Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

Title

Effectiveness Monitoring in the North Santiam, South Santiam and Calapooia River Watersheds

Abstract

The Willamette River Basin has experienced extensive anthropomorphic change in recent decades. As a result of this change the quality and quantity of in-stream habitat for ESA listed salmonids has been degraded. In light of this situation, the North Santiam, South Santiam and Calapooia River Watershed Councils (Councils) have voluntarily formed a unique regional team that has been accepted into the Meyer Memorial Trust Model Watershed Program. The Model Watershed Program is a 10 year strategy designed to expedite the efficacy and pace of community based restoration. Effectiveness monitoring of restoration efforts is an integral component of the strategy.

The Councils restoration activities currently focus on in-stream large wood placement, riparian planting and riparian fencing. We are monitoring the success of restoration activities through a series of testable hypotheses using established protocols to provide repeatable, quantifiable data for analysis. The timing and frequency of parameter measurements are determined by the type of restoration actions undertaken.

During summer of 2010, pre-project baseline data collection occurred at 11 treatment and control stream reaches within six subbasins. Reach lengths varied from 350m to 1000m. Data was collected on water temperature, riparian condition, percent canopy coverage, thalweg profile, wetted width, substrate composition, embeddedness, invasive species and macroinvertebrates from planned restoration sites. Summary data from year one of the ten year monitoring program is presented and discussed, in addition to the future direction of the project.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

Title

Mainstem Rogue River Dam Removal Projects - An Oregon Success Story

Abstract

The mighty Rogue River, one of the original eight rivers named in the Wild and Scenic Rivers Act of 1968, traverses over 215 miles and encompasses 5,200 square miles of drainage area in Southwestern Oregon, has been tamed over the past century through myriad flood control and irrigation diversion structures. Native migratory fish including chinook and coho salmon and steelhead trout have returned home from the Pacific Ocean for hundreds of generations to seek their natal snow-melt waters of the Crater Lake basin. This summer 2010, marks a significant milestone in Oregon's history. Through countless hours of planning and designing, one of the last and mighty full-channel spanning dam structures will be removed and the mainstem river will be one step closer to its historical free flowing run-of-the river condition. This presentation will set the stage, provide a historical context, and tell a compelling story about the major dam removal projects on the Rogue River.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

Title

Fish Friendly Tide Gates; Do They Exist?

Abstract

Native migratory fish encounter may artificial obstructions as they complete their life-cycle. Returning adults as well as downstream migrants often encounter tide gate structures. Tide gates can negatively affect native migratory fish by preventing their migration as well as impacting the quality, quantity and connectivity of their estuarine and freshwater tidal habitats. Limited research and hydraulic flow characteristic data exists for tide gate structures. A detailed more thorough understanding of flow characteristics of these flow limiting structures is an important first step in the development of fish passage design criteria for tide gates. Tide gate design criteria improvements are an essential step forward as ODFW plans to develop new administrative rules for tide gate structures. Tide gates that maximize fish passage will have profound effects on native migratory fish and should result in more fish to be utilized from a conservation and restoration perspective as well as both recreationally and commercially throughout Oregon. This presentation will provide an overview of tide gate function as it directly relates to fish passage. Come and share a glimpse into the tide gate and fish passage world as seen through the eyes of Greg Apke, ODFW's Statewide Fish Passage Program Coordinator.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper Student: False

Co-Authors

Title

Implementing Oregon's Middle Columbia Steelhead Recovery Plan

Abstract

In February 2010, the Oregon Fish and Wildlife Commission approved the Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment (Oregon Mid-C Recovery Plan). The Oregon Mid-C Recovery Plan serves as a recovery "roadmap" for ten Middle Columbia River steelhead populations that occupy Oregon tributaries to the Columbia River. These steelhead populations spawn and rear in the Fifteenmile Creek, Deschutes, John Day, Umatilla and Walla Walla river basins and are part of the Mid-C steelhead (Oncorhynchus mykiss) Distinct Population Segment (DPS) which is listed as threatened under the Endangered Species Act. The plan specifies two desired status recovery goals: (1) removal of the Mid-C steelhead DPS from the threatened and endangered species list and (2) upon achieving ESA recovery, the State of Oregon aims to rebuild Oregon's Mid-C steelhead populations to levels that will provide for sustainable fisheries and other ecological, cultural and social benefits. Coordinated implementation which includes tracking, monitoring, reporting, and adaptive management feedback is necessary to achieve these recovery goals. This presentation will provide background on the Oregon Mid-C Recovery Plan, highlight priority recovery actions in the Deschutes Basin, and summarize the current status of and next steps in the implementation process.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Poster *Student: True*

Co-Authors

Steven	Kolmes	University of Portland
Ron	Wasowski	University of Portland
David	Alexander	University of Portland

Title

Temperature Threshold Monitoring of Salmonid Habitat in Four Clear-Water Upper Tribuaries of the Sandy River

Abstract

Four clear-water streams—Clear Fork, Lost Creek, Camp Creek, and Still Creek—in the Sandy River Basin were monitored for temperature in a four-year analysis to examine potential anchor habitat for Pacific Salmon. Temperatures were recorded using micro –T temperature loggers at 15 locations, representative of all streams, during 22 July - 5 September 2006, 2 July - 4 September 2007, 20 June - 7 September 2008, and 23 June - 9 September 2009. Temperature was predicted to be one of the most important factors for identifying productive anchor habitat and a limiting factor in the productivity of summer, salmonid runs. The more downstream micro–T location on each stream typically exhibited higher temperature recordings. The State of Oregon Seven-Day Average Maximum (7-DAM) critical temperature value of 13°C was used as a reference for the biological limit governing suitable salmonid spawning and egg incubation conditions. The maximum 7-DAM temperatures for Clear Fork, Lost Creek, Camp Creek, and Still Creek occurred at different times for each summer—the third week in July 2006, the second week in July 2007, the third week of August 2008, and the fifth week of July 2009. These periods of thermal stress had the greatest effect of inhibiting specific life stages of current salmonid populations in the headwater habitats of the Sandy River Basin.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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David	Alexander	University of Portland

Title

Monitoring Enterococcus and Escherichia coli (E. coli) Concentrations in a Bacteriological Water Quality Analysis of Salmonid Habi

Abstract

Four clear-water streams—Clear Fork, Lost Creek, Camp Creek, and Still Creek—and the Zigzag River in the Sandy River Basin were monitored for Enterococcus and Escherichia coli (E. coli) concentrations to examine water quality in potential salmonid habitat. Sixteen sites were selected to provide a uniform representation of water quality for each stream and one site on the Zigzag River during a 9 week period from July - September 2007, an 11 week period from June - September 2008, and an 11 week period from June - September 2009. E. coli was monitored in 2009 only, as an additional measure to examine water quality. Bacterial contamination varied for each summer and was unique for each stream environment. This study analyzed a progression of five-week mean counts for each bacterium. Five-week mean Enterococcus counts generally increased throughout each summer while five-week mean E. coli counts in 2009 were more variable. Enterococcus counts exceeded the federal five-week standard of 33 CFU per 100 mL on several occasions for each year. The federal five-week standard of 126 CFU per 100 mL for E. coli was not exceeded in the 2009 sample period. The presence of Enterococcus or E. coli in water samples indicates fecal contamination and the possible presence of enteric pathogens. Extensive human activity near streams such as Camp Creek correlated with the highest bacteria counts. Steadily increasing concentrations of Enterococcus and E. coli over each sampling period was indicative of significant and persistent sources of fecal contamination.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

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Title

Bacteriological Water Quality and Temperature Monitoring of Salmonid Habitat in Clear-water Streams near Mount Hood, Oregon

Abstract

Four clear-water streams—Clear Fork, Lost Creek, Camp Creek, and Still Creek—in the Sandy River Basin were monitored for temperature and bacterial concentrations in a multi-year analysis to examine anchor habitat for Pacific Salmon. Temperatures were recorded using micro –T temperature loggers at 15 locations, representative of all streams, during 22 July - 5 September 2006, 2 July - 4 September 2007, 20 June - 7 September 2008, and 23 June - 9 September 2009. The State of Oregon Seven-Day Average Maximum (7DAM) critical temperature value of 13°C was used as a reference for the biological limit governing suitable salmonid spawning and egg incubation conditions. The maximum 7DAM temperatures for Clear Fork, Lost Creek, Camp Creek, and Still Creek occurred at different times for each summer. Periods of thermal stress had the greatest effect of inhibiting specific life stages of current salmonid populations. Bacteria concentrations of Enterococcus were measured at 16 sites to provide a uniform representation of water quality for each, clear-water stream and the Zigzag River. Samples were collected during a 9 week period from July - September 2007, an 11 week period from June - September 2008, and an 11 week period from June - September 2009. Bacterial contamination varied for each summer and was unique for each stream environment. Enterococcus counts exceeded the federal five-week standard of 33 CFU per 100 mL on several occasions for each year. Extensive human activity near streams such as Camp Creek correlated with the highest bacteria counts. Steadily increasing concentrations of Enterococcus over each sampling period was indicative of significant and persistent sources of fecal contamination.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Effects of US Army Corps of Engineers Willamette Projects Operations on Oregon Chub and Other Floodplain Fishes

Abstract

Oregon chub (Oregonichthys crameri), small minnows endemic to the Willamette Valley, were federally listed as endangered under the Endangered Species Act in 1993. In 2010, the species' status was upgraded to threatened, with the primary remaining threat being nonnative fishes, which were found to be widespread in off-channel habitats preferred by Oregon chub. In 2009, we initiated a floodplain monitoring study, as part of the U. S. Army Corps of Engineers' Willamette Valley Biological Opinion, with the objective of identifying those conditions (flow levels, temperature regimes, habitat modifications) that may allow Oregon chub to thrive, and co-exist with non-native fishes, in connected habitats. In this multi-year study, we will assess the impacts of altered flow and temperature regimes, floodplain restoration, and reconnection of off-channel habitats on habitat availability and fish assemblages downstream of Dexter Dam on the Middle Fork Willamette River. Our approach includes mapping the bathymetry and hydrologic points of connection, monitoring water levels and temperatures, and sampling fish assemblages at each location. We calculate water volume, area, and vegetated areas at these habitats, and describe the relationship between water levels, temperatures, and hydrologic connection with mainstem river flows (regulated and unregulated). We will compare these physical data with the changes in the abundance of Oregon chub and community structure over time. Our talk will discuss details of our study plan, results from our first full year of monitoring, and provide examples of the application of our methods.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

MOVEMENTS OF JUVENILE LOGGERHEAD TURTLES IN THE SOUTHWESTERN ATLANTIC

Abstract

In the Southwestern Atlantic (SWA), juvenile and sub-adult loggerhead sea turtles (Caretta caretta) are very abundant and frequently captured by pelagic longline fisheries. Due to this, there is a need to improve our understanding of their behavior and habitat use in this region. Between July 2006 and March 2010, a total of 27 satellite transmitters were successfully deployed at sea on juvenile and sub-adult loggerheads (mean CCL: 61.8?6.9 cm, range: 49-83 cm) captured as bycatch in the Uruguayan and Brazilian pelagic longline fisheries. The aims of this study are to characterize the broad-scale behavioral patterns, inter-seasonal variability and general high use areas of these tracked turtles. The mean turtle tracking duration was 259?159 days, during which time turtles moved between latitudes of 25 to 45?S and longitudes 35 to 54?W. The areas of highest use for all the tracked turtles were located over the continental shelf and slope within the Uruguayan and Brazilian EEZs, as well as oceanic international waters off the continental slope of southern Brazil. Maximum dive depth recorded varied by turtle between 100 and 300m depths, and two turtles demonstrated dives to depths close to the bottom within the 200m isobath. The overall mean SST encountered by tracked turtles was 19.8±2.3?C (range: 10.21?C-28.4?C) and turtles showed an affinity for mesotrophic/eutrophic chlorophyll a values (mean: 0.458?1.012 mg m-3). Latitudinal movements varied by season and sea surface temperature, however no difference by season were observed with bathymetry or Chl a concentrations. We also present preliminary results from a first-passage time analysis preformed on these data to determine whether turtles exhibit distinct scales of movement, and whether those scales of different movement behaviors are associated with mesoscale environmental features.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

Round Butte Dam Selective Water Withdrawal Fish Passage Facility, Juvenile Collection, and Downstream Transportation Evaluatio Studies, 2010

Abstract

Portland General Electric and the Confederated Tribes of the Warm Springs Reservation of Oregon have been operating the new Selective Water Withdrawal (SWW) and associated Fish Transfer Facility (FTF) for approximately one year. The water intake structure screens approximately 6,000 cfs of surface water to exclude fish from the power house flow while directing the fish to the capture facilities. The fish passage facilities are designed to capture fish according to size, biologically sample, recycle, and transport resident species and downstream migrating salmon and steelhead. The Fish Facility, Juvenile Collection, Downstream Transportation, and Release evaluation studies focused on analyzing data collected on fish capture and passage performance for naturally reared smolts and juvenile and adult resident fish captured and processed at the collection facilities. The studies also evaluated the performance of the fish collection and sampling facilities relative to the 93% safe passage standard established for naturally reared salmonids during the first five years of operation. The safe passage standard applies to fish survival from the time they are captured at the SWW to the time they are released into the lower Deschutes River below the project. Chinook smolt survival was 98.2%, Steelhead smolt 98.5%, and sockeye smolt was 97.7%. Test fish and sample sizes varied from only a few fish to observe behavior in relation to facility components such as the fish separators, to larger groups of test fish to identify facility induced injury or mortality that may be associated with a particular component, or a series of components within a various system. Because of the difficulty in isolating injury to individual components, the tests were completed separately for the capture and separation facilities, and for the holding and processing, and transport facilities. The fish passage facilities component and segment testing objectives and results will be further discussed during the presentation.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Biotic, geomorphic, and hydrologic responses to a dam-break flood in a small headwater stream

Abstract

Disturbance is thought to be an important factor in the organization of physical and biotic components of aquatic systems. It is unusual to have data from both the pre- and post-disturbance periods from both the affected channel and reference channels. Here we report on the effects of a dam-break flood that occurred in a fish-bearing stream during a long-term paired-watershed study. Pre- and post-flood data were collected on fish, aquatic invertebrates, habitat, and hydrology. A substantial decline in adult cutthroat trout abundance was observed immediately after the flood. Abundance remained low for both age 1+ and age 0 cutthroat trout through the following summer. Relative growth rates of age 1+ cutthroat trout during this period were significantly greater than estimates from unaffected tributaries and from the affected tributary prior to the flood. Aquatic invertebrate emergence rate and benthic biomass increased in the affected tributary, but benthic taxa richness declined. No net change in pool area or substrate composition was observed; however, maximum depth of pools increased in the affected tributary and in first two mainstem segments downstream from the tributary confluence. A large increase in LWD was observed in the affected tributary. Although daily maximum and minimum water temperatures increased during the summer after the flood in a portion of the channel that had been clearcut harvested, temperature actually decreased downstream of the harvest unit. Apparently, hyporheic exchange and groundwater input led to cooling in that area. Despite the magnitude of this disturbance event, there are no indications of long-term negative consequences to the biota in the system. Although such events may occur infrequently in any individual watershed, these data provide an excellent example of the evolutionary capacity of a headwater catchment to respond to disturbance.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

Oregon Professional Science Master's programs

Abstract

An educated workforce grows economies and improves competitiveness, but enrollment of U.S. citizens in science programs has significantly declined over the past 12 years. Professional Science Master's (PSM) were created to stimulate interest in Science, Technology, Engineering and Mathematics (STEM) education, to prepare graduates for employment outside academia, and to help them effectively link industry's scientific and business workforces. Innovative PSM programs offer depth of training in STEM fields as well as breadth of training in business management, ethics, communication and other professional skills, and students interact with potential employers through internship experiences. The highest projected job growth through 2018 is in STEM fields, and 25% of STEM jobs will require a graduate degree representing a 17% increase in MS-level positions. Median salaries 1-5 years after earning a degree are consistently greater for MS compared to BS and PhD holders in engineering, life sciences, and mathematics/computer sciences. There are currently over 219 PSM programs offered at 103 universities across the U.S. PSM programs at Oregon State University (OSU) were developed with significant input from various employment sectors and options include Environmental Sciences, Applied Physics, Biotechnology, and Applied Systematics in Botany. There are currently 49 OSU PSM graduates, over 90% are currently employed in their field, 83% stay in the Pacific Northwest, and 71% stay in Oregon compared to 25% of PhD degree holders. New PSM programs at OSU will include Fisheries and Wildlife Administration (expected fall 2011), Renewable Energy (expected fall 2012), and Marine Resource Management (after 2012). Oregon currently has a statewide initiative to foster development of PSM programs on other campuses. Portland State University is expecting approval for a new PSM in Environmental Management and is working with OSU on the Renewable Energy PSM.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper *Student: False*

Co-Authors

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Title

Invasive Common Carp negatively impacting Aquatic Health at Malheur National Wildlife Refuge

Abstract

Malheur National Wildlife Refuge (Refuge) was established on August 18, 1908 by President Theodore Roosevelt using Executive Order No. 929 “as a preserve and breeding ground for native birds, especially colonial nesting water birds.” Once famous for its water bird and waterfowl production, the Refuge’s aquatic health has been devastated by common carp. The Refuge has a land base of over 187,000 acres and is an integral part of the Pacific Flyway. Since the 1950’s, the common carp infestation has severely decreased aquatic system biotic productivity within a majority of the Refuge’s wetlands, lakes, and etc. Over the past year, the Refuge has taken the necessary steps to start to understand and develop a comprehensive control plan to remediate the carp infestation. Although this project is in its infancy, this talk will address the progress to date.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Upstream passage of radio-tagged American shad at the lower four Columbia River dams in 2010: not what you might think.

Abstract

American shad (Alosa sapidissima) are native to the Atlantic Coast of North America, and were introduced to the Pacific Coast in the late 1800s. They are imperiled in their native range and are much more numerous in the West. One factor thought to contribute to their decline in the East is poor dam passage, despite fish ladders and lifts being in place for decades. We studied upstream passage of American shad at several dams on the Columbia River to determine if passage was as good as generally perceived, and if so, why so here and not in the East. We radio- and PIT-tagged 234 adult fish after capture by either angling or electrofishing in the Bonneville Dam tailrace, or diversion into the adult fish facility at that dam. Tagged fish were released immediately after tagging near their place of capture. A total of 26% of the fish passed Bonneville Dam. A total of 78% of those passing Bonneville Dam passed The Dalles Dam, 45% of those passed John Day Dam, and 48% of those passed McNary Dam. A seasonal effect was evident, with 57% tagged in the early part of the run passing Bonneville Dam, compared to 18 and 4% tagged during the middle and late parts of the run. Seasonal effects are also apparent from studies in East Coast rivers. These results indicate greater passage success than in East Coast rivers: the management goal on the Connecticut River is 50% passage per dam, but passage ranges from 1–17% at Turner's Falls Dam. The results from this study, particularly those at The Dalles Dam, warrant further investigation into passage in the Columbia River system and may aid restoration of American shad on the East Coast.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Ryan	Mann	Department of Fish and Wildlife Resources, University of Idaho

Title

Prespawn mortality in spring Chinook salmon in the upper Willamette River: potential causes and management strategies.

Abstract

In an effort to reintroduce spring Chinook to blocked spawning habitat, salmon have been transported above Fall Creek and Dexter Dams. However, around 60-90 % of the transplanted salmon died before spawning in the past few years. Prespawn mortality is not solely a problem for these transplants; it has been observed in other mainstem tributaries, although not to these levels. By examining potential causes of prespawn mortality, we hope to discover if Chinook salmon are physiologically predisposed to pathogens or if an environmental factor such as temperature or parasite burden is responsible.

