When building a home it is best to start with a strong foundation so it won't collapse under its own weight. The same is true when building a wild salmon and steelhead management program. The foundation we propose is based on two important conservation principles. "*Salmon are a part of nature's trust, which creates a special obligation for the governmental agencies charged with their management. They must act as trustees of the wild salmon and protect them consistent with the long standing public trust doctrine. That obligation is to maintain the wild salmon legacy in good health for citizen beneficiaries of present and future generations. Salmon managers have abrogated that responsibility and have instead converted salmon management to the production of commodities for the benefit of sport and commercial fisheries. The salmon commodity is produced in a large industrial operation (hatcheries) which has undermined their public trust responsibilities as well as the ecological underpinnings of wild salmon's sustaining ecosystems. It created the impoverishment of wild salmon that exists today.*" (Lichatowich et al. 2017 – "*Wild Pacific Salmon: A Threatened Legacy*".)

Producing salmon as a hatchery commodity has undermined agencies' public trust responsibilities.

River and population specific management: Recognizing that the basic management unit is each specific river and population is the second part of the foundation for wild salmon and steelhead conservation and recovery. While this approach is not widely used in the Pacific Northwest, Atlantic salmon managers have adopted a river by river approach to management. In Europe and Eastern Canada salmon are being managed for the natural productivity of wild salmon in each river. River specific management sets an egg deposition target for each river and its tributaries, and then regulates harvest to achieve the appropriate number of spawners. This includes commercial ocean and river fisheries and river sport fisheries. Conservation also includes habitat protection and restoration to provide the ecological conditions required by wild salmon. Faced with declining salmon runs and little money for hatcheries, governments in Europe and Eastern Canada adopted river specific management to care for wild salmon and fisheries.

Questions regarding management practices and concepts that sustain wild salmon and steelhead:

1. **Spawner Abundance:** If there is no spawner escapement goal, then the wild salmon and steelhead are not managed for conservation. If the species is threatened with extinction, then the lack of an escapement requirement makes recovery impossible. Does your river have a target for the number of spawners needed to achieve full seeding of the habitat? How was the target number of spawners determined? Is harvest regulated to achieve the target spawner escapement annually in a river you are concerned about?

2. **Hatchery Spawners:** When hatchery salmon or steelhead breed with wild fish there are genetic and ecological

Continued on next page

Continued from previous page

impacts to the wild population. The hatchery fish found on natural spawning grounds are called strays. Natural stray rates of wild salmonids are 1 to 3%. Natural strays of wild fish serve a biological purpose, such as recolonizing habitats and potential genetic benefits to a local population. However, hatchery strays often have negative consequences for wild fish. Presently, the official number of hatchery strays allowed is excessive. This is important because naturally spawning hatchery strays and residuals have a negative impact on the reproductive success of wild salmonids. How many hatchery salmon and steelhead are spawning in your stream and what is their impact on wild salmonids? Is the number of hatchery fish mixing with wild fish on the spawning grounds regulated? Is the stray rate of hatchery fish measured and evaluated for conservation impacts on the wild salmonid population? How will excessive stray rates and non-migrating hatchery juveniles be reduced to protect wild fish?

3. **Locally Adapting:** Wild salmonids are constantly adapting to their fluctuating ecosystem including ocean and freshwater environments. Salmon and steelhead return to their natal streams to reproduce. They form a diversity of spawning populations that are adapted and continue to adapt to changing environmental conditions. Therefore wild salmonid species are productive in a vast array of ecological conditions across the landscape. Local adaptation means that a salmonid population in its natal stream will be more productive than in another stream, since all streams have different environmental conditions. Management, to be successful, must accept the fine scale adaptation of wild salmon and steelhead in order to maintain their productivity and abundance in each stream. Is the management in your stream protecting the natural adaptive diversity of wild salmon and steelhead?

4. **Habitat:** Wild salmon and steelhead are adapted to the habitat conditions of their natal stream. Each stream has habitat conditions that support the life history requirements of locally adapted salmonids. These habitats have been called a chain of habitat conditions used by salmonids to complete their freshwater reproductive potential. If the links in this chain of habitats is degraded or destroyed, salmon and steelhead are unable to effectively complete their life cycle, causing decline are degraded habitats and extinction when habitat links are destroyed. Are habitat protection programs and investments in habitat restoration based on the life history requirements of the species utilizing the stream? Since each species uses different habitat linkages, habitat management and restoration programs need to address the needs of each species. For example, fall and spring Chinook and winter and summer steelhead have different habitat requirements that must be maintained so that each distinct breeding population can be productive and complete its freshwater life history requirements. Are the state and federal land and water management agencies protecting the life cycle habitats required by each species in your river?

