

W A S H I N G T O N T R O U T
◆ R E P O R T ◆

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PRESERVE, PROTECT, RESTORE

Vol. 14 No. 1

Environmental Discovery



“A magical experience.”
Audrey Wheeler, 5th grade

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Save the Date!

Washington Trout's 13th Annual Wild Fish Soiree & Benefit Auction



The thirteenth annual Wild Fish Soiree and Benefit Auction will be held on Sunday, May 16, 2004. The 2004 Soiree will be catered by Lowell-Hunt Catering, who have generously donated the use of their dining and entertainment facilities located at 1111 Fairview Ave. NE on South Lake Union in downtown Seattle. More details, including lists of donated items, are available on our website at www.washingtontrout.org. So please mark your calendars, and look for your invitation this April.

The evening will begin with a silent auction and hosted reception, followed by an exceptionally catered banquet, a keynote presentation to be announced, and an entertaining live auction. The Soiree is a wonderful opportunity to enjoy a great evening with the staff, board, and other members and supporters of WT, while contributing significant funding for Washington Trout's important research and advocacy for Washington's wild salmon, trout, char, and other native fish.

The 2003 Soiree was a great success. Washington Trout was honored to present Dr. Bern Shanks, former Director of WDFW, as the evening's keynote speaker, who spoke on the history of the scientific environmental movement, the salmon crises, and the important role of grassroots organizations to engage and challenge government to adequately conserve and protect our natural resources.

The 2003 Benefit Auction raised nearly \$50,000 for WT's advocacy, research, and restoration programs, more than any previous event. The highlight of the evening was

Michael Darland's spontaneous and spectacularly generous donation of two extra trips to Southern Chile Expeditions' Yan Kee Way Lodge, sending six happy flyfishers to the Chilean Patagonia and raising nearly \$20,000 for WT!

Washington Trout gratefully acknowledges the members and supporters who helped make the 2003 auction such a wonderful success, and offers special appreciation to our sponsors: Batdorf and Bronson Coffee Roasters, Red Hook Brewery, and Woodinville Print & Copy. We are looking forward to another memorable Soiree, and hope our members and supporters are up to the challenge of surpassing last year's record success.

Washington Trout is pleased to announce that we have already received several feature auction items including a week of fishing on the River Dee in Scotland, a fly-fishing expedition package from Southern Chile Expeditions, and Steelhead Camp: Lowell-Hunt style.



Our first featured acquisition for the 2004 Soiree is a week of fishing for two anglers on the banks of the famed River Dee in Scotland. Julian and Miranda McHardy have graciously donated their secluded "Woodend" beat for two anglers on the River Dee. The trip includes accommodations in a charming two bedroom garden cottage that can accommodate up to four people and includes a full kitchen. This is a perfect trip for two couples or a family.

For literally centuries, the River Dee has delighted anglers with its classic pools and runs of Atlantic salmon

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Awareness Through Discovery

*WT Coordinates the Environmental Discovery Program
by Leah Hausman, WT Outreach Coordinator*



WT Outreach Coordinator Leah Hausman, walks students through "The Journey Home" obstacle course. In this field trip activity, students role-play salmon returning to their freshwater spawning grounds and have to navigate different habitats and obstacles, including a log jam, off-channel habitat, natural predators, fishermen, and a culvert. Photo by Kurt Beardslee.

Last September and October, one hundred 4th and 5th grade students learned about the importance of native plants, native animals, and healthy ecosystems by participating in the *Environmental Discovery Program*, a joint educational project of Washington Trout and Stewardship Partners of Seattle. Stewardship Partners originally developed the EDP, a three-day, hands-on, classroom and field-based program. Elementary school students from Seattle and surrounding areas spend a field-day at Oxbow Farm, an organic farm on the banks of the Snoqualmie River between Duvall and Carnation on SR 203.

Stewardship Partners conducted the first pilot-season of the program in Fall 2002 with four 4th and 5th grade classes from Greenwood, View Ridge, and Wedgwood Elementary Schools in Seattle, and Stillwater Elementary in Carnation. The program was offered to three 4th grade classes from Stillwater Elementary and Dearborn Park Elementary in Seattle in Spring 2003, and four 4th and 5th grade classes from Stillwater, Greenwood, Wedgwood,

and Coe Elementary in Seattle participated last fall. WT Outreach Coordinator Leah Hausman was contracted to instruct classes during the fall 2002 and spring 2003 seasons, and is now the Program Coordinator for the EDP.

This spring, four 4th grade classes will participate in the EDP - two classes from Stillwater Elementary and one class each from Stevens Elementary and Loyal Heights Elementary in Seattle. The *Environmental Discovery Program* has averaged four classes each season, and in Fall 2004 we will begin expanding overall program size to include more classes and more students each season.

The *Environmental Discovery Program* is offered free of charge to participating schools. Students receive a partial day of pre field-trip classroom instruction, followed by a full day field trip to Oxbow Farm, and a follow-up classroom visit. The *Environmental Discovery Program* is about "discovering" the outdoors. Students take advantage of the two classroom visits and the rural field setting to learn about native plants and animals, go exploring

on guided nature hikes, and develop their appreciation for wildlife and the outdoors. Teachers may choose from five different field trip classes to create their ideal environmental education program experience: The Journey Home, Water Quality, Plant Identification, Animal Lives and Discovery Skills.

Chris: My favorite part about our field trip to Oxbow Farm was the great long race for freedom. There were enemies like eagles, bear and fisherman that try to get the salmon. It was extremely fun!

Wendy Icasiano's 5th grade class
Coe Elementary, Seattle, WA.

Last fall, students participated in a new activity called "The Journey Home." Students role-played the journey of returning salmon from the estuary to the spawning ground. The children had the opportunity to experience the habitat needs of salmon and the obstacles they must overcome when returning to their home stream to spawn.

The students encounter log jams that create pools and protection, trees that shade and help control water temperature, ponds and other off-channel habitats that provide areas to rest, and gravel for spawning. They face obstacles that include animal predators, human fisherman, and a culvert that block their passage upstream to two tributaries, one of which has been "killed" by manmade chemical pollution. The class is divided into groups, with most students playing the role of the returning salmon, and the rest playing animal predators and human fisherman.

This spring we are introducing a new class - "Water Quality." In this class students will conduct field tests of Oxbow Lake, its channel, or the Snoqualmie River for parameters such as phosphates, nitrates, dissolved oxygen, temperature, and pH. A discussion in the field and during the classroom visits will help students understand the role of water quality testing, the natural and human sources for the chosen parameters, and the significance of the test results in regards to wildlife and the overall habitat.

"Plant Identification" classes are conducted in an easily accessible area where Stewardship Partners has replanted a riparian area with native trees. Students use a dichotomous tree key developed specifically for the site to identify different tree species, and then build on their identification skills using several field guides. Educational and hands-on games and activities round out the class.

The "Animal Lives" class emphasizes the importance of native animals, their habitat needs, and the delicate balance of an ecosystem. Some of the games instructors may play with students during this class are "Who Am I," "Who Eats Who," and "Oh Frog." These games help students more fully understand concepts such as the web of life, ecosystems, limiting factors, and predator-prey relationships.

The final field trip class - "Discovery Skills" - includes a .3-mile hike through a natural area that loops down to Oxbow Lake. Students explore the natural environment by looking at plant life, searching for animal tracks, listening for birds, and of course, collecting lots and lots of bugs. The instructor provides materials and tools to help students explore their surroundings, including a wide variety of field guides, magnifying lenses, collection jars, binoculars, and materials to conduct additional sensory-based activities. The focus of the Discovery Skills class epitomizes the overall goals and objectives of the *Environmental Discovery Program* - to help students tune into nature and to expand their awareness and appreciation of the wildlife that surrounds them at Oxbow Farm and in their own communities.

One specific activity in Discovery Skills encourages students to tune back into sounds they may have conditioned themselves to tune-out. Students spread out individually and quietly listen to everything around them for ten minutes, making a "sound map" of everything they hear - both natural and human. At the end of the ten minutes they regroup to discuss their favorite sounds, what they expected to hear, and what they had not expected to hear. After the discussion, the students return to their private spot and use their other senses to focus on one particular object in their location. Using magnifying lenses and their journals, the students record descriptions of their item, draw pictures, and use their imagination to discover and elaborate on anything else the object reminds them of.

Ethyn: One thing I learned at Oxbow Farm was how to look up animal tracks in the field guides that they had there.

I liked it because it was kind of cool seeing what animals had been there and also what animals live there.

Wendy Icasiano's 5th grade class
Coe Elementary, Seattle, WA.

In the pre field-trip classroom visit, students are introduced to concepts central to the field trip classes, the use of field guides, and the importance of wetland

habitats they will visit during the field trip. During the follow-up classroom visit, students get additional hands-on instruction in using field guides, participate in an activity about wetlands, and finish by creating a picture, poem, or story about their experience with the Environmental Discovery Program. Each of the classroom visits is roughly an hour and a half to two hours.

Washington Trout is working to develop a pilot program within the EDP that would utilize underwater videography technology to create a virtual field trip to Oxbow Farm. WT is a leader in using underwater video for fish research and monitoring, and believes it has very promising educational potential. If technically feasible, WT would propose placing underwater video cameras in key locations throughout the Oxbow Farm property and, using satellite or wireless technology, transmit a live feed from those cameras to WT's office. We would then host the streaming video on WT's website and develop curriculum that would incorporate the online video into the larger program. Because of the unobtrusive nature of this technology, students would be able to gain a more realistic perspective of how the featured habitats are used by wildlife and reinforces overall program goals of exploration and discovery. While still in its early stages of development, WT hopes to hold the pilot in the fall of 2004.



WT Outreach Coordinator Leah Hausman helps two students use the dichotomous tree key in the "Plant Identification" field trip class. Photo by Wendy Icasiano.

The success of the program depends heavily on volunteer involvement and community support. At least two volunteers are needed as instructors or supervisors on each field trip, and donated resources and materials enhance the program while keeping costs down. WT would like to extend its appreciation to the volunteers of the Fall 2003 *Environmental Discovery Program* for their

time, dedication, flexibility, patience, and incredible sense of humor - Brooke Alford, Barbara Bruell, Nancy Hahn, Reiko Meyer, Anna-Karin Roo and Keli Sullivan. Hancor Manufacturing in Olympia donated a piece of culvert material used in The Journey Home to demonstrate a manmade challenge salmon face during their migrations.

Patricia: My favorite part of the field trip was when we used the key for the native plants. We used it to identify plants.

Wendy Icasiano's 5th grade class
Coe Elementary, Seattle, WA.