Freshly dead prespawn mortalities and postspawn fish were collected by Oregon Department of Fish and Wildlife survey crews from Fall Creek and North Fork Middle Fork of the Willamette River. Live fish were sampled at Dexter and Fall Creek traps and below Willamette Falls. Spawned fish from Willamette Hatchery were also sampled. In addition, fish were held in a cool temperature, pathogen free facility to determine if survival to spawning could be improved. Fish from Fall Creek and Dexter traps were transported to the Fish Performance and Genetics Lab in both June and July. Necropsies were performed on all fish and samples were taken for histology.

For each of four parasites most commonly found, prespawn mortalities had a higher severity of infection when compared to successful spawners. Furthermore, fish sampled at Willamette Falls showed no infection of Nanophyetus in the kidney while fish collected in the upper watershed had massive infections. This suggests that infection with this parasite was likely in the Willamette River above the Falls.

Holding seemed to reduce prespawn mortality. The fish held longer had a higher survival rate(90% vs 70%), perhaps because they had less exposure time to pathogens and likely never experienced elevated temperatures.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Evaluation of a video lander as a survey tool for demersal fishes on Oregon's rocky reefs

Abstract

Developing stock assessments for demersal fishes living on nearshore rocky reefs in the Pacific northwest has been hampered by a lack of effective and affordable survey techniques for these habitats. The reefs are mostly untrawlable, frequently extend beyond diveable depths and can have strong currents, and spatially complex habitats that make remotely operated vehicle (ROV) surveys difficult at times. Very low limits on total mortality for some overfished rockfish (Sebastes) species can also restrict conventional survey techniques, like longlining, because research "take" can result in the closure of commercial and recreational fisheries. We report on the design and field testing of a video lander as a potential survey tool for demersal fishes inhabiting Oregon's nearshore rocky reef systems. Our lander utilized a standard definition underwater video system (no surface feed) with low wattage LED lighting attached to a frame that was specially designed for a high probability of successful retrieval from rugged rocky habitat. The design incorporated a very smooth upper section to reduce hang-ups as well as an inexpensive "crab pot like" steel base that was designed to break away if the lander became completely stuck in rocky habitat. A series of break away attachment points designed to rotate and tip the lander to dislodge it were also utilized. The lander proved its survivability in field trials, being successfully deployed in high-relief rocky habitat for 540 successful "drops" in 2009-10 at 4 different reef complexes during which the sacrificial base was lost only 4 times. At offshore reefs like Stonewall Bank, visibility was typically excellent, however, turbidity was sometimes a problem limiting visibility at nearshore reef complexes like Siletz Reef. Some examples of demersal fish presence/absence data gathered with the video lander are shown along with habitat associations.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Empirical Data in Support of Supplementation Science

Abstract

There is a body of literature and an ongoing regional debate regarding the potential for negative fitness effects when hatchery-origin fish are allowed to integrate with natural-origin fish on the natural spawning grounds. However, it is unclear what the magnitude of these effects on productivity might be relative to the beneficial demographic effects of hatchery supplementation. Additionally, this debate often disregards regional commitments to meeting mitigation and treaty trust obligations in a river system dramatically altered to serve many purposes. These conditions necessitate a long-term role for properly designed hatchery programs. The concern over possible reduction to population productivity appears to be driving recent recommendations for substantial changes in management of Columbia basin hatcheries, with the specific objective to diminish purported fitness effects (e.g., HSRG, RIST, Mitchell Act draft EIS). However, supplementation programs which adhere to hatchery reform parameters such as those described by Cuenco et al. (1993) and HSRG (2005) should not experience the negative results reported for programs which do not follow reform protocols. This talk will present empirical data from several supplementation programs and address the following questions relative to the RASP (1992) definition of supplementation: Can supplementation maintain or increase natural production? Can supplementation hatcheries be managed to maintain the long-term fitness of wild/natural populations? If there are negative hatchery effects, are they reversible?

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

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Title

Fish Passage and Screening on Whychus Creek, a Tributary to the Upper Deschutes River

Abstract

River Design Group, Inc. collaborated with the Upper Deschutes Watershed Council, the U.S. Forest Service - Sisters Ranger District (USFS), and the Three Sisters Irrigation District (TSID) to complete a fish passage and screening solution on Whychus Creek near Sisters, Oregon. Project goals included providing volitional fish passage over a 6 ft concrete diversion dam, maintaining channel stability, and screening a secondary irrigation diversion. Target fish species expected to benefit from the project include Chinook salmon and steelhead that have been reintroduced to the Upper Deschutes River watershed. To meet the project goals, RDG oversaw the design and implementation of a roughened channel fishway and a vertical plate fish screen.

RDG's project elements were part of a larger project that included stream restoration completed by USFS and implementation of a Farmers Conservation Alliance flat panel screen on the TSID diversion.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

Title

Overwintering behavior of juvenile fall Chinook salmon: Complications in estimating SAR and TIR

Abstract

The tendancy of some populations of fall Chinook salmon to overwinter during juvenile migration can complicate estimation of the smolt-to-adult return percentage (SAR) and transport-inriver ratio (TIR). Estimating SAR for the undetected (C0) group of smolts using PIT-tag detections requires estimating inriver survival, as well as detection and removal probabilities at detection dams. Migration delays can introduce bias into estimates of inriver survival, yielding biased estimates of SAR and TIR. In particular, SAR of the C0 group will be biased because adults that were undetected as juveniles will include fish that overwintered during juvenile migration, whereas the estimated size of the C0 juvenile group will include only those that migrated past dams as subyearlings. Transport SARs will not be biased in this way, because it is known which PIT-tagged smolts were transported. The result is positively biased SAR estimates for the C0 group, and negatively biased TIRs.

Populations that exhibit strong overwintering tendencies can have markedly biased estimates of SAR and TIR using the C0 approach. The extended PIT-tag detection period in 2006 showed that at least 3,100 (out of 98,020; 3.2%) subyearling fall Chinook salmon from the Clearwater River delayed migration in the Snake River until early winter, past the usual time when the PIT-tag detection system (i.e. bypass system) is dewatered. Under normal circumstances, with the bypass system dewatered at the end of October, the Clearwater populations would have produced a TIR estimate that was only 40% of the TIR estimate using detections through December. Because tagged fish that delayed migration until late winter or early spring were not observed in these data, the bias in the SAR and TIR estimates may be larger still. Alternative methods are recommended for estimating SAR and TIR in the presence of overwintering behavior.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author

Meeting: ORAFS11

Julie	Burton	Indian Creek Stewards	jules@bendane.com

Presenting Poster *Student: False*

Co-Authors

Title

Report on grant progress for Indian Creek Signage

Abstract

During December of 2009, I wrote for grant assistance from the Oregon Chapter of the American Fisheries to help in a restoration area. I teach Environmental Science at the local community college and this restoration and associated monitoring is part of my class curriculum. I sit on a coalition, the Indian Creek Stewards, that seeks to improve and educate about an urban creek in the heart of our town and alongside my classroom at Columbia Gorge Community College (CGCC).

We were granted funds to create signs that help us in this work, and we are grateful! Due to the diverse nature of the coalition, more time than expected has passed but we finally have agreement on the first of our educational outreach signs and hope to have erected one by this meeting.

I will bring along pictures of the restoration area and explain a little back history of our project that I hope will be relevant to your efforts.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

Jules	Burton	Columbia Gorge Community College, Hood River, OR	jules@bendane.com

Presenting Paper *Student: False*

Co-Authors

Title

ORAFS Grant Update for Annual Meeting, Indian Creek Education Outreach Signage

Abstract

During December of 2009, I wrote for grant money from the Oregon Chapter of the American Fisheries to help in a restoration area. I teach Environmental Science at the local community college and this restoration and associated monitoring is part of my class curriculum. I sit on a coalition, the Indian Creek Stewards, that seeks to improve and educate about an urban creek in the heart of our town and alongside my classroom at Columbia Gorge Community College (CGCC). We were granted funds to create signs that help us in this work, and we are grateful!

Due to the diverse nature of the coalition, more time than expected has passed but we finally have agreement on the first of our educational outreach signs and hope to have erected one by this meeting. I will bring along pictures of the restoration area and explain a little back history of our project that I hope will be relevant to your efforts.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author

Meeting: ORAFS11

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Presenting Paper *Student: True*

Co-Authors

Title

Movement patterns and home ranges of fishes of the Redfish Rocks Marine Reserve

Abstract

Marine reserve effects depend on the relationship between reserve size and home ranges of adult fish. My goal is to understand the movement patterns of fishes in the Redfish Rocks Marine Reserve and Marine Protected Area, to be closed on July 1, 2011, to help characterize baseline ecology of the area. I am using acoustic telemetry to evaluate movement patterns of six locally valuable fish species; the China rockfish (Sebastes nebulosus), quillback rockfish (S. maliger), canary rockfish (S. pinniger), copper rockfish (S. caurinus), black rockfish (S. melanops), and cabezon (Scorpaenichthys marmoratus).

Using surgically implanted acoustic tags and an array of thirty-two acoustic receivers deployed inside and outside the reserve, I will test these hypotheses:

1. The reserve affords different levels of protection to different species.

Part of the array is arranged at the reserve boundary, and will detect fish as they move across it. I will use the amount of time fish of different species spend within and outside the reserve to estimate the level of protection afforded to each species.

2. Movements between Redfish Rocks and Island Rock differ by species.

Part of the array is located around Island Rock, an area of similar habitat located nearby but outside the reserve. Some fish will be tagged at Island Rock, and I will compare movement patterns between the two locations among species.

3. Movement patterns differ between seasons.

The portion of the array within the reserve will detect fine scale movements and the boundary array will detect movements between the reserve and the deeper water of the adjacent MPA. I will compare these patterns between seasons.

4. Habitat – associated movement patterns are different among species.

I will compare fine scale movements within the reserve to detailed bathymetry data and examine them for differences among species.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

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Title

Changes in the Thermal Structure of Lake Billy Chinook with the New Selective Water Withdrawal Facility

Abstract

Lake Billy Chinook (LBC) was formed in 1964 by construction of Round Butte Dam on the Deschutes River at km 177. Located in the canyons of the Crooked and Metolius rivers in addition to the Deschutes, LBC has a surface area of 1619 ha, and a maximum depth of 122 m. Until December 2009, all water exited from a depth of ~ 73 m. Because all three tributary rivers are dominated by groundwater inputs of different temperatures, thermal stratification by tributary input normally occurred. Denser, cold Metolius water filled the reservoir bottom up to 73 m while the warmer inputs from the Crooked and Deschutes would fill the major volume of the reservoir down from the surface. Surface currents ebbed up the Metolius Arm and not to fish collection facilities resulting in the failure of downstream fish passage in the late 1960s. During warm months water in the epilimnion and top 35 m was trapped. Biological activity progressed with blue-green algae booms often occurring during late summer. The presence of LBC also had the effect of delaying the cycle of discharge temperatures down the lower Deschutes River about 6 weeks with cooler water discharged in the spring - and warmer water discharged in the fall than would have occurred naturally. With the completion of the new Selective Water Withdrawal Facility, withdrawal from the top 14 m has resulted in a significantly cooler reservoir as the volume is being filled from the bottom with cold Metolius water. From July through October, deep cold water is mixed with warmer surface water in increasing amounts to manage lower Deschutes River temperatures at km 161 to natural thermal potential. Surface water quality of LBC appeared to have improved during 2010 as no major blooms of filamentous blue-green algae species were observed.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Co-Authors

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Eric	Johnson	University of Idaho
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Title

Look out below: juvenile salmonid passage operations at Columbia and Snake river dams can slow adult salmonid upstream passage

Abstract

Safe downstream passage of salmonids is a goal of operations at Columbia River Federal Power System (CRFPS) dams. Spill is used to facilitate passage, but affects conditions downstream of dams encountered by upstream migrating adults. We evaluated the response of adults to spill in three studies: the effects of spill patterns proposed for use with a spillway weir at Little Goose Dam, the influence of spill volume at Bonneville Dam, and effects of total dissolved gas supersaturation (TDGS) on adult Chinook salmon. Spill patterns at Little Goose Dam in 2007 were modified in anticipation of a spillway weir installation and were associated with reduced counts of adult salmon. Subsequently, we compared passage by radio-tagged adult spring–summer Chinook salmon across three spill treatments (Uniform, a control, and two treatments considered for operation of the spillway weir: Bulk and Alternate) in 2008. Tailrace passage times were the longest for the Bulk treatment (22.2 h), followed by the Alternate (15.2 h), and Uniform treatments (11.5 h). The paths of GPS-equipped rogues indicated the size of tailrace eddies varied with spill treatment and flow. Second, a three year experiment at Bonneville Dam revealed reduced dam counts and increased passage times for adult salmonids during experimental high spill treatments. Finally, we estimated TDGS exposure and potential for gas bubble disease using migration tracks of radio-tagged adult salmon and a 2-D CFD hydrodynamic and dissolved gas model. We observed operations affected the location of the plume in the tailrace and that salmon swam sufficiently deep in the water column to avoid GBD expression. Collectively, the results illustrate the effects of spill on upstream migrating adults and the potential trade-off between the benefits of spill for juvenile salmonids and the costs to adults.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Poster *Student: False*

Co-Authors

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Title

Performance of a Salmon Egg Isolation Mist Incubation System

Abstract

Our goal was to create a low budget egg incubation system that would enable the isolation of individual female eggs from the eggs of other females for a research experiment on BKD in Chinook salmon. Because it would not be possible to treat the eggs for fungus growth during the incubation period, a mist incubation system was deemed the best option. Working with our pathogen free well water and the existing plumbing, a system was developed using irrigation hosing, sprinklers, and plastic buckets with screened bottoms. We had initially planned to use water from the head box but the head pressure was not adequate to make the sprinklers mist properly so a garden hose directly off of the pressurized well water line was used. Even though the water was not degassed in a packed column, the mist created from the sprinklers had dissolved oxygen readings between 7 and 9 mg/L. Female eggs were placed in individual isolation buckets by density with the more fecund females being divided into two buckets. Prior to placing the eggs in the bucket incubators, as much organic matter as possible was removed by hand and by using iodophore rinses in order to minimize potential problems with fungus. Minor amounts of fungus were experienced which may be due to an overzealous cleaning and handling of the eggs as we adjusted our handling method to the new system. Once all eggs reached the eyed stage, the percent fertility was measured to determine the success with this system. Moist air incubation systems are proving to be very effective but can also be very expensive. This system is much cheaper and, although further study is needed, may be as effective as commercial moist air incubation systems.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper Student: False

Co-Authors

Patti Hudson North Fork John Day Watershed Council

Title

Rancher's Guide to a Healthy Watershed

Abstract

The North Fork John Day Watershed Council designed, printed, and distributed a Rancher's Guide to a Healthy Watershed. The single-page, four-fold brochure was designed to help local ranchers make local-based decisions about stream protection and restoration. With fewer than 1,200 residents and nearly 70 % of the watershed in public ownership, the North Fork John Day Watershed Council (Council) serves an extremely rural community with strong ties to the land. Ranching is the foundation of the local economy and livestock grazing is the predominant land use. The majority of the Council's restoration projects have been implemented on public and private lands used for livestock grazing. Yet there have been minimal educational materials available to help ranchers identify problems and find solutions that fit their particular management objectives and address local environmental conditions. Topics covered in the brochure include: watershed ecology, ranching impacts on watershed health, solutions that benefit fisheries and ranchers, and the local resources available to ranchers. The Council has used this educational brochure to take advantage of our frequent and on-going contact with local landowners at various community events and meetings. Experience has shown us that these local stakeholders are more receptive to information and more responsive to recommendations coming from a known, local source, rather than a government agency or outside organization. This gives the NFJDWC unique credibility when it comes to protecting, enhancing and restoring Chinook, steelhead and bull trout habitat, while also helping local ranchers meet their objectives.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author

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Title

Can Thermal Refugia Offer Salmonids Protection From Disease?

Abstract

Summer temperatures in the Klamath River, California reach stressful levels for salmonids, forcing them to seek relief in thermal refugia at cold tributary confluences. In the main-stem of the Klamath River, salmonid outmigrants are subject to infection from the myxozoan parasite Ceratomyxa shasta. The study objectives were (1) to characterize the density of C. shasta as temperature changed in a thermal refugium during high fish use and (2) to test the effects of fluctuating temperatures on the proliferation of ceratomyxosis in Chinook and coho salmon. Temperature, parasite density, and fish use were measured in June, July, and August 2010 at Beaver Creek-Klamath River confluence, a known summer refugium for salmonids. Parasite density mapping within the coldwater refugium showed that C. shasta was less abundant than in the main-stem of the Klamath River at three time points throughout the summer of 2010. Chinook and coho salmon exposed to C. shasta in the Klamath River for 12 and 48 hours were subsequently held at either constant 18°C or fluctuating 15-21°C water (both temperature regimes accumulated the same degree days). After a 48 h exposure, Chinook mortality averaged 22.7% and 15.7% for fish held at 18°C and 15-21°C, respectively. Coho mortality was 21.2% and 23.8% when held at 18°C and 15-21°C, respectively. After a 12 h exposure, Chinook mortality averaged 6.6% at 18°C and 1.3% at 15-21°C. Coho mortality averaged 8.2% at 18°C and 1.2% at 15-21°C. There were no significant differences in mortality or time to death for Chinook or coho between temperature groups. This suggests that fish using thermal refugia may encounter fewer parasites, provided the tributary is not a source of parasites; however, already infected fish using refugia and main-stem habitats may have similar disease effects as a fish encountering a constant temperature profile, provided the degree days are equal.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Co-Authors

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Matt	Falcy	Oregon Department of Fish and Wildlife

Title

Adverse impact of hatchery fish on the productivity of 93 natural populations of salmon and steelhead

Abstract

We found a negative relationship between the reproductive performance in 93 natural populations of steelhead, coho, and Chinook salmon and the proportion of hatchery fish in these populations. We used intrinsic productivity as estimated from fitting a variety of recruitment models to abundance data for each population as our indicator of reproductive performance. The strength of this relationship was such that a hypothetical population comprised entirely of hatchery spawners would have an intrinsic productivity only 0.128 of that for a population comprised entirely of wild fish. There was no difference in this effect among the three species examined. Further, the impact of hatchery fish from 'wild type' hatchery broodstocks was no less adverse than hatchery fish from traditional, domesticated broodstocks. It was concluded that in most cases, measures that minimize the interactions between wild and hatchery fish will be the best long-term conservation strategy for wild populations.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Stan	van de Wetering	Confederated Tribes of Siletz Indians
Carl	Schreck	USGS, Oregon Cooperative Fish and Wildlife Research Unit, Department of Fis nd Wildlife

Title

Evidence that warm temperature, but not holding and transportation, raises blood plasma levels of the reproductive hormone, 17ß-estradiol, in immature adult Pacific lamprey, Entosphenus tridentatus

Abstract

Pacific lamprey, Entosphenus tridentatus, are declining rapidly throughout the Pacific Northwest. The present study seeks to contribute knowledge on the effects of temperature, holding and transportation on the reproductive hormone, 17ß-estradiol (E2), in immature adult lamprey. We tested three predictions: 1) holding immature adult Pacific lamprey for up to 1 month at a relatively cool ~14.5°C, would significantly lower or prevent elevation of E2 in the blood plasma in comparison with fish sampled immediately at 21.5°C during the summer; 2) levels of E2 in the blood plasma would not significantly differ with respect to collecting, holding and transporting lampreys over a few hours during the summer; and 3) sex would not be associated with significant differences in levels of E2 in these immature fish. The results were consistent with our predictions: 1) fish held for 29 d in captivity at ~14.5°C had significantly lower levels of E2 (0.17±0.02SE ng/ml; N = 16) than fish sampled the following day at 21.5°C (0.62 ±0.12 ng/ml; N = 8); 2) there was no significant difference in levels of E2 (N = 38) with respect to holding times of 0 to 6 h at 21.5°C (range: 0.12—3.13 ng/ml); 3) there was no significant difference in levels of E2 with respect to sex in lampreys held in captivity for 29 d at ~14.5°C or lampreys held for up to 6 h at 21.5°C. These results suggest that warm temperatures, but not holding and transportation, may raise plasma levels of E2 in immature Pacific lampreys. A large die-off of adult lampreys at the collecting location and atretic testes in several males also appear to be associated with very warm summer temperatures (>20°C).

