

WASHINGTON TROUT  
◆ R E P O R T ◆

*Spring 2006*

PRESERVE, PROTECT, RESTORE

*Vol. 16 No. 1*

RETURN TO ICICLE CREEK

PAGE 16

# WASHINGTON TROUT ♦ R E P O R T ♦

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## Inside

3. The 2006 Wild Fish Soireé and Benefit Auction
4. Examining Otolith Microchemistry to Determine Rearing-Habitat Preferences in Juvenile Chinook
6. Staff and Board News
7. Help WT Advocate for Healthier Wild-Fish Ecosystems
8. Program Updates
16. Return to Icicle Creek
30. Washington Trout Acquires 40 Acres on the Skagit River

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# THE 2006 WILD FISH SOIRÉE AND BENEFIT AUCTION

AN EVENING OF FOOD, WINE, GOOD COMPANY, AND SERIOUS PURPOSE

*Kristen Durance, WT Public Outreach Coordinator*



On May 13 2006, celebrate the 15<sup>th</sup> annual Wild Fish Soiree and Benefit Auction with Washington Trout. The 2006 Soiree and Auction will be held at the Chateau Ste. Michelle Winery in Woodinville, Washington. Join us for a pleasant spring evening delicious food, hand crafted wine, good company, and serious purpose.

The Wild Fish Soiree generates a significant share of the money Washington Trout depends on to fund critical advocacy and restoration projects. Each year, it is our single most important fundraising event. The 2005 Soiree was a great success, raising over \$42,000. Bidders spent the evening outbidding each other for fishing trips, gear, weekend adventures, evenings out, and beautiful works of art. One hundred percent of the proceeds were used to support WT research, restoration, and advocacy initiatives.

Michael and Myrna Darland of Southern Chile Expeditions and Jack Cook of Fly Fish Washington have long been generous supporters of Washington Trout. In 2005, as they have done many times, they had donated premium fishing/vacation packages for auction. During the heat of bidding, the Darlands and Cook both magnanimously offered additional trips at high bid, doubling the money raised by their donations. Their generosity astonished and inspired the entire room, and made a significant contribution to the overall success of the evening; Washington Trout gratefully acknowledges their commitment and support.

Dr. David Montgomery, author of *King of Fish: The Thousand-Year Run of Salmon*, gave a provocative key note presentation on the historical paths of salmon and humans from the United Kingdom to the Pacific Northwest. Discussing the environmental, political, and cultural features of salmon conservation, he offered a

sobering assessment, challenging recommendations, but an encouraging prognosis for establishing plans for real salmon recovery.

The evening's "Fund-A-Dream" bidding raised over \$10,000 to match a \$1680 donation from a third-grade class at Endeavour Elementary School in Issaquah. Courtney Vu and Addy Lalier, students in Jennifer Perry's third-grade class, had raised \$13.10 at a bake sale in their neighborhood and wanted to donate it to "save the fish." Ms. Perry relayed this message on an internet bulletin board at WashingtonFlyFishing.com. Matching donations poured in from anglers all over the state and were presented to Washington Trout by Addy, Courtney, and their class. At the Soiree, over 70 bidders added to the "Thirteen Dollar Fund," and proved that every action, no matter the size, can have a huge impact in the world.



*Dr. David Montgomery, 2005 keynote speaker.*

Whether you are a long-time member or have just recently joined us, one way you show your support for Washington Trout is to attend the 2006 Wild Fish Soiree. The evening will start at 5:00pm with a silent auction and champagne reception, followed by dinner and key note address at 6:30, and a live auction from 7:30 to 9:30. Dinner and wine will be prepared and served by the exceptional culinary team at the Chateau Ste. Michelle, named Winery of the Year in 2005 by Restaurant Wine. Everyone's favorite auctioneer, Jerry Toner, will once again keep the pace lively and entertaining – keep an eye out for the economic indicators!

At this year's Soiree, we will kick off a 2006 raffle for a beautiful Chestnut Canoe, hand built and donated by Bill and Trudy Kindler. At fifteen feet long and 36 inches wide, designed to be paddled by two people, this exceptionally stable canoe is a great recreational/family boat. Bill has constructed a gorgeous boat, hand laid from strips of reclaimed western red cedar, and trimmed in Honduras mahogany, Alaskan yellow cedar, and Peruvian walnut, with hand caned seats of natural cane, and brass fittings. The meticulous construction is as efficient and conservative as it is handsome, providing a high yield on wood, requiring only two 2x6's for the entire hull. Bill

*Continued on page 30*

## Cutting Edge Conservation

# Examining Otolith Microchemistry to Determine Rearing-Habitat Preferences in Juvenile Chinook

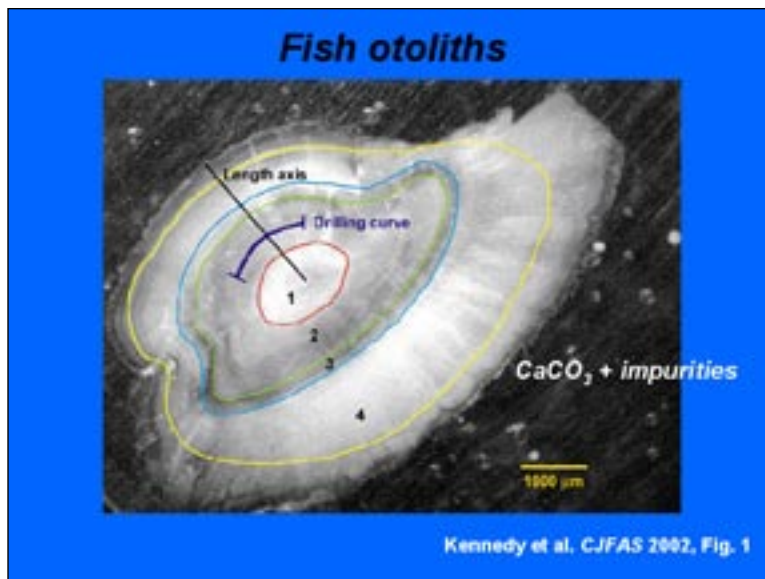
Nick Gayeski, WT Resource Analyst

In 2006, Washington Trout will initiate an exciting pilot study to determine the diversity of rearing strategies of juvenile chinook salmon in the Cedar River by analyzing the microchemistry of the otoliths of juvenile chinook salmon. Otoliths are calcium carbonate structures in the inner ear of fish that grow in proportion to the overall growth of the fish. Otoliths generally display daily growth increments so that the size and growth rate of fish at various habitat- and life-stage transitions can be estimated by back-calculation.

Funding for this cutting-edge research was awarded to WT by the City of Seattle's Anadromous Fish Committee (AFC) and Instream Flow Oversight Commission (IFC). The AFC and IFC are advisory committees established respectively by the Landsburg Mitigation Agreement and the Cedar River Watershed Habitat Conservation Plan (HCP). Both committees have separate funding provided by the City under the HCP for actions and studies directed at the preservation and recovery of native salmonids in the Cedar River watershed.

Natural-origin Cedar River chinook salmon are a component of the Puget Sound Evolutionarily Significant Unit (ESU) and are listed as Threatened under the Endangered Species Act. Wild juvenile chinook salmon emigrate from the Cedar River and enter Lake Washington over an extended period from February through June. Juveniles that migrate early (February through April) are smaller than juveniles that migrate later (May and June). These early migrants do not appear ready to enter salt water and are believed to rear in the Lake for several weeks

before attaining the size required to become smolts and enter saltwater. The larger juveniles that migrate later are generally in smolt condition and are believed to migrate directly through Lake Washington to Puget Sound. WT investigators are interested in determining whether one of these two general juvenile life history types ("lake-rearing" and "river-rearing") is more successful (has better survival and produces more adult spawners) than the other.



*The microstructures and microchemistries of salmon otoliths (calcium structures in the inner ear) display information about the growth rates and rearing-habitat preferences of juvenile salmon.*

WT proposed addressing this question by analyzing the microchemistry of the otoliths of samples of juveniles and post-spawning adult chinook salmon. Dr. Reg. Reisenbichler of the of the United State Geological Survey's (USGS) Western Fisheries Research Center (WFRC) proposed to the AFC/IFC to address this same issue by studying the microstructure (daily growth patters) of the otoliths of juvenile chinook salmon collected from various locations in

Lake Washington and from the outmigrant trap located near the mouth of the Cedar River that is operated by the Washington Department of Fish and Wildlife (WDFW).

Since the proposals appeared to complement each other, Washington Trout and WRFC proposed to coordinate our research efforts so that the both kinds of analyses could be performed on otoliths from the same juveniles, greatly increasing the amount of information that will be extracted from each juvenile otolith, reducing the overall mortality associated with the research, and reducing the costs involved in processing otoliths with each method. The AFC and IFC approved the integrated proposal in March 2006.

## **The Power of Microchemistry**

The daily growth increments of salmon and information about their growth rates are displayed in the microstructures of the otoliths of individual fish. Examining these microstructures will yield data suggesting the productivity of habitats occupied by the fish during various life-history stages and the amount of time spent in those habitat types, but it will offer little clue about the actual location of those habitats. But otoliths incorporate earth elements other than calcium (such as strontium, barium, potassium, and magnesium) in the carbonate structure of the otoliths in constant proportions to calcium. The proportions in which these elements are substituted for calcium in the otolith are determined predominately by the bedrock geology of the waters in which the fish are rearing. The isotopes of these elements also are incorporated into otoliths in fixed proportions that are likewise determined largely by local bedrock geology. The ratios of these elements (strontium/calcium, for example) and isotopes ( $^{87}\text{Sr}/^{86}\text{Sr}$ , for example) therefore provide daily records of the elemental and isotopic chemistry of the water in which juveniles live.

Advances during the past decade in the accuracy and precision of the technology for analyzing microchemistry and for obtaining analyzable quantities from structures as small as the otoliths of juvenile salmon have made it possible to use these elemental and isotopic ratios as natural tags that can be used to study fish movement and habitat preferences. These records can be interrogated at several intervals of interest (such as weekly or monthly in addition to daily) enabling researchers to identify the locations in which juvenile salmon rear at particular points in their lives once the elemental and isotopic signatures of regional water sources have been identified.

Washington Trout engaged Dr. Brian Kennedy of the University of Idaho -- a prominent expert in employing the analysis of elemental and isotopic ratios in otoliths to identify habitat use and movement patterns of salmonid and other fishes -- to help develop the proposal for the pilot project. Dr. Kennedy will be sub-contracted to conduct the microchemical analyses.

## **Objectives and Potential Benefits**

The objective of this initial year of research will be to verify that the otolith microchemistry of lake-rearing juvenile chinook salmon differs from the microchemistry of river-rearing juveniles. This will involve the microchemical analysis of water samples from throughout the Cedar River watershed and Lake Washington -- to verify that elemental and isotopic ratios differ between water samples from different locations in which juvenile chinook salmon may rear -- and the microchemical analysis of the otoliths of juvenile chinook salmon sampled from the outmigrant trap in the lower Cedar River and collected at various locations around Lake Washington. -- to verify

that water chemistry differences are recorded in the otoliths.

Once these pilot tasks have been accomplished (February 2007), we expect to receive an additional one to two years of funding to address more specific questions concerning the rearing strategies of juvenile Cedar River chinook and associated patterns of habitat use. The answers we will obtain from this additional study will help to focus habitat protection and restoration efforts in the Cedar River/Lake Washington system directed at recovering the Cedar River chinook salmon population.

The primary focus of future research will be the analysis of the microchemistry of otoliths of post-spawning adult chinook salmon collected during spawning surveys. Spawning adults are the ones with successful life histories. Therefore, it will be important to determine whether or not particular juvenile rearing strategies ("lake-rearing" or "river-rearing") are disproportionately represented among the returning adults. Such information would help in directing protection efforts and would also direct research efforts to determine why rearing strategies that are under-represented in the samples of adult otoliths are not as successful. Otoliths from adult chinook salmon carcasses collected during spawning surveys on the Cedar River in recent years have been archived by WDFW and will be available to us for this research. We plan to analyze samples of adult otoliths from brood years 2004 -- 2007.

A related topic of future research will be to evaluate the accuracy of the microchemistry of the scales of juvenile chinook salmon to reveal patterns of recent (weeks to months) habitat use. Scales are similar to otoliths in that they provide a record of fish growth throughout most of a fish's life; but in contrast to otoliths, the elemental and isotopic composition of scales also changes as fish age and scales are replaced as the fish grows. However, over short periods of time ranging up to several months scales can provide reliable elemental and isotopic signatures. This is likely to be true of juvenile ocean-type chinook salmon (such as Cedar River chinook salmon) that rear in freshwater for periods of weeks or months. Verification that scale microchemistry can accurately measure patterns of habitat use of juvenile chinook salmon would provide a non-lethal tool for monitoring this critical aspect of juvenile ecology, which would greatly facilitate the adoption of this technique by fisheries managers in the region for purposes of monitoring various actions directed at the preservation and recovery of salmonid populations. ●

# Staff and Board News

## Joe Kelly, Board Member

Joe Kelly joined the Washington Trout Board of Directors in 2005. Joe has been an exploration Geologist, a teacher and a refinery operator. He is currently retired and living in Ferndale, Washington.

Joe earned his B.A. in Education and a M.Sc. in Geology from Western Washington University, and completed graduate coursework in Geology at the University of Washington and Stanford University.

An enthusiastic fly fisher, Joe is co-chair of the conservation committee for the Fourth Corner Fly Fishers. "As I have gotten older my focus has shifted," says Joe, "from simply fishing to working actively to protect our native fish populations and their environments."

Joe sees one of his roles as a board member is to help inform more people about conservation issues generally and Washington Trout's mission and initiatives in particular. Joe has spent most of his life in the region. He has witnessed first hand the steady degradation of local wild-fish populations and habitats.