The program would of course hardly be possible without the commitment and contribution of the public school teachers who participate in the program. The teachers prepare their classes for the program, help keep students organized and assist them during the field day, and often build upon their students' environmental learning with follow-up lesson plans. The *Environmental Discovery Program* acknowledges the dedication and assistance of: Wendy Icasiano of Coe Elementary; Janice Hunt of Dearborn Park Elementary; Lisa Dunker and Oleine Hedeon of Greenwood Elementary; Pat Morrison, Orlene Olson, and Jerry Price of Stillwater Elementary; Janet Burks of View Ridge Elementary; and Sharon Musselwhite of Wedgwood School. Two teachers new to the program will be participating in Spring 2004 and we look forward to working with Joanna Choi of Loyal Heights Elementary and Susie Diessner of Stevens Elementary.

Stewardship Partners is non-profit conservation organization that helps provide incentives for landowners to conduct conservation and restoration activities. Oxbow Farm has served as a focal point for Stewardship Partner's work in the Lower Snoqualmie Valley. The property contains functional wetlands, upland forest, ponds, river shoreline, and a healthy off-channel Oxbow that is connected to the main stem of the Snoqualmie. An organic farm operating on the property grows produce for local farmer markets and individual shareholders of the Community Supported Agriculture co-op. Stewardship Partners has conducted a monitoring program of the oxbow, implemented a series of riparian restoration projects, and with Washington Trout, established the *Environmental Discovery Program*.

Its ecological features, the nexus of agriculture and restoration activities, and the landowner's commitment to stewardship, has made Oxbow Farm an excellent learning location for environmental education, and it can continue to accommodate the *Environmental Discovery Program* as it expands.

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Making Hatcheries Safe for Salmon Recovery

WT Challenges Puget Sound Hatchery Plans



by Ramon Vanden Brulle, WT Communications Director

In 2002 and 2003, Washington Trout and the Native Fish Society filed two lawsuits in Federal Court against the Washington Department of Fish & Wildlife, alleging that WDFW chinook and coho/steelhead hatchery programs in Puget Sound were jeopardizing wild chinook recovery efforts and violating the Endangered Species Act by harming and killing listed Puget Sound chinook (See “Wild Salmon Recovery Initiative; Program Updates;” *Washington Trout Report*, spring 2003). The department’s releases of hatchery-bred chinook, coho and steelhead harm and kill listed wild chinook through competition for food and habitat, displacement, predation, and harmful genetic interactions. Under the specific terms of the ESA, the Puget Sound hatcheries had been unauthorized since January 2001, making each incident of harm to listed chinook illegal.

Puget Sound chinook were listed as Threatened under the ESA in 1999. NOAA Fisheries, which enforces the ESA, has acknowledged that hatcheries have been a factor in wild-salmon declines, and that hatchery operations and facilities can harm and even kill listed salmon. Under the ESA it is illegal to harm, harass, kill, or otherwise “take” a listed species.

NOAA Fisheries requires take-authorization applications called *Hatchery and Genetic Management Plans* (HGMPs) for any hatchery program with the potential to impact a listed salmon or steelhead population. Washington State has 13 salmon and steelhead populations with federal ESA protection. Nearly all the HGMPs were overdue a January 2001 deadline. The department submitted HGMPs for its Puget Sound hatcheries in late 2002 and early 2003 (after WT filed its suits).

Approximately 85 HGMPs for hatcheries in the Columbia Basin are still outstanding.

Settlement

The Puget Sound HGMPs are still under federal review, and a final NOAA Fisheries determination is not expected for many months. In lengthy and intense negotiations during spring 2003, WT and NFS reached a settlement agreement with WDFW that set a schedule for the submission of the HGMPs still outstanding, and expanded the public review of all the HGMPs. The agreement will enhance the opportunity for federal analysts, public advocates, and individual citizens to evaluate and improve hatchery management practices in Washington.

Under the terms of the agreement, WDFW published the text of the Puget Sound HGMPs in the State Register and on its website, and accepted comments from the public on each of the completed documents. They then drafted and published responses to the public comments, and submitted the comments and responses to NOAA Fisheries for review with the HGMPs. The public-comment period for the 79 Puget Sound HGMPs began on June 18 and ended on August 1.

Of the roughly 85 still outstanding salmon and steelhead HGMPs, half will be submitted by late 2004, and the remainder by late 2005. WDFW will also solicit public comment on these additional HGMPs as they are completed, and forward comments and department responses to NOAA Fisheries for review. WT proposed the comment and response process as a way to ensure that each HGMP is as thorough, accurate, and as biologically and legally credible as possible, make hatchery management more transparent, engage the public, and influence needed improvements in current hatchery practices.

Typically, NOAA Fisheries would seek public review and comment on HGMPs during its own review and approval process. The Settlement will augment that process by soliciting public input on the hatchery plans prior to NOAA Fisheries' review. It presents an opportunity for the public to become more meaningfully involved in this important process, to influence improvements in WDFW hatchery practices, and to help ensure the effective recovery of federally listed salmon and steelhead. Advocates of hatchery reform can review these operational hatchery plans for consistency with acknowledged reform needs, and with recommendations from independent science panels.

The NOAA Fisheries public-review process will likely focus on its own approval decision, not the individual HGMPs. It will come after NOAA Fisheries will have already essentially made its decision. Now WDFW will have to submit not only its hatchery plan to NOAA Fisheries for review, it will also have to submit the public's challenges or comments on that plan as part of its application for ESA approval. Issues that WDFW might have been happier to omit will now be part of the record, making it less likely that NOAA Fisheries will approve an unsatisfactory plan. It will help jump-start the hatchery-reform process, and give the public an opportunity to monitor its progress.

Washington Trout believes the public can and should be engaged in the whole process, not just comment on a finished product. Good public comments, based on facts and good science, if they can really engage the decision-

WDFW's release of hatchery-bred chinook, coho and steelhead harms and kills listed wild chinook through competition for food and habitat, displacement, predation, and harmful genetic interactions

making process, can be much more effective at influencing management practices. WT was of course significantly involved in the process. As they became available, we posted drafts of our review on the WT website (www.washingtontrout.org), along with relevant source material, to assist individuals and organizations in their own reviews and comments.

Seattle attorney Richard Smith, of Smith & Lowney PLLC, represented WT and NFS in both suits and in negotiating the settlement agreement.

WT Comments on Puget Sound HGMPs

On August 1, Washington Trout submitted comments regarding the HGMPs for WDFW's chinook, coho, and steelhead hatchery programs in Puget Sound. We found the HGMPs inadequate to warrant ESA authorization, and recommended that WDFW withdraw them for significant revision, and/or consider scaling back or discontinuing its Puget Sound hatchery program.

After reviewing all the chinook HGMPs and all the coho and steelhead HGMPs, WT identified several general concerns that run throughout all or many of the documents. These include our assessment that:

- In general, the HGMPs fail to adequately describe clear program goals, justifications, performance standards and indicators, or adequately detailed monitoring and evaluation protocols or timetables;
- A number of erroneous and/or unsupported assumptions run throughout the HGMPs;
- Many of the HGMPs contain critical deficiencies

and omissions;

- There is a consistent failure to quantify, as required, the estimated take of listed Puget Sound chinook;
- The overall size of the chinook hatchery program in Puget Sound is far too large with respect to any reasonable “acceptable levels” of competition, predation, and related genetic and ecological impacts upon indigenous wild chinook;
- The overall size of the coho and steelhead hatchery programs in Puget Sound are far too large with respect to any reasonable “acceptable levels” of competition, predation, and ecological impacts upon indigenous wild chinook;
- The HGMPs are often in direct conflict with critical elements of WDFW’s own Wild Salmonid Policy.

Washington Trout is skeptical about the size and scope of individual programs and the Puget Sound hatchery program in general, about rearing and release strategies and techniques employed by WDFW, and about many of the fundamental assumptions underlying WDFW hatchery practices. Our concerns and skepticism are based on our review of the current scientific literature and a preponderance of the evidence (See “Overwhelming Evidence;” *WT Report*, Spring 2003). Independent science panels at NOAA Fisheries, the Bonneville Power Administration, the National Research Council, and dozens of individual scientists have all concluded that hatcheries have contributed to the decline of wild salmon, and that current hatchery practices are hindering recovery.

The HGMP process is intended to determine if individual hatchery programs can be operated without unduly threatening chinook recovery, by evaluating several broad factors and weighing them against each other. The benefits from a particular hatchery program and specific proposals to minimize risks and monitor impacts to listed chinook can be compared against the current health of the affected population and the potential for the program to harm wild chinook.

Unfortunately, the information provided by WDFW that would address these factors is cursory, vague, and often inappropriate. The HGMPs rely on assertions that various practices will minimize adverse effects, without any explication, citation, or other support. Available evidence that challenges or contradicts these assertions is rarely if ever acknowledged or addressed. Levels of risk are consistently ignored, discounted, or acknowledged as unknown.

For instance, WDFW consistently asserts that it can minimize competitive interactions between hatchery

and wild juveniles by segregating hatchery and wild fish through the timing of hatchery releases. But the HGMPs either disregard or fail to reconcile that wild juvenile chinook are present in freshwater habitats for a period of several months. In many cases hatchery releases overlap with both the wild-chinook rearing and out-migration times that are estimated by WDFW. The HGMPs fail to acknowledge or address current data that suggest hatchery and wild juveniles may be cohabiting nearshore saltwater environments in Puget Sound throughout the year. The assertion that hatchery and wild juveniles are being effectively segregated appears to be contradicted by available data, and often by information provided in the HGMPs themselves.

The HGMPs don’t commit to any readily identifiable, measurable performance standards or indicators, and no program-specific monitoring plans or timetables are identified or described for meeting performance standards or reducing impacts. While acknowledging the problems, WDFW fails to address how individual hatchery programs are harming listed chinook through competition, displacement, and predation in juvenile life stages, and through competition and spawning interactions during adult life stages.

WDFW consistently fails to discuss why it is socially, economically, or biologically necessary, advisable, or even beneficial to rear and release fish at the described programs. Measures to minimize “adverse genetic, demographic or ecological effects on listed fish” are never

WDFW’s assertion that hatchery and wild juveniles are being effectively segregated appears to be contradicted by available data, and often by information provided in the HGMPs themselves.

adequately described. Indeed, the level of these effects that WDFW would consider adequately “minimized” is never identified, nor is any effort to monitor how and when these effects will indeed be minimized described in any detail.

Washington Trout’s comments reflect our concern that the overall scope and scale of the Puget Sound hatchery program is simply too large to responsibly accommodate the level of uncertainty presented in the HGMPs. We offered recommendations where appropriate, and references that support our comments and recommendations. WT believes the HGMPs are inadequate to warrant ESA authorization, and suggested that WDFW withdraw many of the applications for significant revision, if it can provide the necessary information. If the necessary information is unavailable at this time, we suggested that WDFW reconsider some of the particular programs, either discontinuing or significantly scaling them back until it can provide the pertinent information.

Continued on page 24.