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

Hemlock Dam Removal and Restoration of Lower Trout Creek

Abstract

This paper and presentation will discuss the recent removal of Hemlock Dam, an aging power/irrigation facility on national forest lands that has impacted wild steelhead for the past 75 years. Hemlock Dam was a 26-foot high, 180-foot long dam located on Trout Creek, a tributary to the Wind River on the Gifford Pinchot National Forest in southwest Washington.

Hemlock was removed in summer 2009 under a contract administered by the Mt Adams Ranger District of the Gifford Pinchot National Forest. Dam demolition and removal was done mechanically, after some 50,000 cubic yards of sediment were removed from the reservoir area, and after a channel was constructed through the impacted reach.

Prior to its removal, Hemlock Dam impaired fish migration, water quality and habitat in lower Trout Creek. This project restored natural processes of sediment routing, woody debris recruitment and routing, and unobstructed passage for fish and other aquatic organisms. In addition, elimination of the small shallow reservoir behind the dam is expected to reduce peak water temperatures in Trout Creek over time.

Trout Creek supports Lower Columbia River steelhead, and for the past two decades this drainage has been managed as a wild fish stronghold. Recovery of steelhead throughout the Wind River is heavily reliant on habitat improvement within the watershed, as there is no hatchery supplementation occurring within the watershed.

This presentation will describe the dam removal process, the planning and preparation required to get to that point, and the restoration of this heavily impacted reach of Trout Creek. We will also share preliminary monitoring results.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Poster Student: False

Co-Authors

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Title

Using Fork Length To Calculate Fecundity At Leavenworth National Fish Hatchery

Abstract

Leavenworth National Fish Hatchery (NFH) operates a segregated spring Chinook salmon program in the Wenatchee River basin. This program provides the only harvestable spring Chinook salmon in the area. Leavenworth NFH collects returning adults in excess of broodstock needs. Accurate forecasting allows managers to surplus excess adults to Tribal and non-profit organizations maximizing adult utilization efficiency. In an effort to assist this process, the relationship between fork length and fecundity was investigated with the aim to generate a simple predictive means to forecast broodstock collection needs within 10%. From 2008 to 2009 a total of 387 adult females were sampled by collecting fork length (mm) and fecundity from egg enumeration during the eyed egg stage. A general linear model was generated and had a statistically significant relationship between fork length and fecundity at the 99% confidence level with a correlation coefficient of 0.67 indicating a moderately strong relationship between the variables. The model as fitted explained 45% of the variability in fecundity and was significant ($p = 0.0000$) for both slope and intercept. Utilizing the average fork length of surplus females returning in 2010 the model forecast the actual fecundity within 98%, meeting the study objective. Results from this study will allow managers to forecast broodstock collection needs and improve adult utilization efficiency.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

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Title

The Smith River Verification Study - A Comparision of Juvenile Salmonid Monitoring Methodologies on the Basin Scale

Abstract

Utilizing snorkel surveys to monitor juvenile salmonids is an important component of the Oregon Plan for Salmon and Watersheds, but there is little information on the relationship between these data and population estimates. The Smith River Verification Study's goal is to compare snorkeling and electrofishing methods for monitoring juvenile salmonids on the basin scale and to inform this relationship. The study was conducted in Douglas County, Oregon over six sampling seasons.

In pools sampled by both methods snorkelers counted an average of 73.6% of coho and 42.8% of steelhead electrofishing estimates. Basin-wide, electrofishing sampled 0.6% of the juvenile distribution. Snorkeling sampled 2.9% and produced higher site occupancies for both coho and steelhead.

Pool densities for coho and steelhead showed little difference between the methods. Electrofishing produced higher population estimates for coho in three years and for steelhead in 2008. In all other years population estimates were not statistically different.

A larger portion of the coho population was found by electrofishing in habitats constrained from snorkeling than by snorkeling in habitats constrained from electrofishing. The majority of these fish were in pools below snorkel depth criteria.

Density metrics from either method in snorkelable pools showed little relationship with total population estimates. Population estimates in snorkelable pools showed a moderate relationship with total population estimates.

Population estimates from each method in snorkelable pools tracked total juvenile population trends more closely than densities from snorkelable pools. However, coho densities from snorkelable pools tracked adult trends more closely than population estimates. Coho pool densities from snorkeling tracked the adult trend each year.

The data suggest refining the appropriate use of the pool density metric in Oregon Plan juvenile monitoring and lowering the depth criteria to allow snorkeling to sample a larger and more consistent portion of the juvenile populations to increase correlation with total population estimates.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Identification of maternal life-history type and natal rearing origin of adult steelhead in the Yakima Basin

Abstract

Steelhead, a name used to describe ocean-going (anadromous) rainbow trout, represent one of many life-history types within Oncorhynchus mykiss populations. Another common life-history tactic is residency, whereby individuals remain in freshwater until fully mature, often traveling only a short distance from their place of origin over the course of their life-cycle. O. mykiss juveniles do not always emulate their parent's life-history choices. Evidence from studies of O. mykiss life-history plasticity has led to theories that cross-ecotype production rates may be specific to each subbasin with a watershed and reflect habitat-dependent trade-offs between freshwater survival and increased reproductive output resulting from ocean maturation. We hypothesize that resident rainbow trout play a critical role within steelhead populations and expect that a significant number of their migratory offspring survive to return as adult steelhead. To test this hypothesis we identified the parental phenotypes and natal rearing origins of adult steelhead in the Yakima Basin by examining geochemical signatures (ratios of strontium isotopes, 87Sr/86Sr) in inner ear bones (otoliths). Much like the rings in a tree, bony material in an otolith is laid down in a concentric circular pattern throughout the fish's life. Each ring has a chemical makeup unique to the habitat occupied at the time the ring was formed because chemicals in the environment are incorporated into calcified tissues as the fish grows. In this way, the entire life-history of the fish is documented in the otolith, including maternal origin; identifiable in the otolith primordia developed during early life-stages. We demonstrate how otolith geochemical analysis can be used to estimate maternal contributions from resident rainbow trout to steelhead production in different portions of a watershed by correlating geochemical signatures in water samples with steelhead otoliths.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper *Student: False*

Co-Authors

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Title

Evaluation of the artificial stream channels for use in studies to evaluate spawning interactions among diploid and triploid rainbow trc

Abstract

To protect native rainbow trout stocks ODFW has recently begun stocking triploid trout into many waterbodies. It is expected that stocking triploid trout will lower or eliminate the risk of genetic transfer between hatchery and wild stocks and will not cause a reduction in wild fish recruitment. This expectation relies on the assumption that triploid trout will not attempt to spawn (successfully or otherwise) with native rainbow trout. Female triploids generally do not mature sexually. Furthermore, secondary sex characteristics and spawning behavior have not been observed in females to date. Conversely, male triploids are only functionally sterile. These fish develop gonads (but these gonads show a differential development compared to testis in diploid males) and undergo “partial or altered” puberty, but their sperm does not give rise to viable progeny (Thorgaard and Gall, 1979; Lincoln and Scott 1984; Benfey et al. 1989).

Even if it is shown that male triploid trout have the potential to spawn a number of factors may reduce the risk. Currently, in Oregon, the majority of wild stocks are spring spawners whereas the hatchery stocks are fall spawners. This temporal separation combined with poor overwintering survival (Shetter 1947; Miller 1958; Bachman 1984), may mean that the risk of triploid hatchery trout measurably reducing native fish recruitment is low.

This study is intended to be a preliminary investigation into 1) the utility of using the artificial streams at the Oregon Hatchery Research Center to evaluate interactions between wild and hatchery reared stocks of rainbow trout and 2) whether male triploids produced by Oregon hatcheries exhibit any spawning behavior. Our objective is to determine whether male triploid rainbow trout exhibit spawning behavior in an artificial stream environment.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper *Student: False*

Co-Authors

Title

Emerging Evidence of Cause for Poor Natural Recruitment from Hatchery Fish

Abstract

Numerous studies have found that hatchery salmon and steelhead spawning in the wild perform poorly compared to their wild counterparts, and these differences are typically assumed to reflect the poor genetic fitness of hatchery fish. However, new and more intensive monitoring studies are revealing that the spawning distribution of hatchery fish in specific stream reaches and tributaries of a watershed tend to differ from that of wild fish. Thus, survival differences may be environmentally, rather than genetically, induced. In this paper I review such evidence for steelhead populations in the mid Columbia region, including the Umatilla, Walla Walla, John Day and Deschutes river basins. Stray hatchery fish from in-basin sources tend to spawn near the point of release, while out-of-basin strays tend to spawn lower in the basin than most wild fish. Stock-recruitment analyses indicate the presence of hatchery spawners has not reduced recruitment compared to wild fish in control areas that have few or no hatchery strays. We deduce that homing imprint is a key factor in the success of fish spawning in the wild, and this homing imprint differs between wild and hatchery fish. I present a conceptual model that predicts recruitment from hatchery fish spawning in the wild, based on the assumption that the density distribution of locations where wild fish spawn reflects the reproductive value of a spawning location. Findings imply that poor reproduction of hatchery fish has often been wrongly interpreted as a genetic effect, with the result that genetic risks posed to wild populations by stray hatchery fish are frequently overstated

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Developing a management plan for Oregon's nearshore marine fisheries

Abstract

The Nearshore Fishery Management Plan (NFMP) is currently being developed by the Marine Resources Program in the Oregon Department of Fish and Wildlife to serve as a guide and provide an action plan to manage state marine and estuarine fisheries into the future. The plan is intended to encompass both commercial and recreational nearshore fisheries for which the state has primary management responsibility. The “nearshore” includes estuarine and marine waters from the head of the tide out to 30 fathoms, which generally mirrors Oregon’s territorial sea. There are three sections within the NFMP. The first section of the NFMP is an adaptive framework that outlines the requirements and structure of each of the following two sections, the resource analyses and the harvest management strategies. Resource analyses are to be completed for each species or species group in a fishery prior to developing a harvest management strategy for that fishery. Analyses will include biological information, mortality estimates, stock status or trends (using current stock assessments or approved alternatives), threats to the resource, and information gaps. The final section, the harvest management strategies, will be grouped by resource complexes, such as groundfish. These will outline harvest strategies for both commercial and recreational nearshore groundfish fisheries, and will attempt to address conflicts between user groups. Overall, the completion of the NFMP will substantially change the approach that the Marine Resources Program takes to manage state fisheries. Completion of the NFMP will allow the Marine Resources Program to critically re-evaluate the management of state fisheries on a regular basis.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Distribution, abundance and population age structure of freshwater mussels in the Mid Klamath Subbasin

Abstract

Freshwater mussels (Bivalvia: Unionoida) are an integral component of freshwater ecosystems. North America harbors the world's most diverse and imperiled mussel fauna, which until recently formed an important part of the diets and material culture of indigenous peoples, including the Karuk Tribe. This study, a collaboration between the Karuk Tribe and Whitman College, represents the first systematic survey of freshwater mussels in the Klamath River, where little is known about mussel distribution, abundance, habitat requirements or conservation status.

We snorkel surveyed 80 sites on the mid Klamath and 17 sites on its tributary the Salmon to assess abundance, distribution, habitat and population age structure of mussels. We assessed physical habitat factors at macro, meso and micro scales.

We identified three mussel genera (Margaritifera, Gonidea, and Anodonta) in the Klamath, with Gonidea abundant and widely-distributed within the Klamath, and Anodonta and Margaritifera present in low numbers and restricted in range to upriver reaches with infrequent scour and downriver reaches with better water quality, respectively. In the Salmon River, we recorded only Margaritifera. At the mesohabitat level, both reach geomorphology and bank type were good predictors of mussel distribution. At the microhabitat level, G. angulata were found significantly more often in bedrock, sand and gravel substrates. Mussels were situated in flow refuges located in areas of low shear stress and high substrate stability protecting them from scour during high flows. The G. angulata population was dominated by mussels 5-8 years old, with few younger and older mussels. The lack of young mussels can be partly attributed to the difficulty of finding juvenile mussels.

Continued study of Klamath mussel distribution, habitat and ecology will be essential to their conservation in the watershed.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

WHAT IS NECESSARY TO RECOVER AN ECONOMICALLY VIABLE POPULATION OF COHO SALMON IN THE SIUSLA RIVER?

Abstract

Historically, the Siuslaw had arguably the largest run of coho salmon south of the Columbia River. Since the 1990's the run has been less than 10% of the historical abundance. This presentation focuses primarily on basin restoration but touches on the broader aspects as well.

The functional unit of the Siuslaw basin is the tributary stream basins because the mainstems of the Siuslaw and Lake Creek are too warm to rear salmonids during the summer. In six out of ten years from 2000-2010, we snorkeled over 250 km of stream within the Siuslaw basin annually. In each tributary basin we examined the current abundance and distribution of coho salmon within the context of its long-term management history. In two out of three years there was a statistically significant difference between the abundance and distribution of coho salmon and the tributary basin's management history. We also used life-history information from Knowles Creek.

We believe that the primary factor limiting coho production in the Siuslaw basin is debris flow deposits that create dam-break floods. The resulting wall of water logs, rock and sediment not only destroys a large number of coho redds but it destroys habitat for decades. These destructive events disrupt the natural flow of water, organic matter, and sediment.

To recover economically viable populations one possible scenario is as follows: 1) first prioritize tributary basins that have minimal risks of dam-break floods. 2) implement practices that over time will decrease the risk of creating dam break floods. 3) focus on the headwaters in basins of less than 15 ha to build a core area of minimal risk to anchor the populations. Then build downstream.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

MINIJACK CHINOOK SALMON IN THE GRANDE RONDE AND IMNAHA RIVER BASINS

Abstract

Recent literature suggests that hatchery-origin minijack (mature precocious age 2 males) spring Chinook salmon (Oncorhynchus tsawytscha) are abundant in the Columbia River hydrosystem. One hypothesis is that hatchery rearing practices contribute to the minijack life history strategy. We examined hatchery PIT-tag smolt releases from the 2002-2010 migration years for spring Chinook released in Catherine Creek, the Lostine River and Imnaha River to determine the prevalence of minijacks in these three hatchery programs. Hatchery supplementation on the Imnaha River has been occurring since the first smolt releases in 1984, and on the Lostine River and Catherine Creek since the first smolt releases in 1997 and 1998, respectively. Spring Chinook minijacks were classified as PIT-tagged smolts detected at adult fish ladders after 1 June of the same release year at Bonneville, McNary, Ice Harbor and or Lower Granite dams. Minijack Chinook were present in all three populations. The minimum estimated number of minijacks ranged from 0 to 1,983, representing less than 0.57% of PIT-tagged smolt releases, in a given brood year. Catherine Creek had the lowest number and the Imnaha River had the greatest number of estimated minijacks. The proportions of PIT-tagged minijacks observed in each stock were significantly correlated with Ranking Ocean Conditions. There was a significant positive correlation between the estimated numbers of hatchery minijacks and natural origin minijacks in Catherine Creek and the Lostine River. Collectively, these findings suggest factors outside of hatchery rearing processes also affect minijack abundance.

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Title

Implementation of Oregon's First Two Marine Reserve Pilot Sites

Abstract

Under the directive of House Bill 3013, passed by the 2009 Oregon Legislature, the State established the first two marine reserve pilot sites in Oregon located at Otter Rock north of Newport and Redfish Rocks south of Port Orford. The legislation required that ODFW develop a work plan to guide implementation of the two pilot sites and that local communities were to be engaged in development and implementation of site specific management plans. This paper provides an overview of the process and progress to date on the development and implementation of management and monitoring of Oregon's first two marine reserve sites. There is a special focus on the partnerships that have been made with local community members, the scientific community, state agencies, and local governments that have been essential to the success of management and monitoring.

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Title

Migration behavior and distribution of Pacific lamprey in the Willamette Basin

Abstract

Pacific lamprey (Entosphenus tridentatus) in the Pacific Northwest have decline dramatically in recent decades, yet very little is known about their migration behavior and habitat use. If Pacific lamprey is to persist into the future, these information gaps will need to be filled. Lamprey is an anadromous cold water fish that starts its migration up stream in the early spring and spawns a year later up in the tributaries. The Willamette Basin was chosen to conduct a two year study on lamprey migration behavior and homing distribution. From May till August a spread out sample of, 148 in 2009 and 219 in 2010, Pacific lamprey were radio-tagged over Willamette Falls. To track the radio-tagged lamprey twenty-one radio telemetry sites were installed on the main stem and major tributaries of the Willamette River. From May to mid August adult Pacific lamprey were observed in active migration over Willamette falls. Water temperature may have been an important limiting factor for lamprey movement. Thus, active migration started at 11°C and ended at 22°C, and detections at our fixed sites ceased until water temperatures dropped back to 11°C around November. During active migration, tagged lamprey distributed in three clusters throughout the basin on the main stem (lower RM 35-45 , mid RM 108 and upper RM 160-180) traveling 5-20 miles a day, typically during night and early-morning hours. A range of migration behavior has been observed. During spawning time lamprey were observed on the main stem as well as in the tributaries. As we look closely at the movement behavior of each tagged lamprey new questions arise. Further identification and characterization of freshwater habitat utilized by migrating adult Pacific lamprey could be critical to sustaining populations throughout the Pacific Northwest.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Migrational movements and distribution of spawning Klamath largescale, Lost River, and shortnose suckers in the Sprague River bef and after the removal of Chiloquin Dam.

Abstract

The migratory movements of Klamath largescale suckers (Catostomus snyderi) and endangered Lost River suckers (Deltistes luxatus) and shortnose suckers (Chasmistes brevirostris) entering the Sprague River to spawn were restricted by an irrigation dam located near Chiloquin, Oregon. Chiloquin Dam was removed in August 2008 to improve access to upstream spawning habitat and to reduce crowding of spawning fish immediately below the structure. The migratory behaviors and location of spawning areas were determined by tracking radio-tagged individuals before and after the removal of the dam. The spawning distributions of these populations were determined from individuals detected on a series of remote passive integrated transponder (PIT) tag detection arrays located in several reaches above and below the dam. Results suggest adult migrants congregate in discrete reaches of the Williamson and Sprague rivers, both above and below the former dam site. Each species also shows some level of temporal and spatial separation in their spawning behavior with some individuals migrating as far as 130 kilometers upstream from Chiloquin Dam. Fish passage at the Chiloquin Dam fish ladder prior to dam removal was apparently low. Post-dam removal monitoring has shown an order of magnitude increase in the number of tagged fish migrating into the reach upstream of the dam site. Spawning was also observed in the first 2.2 river kilometers above the former dam site on what was previously identified as underutilized spawning habitat. Most tagged fish, however, still migrated to spawning areas within a few river kilometers upstream and downstream of the former dam site. This indicates that although dam removal apparently allowed fish to disperse into underutilized spawning habitat in the lower Sprague River, substantial shifts in migration patterns and spawning distributions at a population level have not yet been observed.

