

The Future of Clark County's East Fork Lewis River



Presented by
Sierra Club Loo Wit Group
SW Washington
Washington State Council
International Federation of Flyfishers



CP16#0546

Submitted BOCC
3/10/2015 *Heaney*



As you read this, the East Fork Lewis River aquifer is being further degraded primarily by gravel mining, impacting groundwater flow patterns and function in the flood plain.

Continued stream bank erosion and associated sediment triggered from past gravel mining continues to cause channel instability. The result, fine sediment continues to smother ESA listed salmon and steelhead redds in the lower East Fork.

This is not the way to treat Clark County's nationally recognized steelhead sanctuary river . . . home of the state record 32 lb. 12 oz. 48" steelhead.

Photo: Gravel mining on 300 acres of prime agriculture land in the East Fork Lewis River floodplain below Daybreak Bridge.

With Your Help, The East Fork Lewis River, A Sanctuary Stream Can Be Saved!

In 2001, American Rivers, a national watchdog organization named the East Fork "one of the 10 most endangered streams in the U.S."

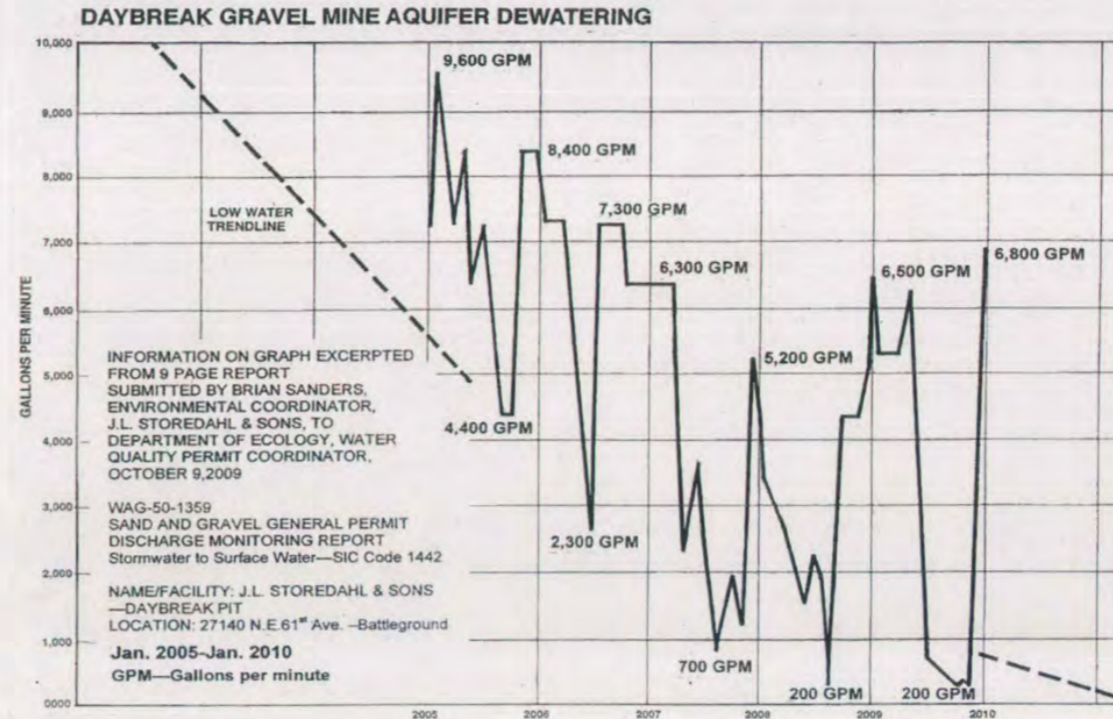
The Federation of Fly Fishers identified its "native runs of salmon and steelhead, one of the country's most at risk, primarily due to gravel mining in the floodplain".

In 2006, Fish First, through much effort, won what they hoped was the final battle against gravel mining in the 100-year floodplain of the East Fork.

Later through Clark County action under "Hearing Examiner Process", the gravel miner was back mining on 300 acres of prime agricultural land in the floodplain which is a major source of groundwater to

sustain river flow during the summer when water temperature threatens fish survival.

In 2010, a Federal Court ruled that the basis for permitting the expansion in the newly re-evaluated 100-year floodplain, in the proposed West Daybreak gravel pit area was flawed and remanded it back. Clark County, should have withdrawn the Daybreak Gravel Mine permits - - they didn't. Presently fish and stream conservation organizations are actively seeking to strengthen and improve Clark County Surface Mining Policies and Regulations to insure they don't repeat the high impact mistakes of the past. They will continue to work to restore habitat and stream conditions for East Fork ESA listed salmon and steelhead populations.



In the 1990s, a gravel miner breached the Troutdale aquifer, a regionally recognized water storage aquifer for Portland and Clark County. Still, in 2014, the story remains the same--continuous, ongoing drawdown of the groundwater base. Over the last 14 years August flows have declined from 108 CFS to 38 CFS.

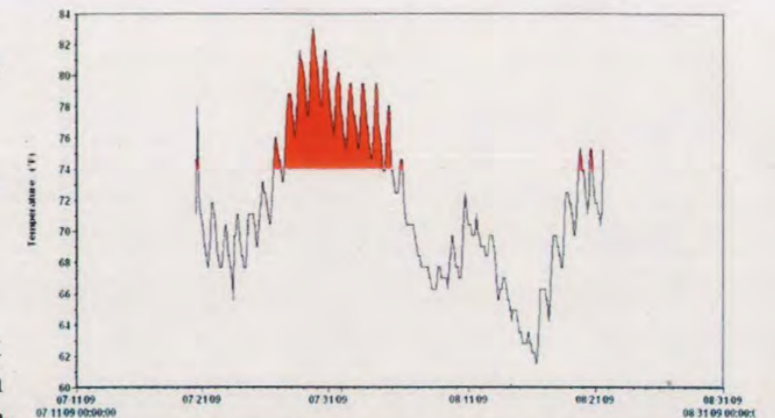
But There's Hope

Phase 1 of the West Daybreak 425 ft. side channel, habitat for juvenile salmon and steelhead is completed and occupied.

Phase 2, the major habitat restoration on the south side of the river bordering Daybreak Park below the bridge is approved and awaiting funding.

Sanctuary Status for the recovery of the East Fork native steelhead gene pool will include; elimination of hatchery stocking, phasing in fish friendly regulations, making restoration a priority. This will include reducing severe bank erosion and smothering sediment loads, create cool groundwater, recharged pools, riffles and side channels that will improve the survival of our ESA listed salmon and steelhead.

Want to know more? Contact,
Ben Dennis - Instream Conservation
VP Conservation West WA State Council IFFF
flyrod ranch@comcast.net (360) 597-3061



Lethal-to-fish 80+ degree temperatures are responsible for the decimation of wild salmon & steelhead populations.



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Washington State Council



SANDRA NEEDS YOUR HELP!

To the Editor
The Columbian
October 14, 2014

In 1978 my husband and I purchased our property on the East Fork and began holding Independence Day Celebrations here in 1980. The river's channel was often more than 10' deep then, with sand, gravel and boulder bottom teeming with crawdads. The channel "hosted" 4 species of salmon (coho, chinook, chum, and steelhead). The crawdad and fish began to disappear a few years later as silt from the irresponsible gravel mining operation began to cover the sandy gravel rock beaches, riffles, and pools with mud and silt.

The 1996 flood toppled trees that jammed at mid river trapping debris that had floated down with the flood.

What was once a pristine river is now a shallow channel with pools less than 2 to 3 feet deep. Agencies that should care are undoubtedly aware of the destruction and need to give the health of the river the priority it deserves, returning it to an environment that nurtures aquatic life.

I've been taking photos of the river since the 1980's which testify to the changes that have occurred. It is shocking. Everyone in Clark County should be concerned. The powers that be need to implement a resolution to this problem NOW.

Sandra S. Bennett, Interim President,
East Fork Frontier Neighborhood Assn.
P.O. Box 409
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360-263-3336

8916 NE 11th St
Vancouver, WA 98664
Nov. 24, 2015

Clark County Mining Overlay Committee
Vancouver, WA

To members of the Mining Overlay Committee,

First, thank you for your service to Clark County. Your time and efforts are very much appreciated.

I write to you as a recreational kayaker who has for 20 years enjoyed the beauty and solitude of the lower East Fork Lewis River. Being on the river in a small, human-powered watercraft is for myself and many other kayakers and canoeists a wonderfully relaxing experience that leaves us feeling renewed.

However, there is a growing problem with sedimentation adversely affecting the river. Navigating by kayak and canoe during periods of low water has become extremely difficult to impossible. Sediment makes the river extremely shallow after July 1 each year until the fall rains.

The area in question extends from shore launches just above, and at, the city of La Center, downstream to Paradise Point State Park and below I-5 to the confluence with the North Fork Lewis River, a distance of 4 river miles. Another sediment-affected area exists at the confluence of the Lewis and Columbia Rivers, along the south shore of the Lewis and the east shore of the Columbia, just downstream of Lake River and the Ridgefield National Wildlife Refuge – an additional 5 river miles. All of these sections are now included in the Lewis River-Vancouver Lake Water Trail, which each year draws thousands of recreational paddlers.

I believe the source of the sediment problem lies with gravel-mining operations and subsequent bank erosion in the East Fork, upstream of La Center, below Daybreak Bridge. These operations have continued for years and are extremely damaging to both the East Fork and the main stem of the Lewis near the Columbia. The increasing sediment often leaves sand bars exposed, requiring paddlers to make a wide detour to avoid them.

I ask that the Committee strongly consider restricting the gravel mining operations that create the sediment problem that has rendered the river unusable for thousands of kayakers and canoeists.

Thank you.

Sincerely,

Lehman Holder,
kayaker and concerned Clark County citizen



Erosion Continues To Bury ESA Listed Steelhead Redds!

On the East Fork Lewis (now a priority one sanctuary river), a huge sediment load is presently smothering ESA listed salmon and steelhead redds, destroying private property and aggrading the river estuary below.

Now that the East Fork is a designated “Sanctuary Stream”, it is even more important that the Lower Columbia Fish Recovery Board puts more emphasis on the restoration on the

lower East Fork, starting with 3700 ft. below Daybreak Bridge, bordering Daybreak Park, thus helping restore the unique big steelhead gene pool (state record 32 lb. 12 oz. 48” steelhead).

To do this we need to all work together to restore this critical East Fork Habitat.

For concerns contact: **Jeff Breckel, Director
Lower Columbia Fish Recovery Board**
jbreckel@lcfwb.gen.wa.us (360) 425-1553

Proven Fish Friendly Habitat Restoration Techniques

Time tested Roman Arch Technology eliminates erosion by directing current away from stream banks to the middle of the channel, while creating cool ground water recharge plunge pools, and tail outs that provide cover for juvenile and returning ESA listed salmon and steelhead.



Root wads and rock/wood J Hook Vanes direct flow away from banks removing erosion stress while creating fish cover and habitat.

Root wads face up-stream 30° to 45°.



J Hooks face up-stream at a 30° angle.

The preceding examples are just three of many effective restoration technologies. One kind of restoration does not fit all the problems at a particular stream site. A mix of treatments is often needed. For more information on fish friendly science/stream engineering based habitat restoration, google the Natural Resource Conservation Service (NRCS) 654 Handbook at their internet site. (nrcs.usda.gov) or NRCS NEH-654.



InStream Conservation

Restoring SW Washington's Endangered Fish & Watersheds

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www.eastforklewisriver.org



Rescuing A Lost Wild Resource in SW Washington

Open the door to proven wild fish restoration projects such as Northwest Wild Fish Rescue's. Last spring NWWFR released 35,000 coho and steelhead smolts. These were rescued as fingerlings, from local streams that were drying up. They were reared in spring fed facilities during the warm summer months and then returned to their tributary streams, to go to ocean pastures, when they smolt the following spring. How many marginal tributaries out there in the greater Northwest could become hundreds of times more productive at producing wild coho and steelhead?

We need to refocus our energy on wild/native fish and reduce the use of hatcheries as a recovery tool. It's been well documented that hatchery salmon and steelhead are severely compromised by hatchery production.

If you're interested, I would be glad to give you a tour of this much conflicted watershed and Northwest Wild Fish Rescue facilities.

Questions, email: flyrodbranch@comcast.net
phone: (360) 597-3061

Best Regards,

Ben Dennis
VP Conservation West, WSCFFF

Welcome to the fourth issue of WSCFFF CONSERVATION CURRENTS, a forum where you and your club can present your conservation projects, your ideas, regulation changes, new products **and** successes to fly fishing clubs and other fly fishers, in the great Northwest. We'll gather them and bring you the news in future Conservation Currents issues.

Please send info and photos to: Ben Dennis,
VP Conservation, West, WSCFFF

Email me: flyrodbranch@comcast.net
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Conservation Currents



Volume 1, Number 4

Editor - Ben Dennis - www.washingtoncouncilfff.org

Spring 2013



Lucia Falls, mile 21 upper East Fork



Lower East Fork, mile 6 below Daybreak Park

The 2 Faces of the East Fork Lewis River

Up until the 1980's, the free flowing 43 mile long East Fork was known as one of the 5 best steelhead streams in Washington state. It was the home of robust populations of wild and native bright spring and fall chinook, coho, chum salmon, winter and summer steelhead, sea run cutthroat trout and smelt. Today, most of the populations are gone, severely depleted or ESA threatened/endangered. When a river with such a history of past productivity of all species, but in particular, a unique population of native steelhead (32lb,12 oz state record), deserves special status for recovery.

Sanctuary Status for the Recovery of the East Fork Lewis River

The East Fork and its tributaries and its remnant fish populations, need sanctuary status and direct involvement of government agencies and conservation organizations, to provide proven fish friendly, science/engineering based habitat restora-

tion following (NRCS) (Natural Resource Conservation Service) guidelines; encompassing site survey, analysis, planning, permitting, funding, construction and monitoring. The resulting rock/wood habitat complexity will provide deep, cool ground water recharged pools and gravel tail waters, where salmon and steelhead spawn. Add cool ground water recharged side channels, where fingerlings and native fish can retreat to during floods, plus more fish friendly regulations. Let's make this a test case to see what healthy habitat improvement, management and nutrient enhancement for wild fish can do. Let's bring the East Fork back to its former glory. Let's make the East Fork a shining example of what can happen when everyone works together to restore healthy habitat for our wild salmon, steelhead and other species.

Let's start by actively supporting the approved and budgeted 3700 ft. habitat restoration, bordering Daybreak Park this year.



InStream Conservation News

Restoring SW Washington's Endangered Fish & Watersheds

Published every so often

Volume Four Fall 2014



How many juvenile salmon/steelhead can you find in this side channel photo?

Cool Side Channel Groundwater Recharge, Creates a Healthy Environment for ESA Listed Juvenile Salmon & Steelhead

300+ juvenile salmon and steelhead are now inhabiting the East Fork, Lewis River, cool groundwater, recharged (57 degree) side channel, at Daybreak Park, below the bridge's south side.

BEFORE---low summer flows and high temperatures can create lethal conditions for wild, river spawned juvenile salmon and steelhead.

NOW---placement of sub-surface, large wood and de-needled Christmas trees, collected by volunteers from "Project Healing Waters" (recovering veterans) and members of the newly formed Salmon Creek Fly Fishers,

working with a local Boy Scout troop, provide cover, predator protection and nutrient.

SUCCESS---the discarded trees gathered by scouts, collected by volunteers and placed in the stream---a success story for people, the stream---and---foremost, ESA listed salmon and steelhead.

Fish First, Friends of the East Fork and other volunteers installed the West Daybreak side channel. Ongoing volunteerism will continue to help long-term water and fish survival in Clark County's newly designated sanctuary river.

Combining side channel habitat with stabilized deep pool, riffle-run, tailout habitat and increased nutrient distribution, either with salmon carcasses or man-made (analogue) pellets, can go a long way toward improving our "Threatened and Endangered", listed wild salmon and steelhead populations.

Stream restoration projects need to be monitored for:

- How successful the project is in providing deep cool water pools, predation cover, and spawning/rearing habitat.
- A transparent audited monitored system of how the project met its goals overtime, and how the taxpayers as well as the fish have benefited.