"I admire Washington Trout's science based and educational approach," Joe says enthusiastically about his board position. "I'm ready. We have to try solving the problems facing our wild resources."

## Josh Robins, Field Biologist

Josh was hired in spring 2006 primarily to join Washington Trout investigators on the west Whidbey Island nearshore fish-use assessment. He will help with beach seining, fish identification, data entry, and data analysis. As necessary, Josh will contribute to other research and restoration projects, conducting spawning surveys, growth studies, fish population monitoring, and habitat restoration; he'll develop and submit grant proposals; help design and monitor projects, develop reports and present research findings.



Josh earned a BS from the School of Aquatic and Fishery Sciences at the University of Washington in 2004, and he expects to complete his Master's degree at the University of Alaska by August 2006. His thesis explores relationships between

adult survival, early marine growth, and biophysical variables for a population of coastal coho salmon in Southeast Alaska.

Josh worked with the University of Washington's Fisheries Research Institute in Wood River Lakes investigating otolith growth to assess migration of juvenile pink and sockeye salmon in lakes. As an undergraduate field/lab technician at the University of Washington, he participated in research projects involving the ecology of Pacific salmon and trout in Washington and Alaska.

Born and raised in Washington state, Josh imagines he has always spent more time outdoors than indoors, and he is enthusiastic about working in the field for Washington Trout.

"I'm thrilled about this opportunity," says Josh, "I'm looking forward to continuing to learn about Pacific salmon and trout through field-based research, while supporting the overall effort to effectively conserve wild populations in Washington state."

## Bernard Shanks Board Member

Washington Trout is proud and excited to announce



that Dr. Bernard Shanks joined the WT Board of Directors in January 2006. Dr. Shanks has spent his entire career in outdoor and environmental management. He brings to the WT board a compelling and impressive background, and a commitment to wild-fish conservation.

Dr. Shanks currently manages the Cooperative Fish and Wildlife Research

Units in the western states for the US Geological Survey. He is a past Director of the Washington Department of Fish and Wildlife. During his tenure at WDFW, Dr. Shanks led the development and adoption of Washington's first science based management plan dedicated to the conservation of the state's wild-fish resources, the WDFW Wild Salmonid Policy.

"Washington Trout has a dedicated and very talented staff," says Dr Shanks. "And I'm very excited to be working with an organization that promotes and utilizes the best science in their conservation efforts."

*Continued on page 29*

# Help WT Advocate for Healthier Wild-Fish Ecosystems

What exactly does Washington Trout want? We say we “advocate” for wild fish; what does that mean?

Put most broadly, Washington Trout advocates for socially responsible and scientifically credible wild-fish conservation. We want risks acknowledged and addressed, data responded to appropriately, laws obeyed, and conservation-responsibilities distributed objectively, even if it’s inconvenient for powerful stakeholders.

Please consider making an individual donation to support Washington Trout’s advocacy campaigns. We depend on direct support from members and donors to keep WT advocacy effective.

The Wild Salmon Recovery Initiative is Washington Trout’s largest advocacy program; its goal is to influence federal, state, and local agencies to effectively recover and conserve salmonid populations and ecosystems listed under the Endangered Species Act. The program has added teeth and accountability to processes that otherwise might have been pro forma and ineffective, and replaced inaction with forward progress. Washington Trout has made harvest management for listed salmon more transparent, and fought back increases in allowable harvest-impacts for listed steelhead. We’re strengthening land-use and water-quality regulations, and raising the bar for acceptable hatchery management. However, listed salmon, steelhead, and bull trout populations continue to be jeopardized by the failure of public agencies to meet their responsibilities. Recovery is still being frustrated by political delay and inappropriate action.

WT participates in many processes that can be reliably anticipated and scheduled, Listing Decisions, Recovery Plans, Environmental Impact Statements, Biological Opinions, and Habitat Conservation Plans. But conservation challenges and opportunities can develop unexpectedly and rapidly, requiring the capacity to respond more spontaneously. It is vitally important that technically credible conservation advocates participate in as many of these circumstances and processes as necessary. Without credible advocacy for healthy wild-fish ecosystems, agencies will likely be unduly influenced by timber, development, agricultural, industrial, hydro-electric, fisheries, and/or other economic interests.

WT coordinates its advocacy with a broad coalition of national and regional conservation organizations, including American Rivers, Audubon Society, Earth Justice, Endangered Species Coalition,

National Wildlife Federation, Native Fish Society, Oregon Natural Resources Council, Oregon Trout, Pacific Coast Federation of Fishermen’s Associations, Public Employees for Environmental Responsibility (PEER), Trout Unlimited, Wild Steelhead Coalition, and others. Conservation advocates rely on Washington Trout for its technical expertise in wild-salmon ecology and management, and we will continue to work closely with our coalition partners on strategies including litigation, public outreach, and agency advocacy.

It sounds romantic, like we’re always mounting barricades, or at least pounding on lecterns. But it involves serious, time-consuming, sometimes tedious work: analyzing and drafting reviews of policy proposals; watchdogging agencies; participating on recovery forums and technical-review teams; working directly with resource-management officials; developing information/action campaigns; litigating where necessary. To be successful, this work requires close examination, painstaking research, careful consideration, thorough consultation, credibility with policy leaders, and above all, persistence. Washington Trout has the experience, knowledge, and passion necessary to get the job done, and we’ve developed collegial professional relationships in the academic and conservation communities, with social and economic stakeholders, and with key staff at relevant local, state, tribal, and federal agencies.

## **Your Support is Vital**

Because WT advocacy has been so effective, it has enjoyed significant support from big institutions including the Bullitt, Flintridge, Horizons, Kongsgaard Goldman, and the Charlotte Martin Foundations, and Northwest Fund for the Environment. But we also rely on support from our membership, drawn from the conservation, recreational, academic, fisheries, and professional resource-management communities, as well as the general public.

We gratefully acknowledge the past and ongoing support we’ve received from all sources, but especially from our membership and individual donors. Direct support from members and donors is extremely important for effective advocacy because it provides the most flexibility. A successful advocacy campaign has to be able to tolerate unpredictability in anticipating and scheduling specific tasks.

Large institutional grants are often “restricted,” that is, the money must be spent on only the specific

*Continued on page 31*

# Program Updates

## Field Research:

### **Phase I Ellis and Schneider Creek Recolonization Study**

During 2006 and 2007 the City of Olympia will restore fish passage at two significant fish-barrier culverts at the mouths of Ellis and Schneider Creeks. The culverts prevent or compromise the upstream migration of anadromous fish historically present in these streams.

During fall 2005 Washington Trout conducted weekly salmon spawning surveys in the two watersheds. Washington Trout staff documented the abundance, reach preference, and timing of chum and coho entry into both streams. Surveys were conducted weekly, stream conditions permitting, between October 20 and December 27, 2005. Identifying the species, number, and location of salmon spawning in each creek provides a baseline for comparison against data collected in the future, after fish passage is restored.

The results of the survey support the presumption of the Washington Department of Fish and Wildlife that the culvert at the mouth of Schneider Creek is a full barrier to fish migration. Survey technicians found no evidence that salmon made entry into Schneider Creek.

WDFW estimates that the culvert near the mouth of Ellis Creek is currently 67% passable, depending on streamflow and the height of the tides at the mouth of the creek. WT field technicians documented four chum redds and seven coho redds, and found the carcasses of four coho and one chum. The total numbers of adult salmon entering Ellis Creek during fall 2005 were likely between four and fourteen coho and between two and eight chum. Of the



*Coho carcasses in Ellis Creek in Nov. 2005.*

five carcasses recovered, three were adipose-clipped, one was too decomposed to determine adipose presence, and one (the chum) was adipose-intact. None of the adipose-clipped carcasses had been marked with a coded wire tag, so hatchery of origin could not be discerned.

The next element in this study will involve characterizing the resident trout and juvenile salmon populations in each watershed. This study will document changes in the fish populations that result from restoring full fish-passage at the mouths of these two watersheds, and will allow for inter-basin, and inter-annual in-basin comparisons of fish population parameters. Washington Trout gratefully acknowledges funding provided by the City of Olympia for this important research, and the loan by WDFW of a coded-wire tag reader.

- Jamie Glasgow

### **French Creek Fish Passage Monitoring**

French Creek is a moderate sized tributary of the Snohomish River, entering the north bank of the river near the town of Snohomish. The French Creek basin drains approximately 28 square miles, and consists of over 117 miles of stream and floodplain channels. The downstream portions of the watershed have been significantly altered to support dairy farming and other agricultural practices. The lower watershed is now an extensive network of ditches, dikes and levees, and a complex pump/tidegate facility where the creek joins the Snohomish. The pump station is screened to protect fish and has a Denil-type fish ladder to provide upstream adult salmon passage during parts of the year. However, the station still restricts adult migration and blocks juvenile salmonid access to the French Creek (WRIA 07 Salmonid Habitat Limiting Factors Analysis, 2002).

French Slough Flood Control (FSFC) operates and manages the pump station and associated fish passage facility. In early 2005 FSFC contracted Washington Trout to design, build, install, and test a fish passage monitoring device at the pump station to determine the number, species, and timing of upstream fish migrants passing through their facility. This information will help FSFC and the Washington Department of Fish and Wildlife decide when the fish passage facility at French Slough, which requires substantial amounts of electricity to operate, must be run.



*Coho captured on a WT-designed digital video recorder. recorder*

Working with security and surveillance companies across the country, Washington Trout designed and built a motion-activated digital video recorder system to capture images of every fish that passes through the FSFC fish passage facility. The digital video recorder saves a short video of each fish that jumps over a weir in the fish passage facility, images that allow Washington Trout crews to document the species of fish and the presence or absence of an adipose fin, to identify fish of hatchery origin. At night, the cameras automatically switch to infrared lighting so that disturbance of fish behavior is minimized. Each fish image is automatically marked with the date and time of passage, so analysis of the footage will provide new and more complete information about anadromous fish entering the French Creek watershed.

Washington Trout began video surveillance at French Slough on October 6, 2005. During the first month of operation 404 adult coho salmon (*Oncorhynchus kisutch*) were documented passing upstream through the French Slough Flood Control facility. Unfortunately, occasional power-blackouts occurred during the first month of monitoring, so total fish-entry could not be documented, but it is likely that over 500 adult coho actually entered the French Creek watershed during this time period. (The cause of the power failures has since been identified and repaired by the FSFC.)

No other fish species were documented during the first month of monitoring. One mink (*Mustela vison*) passed through the fish passage facility on October 27. Visually determining whether observed fish had a clipped adipose fin was accomplished for 63% of the 404 coho documented. In these cases, 4% were ad-clipped, indicating hatchery origin; 96% had an intact adipose fin. Fish passage through the pump station was monitored until December 2005, but funding has so far only been available to review and analyze images recorded through October 2005.

Washington Trout is committed to developing and using the most effective technologies to collect field data and help guide responsible resource-management. The French Creek project also accommodates our strong desire to work with the agricultural community to identify alternative management practices that benefit fish and farmers. Funding for the project was provided by FSFC. We are currently seeking funding to continue the video-footage review from November 2005 onward.

- JG

### **Whidbey Island Nearshore Study**

In 2005, Washington Trout crews surveyed the nearshore waters of Admiralty Inlet and the Strait of Juan de Fuca on Whidbey Island for juvenile salmonid presence. From February through August, crews sampled ten sites that represent the range of habitats available to juvenile salmon as they migrate along the western shore of Whidbey Island from natal rivers to the Pacific Ocean. Sample sites included open beaches, cusped forelands, coastal barrier marshes, estuaries, and lagoons.

Since the end of the field season, project investigators have been busy analyzing the collected data, and preparing a final report for release in 2006. The information provided by the project will help managers and funders develop and prioritize recovery strategies and habitat protection and restoration initiatives in Puget Sound.

To determine juvenile salmon presence, WT staff utilized a two types of beach seines. A large net beach seine, 120' long and 12' deep, was used at deep water sites and open beaches, while a small net, 80' long and 6' deep, was used to sample shallow sites with more complex habitat structure. Chum salmon were the most common juvenile salmon caught at all sites, while coho salmon were the least common.

In addition to juvenile salmonids, Washington Trout crews collected data regarding all fish species encountered during the surveys. These data were used to calculate species-diversity indices for each site. Figure 1 shows the Shannon-Wiener Diversity Index score for each of the ten sampled sites. This metric is based on a combination of species richness (total number of species encountered) and species evenness (site dominance by a few species). The potential diversity for a given site is designated  $H'$  Max, a metric directly related to species richness, while  $J'$  is the measured evenness.

Keystone Harbor had a high  $H'$  Max because numerous different species were encountered there, giving it a high level of species richness; however, the measured S-W Diversity Score was relatively low because the species-evenness scores were low. Catch totals at

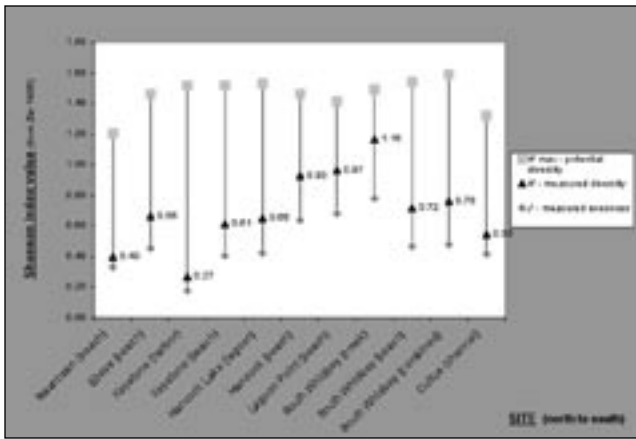


Figure 1. Species diversity and evenness for nearshore marine fish communities sampled with the large beach seine along the West coast of Whidbey Island.