5. **Genetics:** Each population of wild salmon and steelhead constantly adapts to its natal and ocean habitats to complete its life cycle. Timing of adult migrations, spawning timing and place, egg deposition and maturation, rearing locations and conditions are under genetic and trait control. While genetic and trait diversity are necessary for successful life cycle productivity, these traits are not entirely fixed. The diversity allows the wild salmonid to adapt to changing environments that their 15 million year evolution has imposed on them. But when environments change too rapidly, the fish are unable to cope and will go extinct. Because wild salmon and steelhead are adapted to the conditions of their home stream environments and to ocean conditions, their abundance fluctuates. Their resilience and persistence is due to their ability to survive in constantly changing ecological conditions. Local adaptation maintains their resilience, but if change is rapid they can be defeated. For example, a dam can block fish from cold water river maturing and spawning habitats for spring Chinook and summer steelhead and they will go extinct when those habitats are no longer available. These environments and the species of wild salmon and steelhead that use them can disappear like the June Hog summer Chinook (80 to 100-plus pounds) in the Columbia River blocked by Grand Coulee Dam. Warm and more acidic ocean conditions due to climate change can cause reduced juvenile, and therefore spawner survival, and if conditions become worse their extinction. Climate change is also changing natal streams in flow and temperature, making them less productive. The goal of management is to maintain the genetic integrity of wild salmonids, so that they are able to cope with a changing ecosystem. It also means that their habitat requirements such as flow, passage and temperature are maintained, so they remain resilient and productive in naturally fluctuating habitats. Are wild salmon and steelhead in your river being managed for life history diversity, productivity and resilience so that their reproductive success and abundance is secured?

6. **Phenotypic Traits:** "Adaptive evolution is driven by natural selection that acts at the level of individual phenotypes" (Vainola et al 2017). Life history diversity provides the flexibility for individuals to cope with habitat changes. Genetics describe the structure of a fish and it can be related to the larger population and distinguished from other populations. Genetic and phenotypic variation among individuals, populations and species is the basis for adaptive evolution that supports the flexible response of a population to shifts in ecological conditions. For example, Columbia River summer steelhead migrate over a specific time and seek out cool water refuges when they encounter a river that is too warm. That flexibility promotes successful migration to their spawning areas. The loss of life history diversity in wild populations means they are more vulnerable to ecological changes that can interfere with successful breeding. What is the life history of salmonids in your stream? How do they use the stream for migration, spawning and rearing? Has the life history changed over time? Do harvest and hatchery management support life history diversity in wild salmonids?

Continued on next page

Continued from previous page

7. **Harvest:** Harvest takes many forms and each harvest subtracts from the potential wild salmon and steelhead breeders in a river system; unregulated harvesting of the fish and their habitat forces depletion or extinction. Harvest is what happens when potential spawners are removed, reducing the reproductive potential of the river population. Fishing is one form of harvest but so are dams that block streams or kill migrating adults and juvenile fish passing dams. Water diversions that constrict migration and rearing by changing flow and increasing temperatures are another form of harvest. Farming and logging are yet more forms of harvest that impact stream temperature, sediment in spawning areas, and stream structure for rearing juveniles and migrating adults. Urban development can have similar impacts on stream productivity as other forms of harvest, including pollution, making rivers less productive. Is harvest in its various forms controlled through regulations to sustain the reproductive success of affected salmon and steelhead? Fishing harvest, if not regulated to secure a spawner objective by species and race of salmonids in each stream, called river specific management, can cause the wild run to fail. When the habitats that sustain those salmonids are not regulated so that the reproductive success of the spawners is protected, then wild salmonids will fail. Are your river wild salmon and steelhead and their habitats managed for abundant, productive and resilient fish?