Volunteers interested in restoring our rivers and helping save our endangered wild & native salmon & steelhead, contact: (360) 887-0866 or (360) 597-3061

Note: All projects shown, are monitored for success

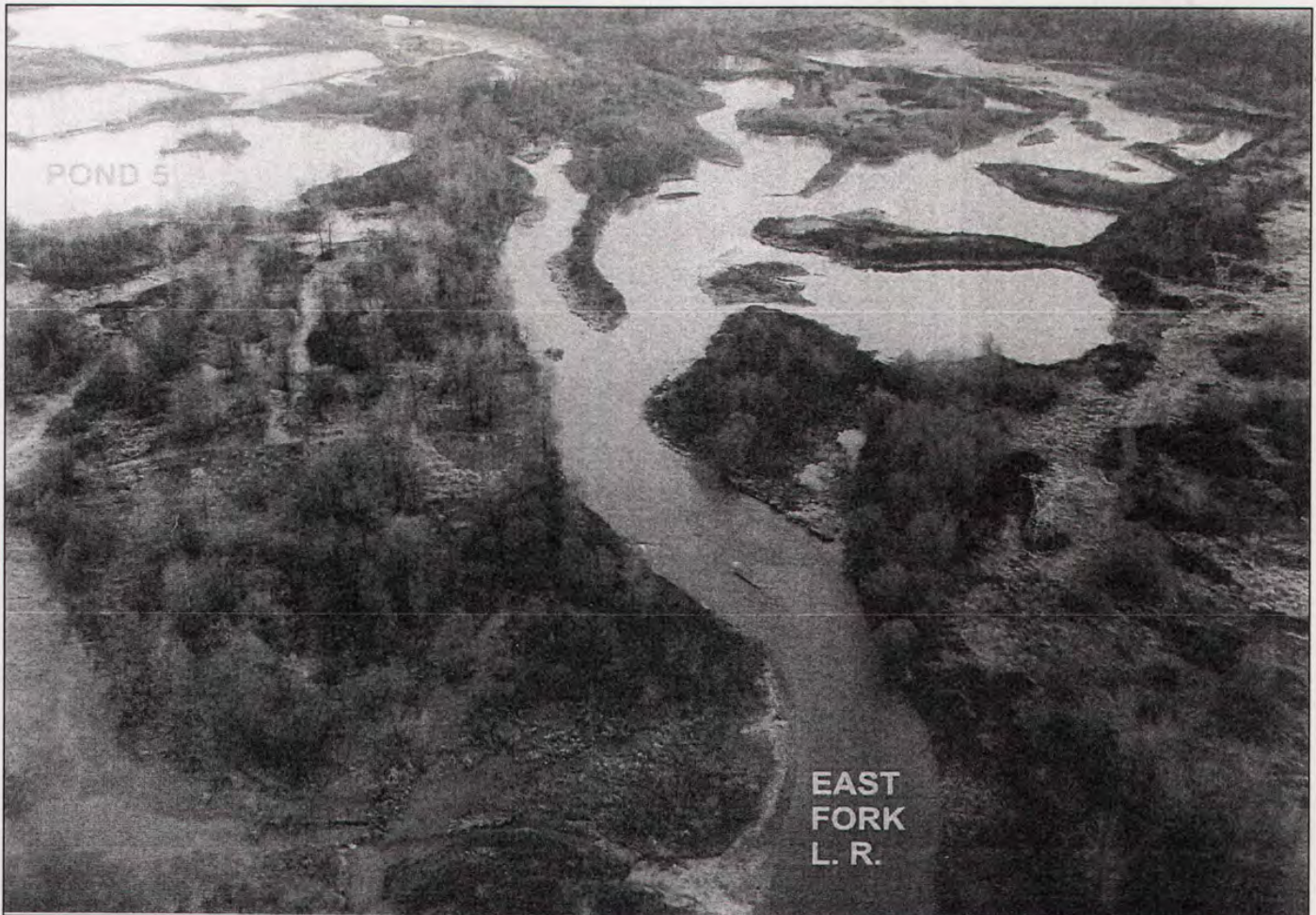


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Upstream View of Dean Creek Outlet. Left is Storedahl-Daybreak Pits Pond 5 - Dec. 2007

Large East Fork Lewis River Sediment Loads Ignored!

Press release, Dec. 03, 2014 ... the Washington Salmon Recovery Funding Board voted to fund 10 projects submitted by the Lower Columbia Fish Recovery Board for a total of \$2.7 million and retain 7 projects listed as “Alternates” for potential funding in case a funded project does not proceed to contracting.


Jeff Breckel, Executive Director LCFRB said, “This is the 16th year the Board and TAC have reviewed projects for several funding sources. Since 1998 the LCFRB has evaluated more than 300 proposals. Grant requests have topped \$51 million. The region has received 252 grant

awards totaling \$39.5 million and sponsors have matched these grants with \$18.1 million in cash and in-kind contributions, roughly 36%.”

Meanwhile, over the last 14 years, huge sediment loads continue to smother ESA listed salmon and steelhead redds, and reduce property values on the Lower East Fork, Clark County’s sanctuary river. The East Fork deserves more attention!

Want to know more? Contact:

Ben Dennis - Instream Conservation
VP Conservation West WA State Council IFFF
flyrodbranch@comcast.net (360) 597-3061
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Become A Friend Of The East Fork Lewis River!



Over the last 70 years the lower 16 miles of Clark County's East Fork Lewis River has been severely degraded by gravel mining, natural events and man. In summer lethal stream temperatures and predators, plus smothering sediments, loss of cool ground water recharged pools and spawning riffles, take its toll on the remaining ESA listed juvenile salmon and steelhead.

In the early 90's, gravel mining breached the Troutdale Aquifer, further reducing summer groundwater flows and increasing river temperatures.

The river's remaining ESA listed wild & native salmon and steelhead are in serious trouble.

Today, the East Fork Lewis River has is a designated "sanctuary" stream

Sanctuary status for the recovery of our wild salmon and steelhead includes:

1. The elimination of all hatchery stocking
2. Fish friendly regulations
3. Habitat restoration using fish friendly, deep groundwater recharged pools with tailouts for spawning, a critical component in the recovery of these magnificent fish (WA state record, 32 lb.12 oz., 48" steelhead)

First step - - restoration of the severely damaged 16 miles of the Lower East Fork, Starting with the 3,700 ft. segment at West Daybreak Park, below the Daybreak bridge.

Together, we will restore this critical East Fork habitat.

Become a friend of the East Fork

Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____

Email: _____

I wish to volunteer. Here's my expertise: _____

Life Membership \$500 High school/college student \$5

Sponsor \$100 Company matching funds \$ _____

Supporter \$10 Grant or gift \$ _____

*Smolts' kids under 12 Free

Friends Of The East Fork is a 501© (3) non profit organization. Your membership and contributions meet Federal guidelines for tax deductions.



Richard Dyrland, MS

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*Join Friends of the East Fork
For information, visit www.eastforklewisriver.org*



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Conserving, Restoring, Educating Through Fly Fishing

Conservation Committee/East Fork Lewis River Restoration

The East Fork Sanctuary Status approval, opens a new door to pressuring Lower Columbia Fish Recovery Board to proceed with long delayed, much needed habitat restoration.

Over the last 5 years I've been working on East Fork issues, talking to agency personnel, politicians, generating educational literature, articles, inserts in publications, a web page (instreamconservation.org), tabletop displays, and talking to the public at events and wherever possible. This has been done mostly with my own funds, some help from the Sierra Club and Washington State Council Federation of Fly Fishers to fund an insert for publications.

The Literature Covers: (see exhibit A)

1. The Tragic History -

What happens when a river is gravel mined? The long term damage to the aquifer, and flood plain, lethal temperatures, sedimentation, pollution, resulting in the loss of ESA listed salmon and steelhead spawning habitat. The fact is the East Fork aquifer, flood plain and hydrology is forever changed by gravel mining.

2. Habitat -

What habitat restoration technologies should be used to bring the East Fork back to health? If habitat restoration is to succeed it is imperative that responsible agencies provide proven fish friendly science/engineer based habitat restoration, following National NRCS Handbook 654 guidelines encompassing site survey analysis, plan ning and permitting rock/wood habitat complexity that removes stress from banks, provides deep cool groundwater, recharged pools, holding areas and gravel tail outs, where wild salmon and steelhead spawn. In addition cool groundwater recharged side channels with cover for juvenile salmon and steelhead, plus nutrient enhancement for a healthy growing environment are critical.

Players -

River restoration is managed by the Lower Columbia Fish Recovery Board.

Jeff Breckel is the director - jbreckel@lcfwb.gen.wa.us - (360) 425-1553.

Board members are a diverse group with diverse interests. Most have little real knowledge of how a river works & is very political. The technical advisory committee is also very political.

The Lower Columbia Fish Enhancement Group Director is Tony Meyer. He is a former power company lineman with no formal training. He has had project failures, especially with log jams. He drives pilings into rivers and lashes them together with cable. Which can be marginally effective, but in some cases can lead to failures, accelerated erosion and loss of habitat for ESA listed fish.

The Recreation and Conservation Office (ROC) is the funding arm of restoration.

Director - Kaleen.cottingham@rco.wa.gov

Brian Abbott is the contact and coordinator for the governors salmon recovery office - brian.abbott@gsro.wa.gov - (360) 902-2638

The following are highly qualified professionals with years of experience in river restoration are;

To insure proper technology is applied to a stream problem, there are restoration alternatives to explore using fish friendly, science and engineering based habitat restoration following NRCS Handbook #654 guidelines.

The following experts are leaders in the field and have evaluated thousands of miles of river habitat and successfully completed hundreds of river restoration projects, across the country.

Dr. Frank Reckendorf, Private Consultant and retired NRCS WNTC
Fluvial Geomorphologist
Phone: (503) 451-2130 Email: frecken@mac.com

Dr. Barry Southerland, Fluvial Geomorphologist, CPESC#514WNTSC, NRCS
Phone: (503) 273-2436 Email: barry.southerland@por.usda.gov

Richard Dyrland, Ms - Supervisory Hydrologist Phone: 360-887-0866
Email: toppacific2@msn.com

Russ Lawrence, P.E., M.Sc., Fluvial Geomorphologist
Streamfix Phone: 503-631-8184 Email: russ@streamfix.com

The tax and rate payers and our ESA listed salmon and steelhead deserve better.
Let's make use of this unparalleled talent now!



Ben Dennis
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VP Conservation West, Washington State Council, Federation of Fly Fishers
Excom Rivers/fish Conservation, SW Washington Loo Wit Group, Sierra Club
V.P. Conservation Director, Salmon Creek Fly Fishers

Conflict rises to surface

Whose side is he on? Hydro-geologist Randy Sweet testified for J.L. Storedahl & Sons in lawsuits brought by Friends of the East Fork and Fish First in 2003, 2005 and 2006, to halt gravel mining in the East Fork of Lewis River. Sweet has done consultant work for Storedahl, including its Daybreak mine expansion project in 2003. He developed its habitat conservation plan. Recently, Superior Court Judge Rovart ruled against National Marine Fisheries Service and U.S. Fish and Wildlife, saying they should have obligated Storedahl to restore existing gravel pits as part of the baseline conditions at the site instead of giving Storedahl credit for reclamation against impacts of digging new pits.

Sweet, then and now, serves as head of Lower Columbia Fish Recovery Board's technical advisory committee. He helps determine who does East Fork restoration and who receives funding. Can Sweet advocate for the gravel miner who destroys endangered fish habitat and be on the recovery board at the same time?

Ben Dennis
VANCOUVER

PS: In essence does Storedahl own the Lower Columbia Fish Recovery Board?

Still waiting on habitat restoration

When government agencies or other organizations stall, refuse, or otherwise delay proven science-driven habitat restoration designed to save our threatened and endangered steelhead and salmon populations, isn't this a violation of the Endangered Species Act?

During the past six years, scientists have presented Natural Resource Conservation Services-approved habitat restoration plans for the lower East Fork of the Lewis River to local, state and federal agencies that are mandated to save these fish.

To date, permitting and funding for these restoration efforts in critical habitat have primarily been refused or delayed, jeopardizing the recovery of these ESA-listed fish.

Isn't this a violation of the Endangered Species Act?

Ben Dennis
VANCOUVER

EAST FORK LEWIS RIVER, AN AMERICAN TRAGEDY

In 2001, American Rivers named the East Fork Lewis River, Clark County, Washington State, "one of the most endangered streams in the U.S." and the Federation of Flyfishers identified its "native runs of salmon and steelhead as one of the country's most at risk", the result of indiscriminate gravel mining.

In July 2005, Fish First and Friends of the East Fork won what they hoped was the final court battle against gravel miner J.L. Stordahl & Sons to cease gravel mining in the floodplain of East Fork of the Lewis River.

In 2008 the Washington State Supreme Court overturned the lawsuit and the gravel miner is back mining the East Fork.

In 2010 a Federal District Court Judge recently ruled that the basis for permitting the expansion of mining is flawed. This ruling and your support can work, requiring Clark County to issue a "cease and desist order" to stop further valley floor gravel mining.

Now nearly 10 years later here is the price the East Fork, home of Washington State's record 32 lb. 12 oz. steelhead continues to pay.

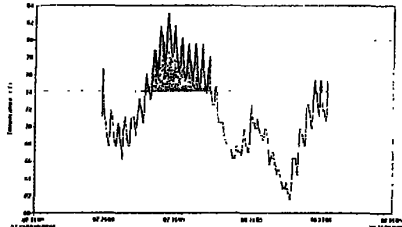
- Excessive sedimentation, bed and bank erosion, channel avulsion, loss of spawning habitat and deep pools, created a stream system crisis.

- In the 1990's the gravel miner breached the huge Aquifer, supplier of water to much of Clark County including the major city, Vancouver and parts of Oregon's Multnomah County, resulting in aggravating the ongoing dewatering of the East Fork.



2001 - 2010 one of the 10 most endangered rivers in the US

- The breach continues to effect summer flows on the East Fork, with records evidencing less than half its 10-year average.
- That coupled with lethal-to-fish summer water temperatures reaching as high as 80 degrees is responsible for the decimation of wild salmon and steelhead populations.



- Other helpful aquatic life in the river is lost, as undesirable warm water predators thrive.
- Science based restoration and funding are being hindered.
- Agencies mandated to protect wild and endangered fish need to do much better.
- Elected officials have been recipients of monetary donations from the gravel miner.
- Nearly 10 years have gone by and the river remains sick.

It is time for the Lower Columbia Fish Recovery Board, county, state and federal officials to finally get serious about enforcing the Endangered Species Act. It is time to put aside political and personal differences and focus energy on the recovery of East Fork Lewis' endangered fish and habitat. It is time to put endangered fish first.

Habitat restoration funds are there. The science and guidelines are there. Let's make this an opportunity for current and future generations to experience a river where endangered salmon and steelhead spawn and thrive.

CALL OR EMAIL YOUR GOVERNMENT OFFICIALS. WITH YOUR HELP WE CAN MAKE A DIFFERENCE.



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The Ongoing Plight of Washington's East Fork Lewis River

By Cindy Morgan
— Friends of the East Fork —

Wild fish advocates have been fighting a years-long battle to protect this important Washington salmon and steelhead river. Author Cindy Morgan brings us up to date on the latest developments on this embattled river. Morgan is on the Board of Directors of Friends of the East Fork. To learn more about this organization visit them at www.eastforklewisriver.org.

Among the many legendary rivers of Washington State, the East Fork of the Lewis River stands in a class of its own. The East Fork has been known for record-size steelhead weighing in the 30-pound-plus range. The record steelhead for the state of Washington, weighing 32-plus pounds, was caught in the river in 1978. Two more steelhead were caught in the stream weighing 30 pounds each the same year. The East Fork is also home to one or more populations of depressed tule fall Chinook, bright fall Chinook, spring Chinook, coho, chum, winter and summer steelhead, searun cutthroat trout, lamprey and smelt. Fifty years of gravel mining in the floodway of the river have severely and critically affected the endangered species of fish that live in the river. The East Fork's biggest asset, habitat, and biggest problems — gravel mining, lethal-to-salmon water temperatures and fecal coliform — lie in the lower river.