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Title

Food web ecology meets enzymology: is thiaminase activity related to trophic structure in Great Lakes food webs?

Abstract

Thiamine Deficiency Complex (TDC) impairs the survival of salmonid embryos and is caused by a lack of thiamine (Vitamin B1). Lack of thiamine in embryos results from the adult female's consumption of thiaminase-containing prey fish such as alewife (Alosa pseudoharengus). The source of thiaminase activity in prey fish, however, remains unknown. Thiaminase activity in prey fish could result from three sources: 1) the ingestion of lower trophic-level organisms that contain thiaminase, 2) the presence of thiaminase-producing bacteria in prey fish guts, or 3) de novo production of thiaminase by prey fish themselves. The purpose of this study was to test the hypothesis that thiaminase activity in prey fish is related to trophic structure (first source above). To test this hypothesis, thiaminase activity of prey fishes was compared to two measures of trophic structure: diet and fatty acid composition. Diet was quantified by gut content analysis, and fatty acid composition was quantified by fatty acid profile analysis. Nonmetric multidimensional scaling was used to evaluate whether thiaminase activity could be explained by particular components of the diet or by the fatty acid composition. The relationship between gut content and thiaminase activity was weak, suggesting little relationship between thiaminase activity and diet. Fishes with similar diet compositions differed in thiaminase activity by orders of magnitude. The relationship between fatty acid profiles and thiaminase activity was slightly stronger. High thiaminase activity was associated with low total fatty acid content. The lack of association between diet items and thiaminase activity is not consistent with the prey-origin hypothesis. The stronger relationship observed between thiaminase activity and fatty acids content suggests that fatty acids are related to thiaminase, but the underlying cause for this relationship remains unknown.

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Title

Avian Predation on Salmonid Smolts in the Columbia River Estuary by the West's Largest Colony of Double-crested Cormorants: Management Implications for Fish and Birds

Abstract

East Sand Island in the Columbia River estuary is home to the largest known breeding colony of double-crested cormorants (Phalacrocorax auritus) in western North America. Nesting populations of double-crested cormorants are protected by the Migratory Bird Treaty Act. Previous research has demonstrated that cormorants on East Sand Island consume millions of juvenile salmonids (Oncorhynchus spp.), including populations that are federally protected under the U.S. Endangered Species Act. To address this concern, fisheries managers are considering efforts to reduce the size of the East Sand Island cormorant colony to increase smolt survival.

In 2010 we conducted field studies to assess the impact of the East Sand Island cormorant colony on the survival of juvenile salmonids in the Columbia River estuary. Counts of adult cormorants indicate that 13,600 breeding pairs attempted to nest in 2010. Diet composition data revealed that juvenile salmonids represented about 16% of the cormorant diet. Consumption estimates generated from bioenergetics modeling indicate that cormorants consumed 19.2 million (95% confidence interval: 14.6 to 23.8 million) smolts in 2010. Consumption was highest on Chinook salmon (O. tshawytscha) (13.4 million smolts), although all anadromous salmonid species were affected. Predation rates obtained from the recovery of passive integrated transponder tags on the colony indicate that East Sand Island cormorants consumed between 1% and 8% of inland salmonid populations (originating upstream of Bonneville Dam) that survived to the vicinity of the estuary during 2004-2009. Predation rates on tagged smolts from the lower Columbia River are believed to be even higher (10 to 30%), although results are limited by small numbers of PIT-tagged fish originating downstream of Bonneville Dam.

Management initiatives that are science-based and can balance the needs of native fish and protected bird populations will be required if a successful solution to this issue is to emerge.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

The Sound of Science

Abstract

At one time in the recent past there was a thing called “science”. A fairly descriptive term, it needed little further discussion, and generally stood for a process to pose a research question, define an objective, carry out a defined procedure, and report on the results. Now, however, there are apparently different “kinds” of science, seemingly always with qualifiers like: good, bad, flawed, adequate, etc., along with various colorful qualifiers assigned to Scientists as well!

The author has applied his finely tuned “trained observer skills” to the notion of qualified science over the past decade, collecting a cool three-dozen kinds of science referred to in media, journals, presentations… anywhere science was cussed and discussed. A presentation, both humerous and insiteful, will review the current state of science in society. Take this opportunity to analyze the current world of science and learn what sound science sounds like – you’ll be amazed!

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

The relative influence of ecological processes in predicting steelhead redd abundance along a complex riverscape in the John Day Riv basin, Oregon

Abstract

Habitat models to predict distribution and abundance of stream fishes often focus on ecological processes that operate at local spatial scales. However, broad-scale processes such as habitat complementation, supplementation, and neighborhood effects may also play an important role in how fish perceive and respond to their environment. Because anadromous stream fishes carry out their life histories across broad spatial and temporal scales, understanding the influence of the environment on these organisms should benefit from an approach that explicitly incorporates a spatially-continuous and multi-scale “riverscape” perspective. We applied this perspective to investigate the relative influences of spatial ecological processes on the abundance of steelhead (Oncorhynchus mykiss) redds across a large riverscape in eastern Oregon, USA. We generated spatially-continuous measures of key processes hypothesized to affect several life stages, including influences on 1) the survival of adults, 2) survival of juvenile steelhead, 3) quality of the environment for egg and larval incubation, 4) the accessibility of spawning habitats, and 5) the potential for interactions between natural-origin and hatchery fish. We calculated metrics based on these processes for ~15,000 km of stream in the John Day River basin, and used count-based regression to model steelhead redd abundance as a function of covariates at three spatial scales: local spawning survey reaches, ecological neighborhoods, and the riverscape. We then used a multi-model information theoretic approach to identify ecological processes that best explained redd abundance in the John Day basin. We anticipate that our results will have utility for conservation and management of ESA listed steelhead populations in the John Day River basin, and will help to optimize survey designs and prioritize areas for habitat restoration.

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Title

Identification and characterization of juvenile spring Chinook salmon overwinter rearing habitat in upper Grande Ronde Valley

Abstract

Management and restoration of spring Chinook salmon requires knowledge of life history attributes, including overwintering habitat within natal and rearing streams and spatiotemporal occupancy of this habitat. Early migrant (i.e., fish overwintering downstream of the natal areas) survival to Lower Granite Dam is typically lower for the Catherine Creek population compared to other populations in the Grande Ronde Subbasin. Our objective was to identify and characterize overwintering reaches and habitat within Catherine Creek of wild juvenile early migrant Chinook salmon. Radiotelemetry techniques were selected to yield high resolution occupancy data and microhabitat suitability. Fish were collected using a rotary screw trap and implanted with a coded radio-tag from mid-October to early-December 2009. Effort was made to relocate each fish once a week, and microhabitat use was collected for 30 randomly selected fish per week. Early migrants occupied a reach of Catherine Creek residing between Union, OR and the mouth of Mill Creek for overwinter rearing from October 2009 through March 2010. Median weekly linear range was high during fall migration, however it decreased toward zero (i.e., no movement) during winter. A considerable increase in movement occurred during mid-January and coincided with elevated water temperatures. A gradient shift occurs within this reach near the mouth of Pyles Creek, where Catherine Creek transitions from complex riffle, run, pool habitat to homogenized deep run habitat. Juvenile spring Chinook salmon preferred deep water and slow currents near cover and the bank throughout their distribution; however, coarse substrates were optimal within the high gradient reach, while silt was most suitable in the low gradient reach. Survival of radio-tagged juvenile Chinook appeared relatively high throughout the study.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Size at Release of Imnaha River Smolts: Does Size Matter?

Abstract

We examined 10 brood year releases of spring Chinook salmon (O. tshawytscha) reared at Lookingglass Fish Hatchery and released at the Imnaha River acclimation pond to determine if size at release affected juvenile survival, or adult return age composition, survival, stray, or harvest rates. For all variables examined, there were significant differences among brood years, regardless of release size. Survival to Lower Granite Dam (LGD) was greater for releases of large smolts (12-15 fish/lb) than small smolts (20-25 fish/lb). Size at release did not significantly affect age composition, return, harvest, or stray rates of age 3-5 hatchery returns. Survival rates were similar between large and small release groups. With the same 10 brood years, we also compared size at release within high and low density rearing conditions. At low density, there was no survival difference to LGD between large and small size groups, nor were there any significant differences between large and small release groups for any variable examined. For smolts reared at high density, smolts from the large release groups survived at a higher rate to LGD and had greater survival to age 3 than smolts from the small release groups. Collectively, these results suggests that the size of smolts released into the Imnaha River does not affect age composition, or return, stray, harvest, or total survival rates.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Assessing Growth, a Physiological Response to a Dynamic Environment

Abstract

Growth is a dynamic physiological response of juvenile fish to their changing environment. Variation in growth can reflect variation of abiotic environmental factors such as temperature, and biotic factors like food availability. Differences in growth among individuals can also predict fitness and survival. The ultimate measure of growth is a change in body size over time. Growth-regulating hormones may also serve as reliable biomarkers that provide the recent growth history of a juvenile fish. In the present study, physiological markers of growth were assessed in steelhead trout fry in association with weight gain or loss over nine days in a semi-natural stream environment. Blood levels of insulin-like growth factor 1 (IGF-1), a hormone that is highly correlated with muscle and bone growth in juvenile fishes, were measured. The Panomics QuantiGene ® Plex 2.0 assay was used to simultaneously quantify the messenger RNA for four proteins produced in the liver known to participate in the regulation of growth. The mRNA transcripts measured encode for the peptide hormones IGF-1 and IGF-2, the IGF binding protein IGFBP-1, and the receptor for the pituitary gland hormone somatolactin (SLR). As expected, elevated levels of IGF-1 in the blood were positively correlated with growth. In the liver, the levels of igf-1 and igf-2 mRNA correlated positively while igfbp-1 correlated negatively with growth. No response of slr to growth was observed. These results validate the use of the Panomics assay and support the use of igf and igfbp mRNA as biomarkers of growth in steelhead trout. The techniques described could be used to assess the growth status of free-living fish as a response to their environment in order to predict their fitness and survival.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Another Look at Hatchery/Wild Relative Fitness (RF) and Relative Reproductive Success (RRS) Results

Abstract

There is growing concern within the scientific community and among the public regarding negative effects of hatchery programs on the fitness and viability of wild salmon populations. The basis for this concern is derived in large part from a limited number of high-profile studies that have been widely cited as "proof" that hatchery programs can have of dramatically large deleterious effects on natural population productivity, and that over just a few generations these effects will accumulate to render natural productivity of the affected population significantly (irreparably?) reduced. However, we feel this assessment of fitness effects to be exaggerated and misrepresentative of the available scientific data. We present a compilation of results from all (to our knowledge) studies of anadromous salmonids that have derived quantified measures of relative fitness (RF) and relative reproductive success (RRS). These RF/RRS data are greatly dispersed, with values ranging from ones that infer the large reductions in fitness in the studies cited above, to values in other studies which indicate little or no effect on fitness. We also discuss how the differences in experimental design among studies and the confounding effects of environmental (non-heritable) and genetic (heritable) factors must be considered prior to drawing conclusions on long term impacts, especially relative to effects of integrated hatchery supplementation programs. We propose that any deleterious effects on fitness from a properly managed supplementation program will be relatively modest and likely more than counterbalanced by the beneficial effects that these programs may have on other viable salmonid population (VSP) parameters - abundance, spatial structure and diversity.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Can data collected from marine protected areas improve estimates of life-history parameters ?

Abstract

MPAs have gained attention recently as an effective tool for the conservation and long-term protection of marine resources. However, their effectiveness from a traditional fisheries management perspective remains equivocal. One of the argued fisheries management benefits of an MPA is that because there is no fishing inside of the protected area, it may be possible to precisely estimate the rate of natural mortality and better determine growth and maturity rates, parameters that are often assumed pre-specified in a stock assessment. This study aims to assess the degree to which having an MPA increases the ability to directly estimate these parameters in a integrated stock assessment model (Stock Synthesis), how long it would take for these benefits to be reflected in improved estimates of management quantities (e.g. FMSY), and the extent to which these improvements will be reduced or lost if there is spillover of adults from the MPA. An age- and length-structured two-area simulation model has been parameterized for two generic fish with contrasting life-histories, a short-lived high-productive and long-lived low-productive species. This model forms the basis for a Monte Carlo simulation which examines the benefits of data from an MPA on estimation performance for Stock Synthesis. Results indicate that the extent of improvement in estimation of growth and maturity parameters from an MPA are slight compared to directly estimating these quantities using fishery data. Estimation of natural mortality from an MPA, however, does substantially improve estimation.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Anadromous Fish Reintroduction above the Pelton Round Butte Project

Abstract

For over 40 years, anadromous fish have been disconnected from their historic range in the Deschutes River Basin. With the relicensing of the Pelton Round Butte Hydroelectric Project (PRB), a comprehensive fish passage program is being implemented. The program is centered upon the construction of a new Selective Water Withdrawal (SWW) structure coupled with a Fish Passage Facility.

To initiate the reintroduction effort, ODFW and multiple stakeholders have been outplanting over a million spring Chinook salmon and summer steelhead fry into the tributaries above the PRB. Since the completion of the SWW in December of 2009, tens of thousands of migrating spring Chinook, summer steelhead, and “sockeye” smolts have been collected and passed downstream providing them the first opportunity to complete an anadromous life cycle in decades.

This presentation will update the American Fisheries Society on our efforts and strategies to reestablish anadromous fish into the upper Deschutes River sub-basin.

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Title

Comparison of Accelerated vs. Natural and Freshwater vs. Saltwater Growth Regimes in the Grande Ronde Basin Spring Chinook Sa Captive Broodstock Program

Abstract

The Grande Ronde Basin Spring Chinook Salmon Captive Broodstock Program brings wild parr into captivity and rears them until maturity, at which time they are spawned. Their offspring are reared to smolt and released into their parents' natal stream to complete their life cycle in nature. Since these fish are maintained in captivity for up to 4 years, many factors contribute to getting the best growth, survival, fecundity and fertility rates. We tested two different pre-smolt and two different post-smolt rearing regimes to determine which gave us the best outcome. From the time of capture as wild parr until smoltification, fish were raised under either a "natural" or "accelerated" growth regime. From smolt to maturity, these fish were raised either in freshwater at Bonneville Fish Hatchery, or in saltwater at Manchester Research Station. We compared four production parameters - growth, survival, fecundity and fertility - in order to evaluate these different rearing strategies. We found that accelerated pre-smolt regime produced larger smolts, however, this difference disappeared by age 3. Fish raised in saltwater had smaller body size at maturity and the females had lower fecundity. Females from the freshwater natural group had better survival to maturity and a higher percentage of females maturing at age 5 than any of the other groups. Males from the saltwater natural group had the fewest males maturing at age 2 and the highest number of males maturing at age 5. Males in accelerated groups had a higher percentage maturing at age 2 and a lower percentage maturing at ages 3 and 4 than the natural groups. In a captive broodstock setting, where growth and fecundity are major goals, a freshwater natural rearing regime appears to produce the most offspring.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Local effects on macroinvertebrates responding to timber harvests and a dam-break flood in Hinkle Creek, Oregon

Abstract

Most studies examining effects of timber harvest on stream biota have been retrospective, comparing sites with and without adjacent harvests. A different approach was used at Hinkle Creek watershed in the southwestern Oregon Cascade foothills, where we participated in a multi-year manipulative study, collecting data before and after planned harvests. North Fork Hinkle Creek was retained as an unharvested, control sub-basin to compare to the South Fork where harvests were conducted first in fishless headwaters, then in downstream sites along the mainstem. Our goal was to examine aquatic macroinvertebrate responses to sequential timber harvests adjacent to headwater (2006) and mainstem reaches (2009). In accordance with Oregon Forest Practice rules, no riparian buffers were when fishless, headwaters were harvested, but riparian trees were left along mainstem, fish-bearing reaches during the second harvests. Invertebrate samples were collected at a network of 24 sites for 2 years pre-harvest (2004-2005), 4 years post-headwater harvest (2006-2009), and 1 year post-mainstem harvest (2009). Prior to harvest, the greatest differences in invertebrate assemblage composition occurred between headwaters and downstream mainstem reaches; assemblages did not differ between North and South Fork sites. Harvests adjacent to headwater streams resulted in locally higher aquatic insect emergence (especially chironomids), higher benthic densities, higher benthic percent chironomids and lower numbers of benthic taxa. These effects persisted from 2006, just after harvest, through 2009. Effects of headwater harvests on invertebrates were not detected in downstream tributaries or mainstem reaches. Similar to local responses after the first harvest along headwater sites, we detected local effects on invertebrates at mainstem sites following harvest adjacent to those downstream sites; these responses were also influenced by an unplanned dam-break flood in a South Fork tributary. These effects included increased aquatic insect emergence, higher benthic percent chironomids, and lower benthic taxa richness.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

CHALLENGES OF DOWNSTREAM PASSAGE FOR HIGH HEAD FLOOD CONTROL PROJECTS IN THE WILLAMETTE VALLEY

Abstract

The Willamette River Basin Flood Control Project biological opinion was issued July 11th, 2008. This opinion contained several RPAs directing the action agencies to pursue improvements to downstream passage for ESA listed UWR Chinook and Steelhead at project dams. These actions will also help meet the requirements of the USFWS Biological Opinion for ESA listed bull trout and Oregon chub. The requirement of these dams to meet multiple authorized purposes, coupled with the biology of the target species create unique and difficult challenges to overcome. To accomplish the mission of restoring access to these historic anadromous fish habitats the action agencies, in close coordination with regulators and regional stakeholders, have begun to study and attack these problems. The unique nature of the challenges that we are faced with will require the development of new and innovative technologies and research techniques.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Using Floodplain Inundation Models to Assist in Willamette River Restoration Prioritization

Abstract

River Design Group, Inc. is working with the Meyer Memorial Trust, the Oregon Watershed Enhancement Board, Oregon State University and the University of Oregon, and The Nature Conservancy to initiate restoration prioritization on a 62 mile reach of the Willamette River between Eugene and Albany, Oregon. The goal of the project is to use existing information to help guide restoration planning for the Willamette River. RDG used a LiDAR data set provided by DOGAMI and acquired by Watershed Sciences, Inc., as the topographic surface model. Stream gage data and USACE flood frequency analyses were used to calculate water surface trendlines. Trendlines were then used to create a 2-year flood water surface layer that was overlaid onto the historical Willamette River floodplain (captures the extent of documented historical flooding). The resulting floodplain inundation maps illustrate areas of predicted inundation associated with a 2-year flood event. Inundation mapping will be used as a tool in prioritizing restoration opportunties on the Willamette River.