Precision Tools for Effective Habitat-Restoration

Using State of the Art Geographic Technology to Analyze Current Conditions and Develop Restoration Strategies

by Joseph Yacker, *WT GIS Specialist*

Choosing places to restore salmon habitat shouldn't be too difficult. Look around and take your pick. But the job is too big, too expensive, and too urgent for that approach. While in many cases we may need to act quickly, we need to always move efficiently, working carefully to avoid false starts. Well paced but thorough consideration can identify the sites with the best potential for returning the most environmental benefit on an investment of limited recovery-resources.

Choosing habitat-restoration sites with a high potential for success and developing restoration strategies that will manifest that potential requires all sorts of data, historical, ecological, biological, geographic, and often social. All that data must be carefully collected, collated, and then rigorously analyzed. It's a big, complicated job. Powerful, high-tech tools speed the work and help assure it is done right.

Currently, Washington Trout is studying the feasibility of restoring flood-plain processes on lower Cherry Creek in the Snoqualmie River watershed. We're collecting data on elevations, sediment-transport, water-quality, and fish-species composition and distribution in the floodplain. We have drilled wells, installed automated recording devices, and monitored by hand to collect ground and surface water data. We have also developed Geographic Information Systems to help model the hydrologic and elevation data. GIS is an extremely powerful tool for illustrating and analyzing the current conditions on the floodplain and the possible changes in function from a variety of restoration options.

Cherry Creek

Near the King-Snohomish County line, the Snoqualmie and Skykomish Rivers join to form the Snohomish. The Snohomish Basin of the central Cascades and Puget Lowlands is one of the region's largest, most important and productive wild-fish watersheds. It will be

central to the recovery effort for Puget Sound chinook salmon, listed as threatened under the Endangered Species Act. Seven miles upstream from its confluence with the Skykomish, the Snoqualmie gathers Cherry Creek.

The Snoqualmie's lowest major tributary, Cherry Creek drains a 29 square-mile watershed. Cherry supports populations of resident rainbow and cutthroat trout, sea-run cutthroat, steelhead, pink salmon, coho salmon, and Puget Sound chinook. In its lower reaches the creek crosses a 750-acre flood plain that merges with the Snoqualmie's broad flood plain where Cherry joins the river. Historically,

floodplain processes create and maintain many small, low gradient side and back channels, shaded by trees, with lots of large wood in the water and water temperature regulated by significant groundwater influence, habitats essential for productively rearing juvenile salmon and trout.

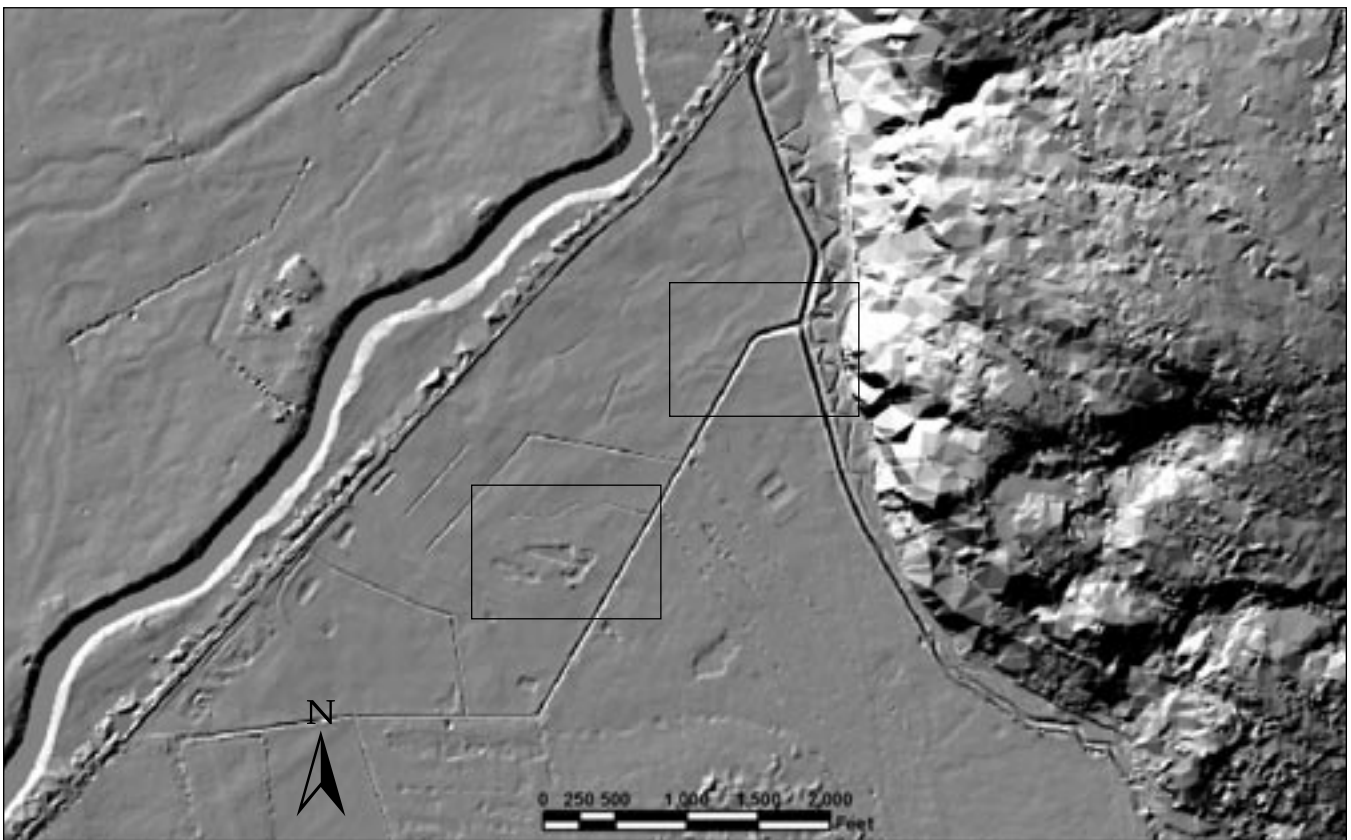
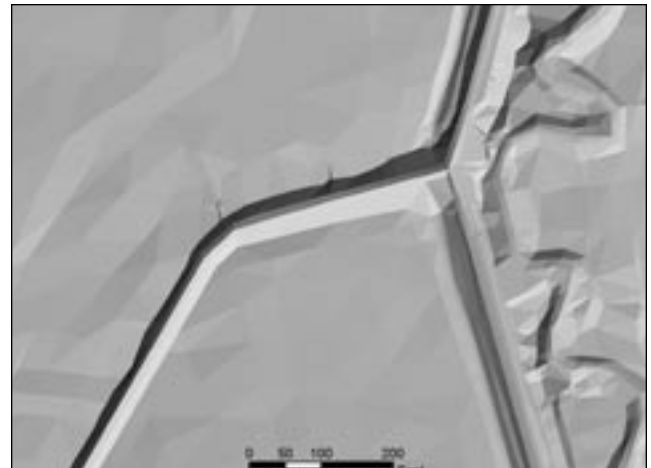
However, as with much of the region, the Snoqualmie and Cherry floodplains have been modified to accommodate agricultural development, stream banks straightened, armored, and diked,

wetlands drained. The loss of flood plain function and habitat has been identified as a major limiting factor for salmon productivity in the Snohomish Basin.

To protect agricultural practices in the valley from flooding, a drainage system of ditched channels, levees, and pumps disconnects lower Cherry Creek from its floodplain. Nearly a mile and a half of lower Cherry Creek has been straightened and diked. The old, unscreened pumphouse causes direct mortality to chinook and other fish, and impedes fish-access to existing habitat. WDFW owns and maintains 333 acres on the lower flood plain as a wildlife unit, managed primarily for stocked upland-bird hunting and dog training. WDFW grants easements to the local drainage district to maintain the drainage system and allows livestock grazing on portions of the unit.



Sub-contractors from Cascade Drilling Inc. install a groundwater monitoring well in Cherry Valley.



Sets of LiDAR and Total Station survey data were combined to create an elevation of lower Cherry Valley, used to model floodplain conditions and the performance of the agricultural drainage system during high-water events. In the main image above, Cherry Creek has been constrained by dikes into a simplified course along the eastern edge of the floodplain, in the center-right of the image; the Snoqualmie River runs diagonally across the image from the lower left; the matrix of Hwy 203 runs northeast, roughly paralleling the Snoqualmie's right bank, and the drainage system bisects the Cherry floodplain in the center of the image; a sinuous remnant historical channel is apparent along Cherry Creek's right bank.

Total Station data collected by WT crews revealed information not available in the LiDAR data set. Figure 1 (top left) shows the underwater topography of ponds and drainage ditches in the floodplain, information used to help model hydrologic functions. Detailed ground elevations of areas that were obscured by vegetation, like much of the remnant channel shown in Figure 2 (top right) were not available from LiDAR data; Total Station surveys provided valuable information that may influence future restoration efforts.



Joseph Yacker, WT GIS Specialist, using the Total Station to survey and record elevation data in an area of dense vegetation.

New Technologies to Develop New Solutions

Working with the local drainage district, WDFW, NMFS, and affected landowners, Washington Trout has been developing ecologically sound solutions for restoring lower Cherry Creek that acknowledges the legitimate needs of the affected users. The feasibility study is an early step in that development. Using GIS technology, we have created detailed, accurate models of the current floodplain, allowing us to graphically illustrate and analyze how the existing drainage system reacts to and copes with flood events of varying sizes, and how the flood plain might function under a number of restoration scenarios.

WT acquired recent, high precision LiDAR (Light Detection And Ranging) elevation data of Cherry and Snoqualmie Valleys from US Geological Survey, collected from aerial surveys using laser detection equipment. The LiDAR elevation data provided accurate information about the topography in the open areas of the flood plain, but LiDAR data can suffer from several shortcomings. The method has difficulty accurately measuring elevations in areas where vegetation obscures the surface, in areas where there are small, dramatic elevation changes (i.e. stream banks), or underwater. To augment the LiDAR data, Washington Trout conducted manual elevation surveys throughout the flood plain.