The Lewis River enters the Columbia River just outside of Woodland. Not far upstream, the Lewis splits into its north fork and the east fork. From that split to just beyond its confluence with the mouth of Mason Creek, the East Fork is tidally influenced. This area provides prime estuary habitat for rearing juvenile and migrating adult salmonids. The entire river is free of dams, and the upper watershed is largely forested. Despite having suffered some scouring from historic log-

ging operations and forest fires, the habitat remains in good condition. The lower East Fork watershed is dominated by residential and agricultural uses and includes a 2,000-acre greenway owned by Clark County. Just upstream of the East Fork's tidal reach is a floodplain gravel mine owned by J.L. Stordahl & Sons, that includes over 70 acres of mined-out gravel pit ponds and a planned expansion of 300 acres.

Upstream of the mine are Daybreak Park and Lewisville Park, both popular swimming and drift boat accesses. Further upstream are Lucia Falls,

For the past 20 years, gravel mining along the East Fork Lewis has been draining the floodplain's aquifer.

Moulton Falls, Sunset Falls and US Forest Service land. The headwaters of the East Fork flow through steep terrain and narrow valleys. Lucia Falls, at river mile 21, blocks migration of all anadromous species except for steelhead and some coho.

East Fork Lewis River identified as critical to salmon recovery

Fall Chinook, chum, coho, and summer and winter steelhead numbers have declined to only a small fraction of historical levels, and populations are all currently at very high risk of extinction. Returns of summer steelhead include both natural and hatchery produced fish.

Critical fish habitat problems include loss of habitat diversity, low summer flows, increased sediment loading,

high summer temperatures, and channel instability due to extensive historical gravel mining activities in the lower river. Underlying watershed issues include impaired hydraulic conditions, increased sediment supply, and degraded riparian conditions, particularly in the lower watershed due to extensive development pressure, high road density, lack of mature forest cover, and loss of floodplain forest. To address these issues, key recovery priorities for the East Fork Lewis sub-basin are to restore lowland floodplain function, riparian function and stream habitat diversity, to manage growth and development, to protect watershed processes and habitat conditions, and to align hatchery priorities with conservation objectives.

Why gravel mining in the floodplain is affecting fish

The Daybreak Mine is dewatering the East Fork by pulling water from the aquifer and dumping it as surface water into the river. The aquifer of a healthy river holds water in reserve that is critical to rearing and holding fish during late summer and fall when the water level in the river is at its lowest and warmest point. The East Fork groundwater reserves are critically low, and during late fall flows are extremely low. Some argue that increased population density is to blame, and while population density may be a factor, groundwater mining at the Daybreak Gravel mine for the last 20 years has been and still is draining the aquifer. The Discharge Monitoring Reports (DMR) written by the mine operator and on file at the Washington Department of Ecology (DOE) prove it. The gravel mine operator breached the Troutdale aquifer in the southeast corner of Pond One. Washington Department of Natural Resources (DNR) geologist inspection annual reports recognized water "bub-

Continued on next page

Continued from previous page

bling up" in the pond in 1991 and in later years. In addition, all five ponds have been mined to 50 feet, exposing the unconsolidated gravel aquifer along all edges. Today, water continues to bubble up in Pond One. Much like an artesian well, water is draining through ponds, culverts and ditches into the East Fork by way of Dean Creek.

Storedahl & Sons was obligated to reclaim its existing mine pits within two years after the end of mining them. It has now been more than a decade with little or no reclamation. DNR inspectors recorded in annual reports that they notified Storedahl that the law requires "that each segment of the mine shall be reclaimed within two years of completion of surface mining on that segment."

Since 2005, Storedahl has been required to file Discharge Monitoring Reports as part of their National Pollutant Discharge Elimination System (NPDES) permit with DOE. Those reports show a steady decrease in the amount of water flow from the ponds.

For example, the DMRs for the first quarter of 2006 spilled 16 times the amount of water allowed in the operator's Habitat Conservation Plan (HCP). During the same quarter, nearly 10 million gallons or 2,904 acre-feet of water drained from the ponds. There are no culverts or streams feeding into the ponds. All of the water that enters the ponds before flowing out into the river comes from the Unconsolidated Gravel and Troutdale aquifers.

Misrepresentation of groundwater conditions

Storedahl's Environmental Impact Statement (EIS) misrepresents groundwater conditions on the site as of the date of the Habitat Conservation Plan (HCP). DNR Annual Inspection Reports from 1991, 1993 and 1998 bring attention to "water with significant current moving through the ponds", "18 inch culvert can't handle discharge, channel has been cut to allow overflow", and "seeps and spring in southeast corner." The company knew the Daybreak Mine had issues with large amounts of water leaving

the ponds, yet they recorded in their HCP that approximately 3.2 cfs in winter and 1.2 cfs in summer enter the ponds and that warmer water leaving the ponds via groundwater seeps takes 70 to 200 days to reach the river.

Despite these claims, the DNR's inspection reports in 1999 and discharge monitoring reports in 2009 tell a very different story. The data shows far more water was measured flowing out of the ponds at the time the operator calculated flow at 3.2 cfs in winter and 1.2 cfs in summer. This is a critical aspect of the environmental impact of this mine on the base flow of the East Fork.

DMR reports that show that the ponds are dewatering the aquifer

The extent and effects of this dewatering are detrimental to a number of ESA listed species including fall Chinook and chum salmon, and summer and winter steelhead — all designated as Threatened.

Low water levels in the East Fork during late summer and fall expose cobble, which warms the water. Warm water temperatures are further exacerbated by warm water that spills continually from the pits. In August 2009, Friends of the East Fork recorded water temperatures over 80 degrees in the river for four days and eleven days above 76 degrees. These temperatures are lethal to salmonids. During the same period The Reflector, a local newspaper, published an article on a large number of floating dead fish spotted in the Daybreak Bridge area.

The East Fork has exceeded Total Maximum Daily Loads (TMDL) for temperature and fecal coliform and is identified by DOE as one of the rivers in Washington in greatest need of reclamation.

Importance of Clark County aquifer

In 2006, most of Clark County was designated a sole source aquifer by the Environmental Protection Agency (EPA). The Troutdale Aquifer lies under the East Fork and is the "sole source" of drinking water for most of the population of Clark County. The potential for groundwater contamination is significant. In addition, increased residential development in

the lower watershed has the potential for pollution loading in the form of storm water and sediment run-off.

Although Clark County Hearings Examiner Daniel Kearns denied the mine expansion in 2008 under county zoning laws, Clark County Superior Court Judge Nichol's reversed his decision in 2010, and Storedahl was able to expand its mining operation on the East Fork.

At about the same time, U.S. District Judge James L. Robart ruled that the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) violated the Administrative Procedures Act by failing to comply with the ESA in setting the environmental baseline for their biological opinions.

The agencies should have treated the mine operator's obligation to reclaim the existing pits as part of the baseline conditions at the site. Their decision was ruled to be 'arbitrary and capricious' because they failed to consider environmental baselines, an important part of the problem. The matter was remanded back to the two agencies for further consideration. The court found that the Environmental Impact Statement (EIS) for the project had the same flaw, and so violated the National Environmental Policy Act (NEPA).

DNR's plan for reclamation is to take thousands of yards of material from construction and freeway projects, hauled and stockpiled at the Daybreak Gravel mine, and dump it into the ponds to partially fill them and reduce their 70 acres of water mass. Filling with off-site fine clay-based material is foreign to what was removed from the excavations and will act as a plug in the aquifer. The water in the aquifer won't be able to flow freely through this area as it had in the past and will flow around it until a major flood event occurs. Then, the water will push this material up and out of the ponds and dump it on downstream properties. The floodplain of the lower East Fork is a braided river valley with ancient channels. The Daybreak Gravel Mine lies in this floodplain only a couple hundred feet from the river. Avulsion into these ponds is expected. It's just a matter of when.

At the Daybreak Gravel Mine, the river widens from an average of 50 to

Continued on next page

Continued from previous page

300 feet. Running warm and shallow in summer, this is the result of abandoned gravel mines on the south side of the river, that were allowed to be swallowed up by the East Fork, causing the river to abandon more than 3,000 feet of prime steelhead spawning beds. The avulsed pits, known as the Ridgefield pits, are full of debris, sediment, and predator fish.

The Federal Emergency Management Agency (FEMA) accepted public comment through March 29, 2011 on revised floodplain maps for several creeks in Clark County including Mill Creek, which is near the Daybreak mine. Map revisions will affect listed species when construction projects are allowed near and in the floodplain and in the watershed. A recent decision in Puget Sound forced FEMA to seek consultation with NOAA Fisheries to develop a biological opinion for all map revisions. Will FEMA consult with NOAA Fisheries on the revisions in Clark County?

Restoration slow

In 2000, at the urging of Fish First, the Washington Department of Fish and Wildlife (WDFW) installed a screw trap just below the pits to prove that endangered chum salmon still swim these waters. Their findings were conclusive that native chum are still present, but in limited numbers. Chum salmon are important to the health of a watershed because healthy runs provide a rich source of nutrients for aquatic and riparian communities.

Local wild fish advocacy groups, Friends of the East Fork and Fish First, used grant money and matching dollars to build a chum channel on private property, just downstream of the gravel mine and three chum salmon spawned in it within days of completion. Both groups also place carcasses in the East Fork and tributaries, replacing some of the nutrients, which were formerly delivered by abundant salmon runs. These carcasses provide nutrients that support primary productivity in the river and surrounding habitats, cascading up the food web through invertebrates to steelhead, salmon fry and other biota in and near the stream.

Ultimately, for the fish to come back

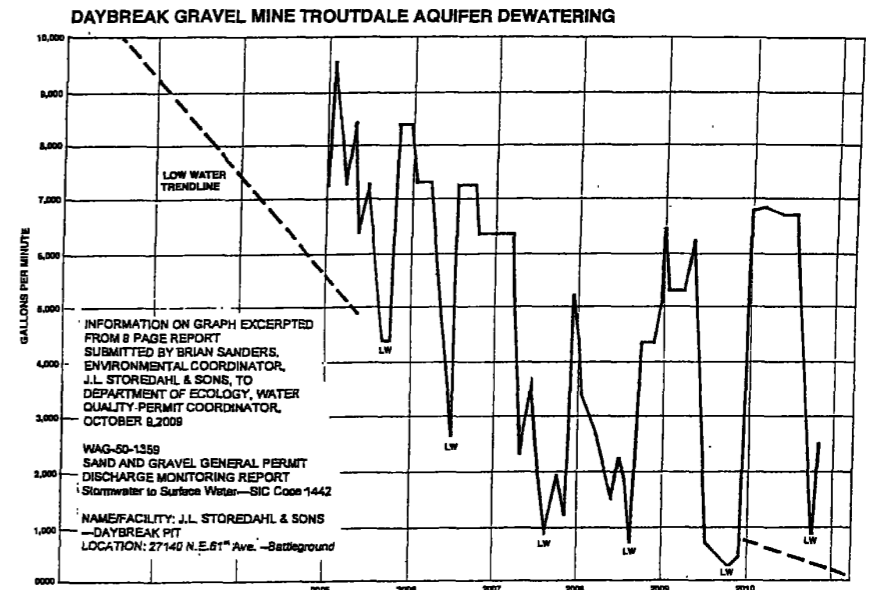
in numbers, non-selective commercial harvest in the Columbia River must be reduced. But reducing harvest will only go so far unless the wasteful withdrawal of water from the aquifer is stopped. With better regulation of groundwater, the aquifer will hold more water and supply a more reliable supply of cold clean water during the critical summer low water period. Cool water and quality habitat for the fish can also be increased by connecting historical tree covered side channels to the river, and more sound management of riparian areas to eliminate mass wasting and silting of redds must be implemented. Without these major changes on the East Fork Lewis River, threatened runs of wild salmon and

steelhead will continue to slide closer to extinction. What a shame that would be for one of Washington's greatest rivers.

The Osprey is a publication of The Federation of Fly Fishers

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.



In the 1990's, gravel miner J.L. Storedahl breached the huge aquifer, supplier of water to much of Clark County, including major city, Vancouver and parts of Oregon's Multnomah County. Still, in 2011, the result remains the same—continuous, ongoing dewatering of the East Fork.

ORBIT**Storedahl dissent silenced?**

Washington's Department of Ecology barred a staff geologist from submitting her criticisms of a proposed gravel mining project on the East Fork of the Lewis River to federal agencies charged with protecting threatened salmon and steelhead.

The state's top geologist told the same agencies to disregard criticisms of J.L. Storedahl and Sons' gravel pit reclamation plan submitted by a state mine reclamation expert. And top officials at the Washington Department of Fish and Wildlife declined to give federal biologists the results of field surveys by Vancouver-based state biologists that show sharp declines in steelhead spawning habitat in the lower East Fork of the Lewis River near the site of the proposed new gravel pits.

Opponents of Storedahl's gravel mining plan say the criticisms are getting muzzled because of political pressure to support the company's plans to mine at its Daybreak site between La Center and Battle Ground. They argue that the very scientists who are being denied a voice in the government approval process are the best qualified to evaluate it.

"We need to focus on the fact that the process is being corrupted," said Jim Malinowski, a north Clark County private-property rights advocate and a member of the advocacy group Fish First. "The technical people who should be evaluating this project are being told not to submit information."

State agency officials say they have been careful not to stray from their statutory authority in commenting on whether the mining plan will likely limit future harm to threatened salmon and steelhead runs in the East Fork. All three agencies dismiss accusations that they soft-pedaled criticisms of the proposal under political pressure.

Tens of millions of dollars of public money and countless volunteer hours have been spent to protect and restore habitat along the undammed East Fork, one of the state's top-priority streams for restoration of threatened salmon and steelhead habitat.

Fish First and Friends of the East Fork have developed a restoration plan for the river, which would be compromised by additional gravel mining. Their plan too has drawn sharp criticism from some scientists.

Storedahl has spent six years and more than \$2 million developing and promoting a mining and habitat restoration plan with help from several well-connected consultants, including Joe King, former Washington House speaker, and Curt Smitch, formerly Gov. Gary Locke's salmon adviser. Last year Smitch solicited letters from Locke, Sen. Maria Cantwell and Sen. Patty Murray expressing support for the habitat plan.

As part of the federal approval process, state agencies are charged with reviewing the Storedahl project and providing their expertise on its potential environmental impacts.

Ecology's review is limited to determining whether Storedahl's plans comply with the state Shoreline Management Act and the section of the federal Clean Water Act governing fill of wetlands, said spokeswoman Sandy Howard in a prepared statement. She said Cygnia Rapp, the employee who criticized the project, "acted outside her scope of work."

Attorney David McDonald, who represents Friends of the East Fork, argues that state agencies should be giving federal decision-makers all relevant scientific data to help them make informed decisions.

"To shirk that duty means they are basically lobbing the ball to the proponents to let them carry it up through the state agencies without challenge," he said. "If decisions are being made by political appointees at the top as opposed to on-the-ground scientists, the only conclusion that can be made is that the political appointees are ignoring the science in favor of political expedience."

U.S. Rep. Brian Baird weighed in on the issue last year as well. In a February 2003 letter, the Vancouver Democrat told state Fish and Wildlife Director Jeff Koenings that his constituents had voiced concerns about the credibility of agency studies and he urged "a fair, open and scientifically credible review."

Approval pending

The National Marine Fisheries Service and the U.S. Fish and Wildlife Service are two weeks away from announcing whether they will permit Kelso-based Storedahl to dig five new pits on 161 acres on a terrace above the East Fork and extract gravel over a period of 10 to 15 years without fear of violating the Endangered Species Act. In November, the agencies released a final environmental impact statement

endorsing Storedahl's habitat conservation plan and the granting of what's known as an "incidental take permit."

The permit would allow Storedahl to "take" or harm threatened fish and their habitat in the course of mining. In exchange, Storedahl said it would implement an \$11 million habitat conservation plan designed to minimize the impact of gravel mining on threatened and endangered species. If approved, the plan would be the first of its kind in the Northwest.

Two state agency heads who now support the Storedahl plan opposed resuming gravel mining near the East Fork when the company first proposed it in 1997. In a letter to the Federal Emergency Management Agency, Ecology director Tom Fitzsimmons and Fish and Wildlife's Koenings warned that FEMA's approval of new East Fork flood plain maps developed by Storedahl would open the door to expanded gravel mining that could pose "a serious threat to salmonid recovery."

Since 2001, Storedahl vice president Kimball Storedahl has met three times with top Ecology officials, four times with mining regulators in the Department of Natural Resources, and three times with state wildlife officials, according to company spokeswoman Ann Rivers. The habitat plan has evolved in response to comments from the public and government agencies.