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Title

Implementation of Hatchery Reform at the Leavenworth National Fish Hatchery

Abstract

In 2005, the USFWS adopted the Puget Sound and Coastal Washington Hatchery Reform Project ("Hatchery Reform") as a template for system-wide and site specific recommendations for the scientifically sound operation of salmon and steelhead hatcheries within the Columbia basin. The resulting recommendations have centered on reducing the impact of hatchery operations on the surrounding environment. The Leavenworth National Fish Hatchery (LNFH) operates a segregated Spring Chinook Salmon program in the Wenatchee River drainage of the Columbia Basin, and has begun addressing Hatchery Reform in 3 specific areas: 1) Fish passage around the facility, 2) straying of fish into the upper basin spawning grounds, and 3) the diversion of Icicle Creek water to aid smolt migration. Fish passage is being improved by altering Icicle Creek flows at the LNFH headgate, and is being monitored with a DIDSON SONAR camera. The straying of LNFH fish is being reduced by differentially marking the fish and removing them at Tumwater Dam. Icicle Creek water diversion is being addressed by pumping smolts directly into the Icicle Creek thalweg, reducing the need for spilling water to flush smolts out of the spillway pool. As the science of hatchery fish production evolves, facilities such as the Leavenworth National Fish Hatchery will need to continue to respond to recommendations such as those submitted by Hatchery Reform.

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Title

Estimation of short-term (48 h) discard survival for seven species of Pacific rockfish (Sebastes) as a function of depth of capture

Abstract

Mandatory discard of some overfished Pacific rockfish species (Sebastes) caught in hook and line fisheries is a controversial management strategy because survival of discarded fish is poorly understood. Rockfish have closed swim bladders and experience barotrauma as they are brought up from depth. This can create buoyancy from retained gas that interferes with resubmergence when fish are released. Barotrauma also creates internal injuries that can lead to mortalities. We report on a 2009-10 field study in which a purpose-built individual caging system was used to estimate short-term (48 h) discard survival for seven species of hook and line caught rockfish. The caging system was designed to minimize any adverse "cage effect". Our cages utilized a novel anchoring system to eliminate cage movement, very smooth internal surfaces to avoid abrasions on the skin of caged fish and screening of vents in a manner that allowed adequate water exchange but prevented entry of carnivorus amphipods. Sample sizes obtained varied from small for some species (3 china rockfish) to larger for more common species like black rockfish (128). Short-term survival was high across a range of depths of capture (9-55) m for all species except blue rockfish (solid sub-type), for which survival declined sharply with increasing depth of capture.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Site fidelity and movement of eight species of Pacific rockfish (Sebastes) at a high-relief rocky reef on the Oregon coast

Abstract

We used acoustic telemetry techniques to study the movements of eight species of Pacific rockfish Sebastes spp. inhabiting Siletz Reef, a high-relief, rocky reef complex on the open Oregon coast. Our primary interest was evaluating potential residence times for various rockfish species in small no-take Marine Protected Areas (MPAs) like those recently proposed for Oregon waters (337-1,502 ha). We tagged 6 black Sebastes melanops,, 31 canary S. pinniger, 9 yelloweye S. ruberrimus, 5 quillback S. maliger and 2 copper S. caurinus rockfish as well as single specimens of china S. nebulosus, vermilion S. miniatus and tiger S. nigrocinctus rockfish and monitored movements with a large (about 5,200 ha) receiver grid for over a year. Canary rockfish showed low site fidelity and wide-ranging movements that exceeded the scale of our detection grid. Canary rockfish also showed the widest range of vertical movements, up to 27 m, in some instances indicating forays well above the seafloor. In contrast, yelloweye, quillback, vermilion, tiger and china rockfish showed high site fidelity, generally being detected only at one or two adjacent receivers for a full year. The range of vertical movements for yelloweye, quillback, vermilion and tiger rockfish was small, ranging from only 2-3 m for the single tiger rockfish up to 3-13 m for four of the quillback rockfish. Black and copper rockfish showed site fidelity that was intermediate between canary rockfish and the more sedentary species and also showed some seasonal variability in site fidelity. These results suggest that small no-take MPAs located on high-relief rocky reefs would provide very minimal protection from fishery impacts for canary rockfish, some protection for copper and black rockfish and much greater protection for quillback, vermilion, tiger and at least some yelloweye rockfish.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Sponge Bob Square Pants Across the Pacific: American High School students invade Russia!

Abstract

In the July of 2009, the Wild Salmon Center and Freshwater Trust hosted an exchange program that brought 12 high school students and 4 teachers from Sakhalin Island Russia to Oregon. The Russians stayed at a summer camp near Mt Hood with 12 high school students from Oregon. At the camp, the students learned about salmon biology and shared their perspective cultures, including everyone singing the lyrics to the Sponge Bob Square Pants theme song.

But this was just part one of the exchange program. In July 2010, 9 American students from Oregon and Alaska traveled to Sakhalin Island to learn about salmon biology and Russian culture. Joined by 12 Russian high school students, the Americans spent 9 days on Sakhalin Island, visiting a small city, staying at an isolated lodge, eating interesting Russian food, and learning the different salmon management issues faced by Russia salmon biologists.

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Title

Comparing the physiology of juvenile summer Chinook salmon reared in either partial water reuse or flow-through raceway environm

Abstract

The Chelan PUD has implemented a pilot Partial Reuse Aquaculture System (PRAS) at the Easbank Hatchery facility, located on the Columbia River near Rocky Reach Dam, to explore rearing technologies that can conserve water resources. The Eastbank Hatchery relies on well water that that is also by local communities. Part of the evaluation of the efficacy of that system is a comparison of growth, smoltification and early male maturation of fish reared in the PRAS system to the fish reared in traditional flow-through raceway environments. In addition, this study also gave us the opportunity to investigate growth, smoltification and early male maturation in summer Chinook salmon in general, which has not been well documented. Sampling was initiated in February and continued until release in April the first year (Brood Year 2007). In the second year of the study sampling was initiated in October (Brood Year 2008) to capture what physiological changes were occurring in the fish during the fall. Of particular interest was whether any fish were smolting in the fall as under-yearlings. Sampling was done monthly and increased to bimonthly in the spring, prior to release. We will present here comparisons in overall growth, body condition, ATPase levels and early male maturation rates between the fish reared in the partial reuse system (experimental) to those reared in traditional raceways (control) over two different brood years.

(Conducted in cooperation with the Chelan PUD and WDFW. Funding was provided by the Chelan PUD)

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

History of Introduction and Dispersal of Non-indigenous American shad (Alosa sapidissima) in the Pacific Northwest

Abstract

The spread of invasive aquatic species constitutes a serious threat to global biodiversity, and has resulted in substantial environmental and economic cost. Although much of the research on the impacts of aquatic invasive species in North America has focused on the Laurentian Great Lakes region, comparatively little attention has been afforded to the role of non-indigenous anadromous species in coastal ecosystems. This is due to the relative rarity with which anadromous species successfully colonize coastal regions following purposeful introduction, and has been linked to the difficulty that anadromous species with complex life histories (e.g. Oncorhynchus spp.) have in adapting to novel environments. However, where such introductions are successful, life history and phenotypic traits can evolve rapidly, and predictably. Thus, from an evolutionary perspective, successful introductions of anadromous species are exceptional events, and provide opportunities to examine adaptation. It is perhaps surprising then that more focus has not been devoted by evolutionary ecologists to the examination of invasive American shad in the Pacific Northwest, despite their presence in the region for well over a century. Details of the introduction of shad to the Pacific region, their rapid dispersal along the coast, and increased abundance in the Columbia River are largely contained in historical documents, and internal government reports. The goal of this synthesis is to bring that information to forefront, and provide meaningful historical context for future examinations of invasive shad in the Pacific Northwest. To this end we i) discuss the history of their introduction, ii) report the chronology of invasion and discuss mechanisms for dispersal, iii) consider the underlying factors responsible for increased abundance in the Columbia River, and iv) discuss the potential impacts of shad on native salmonids.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Monitoring the First Chinook and Steelhead Smolt Migration in the Upper Deschutes Basin in Fifty Years: Some Preliminary Results

Abstract

Anadromous fish were extirpated from the upper Deschutes watershed above the three dams of the Pelton Round Butte Hydroelectric Project (rkm 100) in the 1960s. Original dam construction included a fish passage system; however, due to bottom withdrawal, confusing reservoir currents in Lake Billy Chinook and temperatures it did not attract smolts to the forebay and fish collector. To remedy the poor attraction currents, and to manage downstream water temperatures, complementary selective water withdrawal (SWW) and fish collection systems were constructed in the Round Butte forebay. The SWW became operational in December 2009. In anticipation of fish passage, Chinook and steelhead fry have been out-planted in the Metolius, Crooked and Deschutes rivers and tributaries since 2007. Studies are underway to determine Chinook and steelhead rearing success, smolt out-migration and survival through the reservoir. We captured and PIT-tagged 1686 Chinook and 536 steelhead smolts in the upper tributaries to evaluate their survival through Lake Billy Chinook. In addition, 53 steelhead were radio-tagged in the Crooked River (rkm 62), and tracked throughout the reservoir. Between 25 to 50% of the Chinook smolts, and 12 to 24% of steelhead smolts PIT-tagged in the three tributaries were captured at the Round Butte SWW fish facility. Of the 35 radio-tagged steelhead that entered Lake Billy Chinook, 23 were detected entering the Round Butte forebay, and 5 were collected by the fish facility. A total of 38,872 Chinook and 7,600 steelhead smolts were captured by the facility and released into the lower Deschutes. Hydrological data suggest the reservoir is still adjusting to post-SWW conditions; despite this, preliminary data suggests the fish facility can capture and transport significant numbers of salmonid smolts downstream. Monitoring studies will continue in 2011, after the reservoir conditions stabilize.

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Title

Grande Ronde Basin Spring Chinook Salmon Captive Broodstock Program: F1 Generation

Abstract

A steady decline in abundance of Grande Ronde Basin spring Chinook salmon resulted in critically low numbers of returning adults in the mid-1990s. A captive broodstock program (CBS) was implemented for the Grande Ronde Basin, with the goal of rapidly increasing the numbers of returning adults. CBS fish were collected as natural parr and reared to maturation and spawned in captivity. The resulting offspring were released as smolts and allowed to spawn in nature upon their return. Hatchery production from the CBS began with the release of BY 1998 F1 generation smolts in 2000. The CBS largely met its goals for parr collection and survival to maturation but growth was lower than expected, resulting lower fecundity (one-third that of natural salmon). The resulting smolt production was further reduced by culling for BKD prevention. Additionally, fertility and eyed egg-to-smolt survival for the CBS was substantially lower than that of the CHP. As a result, smolt production was usually below the 150,000 smolt goal. CBS smolt survival to Lower Granite Dam was usually lower than both CHP and natural smolts. However, CBS salmon usually met the 0.1% smolt-to-adult return rate target and, despite the low smolt release numbers, adults returns often met the target of 150 adults for each stream. However, due to the low fecundity of CBS females, the number of adult offspring / parent is much lower than that of CHP females. Adult run timing has been similar to that of natural salmon returning to each stream. The Captive Broodstock Program successfully and rapidly increased the number of adults returning to and spawning in each of the program streams.

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Title

28 Years of a Model Hatchery Supplementation Program in the Imnaha River: Is it Time for Plan B?

Abstract

Chinook salmon Oncorhynchus tshawytscha of the Imnaha River, northeast Oregon, are a unique spring/summer race that migrates and matures later than other Snake River populations in Oregon. The Imnaha River Chinook Salmon Supplementation Program has been operating since 1982 and annual means of 118 adults have been spawned, 256,550 smolts released and 1,418 adults returned. We compared smolt and adult characteristics between hatchery and natural Imnaha River Chinook salmon to determine whether the program has been successful in accomplishing its life history goal of mimicking the life history of natural salmon. We also compared abundance and productivity of Chinook salmon in the Imnaha River with similar but unsupplemented Snake River Basin populations to evaluate whether abundance and productivity of the Imnaha River have increased above that which would have been expected if the river had not been supplemented. We found that hatchery smolts are larger than natural smolts. Hatchery adults return at a younger age and return and spawn later than natural adults. Additionally, hatchery adults tend to spawn lower in the system, near that acclimation site, whereas natural salmon tend to spawn further upstream. The program has increased total abundance, with the hatchery recruit:spawner ratio being 6 times that of natural salmon. But the program has not achieved other goals, particularly those related to enhancing abundance of natural origin salmon and maintaining productivity. Natural origin abundance has not increased, despite an increase in total spawners in nature. Mean recruit:spawner ratio for natural salmon has exceeded replacement for only 5 of 23 brood years, whereas productivity exceeded replacement for 19 of the 33 years immediately prior to supplementation. It may be time to substantially modify this program, with changes in weir management, broodstock collection, hatchery rearing and smolt releases.

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Title

Susceptibility of diploid and triploid juvenile rainbow trout to the parasite, Ceratomyxa shasta

Abstract

Susceptibility of diploid and triploid juvenile rainbow trout to the parasite, Ceratomyxa shasta

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Juvenile diploid and triploid rainbow trout each from two different brood stocks were tested for their susceptibility to C. shasta by exposure in the Willamette River. The Roaring River Hatchery diploid rainbow trout are known to be very susceptible to this parasite while the Crane Prairie rainbow are somewhat resistant. Live cages containing 50 fish each (25 diploids and 25 triploids differentiated by freeze brand mark) were placed in the Willamette River near Corvallis, Oregon in triplicate for each exposure period. The Roaring River Hatchery rainbow trout were exposed in early August for 10 and 52 hr while the Crane Prairie rainbow were exposed in mid October for one week. After exposure, the groups were transported to the Salmon Disease Laboratory at Corvallis, the diploid and triploid fish from each cage separated into tanks, reared and monitored for C. shasta infection for 90 days. For the Roaring River rainbow trout, a cumulative percent mortality greater than 90% was observed after both 10 h and 52 h exposure and was equivalent between diploids and triploids, however, the triploid fish died slightly faster. The Crane Praire rainbow study is currently in progress, but results to date demonstrate that this stock has greater resistance to the parasite and the triploids do not appear to be more susceptible than the diploids. Water samples taken from the river during the exposures in August and October were tested by qPCR assay and indicated that the density of C. shasta was low during the river exposures as fewer than 1 spore was detected per L.

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Title

Adult male Dungeness crab (Cancer magister) movements near Reedsport, Oregon from a fisheries collaborative mark-recapture stud

Abstract

There was a need to establish a baseline of the biotic community within the project area with the licensing of the Oregon Power Technologies (OPT) wave energy site located just north of the mouth of the Umpqua River, Oregon. As part of this baseline the movement of Dungeness crabs (Cancer magister) was tracked within the project site, both prior to and after the installation of the wave energy buoys.

Three thousand male Dungeness crabs were tagged utilizing numbered Floy tags tied around their back right legs in October and November, 2009. One thousand crabs were tagged within the proposed OPT site, and at two control sites north and south of this location. A total of 956 tags were recaptured by commercial fishermen between December 1, 2009 and Sept 1, 2010. Recapture data was plotted utilizing GIS to show the movement patterns of recaptured individuals.

Movement patterns both prior to and after the placement of the OPT wave energy buoys will be compared to determine if the buoys have any discernible influence upon the movement patterns of Dungeness crabs.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Stock-based ocean aggregation of discreet populations of Chinook salmon (Oncorhynchus tshawytscha) taken in the Oregon troll fish

Abstract

The Oregon Chinook salmon fishery is primarily an ocean fishery that harvests salmon spawned in the hatcheries and rivers of California, Oregon and Washington. In a mixed-stock ocean fishery, a thorough understanding of the distribution and aggregation of discreet Chinook salmon stocks is essential to sustain and recover individual stocks. Coded wire tag recoveries have indicated that Chinook salmon from a common river of origin likewise occur in a common ocean distribution. Numerous studies have demonstrated seasonal changes in the relative contribution of individual stocks to a mixed stock fishery at a specific ocean location. In addition, stock composition has been shown to vary over relatively short spatial distances. These observations raise the question of whether Chinook salmon form stable or temporary at-sea associations with population cohorts. Investigation of stock-based marine aggregations requires a sufficient sample size and a degree of precision with respect to catch location and stock identification previously unavailable.

Project CROOS, Collaborative Research on Oregon Ocean Salmon, is a unique partnership of scientists and commercial fishermen that combines catch location data with stock assignments obtained from genetic micro-satellite analysis to investigate the distribution of Oregon Chinook across multiple spatial scales. Using catch data collected by collaborating Oregon troll fishermen in 2006 and 2007, we investigated the distribution of individual populations of Chinook salmon along the nearshore regions of the Oregon Coast focusing on stock-based patterns of aggregation at spatial scales as low as tens to hundreds of meters. Using distance-based metrics compared against random permutations, we found evidence suggesting that Chinook salmon were intermittently more closely associated with river cohorts than expected. However, these discreet stocks were generally intermingled with other stocks in larger, mixed-stock shoals.

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Title

Comparison of two methods for Pit-tagging Redside Shiners: effects on mortality, tag retention, and feasibility of using these methods a listed minnow, the Oregon chub

Abstract

Little is known of the movement of Oregon chub (Oregonichthys crameri) between populations within the Willamette Valley. To address this question, we assessed whether micro-Passive integrated transponder (PIT) tags can be used to monitor the movement patterns of small minnows. In 2010, we evaluated the effects of implanting 8.5 X 2.12 mm micro-PIT tags on the survival of redside shiners (Richardsonius balteatus), a surrogate for Oregon chub. This species is not listed and is of a similar size and body shape to adult Oregon chub. We assessed mortality rates, tag loss, and growth of two different PIT-tagging methods (incision and injection). Our experimental design consisted of fifteen groups of redside shiners (five treatments; three replicates per treatment; 30 fish per replicate). For each treatment, we assigned ten fish to each of three size categories (40-50, 50-60, 60-70 mm total length) to assess the effects of size on the survival and tag retention of PIT-tagged fish. After implantation fish were reared for thirty days in a laboratory environment. The five treatments included controls (no tags inserted), incision placebos (fish that received an incision but were not PIT-tagged), fish that were PIT-tagged through incision, injection placebos (fish that received an injection into the abdominal cavity but were not PIT-tagged), and fish that were PIT-tagged through injection. We found that the injection method had as similar survival rate to the placebo and control treatments. Conversely, the incision method had a higher mortality than the other groups. In a concurrent study, we found little effect of the duration of exposure to buffered MS-222 solution on survival. We will discuss the results of this study and the potential for application of these methods for the threatened Oregon chub.

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Title

Direct estimation of the effects of capturing and marking animals on post-release survival

Abstract

Parameter estimates obtained from capture-recapture models are unbiased only if capturing and marking animals does not affect their post-release survival. Sampling-related mortality is likely to occur after animals are released, making it difficult to assess. Past methods for evaluating sampling-related mortality have included both experimental and observational approaches. However, quantifying post-release mortality attributable to capture and marking has often been impossible because of the need for a control group of animals that are captured using a method with no associated mortality. We present a novel approach for quantifying mortality due to capture and marking by incorporating both active sampling and passive resighting data. The critical element of the approach is a control group of individuals that are passively resighted but not captured. A model selection approach is used for inference based on a set of competing models and the magnitude of the effects is based on model-averaged survival estimates. The effects of important variables such as holding time, marking or tagging location, personnel experience, and animal size are easily quantified using model covariates. We demonstrate the approach by estimating mortality due to capturing and tagging for two endangered catastomids in the Upper Klamath Basin of Oregon and California. Results from this study indicate that the sampling activities associated with this research program were not a substantial source of added mortality and population parameter estimates generated from these capture-recapture data are not substantially biased due to capture and marking effects.

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Title

High School Dialogue Project: Using Genetics and Ecology to Save Salmon

Abstract

This spring 2011 high school dialogue project centers on the work of two Oregon laboratories to address the problem of diminishing salmon populations: 1) OSU Prof. Jerri Bartholomew's work, with her graduate students, to solve the puzzle of C. shasta, a lethal parasite that can infect 80% of out-migrating salmon in the Klamath River, and 2) Project CROOS at Newport's Hatfield Marine Science Center, a cooperative effort between ocean fishermen and scientists to use genetic stock identification to avoid fishing of weak stock.