Keystone were dominated by a few species, most notably three-spine stickle back and herring. Keystone Harbor was one of the more disturbed habitats sampled in this project, with regular dredging occurring in the sample area for the adjacent ferry terminal. A common observation is that species communities subjected to ecological stressors experience increased abundances of a few species best suited to disturbed environments, which lowers the evenness score. In contrast, the South Whidbey Creek site, located in a relatively undisturbed stretch of the coast, had an almost identical potential diversity (species richness) score as Keystone Harbor, but measured diversity was much higher because the catch totals were not dominated

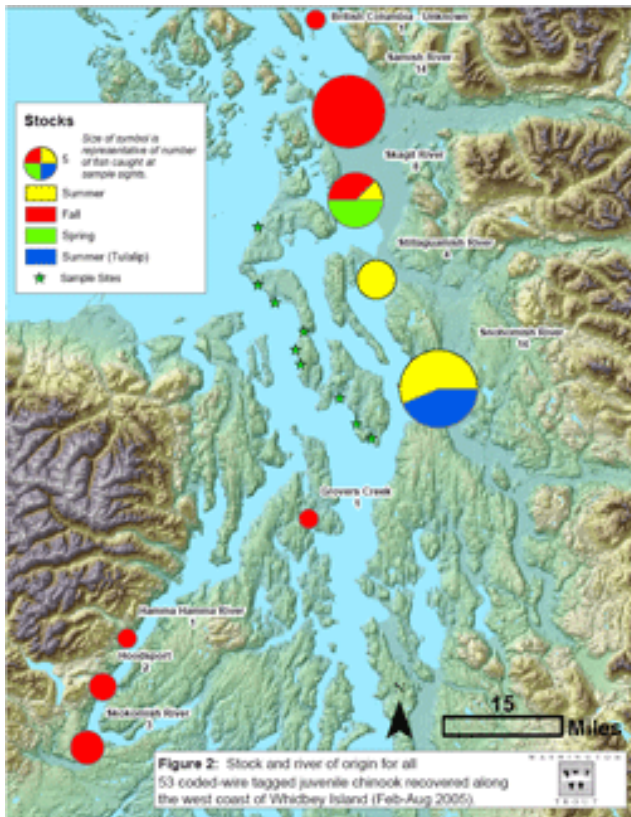


Figure 2: Stock and river of origin for all 53 coded-wire tagged juvenile chinook recovered along the west coast of Whidbey Island (Feb-Aug 2005).

by one or two species, and were more evenly spread across all species.

Approximately 8% of the juvenile chinook caught during the project were marked with Coded Wire Tags (CWTs). These tags identify the stock and river of origin for tagged fish, usually hatchery salmon. Figure 2 shows the stock and river of origin for the 53 juvenile Chinook sampled with recovered CWTs. Eleven percent of the recovered CWT fish were from river's draining into the Hood Canal Watershed, indicating that these fish crossed Admiralty Inlet to utilize habitats along Whidbey's western shore. Twenty-eight percent of the recovered CWT fish were from the three rivers draining into the Whidbey Basin: the Skagit, Stillaguamish, and Snohomish River systems. One of the recovered fish had a British Columbia tag; however, we have not been able to determine the stock and river of origin for this fish. Fourteen percent of the recovered fish were from the Samish River which drains into the North Puget Sound.

Interestingly, none of the recovered CWT fish were from south Puget Sound river basins, such as the Puyallup or Nisqually. This could be a result of small sample sizes, hatchery release timing, sample timing, or could indicate that juvenile chinook from these basins are not occupying habitats on the western shore of Whidbey Island in the same abundances as fish from the Hood Canal, Whidbey Basin, and North Puget Sound.

The West Whidbey Nearshore project is providing valuable information about the needs and behavior of juvenile salmon migrating and rearing in Puget Sound, and the conditions they experience in various nearshore habitats. This information will influence and help guide recovery and conservation efforts throughout the region.

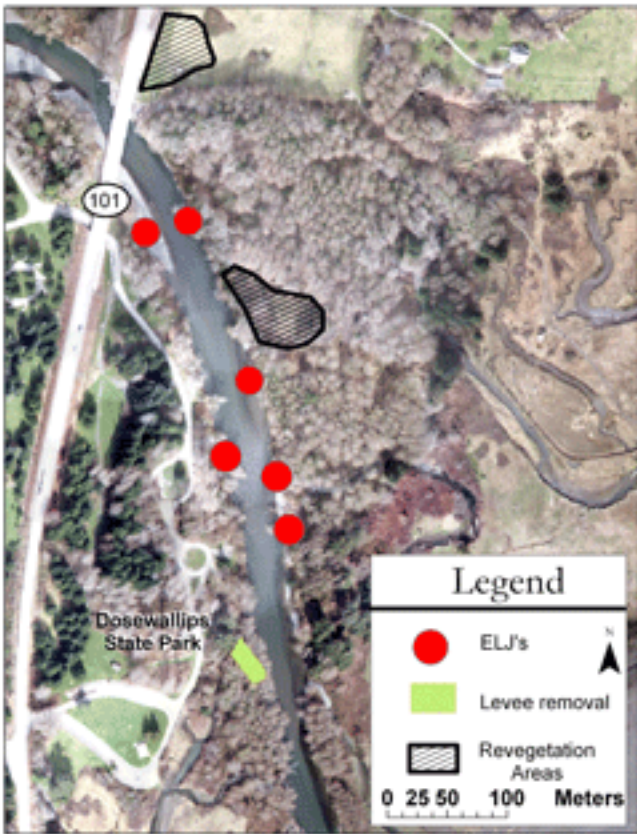
- Micah Wait

## Habitat Restoration:

### Dosewallips Estuary Restoration Project

In summer 2006, in cooperation with Washington State Parks, the Port Gamble S'Kallalam Tribe, and the Hood Canal Coordinating Council, Washington Trout will initiate the second phase of a major restoration project on the Dosewallips River estuary.

During the first phase of the project in 2004 Washington Trout removed over 1000 ft of a remnant dike in the Dosewallips salt marsh, increasing tidal inundation and sheet flow in a five-acre cell of the estuary. Restoration crews also removed invasive Himalayan blackberry and planted native conifer tree species in the wooded area within the distributary-channel network of the Dosewallips River. In 2004, project staff collected data



for and assisted in the creation of a reach analysis for the lower Dosewallips River and estuary. The reach analysis will determine the current and historic physical habitat conditions in the study area and outline actions needed to remedy degraded ecological functions. The second phase of the Dosewallips Estuary Restoration Project will implement the actions recommended in the reach analysis.

Results from the reach analysis suggest that the mainstem of the lower river had lost the structural complexity needed to maintain the diverse suite of habitats that support productive salmon populations. Historically, the lower Dosewallips River was a sinuous channel with numerous braids and a complex network of distributary channels. This channel morphology was created by enormous log jams formed by massive trees washed into the river from the watershed's old growth forests. These log jams formed stable hard points in a dynamic fluvial setting, forcing bifurcations of river flow and scouring out deep pools- creating a complex and dynamic habitat structure.

Modifications to natural river conditions began soon after the area was settled. Large wood was removed from the river in order to decrease flooding in homesteaded areas. Intensive logging carried on in the lower reaches of the watershed destabilized slopes, robbed the river of its riparian wood supply, and was accompanied by splash damming operations that scoured the river of spawning

gravels. As the town of Brinnon and the Dosewallips State Park grew and were developed, flood control became a local priority, and bank armoring and dredging were used to create a simplified channel configuration. Alluvium dredged from the river bed was piled with rip rap along the shoreline to confine river flows to a single, linear channel. Again, log jams that had developed in the lower river were dismantled to discourage divergent flows and the periodic flooding associated with a properly functioning floodplain.

These anthropogenic alterations to the channel morphology of the Dosewallips River have contributed to the decline of native fish populations in the lower river, particularly the summer-run chum salmon and chinook salmon that were most reliant on lower river mainstem habitats for spawning and rearing.

WT has developed, within the framework of the reach analysis, a list of recommended restoration actions. Beginning in spring 2006, crews will install engineered log jams, remove selected sections of bank armoring, and reestablish native riparian vegetation throughout the project reach. Work will continue through 2006 and into 2007.

WT has contracted Tim Abbe and Herrera Environmental Inc to permit, design, and site three engineered log jams for installation in summer 2006. Engineered log jams will create deep water scour pools where fresh-from-the-saltwater adult salmon can hold and wait for gonad maturation. These pools will also serve as ideal rearing areas for juvenile salmon, providing access to mainstem feeding lanes with deep water, complex structure, and overhead refuge from predators. Log jams will bifurcate river flows, forcing water into the distributary channels that meander across the wooded island to the east of the river (figure 1). These channels are alternate outmigration routes for smolting salmon, and increasing flows down these will better distribute fish throughout the productive habitats of the salt-marsh estuary.

It is well understood that density-dependant interactions can reduce survival among outmigrant juvenile salmon. Distributary channels serve to decrease population densities by spreading fish across the entire salt marsh estuary. A fifty foot long section of levee along the eastern shore of the river, downstream of park infrastructure, will be removed, reconnecting a remnant distributary channel (figure 1). Again, increased flows into the river's distributary network will help to spread juvenile salmon throughout the salt marsh, decreasing the likelihood of harmful density-dependent impacts.

Historical timber harvest and the invasion of non-native species have impacted the forests in the project reach. Dense patches of Himalayan blackberry line some portions of the river bank to the exclusion of all other plant

species; while early logging activity in the area removed the large coniferous trees that are so important for the formation of stable log jams. WT crews have been busy over the 05/06 winter clearing and burning blackberries and planting native Sitka spruce and western red-cedar to restore the riparian forests of the lower river.

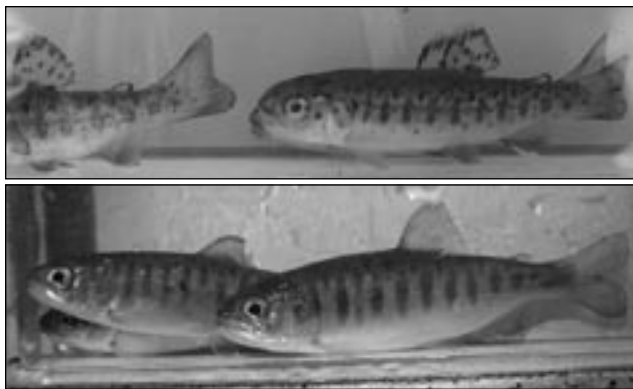
Compared to many riverine systems in the Puget Sound region, the Dosewallips is in relatively good condition. Over 80% of the Dosewallips watershed is protected in Olympic National Park, ensuring excellent water quality and an abundant supply of sediment and large wood. The majority landowner in the riverine corridor between the parks is the Olympic Nation Forest. And the lowermost portion of the river is entirely within the Dosewallips State Park, where our restoration project will enhance habitat forming ecological processes. With sound stewardship and management in both parks and the Olympic National Forest, the Dosewallips River will serve as an excellent refugia habitat for wild salmon, steelhead, char, and resident trout.

- MW

## Habitat Lost & Found:

### Municipal Water-Typing

The Habitat Lost & Found program served a particularly important function in 2005 by assisting local jurisdictions in performing state-mandated updates to their growth management regulations. The Washington State Growth Management Act requires that all County and Municipal Government Critical Areas Ordinances be updated based on “Best Available Science,” preferably by 2005. This includes updating local stream classification systems and their associated protective riparian stream buffer requirements. Washington Trout performed water-typing surveys for a number of western Washington cities and counties during 2004-2005, collecting current



Juvenile cutthroat trout (top) and coho salmon (bottom) collected during Washington Trout's 2004 water-typing surveys in Redmond, WA.

information about local fish populations and anthropogenic impacts to their habitat. The surveys have provided data that will support greater habitat protection in over 50 watersheds in King, Thurston and San Juan Counties.

In 2004 and 2005 HLF crews performed water-typing surveys in 22 watersheds within the city of Redmond. Redmond has used the survey results to increase protection for wild-fish habitat within its jurisdiction. During June and July 2004, Washington Trout field crews conducted fish species composition and distribution surveys in 18 Redmond watersheds, on public lands and where permission to access was granted by stream-side landowners. The City had previously performed stream reconnaissance studies to characterize its watershed resources, but Washington Trout's water-typing surveys represented the first comprehensive and systematic inventory of fish species composition and distribution



Boulder-strewn channel in Redmond, WA. designated “fish-bearing” in 2004 on the basis of physical habitat characteristics.

within Redmond's watersheds. The primary objective of the new survey, as motivated by the required Critical Areas Ordinance update, was to collect data to refine the extent of known fish-bearing water within the City.

In Redmond, fish presence was documented in 71% of the streams surveyed by Washington Trout crews. Investigators observed juvenile and adult coho salmon, juvenile and adult cutthroat trout, stickleback, sculpin, and brook lamprey. Washington Trout crews evaluated, characterized, and documented stream habitat by collecting data on channel gradients, channel widths, fish passage barriers, and riparian characteristics. Many stream reaches without fish at the time of the survey nevertheless met state-mandated criteria for the ‘fish-bearing’ classification on the basis of physical habitat characteristics. These results suggest that the distribution of fish and fish habitat in the City of Redmond has been underestimated in the past, and that stream reaches throughout the City's watersheds qualify for and should receive increased



*Cutthroat trout (juvenile at left; adult at right) found stranded in 2005 at new culvert installation site in Redmond.*

protection. WT documented more than five miles of previously unmapped stream channel and upgraded the water-type classification to ‘fish-bearing’ for more than 13 additional miles of stream.

In response to the surveys, Redmond has revised its Critical Areas Ordinance and improved protection for its fisheries resources, incorporating a new stream-classification system and significantly wider riparian stream-buffers. Redmond’s Department of Natural Resources has also been appraised of numerous man-made barriers to fish migration within City limits; preliminary steps have been taken by the City to remedy these anthropogenic impacts.