Outdated maps?

No one can predict when a repeat of the 1996 floods will occur. But in comments Rapp submitted to Ecology in January, she argued that the Storedahl plan understates the potential of the East Fork to change course dramatically when that day comes, flowing into old gravel pits and wiping out critical fish habitat as it did in 1996.

Rapp, an expert on river dynamics in Ecology's Bellevue office, reviewed Storedahl's habitat plan and visited the site of the proposed mining at the request of a Fish First member.

"I did everything by the book. I went on state time. I was trying to work internally to get the information out," Rapp said. "I deal with river mechanics," she added. "It was a no-brainer for me to be involved."

She said she spent two all-nighters writing a 14-page report after making the visit to the site and reviewing Storedahl's habitat plan.

"I was so appalled by the quality of the work I didn't feel like I had a choice," she said. She was concerned that if she didn't raise what she saw as weaknesses in the plan, no one would.

When she was told her comments would not be included in Ecology's report, Rapp submitted her critique as a private citizen. She felt compelled to do so, she wrote, "out of respect for my deep concerns regarding this project and my professional standards as a licensed geologist."

Rapp declined to disclose who vetoed her report or the reason she was given.

"Any comments from Ecology must be carefully and fully vetted within the agency and coordinated with other commenting agencies before submitting," Howard's written statement said. "This employee's late involvement did not allow this to happen. This employee's comments did not reflect Ecology's areas of authority."

Rapp's critique focused on the instability of the river.

The stretch of the East Fork downstream from Daybreak Park where Storedahl intends to mine was radically reshaped by the 1996 floods. During high water, the river was swallowed by old gravel pits in its flood plain and the old channel was left high and dry, a process known as avulsion. Immediately upstream, the river now flows shallow, warm and full of sediment from the erosion of a steep bluff. Helicopter surveys conducted by the Washington Department of Fish and Wildlife reveal that steelhead spawning beds have all but disappeared from this reach since 1996.

From 1997 to 1999 the channel moved an average of 100 feet per year, yet Storedahl's 100-year flood plain map, approved by FEMA in 2000, does not reflect that change, Rapp said.

Storedahl consultant Randy Sweet disputed that the map no longer reflects the river's flood plain. "We haven't seen anything that says (the map) should be changed," he said.

But Rapp's concerns were echoed by Kale Gullett, a geologist with the federal fisheries service, who stressed last month in an internal agency memo that the river, its flood plain, the groundwater beneath and the proposed new pits are all hydrologically linked, regardless of what the flood plain maps show.

"Consequently, from a fish's perspective, the proposed ponds will likely affect groundwater flow and the quality and quantity of habitat in the East Fork," he wrote.

Plan questioned

Chris Johnson, chief surface mine reclamation geologist for the state Department of Natural Resources, like Rapp discovered a few weeks ago that he was not in sync with his agency. In comments he submitted to

federal fisheries officials on Storedahl's mine reclamation plan, he warned that in the event of a repeat of the 1996 floods, the fine sediment Storedahl plans to use to refill its old pits could end up in the river.

Storedahl plans to use 571,000 cubic yards of material from other mining operations to partially fill its old pits. Nearly half will be fine-grain sediment from gravel processing, which could bury spawning gravels, fill resting pools and smother fish if it reaches the river.

"The continued creation of large lakes on the flood plain, backfilled with imported fine sediment, does not seem to mesh with any intent to reclaim and conserve salmon and trout habitat," he wrote.

Comments distanced

On Feb. 18, state geologist Ron Teissere wrote to Steve Landino, chief of the Washington habitat branch of the fisheries service, and told him, in effect, that Johnson did not speak for the agency.

"Unfortunately, Mr. Johnson's letter can be interpreted as an impeachment of the adequacy of the final Habitat Conservation Plan" by DNR, Teissere wrote. "In fact, the Department of Natural Resources believes the final Habitat Conservation Plan is adequate."

Johnson referred calls for comment to Teissere.

Teissere said federal fisheries officials contacted him after they received Johnson's comments asking whether his agency had switched positions and no longer supported the plan.

Federal officials "are the ones who are going to have to answer for whether fish are better or worse off because of this proposal. That's not really our job."

Teissere conceded, however, that fish are at increased risk before the old pits are completely revegetated. "We will all hold our breaths until that vegetation gets established," he said.

Spawning beds disappear

As early as 2000, Vancouver-based biologists in the Washington Department of Fish and Wildlife argued that resumed gravel mining at Storedahl's Daybreak site was "unmitigable" that it could damage salmon habitat in ways no conservation plan could fix.

"The ability to recover chum salmon will be seriously compromised" if that reach is again captured by gravel ponds or becomes isolated, wrote Vancouver regional office head Lee Van Tussenbrook and biologist Steve Manlow in 2003.

The biologists submitted tables documenting a startling decline since 1996 in steelhead spawning beds, or redds, below Daybreak Bridge. In 1994, biologists counted 60 redds in that stretch. In 2001 and 2002, none were observed.

The biologists noted that the National Marine Fisheries Service National Gravel Extraction Policy "explicitly recognizes and acknowledges that gravel extraction in and near anadromous fish streams causes many adverse impacts to fish populations and the habitat they rely on."

None of those points were included in formal comments the state fish and wildlife agency submitted to federal officials in January.

"A policy call was made in Olympia that it wasn't relevant," Van Tussenbrook said.

Agency heads did, however, question the basis for many Storedahl claims that its habitat plan would benefit threatened fish.

Greg Hueckel, assistant director of the agency's habitat program, said the Vancouver biologists' comments were not relevant because they reflect what happened after the 1996 floods, not what might happen in the future.

"We feel that in the project as proposed, the risk of avulsion has been minimized," he said.

Van Tussenbrook declined to second-guess his agency or to say whether he still believes, as he wrote in 2000, that the Storedahl project cannot be mitigated.

He said he did believe the data his biologists gathered was relevant to understanding the challenge of recovering threatened salmon runs.

"The federal fish agencies should be asking those questions as they review the habitat conservation plan," he said.

TRACKING STOREDAHL'S GRAVEL MINING PLAN

Federal approval process

What: Final Habitat Conservation Plan and Environmental Impact Statement.

Comment: Closed Jan. 28.

Decision: April 7 (tentative).

County approval process

What: Application to rezone 100 acres from agriculture to surface mining, approve site plan and obtain habitat, wetland and shoreline permits as well as conditional use permit to operate gravel crusher.

Comment: Open until April 29. Public hearing before county hearings examiner April 29.

Decision: Hearings examiner decision due May 13; may be appealed to county commissioners.

Story from REDORBIT NEWS:

<http://www.redorbit.com/news/display/?id=51340>

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Decision Throws Wrench in Storedahl Plans; County Greatly Restricts Gravel-Mining Rights

Posted on: Monday, 1 August 2005, 18:00 CDT

Clark County's decision sharply restricting J.L. Storedahl and Sons' right to mine for gravel on 101 acres near the East Fork of the Lewis River may force the Kelso-based company to rethink its seven-year, \$3 million mining expansion bid.

The company wouldn't say if it plans to appeal the July 12 ruling, which becomes final Tuesday. If it doesn't appeal, Storedahl could still mine gravel from 61 acres on a bench north of the East Fork. But it's not clear whether the company could mine that property profitably.

If it proceeds with a scaled-back operation, the company would still have to protect the East Fork's threatened salmon and steelhead by following 18 measures laid out in a federal habitat conservation plan. Those include controlling wash water from gravel operations to reduce discharge of turbid water, planting conifers and hardwoods within the floodplain, recontouring existing ponds, and restoring Dean Creek, a small East Fork tributary.

A hearings examiner had found that Storedahl has a pre-existing right to mine on its entire 300-acre Daybreak site, but county commissioners voted 2-1 to reject the finding.

Commissioners Betty Sue Morris and Steve Stuart said Storedahl has the right to mine only on the 71 acres the company was mining in 1973, the year the county passed zoning laws to restrict mining.

The July decision was a second blow to Storedahl, which had persuaded federal fish agencies that it could conduct an environmentally sensitive gravel mining operation near a blue-ribbon salmon and steelhead stream without harming fish.

In February, commissioners voted 3-0 to reject Storedahl's application for a zone change that would have allowed the company to dig five new gravel pits on land it leases for pasture. Morris said she was not convinced that allowing mining at the site would be in the public interest because it might place the East Fork's threatened salmon and steelhead at further risk.

The commission's rulings leave the company with narrowed options, said David McDonald, an attorney for Friends of the East Fork, one of the groups challenging the mining in court.

"Now they don't have a rezone and they don't have a nonconforming use right to mine," he said. "The most they could claim is that they have potential approval to mine those 60 acres under their habitat conservation plan."

Storedahl officials referred all questions about how they might respond to the county rulings to their attorneys.

"Mining is authorized on those 60 acres," said Sandy Mackie, the company's Olympia lawyer. "There is a significant quantity of gravel there."

Processing may be banned

A new wrinkle that could further limit the company's options turned up since the commission's vote.

Gravel mining in the 1970s left five large pits on the 71-acre Daybreak property. Storedahl proposed using those pits to treat water from the gravel-washing process. The company planned to partially fill the pits with 571,000 cubic yards of rock and gravel imported from other excavation projects and fine materials recovered from the rock-washing process.

County Hearings Examiner Daniel Kearns ruled June 8 that Storedahl had no pre-existing right to process materials from off-site because it was not importing gravel back in 1973.

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Clean Water for Salmon: An Elusive Goal

by Sharon Selvaggio

— Northwest Center for Alternatives to Pesticides —

While we often hear that we are an over-regulated nation, the truth is that thousands of miles of salmon and steelhead streams continue to be subjected to contamination by hazardous pesticides, even though the National Marine Fisheries Service has determined that the legal use of these pesticides jeopardizes the survival of multiple runs.

Author Sharon Selvaggio, Healthy Wildlife and Water Program Director for the Northwest Center for Alternatives to Pesticides describes the continuing threat that dangerous chemicals in our waterways pose to wild fish and other aquatic life.

For more information about NCAP visit their website at www.pesticide.org.

Despite years of effort to recover endangered and threatened Pacific salmon and steelhead, some of the most toxic pesticides still legal in America continue to enter their habitat. Common-sense efforts to

keep these pesticides out of streams, including stream buffers and foregoing application when soils are saturated, have been ordered by the foremost fish agency in the country — the

Pesticides are ubiquitous in our modern world, with nearly a billion pounds applied each year in the U.S.

National Marine Fisheries Service — but the Environmental Protection Agency (EPA) has yet to act on these recommendations.

Pesticides are ubiquitous in our modern world, with nearly a billion pounds of pesticides applied each year in the U.S., the majority in agriculture.

Pesticides are designed to kill. Once these chemicals escape into the nation's rivers, they are nothing more than poisons to both fish and humans. And escape into the waters they do. According to the U.S. Geological Survey, which monitors surface waters nationwide as part of the National Water Quality Assessment Program (NAWQA), pesticides occur frequently at harmful levels in the nation's rivers and streams. Data gathered between 2002-2011 show that:

● in agricultural areas, more than 60% of sampled streams contained pesticides that exceeded at least one chronic aquatic-life benchmark,

● in urban areas 90% of streams contained pesticides exceeding at least one chronic aquatic life benchmark.

In the Pacific Northwest and California, the unfortunate and unin-

Continued on Page 4

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FROM THE PERCH — EDITOR'S MESSAGE

What's in the Water?

by Jim Yuskavitch

It isn't news to wild fish advocates that clean water is an absolutely crucial component of healthy aquatic ecosystems. We're pretty good at keeping our eye on water quality in the streams where wild fish swim and spawn. We advocate for closing roads in forests where they contribute to erosion and sedimentation, and for buffers off limits to loggers to protect riparian corridors (on that note, NOAA and the EPA have just rejected Oregon's logging rules as inadequate for protecting fish and water quality — the only West Coast state not to qualify). And there are catastrophic events that focus our attention because of their magnitude and immediate impact, such as chemical spills or mine pollution, such the Mount Polley Mine

disaster in British Columbia, detailed in this issue of The Osprey. But there is also a significant cause of water pollution, perhaps even more insidious because it often "flies under the radar" of wild fish advocates — pesticides that commonly end up in our streams. A difficult issue involving complex chemicals and equally complex regulations, they are more widely used than many of us realize. But as Sharon Selvaggio, author of our cover story on pesticides describes, even if they don't often result in mass die-offs of fish that make the evening news, these contaminants can have seriously detrimental effects over the long-term. It's a subject that wild fish advocates would do well to learn more about and pay more attention.

THE OSPREY



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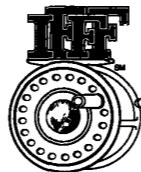
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The International Federation of Fly Fishers is a unique non-profit organization concerned with sport fishing and fisheries

The International Federation of Fly Fishers (IFFF) supports conservation of all fish in all waters. IFFF has a long standing commitment to solving fisheries problems at the grass roots. By charter and inclination, IFFF 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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River in low numbers. In 2013, redd surveys revealed coho higher in the watershed than previously but it has been particularly difficult to monitor their small populations since dam removal. "We are continuing to develop methods that can satisfy monitoring gaps that were created by the removal of Powerdale, particularly with regards to adult summer steelhead, coho, and fall Chinook," explains Simpson.

Pacific lamprey historically were found throughout the Hood River basin but the Powerdale Dam blocked their upstream passage. Since dam removal, the Tribes have begun monitoring the recolonization, distribution and abundance of lamprey using electrofishing and antennas that detect adults tagged at Bonneville Dam. In 2012, three tagged adults were detected at the mouth of the Hood River and ammocoetes (larvae) were found low in the East Fork Hood River. In 2013, 14 Bonneville-tagged adults were detected and ammocoetes were found a mile further up the East Fork. Though often overlooked while salmon and steelhead take the spotlight, Pacific lamprey may have the most dramatic post-Powerdale recovery story.

The return of a free-flowing Hood River brings both opportunities and new challenges to the native fish of the Hood River basin, and to the people charged with managing fisheries and habitat enhancement programs. Overall, the outlook is positive. A 400-acre riparian preserve has been established on the edge of a growing city, to benefit both fish and anglers. Lamprey are recolonizing territory they couldn't reach for 90 years. Spring Chinook are holding steady. And according to Simpson, "the fact that steelhead smolt abundance has been trending upward since 2010—while survival during out-migration has remained relatively steady—is encouraging from a recovery perspective. The fact that the lower river is no longer fragmented is critical for long-term species recovery." Columbia Land Trust is thrilled to be involved in Hood River conservation at such a pivotal time in the watershed.

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River soon will be signing a new conservation easement to protect a 180-acre property that includes forested riparian land and prime spawning habitat.

The Land Trust's role is just one part of the ongoing efforts to restore the Hood River's habitats and hydrologic processes. The Hood River Watershed Group has served as the hub for restoration planning and implementation since 1993. At a recent Watershed Group meeting, members presented some of their 2014 accomplishments. One project in 2014 involved helicopter placement of large woody debris into Lake Branch, a tributary to the West Fork Hood River. Lake Branch provides spawning and rearing habitat for ESA-listed summer steelhead, spring Chinook, and non-listed resident rainbow trout but has been severely impacted by past logging practices. The installation of log jams should help increase channel and floodplain connectivity and hasten development of habitat favorable to salmonids. This habitat enhancement project was implemented jointly by the Tribes and the US Forest Service.

Also in 2014, the US Forest Service partnered with Middle Fork Irrigation District to improve fish passage at the Irrigation District's diversion. A roughened stream channel was constructed adjacent to the diversion, creating a steep riffle that will be passable to fish at almost all flow levels. This project ensures that the diversion will not cut off steelhead and bull trout from their spawning grounds upstream.

In 2014, Columbia Land Trust began restoration work on the Powerdale lands. The Land Trust rehabilitated PacifiCorp's failed revegetation attempts on the bare riverbanks adjacent to the former dam site. The Land Trust also contracted for the removal of nearly half a mile of 10-foot-diameter steel pipeline from the Hood River's floodplain, which was left behind when PacifiCorp walked away from the property.