This six week project uses current science to frame in-class teaching of state standards and scientific inquiry. The curriculum includes video interviews of scientists, teacher-delivered lectures, exercises and games, discussion sessions, and field trips. The lectures and field trips communicate the work in progress of each lab, the core science needed to carry out this work, and build up to student projects to develop testable hypotheses related to the work of either lab. Students will be required to defend their hypothesis and lay out methods to test it.

Biology classes are paired across distance and community perspective. An example of such a pairing, echoeing the "farms vs. fish" issue in the Klamath River Basin, is Henley High School serving a Klamath Falls farming community and Astoria High School serving a coastal Oregon fishing community. Internet student groups will present challenges to their partner school as well as work jointly on their hypothesis/methods project. Scientists will review and provide feedback on the top student projects.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Suitable bull trout (Salvelinus confluentus) habitat on the Umatilla National Forest

Abstract

More recently, there have been large scale efforts in documenting current and future suitable bull trout (Salvelinus confluentus) habitat in a changing climate. In particular, many efforts have been focused in the Pacific Northwest, however, little work has analyzed critical bull trout habitat on the Umatilla National Forest. The objectives of this study were to delineate current and future suitable bull trout habitat on the Umatilla NF with focus on the North Fork John Day, Walla Walla, Tucannon, Lookingglass and Umatilla subwatersheds. Part of this work is in response to the Watershed Vulnerability Assessment (WVA) program on the Umatilla NF. The purpose of the WVA is to illustrate the relative vulnerability of forest watersheds to risks posed by climate change. A multiple regression stream temperature model developed by the Rocky Mountain Research Station (RMRS) was used to delineate suitable bull trout habitat. The stream temperature model considers summer mean weekly maximum temperatures and physical parameters or predictor values that directly affect water temperature such as water diversion, wildfire and groundwater influences. The regression analysis also considers geomorphic predictors such as cumulative drainage area, slope and elevation. Results show a predicted forest-wide loss of 769.3 river miles of suitable bull trout habitat. The Tucannon, Umatilla, and North Fork John Day watersheds suffered large habitat losses; however, the Lookingglass and Upper North Fork John Day drainages were resilient to future habitat loss possibly due to groundwater buffers. This model does not consider brook trout (Salvenlinus fontinalis) competition or culvert barriers but, this analysis does suggest large tributary habitat loss and ensuring proper aquatic organism passage to this suitable habitat may be important to sustaining future bull trout populations in several of these watersheds.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

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Title

Application of Eyed Egg Planting in Weak Stock Conservation and Restoration

Abstract

The history of eyed egg planting is replete with examples of experimentation most of which produced unmeasured results. This paper will review some of the known methods of egg planting, then provide a rationale for re-visiting this approach to weak stock augmentation and/or re-introduction of extirpated stocks based on improved protocols, technology and evaluation techniques.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Conceptual framework for assessing status and trends in habitat conditions and modeling biotic response for spring Chinook salmon i upper Grande Ronde River basin

Abstract

The Columbia River Inter-Tribal Fish Commission initiated a monitoring program in the Upper Grande Ronde River, Catherine Creek, and Minam River basins in 2009 designed to assess current status and trends in key limiting habitat factors for ESA-listed spring Chinook salmon populations. This presentation outlines our conceptual framework and specific approaches for achieving this objective, and presents initial results from the first non-pilot year of this study (2010). We selected a probabilistic sample of 20 reaches distributed throughout the basins and measured a suite of stream habitat characteristics in each sample reach including channel morphology, surface and sub-surface substrate composition, water quality, discharge, and biotic community (benthic invertebrates and fish abundance). In addition, stream temperature and discharge data were collected at approximately 85 sites during June through September. Temperature and discharge data will be combined with remote sensing data including LIDAR and FLIR to develop a basin-wide Heat Source water temperature model. Habitat characteristics measured in the field will be used as input data for a life cycle model, which will link biotic responses of spring Chinook salmon with changes in key fish habitat variables. Analyses demonstrating the link between sub-surface substrate composition and potential embryo survival rates will be presented to demonstrate the above concepts. These tools will allow us to evaluate restoration potential for imperiled salmon populations in the upper Grande Ronde basin and identify and prioritize restoration actions that will be most effective for population recovery.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Physiological metrics effectively assess habitat quality of Redband Trout (O. mykiss gairdnerii)

Abstract

Thermal habitat degradation is a substantial concern in salmon bearing streams, particularly in eastern Oregon. We have developed a method that can rapidly, effectively, and non-lethally monitor habitat quality. We have tested this method in the John Day River (JDR), a DEQ water quality limited stream, which contains anadromous redband rainbow trout (O. mykiss gairdnerii). Working in the John Day River (summer water temperatures =25°C) and the Crooked River (CR; temperatures ~10°C), we investigated thermal stress, prey consumption and ability to accumulate whole body lipids (WBL) in fish from those areas in June, August, and October 2009. After weighing and measuring fish, livers and fin clips were analyzed for heat shock protein 70 (hsp70)– as an indicator of heat stress–using Western blot analysis, WBL content determined by proximate analysis, and stomach contents were removed, counted, weighed, and ash free dry mass (AFDM) was determined. Fish in the JDR increased hsp70 production, indicative of thermal stress, and did not grow, while CR fish showed no hsp70 production and grew in size. Likewise, fish WBLs increased across the summer only in the coolest streams or in fish that also increased food consumption. Overall, we conclude that fish in warm streams likely use energy for hsp70 production and not growth under extreme seasonal heat stress, while fish from the coolest stream were less stressed, ate well, had greater WBL contents, and were better able to grow over the course of the summer than those in warm streams. Changes in season and site also affected food consumption; it is also likely that greater food availability, a criterion for habitat quality based on habitat structure, leads to a more-well fed, fatter fish.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Are Fall Chinook Released from the Salmon River Hatchery Comparable to Their Natural Counterparts?

Abstract

The Oregon Department of Fish and Wildlife Salmon River Hatchery releases approximately 200,000 adipose marked (Ad), coded wire tagged (CWT) Chinook salmon (Oncorhynchus tshawytscha) smolts annually to serve as one of Oregon's Exploitation Rate Indicator (ERI) stocks for north migrating coastal populations. This ERI program is necessary to model the catch distribution and abundance of Chinook managed through both the Pacific Fishery Management Council and the Pacific Salmon Treaty. The first Ad+CWT marking of a naturally produced stock on the Oregon coast was implemented in 2002 with the 2001 brood of Siuslaw River Chinook. The objectives of this study were to compare survival rates, age at maturation, distribution of the ocean catch, and exploitation rates between the two tagged groups. Additionally, we wanted to test the assumption that the Salmon River Hatchery stock is representative of the wild populations on the north Oregon coast. To accomplish these objectives, a total of 45,059 Chinook pre-smolts were captured from the Siuslaw River basin, Ad+CWT marked, and released back into the river. In-river spawning and creel surveys were conducted in both basins annually between 2003 and 2006 in order to reconstruct the terminal returns of those Ad+CWT releases. Additional CWT information is obtained through Eastern-Pacific coastwide sampling of commercial and sport fishing vessels participating in ocean fisheries. We then conducted a cohort reconstruction analysis of the 2001 brood from both the Salmon and Siuslaw rivers. The adult survival rate of the Siuslaw River Chinook stock was higher (4.2%) than those produced from the Salmon River hatchery (1.9%). Ocean catch distribution and exploitation rates of Salmon River and Siuslaw Chinook were similar, suggesting Salmon River Hatchery produced Chinook may adequately represent naturally produced stocks of the North Oregon coast in ocean fisheries. However, freshwater harvest rates were very different.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Apophallus sp. metacercariae in coho salmon and associations with over winter survival in a coastal river in Oregon

Abstract

For the last several years we have been evaluating the distribution and abundance of parasites in coho salmon (Oncohrynchus kistuch) parr and smolts in from the West Fork Smith River, Oregon. Amongst other parasites, we observed an extremely high abundance of Apophallus sp metacercariae (Heterophyidae) in the muscle of parr from multiple year from the lower main stem of this river. Infections from ranged from 340–4,666 parasites/fish. In contrast, parr from upstream sites showed 0-342 parasites/fish. Out migrating smolts collected each year in the following spring consistently had light infections. Given that there was only 10% overlap in abundance between main stem fish and smolts, probably only the very lightly infected parr from the main stem population survive to the smolt stage. We analyzed smolt data compiled from multiple years using a variation of Crofton's truncation of the negative binomial. Analysis of our data fitted to the negative binomial distribution indicated that the threshold for parasite-associated mortality began around 200 parasites/fish for metacercariae. Therefore, 95% of lower mainstem parr, and only 1% of upper mainstem parr, had infections greater than this value. This indicates that that most of these parr do not survive over the winter until smolt stage. These results concur with early findings by others, where this stretch of the river has lower than expected overwinter survival. In addition, our laboratory performance studies showed that Apophallus was strongly linked to reduced growth, and hence reduced swimming stamina. The lower main stem of this river has been heavily logged and has high summer temperatures. The latter may directly enhance snails and Apophallus reproduction, which may explain the noteworthy abundance of this digenean in coho salmon at this location.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Hydroacoustic Evaluation of Overwintering Summer Steelhead Fallback and Kelt Passage at The Dalles Dam, 2009–2010

Abstract

We conducted an evaluation of overwintering summer steelhead (Oncorhynchus mykiss) fallback and steelhead kelt downstream passage at The Dalles Dam during fall 2009 through spring 2010. The goal of this study was to characterize adult steelhead distributions and passage rates at the sluiceway and turbines so fisheries managers may use this information in decision-making relative to sluiceway operations. The study period was from November 1, 2009 to April 10, 2010. The objectives were to 1) estimate the number and distribution of steelhead acoustic targets passing into the sluiceway and turbines between November 1 and December 15, 2009 and March 1 and April 10, 2010, and 2) estimate the number and distribution of steelhead targets passing into turbines between December 16, 2009 and February 28, 2010. We obtained passage data using fixed-location hydroacoustics. Fallback of steelhead (879 ± 165 (95% CI)) occurred throughout the fall study period. Ninety two percent passed through the sluiceway. Run timing peaked in early December. Horizontal distribution data indicated Sluice 1 is the preferred route. Diel distribution was variable with no distinct patterns. Sixty two ± 40(95% CI) adult steelhead passed through the turbines during the winter turbine study. Horizontal distribution data indicated turbine unit 18 passed the majority of fish. Fish passage occurred during morning periods only. Downstream kelt passage (1,985 ± 234(95% CI)) occurred throughout the spring period. Ninety-nine percent passed through the sluiceway. Run timing peaked in late March. Horizontal distribution indicated that Sluice 1 is the preferred route. No clear pattern was seen for diel distribution. The results of this study strongly suggest that operating the sluiceway for steelhead passage during fall, winter, and early spring will provide an optimal, non-turbine route for these fishes to pass the dam.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Hydroacoustic Evaluation of Juvenile Salmonid Passage at Lookout Point Dam, 2010

Abstract

We conducted an evaluation of juvenile salmonid downstream passage at Lookout Point dam on the Willamette River in 2010. The goal of this study was to provide information on fish passage rates and distribution at the dam to support decisions on long-term measures and operations to enhance dam passage conditions. The study period was from February 1, 2010 to January 31, 2011. The objective was to estimate total number, and seasonal, daily, and diel distribution of juvenile salmonid passage through the dam. We obtained passage data using fixed-location hydroacoustics, where transducers were deployed at each of the three penstock intakes and the four regulating outlets of the dam. Data was collected 24hr/d, 7d/wk for the course of the study period. This study is still in the data collection and analysis phase. Data will be analyzed and presented at the Oregon Chapter Annual Meeting. Expected results will include run timing and passage rates and distribution of juvenile salmonids at the dam.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Hydroacoustic Evaluation of Juvenile Salmonids at Cougar Dam, 2010

Abstract

We conducted an evaluation of juvenile salmonid behavior at Cougar dam on the McKenzie River in 2010. The goal of this study was to provide information on fish behavior at the dam to support decisions on long-term measures and operations to enhance dam passage conditions. The study period was from February 1, 2010 to January 31, 2011. The objective was to examine fish behavior and movement patterns in the nearfield (< 20 m) forebay of the Water Temperature Control Tower. Information on fish behavior and movement patterns is useful to interpret fish passage rates and to inform development of long-term fish protection measures. We used a Dual Frequency Identification Sonar (DIDSON) acoustic camera to obtain fish behavior data. The DIDSON was deployed on a barge at the tower and aimed across the tower intakes. Data was collected 24hr/d, weekly or bi-weekly, for the course of the study period. This study is still in the data collection and analysis phase. Data will be analyzed and presented at the Oregon Chapter Annual Meeting. Expected results will include behavior and movement patterns of juvenile salmonids at the dam.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

Formerly a Wild Sanctuary: Hatchery Fish in the Upper Sandy Basin

Abstract

On October 20, 2007 the Sandy River was restored to free flowing conditions following the Marmot Dam removal. Lauded by stakeholders as a cutting-edge masterpiece of restoration, the removal was primarily intended to improve passage for migrating salmon. Within days of the removal, salmon were seen swimming past the dam site, something they had been unable to do for nearly a century. Historically, wild and hatchery fish were sorted at Marmot Dam, with only wild fish being allowed to continue upstream. This effectively created a wild sanctuary, with abundant spawning habitat and none of the potential deleterious impacts of the interaction between hatchery and wild stock, including interspecies hybridization, direct competition, genetic introgression and disease introductions. The removal of the Marmot Dam eliminated the ability to prevent hatchery stock from entering the upper basin. This has unfortunately resulted in a significant increase of hatchery salmon spawning in what was formerly wild sanctuary. How should dam removal affect hatchery management? Should managers be concerned?

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Do-or-die collection at Cowlitz Falls Dam: evaluations to improve collection of juvenile salmon in a tributary of the Columbia River

Abstract

Fish passage issues at hydropower dams located on tributaries to the Columbia River can differ significantly from those at mainstem dams. Fish passage research on the Columbia River typically focuses on understanding how dam operations can be manipulated to alter passage route distributions and smolt survival rates during the outmigration period. Fish passage options in tributary systems can be limited. For example, fish that are not collected at Cowlitz Falls Dam pass downstream and become landlocked residents in reservoirs where they are lost to the anadromous population. Because of this, research efforts at Cowlitz Falls Dam have focused on improving collection systems to maximize the number of fish collected. Our data suggest that species-specific responses to factors such as river flow, dam operations, and water temperature are important to collection success. For example, juvenile coho salmon collection typically decreases when river flows exceed 6,000 cfs at the dam. Conversely, juvenile Chinook salmon collection decreases with decreasing river flows and increasing water temperature. Additionally, collection efforts outside of the typical spring and summer collection period may be required because of factors such as downstream dispersal of post-emergent fry, fall movements of parr, and winter entrainment of fry and parr during high flow periods. Our presentation will show how a holistic research approach may be required at smaller tributary dams to better understand factors that affect efforts to collect juvenile salmon.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Assessing aquatic insect assemblages within geohydrologic categories in sub-alpine headwaters of Mt. Rainier National Park

Abstract

Ecological monitoring requires the dynamic assessment of environmental processes and biotic communities found within unique habitats. Because environmental shifts are likely to influence high latitude/altitude ecosystems, the physical processes and biotic communities found within montane headwaters can provide ideal indicators of hydrological and ecological responses. In an effort to characterize these indicators, we used aquatic insect community composition to evaluate geohydrologic stream categories within relict glaciated headwaters in Mt. Rainier National Park, WA. Aquatic insects were collected every other week from July to October 2010 in three replicate basins which contained comparable stream segment types (colluvial groundwater source, fluvial stream segment, bedrock outlet). Aquatic insect densities within each segment type were assessed using Ward's hierarchical cluster analysis and nonmetric multidimensional scaling (NMDS). Ordinations were used to identify potential indicator taxa found within each segment type. Preliminary cluster results of the 68 identified taxa indicated that aquatic insect densities significantly align with categorized headwater segment types (cophenetic correlation = 0.79). Two-dimensional NMDS ordinations further supported clustering and indicated that distinct taxa significantly influence each segment category (stress = 17.462; $p < 0.001$; goodness of fit $R2 = 0.84$). In addition to providing support for physical categorization and potential indicator groups, this study documented several rare/endemic taxa and confirmed a new species of Lednia. This assessment helps to support the use of scale-dependent emergent properties and related biotic community abundances in the monitoring and conservation of relic glaciated headwater systems. Additionally, our efforts emphasize the importance of considering site- and time-specific measurements (both physical and biotic) when assessing sub-alpine headwaters.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Design and Implementation of a Monitoring Framework for Oregon's Marine Reserves

Abstract

In 2009 the Oregon legislature designated two pilot marine reserves in Oregon's nearshore waters. The Ocean Policy Advisory Council, a legislatively mandated marine policy advisory board designated these sites with the biological goal of conserving marine habitats and biodiversity and to provide a framework for scientific research and monitoring. Redfish Rocks Marine Reserve and Marine Protected Area were developed for nearshore ground fish species, predominantly caught in the live fish fishery. Otter Rock Marine Reserve was developed to protect the unique ecology and potential juvenile rockfish habitat of the site. These two pilot sites will be closed to extractive use in June 2011 and will serve as reference areas over time, enabling the measurement of change due to natural influence versus those caused by human induced stressors. In the summer of 2010 we conducted baseline surveys to assess oceanographic condition, characterize habitat and determine species presence, abundance and distribution within the reserves and associated comparison areas. We present here the design framework and methods employed as well as summer oceanographic conditions, habitat characterization, species abundance and distributional data. From the baseline studies and analyses we will implement a long term monitoring plan from which to evaluate changes in habitat, invertebrate and demersal fish populations.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Pacific lamprey and hyporheic exchange: A potential universal driver affecting habitat selection, migration, and dam passage in the N Umpqua Subbasin.