Data collected during the Redmond water-typing surveys are being incorporated into an interactive Web-based Geographic Information System (GIS). The Web site will enable visitors—the general public and agency staff alike—to view primary field data and hundreds of accompanying photographs of fish and fish habitat recorded during the course of the project. The site will allow users to select among a number of GIS background layers for viewing, including fish distribution, topography, and aerial photographs. These GIS layers, which represent a dynamic foundation to which future data and photographs can be added, have been made available to the City of Redmond so they can be updated as additional information is collected. For examples of Washington Trout’s interactive online maps, visit [www.washingtontrout.org/maps](http://www.washingtontrout.org/maps).

- Eliot Drucker, PhD

### **N. Thurston Co. Watertype Assessment**

Thurston County is one of the fastest growing counties in the state. Over the past decade, the county has averaged 35,900 new residents each year. The Thurston Regional Planning Council predicts that by 2025, the county’s population will increase by 58%. In the face of these development pressures, it is increasingly important to ensure that growth occurs responsibly and with minimal impact on already stressed wild-fish ecosystems. Cooper

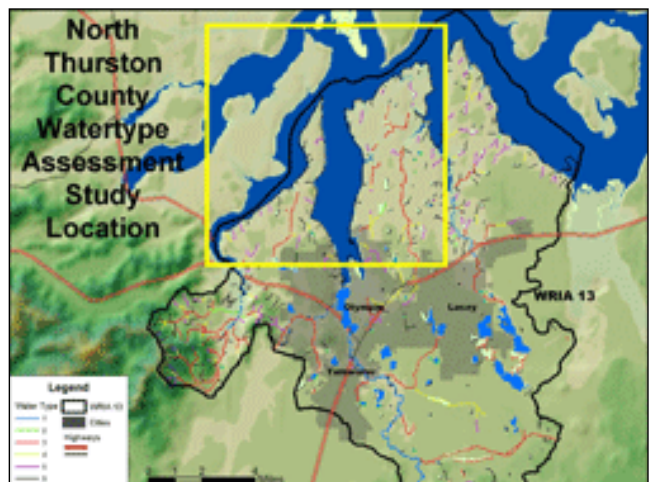
Point, Johnson Point, and the Steamboat Island peninsula are located in North Thurston County just outside of the City of Olympia, an area of relatively low-density development. However, because of their proximity to the city and their build-out potential, their environments are highly vulnerable to near-future development.

The amount of protection that streams receive in Thurston County is regulated by the water type classification system developed by the Washington Department of Natural Resources (WDNR). Fish-bearing streams are classified as types 1, 2, and 3, and receive greater protection and wider stream-buffers than non fish-bearing streams classified as types 4 and 5. Thurston County requires 100-foot stream buffers on types 1, 2, 3 streams, 50-ft on type 4 streams, and 25-ft on type 5 streams (with 50-foot buffers for type 5 streams that drain directly into Puget Sound).

This system can adequately protect fish and their habitats only if the streams in the County are accurately classified. Alarming, data collected in part by Washington Trout has documented large (>50%) error rates associated with WDNR water type classifications in western Washington ( see <http://www.washingtontrout.org/maps.shtml>); consequently, thousands of miles of unmapped and misclassified streams do not receive the protection they warrant.

Errors in water type maps typically fall into two main categories:

1. The upstream extent of fish and/or fish habitat is underestimated; and/or
2. Streams are mapped incorrectly or not at all.



Where water type maps are incorrect, fish and fish habitats do not receive appropriate regulatory protection from land management activities including residential development and the construction of associated infrastructure. Consequently, direct effects of inaccurate water type maps often include:

- Compromised fish passage;
- Reduced water quality;
- Reduced bank and bed stability;
- Increased sediment loading;
- Reduced LWD recruitment;
- Altered nutrient cycling; and
- Compromised hydrograph (reduced summer low-flow, increased magnitude and frequency of high flow events).

WDFW has identified one of the primary sources of habitat loss in the South Puget Sound basin as residential development and road building. “These activities result in loss of riparian vegetation, increased sediment loads, high run-off rates, and blockages to migration...” (WA State Salmonid Stock Inventory – Coastal Cutthroat Trout. 2000).

In spring 2005 Washington Trout received funding from the Salmon Recovery Funding Board to perform a watertype assessment in North Thurston County. Project objectives are fivefold:

1. Correct the misclassification of WDNR water type in those watersheds draining North Thurston County on Cooper and Dofflemeyer Points, and the Steamboat Island peninsula. Correctly classifying water type designations will ensure that those habitats that warrant protection have a better chance of receiving it.
2. Correctly map previously unmapped and incorrectly mapped stream channels. Channels that are not mapped correctly, or do not appear on the maps at all, may be overlooked and receive little or no protection. Without accurately identifying where the fish and their habitats are, neither can be protected nor included in basin-wide recovery planning efforts.
3. Provide salmon species-specific distribution data, instream and riparian habitat data, and fish passage data to assist with basin wide restoration project identification and prioritization efforts.
4. Evaluate the type and extent of water type designation inaccuracies that exist in North Thurston County. This assessment will begin to characterize the magnitude and extent of regulatory mapping errors in Thurston County. Present the results of the assessment to a broad public and agency audience.
5. Make all the information collected during and resulting from this assessment available to interested agencies and the general public via an interactive web-based GIS (see <http://www.washingtontrout.org/maps.shtml>). Work directly with Thurston County, WDFW,

WDNR, the City of Olympia, and the Squaxin Tribe to ensure that regulatory maps are updated with the newly collected watertype data.

In addition to ensuring that the best available science is used to protect fish habitats under existing laws, this assessment will fill data gaps regarding non road-related fish passage issues (diversion dams, withdrawal systems, etc.) and fish species composition and distribution – information needed to responsibly identify, prioritize, and implement effective and science-based restoration projects. This assessment will also lead to the direct identification of restoration and protection opportunities within the study watersheds.

To date, Washington Trout has completed the watertype inventories on Cooper Point, the peninsula immediately to the west of downtown Olympia. On this point of land, Thurston County had identified seven watersheds, the WDFW Stream Catalog (1975) identified seven watersheds, and the Washington Department of Natural Resources identified twenty-four watersheds. Using data (LiDAR and airphotos) provided to the project by Thurston County, and after performing on-the-ground surveys, Washington Trout mapped and classified 37 separate watersheds (each with a mouth at saltwater). Many of these watersheds meet the physical and/or biological criteria to receive protection as type-3 waters. We have documented what appears to be a thriving population of native Olympic Mudminnow (*Novumbra hubbsi*, a State Species of Concern) in the upper Green Cove Creek watershed. Other species encountered during the surveys include coastal cutthroat trout, coho salmon, prickly sculpin, and lamprey.



Olympic Mudminnow (*Novumbra hubbsi*, a State species of concern).

Washington Trout is presently requesting permission from landowners to continue the watertype field assessments on Dofflemeyer Point, the point of land immediately to the east of Olympia. That fieldwork is scheduled to begin in April 2006. In the meantime, we will be using our Cooper Point field data to generate an internet-based interactive GIS to make our findings available to Thurston County, WDFW, WDNR, other

agencies, and the general public. Watch for the interactive watertype maps to appear on our website ([www.washingtontrout.org](http://www.washingtontrout.org)) this summer.

- JG

*Washington Trout's Habitat Lost & Found program was funded in part during 2005 by a grant from the Hugh and Jane Ferguson Foundation. Washington Trout gratefully acknowledges the support of the Ferguson Foundation, and we recognize and appreciate their commitment to scientifically sound and socially responsible natural-resource management. Please visit [www.washingtontrout.org](http://www.washingtontrout.org) for an overview of other Habitat Lost & Found research, restoration, and advocacy projects.*

## Outreach/Education:

### Washington Trout at the Northwest Flower and Garden Show

For five days in February, WT staff and volunteers represented Washington Trout at the NW Flower and Garden Show. From February 8<sup>th</sup> through the 12<sup>th</sup>, the five day festival brought garden enthusiasts, plant aficionados and conservation minded folks together to learn more about gardening and plants.

Armed with the theme, "Everything lives in a watershed," WT staff and volunteers worked with the public to explore what happens to the water that falls in their neighborhood. As one of the few hands-on booths in the education portion of the show, the booth was often filled with children itching to squirt water on the EnviroScape, our small watershed model. Pollution in the watershed was represented by various household items like soy sauce, chocolate sprinkles and flecks of paper and as children polluted the watershed with everything from leaking car oil to pesticides and animal waste, they were able to visualize where it all went during a rain storm. Using spray bottles, children (and even some adults!) went to town, soaking the watershed and creating quite a mess of the represented river and lake.

The booth was a wonderful opportunity to educate the public on how what you plant in your yard can have a positive impact on native fish. With many urban gardeners in attendance, it was important to relay the message that even in urban environments native plants benefit native fish.

This event was made possible by the generosity of Bruce and Jeanne McNae, who donated the booth fee for the entire five-day festival. WT would also like to thank the wonderful volunteer crew who made the event possible – Celina Steiger, Fritz Wollett, Emily Jones, Darren Erickson, Mark Hersh & Brook Kelly.

- Kristen Durance

### James Prosek Book Signing at C.C. Filson Flagship Store

On December 10 2005, world-renowned writer, artist, and fly angler James Prosek joined conservationists, sport enthusiasts, and outdoor aficionados at the Filson flagship store in Seattle to help raise awareness, and money, for Washington Trout. Filson is a premium outdoor clothing retailer with a long history in the Northwest. They generously donated proceeds from the event to Washington Trout, 10% of the day's sales and 100% of the proceeds from a silent auction for a James Prosek lithograph. The event raised over \$2,300 to help WT fight to conserve and protect Washington's wild fish.



Left to right: Jeff Greer, Filson; Kurt Beardslee, WT; Mark Bale, Sage; James Prosek, Artist; Bill McMillan, WT; and John Zannini, Filson.

Mr. Prosek is the author and illustrator of several books, including *Fly-Fishing the 41st From Connecticut to Mongolia and Home Again: A Fisherman's Odyssey*, and *Trout of the World*. His exceptionally sensitive paintings of trout from across the globe are shown and sold internationally. He has worked with conservation groups through his travels to help protect rare and endangered trout around the world. Washington Trout is grateful for his support of our work to protect the rare Beardslee Trout in Lake Crescent in Olympic National Park.

Washington Trout would like to thank Filson's CEO, Doug Williams as well as John Zannini and Jeff Greer for their dedication to the protection of Washington's wild fish ecosystems. Working with local businesses is vital to ensuring the success of our work to protect Washington's wild fish ecosystems and we are proud to have Filson as one of our partners.

- KD

### Environmental Discovery Program

It has been an exciting and busy year for WT education programs. We've continued to expand

*Continued on page 22*

# RETURN TO ICICLE CREEK

Washington Trout has never left, fighting for almost seven years to reform the Leavenworth National Fish Hatchery, but wild salmon, steelhead, and bull trout may finally be returning to upper Icicle Creek after being locked out for almost 70 years. WT is working harder than ever to make sure they make it back as soon as possible, and investigating how their homecoming can contribute to wild-fish recovery throughout the upper Columbia River Basin.

## Securing Their Passage

### *Addressing Ecological Costs at the Leavenworth National Fish Hatchery*

Kurt Beardslee, WT Executive Director

Icicle Creek runs cold and clear from the high eastern flanks of Washington's Cascade Mountains, through designated wilderness and National Forest. It drains 216 square miles of alpine, forest, meadow, and scrub habitats, much of it pristine, starting high in the spectacular Stuart Range and Alpine Lakes Wilderness, ultimately joining the Wenatchee River near Leavenworth Washington, an area of climatic and geographic transition, where the east slope of the Cascades begins to give way to the semi-arid Columbia Basin. Icicle Creek has historically been a significant component of the vast anadromous-fish network of the Columbia River watershed, gathering runs of spring, summer, and fall chinook salmon, coho salmon, and steelhead. The creek also supports wild native populations of resident rainbow and westslope-cutthroat trout, and resident and fluvial bull trout.

Unfortunately, like too much of the Columbia River wild-fish ecosystem, Icicle Creek has suffered grave insults to its ecological integrity that have had severe impacts on its wild-fish populations, despite generally high-quality habitat conditions throughout most of the watershed. Like other fish in the upper Columbia Basin, native salmon and steelhead reared in Icicle Creek must negotiate a series of major hydroelectric projects on the mainstem Columbia on their trip to and from the Pacific Ocean. They must somehow overcome turbines, fish ladders, modified river hydrology, unnaturally high water temperatures, and exotic predators. They are often harvested in unsustainable fisheries, and their overall fitness has been compromised by generations of genetic and ecological introgression from poorly managed hatchery programs. Few wild salmon and steelhead in the upper Columbia have been able to tolerate the assault. Upper Columbia coho are functionally extinct. Upper Columbia chinook are listed as endangered under the Endangered Species Act. Upper Columbia steelhead and mid Columbia bull trout are listed as threatened.

But Icicle Creek carries a special burden (though by no means unique) among tributaries in the upper Columbia. The Leavenworth National Fish Hatchery began operations a few miles above the mouth of Icicle Creek between 1938 and 1940, installing instream structures that diverted water and blocked passage for migratory fish. Since that time, wild salmon, trout, and char have been blocked from almost 30 miles of pristine aquatic and riparian habitats in the upper Icicle Basin, historically and potentially productive spawning, rearing, feeding, and refuge habitat for declining and listed populations of chinook, steelhead, and bull trout. The US Fish and Wildlife Service, charged with managing the conservation of many public natural-resources, including resident rainbow, cutthroat, and ESA-listed bull trout, manages and operates LNFH, but has continued to allow hatchery operations to harm and limit local fish populations.