8. Nutrients from naturally spawning salmonids: Our rivers and creeks are being starved. When Pacific salmon spawn and die, their carcasses support the next generation of fish, fertilize riparian plant growth that in turn supplies rearing structure and shade for fish and improve the reproductive and rearing capacity of the stream. Naturally spawning wild salmonids fertilize the areas where they breed and influence the productivity of the river. These carcasses also feed wildlife that depend on this seasonal influx of food. According to estimates by Gresh et al 2000, "the historic biomass of salmon returning to the Pacific Northwest (Washington, Oregon, Idaho, and California) to be 160–226 million kg (350-498 million pounds). The number of fish now returning to these rivers has a biomass of 11.8–13.7 million kg (26-30 million pounds). These numbers indicate that just 6–7% of the marine-derived nitrogen and phosphorous once delivered to the rivers of the Pacific Northwest is currently reaching those streams." This loss of nutrients contributes to the depletion of salmonid abundance and diversity, making recovery to self-sustaining levels impossible. What is the nutrient target for wild spawning salmon and steelhead in your stream?

West Coast salmon are managed for hatchery egg-take, not wild fish egg deposit in their home rivers.

9. The Shifting Baseline: Each human generation learns what is normal, consequently, history shifts with each generation as a new normal is accepted. When the 80-100 pound summer Chinook were eliminated by Grand Coulee Dam on the Columbia, people are no longer amazed by these giant salmon and lose connection to their very existence. Even though it was not unusual to catch 30- and 40-plus pound summer steelhead in the Columbia, they are now a footnote found in old records. Like all salmonids, these fish were the creation of their habitats and persisted for over 12,000 years, but today are absent. What we see and experience shapes what we know and as these biological pages from our history are ripped out of our communal understanding of a river and its salmon, we live, without realizing it, a diminished life. It is easy to forget salmon spawning in Nevada because a dam was built in 1932 on the Owyhee River. The extinction of experience shapes how salmon are managed. Once these wild salmon are gone they cannot be replaced, yet our rivers and salmon continue to be diminished and lost. The shifting base line continues to influence what we believe is normal. What is considered normal on your river and is it protective of wild salmon and steelhead?

Hatcheries are not free and are not a replacement for wild salmonids: The West Coast approach to salmon and steelhead management is not sustainable. It relies on funding rather than the salmonid ecosystem. Hatcheries are reliant on politics and public funding, making ongoing hatchery production uncertain. Most, if not all hatcheries, are deficit spending programs (the cost is greater than the benefits provided) and degrade the reproductive success wild salmon and steelhead through non-selective harvest along with genetic and ecological impacts of mixing wild and hatchery fish spawners. The outcome of the ongoing conviction that hatcheries can replace wild salmon and steelhead has failed, while the public continues to pick up the bill.

In 2015, Wales closed its hatcheries based on information that hatchery salmon were interfering with wild Atlantic salmon. This decision was based on research in Europe and the states of Oregon and Washington. Management for Atlantic salmon has set a new standard different from that in America. The difference is that Atlantic salmon are managed for the natural productivity and resilience of wild salmon rather than replacing them with artificially produced fish. In contrast, West Coast salmon are managed for hatchery egg-take, not wild salmon and steelhead egg deposition in their home rivers.

Conclusion:

People have a lot in common with wild salmon and steelhead. We have a shared interest in particular streams. The fish can take care of themselves, providing you are interested and care enough for your favorite river to grant them the conditions they need to be even more productive, resilient and abundant.

Book Review — "A Temporary Refuge: Fourteen Seasons with Wild Steelhead"

By Michael Checcio

— *Writer* —

A Temporary Refuge: Fourteen Seasons with Wild Steelhead
By Lee Spencer. Published by Patagonia Books, 2017; $27.95 softbound. Reprinted by permission of Michael Checcio and California Fly Fisher Magazine.

There once was a time when Lee Spencer would spend up to 15 hours daily fly fishing for summer-run steelhead on the North Umpqua River in Oregon. These days, he is content to sit in a makeshift perch on a ledge above Big Bend Pool on Steamboat Creek, which is a major spawning tributary of the North Umpqua, patiently observing resting steelhead while taking copious notes. When he bothers to fish at all in the main river, he cuts the points off his hooks so his flies won't hurt the steelhead.