Design work is already underway for restoration of natural floodplain function at the former pipeline site, with construction anticipated in summer 2015. A berm that protected the pipeline from flooding will be breached

and the floodplain will be enhanced with large woody structures to slow flood flows and create refuges for fish during high water events. For the future, Columbia Land Trust and its partners have set their sights on other locations within the Powerdale corridor that would benefit from similar restoration work. Though some of these will involve tough negotiations and significant fundraising, long-term plans for the Powerdale lands envision a scenic corridor that provides high-quality fish and wildlife habitat as well as hiking and angling opportunities just minutes away from a bustling downtown.

Fish research and monitoring are critical for restoration, and biologists have identified habitat deficiencies and set restoration goals.

Fish research and monitoring is a critical component of the restoration planning and assessment processes. State, federal and tribal biologists have helped identify habitat deficiencies, set restoration goals, and provide feedback on the impact of restoration investments in the Hood River watershed.

Since 2004, juvenile steelhead and spring Chinook in the Hood River have been marked with PIT (passive integrated transponder) tags. Recapture rates from screw traps in the Hood River and detections at other PIT tag readers along the migration route allow biologists to estimate smolt abundance, juvenile survival rates to Bonneville Dam, and smolt-to-adult return rates.

In the Hood River, total steelhead smolt abundance has trended upward, especially from 2011 to 2013. Phil Simpson of ODFW surmises that among the factors that may have contributed to this trend, the increase in habitat availability and connectivity after dam removal may be important.

In addition, low flows have been at least average or higher in recent years, and summer steelhead hatchery supplementation ended in 2009, which could have led to an increase in summer steelhead survival.

The survival rate of hatchery smolts moving downstream from Hood River to Bonneville Dam has also trended upward in the last couple years, after lagging substantially behind the wild steelhead survival rate (71% on average from 2005 to 2013) for years. The change may be due to the larger size of hatchery smolts prior to release in the last few years. From 1994 to 2008, the average smolt-to-adult return rate for wild steelhead was 6.72%, but just 1.95% for hatchery steelhead. These figures are not too far from program goals of 7% survival for wild and 2% for hatchery steelhead.

PIT tagging has shed light on some interesting trends in juvenile spring Chinook survival as well. Some spring Chinook are caught at screw traps and tagged in spring at age 1+ while others are caught and tagged in fall at age 0+. The spring tagged group has shown significantly higher survival rates than the fall group. It seems that fish in the fall group are leaving the Hood River basin at a very young age and adult returns from this group are very low (0.15% to Bonneville Dam).

Monitoring of adult returns to the Hood River has been more challenging since dam removal. Weirs at several strategic locations throughout the watershed now serve the same two purposes as the former fish trap at Powerdale. They allow for removal of hatchery-origin steelhead from the naturally spawning population and enable estimation of adult abundance, though the weirs are not nearly as reliable as the former fish trap.

Adult hatchery steelhead returns have been increasing in the last few years, likely due to larger smolt size at release. Recent returns of hatchery spring Chinook have been consistent, though jack returns have been higher than normal. In 2013, an estimated 800 adults and 500 jacks entered the Hood River. Though low, these numbers look positive when compared to adult Chinook returns of less than 100 in the late 1990s.

Coho salmon are found in the Hood

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Transitions

by Norm Ploss

— Chair, Steelhead Committee —

Another chapter of the Steelhead Committee begins with a new Chair. First things first, a bountiful thank you to Will Atlas for the years he served as Chair. As a scientist, he added much to the Committee. He's now on a new journey evolving his career but remains a valued member. At the same time Will joined, the Committee was fortunate to have other younger scientists and an energetic shop owner and steelhead guide join the ranks.

When the past Chairs asked if I would serve, my reaction was to make sure everyone understood my service would be transitional. More on future Committee plans below.

Personal Background

My first steelhead was caught on California's Smith River in the 1970s. During that same period, Gloria and I made several float trips on the lower Deschutes. It was, however, in the 1980s when my fly fishing for steelhead evolved on California's Klamath and Trinity Rivers. Many great stories and a long-term friendship still with one of the guides. Mac and I were camped on the Klamath in 2002 at the front end of the big salmon kill. Having also caught steelhead in Oregon and Washington added to the appreciation. Fly fishing for silvers in Alaska on several trips rounds out the larger fish with a fly. Much of my favorite fishing includes golden trout in the high Sierras up to 12,000 feet and float tubing California and Central Oregon.

During the 1970s, with friends in Santa Cruz, California we formed "Save San Lorenzo Association" in part to oppose a small dam. Became a FFF member and attended my first conclave in Steamboat Springs, Colorado in the mid 1970s. Around 2000, the Conservation Chair of the Northern California Council was looking for

someone to start a steelhead committee. In doing that, I attended the now defunct Steelhead Summit Alliance in Seattle, and joined the FFF Steelhead Committee as California rep. About the same time I became an FFF Life Member.

Work options were limited for a degree in International Relations and Economics. And so during this same period I studied Civil Engineering, becoming a Registered Civil Engineer in California in 1982. Went to work in local government ultimately for sever-

The Osprey remains our "Crown Jewel," publishing insightful articles impacting wild steelhead and salmon.

al cities, counties, and special districts. Covering many discipline areas, my favorite has always been environmental issues.

After several decades in Santa Cruz, Gloria and I moved to Bend, Oregon in spring 2013.

Committee into the future

Being closer to the Northwest was part of the reason the past Chairs suggested I become Chair. With them, we carried on a conversation over several months. We generally agreed on continuing and some new directions for the Committee:

- The Osprey remains the crown jewel of the committee, publishing insightful articles impacting migratory fish.

- Continue to participate in lawsuits and even the threat thereof where we see actions moving adversely to the fish. As always, this will be in conjunc-

tion with other organizations when we have mutual values and interests in an issue.

- Activism, testimony, letters, etc. to government agencies in support of or opposition to various proposed actions.

- Prior to starting as Chair, we were able to easily get clarification on the current IFFF wild migratory fish policies. The correct ones were recently reposted on the IFFF web site.

- Committee By-Laws: To insure future leaders of the Committee have easy access to understanding the working of the Committee we will embark on memorializing the Committee with 'by-laws' or 'standard operating procedures' similar in form to those of the IFFF Board. Sounds dull, but it will save future and past Committee members from re-writing their thoughts on how the Committee operates as they did for me.

- Meetings: Our future meetings will be more widespread. Three each year, Seattle, Portland, Bend.

- 2015 Meetings and Locations: May 18, Portland. August during the Fly Fishing Fair in Bend. December, Seattle.

- Participation during 2015 Fly Fishing Fair in Bend. We propose to have our meeting and at least one panel discussion/presentation. Any member of the IFFF with an interest in steelhead conservation is welcome to become a member of the Committee.

Current Issue of The Osprey

Once again, the Osprey contains articles by participants on the frontline of conservation. Read and become informed.





Salmon and Pesticides
Continued from page 1

tended creatures at the receiving end include 17 runs of salmon and 11 runs of steelhead listed as endangered or threatened under the Endangered Species Act (ESA). Fish and other aquatic organisms are particularly vulnerable to pesticide contamination of water, since pesticides can be carried far downstream and aquatic organisms are immersed throughout their lives.

What Harm Can Pesticides Cause to Fish or Their Prey?

While the intended effect for the pesticide application may be eliminating fruit-boring insects in apples or preventing weeds in new fields of wheat, the toxicity inherent in pesticides (which includes herbicides as well as insecticides, fungicides, rodenticides, and wood preservatives) can pose direct harm to non-target organisms. Even if aquatic areas are intentionally avoided, runoff, leaching, and even atmospheric deposition of pesticides from use sites can carry repeated doses of pesticides into streams.

Fish and aquatic animals are exposed to pesticides in three ways (1) dermally, with direct absorption through the skin by swimming in pesticide-contaminated waters, (2) through breathing, by direct uptake of pesticides through the gills during respiration, and (3) orally, by drinking pesticide-contaminated water or feeding on pesticide-contaminated prey.

Any of these routes of exposure can cause direct mortality in short time frames (acute toxicity). This is the kind of poisoning that occurs with spills, which sometimes results in large fish kills. Some of the most acutely toxic pesticides to fish or aquatic invertebrates include organophosphate pesticides (such as diazinon, malathion, and chlorpyrifos) and carbamate pesticides (such as carbaryl). These are nerve poisons and act by disrupting nervous signals in animals. Pyrethroid chemicals are also highly toxic to fish. Pyrethroids mimic the mode of action of the plant-derived pesticide pyrethrin, but are much more toxic and persistent in the environment. They attach to soil parti-

cles and are washed into waterways on sediment.

Thankfully, the majority of pesticide contamination in salmon streams does not result in the immediate death of fish. This does not mean, however, that



While pesticide contamination of streams usually doesn't result in immediate die-offs of fish, sub-lethal doses can result in numerous negative effects that lower their ability to survive. Photo by Jim Yuskavitch

salmon and steelhead are safe from pesticide effects. Small "sublethal" doses of some pesticides can lead to changes in behavior, weight loss, impaired reproduction, inability to avoid predators, and lowered tolerance to extreme temperatures. Indirect effects can include changes in habitat, including a reduction in the abundance of prey species. The overall consequences of sublethal doses of pesticides can be reduced adult survival and lowered populations. This is a risky outcome, especially for populations already depleted and stressed by other factors such as passage issues, warm temperatures, and presence of exotic fish.

Is Our Government Doing its Job to Keep the Water Clean?

It is the EPA's responsibility to ensure that pesticide use doesn't harm

endangered species (see sidebar on page 6). But unfortunately for salmon and steelhead, the EPA has failed the public trust. In fact, EPA only began evaluating pesticide effects to listed Pacific salmon and steelhead after

being sued in 2001 by a coalition of environmental and fishing groups, including the Washington Toxics Coalition, Northwest Center for Alternatives to Pesticides, Pacific Coast Federation of Fishermen's Associations, and Institute for Fisheries Resources.

The suit focused solely on 54 broad-spectrum and highly toxic pesticides, all of which had been found at levels higher than EPA's own "aquatic life standards" in rivers on the West Coast. These 54 compounds were toxic to more than fish; many were documented as highly toxic to humans, bioaccumulative in human tissue, human endocrine disrupters, and/or known carcinogens or mutagens.

In 2002, the U.S. District Court ruled for the salmon, ordering EPA to initiate the Endangered Species Act evaluation process. Interim no-spray

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mented with in the 1970s" says French. The Endangered Species Act (ESA) listings brought a new focus to fisheries management in the 1990s. Bull trout and the Lower Columbia Distinct Population Segment of steelhead, Chinook and coho are all listed as Threatened under the ESA.

In the Hood River basin, fisheries management is a joint responsibility of the Oregon Department of Fish and Wildlife and the Confederated Tribes of Warm Springs (Tribes, for short). The Tribes hold federally-reserved fishing rights in the Columbia River



The Hood River flows free where the Powerdale Dam once stood. Photo by Paloma Ayala Vela

and the Hood River watershed, arising from an 1855 treaty. ODFW and the Tribes jointly implement the Hood River Production Program, funded by the Bonneville Power Administration. Program goals include:

- Establish a naturally self-sustaining spring Chinook salmon population using Deschutes River stock;
- Rebuild naturally self-sustaining runs of summer and winter steelhead;
- Maintain genetic characteristics of wild anadromous populations;
- Restore degraded fish habitat;
- Contribute to tribal and non-tribal fisheries and ocean fisheries; and

- Monitor and evaluate program effectiveness.

Despite its many detriments, the Powerdale Dam provided a unique tool for fisheries management. As French explains, a trapping facility at the fish ladder "provided a place to capture all migratory fish at a location low in the basin to collect hatchery broodstock, count returning fish, and selectively allow fish to escape to upstream spawning areas.... Due to the trap and dam's unique ability to act as a research site, several significant studies were published based on the interactions between hatchery and wild fish. In fact, removal of the dam was

before the dam and most of the associated features were demolished in 2010.

Once the infrastructure was removed, the river channel was redesigned to maintain water depth and prevent impassable jumps. By 2011, results of hydrology monitoring indicated that the re-graded reach of the river had recovered to natural slopes and channel morphology and would maintain fish passage over a full range of flows. Riverbed materials shifted naturally to form a mid-channel bar just downstream of the former dam site.

In accordance with FERC rules, decommissioning involved the development of a Settlement Agreement among PacifiCorp and various stakeholders (National Marine Fisheries Service, US Fish and Wildlife Service, ODFW, Oregon Water Resources Department, the Tribes, American Rivers, and the Hood River Watershed Group). The stakeholders not only decided who would own the 400 acres of PacifiCorp's Powerdale lands in the future, they also created a Conservation Easement to control future management of the property.

In 2013, Columbia Land Trust assumed ownership of approximately 300 acres of the former Powerdale Hydroelectric Project lands and Hood River County acquired the remaining 100 acres. Both owners are legally bound by a Conservation Easement to manage the Powerdale lands with four goals in mind:

- Goal 1: Protect the existing fish and wildlife habitat while allowing for habitat restoration and enhancement;
- Goal 2: Retain existing recreational uses;
- Goal 3: Allow for expanded recreational and educational opportunities, provided those are consistent with Goal 1; and
- Goal 4: Acknowledge and preserve the right of Confederated Tribes of Warm Springs tribal members to exercise their Treaty-secured off reservation fishing rights on the Powerdale lands.

Columbia Land Trust's growing presence in the Hood River watershed has implications for future conservation on private lands in the basin. In fact, Columbia Land Trust and a private landowner on the East Fork Hood

actually delayed a couple of years so ongoing research could be completed at the dam."

The long process leading to dam removal began in 2003, when dam operator PacifiCorp decided to decommission the Powerdale Hydroelectric Project rather than make the costly upgrades that would be required to relicense the project through the Federal Energy Regulatory Commission (FERC). Extensive flood damage in November 2006 took the project out of commission earlier than planned. Although power generation ceased, another three years passed

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For each Biop with a jeopardy or adverse modification call, NMFS has included mitigation measures known as the Reasonable and Prudent Alternative (RPA) to prevent or mitigate pesticide harm, as required (see sidebar). Interestingly, rather than recommend cancellation of these pesticides, these RPAs include more moderate measures such as:

- Drift and runoff buffers
- Application limitations when wind speeds exceed 10 mph
- Application prohibitions when soil moistures are already saturated or a storm event is likely in 48 hours following the application
- Reporting of all incidents of fish mortality

After 12 years of Analysis and Regulation, Aren't Salmon Better Protected Now?

A citizen might expect that EPA would have followed the recommendations from NMFS, as the law requires. In fact, EPA has NOT used its power under FIFRA to implement the RPAs or equivalent measures. This not only bodes ill for salmonids but throws into question the whole meaning and purpose of federal endangered species law.

Much to the disappointment of the coalition of groups involved in the litigation, the buffers that were mandated while EPA completed the consultation process were eliminated once the Biological Opinions were complete. The buffers were eliminated, even though the logical conclusion of the Biological Opinions — implementation of permanent protective measures as outlined in the RPAs — was never acted on by EPA.

In addition, the process has unleashed pushback from the chemical industry. The first Biop was challenged in court by Dow Chemical, and has been remanded to the NMFS for re-evaluation.

Other pushback has been in the form of proposed waivers from pesticide review in Congressional legislation.

A SHORT PRIMER ON LAWS GOVERNING PESTICIDES AND ENDANGERED SPECIES PROTECTION

FIFRA — The Law governing pesticide approvals in the US

The Environmental Protection Agency (EPA) is required to assess human and environmental safety factors prior to approval of pesticides under the regulations pertaining to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and other guidelines pertaining to pesticides.

The Endangered Species Act Requires Agencies to Evaluate their Actions

Like other Federal agencies, EPA is required to determine whether its actions, including decisions on pesticide registrations, may affect species listed as endangered or threatened under the Endangered Species Act. (ESA). Agencies are required to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS) [together known as "the Services"] to allow the fish and wildlife agencies to independently consider other agencies' actions.

Agencies can forego consultation with the Services when the agency determines "No Effect" to a listed species, however the definition of this is extremely narrow. Agencies are required to initiate consultation when their analyses conclude that their actions are "likely to adversely affect" listed species. Agencies must also consult with the Services when they conclude that an action is "not likely to adversely affect" due to situations when effects on listed species are expected to be discountable, insignificant, or completely beneficial.