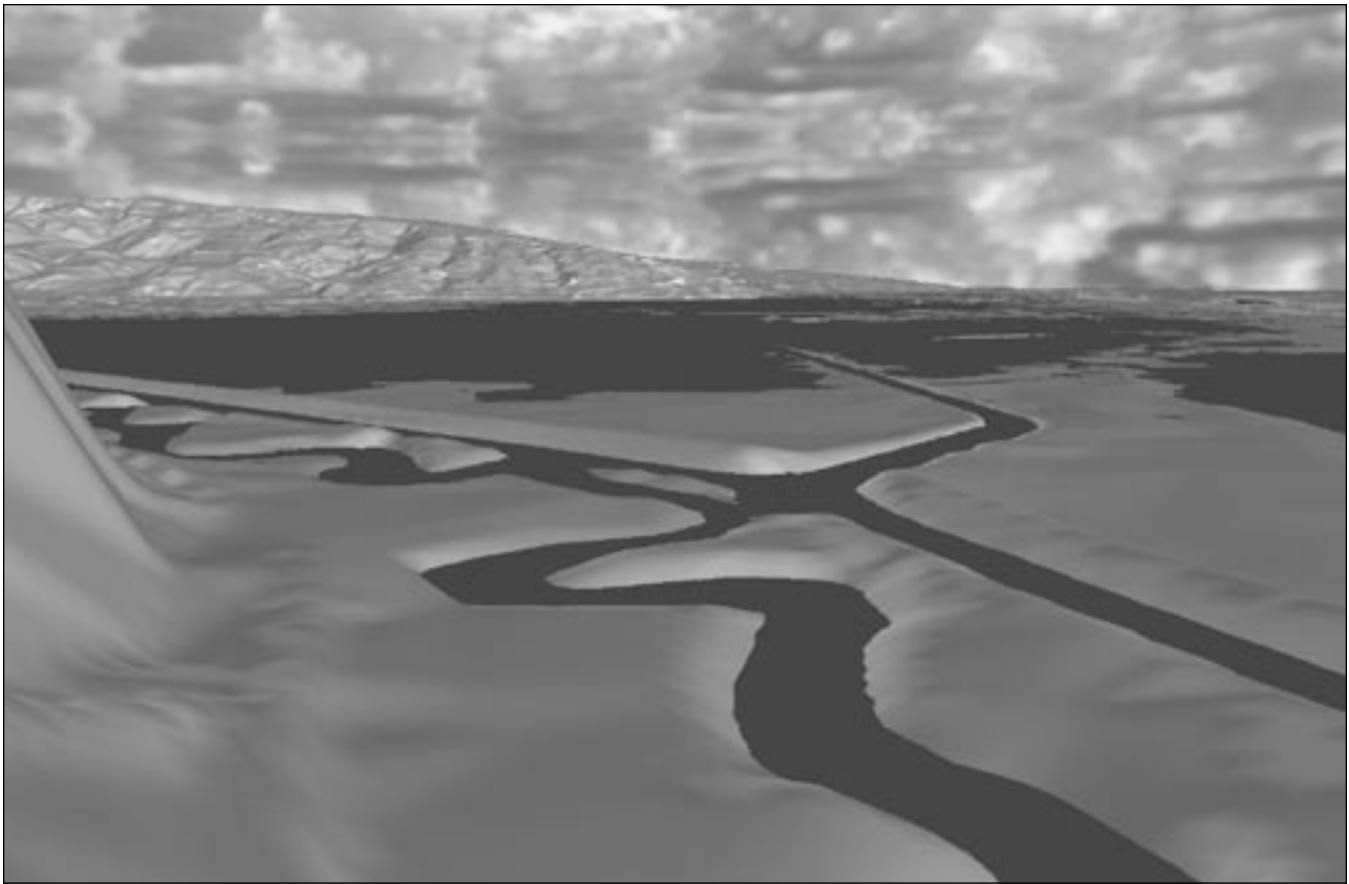
Equipped with a high precision land surveying instrument called a *Total Station*, Washington Trout crews began surveying parts of the Cherry Valley Floodplain in February, 2003. The *Total Station* employs infrared beams to measure the distance between the instrument, operated by the surveyor, and a prism, positioned by a rodsman. Then, using mathematical computations, the *Total Station* can in just seconds record the X,Y, Z coordinates of the prism, within millimeters.

Survey crews collected nearly 10,000 high precision elevation points within the floodplain. The *Total Station* data revealed information absent from the LiDAR data. The underwater topography of the many ponds on the flood plain was missing from the LiDAR data, but is important for analyzing and modeling the hydrologic function of the flood plain. Most notably, the *Total Station* surveys identified a sinuous remnant channel, assumed to be mainstem Cherry Creek's historic channel, adjacent to the currently diked and straightened section of the stream.

These data points were imported into a GIS and combined with the LiDAR data to create an elevation "surface" of the study area. We submitted the elevation datasets to project-subcontractors R2 Resource Consultants. Their hydraulic engineers and hydro-geologists used the elevation surface to determine where water would flow, where it would accumulate, and what volumes of accumulation could be expected for different flood conditions. They computed the volume of the Cherry Valley Floodplain, the minimum elevation of the levee, and the gradients of Cherry Creek and the drainage ditches in the flood plain. With Washington Trout, the R2 engineers are using these analyses to prepare several restoration alternatives and to model likely impacts from each.

Washington Trout also used GIS technology to create computer animations in three simulated dimensions and from several angles of actual or modeled high-water events on the flood plain. The animations depict time sequences of events as flood waters rise and fall, first in Cherry Creek, and then in Cherry Valley. Some animations illustrate how the flood plain is functioning under current conditions as influenced by the drainage system, while others will depict how the flood plain would function in similar flood events under several proposed restoration scenarios.

The animations will allow the project partners and stakeholders to witness and analyze the performance of the existing drainage system in condensed time and under lab conditions. We can determine exactly how much water the drainage system can cope with, and predict how often those events may occur. We can see what portions of the floodplain are impacted by floods of varying magnitude, when, and for how long. These demonstrations also illustrate to project stakeholders what the effects will likely be from proposed changes to the Cherry Valley drainage system.



A perspective view of the elevation data, looking southwest across the floodplain, overlain with a depiction of water surface-area at a known (measured) elevation. The background shows the floodplain inundated with water; the straightened and diked mainstem of Cherry Creek cuts diagonally across the center of the image, with the main drainage ditch entering at the center right; the remnant historical channel meanders through the foreground. WT combined series of such images over time ranges to create animations of actual flood events and analyze the performance of the drainage system.

Just as importantly, the modeling and animation allow us to make much more informed assumptions about the likelihood of successfully restoring natural floodplain processes in Cherry Valley under each of the proposed restoration options. We can use the information to help determine which restoration option would likely produce the most ecological benefit, what the benefit of each option would be, and the cost-benefit ratio of each.

Currently, R2 Resource Consultants, Inc. is calibrating the model to ensure it is accurately representing the hydrology of Cherry Valley. Preliminary model results and animated scenarios have been promising – it appears that the modeling tool will be sufficiently accurate to assess a variety of restoration alternatives.

This information will be critically important in making the inevitable ecological, social, and economic calculations necessary before funding and implementing any restoration solution. How do we balance ecological benefit against impacts on current use? Being able to better quantify the benefits, impacts, and tradeoffs will enable communities, policy makers, and stakeholders to make more rational, responsible, and ultimately more successful

decisions. And the ability to generate accurate, credible data and projections supports Washington Trout's advocacy for solutions that offer the most benefit to wild fish and their habitats.

Washington Trout initially implemented an in-house GIS program in 1999 to enhance our ability to study, model, and implement scientifically sound solutions for wild-fish recovery. The Cherry Valley Feasibility Study represents the most advanced use of GIS and survey technologies by Washington Trout since the program began. Without the use of these tools it would have been extremely difficult to accurately model the results of proposed restoration solutions in Cherry Valley. We are encouraged by the success of this project and continue to be excited by the potential of GIS as an important conservation tool.

Washington Trout gratefully acknowledges funding and other support from the Environmental Systems Research Institute (ESRI), Hewlett-Packard, and the Conservation Technology Support Program that enabled the development of WT's GIS capability. 🐟

Urban Streams Support Wild Fish

But Why Are Some Coho Dying Before They Spawn?

by Bill McMillan, *WT President* & Jamie Glasgow, *WT Director of Science & Research (Ecology)*

For the fifth consecutive year, Washington Trout field crews have been contracted to conduct spawning surveys on Seattle's urban creeks. In fall 2003, Des Moines Creek in the city of Des Moines was added to the previous four years of surveys on Seattle's Fautleroy, Longfellow, Piper's, Taylor, and Thornton creeks.

WT crews are documenting the range of species of fish and wildlife present (from sockeye to beaver, peamouth to otter, and coy to great blue heron); the absence of salmon adipose fins (identifying hatchery salmon straying into Seattle creeks); the presence of salmon adipose fins (on wild fish and some un-marked hatchery origin finger-



WT President and Field Biologist Bill McMillan conducting spawning surveys on DesMoines Creek in South King County.

lings); and the different species' spawn-timing and spawning-location preferences at each of the six streams. WT surveyors also document how far upstream salmon return in the urban creeks, helping to identify passage barriers such as culverts, weirs, and ephemeral passage barriers including beaver dams (common even in urban creeks), debris jams, and sediment buildups.

WT has identified at least one impressive success story in Seattle's urban creeks, a vigorous cutthroat trout population of Thornton Creek. Thornton cutthroat are surprisingly abundant; surveys have documented an estimated 400-600 spawners each spring during the past three years. Thornton's returning cutthroat rival coho salmon in size. Spawners average 20" in body length with individuals estimated as large as 27"-28" and up to ten pounds in weight!

We believe the cutthroat population in Thornton is largely adfluvial; the trout spawn and rear in the creek but spend the majority of their lives in Lake Washington, feeding, growing, and maturing to spawning age (likely three to four years). Cutthroat spawn more than once, sometimes three to four times before eventually dying at six to eight years of age.

In Lake Washington cutthroat are known to prey on sockeye and kokanee salmon, but a 15-pound specimen caught several years ago by a sportsman had several yellow perch in its stomach. Yellow perch also prey on juvenile salmon. So cutthroat may do as much good for salmon as they do harm thanks to their catholic tastes for any fish that swims.

Urban Pre-Spawning Mortality

During spawning surveys in 2001 and 2002 Washington Trout recorded elevated numbers of adult coho salmon that were dying in the city streams before they were able to spawn, a phenomenon known as pre-spawning mortality. WT surveyors documented that coho returning to Seattle's streams are experiencing pre-spawning mortality rates ranging from 20% to 100%, depending on the creek and the year.

Washington Trout presented the pre-spawning mortality data to Seattle Public Utilities and NOAA Fisheries. Recognizing the ecological and human-health implications of this phenomenon, both agencies, working closely with Washington Trout, are attempting to determine the extent of the problem and identify the likely causes. In response to the WT findings, NOAA Fisheries is conducting an intensive research project on Longfellow Creek. This season, NOAA's Northwest Fisheries Science Center is performing daily surveys to evaluate coho spawning success in Longfellow Creek, and studying the carcasses of fish that died prior to spawning. Preliminary data suggest that the coho deaths seem closely related to storm runoff events. It is possible that after several months of fall/winter rains "washing" out potential toxins that accumulated on roads, parking lots, roof tops, yards, gardens, golf courses and graveyards through the dry summer months, the level of toxin transported to urban creeks in February-March (peak cutthroat spawning returns) is lower than in late October through November (peak coho spawning returns). However, this does not explain how juvenile cutthroat survive for a year or two in the creek before migrating out, nor the fact that some cutthroat spawn successfully in January while the few coho that spawn then typically do not.