Lee Spencer is the "Fishwatch Caretaker" at Big Bend Pool. His function from May through December each season is to be a "human presence" that will deter would-be poachers from wiping out the wild steelhead that gather by the hundreds in the pool to await winter rains that will send them upstream to spawn. Big Bend was once known as the "Dynamite Hole," but thanks to Spencer's presence, the explosions that would turn massive numbers of fish belly-up are now a thing of the past. Spencer is now in his eighteenth season at Big Bend, patiently observing his surroundings and taking meticulous field notes. He has given up secure employment and a comfortable life in order to study and protect these fish. A prehistoric archeologist by profession, Spencer says he is "peculiarly trained to document the unknown."

What he found, *A Temporary Refuge*, is a distillation of 14 seasons at Big Bend Pool, mostly in the company of Sis, an Australian cattle dog, a heeler who saw her "job" as greeting visitors and herding them down a footpath to an observation platform that her master had set up for his fieldwork. In season, Spencer lives on site in an old Airstream trailer, with no phone, e-mail, or Internet, and it is almost too easy to think of him as a modern-day Thoreau. No doubt comparisons to Walden will prove irresistible.

But if Spencer's book brings to mind any literary antecedent, let me suggest it is another, older classic, Gilbert White's "*The Natural History of Selborne*." First published in 1789 and never out of print, it is one of the most beloved works in English literature. White's classic was the first natural history to suggest that the lives of birds and other animals have their own richness and rhythm. Like White's masterpiece, *A Temporary Refuge* is a natural history written by an amateur "naturalist," a distinctly old-fashioned term. And like White's book, *A Temporary Refuge* is in essence a work of phenology, which is the study of seasonal changes in plants and animals from year to year — such as flowering, the emergence of insects, and the migrations of birds and fish — especially in their timing and in their relationship to weather and climate. Both White and Spencer based their books on their field notes, which became a sort of annual calendar of observations that took in all the flora and fauna, migratory patterns, and seasonal shifts and transformational changes in their immediate habitats. White was a Protestant clergyman focused primarily on birds. Spencer is more Zen-like and inclined toward salmonids. Neither seems to have missed a thing.

Spencer has given up secure employment and a comfortable life in order to study and protect these fish.

In making the transition from obsessive steelhead fisherman to the guardian of a single pool — first as a volunteer at Big Bend, later as a full-time "fishwatcher" getting paid a modest per diem by the North Umpqua Foundation — Spencer learned to see his riverine habitat afresh

"*The first day of that season, I realized that the pool represented an unusual opportunity to take notes on whatever these wild summer steelhead did. Note taking and observation are what I had spent more than twenty-five years doing as a prehistoric field archeologist. . . . For the previous four or five years I had been spending fifty to a hundred days each summer and fall casting flies to steelhead in the North Umpqua, and my interest in this species of Pacific salmon was fully developed, though I had far more questions than answers. Plainly, so did everyone else. In the more than seventeen years that I had been casting flies for these fish, the how-to and the whys of steelhead and flies had accumulated in random layers of half-truths . . . .By [now] I have spent more than 3,400 days mostly without a fly rod in hand, just sitting with the wild steelhead at the pool. I can now leaven most angling myths with natural history observations.*"

Big Bend on Steamboat Creek is what Spencer calls a "refuge pool," a place where steelhead can gather to wait out the warm-weather months. They choose the pool at Big Bend because it is refreshed by a feeder creek that provides water that is much cooler than the temperatures found in the rest of Steamboat Creek. Over the

Continued on next page

Continued from previous page

summer and autumn months, as many as four hundred to eight hundred wild steelhead, along with a few spring chinook salmon, come to rest in this pool. They are exquisitely attuned to their surroundings, especially to the presence of visitors at the pool. No fishing has been allowed on Steamboat Creek since the 1930s, but the presence of humans can stress the fish. Because he is now getting around fifteen hundred visitors there each season, Spencer has chosen not to name either Steamboat Creek or Big Bend Pool in the text of his book. Which is a bit ridiculous, because its location is common knowledge, and both Steamboat Creek and Big Bend Pool are named prominently on the book's Amazon page, on the cover of the advance reading copy I received, and in the promotional literature put out by its publisher, Patagonia. (Spencer also appears in Patagonia's documentary film DamNation.) Perhaps this is a Zen riddle we are supposed to solve, because this book could have come out of the mind of Chuang Tzu. Is Spencer dreaming he is a steelhead, or is he a steelhead dreaming he is a prehistoric field archeologist?