Abstract

Adult Pacific lamprey counts at Winchester Dam (Winchester, OR) have declined from 46,785 in 1966 to only 34 fish in 2001, and counts in recent years continue to be substantially depressed. However, there is strong evidence that at least some of the Pacific lamprey are using alternate routes to pass the dam besides the fish ladder. By tracking the Pacific lamprey starting below the Winchester Dam using radio telemetry, we monitored their dam passage routes as well as migration behavior and habitat use in 2009 and 2010. To our surprise, the vast majority of the tagged fish stayed below the dam even after the spring-summer migration phase and passage rates were comparably lower for larger size class lamprey (contrary to Columbia River monitoring results). Additionally, early run lamprey had a higher passage efficiency and traveled further upstream compared to mid and late run lamprey. Migration behavior and timing was strongly linked with stream temperature across all runs. Finally, manual tracking and habitat analysis both indicated that glide and run type habitat units were used significantly more in comparison to what is naturally available for holding and overwintering habitat. Results from dam passage, migration behavior, and habitat selection (large and small scale) all point to the fact that hyporheic exchange and subsurface flow is potentially an overarching driver for all three of these activities.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Project CROOS: Developing Information Systems for Fishery Science, Management, and Marketing

Abstract

Starting in 2006 Pacific Northwest commercial ocean troll fisheries for Chinook salmon have been severely restircted or closed due to low abundance of Sacramento River and Klamath River fall Chinook. In 2005, anticipating the Klamath River fishery restrictions, a collaboration of fishermen, scientists, and seafood marketers initiated Project CROOS (Collaborative Research on Oregon Ocean Salmon) to explore the potential of genetic stock identification (GSI) to provide fisheries managers with better data to manage harvest. The object was to improve knowledge of stock distributions in the hope of avoiding weak stocks. Fishermen bar-coded each fish caught, recorded the location using GPS, collected fin clips (for GSI) and scales (for aging), along with fish length and depth caught. Data were used to map changing distributions, by stock, throughout the fishery. In 2010, Oregon and California ocean fisheries were sampled weekly from May through September, providing the first broad-scale application of this technique. Data were assembled in a central data base where they can be associated with supporting data sets including oceanographic data, satellite observations, and coded-wire tag data. Potential users of these data are scientists, fishermen, fishery managers, processors, marketers, and the general public. A web site, www.pacificfishtrax.org, is being developed as a portal to these data. This web site is designed to provide access tailored to the needs of specific user groups, and to be extended to accommodate new species, data types, and users. The ultimate goal is to develop a coast-wide data network with flexible tools to serve the full spectrum of needs and services supporting a variety of West Coast fisheries.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Maternal effects and biodiversity in fishes

Abstract

Understanding the origin and nature of intraspecific biodiversity enables us to better conserve and manage animal populations. Studies have shown that both genes (G) and environment (E) contribute to phenotypic variation as well as the interaction of these two factors (G*E) i.e. different genotypes respond differently to environmental variation. This has been termed phenotypic plasticity. When phenotypic plasticity includes transgenerational effects we commonly refer to it as maternal effects.

Maternal effects have been defined as non-genetic contributions of a mother to her progeny and can include factors such as egg size and egg quality that yield a higher survival for the progeny. It is important to understand how maternal effects, e.g. through egg size or yolk composition, can affect early development of behavior and how that influences later life stages.

Here I present evidence of maternal effects in two highly polymorphic species of salmonids. I investigated the influence of egg size and egg composition on survival, early development, behaviour, morphology and growth of Arctic charr (Salvelinus alpinus) and Rainbow trout (Oncorhynchus mykiss). I found that egg size influences behavior and morphology of juveniles and 1(+) fish , but this relationship differed among families, indicating that maternal effects are related to genetic composition of mothers.
These results show a relationship between individual egg size and growth pattern potentially influencing behavior and later life histories e.g. the decision to migrate to saltwater. My results indicate that epigenetic inheritance like maternal effects may play a key role in maintaining polymorphism in fishes including a potential role in speciation.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Monitoring estuarine survival of steelhead trout (Oncorhynchus mykiss) smolts using acoustic telemetry

Abstract

Steelhead is a species of concern throughout Oregon, with several populations already listed as threatened or endangered. Oregon coastal steelhead are already designated as a species of concern and regulations are in place to completely protect native winter run steelhead from harvest. We developed a method estimating steelhead smolt survival to the ocean using acoustic telemetry in the Alsea River, Oregon. We collected data during the springs 2009 and 2010 that showed different flow regimes. Our results are consistent for the 2 years of data: 1) wild steelhead smolts spend little time in the estuary, 2) typically only 50% of the wild steelhead smolts reaching the estuary actually enter the ocean, 3) most mortality occurs in the lower estuary, and 4) smolts tagged during the peak of the run appear to have higher survival rates. These data can better inform management decisions, benefit steelhead anglers, and assist in guidance for more effective estuarine restoration projects.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Evaluating passive integrated transponder tag retention rates in wild populations of headwater stream salmonids

Abstract

Passive integrated transponder tags (PIT) are commonly used by fisheries managers to assess attributes such as fish growth, movement, and survival; however, data interpretation can be misleading if PIT tag retention rates are overestimated. For example, reported tag retention rates have generally been high in studies of juvenile fish in laboratory settings (mean 96%, range 89-99%); however, recent studies of wild populations of trout yielded seasonal retention rates as low as 56% (mean 69%, range 56-95%) and annual retention rates as low as 62% (mean 74%, range 62-80%). These results suggest that tag retention by wild fish in field conditions may be lower and much more variable than previously assumed. The objectives of this study were to document short term tag retention rates, determine what proportion of annual retention could be attributed to short term tag loss, and evaluate some factors that could potential influence short term tag retention rates. Our ongoing studies in western Oregon provided the opportunity to assess seasonal and annual PIT tag (8mm FDX and 23mm HDX) retention rates and compare data among juvenile and adult coastal cutthroat trout, juvenile steelhead, and juvenile coho salmon in three headwater streams. From 2002-2010, we used a double-marking strategy (adipose fin clip + PIT tag) to assess annual retention ratesand in 2009 and 2010, a third mark (elastomer) was used to assess short term retention rates. This study design allowed comparisons between seasonal and annual retention rates, and assessment of variation related to tagging method, tag size, and personnel.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Responses by fall-emerging aquatic insects to small temperature increases in experimental streams

Abstract

To examine how small increases in summer temperatures can affect aquatic insect growth and emergence in the fall, this experiment was conducted at the Oregon Hatchery Research Center from July to mid-December 2007. Naturally fluctuating temperatures from Fall Creek, a third order stream flowing adjacent to the laboratory, and Carnes Creek, a cooler first order stream flowing into Fall Creek nearby, and Fall Creek water warmed by 3-5°C, were maintained in flow-through troughs from mid-summer until autumn. We introduced the caddisfly Psychoglypha bella (66 individuals/trough), the mayfly Paraleptophlebia bicornuta (45 individuals/trough) and also observed the hyporheic stonefly Mesocapnia projecta, that colonized via both stream sources in the fall. Irrespective of temperature, female P. bella and M. projecta were larger than males. Only P. bicornuta size decreased with warmer temperatures. Other taxa-specific responses to higher temperatures were primarily phenological. Paraleptophlebia bicornuta emergence began 13 August and lasted 70 days. These mayflies originated from Fall Creek, and individuals in the Fall Creek trough emerged earlier than those in either warmer or cooler conditions. Psychoglypha bella larvae pupated by early October and began emerging on 12 October, beginning an emergence interval of 56 days. Adult male P. bella in the warmest trough emerged significantly earlier than females in that trough; they also emerged earlier than caddisflies in other treatments. Male and female P. bella and P. bicornuta emerged synchronously in coolest temperatures. Mesocapnia projecta males and females displayed strong synchrony in emergence that lasted only 36 days, though males emerged progressively later in warmer temperatures. Because these insects emerge in the fall, differences in their availability and size arising from small changes in temperature may be important to fish during the autumn when benthic prey are scarce.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Impacts of herbicides on Pacific Lamprey (Lampetra tridentata) Olfaction

Abstract

The physiological and behavioral changes that can occur after exposure to sub-lethal levels of herbicides may lead to changes in reproductive success in fish populations and ultimately to population declines. The Confederated Tribes of Siletz Indians (CTSI) have a long history with the Pacific Lamprey and are concerned about the current noted population declines in Oregon. CTSI owns timber property and manages it using herbicides; they are concerned that these herbicides may have deleterious effects on this culturally important food source. Our research is looking at whether there is a link between herbicide exposure and lamprey's ability to orient to juvenile pheromones that are used during the pre-spawning migration and adult pheromones that are used as reproductive cues during spawning. A behavioral trial using a y-maze will be conducted to compare changes in orientation. Competitive displacement assays will be used to establish if olfactory receptors are impaired by herbicides. Finally we will look for changes in heart and breathing rate in reaction to behaviorally relevant odors. Physiological changes resulting from exposure to herbicides could lead to a fish being unable to behave appropriately to environmental cues. We hypothesize that herbicides will be correlated with a decreased ability to orient to biologically relevant pheromones, impair olfactory receptors, and alter physiological responses such as heart rate and breathing patterns.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Kokanee and Sockeye Salmon in the Deschutes Basin: Management and Reintroduction

Abstract

Among species slated for reintroduction into the waters of the Deschutes River Basin above the Pelton Round Butte Hydroelectric Project (PRB Project) are anadromous sockeye salmon (Oncorhynchus nerka). Although a definitive reintroduction plan is currently in development and unavailable at this time, the basic tenet of the plan is to build an anadromous population utilizing established resident populations of kokanee (landlocked sockeye) that reside in Lake Billy Chinook (LBC) and / or Suttle Lake. In spring 2009, a small number of O. nerka smolts (981) were collected at the outlet of Suttle Lake and released into the lower Deschutes River downstream of the PRB Project. In spring 2010, approximately 50,000 smolt-size O. nerka were captured at the newly constructed Fish Transfer / Surface Water Withdrawal Facility in the forebay of LBC and released into the lower Deschutes River. Adult returns from these smolt releases are expected beginning in 2011 and 2012. The collection and release of LBC and Suttle Lake O. nerka smolts will continue in 2011 and beyond. Success of this project will require informed management decisions, particularly information about the status and trends of the kokanee populations in the LBC / Suttle Lake system. Current and ongoing data collection of kokanee population dynamics include spawning escapement of LBC kokanee into the Metolius River, juvenile outmigration from Suttle Lake and LBC, reservoir recruitment of juveniles to LBC, hydroacoustic surveys, and genetic analyses. All these data will contribute to attempts of creating a life history model of O. nerka in the Deschutes Basin. This presentation summarizes past data collection efforts, present population statuses, future goals, and the many challenges faced by fisheries managers in the Deschutes River Basin.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

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Title

Status of Pacific lamprey Entosphenus tridentatus and other lamprey species in the Klickitat River Basin

Abstract

Declining Pacific lamprey (formerly Lampetra tridentata) populations are a major concern to the Confederated Tribes and Bands of the Yakama Nation. At one time this fish was a primary food present at ceremonies, today lamprey is often absent. The Yakama Nation Lamprey Project is being conducted in cooperation with Bonneville Power Administration under the Columbia Basin Fish Accords agreement. Project goals in 2009/10 were to evaluate spatial patterns of larval lamprey presence by 1) collecting information on historical distribution, literature reviews, 2) insights on traditional ecological knowledge (TEK) from tribal, state, and federal natural resources workers, 2) develop, coordinate sampling protocols with other basin tribes, agencies, and 3) document current spatial distribution using an ABP 2 electrofishing unit. Preliminary historical accounts from TEK were assessed to help identify baseline information. Life history strategies for the Pacific lamprey, River lamprey (Lampetra ayersi), and Western brook lamprey (Lampetra richardsoni) in the Klickitat River were scarce. To help answer questions of species composition and distribution we examined predefined spatial sites in the Klickitat River. We compiled historical information to help identify the status of lampreys in the Klickitat Subbasin. We sampled 56 longitudinal margin sites over 94 river kilometers (RK). The proportion of samples containing larvae within individual sites was low throughout the survey. Our catch data indicates distributions of larval Pacific lamprey up to RK 70 in the Klickitat River. Sizes of ammocoetes ranged from 20 to 125 mm (n = 686). We did not collect any River lamprey in the system at this time, though we did find Western brook larvae and adults residing in the Little Klickitat River (n=43). Preliminary results from this study indicate the presence of Pacific and Western brook lamprey in the Klickitat subbasin.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper *Student: False*

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Title

Wolf Creek Monitoring: A Partnership Story

Abstract

We, as crazed Fisheries Biologists, intuitively know that instream restoration techniques work, but how do you quantitatively measure that success? How do you quantify the improvements we make through these efforts? The Wolf Creek Restoration and Monitoring project will attempt to provide some answers to these questions in the long-term. The Wolf Creek project is a large-scale restoration project that treated over 10 miles of stream with 900 logs and 3700 boulders over a two year time period. This presentation, designed for those involved in watershed (instream) restoration activities and monitoring, describes the monitoring effort associated with this project and how working with multiple partners has resulted in a robust, multifaceted monitoring approach to restoration effectiveness monitoring. The Wolf Creek project involved two unique monitoring techniques that are showing great potential, high density AREMP surveys and total station habitat mapping. While still early into this project, we hope to provide some insights into what works well, and what doesn't.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

A spatially and temporally explicit, individual-based, life-history and productivity modeling approach for aquatic species

Abstract

Realized life history expression and productivity in aquatic species, and salmonid fishes in particular, is the result of multiple interacting factors including genetics, habitat, growth potential and condition, and the thermal regime individuals experience, both at critical stages and throughout development. Individual fishes, each with their inherited propensities and characteristics, experience spatially and temporally specific conditions throughout their lives that influence growth, movement, and life history "decisions". Modeling the interaction of these factors at the (potentially) broad spatial and temporal scales at which individuals carry out their life histories is a challenge. There are individual-based modeling approaches which are not spatially-explicit (or limited to restricted and specific spatial domains), spatially-explicit models that are not individual-based, and "spatially-explicit", individual-based models that neglect or simplify the temporal specificity of spatially-explicit conditions. HexSim is a spatially-explicit, individual-based, multi-species computer model designed for simulating terrestrial wildlife population dynamics and interactions. HexSim treats space as a series of continuous hexagonal grids that individuals experience and interact with over discrete time steps. The individual-based modeling modules in HexSim are robust and allow for detailed parameterization of individuals, populations, and events. We are presenting a modification of HexSim for aquatic populations. The unique spatial constraints of stream system modeling, and modifications to the simulation model necessary for inclusion of relevant aspects of fish biology and behavior, will be discussed. Our initial goal is to predict life history expression and production of steelhead (Oncorhynchus mykiss) in the John Day River basin, Oregon. Spatially and temporally continuous parameter datasets (e.g. water temperature and food availability) developed for the John Day will also be presented.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper *Student: False*

Co-Authors

Title

Sea Lion Predation on Anadromous Salmonids at Bonneville Dam

Abstract

After OR, WA, and ID filed an application to lethally take California sea lions (Zalophus californianus) that began preying on at-risk populations of anadromous salmonids (Oncorhynchus spp.) immediately below Bonneville Dam on the Columbia River, the National Marine Fisheries Service (NMFS) convened an advisory group to help decide on the application. Approval of the application had to fit Section 120 of the Marine Mammal Protection Act (MMPA). Sect. 120 was added in 1994 as a result of high predation by California sea lions on steelhead (Oncorhynchus mykiss) at Ballard Locks in Seattle, WA. The Pinniped-Fishery Interaction Task Force was formed in 2007, and I was asked by NMFS to represent independent science because I had experience with pinniped-fishery interactions, I was retired, and I was Past President of ORAFS, which was viewed as a relatively independent science organization. My presentation will cover the history of the predation issue at Bonneville Dam, recommendations by the Task Force in 2007, the Letter of Authorization (LOA) that was granted to the States, results of the States' implementation of the LOA to date, court decisions affecting implementation, and new recommendations from the Task Force (reconvened in late 2010).

While the LOA allowed the States to remove up to 85 California sea lions per year from 2008 – 2012, only 9, 15, and 14 were removed in 2008, 2009, and 2010, respectively. There has been no clear change in predation rates on anadromous salmonids during the last 3 years. There has been an increase in the presence of Steller sea lions (Eumetopias jubatus) near the face of the dam and they have shifted their diet preference from white sturgeon (Acipenser transmontanus) to anadromous salmonids. But Steller sea lions are protected under the U.S. Endangered Species Act.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Passage issues for lampreys: the straw that's breaking the eel's back?

Abstract

Both juvenile and adult lampreys encounter a variety of obstacles to passage during migration and movements in streams. Hydropower and other dams, culverts, irrigation diversion screens, and weirs can delay, obstruct, injure, or kill fish. However, the extent to which most structures affect juvenile and adult movements and survival is not known. For this talk, I will review some pressing issues and concerns related to passage of lampreys, including facilitating passage at dams, the inter-dam fate of migrating fish, the extent of spawning by fish prevented from passing upstream, the energetics of fish passage and migration, and the potential impacts of irrigation diversion screens on juvenile lampreys. Passage problems for lampreys may be the most serious impediment to the restoration and conservation of declining populations. Knowledge gained from passage and other studies should be considered when designing, modifying, or developing new structures to facilitate passage of lampreys throughout the Columbia River basin.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Evaluation of Sampling Designs to Monitor the Status of Great Basin Redband Trout in Eastern Oregon

Abstract

The summer 2010 field season marked the completion of the fourth of a six year sampling effort to assess the distribution and abundance of redband trout (Oncorhynchus mykiss newberrii) in the six interior basins of Oregon's high desert: Catlow, Chewaucan, Fort Rock, Goose Lake, Malheur, and Warner Valley Species Management Units (SMUs). This year also concluded the population level sampling for the Goose Lake and Warner Valley SMU's. Across all sampling years, sites were randomly selected using Generalized Random Tessellation Stratified (GRTS) design developed by the EPA which provides a random spatially balanced sample allowing for statistically rigorous evaluation of status, trend and distribution at multiple spatial scales. A total of 942 site surveys were conducted over the course of the study covering nearly 2% of the entire 2,420 km sampling frame. Populations of age+1 redband trout at the SMU level have remained viable but have declined since they were first intensively sampled in 1999 and throughout the course of this study. Estimates of overall landscape-wide average abundance of age+1 redband trout was of similar magnitude and had comparable precision across all study years, yet target levels of relative precision were met infrequently. Abundance at the SMU and population level showed substantial variation, both spatially and inter-annually. Site level fish densities (fish/m) sampled at repeatedly visited annual sites (2007-2010) show significant differences between years in some SMU's, reducing their usefulness as SMU (or population) level indexes. Despite the current study design falling short of target precision, this study design captures the yearly variation in abundance that would otherwise be missed if sampling occurred less frequently. Here we evaluate alternative sampling designs that would maximize data acquisition while allowing for estimates of yearly variation.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Matters of the Heart and Sex: Cardiac Stress Physiology in Rainbow Trout

Abstract

The heart is an essential organ for the survival of fish. Despite its physiological importance, little is known about the long-term effects of environmental stress on cardiac function in fish. Our goal is to understand how physical stress and endocrine disruptors affect gene expression in the heart. By studying differential gene expression, we can identify the underlying molecular mechanisms forming the basis for physiological change. We have found that the genes gcr2, nupr1, and junb increase in response to physical stress. Further, ethinyl estradiol, the active ingredient in birth control pills, and a known endocrine disruptor in fish, changed resting levels of cardiac genes vtg1, ER and AR following a 7d exposure. The implications and functions of these genes will be discussed. Our results illustrate that environmental stressors affect cardiac tissue in fish at the cellular level. In addition, physiological sex differences in juveniles are often assumed to be non-existent, causing sex to not be included as a variable during the design and analysis of experiments. However, in both our present and previous gene expression studies we have found differences between the sexes in immature rainbow trout. To this end, we will also discuss issues our laboratory has encountered on the methods of properly identifying the sexes.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Conservation Public Relations (CPR) for Pacific Lamprey: creating visual media tools to communicate the value of a little-known fish

Abstract

Currently among the general public there is a lack of knowledge and appreciation of the role Pacific Lamprey play in aquatic ecosystems throughout the Pacific Northwest. Unfortunately, because of invasive sea lamprey issues in the Great Lakes, most who have heard the term 'lamprey' have likely heard it in a negative context. This lack of knowledge combined with the negative perception of lamprey as a parasitic and invasive species presents a challenge to generating public support and understanding for efforts to conserve these native fishes. As scientists and conservationists ramp up efforts to understand and restore Pacific lamprey across the Pacific rim, there is a need to share with a broader audience the nature, ecological and cultural value, and conservation challenges of this ancient fish species. We will present preliminary imagery and plans from our ongoing collaborative effort to produce a suite of educational films and visual resources for various public audiences on the ecology and conservation of Pacific Lamprey.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