Bill McMillan examines a coho carcass on a tributary to Griffin Creek in the Snoqualmie watershed.

This fall NOAA researchers placed two sheds filled with small aquariums containing juvenile coho along Longfellow Creek. Water is pumped continually from the creek through the aquarium tanks. To date, not a single juvenile coho has died in the experiment, suggesting juvenile coho do not appear to suffer the same consequences as adult coho have (65%-90% mortality in past years). It appears that juvenile coho are not as vulnerable to storm water toxins as adult coho. Returning adults are in the process of reversing their body chemistry from saltwater to freshwater as well as trying to deal with sudden exposure to urban storm water. While this may be a lethal combination, it is but one possibility. NOAA Fisheries, SPU, and WT will continue to work together to collect the additional data needed to definitively identify the mechanism behind the observed elevated rates of coho pre-spawning mortality.

Pre-Spawning Mortality in the Snohomish Basin

It is unknown how much coho pre-spawning mortality is occurring outside of Puget Sound's urban centers. With funding from the Environmental Protection Agency, and working with the Washington Department of Fish and Wildlife (WDFW), NOAA Fisheries, Seattle Public Utilities, and Snohomish County, Washington Trout is attempting to document the spatial and temporal extent of coho salmon pre-spawn mortality in the Snohomish Basin, and catalogue and investigate the relationship of these occurrences with watershed characteristics and land use patterns.

WT crews are surveying coho spawning index reaches throughout the Snohomish that have been designated by the WDFW to estimate coho escapement. The index reaches range in length from 0.25 to 2.5 miles and drain lands managed for forest practices, agriculture, rural, and urban development. Crews hike the index reaches to assess the spawning success of coho carcasses they find. Eggs found in female coho carcasses are enumerated so the percent of retained eggs can be calculated. As possible, crews record the likely

cause of death when females with significant egg-retention are encountered; efforts are made to distinguish mortality from unknown causes, predation, and stranding. WT will use a geographic information system representing land-use at each of the index watersheds to document relationships between land-use and egg-retention or pre-spawn mortality.



The eggs in this female carcass found on a Snoqualmie River tributary indicate that the coho died before spawning.

The Snohomish pre-spawn mortality surveys began in late October – preliminary data demonstrate that some pre-spawning mortality is occurring in most of the index reaches being surveyed. However, it is not nearly as common as in the Seattle and Des Moines streams. 🐟

King County Water Typing Surveys

Recognizing Fish and Habitats Too Often Ignored

By Jamie Glasgow, WT Director of Science and Research (Ecology)

Washington Trout has completed the first phases of a major water typing survey under contract to King County. WT field biologists physically surveyed stream reaches in 25 watersheds in Burien, Des Moines, Normandy Park, SeaTac, and Federal Way. Through visual observation and electro-fishing, crews determined fish presence and distribution, corrected inaccurate stream-maps, and documented potential fish passage barriers, instream features, and other habitat characteristics.



WT Executive Director Kurt Beardslee electroshocking in Upper Miller Creek underneath Hwy 518 near Sea-Tac Airport.

King County wants to update and correct information about the streams in this area that drain directly into Puget Sound in order to improve land and water management, responsibly plan and manage future development, and prioritize recovery strategies for listed Puget Sound chinook and other wild fish. Washington Trout is using the data from the surveys to develop an internet-based Geographic Information System (GIS) that will provide users with updated, graphic, accurate information about the distribution and condition of fish populations and habitats in southwest King County.

The GIS will compliment similar web-sites developed to present water typing data collected by Washington Trout on streams on Vashon Island, Island County, and Jefferson County. King County, local jurisdictions, public advocates, and community organizations can use the information to help protect and restore remaining wild-fish resources in the central Puget Sound area.

Water Typing and Washington Trout

In 1975, the Washington Department of Natural Resources developed the process of water typing to regulate forest practices that impact Washington's surface waters, classifying streams into one of five types, depending on their physical, biological, and human-use characteristics. Streams that bear fish are classified as Types one, two, or three; Type-four and Type-five streams are non fish-bearing. Accurate water typing is essential to protecting fish and their habitats because the kind and proximity of human activities allowable in areas adjacent

to streams and other surface waters is dictated by water type. For example, riparian buffer zones required on type-two streams are greater than those required on type-four streams.

WDNR's original water typing efforts underestimated the actual miles of fish-bearing streams by almost 50% statewide. Hundreds of miles of wild salmon and trout habitat have been compromised because

they were mis-identified and subsequently subjected to inappropriate land practices. In 1997, WDNR revised its criteria for classifying streams as fish-bearing and upgraded protections for waters contemporarily identified as non fish-bearing. However, the ruling applied only to lands regulated for forest practices.

Under its *Habitat Lost & Found* program, WT has since 1994 been physically surveying streams throughout Washington to correct their misclassification and qualify them for the protection warranted under existing laws. We have upgraded the status of nearly 5000 stream reaches statewide.

Crisis in Regulating Development

Though originally designed for regulating forest practices, the WDNR water typing maps have been widely adopted by city and county agencies for regulating development activities outside the forest-practice zones. Unfortunately, the maps are even more inaccurate outside the forest-practice zones. Recent water-typing surveys by Washington Trout in rural and suburban landscapes in King, Snohomish, Jefferson, and Island counties documented similar error-rates in designating streams as fish-bearing or non fish-bearing, and provided evidence that a significant number of streams in these areas do not even appear on any maps. Of 88 stream miles surveyed by Washington Trout during summer 2000, some 10.2 miles or 12% were previously unrecorded on DNR water-type maps.

Since 1997 WDNR has maintained a system for correcting water type designations in forestlands, but there is no comparable system to ensure timely updates in

non-forestry areas subject to Growth Management Act (GMA) planning and regulations. Likewise, county and local planning and conservation ordinances rely on DNR water-type maps, often without adequate mechanisms for checking or correcting the data presented in the maps.

These factors are creating a crisis in how development along streams is being regulated. Local jurisdictions are relying on inaccurate water-typing maps to regulate land and water use, and many streams and the fish they support are facing threats from development and associated practices because they are not receiving protection they legally deserve.

King County Surveys

In spring 2003 Washington

Trout surveyed 25 south King County watersheds that drain directly into Puget Sound through the cities of Burien, Des Moines, Normandy Park, SeaTac, and Federal Way. Washington Trout crews determined the types and distribution of fish in the watersheds, and documented potential fish passage barriers, instream features, and habitat characteristics that were observed during the course of the watertyping surveys. Fish that were brought to hand were photographed, and instream features including culverts, weirs, fishways, and diversion dams were documented, described, and measured. Using GPS, the crews recorded the latitude and longitude of each observation. WT surveyors also groundtruthed the existing King County and WDNR stream maps along the reaches surveyed and, where necessary, corrected the locations of



WT Projects Manager Mary Lou White surveying a severely degraded tributary of Miller Creek.

Over a seven week period between April and June 2003, Washington Trout surveyed 38 miles of stream habitat. From the southern end of Seattle to the northern end of Tacoma, the survey area incorporated approximately 40 sq. miles, drained mostly by small streams with a variety of gradient characteristics. The survey area is dominated by significant urban and suburban development. Much of southern King County has been developed for several decades, some areas since the early 20th century, particularly areas adjacent to the Puget Sound shoreline. Extensive areas are covered by impervious and semi-impervious surfaces, roads, parking lots, roofs, driveways, lawns, and manicured landscaping. Before making their way to Puget Sound, streams must run through residential neighborhoods, commercial lots, golf courses, airports,

and industrial areas, along roads, through ditches and culverts, adjacent to sewage treatment plants, over water diversions, and even into long pipes under commercial and residential developments.

Historically, most or all of these watersheds likely gathered runs of anadromous salmon and trout, and harbored populations of resident trout and other native fish species. Despite the heavy impacts of local development, many of these watersheds still maintain areas of relatively healthy habitats, utilized by significant populations of wild fish. On some streams, parks and other as yet undeveloped areas have provided some measure of protection supporting natural stream processes. Other stream reaches may have benefited from a not quite benign neglect, running through a small but forgotten wetland behind a shopping center, or at the bottom of a wooded ravine winding along the back of older residential neighborhoods. Accurately documenting and categorizing these streams will give King County and the affected cities the information they need to responsibly regulate new development, manage the maintenance of existing properties, and prioritize and implement stream-restoration and protection activities.

The project results are being incorporated into an interactive internet-based GIS to ensure that the public and appropriate regulatory agencies can readily access the information. The interactive web page will be accessible from Washington Trout's web page (www.washingtontrout.org) in early 2004. The data layers that comprise the GIS will be delivered to King County where they will be maintained and updated as new information is collected, promoting the County's use of the most current and accurate fish and fish habitat location information



Massey Creek, in the heart of Des Moines, still supports wild fish like this sea run cutthroat trout.

stream channel on the maps or added streams encountered that were not on the maps. The surveys included portions of Miller, Walker, and Des Moines Creeks, three watersheds that will likely be impacted by the proposed SeaTac airport third-runway project.

while making land management and habitat protection/restoration decisions.

In addition to the inaccuracies of the existing water-type maps, the jumble of local jurisdictions responsible for these streams and the inconsistency of regulatory standards complicate efforts to manage, conserve, and protect these watersheds. The widths of streamside buffer zones intended to protect riparian habitats along streams vary throughout the survey area, ranging from non-existent to wide parks or greenbelts.

Prior to the field phase, project biologists consulted with the local WDFW Area Habitat Biologist to determine which streams have recently undergone field surveys. Using a parcels database provided by King County, Washington Trout staff attempted to contact the owners of approximately 990 parcels to request permission for Washington Trout fieldcrews to access their property during the survey. Permission was granted at approximately 35% of those parcels, and another 1.5% of the parcels were publicly held so no permission was needed.

Washington Trout conducted the surveys following Washington Department of Natural Resources (WDNR) watertype protocols, including the verification of fish presence by visual observation or by electrofishing. Where permission to access had been granted, two- to three-person field crews walked each stream identified on current WDNR water type maps, verifying habitat characteristics and fish presence/absence by visual observation or by electrofishing. When unmapped streams were encountered, they were surveyed to the extent that landowners granted permission.

To minimize potential detrimental impacts to fish from electrofishing, visual observation was the preferred method to document fish presence. Washington Trout field crews charted new stream courses not depicted on water type maps and evaluated these unmapped streams for fish use. Survey crews employed Global Positioning Systems (GPS) to facilitate data transfer and integration with existing map layers.

Anadromous fish have relatively easy access to these streams, and most have documented historical use by salmon, steelhead, and sea-run cutthroat. However, prior to this study there was no known freshwater-habitat use by ESA listed bull trout or Puget Sound chinook or within

the study area. Regardless, the downstream-most reaches of each watershed were sampled using visual observation; backpack electrofishing equipment was not employed in these areas because of high conductivities and the potential presence of juvenile chinook. In the event that chinook or bull trout were encountered during the course of fieldwork, study protocols required field crews to immediately cease electrofishing in the vicinity of the observation, and continue the survey upstream of the next likely barrier to anadromy encountered. Crews did encounter chinook juveniles in lower Des Moines and Massey Creeks in the city of Des Moines.