A fly fisher methodically works the waters of the North Umpqua River hoping to connect with a wild summer steelhead. Photo by Jim Yuskavitch

This is to say that the author has the ability to think outside the ordinary human perspective and perceive things from the point of view of an animal whose mind is mostly a mystery to us. For example, based on long observation, he believes steelhead leap out of the water primarily for a better view of their surroundings and often in response to even the smallest changes in their environment. One season, a lightning strike caused a protracted wildfire near a tributary stream three miles above Big Bend Pool

"*The steelhead were more active than I had ever seen them. They carried out an estimated 25,000 jumps, flashes, accelerations, and rises. Eleven days after the start of the fire, I counted 303 jumps during the course of one day. On an average day prior to the fire, a large number of jumps for a day might amount to forty.*

Virtually all jumps by steelhead are for the purpose of getting their eyes above the surface. One, undertaken for the sake of taking a good look around, involves a steelhead jumping as much as six to eight feet out of the water. During this vertical jump the steelhead keeps its head up, which causes the fish to drop back into the pool tail first or on its belly. These "looking leaps" were the main type that I saw executed during the time of the fire.

My guess is that the steelhead in the pool were receiving continuous signals of the fire carried to them by the currents of the [tributary] creek. Seeing very little in the water, they jumped up into the air to look about. Because they could discern nothing above the surface either, they continued making their jumps".

Why do steelhead take flies? Is it aggression, fear, or some latent feeding response? Steelhead and salmon don't feed in any meaningful sense once they return from the ocean to their natal river. Spencer thinks they seize flies out of what we humans call "curiosity." ("The curious eat themselves," said the poet Theodore Roethke.) Steelhead are constantly rising to organic debris such as leaves and twigs — seemingly more often to this stuff than even to living insects — and are forever nosing around the flotsam and jetsam of a stream. To "match the hatch," steelhead anglers might as well tie their flies to resemble twigs.

" *The wild steelhead pay sharp attention to the world around them, both above and below the surface, and they are interested in even minute changes. When the first few red leaves of the Pacific dogwood drift through the pool in the fall, steelhead line up close to the surface and take turns examining or mouthing the leaves. The same thing happens with the first brilliantly yellow and lanceolate Pacific willow leaves, the first woolly bear caterpillar, the first gigantic and yellow broad-leaved maple leaf, the first orange vine maple leaf, and other first-time events. In the quite rare event that a steelhead actually takes an item floating through the pool, the steelhead moves into the path of a leaf or lichen, opens its mouth, and shakes its head to release the item after mouthing it. The same is true when certain bugs first appear.*"

Spencer used to think all steelhead rising to his flies were would-be takers. Now he knows better. "*I [am] more prepared to regard steelhead as fellow creatures adapted to their own perceptual world, and not as myopic creatures responding to the magical reality of steelhead flies.*" This "curiosity," he believes, is part of a steelhead's adaptability to an ever-changing environment. "*With a creature the size of a steelhead, its interactions with its*

Continued on next page

Continued from previous page

environment must include learning, and that curiosity can be a powerful tool in any learning process. Learning is especially useful in dealing with change, and the Pacific Northwest high-gradient streams are one of the most changeable environments on the North American continent."

What they might not be able to adapt to, he says, are the ecological ravages mankind has brought about with our modern way of life. The author makes a compelling case for closing hatcheries in every river basin that has sustaining populations of wild steelhead and salmon. "Native" hatchery steelhead can't really be considered "native" to a given stream, because "*there are probably more than twenty-five different local breeding populations of summer steelhead in the North Umpqua Basin, and each is native to a different tributary or main stem reach.*"

Finally, "the best we can do for them is to let them be." Fly fishers will have to think long and hard about that. Or start cutting the points off our hooks.

There is more to dwell on in this book than in any other I have read about fly fishing. It's not just about the way of the steelhead. It's about an entire world of forest and stream teeming with life amid seasonal changes: plants, fish, birds, amphibians, reptiles, mammals - and the people of the river basin who tell their stories. Spencer seems to know everyone up there by name. A Temporary Refuge is arranged in the form of an almanac, with each month in the vigil from May through November being given its own chapter. His narrative is drawn from his working diary of 16 volumes of annual notes that he kept and posted on the North Umpqua Foundation Web site (where they can be viewed at northumpqua.org.) His field notes are often used by biologists and other employees of the U.S. Forest Service and the Oregon Department of Fish and Wildlife. But the real appeal of this book is to a general audience and to anyone who savors fine nature writing.