Under any determination that doesn't result in a "No Effect", the Services are required to concur with this call in writing. This serves as an important check by agency biologists who are familiar with the rare species at hand, and provides consistency in ESA administration and enforcement across a variety of scenarios.

Consultations with the Services conclude when the Services, in a written Biological Opinion, determine whether a Federal action may pose "jeopardy" to a listed species, or "adverse modification" of its critical habitat, if designated, with an explanation of their reasoning.

When the Services find jeopardy or adverse modification to a species stemming from a federal action, they identify, in the Biological Opinion, reasonable and prudent alternatives (RPAs) to avoid such effects. In the case of the pesticide Biops, the RPAs are those actions that can be implemented by EPA in a manner consistent with the intended purpose of the registration and that the Services believe would prevent jeopardy to listed species or destruction or adverse modification of critical habitat.

For instance, in 2011, one version of the federal Farm Bill included a provision that would have prevented the EPA from taking actions to protect endangered species from harmful pesticides under the ESA, without the voluntary agreement of pesticide manufacturers. The same Farm Bill draft also included a clause that would have eliminated Clean Water Act protections as they apply to pesticides.

The Good News

Thankfully, environmental and fishing groups have been monitoring the

EPA and Congress and working steadily to uphold sensible pesticide policy.

For example, the Northwest Center for Alternatives to Pesticides and other groups, including the Northern California Council of the International Federation of Fly Fishers, noticed EPA's lack of action on the RPAs, and filed a complaint in federal court (through environmental law firm Earthjustice) asserting that this lack of action and the remand of the first organophosphate Biop amounted to illegal take of listed salmonids. This action resulted in a settlement agree-

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hinged on PacifiCorp agreeing to terms for dam removal in a separate yet connected agreement. With fishing and irrigation communities now forming a coalition bent on solving the Klamath crisis, PacifiCorp came to the table and the dam removal agreement was soon forged. Both agreements were signed in a large ceremony in Salem, Oregon in 2010.

The Agreements describe rules for determining water allocations for agriculture, the river, Upper Klamath Lake and the wildlife refuges. One feature of the Agreements is the enlargement of Upper Klamath Lake to more closely resemble its original size thus adding 97,000 acre feet of storage to the water equation. In addition, the Agreements call for the lower four Klamath dams to be removed in 2020.

The habitat restoration and irrigation improvements laid out in the Agreements would be funded with federal dollars (approximately \$18 million a year for 15 years) and dam removal funded by PacifiCorp ratepayers (cheaper than relicensing the dams) and a California Water bond. PacifiCorp has already collected nearly half of the \$200 million it committed to dam removal and the California water bond that just passed adds another \$250 million. This \$450 million total far exceeds dam removal cost estimates in the environmental impact report released by the Department of Interior last year.

However, the newly forged bipartisan Klamath Coalition was a victim of bad timing. As the Agreements were being signed, the national economy was starting to melt down. That fall, Tea Party conservatives won enough seats in the House of Representatives to strangle any bills seeking to appropriate money.

The Klamath Coalition continued to organize support for the legislation despite the setbacks. Then in 2012, another wild card was dealt. After nearly 40 years of percolating through the courts, a judge issued a determination in the Klamath adjudication, awarding the rights to much of the water in the Upper Klamath Basin to the Klamath Tribes. Although the Klamath Tribes' position was that the Klamath Agreements would go further

to restore fisheries than a water rights adjudication, Congress appeared unwilling to help solve the Klamath crisis by enacting the Agreements. Thus, the Klamath Tribes had little alternative to using their right to shut off water to farms in 2013, leaving 100,000 cattle high and dry. Particularly hard hit by this were independent irrigators upstream of the Klamath Irrigation Project. These irrigators drew water from the Williamson, Sprague, and Wood River systems which are the Klamath's true headwaters.

The water shut-off led the Oregon congressional delegation to call for a Congressional Task Force to address the conflict. The Task Force, made up

With broad support throughout the basin, Congressional approval for the Agreement was a sure thing. Well, not quite.

of representatives of many of the parties to the Klamath Agreements, trimmed the budget for implementing the Agreements and laid out the basic structure for a third Agreement, this one between the Klamath tribes and irrigators upstream of Upper Klamath Lake. Thus, early in 2014, the Upper Klamath Basin Comprehensive Agreement (UKBA) was signed. The UKBA allowed the Klamath Tribes to see their water needs met in a way that was flexible enough to keep irrigated agriculture in the Upper Basin economically viable. This Agreement also hinges on the implementation of the other two Klamath Agreements including provisions for dam removal.

With remarkably broad support from the bottom of the basin to the top, from the political far left to the far right, approval from congress was in the bag! Well...not exactly. Despite a flurry of last minute organizing and a show of support from traditionally conservative groups such as the Oregon Farm Bureau and Cattlemen's Association, Congressmen Walden still killed the

bill. Walden cited local opposition to dam removal from some corners of Klamath County, Oregon and Siskiyou County, California. But the fact remains that communities with the most at stake in the Klamath have developed a solution to the crisis that meets their collective needs to survive economically and culturally.

However, just days after the 113th Congress ended its session, Congressman Walden offered some cause for optimism. In a speaking tour in Klamath County, he appeared impressed by the reversal of some of constituents to now support the Agreements. Walden said in an interview with Klamath Falls TV station KOB1 reporter Lyle Ahrens that he's not in favor of dam removal, but "we're taking a second look at that because of all of the issues that are at play with no real alternative on the table."

The change in position by local leaders came slowly as many of the facts of the Agreements were made clear and the risks of doing nothing were becoming better understood. Those of us in the lower Klamath Basin understand that conservative lawmakers have a general distaste for dam removal. But these dams in particular are not worth saving: they are poor power producers, they divert no irrigation water, and even their owner is supportive of their removal under terms of the Klamath Agreements. Additionally, no federal dollars will be used to remove them.

What is clear is that the fate of Klamath communities is in Congressman Greg Walden's hands. He is now a prominent leader of the Republican controlled House. Many of his constituents could face severe economic hardships if the drought persists another year and the Klamath tribes have to once again exercise their senior water rights, thus curtailing irrigation diversions. He can ensure his constituents avoid this disaster by passing the Agreements that Klamath communities worked so hard to develop.

For more information see www.klamathrestoration.gov and www.klamathriver.org

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Water Quality Monitoring: The Promise and Limitations

By Sharon Selvaggio

Water quality monitoring is a good way to evaluate exposure but cannot be relied upon as a definitive answer about whether and how much salmonids or their prey are exposed to pesticide contaminants. Within the range of Pacific salmonids, pesticides in surface water are monitored by a variety of federal and state agencies, counties and tribes. While water quality monitoring efforts provide an important clue to the exposure of salmonids to pesticides, monitoring data and interpretation is subject to some important limitations.

1) Most pesticides are not monitored. Only a fraction of registered active ingredients are included in surface water monitoring efforts. Approximately 1,100 active ingredients (the key toxic ingredient in pesticides) are registered in the U.S. Yet, the U.S. Geological Survey National Water Quality Assessment (NAWQA) program tests for a maximum of 128 active ingredients and 57 degradation products (degradation products can be equally or more toxic than the parent pesticide). In Washington, state-led monitoring in 2013 in selected salmon streams included analysis of 174 pesticides (including 34 degradates).

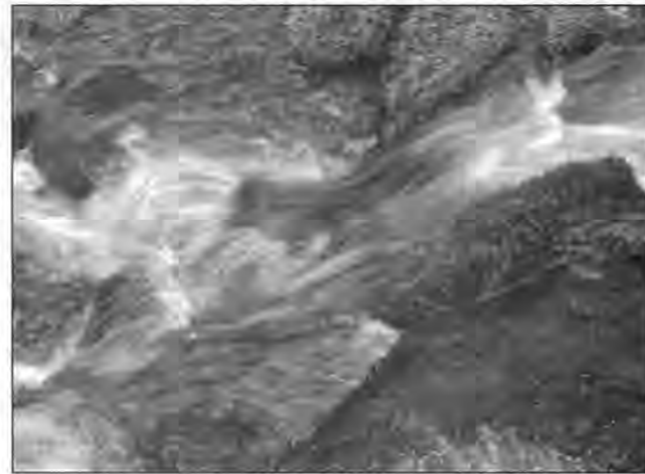
2) Enforceable standards don't exist for most pesticides. To be useful, monitoring results need to be compared to known standards of risk. However, only a tiny number of registered active ingredients are subject to enforceable Clean Water Act standards. Many of the others have (non-enforceable) "aquatic life benchmarks" designated, but even these only cover a fraction of the registered pesticides. Of the pesticides and degradates analyzed by NAWQA, less than 80 chemicals are linked to one or more chronic aquatic-life benchmarks.

3) Even the best monitoring is only a limited snapshot of actual exposure. Water quality monitoring is expensive, with laboratory costs ranging from \$500-\$1,000 per sample, depending upon what is analyzed. This doesn't include the cost of sample collection, transport, or sampling design. To effectively speak to the actual presence of harmful chemicals, an adequate number of sampling locations needs to be selected, and these sites monitored frequently enough to capture the full range of exposure that may be occurring.

4) The EPA does not regulate pesticide mixtures in waters. Salmon encounter "chemical soups" in most streams; NAWQA results indicate that pesticides usually occur as mixtures. The EPA acknowledges in its own documents the possibility that low-level exposures to multiple chemical substances toxic by a common mechanism could lead to the same adverse health effect as would a higher level of exposure to any of the substances individually. This is known as additive or synergistic effect. For example, streams that contain detectable levels of different organophosphates (such as malathion and chlorpyrifos) should be assessed for the combination of effects, not just separate effects from each chemical, because these pesticides both interfere with nerve impulses in the same way. In such situations (which are common), comparisons to single-compound benchmarks may tend to underestimate the potential for adverse effects for some sites.

5) Uncertainty in risk benchmarks. Water-quality benchmarks are estimates of the concentrations below which adverse effects on humans or aquatic life are not expected to occur. For some benchmarks, there is substantial uncertainty in underlying estimates of no-effect levels, depending on the methods used to derive them and the quantity and types of toxicity information on which they are based.

In short, monitoring efforts are helpful, and useful in understanding trends over time, or for understanding spatial differences over large scales, but (unless very intensive sampling is underway) may be of limited use in truly understanding exposures in defined locations and times.



Water quality monitoring by a variety of government agencies helps determine the degree of exposure by pesticides to salmonids. Photo by Jim Yuskavitch

The Campaign to Remove Four Klamath River Dams Continues

By S. Craig Tucker

— Karuk Tribe —

Author S. Craig Tucker updates us on the current state of negotiations, politics and strategies for removing the four dams on the Klamath River to benefit wild salmon and steelhead. Tucker is Natural Resources Policy Advocate for the Yurok Tribe, one of the five Native American Tribes, along with the Yurok, Shasta, Hoopa and Klamath that traditionally lived along the Klamath River, and for whom the river and its salmon are culturally and economically important. For more information on the Karuk Tribe visit their web site at: www.karuk.us

For those keeping a watchful eye on the Klamath River, the 113th Congress' lame duck session was quite the nail biter. A broad coalition of Native American tribes, conservation, fishing, and farming groups have been pressing Congress since 2010 to pass legislation aimed at implementing a set of agreements that would lead to the removal of the lower four Klamath River dams, fairly balance water use between the environment and agriculture, improve irrigation infrastructure, and restore fisheries habitat all across the basin. The needed legislation was championed by Oregon's Democratic senators Ron Wyden and Jeff Merkley, with support from California Senators Diane Feinstein and Barbara Boxer, both Democrats. Oregon Congressman Jared Huffman, Republican, championed the bill in the House. The senators worked to include the Klamath legislation in one of the omnibus bills in early December but Oregon congressmen Republican Greg Walden blocked the bill language in the House, leaving Klamath communities with a lump of coal in their holiday stockings. However, some think that Congressman Walden's stance may be softening in the wake of broadening support for the Agreements from his

conservative base.

But before we get to that, let's remember why the Klamath is so important.

The Klamath River watershed is massive. About the size of Maryland, the Klamath Basin encompasses over 12,000 square miles. Stretching from the peaks of the Cascades in southeastern Oregon to the foggy, fern riddled redwood forests of California's North Coast, the Klamath is one of the most ecologically unique, economically productive, and culturally diverse watersheds in America.

The Klamath hosts an array of anadromous and resident fish. Before

*Fishing communities
focused their activism
at PacifiCorp and
initiated discussions
with the irrigation
community.*

the era of dam building, spring Chinook were the largest run of fish on the Klamath. With much of their habitat blocked by dams, the Klamath only manages to sustain a small vestigial run of springers. Fall Chinook are the dominant run today, attracting sportsmen and commercial anglers to the region. Prized particularly by tribal communities are the Pacific lamprey, which make their way into the Klamath in late winter or early spring. Winter steelhead and green sturgeon also call the Klamath home as well as resident suckers or c'wam, resident trout, and river mussels. Coho salmon are federally listed as threatened under the Endangered Species Act, as are the Klamath's Lost River suckers.

With large runs of fish come large numbers of anglers. Some are looking for the unique experience of landing a fierce winter steelhead while others are out to make a living in pursuit of Klamath River salmon stocks offshore. Tribes fish both commercially and ceremonially with different tribes having different fishing styles. This influx of fishermen brings millions in tourist dollars to the region. Klamath salmon travel thousands of miles in the ocean, which means the economic benefits of the Klamath fishery is not limited to the Klamath Basin. The offshore Klamath Management Zone stretches from Coos Bay, Oregon to Monterey Bay, California. This means that the health of the Klamath dictates how many salmon can and can't be harvested along a large portion of the West Coast, affecting the economy of many coastal fishing communities.

Another feature of the Klamath, and maybe its most important, is the diverse communities of people who call the basin home. Even before Europeans arrived, the Klamath basin was culturally diverse. Tribes in the basin fall into at least three radically distinct language groups and each has its own unique history and cultural practices. Today, the Yurok, Karuk, and Klamath Tribes of Oregon still live along the Klamath River and fish its waters.

As the United States sought to "develop" the arid lands of the West, the Bureau of Reclamation built the Klamath Irrigation Project in southeastern Oregon, draining wetlands and carving irrigation canals in the landscape. These lands were homesteaded by veterans of World Wars I and II, who were promised an ample supply of water from Upper Klamath Lake to grow crops and their own communities. Upstream of Upper Klamath Lake, in the sub-basins that form the

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henceforth simply referring to the event as “a disaster”.) Within days, three separate investigations were launched: One by the province’s Chief Inspector of Mines, a multi-agency criminal investigation being led by the Conservation Officer Service, and an independent review panel featuring three eminent geotechnical experts.

Hazeltine Creek is now a muddy, grey swath of wasteland, over 50 meters wide: a moonscape. And Quesnel Lake and river, which are usually crystal clear in the winter, remain an eerie glacial green owing to the vast sediment load from the ultra fine mine tailings still suspended in the lake and still flowing on into the Fraser. While the water generally meets minimum standards for safe drinking, government water quality testing in Quesnel Lake near the mouth of Hazeltine Creek this fall showed levels of chromium, cobalt, copper, iron, silver, vanadium, and zinc that exceeded official standards for aquatic life. In Hazeltine Creek itself, the list grew to include arsenic, manganese, mercury, nickel, thallium, and titanium. Copper is particularly bad for aquatic life. There’s a reason it is the active ingredient in anti-fouling bottom paint for boats in places where the deadly copper-based paints have not yet been outlawed. Heavy exposure will kill fish outright, but there are serious sub-lethal effects at lower levels. Exposing fish to dissolved copper, and some of these other metals, is known to impair their sense of smell, making them more susceptible to predators. It also stunts their growth, and impairs their migration behaviors, their reproduction, and their immune systems.

Lakeside residents who used to drink their tap water, and know how crystal-clear the murky water should be, are still drinking the bottled water being supplied to them by Imperial Metals. According to a recent article in the Williams Lake Tribune, the only filters capable of removing the ultra fine mine tailings from the lake water were plugging up after only two days of use. A local fishing lodge operator, Skeed Brokowski, told the newspaper he doesn’t open his mouth in the shower anymore.