The integrity of many of these watersheds has been compromised by numerous barriers to migration, long piped-reaches of stream channel, bank armoring, channel straightening, landscaping and herbicide applications, and stormwater inputs. Still, fish species encountered included juvenile and adult coastal cutthroat trout, rainbow trout, 3-Spine Stickleback, largemouth bass, goldfish, sunfish, bullhead; and juvenile steelhead, chum, coho, chinook and lamprey. In many of the watersheds, the distribution of the anadromous species was limited

by the presence of culverts and other instream features that prevented migration – those features encountered during the survey are documented on the web page.

Preliminary analysis of the survey data indicate that of the 38 miles of stream that were surveyed, only 2.3 miles of stream were accurately typed prior to the WT survey. The watertype designation of 18 miles of stream was upgraded, providing greater protection

under existing laws than previously believed warranted. 17.7 miles of stream were either previously unmapped or had been depicted on the maps in the wrong location.

Project funding was provided by King County with funds originating from the King Conservation District, and the Hugh and Jane Ferguson Foundation. The city of Federal Way provided funding to have the lower one mile of Joes Creek in Federal Way added to the scope of the project. Washington Trout applauds these agencies and the Ferguson Foundation for recognizing the importance of these fundamental data to a comprehensive fish recovery program. Washington Trout will present the results of the project at the King County Department of Natural Resources in early 2004. 🐟



Pete Lawson of Parametrix Environmental Consulting and Kurt Beardsee, WT Executive Director, surveying for fish presence on upper Miller Creek.

Project Updates

Longfellow Creek Historical Ecology Project



Seattle Public Utilities Environmental Biologist Katherine Lynch and Longfellow Creek Watershed Specialist Sheryl Shapiro lead interview participants on a tour of habitat-restoration sites on Longfellow Creek. Photo by Leah Hausman.

In December 2002, Seattle Public Utilities contracted WT Outreach Coordinator Leah Hausman to conduct oral history interviews as part of SPU's Historical Ecology Project. Hausman conducted twenty-five interviews with long-time residents of the Longfellow Creek watershed in West Seattle, as well as persons who have played important roles in restoration efforts, local service industries, and the community. The interviews gathered personal memories and experiences of Longfellow Creek and its watershed. The information will be used to enhance SPU's Urban Creek Legacy Program, Longfellow Creek Watershed Project, and other reports and restoration projects.

Oral history is being increasingly recognized as an important source of historical information. The Longfellow Creek interviews, completed in spring 2003, have provided information on historical fish use of Longfellow Creek, the historical ecology of the watershed, and on the relationship between Longfellow Creek and the surrounding community.

One original goal of the interviews was to fill in gaps in the historical records of fish presence, species composition, and distribution in the Longfellow watershed. But the interviews have also provided valuable insight on the development of the community surrounding Longfellow Creek, the relationship between the two, and how they have evolved together over the years.

Little information about fish use in Longfellow Creek is available in written historical records. Several project participants grew up fishing the creek and exploring its surroundings. One source recalled strong runs of sea-run cutthroat in Longfellow and another source identified a historical Native American trout fishing site near the mouth of the creek.

Interviewees painted a changing picture of Longfellow Creek from the early twentieth century to the present. Originally the creek likely supported populations of salmon, cutthroat, rainbow, and steelhead trout. But Seattle's developing industrial waterfront and early suburban development has exposed Longfellow to continuing insults. A steel plant began operating near the creek's tidal wetlands at Youngs Cove in 1905. Sometime before 1916 the wetlands were filled, and lower Longfellow was diverted into Elliot Bay through a long subterranean pipe. In the 1940s, the watershed began experiencing increasing residential and commercial development. Westwood Village, a retail shopping center, was developed near the creek's headwaters in 1964. In the early 1970s, to accommodate stormwater runoff from increasing development, Seattle installed a larger, 3300-foot culvert under the steel plant property. The original pipeline remains in place to accommodate stormwater overflow.

The biological integrity of Longfellow Creek has been severely compromised by its association with humans. Its native fish populations are challenged by the impacts of the residential and commercial development in its upper and middle reaches, heavy industrialization at its mouth, pollution, and fish-passage issues. Despite these injuries, Longfellow still manages to support fish, and interviewees living in the watershed continue to report finding salmon in the lower creek.

In June and July, WT's Hausman, Longfellow Creek Watershed Specialist Sheryl Shapiro, and Seattle Public Utilities' Environmental Biologist Katherine Lynch hosted two Thank-You events for project participants and their families. The events included tours of habitat-restoration sites on Longfellow Creek, receptions, and presentations by Hausman, Shapiro, and Lynch on the Longfellow Creek watershed and the Historical Ecology Project.

Participants received a draft compilation of interview summaries and were given the opportunity to review and revise their interviews. Seattle Public Utilities is currently exploring future uses of the oral history information. Among the possible formats being considered are

an audio CD of selected interviews, a traveling historical ecology exhibit, incorporating oral history information into Longfellow Creek walking tours, and the creation of an educational history kit for teachers. Parties interested in working on the development of these and other materials are encouraged to contact Longfellow Creek Watershed Specialist Sheryl Shapiro at (206) 233-2046.

Washington Trout and Seattle Public Utilities gratefully acknowledge the time project participants took to share their memories and experiences. Their personal histories will contribute significantly to understanding the role Longfellow Creek has played in peoples lives and the local community, and will help develop future stewardship efforts in the watershed.

- Leah Hausman

Caged Mussel Study

This fall, in partnership with King County Environmental Laboratories, Applied Biomonitoring, and Bear Creek Water Tenders, WT has begun work on a caged mussel study in the Bear Creek Watershed near Woodinville, WA. The study will contribute to better understanding of the spatial and temporal distribution of potentially toxic chemicals that are bioaccumulated

by *Margaritifera falcata*, a freshwater mussel species native to the Pacific Northwest.

Landowners along Bear Creek have observed substantial declines in the abundance of *M. falcata* over the last 40 years. Recent declines in freshwater mussel populations have been attributed to loss of appropriate habitat, declines in local populations of salmonids, which act as hosts to larval mussels, and pollution. It is unclear what effects, if any, exposure to toxic chemicals

from anthropogenic sources has had on the *M. falcata* population in Bear Creek. Like all mussels, *M. falcata* is a filter feeder, exposing its body tissues to direct contact with any dissolved or particulate chemicals in the water

column. They may also be exposed to chemicals in stream sediment.

In order to assess the potential effects of chemical exposure on the health of the mussel population in the Bear Creek Watershed, mussels were collected from an area that still supports a stable population, placed in cages, and deployed in seven locations

throughout the watershed. The deployment strategy will allow WT to determine the spatial distribution of aquatic chemicals being bioaccumulated by *M. falcata* that may have adverse effects on the population, and to examine the relationship between upstream land use and chemicals accumulated in mussel tissues. Each mussel cage consists of four mussels in a plastic mesh bag attached to rebar pounded into the creek bottom. After 90 days, the mussel tissues will have reached equilibrium with their new environment. The cages will then be pulled and the mussels sent to King County Environmental Laboratories, where they will be tested for a host of suspected chemicals including a suite of heavy metals and common pesticides.

- Micah Wait



Sandra Salazar of Applied Biomonitoring collecting pre-project mussel health data.

Deer Harbor Watershed Assessment

The unique climate, topography, hydrology, and geology of the San Juan archipelago make the watersheds of these islands substantially different than watersheds found elsewhere in the state. The distinctiveness of the San Juan watersheds has and will continue to drive local adaptation of the salmon that use them. The value of the San Juan watersheds may be more associated with promoting and protecting the genetic diversity of Puget Sound and Georgia Strait salmon populations, and not in overall production of large numbers of salmon (at least not in the current environmental conditions). Protecting these local adaptations is critically important to the health and the long-term resiliency of Washington's salmon stocks.

Deer Harbor is located on the southwest corner of Orcas Island, the largest island in the San Juan chain. A small seasonal creek flows off the low hills in the harbor's uplands, entering the harbor from the north. The stream's estuary is bisected by a county road, whose bank armoring and prism restrict the flow of water into and out of the estuary, consequently interfering with the processes of sediment transport and salt/fresh water mixing. It is



Russell Barsh of the Samish Tribe (center right) talks with interns and students interested in restoring the Deer Harbor watershed on Orcas Is.

believed that the bottleneck formed by the road is causing sediment to accumulate within the estuary, compromising its integrity. The stream, Fish Trap Creek, is assumed to currently be non fish-bearing, though its name and evidence offered by the presence of Samish tribal middens suggest that it historically supported salmon and/or sea-run cutthroat trout populations.

In a partnership with the Samish Tribe, Skagit Conservation District, San Juan County, Smayda Environmental Associates, Inc., People for Puget Sound, University of Washington, and Island residents, Washington Trout will survey and evaluate the current condition of Fish Trap Creek with respect to salmonid spawning and rearing potential to identify activities that would improve salmonid habitat in the creek. Simultaneously, other members of the project team will ascertain the nature and extent of ecological changes in Fish Trap Creek's estuary in the recent past (25-200 years) from historical records, archaeology, and sediments; evaluate the extent to which existing vegetation bordering Cayou Lagoon and Fish Trap Creek contributes to maintaining water quality, water quantity, water temperatures, sediments and nutrients appropriate for salmonids; and model how the presence of the bridge and associated infrastructure has affected historic estuarine processes.

These data will be used to identify and prioritize restoration alternatives to help restore natural physical and biological processes within Fish Trap Creek and its estuary in Deer Harbor. Alternatives may include replacing the currently restrictive bridge with a larger one that does not impede flow and sediment, removing barriers to fish passage in Fish Trap Creek, removing invasive plants and replanting the creek's estuary with native plants. Project work began during summer 2003 and will continue through 2004.

- Jamie Glasgow

Dosewallips Estuary Restoration

During summer 2003, Washington Trout was awarded a grant of \$165,000 from the Salmon Recovery Funding Board to restore the Dosewallips estuary in the Hood Canal near Brinnon, WA in southern Jefferson County. The Dosewallips River is the second largest tributary to Hood Canal. Its headwaters are protected within Olympic National Park and Olympic National Forest, while the lower river reaches run mostly through privately held lands. Dosewallips State Park, at the river mouth and estuary, is the largest block of public land in the lower watershed and an essential habitat area for salmon spawning and rearing in the watershed, as well as non-natal stocks migrating along the Hood Canal shoreline.