When construction began on LNFH, wild spring, summer, and fall chinook salmon returned annually to Icicle Creek; so did coho salmon, summer steelhead, and fluvial bull trout migrating to and from the Wenatchee River. The hatchery was intended to mitigate for the loss of salmon somewhere else. The Grand Coulee Dam ended a 10,000 year history of wild-fish evolution in the upper Columbia River. Whole races of salmon and steelhead were lost when all migratory access for anadromous salmon and steelhead was cut off above the dam. With the Mitchell, Act, congress authorized hatcheries like LNFH throughout the Columbia Basin, to manufacture new salmon and steelhead to replace the runs lost above Grand Coulee.

Unfortunately, the Mitchell-Act hatcheries have generally been unable to mitigate for the loss of salmon runs without imposing significant ecological costs of their own. Ironically, the Leavenworth hatchery, intended to mitigate for Grand Coulee Dam, the largest fish-passage barrier in the Columbia Basin, wound up contributing to

*Continued on page 20*

# RETURN TO ICICLE CREEK

Washington Trout has never left, fighting for almost seven years to reform the Leavenworth National Fish Hatchery, but wild salmon, steelhead, and bull trout may finally be returning to upper Icicle Creek after being locked out for almost 70 years. WT is working harder than ever to make sure they make it back as soon as possible, and investigating how their homecoming can contribute to wild-fish recovery throughout the upper Columbia River Basin.

## When They Return

*Understanding the Processes and Consequences of Wild-Fish Recolonization in Icicle Creek*

Dr. Eliot Drucker PhD, WT Director of Science & Research (Physiology) & Nick Gayeski, WT Resource Analyst

Icicle Creek joins the Wenatchee River at Leavenworth, Washington. Contrary to its label, Icicle is a major tributary in the Wenatchee watershed. Like most significant tributaries in the Upper Columbia River Basin, Icicle Creek historically supported anadromous spring chinook salmon, steelhead, and migratory native char, as well as resident cutthroat trout, rainbow trout and bull trout. While the watershed does contain many miles of high-quality rearing and spawning habitat, it has presented a distinctive suite of challenges for trout, salmon and char seeking to utilize this habitat.

Both natural and anthropogenic influences have affected the distribution of salmonids within Icicle Creek and its tributaries. Most of the Icicle Creek catchment (nearly 90% by area) is managed by the Okanogan and Wenatchee National Forests, and three-quarters of the watershed lies within the Alpine Lakes Wilderness Area. Impacts from road-building and natural wildfires have affected the creek, and mainstem Icicle Creek contains a number of impressive boulder cascades which have traditionally been considered natural fish passage barriers.

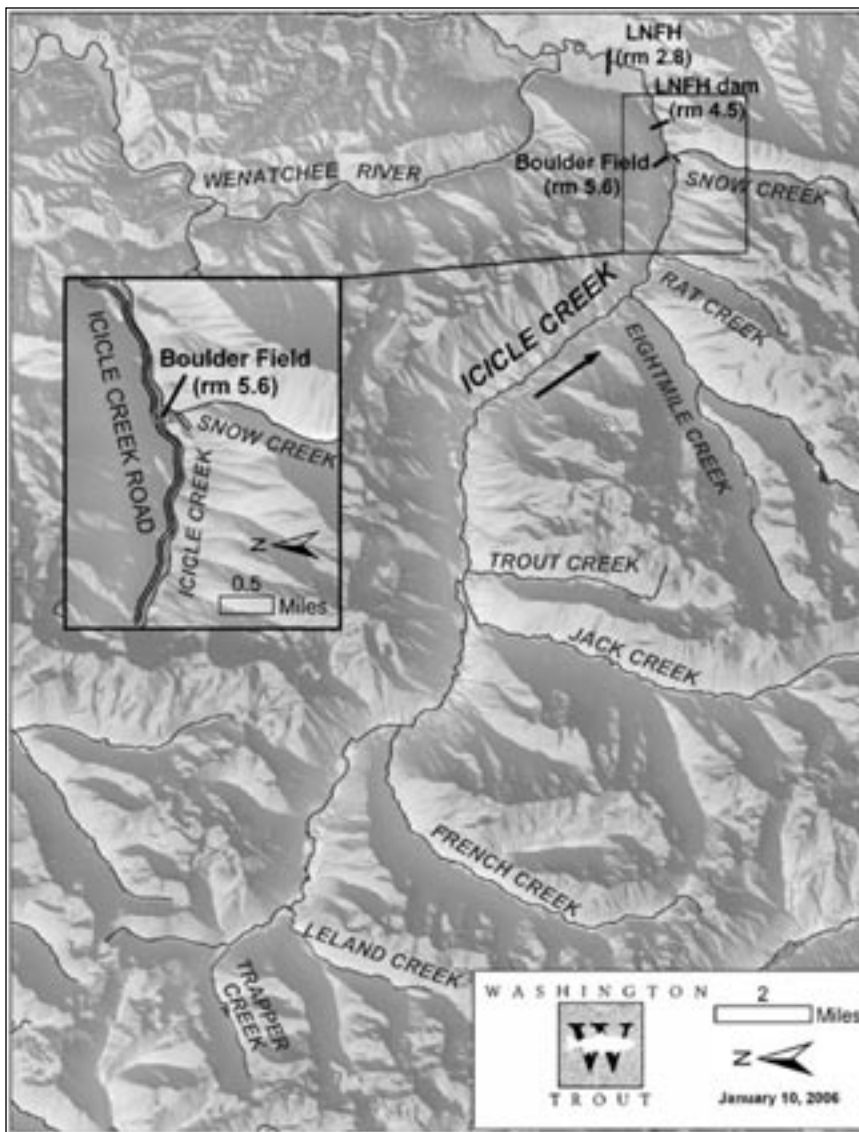
By far the greatest challenge to migratory salmonids in Icicle Creek has been the installation of man-made barriers to fish movement associated with the construction and operation of the Leavenworth National Fish Hatchery at river mile 2.8. The barriers block returning salmonids from more than 29 linear miles of near-pristine mainstem and tributary habitat in the upper Icicle Creek basin (see Map). Over the past 68 years, native resident rainbow and bull trout populations in the upper basin have evolved in isolation from the influence of anadromous fishes.

Recent initiatives undertaken by local citizens and WT have compelled the US Fish and Wildlife Service to improve fish passage at the hatchery, and plans to

provide year-round upstream and downstream passage are expected to be implemented by USFWS within the next two years (see “Securing Their Passage;” p.16). Fish passage in lower Icicle Creek will soon be restored by the reconnection of the mile-long historic channel adjacent to the hatchery’s diversion canal. The restoration of access and competent flow should initiate natural processes of recolonization of the historic channel and potentially the upper Icicle Creek basin by native anadromous salmonids.

Improving stream flow and augmenting fish use in the historic channel of Icicle Creek creates the rare opportunity to study the joint processes of ecological recovery and recolonization by native fishes of over one mile of floodplain habitat in the Upper Columbia River Basin. The isolation of rainbow trout and bull trout populations in the upper Icicle Creek basin provides the additional opportunity to study the dynamics and structure of native resident trout populations in the absence of anadromy.

As yet, few details are known about the seasonal and annual dynamics of native resident fish populations in the Upper Columbia Basin. Research in the upper Icicle Creek basin would help fill an important gap in our knowledge of growth and survival in these populations, assisting management of this resource. Such research would also illuminate the impact of the restoration of anadromy to the upper Icicle Creek catchment on these resident fish populations, if and when recolonization occurs. Few, if any, other watersheds in the entire Columbia Basin within the historical distribution of anadromous salmon and steelhead possess the unusual combination of ecological attributes characterizing Icicle Creek. Understanding the rewards and costs of reestablishing fish passage in Icicle Creek will form a foundation for the recovery of declining wild-fish populations throughout the entire Columbia River Basin.



Map of Icicle Creek and tributaries. Approximately 30 miles of mainstem and tributary habitat that supported anadromy before construction of the Leavenworth National Fish Hatchery (LNFH) exist in the upper Icicle basin above the mouth of Snow Creek. Inset: detail of boulder field reach and the adjacent Icicle Creek Road. Source data: elevation, USGS 10 m DEM; hydrography, Washington Department of Natural Resources.

Senior staff at Washington Trout have developed and submitted for review a proposal for a multi-year research program on Icicle Creek that is expected to enhance our understanding of salmonid habitat use, population structure, and population dynamics in the Upper Columbia River Basin. We have proposed to begin this important investigation during the 2006 field season.

### The Need for Research in Icicle Creek

Restoration of anadromy in the upper Icicle Creek basin is directly dependent on fish passage both through LNFH and other obstacles upstream, including a field of boulders in mainstem Icicle Creek at river mile 5.6, the first potential impediment to fish migration above LNFH's upstream-most facility, a full-spanning diversion dam at river mile 4.5 (see Map). In the absence of quantitative

data from field surveys, the boulder field has been viewed by some as a complete barrier to fish passage. To date, our understanding of the extent to which migratory salmonids can surpass the boulder field is based on limited data from USFWS snorkel surveys. Preliminary observations by Washington Trout in 2005 suggest that adult migratory salmonids may in fact successfully negotiate this obstacle.

Fish passage through the natural boulder field may have been made more difficult during construction of roads and infrastructure for irrigation. Informal observations of the geology of the boulder field suggest that while many of the boulders are of natural (fluvial) origin, others likely were introduced during construction and maintenance of the adjacent Icicle Creek Road beginning in 1933–1934. It is possible that human activity modified the boulder field, creating additional challenges and new barriers to fish seeking upstream passage. This critical but as yet unanswered question will be investigated under the project.

Like many other tributary subbasins in the Wenatchee, Entiat, and Methow River basins, upper Icicle Creek is a relatively cold basin. A limited annual thermal regime (less than 2600 annual degree-days) should, according to conventional expectations, lower the productivity of the watershed relative to tributaries of comparable size further



Leavenworth National Fish Hatchery's water diversion dam on Icicle Creek. photo: Jamie Glasgow.



*Upstream view of boulder field on Icicle Creek (rm 5.6). photo: Jamie Glasgow.*

downstream in the Columbia Basin. However, to date no comprehensive study in Icicle Creek has been undertaken to test this assumption.

Moreover, relatively cold subbasins in the upper Columbia are likely to become warmer in the coming decades as the planet itself continues to warm. Icicle Creek and similar subbasins throughout the upper Columbia may provide an ecological refuge as they become more productive and will therefore become increasingly important to the preservation and recovery of native salmonids. Washington Trout's research in Icicle Creek will likely contribute valuable baseline data for monitoring and managing the impact of global warming on native salmonid populations in the Upper Columbia River Basin.

### **Research Goals and Strategies**

The scientific goals of the Icicle Creek project are to improve our understanding of the relationships among physical and ecological processes governing aquatic food webs; habitat use, growth, and survival of juvenile salmonids; and population structure and dynamics of resident salmonids with and without the influence of anadromy. The ecology of native resident and migratory salmonids in the Upper Columbia basin and associated ecosystem processes are not fully understood. Collecting this fundamental information will address a lack of critically important knowledge.

Research will be conducted over the course of several years in three locations: the upper Icicle Creek basin, the historic Icicle Creek channel adjacent to the hatchery (rm 2.8–4.0), and the boulder field (river mile 5.6). Research activities will also take place on the Chiwawa River, a nearby tributary of the Wenatchee River upstream of the confluence of the Icicle, selected as a reference subbasin.

In the upper Icicle Creek basin, investigators will collect baseline data on the feeding ecology and population structure and dynamics of resident rainbow trout and bull trout, including: population age-structure; habitat preferences for juvenile rearing; age-specific distribution and abundance, diet and growth rate, and survival; ages-at-maturity; and frequency of repeat spawning. In the historic Icicle Creek channel, Washington Trout will measure: geomorphic changes in the channel; use of the channel by adult and juvenile salmon and steelhead; fish immigration and emigration from the channel; changes to the aquatic food web; and changes in the structure of the riparian vegetation. In the boulder field reach investigators will assess the extent to which migratory salmonids can surpass the boulder field to enter the upper Icicle basin. They will also evaluate human impacts on the physical configuration of the boulder field and on stream flows in Icicle Creek.

The Chiwawa River is comparable in size to Icicle Creek, but its resident salmonids have not historically been isolated from anadromous salmonids. In this reference subbasin, Washington Trout will collect data on the feeding ecology and population structure and dynamics of resident salmonids for comparison to the upper Icicle Creek basin.



*Resident rainbow trout in upper Icicle Creek. photo: Jamie Glasgow.*

We will combine a suite of traditional fish and habitat monitoring methods with a number of innovative, state-of-the-art techniques. To illuminate aspects of habitat use and fish energetics hitherto difficult and prohibitively expensive to study in the field, Washington Trout will analyze isotope ratios of rare earth elements (such as strontium) in the calcified tissues (scales, bones, and otoliths) of salmonid fishes to identify time-specific use of subbasin areas by juveniles and adults. Investigators will also analyze inert geologically derived trace elements, in particular cesium-133, to provide fine-scale measurements of the consumption rates of juvenile salmonids. Traditional

methods of measuring diet and energetics, such as stomach content analysis and comparison of growth rate between two sampling periods, provide much coarser and less reliable data. Dr. Brian Kennedy of the College of Natural Resources at the University of Idaho will provide these analyses, working in close collaboration with Washington Trout.

When the passage barriers at LNFH are removed, Washington Trout will investigate patterns of fish migration between the historic channel and upper Icicle basin, using a state-of-the-art resistivity counter system installed upstream of the restored historic channel. The system will continuously record both the size and direction of fish passing into and out of the historic channel. The resistivity counter is ideally suited to enumeration of untagged, wild fish; the system operates by detecting changes in water conductivity caused by the presence of a fish's body. An array of Passive Integrated Transponder (PIT) tag readers will be installed to detect passage of internally tagged hatchery fish and wild juvenile rainbow and bull trout tagged for associated research purposes.