In that regard, it is very much in the spirit of Gilbert White's classic "*The Natural History of Selborne,*" whose admirers have included Samuel Taylor Coleridge, Thomas Carlyle, Charles Darwin, John Ruskin, Virginia Woolf, and W. H. Auden. David Attenborough called White "a man in total harmony with his world." You can say the same about Lee Spencer.

Steamboat Creek, a key steelhead spawning tributary of the North Umpqua River, along which Lee Spencer has spent years looking after these magnificent fish. Photo by Jim Yuskavitch

Lastly, this is the story of a relationship between a human and a dog. While heartfelt, the story avoids the kind of sentimentality that usually dooms such narratives—especially in their "Go toward the light" chapters. When the time comes for Spencer to put down his beloved heeler, there is grief. But there is also a deeper understanding. Every living thing dies, though it may only be humans who "know" death. Spreading the ashes of his pet, the author summons the opening stanza of the "Eighth Elegy" by Rainer Maria Rilke.

With all its eyes, the animal world
beholds the Open. Only our eyes
are as if inverted and set all around it
like traps at its portals to freedom.
What's outside we only know from the animal's
countenance; for almost from the first we take a child
and twist him round and force him to gaze
backwards and take in structure, not the Open
that lies so deep in an animal's face.
Free from death.
Only we see death; the free animal has its demise
perpetually behind it and before it always
God, and when it moves, it moves into eternity,
the way brooks and running springs move.

Rilke's famous sequence of poems called Duino Elegies begins with lamentations but ends in rapture. And in *The Sonnets to Orpheus* that are the companion poems to the Elegies, the poet finds complete acceptance in all things alive and earthly. Rilke's openness is the eternal and infinite nature of reality into which all animals gaze.

But our human perspective is limited. We set up barriers around what we see, and these become traps to our living a life that is fully aware and in the moment. But there is a way to experience the world more fully and joyously. Fly fishers know such moments. They come to us when we find ourselves caught up in the flow of an activity that is so immersive we lose ourselves in the fascination and joy of what we are doing. But we tend to think of such moments as circumscribed — reserved for special activities, like fly fishing. If we can learn to see the world from all perspectives — not just the human one - we might see life as always flowing and transformational. And we might come to know, even within the limitations of our human perspective, some of the freedom that animals must feel. And find in love and nature consolation for our mortality.

For Lee Spencer, Big Bend Pool is the Open in Rilke's poem. I can hardly think of a more profound testament to a river or of a scientific and sociological document that is so human, beautiful, and moving.

Run Update: Wild Columbia and Snake River Steelhead

By David Moskowitz

— *The Conservation Angler* —

The 2017 pre-season forecast for Columbia River summer steelhead was reported at the March 24, 2017 North of Falcon Meeting held in Vancouver, WA. Here is a quick update on those data from Dave Moskowitz, Executive Director of The Conservation Angler:

Columbia Summer Steelhead – 2017 Pre-season Forecast

Early summers (Skamania run) = 11,300 total, with only 4,100 wild fish. **A-run summer steelhead** = 112,100 total, with only 33,000 wild fish **B-run summer steelhead** = 7,300 total, with only 1,100 wild fish

Actual Run Size: Bonneville Dam from July 1 to September 17, 2017:

- The early run (so-called "Skamania" stock) steelhead totaled fewer than 4,000 adults with only just over 1,000 wild fish, the lowest count since 1970.
- 91,311 total upriver summer steelhead have passed Bonneville Dam as of September 17. This is a small but welcome uptick since mid-August.
- This total is only **32.2%** of the most recent 10-yr. average (2007-16).
- 28,363 wild summer steelhead have passed over Bonneville Dam so far.
- The 2017 wild steelhead return is only **29.2%** of the most recent ten-year average for wild steelhead past Bonneville.
- Wild steelhead comprise 31.1% of the total steelhead past Bonneville Dam.

Actual 2017 Run Size to-date: The Dalles Dam

Here is a snapshot of things so far in 2017 from **July 1 to September 17**
- 46,252 total summer steelhead have passed The Dalles Dam.
- This total is only **24.7%** of the most recent 10-yr. average (2007-2016).
- Only 14,052 wild summer steelhead have passed over The Dalles Dam.
- The 2017 wild steelhead return is only **21.8%** of the most recent ten-year average for wild steelhead returns past The Dalles.
- Wild steelhead comprise 30.4% of the total steelhead past The Dalles Dam.