The Dosewallips estuary supports extensive mudflat, eelgrass, and emergent marsh habitats important to varied fish, wildlife, and shellfish populations. Numerous recent planning efforts have highlighted the Dosewallips as among the most pristine riverine-estuarine systems in Hood Canal, offering one of the best chances for effective salmon habitat protection and recovery.

In early September, WT organized the first meeting of the Dosewallips Estuary Restoration Team (DERT), made up of representatives from Port Gamble S'Klallam Tribe, Hood Canal Coordinating Council, Washington State Parks, Washington Department of Fish and Wildlife, the Hood Canal Salmon Enhancement Group, and the US Forest Service. The DERT will provide project review and guidance and assist with project design, implementation, public outreach, and education.

At the September meeting, the group discussed the restoration options available with current funding,



WT Executive Director Kurt Beardslee and WT Conservation Biologist Micah Wait setting up a prototype videographic fish weir in a blind tidal channel on the Dosewallips estuary.

including: removing and replacing culverts at two sites on Sylopash Slough, a large blind tidal channel in the estuary which provides both rearing and spawning habitats; removing small remnant dikes in the estuarine salt marsh;



WT Executive Director Kurt Beardslee adjusts the videographic unit while WT Conservation Biologist Micah Wait and Doug Rose, a WT Board member, discuss issues in the Dosewallips estuary.

addressing vegetation issues in the estuary and lower-river (removing non-native plants and replanting native species); performing a feasibility study to remove or set-back mainstem Dosewallips levees downstream from Highway 101 by incorporating engineered log jams to restore historical channel sinuosity and habitat diversity; and acquiring a piece of property along the upper reaches of Sylopash Slough from a local developer and turning the property over to the Dosewallips State Park.

Field work began with baseline monitoring of fall-time fish use in the estuary. In early November, WT personnel tested a prototype videographic fish weir at the project site and documented seasonal fish use in various estuarine habitats. The videographic fish weir, conceived, designed, and constructed by Washington Trout, allows for the monitoring of short-term fish use in habitats such as blind tidal channels, beaver dam side channels, and distributary channels. The weir forces migrating fish past a Plexiglas plate, a video camera placed behind the plate allows for the enumeration of fish migrating into or out of the habitat, as either a part of the tidal cycle or a daily migration route. Field personnel also explored and surveyed the diverse habitats of the lower river and its blind tidal channels and distributaries using a backpack mounted video camera, documenting day and night-time fish use in these habitats.

Restoration of the Dosewallips estuary will benefit wild populations of resident and sea-run cutthroat, steelhead, coho salmon, pink salmon, and ESA-listed chinook and summer chum salmon.

- Micah Wait

Island County Watershed Assessments

In early 2003, Washington Trout was contracted by Island County to perform a comprehensive watershed assessment on Maxwellton creek on Whidbey Island and Chapman creek on Camano Island. Washington Trout field crews have been documenting fish distribution and species composition patterns, and assessing water quality, fish habitat, and fish passage concerns in the two watersheds. Once completed, current condition and historical assessments for each parameter (fish distribution, species composition, water quality, habitat and passage) will be examined and evaluated to identify and prioritize restoration and protection opportunities on a parcel and watershed level.

Many landowners in both watersheds allowed Washington Trout crews to survey stream reaches on their property; landowners granted access for 27.7 percent of the Maxwellton watershed and 50.5 percent of the Chapman Creek watershed. The crews spent much of the spring and early summer determining fish species composition and distribution for the two watersheds. Crews found coho



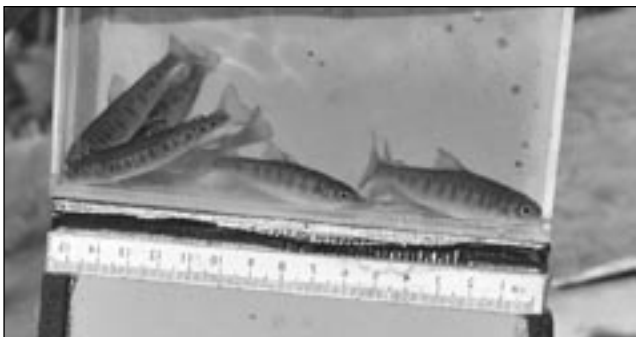
Lower Maxwellton Creek.

salmon, sculpin, and stickleback in Maxwellton Creek, and cutthroat trout in both Maxwellton and Chapman Creeks. Non-native Largemouth bass were observed in Chapman Creek. Washington Trout Field Biologist Mary Lou White and Jamie Glasgow, Director of Science and Research (Ecology), presented the fish survey results to project partners Island County, Snohomish Conservation District, and Maxwellton Salmon Adventure representatives. Fish distribution and species composition field data have been transcribed from field books into an interactive Geographic Information System which will be available on the internet as a link from the Washington Trout website early in 2004.



David Crabb, WT Field Technician, installing a temperature data logger in Maxwellton Creek.

In the latter part of the summer and early fall, water quality data were collected at representative sites throughout each watershed, and qualitative habitat surveys conducted in the areas where landowners granted access. Historical habitat studies, aerial photographs, elevation models, and other remote data sources were reviewed and where appropriate used to characterize habitat conditions in areas where Washington Trout crews did not have access. Last winter, Washington Trout crews conducted



Juvenile coho and cutthroat were among the many fish captured and released in Maxwellton Creek.

weekly spawning surveys in both the Maxwellton and Chapman Creek Watersheds. One adult male coho and eleven redds were observed by the Washington Trout crews in Maxwellton creek. Five additional adult salmon of unknown species were observed and reported by local residents. No spawning fish nor redds were observed in Chapman Creek, which has an impassible culvert barrier near it's mouth.

Island County will use the results of Washington Trout's watershed assessments to prioritize salmon restoration and protection projects. In order to foster community involvement and ownership of salmon recovery efforts in Island County, WT will convene public meetings at the conclusion of the project to involve the public and educate them about their freshwater resources and the fish and wildlife that use them. Work will continue through spring of 2004.

- Mary Lou White ❖

Environmental Discovery continued from page 7.

Environmental education, particularly field-based education, introduces students to the wonders of the outdoors by giving them the opportunity to experience first-hand the beauty of the natural world, the delicate balance of an ecosystem, and the importance of conservation and restoration. Hopefully, this leads the students to a passion for the natural environment that does not rely solely on consumptive or recreational activities, but rather on a more fundamental appreciation and understanding of their surroundings.

The *Environmental Discovery Program* is raising the bar on educating local young people about the ecology of their communities, creating a foundation for future awareness, commitment, and involvement in pressing environmental issues. Young students are learning lessons in the classroom and the field that far exceeds the instruction their parents or even their older siblings received.

In educating them, we can open ourselves to what our children have to teach us about the environment. By sharing with them the fun of capturing a bug in a jar, the fascination of looking up an odd, unfamiliar plant in a field guide, or the simple beauty of sitting and listening to a chorus of bird songs, we and they can come to understand how fragile the web of life really is, and how desperately we need to ensure the protection of our native plants, animals, and ecosystems. ❖

WDFW Responds

On October 29, WDFW published its responses to the 24 sets of public comments it received from individuals and organizations throughout the state. Washington Trout explicitly characterized many of our specific comments as “requests to supply more detailed information to meet the requirements of the HGMP Template and the 4d Rule,” and to its credit, WDFW appears in their responses to be committing to providing some of that information. Most significantly, the responses appear to commit to developing and identifying measurable performance standards and indicators adequate to evaluate harmful impacts, and to developing monitoring programs adequate to measuring hatchery performance relative to the standards and indicators. These would be major steps forward.

However, the responses offer little detail, promising information during the development of an EIS (prepared by NOAA Fisheries) in “spring 2005.” WDFW asserts that the ESA does not require numeric performance standards, but they plan to provide them. In some other cases, WDFW appears to concur and/or admit that specific comments have merit, allowing that the requested information or recommended approach would be “useful” in evaluating the HGMPs. Again, it defers providing any specific information until completion of the promised EIS.

Under the terms of the Settlement Agreement, WDFW was required to draft and publish “substantive” responses to all public comments. Unfortunately, “substantive” is not an altogether objective term, and determining whether WDFW has met that standard is by and large a value judgment, made more difficult by the format employed by WDFW in their responses. WDFW summarizes many comments, and some individual responses appear to be attempts to answer several comments at once. This approach is marginally successful in some cases, but in some others it makes matching comments to responses less than straightforward. Many of WDFW’s summaries are extremely brief, and the responses lack significant detail, so it is not always clear what is being committed.

For instance, WDFW summarizes WT’s comments regarding the HGMP’s failure to adequately describe monitoring plans:

Detailed description of the monitoring plans and methods related to the performance indicators is not provided.

WDFW concurs, and promises “additional details” as it participates in the “iterative, ongoing review leading

to the distribution of the Final Environmental Impact Statement.” (This basic language ends nearly every response that promises information.) However, our comments included specific suggestions about parameters to be monitored and the type of information we were requesting, including a list of contingent management responses to monitoring findings. We recommended criteria for performance indicators. The response doesn’t make it clear if WDFW concurs with all, some, or any of the details of our relevant comments, or what types of “additional details” it will eventually provide. We gave them several hundred words on the lack a “detailed description” of their monitoring plans – and their performance indicators – which they have summarized in two lines; do they concur with all several hundred words, or just the two lines?

In some cases, and as we expected, WDFW appears to challenge the merits of some specific comments. They claim that the ESA does not require them to provide

WDFW appears to commit to identifying performance standards and developing monitoring programs adequate to measuring hatchery performance. These would be major steps forward.

numerical estimates of potential take from hatchery operations. They disagree that predation is a concern. Some of these responses are reasonably principled, if not altogether convincing to Washington Trout.

However, some other responses appear to have misinterpreted a comment or failed to address important specific examples, citations, and requests. WDFW’s summary of a WT comment reads:

WDFW incorrectly assumes that there is a “unique narrow period of time during which an overwhelming majority of wild juveniles migrate downstream and out of the river basin.”

The response indicates that WDFW did provide information (in “many” HGMPs) regarding out-migration timing of wild juveniles that should address our concern. But the explicitly clear point of the comments from which the quotation is taken was that WDFW’s assertion in the HGMPs that hatchery and wild juveniles are being effectively segregated temporally is not supported by the available information, not simply that the information was not presented. This much more relevant issue is not addressed by the response, except to note that all “available” information on “natural-origin” out-migration will eventually be provided.

Unfortunately it appears that WDFW has failed to address some of our other general concerns and many important specific comments. While WDFW does commit

to providing more information in the future, very little information requested in our comments is provided in the responses. Our concerns about competition, many critical omissions, the overall scale of the program, and the failure of the HGMPs to comply with the Wild Salmonid Policy or align with other recovery initiatives go unanswered. Specific requests and recommendations are ignored. Most significantly, the responses do not address our oft-stated concern that the HGMPs do not attempt to support or even elaborate the critical assertion that hatchery juveniles are effectively segregated from wild juveniles during rearing. They do not appear to respond to our recommendation to provide proposals with estimated timelines for filling current data-gaps.