The Icicle Creek project has been coordinated with biologists in the Integrated Status and Effectiveness Monitoring Program, a multi-agency consortium headed by Dr. Chris Jordan at the NOAA Fisheries Northwest Fisheries Science Center, to integrate Washington Trout's work with existing monitoring activities in the Wenatchee River watershed.

### **Biological and Educational Significance**

The Icicle Creek project will contribute primary research on salmonid life history and ecosystem recovery. The project will acquire important information about the ecology of native resident salmonids and document long-term ecological change driven by wild-fish recolonization and the restoration of anadromy. It will identify the rearing habitats of successful spawners, guiding future habitat protection and restoration actions. With comparable studies by NOAA Fisheries in western Washington on the Cedar and Elwha Rivers, the Icicle Creek project will ideally contribute to a model recolonization research program for application in other watersheds.

Washington Trout will disseminate results from the project to the scientific, management, and conservation communities, and the general public, through efforts to engage local and regional audiences including on-site tours, public reports, and volunteer recruitment. Ultimately, the Icicle Creek project will help meet Washington Trout's goal of fostering appreciation for and protection of natural resources through science-based environmental understanding. ◀

the problem, blocking wild fish from additional habitat. For almost 70 years the fish-passage barriers at LNFH, less than three miles from the mouth of Icicle Creek, have isolated wild salmon, steelhead, and bull trout from the largely pristine upper Icicle basin.

Despite the USFWS's responsibility to manage the conservation and recovery of ESA-listed bull trout, and its legal responsibility under the ESA to conserve listed chinook and steelhead, the federal agency continues to maintain the fish-passage barriers in Icicle Creek, dewater and otherwise degrades over a mile of historical stream channel, illegally diverts water from the creek, and discharges pollutants into Icicle Creek without a valid or adequately monitored permit. In order to manufacture hatchery fish for harvest, USFWS has been willing to violate the law and jeopardize the native wild-fish populations in Icicle Creek.

Around 1999, Washington Trout began working with the Icicle Creek Watershed Council and other members of the Leavenworth community to advocate for full, year-round wild-fish passage at the hatchery. For almost six years, we attempted to engage USFWS, urging them to make changes at LNFH that would contribute to the recovery of listed fish in Icicle Creek, and that would end ongoing violations of the ESA and Clean Water Act.

Citing years of delay and broken promises, Washington Trout filed suit under the ESA in June 2005 to force USFWS to remove fish-passage barriers at LNFH. In July, we filed a second suit against USFWS, alleging violations of the Clean Water Act at the Leavenworth hatchery. Our primary goals are the restoration of fish passage and other ecological functions in the natural stream channel, and the end of illegal water diversions and effluent discharges from and into Icicle Creek.

### **The ESA Case**

Washington Trout alleges that USFWS is violating the ESA because the fish-passage barriers harm or "take" listed steelhead and bull trout by blocking all fish migration to over 29 miles of Icicle Creek, trapping listed fish in a one-mile section of creek, and diverting most of the water out of this one mile section, stranding the protected fish in the dewatered reach. In addition, the hatchery's water-intake facility is improperly screened, which can harm or kill juvenile and adult fish when they become entrained in the intake system. USFWS is violating conditions of its existing take-authorization permits, and some of the facility's impacts are not authorized by those permits.

All federal agencies have a legal obligation to protect and conserve listed species, and USFWS is the agency specifically charged with the protection of listed bull trout. Under the ESA, it is illegal to harass, harm, wound, kill, collect, or capture a listed species without

specific authorization. It is also illegal to substantially degrade habitat or disrupt behavioral patterns like migration, breeding, and feeding. A private development, timber, or agricultural interest that illegally blocked fish or diverted water could be exposed to fines and even potential arrest, possibly imposed by the Fish and Wildlife Service itself.

The hatchery contends it is operating under its mandate to produce fish, and it is working toward coming into compliance with the ESA. But Dick Rieman, Leavenworth resident, vice-president of the Washington Trout board and member of the Icicle Creek Watershed Council, disagrees.

“They talk a good game,” said Rieman. “They always talk, but where’s the action? They promised a fix in 2000, but still haven’t done anything, except let the Icicle Creek Watershed Council spend \$250,000 of our money to remove old hatchery structures from the river. Meanwhile the agency is still blocking fish and diverting water. We’ve tried to be amicable partners, but it just hasn’t worked.”

Washington Trout was originally represented pro bono by the Kathy and Steve Berman Environmental Law Clinic at the University of Washington School of Law. The Seattle law firm Smith and Lowney took over the case in summer 2005.

### **The Clean Water Act Violations**

For almost twenty-five years, the LNFH has been violating the Clean Water Act by discharging pollutants into Icicle Creek without a valid permit. The Leavenworth hatchery discharges waste water and cleaning effluent that contain many recognized and harmful pollutants, including disinfectants, fish feces, uneaten fish food, nitrogen, phosphorus, antibiotics, various pathogens, portions of fish carcasses, and potentially, PCBs, which are known carcinogens. Recent reports have suggested links between discharges from the hatchery and PCB-contaminated mountain whitefish in Icicle Creek. The illegal discharges are likely harming listed chinook, steelhead, and bull trout. Listed steelhead and listed bull trout use Icicle Creek to spawn, feed, and rear.

Under the CWA, discharge permits must generally be reviewed every five years, to determine if the terms of the permit have been effective, and to implement any technological innovations that could improve water quality affected by the discharges. But the only CWA permit LNFH has ever received was issued by the Environmental Protection Agency in December 1974. That permit expired by its own terms in August 1979. In November 1980, more than twelve months after the permit expired, the USFWS submitted an application to renew its CWA permit, and almost exactly one year later, the EPA notified USFWS that it would “automatically” extend the permit “indefinitely,”

pending “formal action.” Under the terms of the Clean Water Act and EPA regulations, an expiring CWA permit can only be extended if the permittee submits a complete application for a new permit at least 180 days prior to the expiration of the current permit, and the EPA can not “automatically” extend permits that have actually expired.

By 2005, almost twenty five years after EPA issued its illegal extension, the agency still has not acted on the hatchery’s 1980 permit renewal application, enabling the hatchery to continue discharging at the 1974 permit levels, without any further review, and avoid making the technological improvements that could be required by the law. Washington Trout’s suit also names the EPA, charging that once the original permit expired, the EPA had no authority to administratively extend it, and that the agency has unreasonably delayed and failed to act in issuing a final decision on the Hatchery’s 1980 renewal application.

Smith and Lowney is representing WT in the CWA case. Richard Smith of Smith and Lowney calls the situation especially egregious.

“This is EPA totally failing to regulate its sister agency, USFWS, since Jimmy Carter was President,” he says. “There is no way that a permit issued in 1974 can require the technology and discharge quality that should be in place to protect water quality in Icicle Creek.”

Even if the expired 1974 permit were still valid, USFWS has been violating that permit and other provisions of the Clean Water Act for at least five years. The Leavenworth Hatchery has failed to comply with the monitoring, reporting, and recording terms of the 1974 permit, and it may have discharged PCBs and other pollutants not covered by the expired permit.

Washington Trout is asking the court to declare EPA’s permit-extension invalid, declare that LNFH is operating without a valid permit or in violation of its existing permit, order USFWS to cease discharging pollutants into Icicle Creek without a permit, and order EPA to either issue or deny a new CWA permit on a short timeline. The suit also asks the court to order EPA and USFWS to promptly undertake studies to determine the extent and environmental significance of PCBs released into Icicle Creek, inform the public of the results of those studies, and implement any actions necessary to remediate for the PCB releases. This case has the potential to set an important precedent, compelling EPA to meet its statutory responsibility to review and revise CWA permits within the legally required timelines.

### **Studying Successful Advocacy**

When native salmon, trout, and char return to Icicle Creek, it will provide an opportunity to study a process of native-fish recolonization within an important

context. Located centrally in the upper Columbia Basin, Icicle Creek is potentially representative of an eco region of significant concern relative to the issues at hand. Understanding the rewards and costs of reestablishing fish passage will form the foundation for the recovery of declining wild-fish populations throughout the entire Columbia Basin. Similar opportunities exist or are pending in other areas in Washington.

The Elwah River on the Strait of Juan De Fuca, and the Cedar in Puget Sound represent eco-regions as distinct from each other as they are from the Upper Columbia. But the Elwah and the Cedar share one major characteristic in common with Icicle Creek. All three have endured major blockages to fish migration for many years and they all have recently or will soon, have these blockages removed. Each of these systems is very dynamic in their own way and each of the native species has evolved in these dynamic environments. They have endured major floods, extreme droughts, freezing winters, fire and landslides. Each of these have been dramatic yet episodic. All of these factors combined may not have been as significant as the stress on the native fish species from the chronic blockage of fish migration over many decades.

Studying how wild fish in each of these distinct and widely distributed eco-regions respond to the reinstatement of fish passage will give scientists and managers critical information that will be needed to guide future management decisions. NOAA Fisheries is leading a coalition of federal, state, and tribal agencies in research efforts on the Cedar and Elwah Rivers. On Icicle Creek, Washington Trout is leading the way. Washington Trout has developed and submitted for review a proposal for a multi-year research program on Icicle Creek to study salmonid habitat use, population structure, and population dynamics and recolonization (see "When They Return," p.17).

### Case Updates

The combination of the two most recent complaints has gotten USFWS's attention, and years of delay and dismissal have already been replaced by some concrete improvements in conditions on Icicle Creek. USFWS has increased natural stream flow into a one-mile reach of the historical channel of Icicle Creek directly adjacent to the LNFH. The restored flow is triggering the restoration of habitats gone fallow from years of isolation, and allowed partial fish-passage for the first time in almost 70 years. These are the first steps in the restoration of the ecology of the Icicle Creek basin. USFWS has expressed its intent to restore full, year-round passage as soon as possible. Both USFWS and EPA have committed to reviewing and revising the hatchery's lapsed CWA permit. Washington Trout is continuing to negotiate with the USFWS and EPA to address the ecological costs and legal consequences of the current operations at LNFH. ◀

*Continued from page 15.*

our primary environmental education program, the Environmental Discovery Program, we are piloting our newest education project Window to Discovery, and we've been occasionally offering educational programs tailored to specific groups of students.



*WT Education Coordinator Casey Ralston works with students from Olympic Hills Elementary School, while their teacher Bill Harris Looks on.*

The EDP is filling most of the field trip slots with returning teachers. Both students and teachers rave about the fieldtrips; students say "it's much more fun to do science outside" and teachers appreciate the opportunity to participate in a fieldtrip that complements what they are teaching in the classroom. In 2005, we worked with twenty classes from 13 schools in Seattle and the Snoqualmie Valley, serving over 500 students. We are currently gearing up for the Spring 2006 season. Ten classes will participate in the program which provides an introductory classroom visit, a fieldtrip, and a follow-up class visit. Students will learn about native plants and animals, habitats, water quality, and healthy ecosystems through hands-on, interactive lessons in the classroom and the field.

In 2005, EDP began developing curriculum and working with teachers and students in a pilot project called Window to Discovery. This program encourages students to make observations, develop hypotheses, and to design experiments (using time-lapse videography) to test their hypotheses. Most students have wanted to learn more about the elusive animals that they don't always get to see during the fieldtrips so we've set up several remote video cameras to record what wildlife are up to when students aren't looking. Some of the experiments used video cameras to observe tree cavities, salmon carcasses, chewed or gnawed tree trunks, and unusual patterns in the mud along the streambank. We are editing the video footage, and will continue to work with these students to test the hypotheses they came up with during their field visits.

As our education programs grow, we get more and more requests for programs and resources from teachers

and other community members who want to know more about what we do. This year we've done one-time education programs such as presenting a salmon lifecycle activity for preschoolers, a fieldtrip to a local salmon spawning stream with students from NW Arts Center, and also a demonstration about watersheds and water quality for a local elementary school science club.

Special thanks to the following teachers and schools for their commitment to environmental education and their participation in the EDP and/or Window to Discovery programs: Cindy Adams, Kent Ferris, and Fran White (Lafayette Elementary); Janet Burks (View Ridge Elementary); Ruth Balf, Bill Harris, and Leslie Spurr (Olympic Hills Elementary); Suzanne Boroughs (Duvall Christian School); Joana Choi (Loyal Heights Elementary); Krista Clowers, Pat Morrison, and Jerry Price (Stillwater Elementary); Heidi Dammel, Beth Devereaux, and Gale Low (Wing Luke Elementary); Jennie Doyle (Endeavour Elementary); Wendy Icasiano (Coe Elementary); Ron McFarland and Anne Weber (Viewlands Elementary); Kate Trumble (Gatewood Elementary); and Theresa Williams (Monroe Middle School).

We also gratefully acknowledge our energetic instructors, many who volunteered their time and shared their knowledge of everything from plants and animal bones to seeing art in nature: Brooke Alford, Barb Bruell, Roma Call, Andrea Faste, Betsy Fogarty, Marcela Gomez, Julie Hahn, Dan Jerke, Emily Jones, Katrina Kindberg, Peter Millett, Julie Nelson, Sal Pasantino, Paula Roberts, Rob Sandelin, Celina Steiger, Jill Weaver, Katie Weden, and Fritz Wollett. For more information about any of these programs, contact WT Education Coordinator Casey Ralston.

- Casey Ralston

## Advocacy:

Ramon Vanden Brulle, WT Communications Director

### **Proposed Listing of Puget Sound Steelhead**

In 2004, Sam Wright submitted a petition to NOAA Fisheries to consider listing the Puget Sound steelhead ESU as either Threatened or Endangered under the Endangered Species Act. In April 2005 NOAA Fisheries published a finding that the petition "may be warranted" and initiated a Status Review of the ESU, soliciting information from the interested public. Though Sam Wright has been a consultant to WT, he prepared and submitted his petition independently. However, WT advocates did respond to NOAA Fisheries' solicitation

of relevant information and engaged the Status Review process.