Bag limits have been reduced to ensure enough hatchery steelhead return, but no specific measures have been taken for wild fish.

Actual 2017 Run Size to-date: Lower Granite Dam

Here is a snapshot of things so far in 2017 from **July 1 to August 31**
- 3,058 total summer steelhead have passed Lower Granite Dam.
- This total is only **7.9%** of the most recent 10-yr. average (2007-2016).
- Only 1,242 wild summer steelhead have passed over Lower Granite Dam.
- The 2017 wild steelhead return is only **10.4%** of the most recent ten-year average for wild steelhead returns past Lower Granite Dam.
- Wild steelhead comprise 40.6% of the total steelhead past Lower Granite.

Notes on Conservation Rationale

1. Steelhead face warm water as they swim up the Columbia and Snake.
2. Fish will continue to shelter in refugia areas when temperatures drop.
3. High water temperatures and the forest fires near Bonneville Dam prevented steelhead sampling research for the first ten days of August, and regularly thereafter, hampering efforts to estimate the health of the B-run steelhead, and limiting efforts to update the wild B-run steelhead forecast.
4. As a result, we are fishing not knowing the B-run steelhead run size.
5. Idaho, Washington and Oregon have *reduced the bag limit for hatchery steelhead* to ensure enough hatchery steelhead return to hatcheries, ***while no specific measures*** have been taken to ensure that wild steelhead return to spawn in their home rivers.
6. Adult steelhead will face angling

Continued on next page

Visitors to Bonneville Dam are seeing fewer wild steelhead in the viewing windows this year as fishery managers document run sizes below predicted levels. Photo by Jim Yuskavitch

Continued from previous page

pressure through February and March. 7. NOAA has recently issued a memo predicting continued poor ocean and marine conditions for the next several years.

Protecting ESA-Listed Steelhead:

Non-tribal commercial and recreational fisheries may not exceed 2% mortality on ESA-listed wild A-run and wild B-run steelhead. In real numbers, sport and non-tribal commercial fisheries must not result in more than 660 wild A-run summer steelhead mortalities *or more than 22 wild B-run summer steelhead* mortalities between the mouth of the Columbia and the confluence of the Snake River. The ESA impact is based on the initial pre-season forecast.

Conservation organizations believe that the *current slate of time and area closures*, plus the creel and monitoring efforts in place are insufficient to avoid exceeding the ESA-impacts, let alone providing enough wild steelhead escapement to spawn in their natal rivers and streams.

Furthermore, the agency conservation measures do not fully and adequately address the impact of tribal platform and net fisheries on wild steelhead.

Key Questions Remain Unanswered:

1. What measures are being taken to monitor the upstream migration of B-run steelhead and track wild B-run steelhead mortality?
2. What measures are being taken to ensure enough wild steelhead reach and spawn in their home rivers?
3. Why is there is no real-time cumulative measure of B-run impacts from fisheries to date?

If you would like more detailed information, please go to www.theconservationangler.com or https://theconservationangler.wordpress.com for The Conservation Angler's detailed recommendations to conserve Columbia and Snake River wild steelhead in the recreational and commercial fisheries planned for the Columbia River this year.

Oregon Adopts Legislation Increasing River Protectons from Suction Dredge Gold Mining

Oregon rivers and their wild fish populations will see less habitat damage from suction dredge gold mining as a result of legislation placing additional restrictions on the practice that was signed by Oregon Governor Kate Brown on June 14, 2017.

The new law limits the number of mining permits to 200, regulates the number of hours miners may operate on streams and increases the cost of a permit to $250 per year.

Suction dredge gold mining on a southwestern Oregon River. Photo courtesy Rogue Riverkeeper

Suction dredge mining, which involves sucking up gravel from stream beds with motorized pumps to search for gold, has been a particular problem in southwestern Oregon rivers where suction dredge gold mining increased to about 2,000 mining operations five years ago and Oregon legislators passed a temporary moratorium on the activity in response. Suction dredge mining is especially destructive to salmon and steelhead spawning habitat.