The future of Quesnel sockeye and

the other fish rearing in the Lake and River is as murky as the unseasonably green metals-laden water they’re now living in. Aside from any resident fish trying to survive in the utter devastation of Polley Lake and Hazeltine Creek, things may be the worst for the juvenile sockeye rearing in Quesnel Lake. Federal fisheries scientists reported that the large return of adult Quesnel sockeye had very high spawning success (98%) relative to the long-term average (84%). Luckily, Mt. Polley wasn’t an acid-draining mine and sediment transport modelling suggests that the concentration of metals-



Debris torrent remnants float across Quesnel Lake. Photos courtesy Quesnel River Research Centre, University of Northern BC.

laden sediments in the water column will be declining over the next few months. But researchers from the University of Northern BC’s Quesnel River Research Centre (QRRC) tracking the sediment plume throughout the lake since the very day of the disaster figure that a substantial proportion of the sediment load settled out onto the bottom of the lake during the summer and fall before winter temperatures spurred the annual mixing of the lake’s thermal layers. Most of the toxic metals are bound to the sediments and because of Quesnel Lake’s extreme depth, everyone is hoping that those sediments will stay on the bottom, below the limits of where the lake’s

water is thought to mix. However, one of North America’s top limnologists, Dr. Jack Stanford of the University of Montana, worries that metals could leach back into the water over time. Citing past research on Quesnel and similar lakes, he told Watershed Watch:

“Laval et al. showed that upwelling from the deep layers of Quesnel Lake often dramatically cools the river below the lake. So the mine wastes with the toxic sediments will go to the bottom, no doubt, but if the bottom waters become the least bit hypoxic the metals will go into solution and flux

into the water column by these advected intrusions and upwell into the lighted zones where they will bioaccumulate and/or chronically inhibit productivity, as apparently occurs in Coeur d’Alene Lake in Idaho, which has received acidic mine wastes for years and where the USA is spending billions on cleanup of mine wastes. I would bet that the Horsefly [River] spawners [a tributary of Quesnel Lake] will swim right through the initial plume, unless it is toxic at the surface, and that the real impacts are months and years from now as the [sockeye] juveniles try to mature in the lake.”

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So now it’s mostly a waiting game. Dozens of scientists from various universities, government agencies, First Nations, and the mining company are involved in monitoring the effects of the disaster on various parts of the receiving ecosystem, and the results will trickle out over the coming months and years. Imperial Metals was made to produce a mitigation plan, which was eventually accepted by the Province, and which they are now implementing—slowly. They seem to be doing what they reasonably can to stabilize the toxic muds that constitute the wasteland formerly known as Hazeltine Creek’s riparian area, before the snow melts this spring, and the creek swells and rages over the metallic sludge. And it won’t change the fact that a vast proportion of the spilled sediment is already settling out into Quesnel Lake, along the shores of the Quesnel River, the Fraser River, and in the Salish Sea. Sure, the company must do what mitigation they can, but we shouldn’t pretend that it will amount to anything more than a few drops in a bucket that can not be unspilled.

The important thing now is to understand what exactly happened, why it happened, who was responsible, and how we can make sure nothing like this happens again.

A few weeks after the catastrophe, I was visiting some friends when their neighbor stopped by. He is a retired mining engineer who spent most of his career overseeing the development and operation of big mines all over the world, including some here in BC. After a couple of beers I asked this gruff but earnest expert what he thought had happened at Mt. Polley.

“It’s obvious what happened”, he said. “They filled it up too full and it bust open.”

We’ll probably find out soon; perhaps by the time you’ve read this. The expert panel’s report is due by January 31. But we already know that the mine’s foreman in charge of the tailings facility quit his job in June, just two months before the disaster, after working there for seven years, partly because he was fed up with management’s negligent attitude toward the tailings impoundment. Two days after the dam burst, he had this to say to

Global News:

“They needed to put in five million tonnes [of rock] around the dam, because they added, once they went to a bigger mine life, they added five times the amount of water. That dam was never designed to hold five times that amount of water. Five million tonnes, well we got maybe a couple hundred thousand. And that’s it, in two years. I’d had enough.”

We also know that in 2011, following the appearance of a 10 meter-long crack in the dam the year before, the engineering company that originally designed the dam walked away from being the facility’s Engineer of Record and provided this written warning to the mining company: “The embankments and the overall tailings

Three months before the disaster, the tailings impoundment was found to be dangerously overflowing.

impoundment are getting large and it is extremely important that they be monitored, constructed, and operated properly to prevent problems in the future.”

And we know that just three months before the disaster, the tailings impoundment was found to be dangerously close to overflowing, and the company was ordered to lower it, which they did.

Most importantly, we know that this disaster happened in the wake of a decade and a half of deregulation and funding cuts to the provincial and federal government authorities charged with ensuring toxic wastes don’t make their way into our rivers, lakes, and oceans. We know that the frequency of government geotechnical inspections at BC mines declined substantially over the past 14 years, with the number of engineers on staff dropping from five in 2000, to just one from 2004 to 2011. I could go on.

If there is an upside to any of this, it

is likely to be found in the furious attention from First Nations and the general public that this disaster has focused on the impacts of mining to lands and waters, the consequences of government deregulation of the mining sector, and the current government’s penchant for saying “yes” to just about any mining proposal that the industry puts forward.

Back in May 2014, *The Osprey* ran an excellent overview of the onslaught of mining activity and other development in the transboundary watersheds running from BC into Southeast Alaska, by Chris Zimmer of Rivers Without Borders. Two of the several mines he discussed—Red Chris and Kerr-Sulphurets-Mitchell (KSM)—are worth talking about here.

The same company that runs the Mount Polley mine, Imperial Metals, is also building the Red Chris mine on Todagin Mountain near Iskut, BC. Among other things it will destroy one of the most productive stone sheep habitats in the world, and turn a pristine lake into a tailings dump. Word is that when the company was trying to sell the Tahltan First Nation on the project, they told them that the tailings pond at Red Chris would be modelled after the one at Mt. Polley. Shortly after the disaster a courageous group of Tahltan patriots known as the Klabona Keepers blockaded the Red Chris access road for two weeks, earning a personal visit from the company president and the Mines Minister. The standoff ended when the company committed to an immediate third-party review of the mine’s design. The review found 22 issues with the design of the tailings dam that Imperial has more or less agreed to address before beginning production. The report also noted that if the dam at Red Chris collapsed, the ensuing devastation would eclipse that at Mt. Polley.

The KSM mine is an even bigger monster. Situated 30 km from the Alaskan border, it straddles the headwaters of the Unuk River, which flows west into Alaska’s Misty Fiords National Monument, and the headwaters of the Bell-Irving River, a major fish-bearing tributary of the Nass River, which is BC’s third largest salmon producer after the Fraser and Skeena. KSM is believed to hold the

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With Powerdale Dam Removed, Hood River Habitat and Fish Making Comeback

By Kate Conley
— Columbia Land Trust —

Author Kate Conley is Eastside Stewardship Lead for the Columbia Land Trust, which is heavily involved in restoring the Hood River. Founded in 1990, Columbia Land Trust conserves and cares for the vital lands, waters and wildlife of the Columbia River region. The nonprofit has 3,000 members and has conserved more than 30,000 acres of land in 14 counties around the Columbia River, from the John Day River near The Dalles, Oregon, to the Pacific Ocean. Columbia Land Trust has earned accreditation from the Land Trust Alliance, which recognizes those land trusts that adhere to national standards for excellence, uphold public trust with rigorous ethical standards, and take steps to ensure that conservation efforts are permanent. For more information about the organization visit their website at: www.columbialandtrust.org.

The Powerdale Dam on Oregon's Hood River came down in 2010 without excessive fanfare. Tucked away behind private orchards, diverting water without backing up a large reservoir, the dam remained unfamiliar to many in the Hood River valley for nearly 90 years. But those who know the Hood River and its fish—the anglers, the biologists, the irrigators who rely on the same water that supports threatened fish species—know that the dam's removal was momentous. Dam removal concluded a planning process that had seemed interminable at times and kicked off a new phase in watershed management.

The Hood River flows north, carrying glacial melt down Mount Hood's slopes through evergreen forests, through acres of apple and pear orchards, and finally through the city of Hood River, where the Hood meets the Columbia River. Flowing in line with the crest of the Cascades, the Hood River marks the Cascade Mountains divide between

rainy westside and arid eastside. This unique transition zone supports a diversity of flora and fauna and has long attracted human use, including intensive logging and agriculture in the early days of Euro-American settlement. "The geographical features of the Hood River watershed coupled with past and current land use practices provide a unique suite of contemporary environmental parameters for fish. Probably no other Oregon watershed of comparable size offers such a wide range of habitat diversity as well as anthropogenic influences," explains Philip Simpson, fisheries researcher with Oregon Department of Fish and Wildlife (ODFW).

In terms of the number of species of fish, the Hood River likely has the most diversity in the state.

In terms of fish species, the Hood River is "likely the most diverse in the state" according to Rod French, District Fish Biologist with ODFW. Salmonid species endemic to the Hood River include steelhead (winter and summer runs), resident rainbow trout, Chinook salmon (spring and fall runs), coho salmon, resident cutthroat trout, sea-run cutthroat, bull trout, and mountain whitefish. Pacific lamprey are also among the anadromous species that spawn in the Hood River.

Though hard data are lacking, historical fish runs were "certainly larger and healthier than today" according to French. Timber harvest, splash damming, road development, and water diversions for irrigation and

power generation all compromised fish habitat in the early 1900s and in some cases continue to stress the system today.

Powerdale Dam was built in 1923. With a 6,000 watt capacity, it was the largest single power unit in Oregon at the time. Electrification of rural areas was unusual in the 1920s but local demand was high due to the economic importance of apple orchards in the Hood River Valley. Electricity gave Hood River's agricultural production a further boost, leading to more irrigation pumping stations and their inevitable impact on stream flows.

The Powerdale Dam was a run-of-river project at river mile 4.2 consisting of a concrete diversion dam 206 feet long and 10 feet high. The dam diverted water into an above-ground pipeline that carried the water approximately 3.5 miles downstream to a powerhouse. Early fish ladders were poorly designed and ineffective. Even the latest ladder completed prevented passage for lamprey. For other species, inadequate downstream screening was the most significant problem. In the early days, fish were sucked into the diversion and passed down to the powerhouse. In later years, various screening upgrades remained problematic. In addition to compromising fish passage, the Powerdale project dewatered the reach from the dam to the powerhouse. With lower flows, pollutants were concentrated, habitat was reduced, and fish migrations were delayed.

After decades of declining fish runs, hatchery supplementation in the Hood River began in the 1950s with steelhead and rainbow trout releases. By the 1970s, the native Hood River spring Chinook run was extirpated, and spring Chinook hatchery releases began in the 1980s. "Some limited coho salmon and cutthroat trout hatchery augmentation was also experi-

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mentary for the 54 chemicals along salmon-bearing streams (300 feet for aerial sprays, 60 feet for ground sprays) were ordered by the Court in 2004, at least until permanent protection measures could be devised through the consultation process.

The Consultation Results

EPA's initial assessment determined that 37 of the 54 pesticides "may effect" listed salmonids (a term that includes both salmon and steelhead). These 37 pesticides were submitted to NMFS for formal consultation under the ESA.

Since 2008, NMFS has been releasing Biological Opinions ("Biops") for these 37 active ingredients in a series of "batch" consultations (pesticides are grouped where they have a common mode of action). Of the 28 pesticides reviewed in completed Biological Opinions so far, a dismal picture has emerged, with the following results:

- 19 pesticides were determined to pose jeopardy (likelihood of extinction) to one or more salmon or steelhead runs
- 21 pesticides were determined to pose adverse modification to the critical habitat of one or more runs
- The ESUs with the highest number of jeopardy calls are Chinook salmon (Sacramento River winter and Central Valley spring runs) and steelhead (Central Valley California, Central California Coast, and Southern California runs).

Figure 1 (opposite) shows the number of jeopardy and adverse modification calls for each chemical that has so far completed the consultation process. Figure 2 shows the number of jeopardy and adverse modification calls by run.

Figure 1. Jeopardy or Adverse Modification Calls to Listed Salmonids Due to Pesticides (National Marine Fisheries Service)

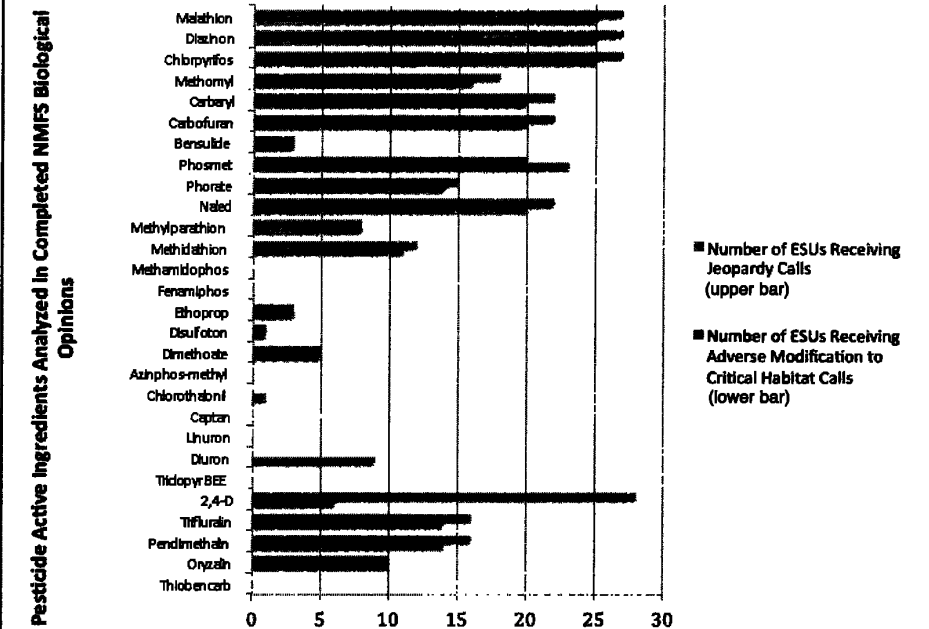
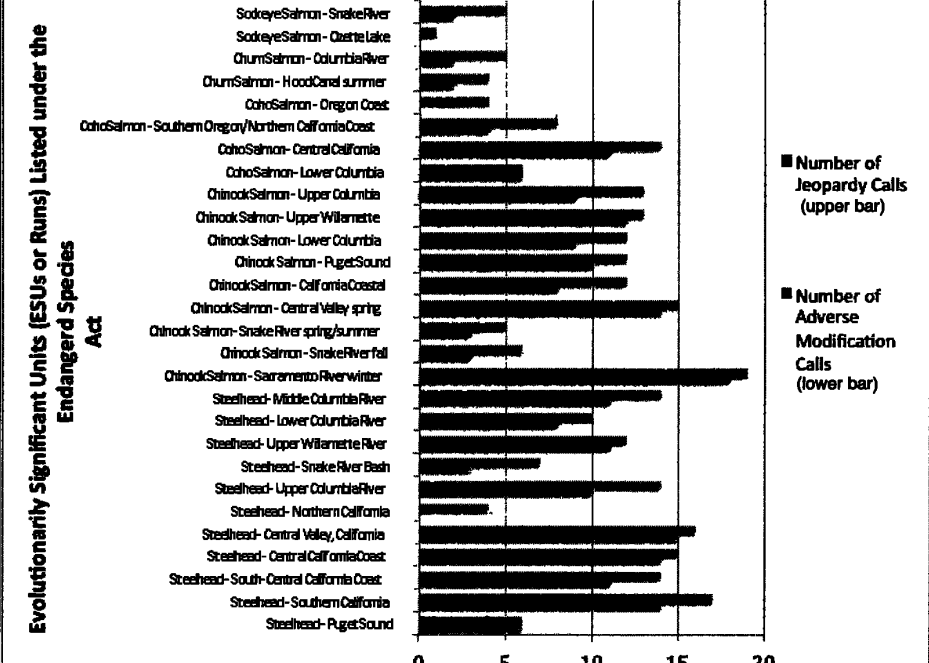


Figure 2. Jeopardy and Adverse Modification Calls in Completed Biological Opinions, by Run



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Klamath's headwaters, other independently minded ranchers cleared the land to grow cattle and hay which generated still more conflict with the Klamath Tribes.

In the 20th century, a private utility, the California Oregon Power Company built a complex of hydropower dams in the middle Klamath Region. Today that company is called PacifiCorp and is largely owned by billionaire investor Warren Buffett. Although these dams provide no irrigation diversions, they do disrupt natural flows, block fish passage, and degrade water quality, thus exacerbating the impacts of irrigated agriculture on fisheries.