NOAA Fisheries created a Biological Review Team (BRT) to evaluate the status of the Puget Sound Steelhead ESU and its risk of extinction. In June 2005, WT submitted a population dynamics analysis of five major winter-run steelhead populations in the PS steelhead ESU to the BRT. WT demonstrated a coherent and pronounced downward trend in population numbers and recruitment strongly suggesting an ESU-wide pattern of decline.

In June 2005, NOAA Fisheries hosted a meeting in Seattle for technical presentations to the BRT. The meeting provided an opportunity for qualified scientists to present technical analyses and help the BRT gather the best available information and data. Based in part on material submitted by WT to the BRT, and in part on past work conducted by WT field researchers, NOAA Fisheries invited Washington Trout to present information at the meeting.

Washington Trout presented fifteen years worth of summer steelhead snorkel data from the Tolt River. The presentation examined inter-annual variability in staging, abundance response to fisheries management changes, hatchery and wild fish interactions and habitat partitioning, and a likely unique life-history strategy exhibited by a small portion of Tolt summer steelhead. Washington Trout presented compelling data to show that WDFW's use of the March 15 cut-off to allowing harvest on hatchery steelhead has likely abbreviated the life-history diversity historically exhibited by PS Steelhead.

Citing "widespread declines in Puget Sound steelhead populations," on March 29 2006, NOAA Fisheries published in the Federal Register a proposal to list PS steelhead as Threatened under the ESA. The announcement stressed the role of hatchery management in Puget Sound steelhead declines. The Washington Department of Fish and Wildlife simultaneously announced the pending release of a new Puget Sound steelhead management plan. WDFW also stressed the role of hatcheries in the decline of PS steelhead, and pledged significant hatchery reforms they hope will influence NOAA's final listing-determination for Puget Sound steelhead. No details on the reform proposals have been released.

NOAA will schedule and announce at least one public hearing on the proposed listing before the end of a 90-day public comment period. Comments may be submitted to NOAA Fisheries Service in Portland, Ore., by e-mail, through the Internet, by standard mail, fax, or hand delivery. Comments regarding the "Puget Sound Steelhead Proposed Listing" must be submitted by June 27, 2006, by E-mail at [PS.Steelhead.nwr@noaa.gov](mailto:PS.Steelhead.nwr@noaa.gov) (subject line:

“Puget Sound Steelhead Proposed Listing”); over the internet through the Federal e-Rulemaking portal at: <http://www.regulations.gov>; by fax at 503-230-5441; by conventional mail to Chief, NMFS, Protected Resources Division, 1201 NE Lloyd Boulevard, Suite 1100, Portland, OR 97232; or hand delivery/courier to NMFS, Protected Resources 1201 NE Lloyd Boulevard, Suite 1100, Portland, OR 97232.

For information contact Office of Protected Resources at 301/713-1401 or the agency website at: <http://www.nwr.noaa.gov/ESA-Salmon-Listings/Salmon-Populations/Steelhead/PS-Stlhd-Petition.cfm>

### **NOAA Accepts Comments on PS Chinook Recovery Plan**

On March 16 2006, NOAA Fisheries accepted comments from the public regarding a recovery plan for Puget Sound chinook, listed as Threatened under the Endangered Species Act. The Puget Sound Chinook Recovery Plan was developed by the Shared Strategy group, a coalition of local, tribal, state, and federal agencies have been working cooperatively since 2002 to develop the Shared Strategy recovery plan.

Washington Trout focused the majority of its comments on the issues of harvest management, hatchery practices, and “H-integration.” The tenor of the sections of the Recovery Plan devoted to these issues fails to acknowledge or reconcile the considerable uncertainties and risks involved. Authors of these sections insist that harvest and hatcheries are currently managed to not impede the recovery of the Puget Sound chinook. Unfortunately, detailed analysis of the data fails to support that insistence.

Harvest-impact levels and spawning targets in the fishery sections appear directly contrary to the recovery goals and habitat-improvement objectives developed by NOAA Fisheries’ own Puget Sound Technical Recovery Team. Viable-population thresholds for fishery management are less than ten percent of the abundance goals identified by the Puget Sound TRT and incorporated into the habitat sections of the Draft Recovery Plan, Some jurisdictions involved in Shared Strategy, and other interests that could be affected by the recovery plan, have expressed concern over contradictions between the two approaches.

Washington Trout expressed our concern that spawning goals and harvest rates should be consistent with ESA recovery goals, and that harvest managers must assure that optimum numbers of wild salmon actually do return to spawn. The full text of WT’s comments are available at [www.washingtontrout.org](http://www.washingtontrout.org).

### **Washington Trout Joins Suit Over Puget Sound Salmon Harvest**

In January 2006, WT joined the The Salmon Spawning & Recovery Alliance, the Native Fish Society, and the Clark-Skamania Flyfishers in submitting a Sixty Day Notice Of Intent To Sue under the ESA to NOAA Fisheries and the U.S. Fish & Wildlife Service. We are asking NOAA Fisheries and USFWS to reinitiate consultation on the Puget Sound Comprehensive Chinook Management Plan: Harvest Management Component (RMP), a fishery management plan for ESA-listed Puget Sound Chinook salmon, and for NOAA Fisheries to reconsider its authorization of the RMP under the Puget Sound chinook 4(d) Rule. We believe the Agencies have violated the Endangered Species Act.

The current fishing-management plan for Puget Sound is jeopardizing the recovery of chinook salmon, listed as Threatened under the Endangered Species Act. It is not based on the best available science, and applies a legally deficient recovery standard. It improperly authorizes directed harvest of listed chinook, and unsustainably high “incidental take” levels on key chinook populations. Managers failed to consider changes in fishing practices, locations, seasons, gear, and/or methods as a reasonable and prudent alternative.

Harvest-related recovery standards are directly contrary to the recovery goals and habitat improvement objectives in Puget Sound Chinook Recovery Plan, known as Shared Strategy. Viable population thresholds identified in harvest plan are less than ten percent of abundance goals identified by the Puget Sound Technical Recovery Team and incorporated into the Draft Puget Sound Recovery Plan. Some jurisdictions involved in Shared Strategy, and other interests that could be affected by the recovery plan, have expressed concern over contradictions between the two plans.

In the notice-letter, we specifically noted that treaty responsibilities and other regulations offer strong protection for Tribal fishing rights, placing limits on NOAA Fisheries’ legal ability to restrict Tribal fishing. We respect and acknowledge Tribal rights to fish for salmon, but impacts to listed fish can be reduced while still honoring treaties. Voluntary, incentive-based changes in tribal fishing gear or methods, and less intensive, more selective non-Tribal fisheries would reduce impacts significantly while potentially creating more opportunity to harvest hatchery stocks and other healthier species.

Salmon harvest has been reduced from historic levels by 30% to 50%, depending on the run – but the starting point was very high, typically 60% to 90% of returning populations. Under the current plan, allowable harvest impacts on listed chinook in Puget Sound vary from 22% to 76% for different populations. Scientists

inside and outside the federal agencies believe that chinook recovery will require consistently achieving spawning levels of wild salmon high enough to conserve as much of the genetic, geographic, and life-history diversity within and between salmon populations as possible. That will likely require much lower total fishing impacts than current management allows.

We want harvest planning to incorporate escapement goals and harvest rates consistent with ESA recovery goals, set to assure adequate numbers of native adults actually do return to spawn, and changes in harvest practices and techniques to meet those goals and rates. We believe NOAA can and should allow less non-selective, non-Tribal intercept fishing while respecting treaty obligations and conservation necessity principles.

### **WT Stalls Hatchery Expansion on Chewuch River**

The Douglas County PUD and Washington Department of Fish and Wildlife are proposing to expand an existing hatchery-supplementation program in the Methow Basin for Upper Columbia River spring chinook, listed as Endangered under the Endangered Species Act. The program currently collects brood stock and plants smolts in the mainstem Methow and the Twisp River, a major basin-tributary. WDFW and the PUD have been frustrated in attempts to collect brood stock in another major tributary, the Chewuch, by what they call an inadequate collection facility at an existing irrigation dam. They have proposed installing an automated fish-trap weir in the lower reach of the Chewuch to capture wild spring chinook adults to use as brood stock for smolt plants back into the Chewuch.

The proposal is part of an agreement to grant Douglas County ESA authorization for operating the Wells Dam on the Columbia River. Wells Dam is responsible for a known amount of harm to listed chinook and other species, including Endangered steelhead and Threatened bull trout. In order to operate the dam without ESA liability, Douglas County has developed and agreed to the terms of a Habitat Conservation Plan (HCP), which includes measures intended to minimize and mitigate the harm caused by the dam. Under the HCP, Douglas County will undertake operational modifications at the dam, habitat restoration activities, and the production of hatchery salmon and steelhead.

In late summer 2005, Peter Morrison of the Pacific Biodiversity Institute in Winthrop, WA contacted WT regarding the proposed weir and the expanded supplementation program. Douglas County's Habitat Conservation Plan had received federal approval, and they had an agreement with a local landowner to place the fish trap. But the Chewuch River is in Okanogan County. Douglas County and WDFW still needed Okanogan County permits before they could install the weir. Mr. Morrison was looking for credible technical support for his concerns about the proposed program and about hatchery supplementation in general, that he could present to officials and the local public during the permitting process. He was particularly concerned that Douglas County and WDFW officials had oversold the project's value in recovering local salmon runs.

On September 21, Washington Trout addressed a letter to the Pacific Biodiversity Institute, (available at [www.washingtontrout.org](http://www.washingtontrout.org)) outlining our skepticism that expanding hatchery-supplementation in the Chewuch can contribute to chinook recovery in the Methow Basin. We summarized the findings of three federally appointed science review panels that hatchery supplementation runs a high risk of reducing the fitness of wild populations, and we recommended an alternative way to reconcile ESA authorization for Wells Dam and chinook conservation in the Chewuch.

Hatchery supplementation is extremely risky, unproven, and subject to a great amount of scientific controversy. Three federally-appointed independent review bodies have each issued reports warning about

the high level of risk that supplementation will produce fish with lowered reproductive fitness; each hatchery-origin spawner will produce fewer returning adults (recruits) per individual than its wild counterpart. All three panels characterized supplementation as "experimental," and an

October 2005 report bluntly concluded that "some supplementation projects will likely provide no actual conservation benefit and some... may also pose a sizable obstacle to recovery of ESA-listed stocks."

Supplemented populations run a very high risk of becoming adapted to conditions they can never find in the wild, the very high early life-stage survival typical in hatchery environments, potentially turning some populations that may have been capable of barely holding on into rapidly declining populations destined for

**Hatchery supplementation is risky, unproven, and subject to significant scientific controversy. Three federally appointed review-panels concluded that supplementation may pose "a sizable obstacle to recovery of ESA-listed**

extinction, or permanent hatchery intervention. Instead of conserving a local salmon run, supplementation risks turning it into a population that cannot exist on its own.

Since hatchery supplementation is such a risky experiment, all programs should include scientifically credible measures to evaluate whether or not they are achieving their objectives without producing intolerable harmful impacts. The three federal panels have all recommended approaches for monitoring supplementation programs in paired experiments with unsupplemented control streams. Washington Trout recommended that Douglas County seek ESA-authorization in exchange for creating a framework for evaluating current Methow supplementation efforts, by establishing the Chewuch as an unsupplemented control for the basin.

On September 28, the local Methow Valley News reported that Douglas County had suspended its application for an Okanogan County conditional-use permit to install the weir when a private landowner withdrew his consent for the PUD to build the fish trap on his property. According to a spokesman for Douglas County quoted in the MVN, if the PUD does not come to terms with the landowner, it “could effectively kill the project.”

Peter Morrison communicated independently to Washington Trout that the information provided in our letter had influenced the landowner’s decision to deny access for the weir project. In October WT science and advocacy staff met in East Wenatchee with representatives from WDFW, Douglas County PUD, NOAA Fisheries, US Fish and Wildlife Service, other PUDs, and the Yakama and Colville Nations. We pressed our recommendation that Douglas County and WDFW explore the feasibility of establishing the Chewuch as an unsupplemented control for the Methow Basin, and expressed our conviction that this approach would facilitate evaluation of current supplementation efforts, conceivably earn ESA-authorization for Douglas County, and provide a better opportunity for recovering listed salmon.

At this time the Chewuch hatchery-supplementation proposal appears to be stalled.

### **WT Testifies for Congressional Field-Hearing**

In October 2005, Washington Trout was invited to testify at a Congressional Field Hearing organized by US Congressman Norm Dicks (D; Bremerton, WA), to offer WT’s perspective on current salmon harvest management, and the recovery of salmon and steelhead populations listed under the Endangered Species Act. Four separate panels offered testimony to congressmen Dicks, Brian Baird (D, WA), and Greg Walden (R, OR): 1) federal and

state fisheries managers; 2) international, regional, and tribal fisheries councils; 3) economic and jurisdictional stakeholders; 4) the conservation community.

The congressmen made no secret of their skepticism regarding current harvest practices and the justifications offered by managers. All three were specifically concerned at how the ESA could accommodate direct harvest mortality on listed populations. During several panels, each congressman pointed out that it is explicitly illegal to kill even one of virtually any other listed species. NOAA Regional Administrator Bob Lohn, testifying on the first panel, conceded that the agency was in “new territory,” but he testified that NOAA believes it can reconcile salmon harvest with recovery management and ESA enforcement.

Virtually every panelist agreed that habitat damage and loss has been a central factor in salmon declines, and that habitat restoration and protection should remain a top priority. But testimony from King County and a former Director of the Washington Department of Fisheries, cast doubt on the accuracy and reliability of fisheries managers’ data, or expressed confusion and concern regarding specific harvest-management approaches.