Moving Forward

On many important hatchery issues, Washington Trout and WDFW still apparently disagree. On the other hand, the department should be given credit for appearing to concede some key points, and some relatively minor but important points. We have contacted WDFW to communicate our appreciation for identifying issues where we seem to agree, while requesting clarification on the HGMP revisions that they've committed to and expressing our concern over responses we consider inadequate or issues left unaddressed. We have simultaneously initiated communication with NOAA Fisheries regarding our comments, WDFW's responses, and NOAA Fisheries' evaluation of both.

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Washington Trout still believes hatchery practices in Puget Sound are causing significant harm to listed species. WDFW's mismanagement of its hatchery program has damaged the public's wild-fish resources, and we want the department to develop a program that actually will minimize the impacts on listed chinook from these hatcheries. We are concerned that WDFW's responses in some ways demonstrate a continued inability or unwillingness to answer many very basic questions four-plus years since listing.

But we are encouraged that under our settlement agreement with them, WDFW may be demonstrating a new openness to improving their hatchery-management practices. We hope and believe the new public processes developed under the agreement are helping move that effort forward. ➤

Background Documents Available at washingtontrout.org

Comments on WDFW Chinook, Coho, & Steelhead Hatchery & Genetic Management Plans for Puget Sound; Washington Trout, August 1, 2003: www.washingtontrout.org/hgmp%20comments%20final%20web.pdf

Settlement Agreement May 9, 2003; Between Washington Trout, Native Fish Society, & WDFW: www.washingtontrout.org/settlementagreement.shtml

Complaint for Declaratory & Injunctive Relief; Threatened Puget Sound Chinook v. WDFW (Coho/Steelhead Hatcheries Lawsuit): www.washingtontrout.org/complaint_coho.shtml

• *Motion for Preliminary Injunction; Threatened Puget Sound Chinook v. WDFW:* www.washingtontrout.org/PImotion.shtml

• *Declaration of Sam Wright Supporting Plaintiffs' Motion for Preliminary Injunction:* www.washingtontrout.org/SWdec7.shtml

WDFW Puget Sound Coho and Steelhead Programs; Notice of intent to sue for violation of Endangered Species Act; January 16, 2003: www.washingtontrout.org/60d%20notice%20letter.shtml

Complaint for Declaratory & Injunctive Relief; Wild Puget Sound Chinook v. WDFW (Chinook Hatchery lawsuit): www.washingtontrout.org/complaint_chinook.shtml

WDFW Puget Sound Chinook Hatchery Program; Notice of intent to sue for violation of Endangered Species Act; June 27, 2002: www.washingtontrout.org/60d%20notice%20chinook.shtml

Hatchery Genetic Management Plans for WDFW Puget Sound Hatchery Programs Provided for Public Comment: www.wa.gov/wdfw/hat/hgmp/index.htm

WDFW Review of Public Comments Received on Puget Sound HGMPs June 18, 2003 through August 1, 2003 Comment Period: www.wa.gov/wdfw/hat/hgmp/ps_hgmp_comment_response_10-29-03.pdf

All Puget Sound HGMP Public Comments Submitted to WDFW for June 18, 2003 through August 1, 2003 Comment Period: www.wa.gov/wdfw/hat/hgmp/hgmp_comments.pdf

Dr. Eliot Drucker Joins WT Staff



Washington Trout would like to extend a warm welcome to Dr. Eliot Drucker, who fills the newly created position of Director of Science & Research (Physiology). Eliot began working in mid-January with other staff scientists to develop WT's scientific programs, including survey and monitoring field work, contracts and grant support, and research publication in peer-reviewed scientific journals. Eliot will pursue

opportunities to expand WT's research efforts into the marine environment, with emphasis on the designation of Marine Protected Areas in Washington state, and issues surrounding salmon farming in net pens on the Northwest coast. Eliot will also work to broaden WT's repertoire of available field tools for monitoring fish abundance and behavior.

A native of Boston, Eliot earned Masters and Doctoral degrees in Biology at Harvard University (1993, 1996) with research interests in the behavior, ecology and physiology of Pacific Northwest fishes. His scientific work was continued at the University of California, Irvine as a National Science Foundation Postdoctoral Research Fellow in Biosciences Related to the Environment (1997-2003). Eliot's published studies include analyses of swimming hydrodynamics of Atlantic and Pacific salmonids, ecological predictors of swimming performance in surfperches, and foraging strategies of Puget Sound intertidal fishes. He has conducted field work at Neah Bay, WA and at the University of Washington's Friday Harbor Marine Laboratories on San Juan Island since 1989.

Eliot's love of the Northwest began fifteen years ago during a vacation to the San Juan Islands and Olympic Peninsula. Since then, he has returned annually to the shores and mountains of Washington state to study and admire its native fishes and their habitat.

Eliot is enthusiastic about starting work with WT. "I have great respect for what Washington Trout is doing," he says, "and I'm excited to help contribute to its scientific efforts." 🐟

Auction continued from page 3.

and sea trout. This is an opportunity to step into history, cast a line over riffles and runs that challenged and rewarded the founders of modern angling, and hook some of the most beautiful and fascinating wild fish that swim. And of course a trip to Scotland offers opportunities beyond memorable angling. Garden Cottage, in the heart of Royal Deeside, is four miles west of the popular town of Banchory, 25 miles from Aberdeen, and a 30 minute drive from Balmoral Castle, Ballater and nearby Braemar. For hundreds of years, Deeside has been famous for its fishing, golf, castles, gardens, whisky and stunning mixture of woodland and mountain scenery.

The cottage is situated on the banks of the River Dee overlooking the walled garden of Woodend House. It is in an exceptionally private and quiet woodland setting, offering salmon and sea trout fishing at your doorstep, beautiful riverside walks, and the ancient majesty of pastoral Scotland.

The trip must be taken June 21-27th, 2004 and is valued at \$2000. The fishing season on the Woodend beat of the River Dee begins March 1 and runs through September 30, with the summer months a particularly prime season for salmon fishing. Details are available on the WT web site. More information about the Garden Cottage is available at www.cottageguide.co.uk/gardencottage and you can learn more about the River Dee and the Woodend beat by visiting the website www.deefish.co.uk/woodend, and the Dee Salmon Fishing Improvement Association at www.dsfa.org.

Our second feature auction item is the 8-day, 7-night fly-fishing expedition package for two anglers to Yan Kee Way lodge in the Chilean Patagonia, generously donated by Michael and Myrna Darland of Southern Chile Expeditions. This package trip was the highlight of the 2003 Soiree and WT would like to extend our heartfelt thanks to the Darland's for their generous and continuing support.

Patagonia is truly one of the most beautiful and unspoiled places left on earth. Yan Kee Way offers incredible fly-fishing for trophy rainbow and brown trout, steelhead, salmon, and sea-run brown trout, as well as other outdoor and vacation adventures in a remote, spectacularly beautiful wilderness setting, while accommodating their guests in four-star luxury.

This package includes all transfers, food, lodging, guides, and fishing licenses. You may exchange fishing days for sport-adventure days, and Southern Chile Expeditions would be happy to arrange a package for spouses to accompany two fishing partners. Available dates for the package are November and December 2004. Winning bid is responsible for airfare to and from Puerto Montt, Chile. This package is valued at \$8500 and bidding will begin at the very reasonable price of \$5000 - that's only \$2500 per person!

Last but not least is Steelhead Camp: Lowell-Hunt Style, a truly unique and unforgettable wilderness dining experience. Upon arrival, you will find a warm, wall tent amidst a pristine setting, for a rustic and cozy atmosphere. Fully appointed, white linen covered tables are set with china and candles. Guests are treated to a spectacular multi-course dinner complimented with fine wines, smooth cigars, and after-dinner cocktails. This amazing experience is for twelve people and is valued at \$5000. Date and location information for the Steelhead Camp will be available soon on our website. For more information about these and other auction items, please visit www.washingtontrout.org.

If you are unable to attend the 2004 Soiree but would like to bid on one of the featured auction items, please contact the Washington Trout office.

Once again, we can use your help to make the auction a success. If you can donate an item, would like to sponsor the 2004 auction, or serve on the Auction Committee, please call WT Outreach Coordinator Leah Hausman at (425) 788-1167 or email leah@washingtontrout.org. Invitations to the Washington Trout 2004 Wild Fish Soiree and Benefit Auction will be mailed to all current members in April. To be placed on the mailing list, to make reservations, or for

The Importance of Membership

Introducing our new membership motto:

“okey-doke, sure, why thank you, that was very generous, whoopee!”

Sounds good to us, does it sound good to you? You probably want more details. As you can tell from the title above, Washington Trout appreciates all gifts and support from our members. From the smallest to the most generous of contributions, your decision to part with your hard-earned money and support WT means a lot to us. And we wanted to show our appreciation for each and every one of your gifts by creating a membership program with the flexibility to give at a time convenient for you and at a level that is personally meaningful and affordable.

WT is offering two new ways to become a member – our brand-new monthly and revised annual giving programs. Either way you go, there is no minimum to join; you choose how much and how often you want to contribute to WT. Members of the Monthly Giving Program pledge to make a monthly donation to WT, which WT can process automatically on your credit card. And of course, there is always the annual program if you prefer to give once a year.

Now that we’ve taken out levels and membership minimums, how do you know how much to give? Take a moment and ask yourself – what do wild fish and healthy habitat mean to me? What is it worth? Place your own personal value on our wild salmon, trout and char. The more you give, the more habitat-restoration, research, and advocacy work WT can accomplish, so please, give till it feels good.

More information about our new membership programs and their benefits is available on our website. For added convenience, Washington Trout can now accept memberships and donations through a secure online server. You can even sign up for the Monthly Giving Program online. Just visit our website at www.washingtontrout.org and follow the links.

All joking aside, the work Washington Trout does is critically important. The success of the effort to protect and restore our wild fish will take the combined resources of a strong, diverse, and engaged base of people caring and giving at all levels. Please join or renew your membership with Washington Trout today and help us create a future for wild fish. 🐟

Washington Trout Membership Application

Name: _____ Address: _____

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Phone H: _____ W: _____ email: _____

Special Skills/interests/ways I can help: _____

I would like to join Washington Trout by making a yearly donation of \$ _____

I would like to join Washington Trout through the *Monthly Giving Program* by pledging \$ _____ per month.

Please charge my VISA / MC / American Express / Discover # _____ Exp. _____

Signature: _____

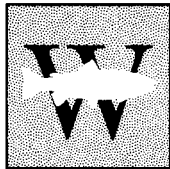
Return form to: Washington Trout, PO Box 402, Duvall, WA. 98019

Washington Trout wants to thank and recognize the following companies and individuals who generously donated to our 2003 Wild Fish Soiree and Auction.

Please use this list to support those who have helped in the recovery of wild fish.

| | | |
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