Despite the new law, Washington State has stricter mining laws and the state of California banned suction dredge mining in 2009.

Lawsuit Aims to Force EPA to Reduce Salmon Mortality Due to High Water Temperatures

Last February, a lawsuit was filed under the Clean Water Act against the Environmental Protection Agency by a coalition of conservation organizations to force the agency to create a "temperature pollution budget" called a Total Maximum Daily Load (TDML) for the Columbia and Snake rivers. The lawsuit would also require EPA to write a plan for keeping the water in those rivers from reaching high enough temperatures to put salmon and steelhead at risk.

The need for a more aggressive approach on water temperature management on the Columbia and Snake rivers was graphically highlighted when warm water resulted in the deaths of about 250,000 Columbia River sockeye salmon during the 2015 upstream migration. Climate change is only expected to make rivers more vulnerable to high water temperatures that can prove fatal to fish such as salmon that are adapted to cold water environments.

Groups involved in the lawsuit include Columbia Riverkeeper, Snake River Waterkeeper, Idaho Rivers United, Pacific Coast Federation of Fishermen's Associations and the Institute for Fisheries Resources.

— Jim Yuskavitch

Guest Column
Continued from page 3

mining the downward trend in salmon stocks and help inform policy changes accordingly.

Climate change and impacts to habitat are the greatest threats to wild salmon and steelhead in the Skeena. This was a tough year for Skeena salmon, which saw some of the lowest returns of Chinook and sockeye ever recorded, amplifying calls for better monitoring of salmon populations now more than ever. For now, the Skeena Watershed remains a salmon stronghold.

Supporting salmon habitat rehabilitation programs, scientific research on salmon populations and working closely with First Nations fisheries is just some of the work ahead of SkeenaWild in the months to come.

Salmon smolts will literally breath more easily now that the proposed LNG terminal on the Skeena River estuary has been cancelled. Photo courtesy Tavish Campbell/Skeena Wild Conservation Trust

THE OSPREY OFFERS ELECTRONIC MAILING AND ACCEPTS ONLINE DONATIONS

Subscribers may now, at their option, receive *The Osprey* as a PDF file attached to an e-mail.

The Osprey staff wants to emphasize that this is subscribers' choice based on how you prefer to receive mailings and what fits your lifestyle. If you are an existing subscriber who would like to switch to e-mail delivery or a new subscriber for either printed or e-mail delivery, please complete the redesigned coupon on this page and send it to the Fly Fishers International with your contribution to support *The Osprey* and the cause of recovering wild steelhead and salmon.

You also have the option of making a secure credit card donation to support *The Osprey* and wild steelhead and salmon by going to this link:
http://www.flyfishersinternational.org/Conservation/TheOspreyNewsletter/tabid/225/Default.aspx

By either means, the steelhead and salmon will thank you for supporting *The Osprey*.

To receive *The Osprey,* please return this coupon with your check made out to The Osprey - Fly Fishers International

THE OSPREY

NAME

ADDRESS

CITY/STATE/ZIP

PHONE

E-Mail

I Am a New Subscriber ❑
I Am An Existing Subscriber ❑

Send My Copies By E-Mail (PDF Electronic Version) ❑
Send My Copies by Standard Mail (Hardcopy) ❑

Yes, I will help protect wild steelhead

- ❑ **$15 Basic Subscription**
- ❑ **$25 Dedicated Angler Level**
- ❑ **$50 For Future Generations of Anglers**
- ❑ **$100 If I Put Off Donating, My Fish Might Not Return Home**
- ❑ **$_____ Other, Because _____**

_____

I am a . . .

- ❑ **Citizen Conservationist**
- ❑ **Commercial Outfitter/Guide**
- ❑ **Professional Natural Resources Mgr.**
- ❑ **Other** _____

If you are a new subscriber, how did you hear about The Osprey?

- ❑ **Friend or fellow angler**
- ❑ **Fishing show**
- ❑ **Fly shop, lodge or guide**
- ❑ **Another publication.Which?**_____
- ❑ **Club or conservation group meeting**
- ❑ **Other** _____

The Osprey — Steelhead Committee
Fly Fishers International
5237 US Hwy 89 South, Suite 11
Livingston, MT 59047-9176

Thanks For Your Support

THE OSPREY

Fly Fishers International
5237 US Hwy 89 South, Suite 11
Livingston, MT 59047-9176