Washington Trout’s testimony focused on how current harvest-management practices are likely jeopardizing salmon recovery, and the unwillingness of NOAA Fisheries to address or even acknowledge the criticism or recommendations of its own science-review panel. (See the full text of WT’s comments at [www.washingtontrout.org](http://www.washingtontrout.org)).

In November 2001, NOAA’s own independent review body, the Salmon Recovery Scientific Review Panel, issued an unusually sharp report, harshly critical of current harvest management for listed salmon and steelhead. The panel said they were “mystified” how managers could justify what the panel called “biologically unsustainable” harvest levels on ESA-listed salmon. They bluntly admonished NOAA Fisheries to develop a more “rational policy.”

We urged the congressmen to use their influence to press NOAA on these issues, expressed our appreciation for the opportunity to present our perspective, and respectfully offered our continued assistance.

Many factors have contributed to the decline of wild-fish populations in Washington and the Northwest. Harvest reform alone will not recover listed salmon and steelhead, and habitat protection and recovery should continue to be a lynchpin of the region’s recovery efforts. But it is unquestionably true that current harvest management is jeopardizing salmon recovery. ❖

# You could own this canoe!



Washington Trout is raffling this beautiful 15', 36" wide Chestnut Canoe, hand built and donated by Bill and Trudy Kindler. This gorgeous boat is hand laid from strips of reclaimed western red cedar, and trimmed in Honduras mahogany, Alaskan yellow cedar, and Peruvian walnut, with natural, hand caned seats, and brass fittings.

It comes with two ash paddles hand made by the Shaw and Tenney Company, regarded as the gold standard in canoe paddles. The boat is valued at over \$3,000. Tickets are \$5 each, for a drawing on April 2, 2007. All proceeds will support Washington Trout research and conservation initiatives. For your convenience, a return membership envelope is enclosed for easy return of your ticket stubs. Visit the WT web site for more pictures and information at [www.washingtontrout.org](http://www.washingtontrout.org).



Ray Troll, 2006 keynote speaker.

and Trudy also donated two ash paddles hand made by Shaw and Tenney, regarded as the gold standard in canoe paddles. The boat is valued at over \$3,000. This beautiful work of art will be on display during the silent auction/reception; tickets will be on sale for \$5 each, for a drawing on April 2, 2007.

We are tickled to death that this year's keynote address will be delivered by noted wildlife artist, humorist, and author Ray Troll. Ray lives and works among the tree tops in Ketchikan, Alaska, drawing pictures about nature, often of wild fish. He grew up around the world before moving to Alaska in 1983, where he has built a career drawing and painting funny, insightful, and irreverently fishy images that migrate into museums, books and magazines, and onto t-shirts sold around the globe. Mr. Troll earned a Masters degree in Fine Arts from Washington State University, but his pop-culture sensibility and quirky aquatic images are grounded in the latest biology and conservation science. He is an honorary member of the Gilbert Ichthyological Society, the Guild of Natural Science Illustrators & a lifetime member of S.P.O.O.F. (the Society for the Protection of Old Fish).

Ray is the illustrator of many popular books, including *Shocking Fish Tales*, *Planet Ocean*, and *Raptors, Fossils, Fins & Fangs*, with author Brad Matsen; *Life's a Fish and then You Fry* by chef Randy Bayliss; and a children's book, *Sharkabet, a Sea of Sharks from A to Z*. He has produced original work to benefit conservation

organizations including the Sierra Club, Greenpeace and the Southeast Alaska Conservation Council.

As always, we will have an exciting array of auction items up for bid in the silent and live auctions, including fishing and outdoor equipment, getaways, nights out, furnishings, and special surprises.

We will be accepting item donations until very close to the auction, but look for a partial catalog at [www.washingtontrout.org](http://www.washingtontrout.org). We need your help to make the 2005 Wild Fish Soiree as successful as possible. We've set a goal to beat last year's record of \$42,000. If you can donate an item, would like to sponsor the 2006 auction or serve on the Auction Committee please call WT Outreach Coordinator, Kristen Durance at 425-788-1167 or email her at [kristen@washingtontrout.org](mailto:kristen@washingtontrout.org).

Cost for dinner and the auction is \$115 per person. You have probably already received your invitation to the 2006 Soiree. If have not received an invitation or you know someone you would like to share this evening with, please contact Kristen Durance. Bringing a friend or neighbor is a great way to celebrate your support for wild fish. If you have never attended the Wild Fish Soiree then please feel free to contact us with any questions and make this the year you join us! With great food, good company and lively discussion, this year's event promises to be more than your average night out. Your help will make the 2006 soiree Washington Trout's most successful fundraiser yet! 🐟

Continued from page 6.

Shanks has worked throughout the western United States for most of his career.

While earning a B.S. in biology and M.S. in earth science at Montana State University, Bozeman, Shanks worked as a Forest Service and BLM smokejumper. He began his federal career as a Park Ranger in Yellowstone, Grand Teton and Grand Canyon National Parks. He also worked in Petrified Forest, Saguaro and Organ Pipe Cactus National Monuments and served in the U.S. Marine Corps.

After completing his Ph.D. in natural resource policy at Michigan State University in 1974 he held research and teaching appointments at the University of Nevada, Reno and Utah State University for a total of eight years. Shanks authored three books on public land policy, wilderness survival and California wildlife as well as articles and papers on conservation and environmental policy.

Shanks served as the senior public lands policy advisor to the California Secretary of Resources and as the Assistant Director for Resources in the California Governor's Office in Washington D.C. He also worked for the Governor of Arizona on public land and wildlife policy issues where he provided support for the protection for the San Pedro River, Buenos Aires Wildlife Refuge and a substantial enlargement of the state park system. He became the first Director of the Center for California Studies at California State University, Sacramento, a public policy institute. For five years he managed a complex program of environmental compliance and research safety as the Director of Environmental Health and Safety at the University of California, Davis.

On leaving WDFW, Dr. Shanks returned to federal service as the Wildlife Program Coordinator at the USGS headquarters in Reston, Virginia. A lifelong outdoor enthusiast and avid sport angler, he cares deeply about Washington's wild fish populations and their habitats, and continues to work for their preservation and recovery. He lives with his wife in Deer Harbor, Washington.

### **Dana E. Trethewy GIS Specialist**

Dana Trethewy has just been hired to take over duties as Washington Trout's Geographic Information Systems specialist. Dana will be responsible for all GIS analyses and cartography related to Washington Trout research, restoration, and advocacy initiatives, and she will provide technology support for field efforts and for WT's local network of workstations, laptops, and server. Dana will oversee a network-infrastructure upgrade that will include new file and web hosting servers.

Dana received a BS in Natural Resource Science from Washington State in 1998, and earned a MS in Watershed Resources from the University of Arizona in



2001. In addition, she completed undergraduate courses in Natural Resource Management at the University of Adelaide in South Australia in 1996.

"I'm really looking forward to working at Washington Trout," says Dana. "I know I'm going to have a great time."

Dana comes to Washington Trout from Natural Resource Consultants in Laguna Beach CA, where she was a GIS Specialist/Biologist, researching and preparing documentation for environmental and planning analyses, biological resource studies, endangered species surveys, developing habitat restoration and monitoring plans, and providing IT support. Previously, she was employed at Environmental Systems Research Institute in Redlands, CA.

At the University of Arizona's School of Renewable Natural Resources, Dana prepared her thesis research on predicting the spread of wildfire between vegetation biomes in southern Arizona. She has a strong foundation in cartographic modeling, spatial analysis, resource mapping (GPS/GIS), watershed management, wildfire management and watershed hydrology.

### **Cary Kindberg**

Washington Trout has wished a fond farewell to GIS Analyst Cary Kindberg; in spring 2006, Cary accepted a management position at URS, a national engineering-design firm.

Cary joined Washington Trout in 2004, developing and implementing GIS products associated with WT's research, restoration, and advocacy activities. He made significant contributions to many important initiatives, including the Redmond Watertyping Project, Dosywallips Estuary Restoration Project and Skykomish Braided Reach Fish Use Study. Cary's dedication, technical proficiency, creativity, and good cheer will be sorely missed.



Washington Trout thanks Cary for his hard work and commitment. We wish him the best of luck in his new endeavors. 🐟

# Washington Trout Acquires 40 Acres on the Skagit River

## *Michael and Myrna Darland Donate Generous Gift*

Kristen Durance, WT Outreach Coordinator

Michael and Myrna Darland have recently donated 40 acres on the Skagit River to Washington Trout. The property includes wooded floodplain habitats, back channels and sloughs, and fronts several hundred yards of main river channel on the lower Skagit. WT is excited and humbled to gratefully acknowledge this incredible gift and the support it represents.



*Anderson Slough, valuable wild-fish spawning and rearing habitat. bisects WT's new 40-acre property on the lower Skagit River. photo: R. Vanden Brulle.*

The Darlands have been generous and committed supporters and benefactors of Washington Trout programs for many years. They are the owners of Southern Chile Expeditions, and have often donated trips to the Chilean Patagonia to Washington Trout's annual benefit auction. At the 2005 Soiree alone, the Darland's generosity helped raise nearly \$17,000 for WT advocacy and research programs.

The land, steeped in family and local history, includes Skagit River frontage, small ponds and more than a ¼-mile of Anderson Slough, flowing through the wooded floodplain areas of the property. The property has been partially developed, and evidence of early settlement is apparent, including a large hollowed-out cedar stump that served as a storehouse and food cooler.

As development pressures increase in the Skagit Valley, areas of undeveloped land will become more valuable ecologically, serving as habitat for native fish and other wildlife. Floodplain, back-channel, and riverine habitats on the property are potentially providing valuable spawning, rearing, and refuge habitats for juvenile and

adult salmon, steelhead, char, and other wild fish. Washington Trout is still in the planning phases as to what the best use for the land will be.

“One hope is to turn it into a research & environmental learning center,” said WT Executive Director, Kurt Beardslee. “It could include an operations base for WT field researchers and advocates working on the Skagit River and other northern Puget Sound programs.”

The Skagit River gathers the most abundant wild runs of salmon in Puget Sound. The Skagit is one of the most important wild fish rivers in Washington, and will form the foundation for the recovery of PS Chinook and PS bull trout, both listed as threatened under the Endangered Species Act, and PS steelhead, proposed for listing in March 2006.



*Michael and Myrna Darland at the 2005 Wild Fish Soiree. photo: Phyllis Utti-Maslin*

The Darland's generous donation provides an exciting opportunity for WT research programs, and helps create real assets for Washington Trout, valuable in attracting future funding. The 40-acres are valued

at over \$250,000.

The Darland's incredibly generous donation represents the single largest gift Washington Trout has ever received from a private party. The entire staff and board has been energized by their gift. We cannot adequately express our gratitude for the Darland's continued and generous support, or our respect for their commitment to the conservation and recovery of Washington's wild-fish heritage. 🐟

tasks outlined in the grant application. This works well when we need funding to challenge an anticipated policy-decision like NOAA Fisheries' inadequate Critical Habitat Designation for all listed salmon and steelhead, or to review the Final Listing Decision for Puget Sound steelhead, the "Shared Strategy" recovery plan for PS Chinook, or the Draft Environmental Impact Statements for Columbia River salmon and steelhead hatcheries, all scheduled for release by particular deadlines.

But sometimes events take unexpected turns, or a local issue off our immediate radar screen can develop into an important opportunity. A congressional delegation starts investigating the role of salmon-harvest in recovery management; the proposed installation of a fish weir on a small tributary in eastern Washington provides an opportunity to influence how hatcheries are managed under the ESA; or a proposed sewage-treatment discharge mobilizes a community to protect a river and its wild-fish legacy. To be consistently successful, an advocacy campaign needs a base of flexible funding to take advantage of unanticipated opportunities, or meet unforeseen challenges.

Please read the advocacy-program updates in this issue of *Washington Trout Report*, or see the feature article about our initiative to reform hatchery practices at the Leavenworth national Fish Hatchery on Icicle Creek ("Return to Icicle Creek; Securing Them Passage").

While opportunities do develop quickly, success requires the depth provided by hard work, experience, expertise, and a reputation for credibility that has earned WT respect from policy leaders. Without the type of support WT receives from members and donors, we might not be able to respond effectively to important opportunities and challenges.

### **Make a Donation for Effective Advocacy**

Please consider directly supporting WT advocacy. By making an individual donation, you'll be working for wild fish every day, mounting barricades and pounding on lecterns with us.

Donate what you can afford, \$25, \$50, \$100, \$1000 or more; join our monthly-giving program and spread your donation over however long you prefer, giving you the opportunity to give more conveniently. You can make an on-line donation at [www.washingtontrout.org](http://www.washingtontrout.org). Let us know that you want to support our advocacy campaign, and your tax deductible contribution will go directly to helping WT staff ensure that wild-fish management in Washington is as thorough, responsible, transparent, and scientifically credible as possible.

For more information about the monthly-giving program and other ways to support Washington Trout, contact WT Outreach-Coordinator Kristen Durance at [kristen@washingtontrout.org](mailto:kristen@washingtontrout.org) or 425/788-1167. ➔

### *In Memoriam*

Washington Trout gratefully acknowledges  
a donation made by the Chris Schaeffler Family  
in memory of  
**Mr. Mikas Stonkus;**

and a donation made by Kris Bledsoe  
in memory of  
**Mr. Robert Paul Nielsen.**

These memorial gifts will directly fund Washington Trout  
advocacy, research, and restoration initiatives.

# Thank You

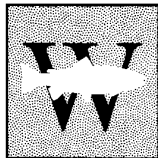
*A special thank you to the following donors who made the 2005 Wild Fish Soiree and Benefit Auction possible and for their commitment to the resource. Please remember them when making future purchases.*

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