Although the Klamath's conflict of cultures began when Europeans began colonizing the area 150 years ago, many would say that in many ways the conflict reached its zenith in 2001 and 2002. Just a few years after coho salmon and Lost River suckers were put on the Endangered Species List, a drought led federal agencies to curtail water deliveries to the Klamath Irrigation Project. This shortage of irrigation water led some farm and ranching families to economic ruin and many others to civil disobedience. With US Marshalls looking on, protesting farmers temporarily took over the irrigation headgates at the Klamath A Canal and turned on the water. Although this action was more symbolic than practical, the protest put a great amount of political pressure on the Bush administration. In 2002, with the basin still caught in the stranglehold of drought, water was this time diverted to farms and ranches over the protest of Klamath River tribes. That fall an estimated 68,000 salmon died before spawning in what has been called the largest adult fish kill in US history. This time it was tribes, fishermen, and environmentalists that took to the streets.

Over the next few years, the irrigation and fishing communities traded barbs in the media and filed numerous lawsuits. In the midst of the debate over water diversions, PacifiCorp's license to operate their Klamath hydropower dams, which have nothing to do with irrigation diversions, expired. Although at first blush this may appear to be bad timing, in actual-



The uppermost Klamath River dam slated for removal is the J.C. Boyle Dam, located near Klamath Falls, in Oregon. Photo by Jim Yuskavitch

ity the timing could not have been better. For decades, the major storyline in the Klamath had focused solely on irrigation diversions largely because there is little opportunity to affect changes to dam operations between license renewals. It's common for a license to operate a private hydropower dam to last 30 to 50 years, so when one expires it creates a once-in-a-lifetime opportunity to make major changes in how a river is managed.

In the case of the Klamath, the relicensing process set the table for meaningful negotiations between warring parties. With neither irrigation communities nor fishing communities winning decisive legal victories and communities wearying of the constant acrimonious fight between neighbors, everyone was primed for a different approach.

As relicensing started, tribes, fishermen, and conservation groups quickly figured out that a golden opportunity was before them. It was becoming increasingly clear that these particular dams were modest power producers at best and that in order to get a new license PacifiCorp would likely be required to install fish ladders and mitigate their significant water quality impacts. Thus, when the cost of relicensing was compared to the value of the electricity the dams could produce, it became clear that dam removal would likely be cheaper than getting a

new license. It's a lot like trying to get your old jalopy to pass an emissions test. Are you really going to invest in a catalytic converter for that '74 Buick or are you trading it in for a Prius? Tribes, fishermen, and conservation groups resolved to collectively convince PacifiCorp that it was time for the Prius.

As fishing communities increasingly focused their activism (and litigation) at PacifiCorp, it afforded leaders from these communities to initiate meaningful discussions with leaders from the irrigation community. Parties to these discussions called a cease-fire from lawsuits and press releases and instead resolved to work together on a strategic plan to resolve their differences. The groups relied heavily on technical analyses and sophisticated hydrologic modeling to develop possible resolutions to the water-sharing problem. At the same time, tribes and their allies were putting pressure on PacifiCorp to consider dam removal with protests, direct action, and litigation.

Long story short: after five years of difficult negotiation, the fishing and the irrigation community associated with the Klamath Irrigation Project developed a joint plan to fairly share water resources, invest in habitat restoration, and improve irrigation infrastructure. However, this agreement

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ment in 2014, which reinstates the buffers where chlorpyrifos, diazinon, malathion, carbaryl, and methomyl are used adjacent to salmon-supporting waters. These reinstated buffers will be in place until permanent protective measures are established (or unless the new consultation process determines no adverse effect).

Fighting back against chemical industry influence in the Farm Bill, the Pacific Coast Federation of Fishermen's Associations submitted testimony warning that inclusion of these waivers would allow corporations a de facto veto over a federal environmental law and would substantially change existing laws "to elevate financial considerations above environmental protections... making future species recovery that much more difficult for other industries, including farming." The letter also pointed out that environmental protections for rivers and estuaries help protect fishing industry jobs and benefit the multi-billion dollar fishing industry. This monitoring paid off; the bill passed without the damaging inclusions.

Other good news is that, since 2001, eight chemicals that were a part of the set of 37 pesticides submitted for consultation have been wholly cancelled, and an additional eight chemicals have had some uses cancelled or restricted. Most of these cancellations and restrictions have occurred in the organophosphate group, a particularly hazardous group of pesticides. While some of these actions have occurred due to farmworker or drinking water concerns, salmonids benefit from the cancellations.

In Oregon, some members of the state Legislature are signaling their desire to move ahead in 2015 with a bill to increase buffer zones between spraying areas and drinking water and to increase the notification requirements for nearby residents. This action follows on the widely reported incidents of overspray of rural residents and their water sources last year, involving some of the same compounds that NMFS analyzed in their biological opinions, such as 2,4-D and triclopyr.

Also in Oregon, a task force appoint-

ed by Governor John Kitzhaber recently recommended reactivation of the state's pesticide use reporting system (which has been defunded since 2009). This system helps facilitate better understanding of pesticide use and assists with logical, sensible approaches for mitigating use risks.

What's Next for Salmonids and Pesticides?

Under request by NMFS, EPA, and other federal agencies, the National Academy of Sciences (NAS) convened a committee to review the scientific and technical issues related to determining risks posed to listed species by pesticides. The salmonid issue is not the only driver for this; EPA has been hit by a number of lawsuits related to its inadequate assessment of endangered species in its pesticide registrations. In April 2013, the NAS Committee published their review of the risk assessment process and provided recommendations to EPA and the Services.

A major conclusion of the committee was that the Services and EPA need a common approach to risk assessment. Heartening to endangered species proponents, the NAS panel urged reliance on probability models in evaluating potential effects on threatened and endangered species, rather than the "risk quotient" approach EPA uses in the rest of its registration program.

In the short run, EPA will prepare a new biological evaluation on the effects of three organophosphate pesticides (chlorpyrifos, diazinon, and malathion) to ALL listed species nationwide. A separate evaluation will address two carbamate pesticides (carbaryl and methomyl). These biological evaluations are expected to be prepared over the next 12-24 months, with formal consultation with the Services (as needed) to follow.

What You Can Do

Ultimately, the process has revealed that it is foolhardy to assume that pesticide use in accordance with current pesticide labeling is sufficient to avoid impacts to listed species, including listed salmonids. Over the long run, eliminating use of toxic pesticides, using them in ways that are proven to

minimize impacts, and/or adoption of alternative, less-toxic means to manage pest problems will most protect salmon from toxic runoff.

The Northwest Center for Alternatives to Pesticides (NCAP) and its partner organizations continue to watchdog the federal and state agencies and Congress on pesticide issues, and to advocate for effective pesticide regulation for protection of both community and environmental health. NCAP works with farmers and researchers to develop alternatives to the pesticides that are affecting salmon populations. Please refer to our website at <http://www.pesticide.org> for more information.

Consumers, farmers, and fish advocates can contribute to this work in many ways.

1) Practice low-impact approaches and seek alternatives to pesticides on your own properties as much as possible.

2) Support organic agriculture in your food buying habits.

3) Observe the legally mandated buffers adjacent to salmon-supporting waters (60 feet for ground applications, 300 feet for aerial applications) if you do apply chlorpyrifos, diazinon, malathion, carbaryl, and methomyl. See the Salmon Mapper at <http://www2.epa.gov/endangered-species/salmon-mapper>

4) Even if salmonids aren't in your local water body, utilize effective buffers around streams, rivers, wetlands, and ditches to avoid the likelihood of pesticides reaching salmon streams.

5) Engage with the issues by joining NCAP's advocacy efforts. During public comment periods on federal actions lend your voice to the process by providing comments to the EPA, Congress, your associates, or the media. NCAP posts actions you can take on our website at www.pesticide.org - check regularly for opportunities to take action. Join NCAP's email list. Please contact us for questions you may have about this work.

See page 8 for a discussion on water quality monitoring.

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largest undeveloped copper and gold reserves of any mine in the world. It would feature three open pits, one of which would be the deepest in the world, and two tailings impoundments with earthen dams like Mt. Polley, except at 218 m and 239 m these ones would stand nine times higher. By comparison, Hoover Dam is 221 m high, but made out of concrete. KSM would also generate billions of tonnes of acid-generating waste rock and the tailings would need to be treated in perpetuity. Following the Mt. Polley disaster, environmental groups, fishermen, and First Nations in Southeast Alaska re-raised the alarm about how Canada runs its mines in the trans-boundary watersheds. Alaska senators Mark Begich (D) and Lisa Murkowski (R) even called on US Secretary of State John Kerry to ask for a more rigorous review of the proposed KSM mine by Canadian authorities. But KSM had already been approved by the rabidly pro-mining provincial government in July 2014 and some of the affected First Nations on the Canadian side were already on board with the project. Despite efforts by the Gitanyow Nation and conservation groups like SkeenaWild Conservation Trust and Rivers Without Borders, and our Alaskan allies, KSM was quietly approved by the feds over the recent Christmas break. Unless the opposition to this mine increases dramatically, or the junior mining company that owns it is unable to attract enough investment to build it, this one looks likely to go ahead.

So what was all that about a silver lining? A few days after the disaster, news media reported that the Neskonlith—a member group of the Secwepemc Nation, based 200 km from Mt. Polley, near Kamloops—barred Imperial Metals from conducting any further exploratory work for a proposed lead and zinc mine in Neskonlith traditional territory. According to CBC News, Chief Judy Wilson issued an eviction notice in person at the company's Vancouver headquarters, saying: "We don't want them in the watershed above our communities here." That watershed happens to be the Adams River, BC's biggest sockeye producer.

Looking 200 km southwest of Mt.

Polley, it is hard not to be optimistic that the political fallout from the disaster will help put the final nail in the coffin of the beleaguered New Prosperity mine proposal. Teztan Biny (a.k.a. Fish Lake) is a sacred place for the Tsilhqot'in people and home to tens of thousands of rainbow trout. Taseko Mines wanted to turn the whole lake into a tailings pond. The Tsilhqot'in Nation and their allies have fiercely opposed the project, and despite approval and lobbying from BC's provincial government, the project was rejected by the federal Environment Minister. A revised proposal was also rejected by the feds last year. The new proposal would have reduced the impact on Fish Lake but still would have had substantial impacts to fish, water, and wildlife, with grossly inadequate mitigation measures, according to a review that Watershed Watch's Craig Orr co-authored for the Tsilhqot'in National Government (TNG). While the company was busy suing the federal government for not adequately considering their latest proposal, the TNG unilaterally declared the mine area to be part of a new tribal park, a few months after they won a historic Supreme Court decision recognizing their title to over 1,700 square kilometers of land elsewhere in their traditional territory.

It's too early to know just how bad the Mt. Polley disaster was for salmon and resident fish in the Quesnel system, but we'll be watching closely as the seasons turn and the data come in. But those mine wastes are now in the water and they're not coming back out, except to flow downstream. So while we're waiting to hear more about the impacts, we will also be taking a close look at those various investigations into the cause of the disaster as they come out. This will present an important opportunity for First Nations and conservation advocates in BC, Canada,

and beyond, to begin reeling in this risky industry and their government backers, and to provide a little more hope for water and fish. If you want to help, write to your local elected representative, tell him or her why they can not allow another Mt. Polley to ever happen in your province or state. Remind them what is at stake. And keep at it. You can also support the people and organizations who have made it their job to fight for your waterways and fish populations, by donating money, by getting in touch to see how you can get involved, or both.

If you want to help support independent monitoring of the Quesnel system in the wake of the Mt. Polley disaster, Watershed Watch recommends giving to the Quesnel River Research Centre at <http://www.unbc.ca/quesnel-river-research-centre>.



Hazeltine Creek in October 2008 before the mine disaster (top) and in October 2014, (above) after the dam breach. Photos courtesy Quesnel River Research Centre, University of Northern BC.

Mount Polley Mine Disaster Threatens Fraser River Sockeye

By Aaron Hill

— Watershed Watch Salmon Society —

On August 4, 2014, a dam at the Mount Polley Mine in British Columbia breached, sending contaminated water into habitat that provides spawning and rearing habitat for Fraser River sockeye salmon. Author Aaron Hill describes the disaster and its potential long-term impacts on wild salmon runs. Aaron Hill is the Executive Director of the Watershed Watch Salmon Society, a BC-based non-profit that works to protect wild salmon and their habitats. Find out more about the Society at:

www.watershed-watch.org.

The memories of epic events often never leave us. Whether it's something beautiful, like the birth of a child, or something horrible, like a violent atrocity, you remember where you were, who you were with, and what you were doing at that crystallizing moment. That is why I think I will always remember standing on my sister's deck on the afternoon of August 4, 2014, across the highway from the Skeena River, having a barbecue with a handful of family and friends, when I first heard about the Mount Polley Mine disaster, and we swarmed around the small screen on my father's phone to watch the aerial footage of the devastation.

The Mount Polley open-pit copper and gold mine looms over Polley Lake in the forested hills west of Quesnel Lake—a monarch of a lake shaped like a sideways "Y" that spans 81 kilometers from east to west, straddling the divide between British Columbia's interior plateau and the Cariboo Mountains. Quesnel Lake is especially pretty, and pretty special. It is the deepest fjord-type lake in the world; so deep that its maximum depth of 511 meters (1,677 feet) was only recently measured. It drains into the Quesnel River, which in turn feeds the mighty Fraser. Quesnel Lake produces a lot of

salmon, and most famously, sockeye salmon.

Quesnel sockeye are "cyclical", meaning that every four years, on the "dominant" year, they come back in big numbers, followed by the "sub-dominant" year, and then two "off-cycle" years. Annual returns of 10 million sockeye to Quesnel Lake were not unusual in the late 1800s, until placer mining during the Cariboo gold rush (including a short-lived dam at the lake outlet that blocked fish passage), the infamous 1914 landslide that blocked the Fraser River at Hell's Gate, industrial fishing pressure, and other insults

On August 4, 2014, Mt. Polley Mine's earthen dam gave way letting loose 25 million cubic meters of sludge and wastewater.

conspired against them. But over the past few decades, Quesnel sockeye came back to once again become a major contributor to the Fraser River sockeye aggregate. Following a collapse of the dominant cycle in 2009—along with most other Fraser sockeye stocks that year—there was a massive return of the so-called sub-dominant cycle in 2010. Their progeny returned strong again in 2014 with preliminary estimates that over 800,000 of these fish—three times the previous generation—swam back to spawn in the fallout of one of the biggest mining disasters in history, where their offspring will spend their first year of life.

In the wee hours of August 4, 2014, just two weeks shy of the expected peak of the Quesnel sockeye run, a sec-

tion of the Mt. Polley Mine's 35 meter (115 foot) earthen dam—essentially a giant berm—gave way and let loose 25 million cubic meters of wastewater and mining sludge from the four square kilometer tailings impoundment. The torrent hit Hazeltine Creek just below where it drains Polley Lake, raising Polley Lake's surface by 1.5 meters (4.9 feet), while Hazeltine Creek—a small, forested stream you can nearly jump across—became a raging river of muddy destruction, hurling trees and earth and everything in its path into Quesnel Lake, 8 km downstream. It was still going strong when the sun came up and it didn't subside for four days.

Luckily, no one was killed. But the disaster ruined local tourism operators for the season, and maybe longer. Secwepemc Nation (aboriginal) fishermen who were harvesting the bonanza of Quesnel sockeye pulled their nets from the water over fears that the fish swimming through the polluted water would be toxic. "The timing of it is catastrophic for our people," Chief Anne Louie of the Williams Lake band told the Canadian Press. "Right now, everybody would be preparing their fish for the winter, but that has not been done."

Dozens of miners were put out of work, and Imperial Metals' share price fell by half, where it remains. The entire area was put under a State of Emergency, and local residents were told not to drink the water. Premier Christy Clark and her Mines Minister flew into the town of Likely a few days later wearing jeans and rolled-up shirt sleeves for the TV cameras. Bill Bennett managed to fan the flames that were already threatening to engulf his tenure as BC's Mines Minister when he compared the catastrophe to a natural landslide and said that while it was surely "a mining disaster," it didn't qualify as an "environmental disaster." (He quickly retreated to safe ground,

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