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Title

Monitoring the Human Dimensions of Marine Reserve Implementation in Oregon

Abstract

Over the last three decades Oregonians have been engaged in a protracted discussion about Marine Spatial Planning. In the last twenty years the discussion has centered on the protection of Oregon's natural marine resources and has taken on various labels such as marine gardens, conservation areas, marine sanctuary, and marine reserves. In 2008 Oregon's Ocean Policy Advisory Council called for public proposals for possible marine reserve areas along the Oregon coast. Six areas were selected as potential marine reserve sites. Two of the areas were recommended for designation as pilot marine reserve sites that would take effect July 1, 2011. The remaining sites were designated for further evaluation and stakeholder community teams were formed in 2009 to take on this task. The two "pilot" marine reserve sites were chosen because of the level of community engagement and the belief that these areas showed a diversity of habitats, species and ecological importance while closing the area to consumptive users would avoid adverse social and economic impacts. In order to understand the effects of closing these areas to consumptive uses, baseline information and data is being gathered on the socioeconomic aspects of these areas and a final monitoring plan will be released early 2011. This presentation will outline the monitoring activities in place for collecting baseline data and information and also present a plan for future monitoring at these and any new marine reserves sites implemented in Oregon. The Human Dimensions Monitoring Plan is in part based on the NOAA Framework for Monitoring and Assessing Socioeconomics and Governance of Large Marine Ecosystems (2000) as well as guided by existing literature and advisory input from social science experts.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Taxonomy, distribution and status of Alvord Basin chubs

Abstract

A recent discovery of a small population of chubs within a quarter mile of Borax Lake prompted an initial review of taxonomy and distribution of chubs in the Alvord Basin. The new population was within the wash-out channels of Borax Lake. We reviewed seven diagnostic characters previously used to distinguish Borax Lake chub and Alvord chub and found that all chubs in the new population fit the description of Alvord chub. The presence of Alvord chub in close proximity to Borax Lake suggests that contact between the two species is probably more common than previously suspected and raises several questions about potential interactions and reproductive isolation. We also used museum records to locate 24 historical sites previously known to support Alvord chub and examined BLM records showing 32 miles of stream channel where G. alvordensis have been sampled since 1934. Most of the sites were between the valley floor and the 4230 ft elevation of Pluvial Lake Alvord and located on private land. For those sites that were inaccessible, the closest point on public land was located and visited. Sites in the valley floor in the southern portion of the Alvord subbasin were dry, as was one site near Juniper Lake. Approximately 19% of formerly perennial stream is now dry throughout most years and only about 10% (2 sites) still had extant populations. The remaining sites were on private land or not sampled because of the presence of Lahontan cutthroat trout. Alvord chub have been considered a species of concern and this preliminary review suggests the need for a more comprehensive status review.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Migration Patterns of Adult Fluvial Bull Trout in the Methow and Columbia Rivers During 2007

Abstract

Detailed information on migration patterns of threatened bull trout Salvelinus confluentus is required to successfully implement conservation actions such as ESA consultations, biological opinions, recovery plans, hydroelectric operations, stream restoration, and fisheries management. In the Upper Columbia Recovery Unit during 2005, three agencies implemented or continued radio telemetry studies of adult fluvial bull trout. An informal voluntary collaboration between studies maximized the data gathered on each tagged fish. In 2007 a total of 36 fish were radio-tracked in the Methow Core Area, including 11 tagged by USFWS in the Methow River, 16 tagged by Douglas County PUD at Wells Dam, and 9 tagged by Chelan County PUD at Rocky Reach Dam on the Columbia River. Bull trout averaged 3.7 to 10.2 days to pass hydroelectric dams and the overall upstream migration rate in the Columbia River averaged 8.8 km/day. Bull trout entered the Methow River from May 22 to July 9, as flows declined from 10,500 ft3/s to 1,500 ft3/s, and upstream migration rate averaged 5.6 km/day. Pre-spawn migration in the Columbia River occurred mostly during day, but as migration progressed upstream in the Methow River movements shifted to night. The migration distances to spawning areas ranged from 15 to 227 km. Fidelity to spawning area was observed. Seasonal dry reaches affected bull trout movements and survival in tributaries. During post-spawn migrations, movements were mostly at night in the Methow River and shifted towards day in the Columbia River. Tagged bull trout successfully migrated downstream through hydroelectric dams on the Columbia River. Sixty-two percent of the Columbia-tagged fish wintered in the main-stem Methow River in 2007 compared to eight percent in 2006. All Methow-tagged bull trout wintered in the Methow River system. Understanding the factors affecting bull trout migrations is necessary to facilitate recovery in the Upper Columbia Recovery Unit.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

A PIT Tag Based Approach for Regional Monitoring of Adult Salmon and Steelhead Escapement at the Population and Major Popula Group Scales.

Abstract

The Integrated Status and Effectiveness Monitoring Project (ISEMP) initiated a project in 2009 to estimate escapement of adult spring/summer Chinook salmon and steelhead to tributaries in the Snake River using passive integrated transponders (PIT). Remotely operated interrogation sites, utilizing pass-by flat panel antennas, were located in nine strategic locations of the South Fork Salmon River (SFSR) and Lemhi River Basins. During the 2009-2010 return, migrating natural unmarked adult salmonids were systematically captured in the Lower Granite Dam (LGD) fish ladder and tagged with PIT tags. Tissue and scale samples were also collected from tagged adults to enable scale ageing and gender determination in cooperation with the Genetic Stock Identification (GSI) project conducted by the Idaho Department of Fish and Game. A total of 3,792 steelhead and 1,168 Chinook were tagged, representing 8% and 4 % of the retuning adults over LGD, respectively. Tributary estimates for steelhead were 1,885 (+ 53, 95% CI) in the SFSR and 578 (+ 93) in the Lemhi. Estimates for Chinook in 2010 were 7,005 (+ 350) in the SFSR and 175 (+ 0) in the Lemhi. However, these estimates do not include the variance associated with sampling at LGD. These efforts have recently been expanded to include PIT tag arrays in the Imnaha River, Grande Ronde River, Clearwater River, and upper Salmon River basins as part of a long term regional monitoring effort funded by the Bonneville Power Administration. When complete, the original nine ISEMP PIT tag arrays will be expanded to include a total of 26 individual remotely operated PIT interrogation sites to generate escapement estimates at the tributary, population, and major population group scales. When combined with the GSI project information, escapement estimates by age class and gender will be possible at multiple population scales.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Starting to assess the skill of hydrology models at simulating the water cycle in the HJ Andrews LTER: assumptions, strengths and weaknesses

Abstract

Simulated impacts of climate on hydrology can vary greatly as a function of the scale of the input data, model assumptions, and model structure. Four models are commonly used to simulate streamflow in the Pacific Northwest US: the MC1 Dynamic Global Vegetation Model which was originally designed to simulate ecosystem processes at the regional to global scale, the Variable Infiltration Capacity (VIC) model based on the physical representation of the hydrology cycle and used for regional assessments, the Regional Hydro-Ecologic Simulation System (RHESSys) model which was designed to address watershed scale coupling between hydrology and vegetation carbon and nitrogen cycling, and the Visualizing Ecosystems for Land Management Assessments (VELMA) model which was designed to address integrated responses of vegetation, soil, and water resources. We compare the four models between themselves and to streamflow records from the HJ Andrews Long Term Ecological Research site to show differences in their representation of water dynamics at the watershed scale. As a first step, we 1) document each model's needs (soil and climate inputs, initial conditions, spinup protocols), and 2) compare the readily available model results with H.J. Andrews observations.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Title

Application of Oregon's marine reserves process to Coastal and Marine Spatial Planning

Abstract

Managing Oregon's nearshore ocean environment has become increasingly complex as the state, key stakeholders, and coastal communities address emerging issues including: renewable energy development, changing fisheries, marine reserves, marine aquaculture, climate change, and ESA listings. Oregon is committed to addressing these issues through comprehensive coastal and marine spatial planning (CMSP), where conservation will be one of several foundational pillars. Establishing and studying a system of marine reserves in Oregon is a key part of this conservation portfolio. Lessons learned from Oregon's implemented community based marine reserve process can inform other state, regional, and national level implementation of CMSP. This talk will focus on the policies that led to the marine reserves implementation process and future steps for marine conservation in Oregon. This talk will close with an application of lessons learned from this community based process to other state implementation processes as well as how to address federal CMSP goals and priorities.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Evidence of Distinct Chinook Salmon Populations in the Nehalem River

Abstract

Anecdotal evidence suggests that the Nehalem River has both a summer and fall run of Chinook salmon, Oncorhynchus tshawytscha. Historically, the summer run is thought to be a small component of the Chinook run on the Nehalem which is currently managed as a fall Chinook fishery. The Oregon Department of Fish and Wildlife (ODFW) Coastal Chinook Research and Monitoring Program is funded by the Pacific Salmon Commission's Chinook Technical Committee Sentinel Stocks Program. The overall goal of this program in the Nehalem basin is to develop a cost-effective and reliable method of estimating annual spawning population sizes. To accomplish this, we first conduct mark-recapture experiments within the basin to generate population estimates with some known degree of precision and accuracy. These estimates are then compared with traditional spawning ground surveys to obtain a calibration factor. This calibration factor is used in the future in conjunction with a suite of spawning ground surveys to develop annual population estimates and forecasts for upcoming years. In an attempt to dissect the contribution of the summer vs. the fall run we used unique batch marks spread across the marking period. Recovery of these unique marks was recorded during the recovery of carcasses. We also collect genetic samples from the marked live fish and carcasses. With two years of a five-year study completed our data is showing the summer run is likely a more significant component of Chinook in the Nehalem basin and is a genetically distinct population from the fall run in the Nehalem. The exact spatial and temporal distribution of the two runs is becoming more evident as we collect more data. For management purposes, this means we will need to develop two population estimates and possibly adjust the fishery accordingly.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Three Sisters Irrigation District Fish Passage, Screening and Restoration Project

Abstract

The Whychus Creek watershed was historically one of the most important spawning areas upstream of the Pelton Round Butte complex, providing excellent habitat for spring chinook salmon and summer steelhead. The Three Sisters Irrigation District (TSID) diversion is the largest and oldest diversion in the watershed, responsible for diverting up to 90% of summer flow and significant fish entrapment.

The TSID diversion is on ODFW's top ten list of unscreened diversions throughout the state. It was also a complete barrier to up and downstream fish passage. A partnership was formed between the Upper Deschutes Watershed Council, the USDA Forest Service, TSID, funders and other partners to implement an innovative fish passage/screening and channel restoration project. Project goals include: providing up and downstream fish passage at the dam, retrofitting the diversion to provide fish screening and restoring 1,400 ft of Whychus Creek below the dam to improve habitat and overall stream function while reducing erosion.

Two parallel projects are being implemented concurrently; re-building and retrofitting a private irrigation diversion originally built into the TSID dam with a state and federally approved fish screen and a water conservation project that will pipe the TSID canal to protect approximately 6 cfs of water instream.

The comprehensive project utilized innovative passage, screening and restoration techniques including construction of a roughened channel for fish passage, a Farmer's Conservation Alliance fish screen and raising the entire bed of the existing channel to achieve river restoration goals. The project highlights the effectiveness of collaboration between irrigation districts, federal and state agencies and non-profits in designing and constructing a fish passage, fish screening and river restoration project.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

1Whychus Creek Restoration through Camp Polk Meadow

Abstract

Since the installation of hydroelectric dams near Warm Springs in the 1960's, steelhead, chinook and sockeye salmon have been missing from the upper reaches of the Deschutes, Metolius and Crooked Rivers. Whychus Creek was responsible for up to 40% of the steelhead spawning, with the potential for up to 9,000 spawning fish. With the recent federal dam relicensing renewal, new provisions for fish passage are expected to return anadromous speciess above the dams.

Historical accounts of spawning in Whychus Creek have identified the Camp Polk reach as one of the most productive spawning areas. However, in an effort to prevent flooding, the US Army Corps of Engineers channelized Whychus Creek as it flows through the Camp Polk meadow in the 1960s. The channelization resulted in a net loss of stream length, an increase in erosion, and a significant loss of fish habitat, wetlands and floodplain area.

Up until the late 1990s, irrigation withdrawals caused certain reaches of Whychus Creek to frequently run dry. Starting in the late 1990s, restoration partners have made concerted efforts to restore instream flows. These flow restoration efforts have been critical for habitat restoration projects to reach their full potential.

In 2006, the Upper Deschutes Watershed Council began leading a diverse team of professionals and partners to develop a project that would restore a more natural channel dimension, pattern and profile to enhance fisheries and wetland habitat. In summer 2009, this collaborative effort culminated in the implementation of the first phase of a three year restoration project. Phase I work included floodplain regrading (over 35,000 yds), over 1.2 miles of new channel construction through the meadow and planting of over 110,000 native plants along the new channel margin.

A video presentation will highlight the comprehensive Camp Polk Meadow Restoration Project.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author

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Co-Authors

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Title

Predicting the response of stream fishes to water use, land cover and climate change with spatially-explicit metapopulation models

Abstract

River regulation, water use, and land development are among the foremost problems faced by aquatic resource managers. Identifying and quantifying their effects on aquatic communities is crucial for evaluating potential conservation strategies. Broader-scale influences, such as climate change, also can affect water quantity or alter the seasonality of flows. We developed landscape-scale models to predict the effects of flow and thermal alteration on the persistence of fish communities in the Chattahoochee River basin, Georgia. The modeling approach integrates geology, geomorphology, hydrology, and landscape characterizations within the basin. Existing data sets have been used to allow regionalization of results to other watersheds while minimizing additional data collection. Hydraulic and ecological models were linked to predict persistence of fish species under future scenarios of flow alteration, land-use effects, and climate change. We intend this as an adaptive framework, within which model components will be iteratively improved with better understanding of mechanisms linking land use, hydrology, and aquatic biota, to provide useful guidance to natural resource managers.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Testing the Ability of Native Cutthroat Trout to Pass Through Small Culverts on Steep Slopes

Abstract

State and federal fish passage assessments often assume that culverts of even modest slopes and velocities are barriers to upstream passage of salmonids. Preliminary research under controlled conditions demonstrate that native coastal cutthroat trout can move upstream through conditions that would be judged complete barriers using widely applied and accepted fish passage criteria. Our work suggests that the fish are exploiting boundary layers within the culvert that provide more favorable hydraulic conditions than average bulk velocity calculations presume. This presentation provides a preliminary summary of research from a detailed set of passage trials designed to test the ability of native cutthroat trout to move through culverts typical of those used on forest roads. Research is ongoing and trials are expected to be complete in 2011.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Endangered sucker distribution and relative abundance in reconnected wetlands and open water areas adjacent to the Klamath River, Oregon

Abstract

Juvenile fish in the Keno Impoundment section of Klamath River experience stressful conditions when water quality degrades during summer months. However, a wetland recently reconnected to the river may provide refugia for fish. We sampled fish and measured water quality in the reconnected marsh, the open Klamath River, and the marsh river fringe areas in between. Fish were captured using hoop-type fyke nets set randomly throughout all three habitats; water quality data was collected at the marsh and fringe sites along with three fixed open water sites. A total of 70 juvenile, endangered suckers (family Catostomidae) were captured from mid-July to mid-September in a total of 76 net sets. Total sucker catch was highest in marsh habitat, but catch rates for suckers, and nearly all other species, were highest in fringe habitat. Mean sucker length was 56 ± 17 mm (standard deviation), indicating nearly all suckers captured were young of the year. Catches were numerically dominated by fathead minnow Pimphales promelas, tui chub Gila bicolor and brown bullhead Ameiurus nebulosus. Two thirds of nets were dominated by one species, suggesting species are unevenly distributed within restored marsh areas. Temperature extremes were greater in the marsh than in fringe habitat. Dissolved oxygen concentrations reached lethal levels in both marsh and fringe areas. Dissolved oxygen in the marsh was similar to fringe areas in July and September, but dissimilar during August. Catches did not appear to be correlated to dissolved oxygen or temperature. Studies to further quantify fish population dynamics in newly restored areas of Keno Impoundment will require larger efforts than we were able to provide for this work.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Short-term, small-scale studies of life-history responses as tools for effectiveness monitoring of instream habitat restoration.

Abstract

In-stream habitat restoration is a commonly employed technique locally, regionally, and globally for the recovery of impacted stream fish populations; however relatively few of these restoration projects is followed by monitoring to determine the project's effectiveness. In the Entiat River (Washington, USA), in-stream habitat restoration structures were installed to enhance juvenile rearing habitat, particularly for chinook salmon (Oncorhynchus tschawytscha) and steelhead (O. mykiss). To complement large-scale, census-based monitoring in several treated and untreated reaches in this basin, we examined density-dependent individual growth and movement for both species in small-scale assays using replicated structures in a single treated and similarly sized pools in a single untreated reach over two study seasons. In the first study season, fish density declined substantially with time in both reaches and each species responded differently to reaches with habitat structures. In both years, chinook salmon were substantially more abundant in the treated reach than in the untreated reach, but steelhead were more variable in their habitat use patterns. Change in fish density over time made estimates of density-dependent growth problematic, but we did find that movement patterns were both density- and habitat-dependent. Fish tended to move less frequently in the treated reach relative to the untreated reach, which is suggestive of higher habitat affinity despite increased density in pools with structural enhancement. The growth rates of steelhead in each reach suggested a different carrying capacity for treated vs. untreated reaches, despite the lack of difference in steelhead density between reach types. Our results suggest that microhabitat scale, within-reach studies of restoration treatments might be necessary to detect impacts to fish populations, although further analysis and more data are required to establish this conclusively.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Using beaver to help recover an ESA-listed steelhead population

Abstract

We report results from a long-term restoration and monitoring program to help recover ESA-listed steelhead (Oncorhynchus mykiss) in the John Day basin in eastern Oregon. We use a novel restoration technique, working with beaver (Castor canadensis), to restore an incised, degraded high desert stream that has a small native steelhead population. Beaver build dams that, if they remain intact, result in substantial alteration of stream hydrology, geomorphology and sediment transport. Observations in our study site suggest that beaver dams: 1) increase pool frequency and depth, 2) increase stream sinuosity and sediment sorting, 3) lower stream temperatures, 4) increase floodplain connectivity, 4) raise water tables and increase groundwater recharge, and 5) increase the extent of riparian vegetation. Our restoration strategy is to provide beaver with low-cost instream structure so they can build stable dams, and also to create structures that mimic certain aspects of beaver dams in sites where vegetative or geomorphic conditions are not currently ideal for beaver colonization. The long term goal is to convert a linear, entrenched, simplified stream into a sinuous, structurally complex stream that is reconnected to its floodplain, with the assumption that such improvements to habitat will lead to a detectable population-level increase in the steelhead that utilized the system. Although we only have one year of post treatment data, initial results suggest that in treated reaches, the physical characteristics of the stream are generally moving towards our desired goals relative to untreated control reaches. However, due to the high natural interannual variability in steelhead numbers, it will likely be years before we are able to detect a significant change in the steelhead population.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Status of Coho Salmon (Oncorhynchus kisutch) in the North Fork (NF) Nehalem River Basin, OR from 13 Years of Life-Cycle Moni

Abstract

Since 1998, as part of the Oregon Plan for Salmon and Watersheds, the Oregon Department of Fish and Wildlife (ODFW) began estimating abundance and freshwater and marine survival rates of coho salmon (Oncorhynchus kisutch) in the North Fork (NF) Nehalem River basin. Adult fish are trapped in a ladder located at Waterhouse Falls, 20 km from the mouth, and at a ladder at Fall Creek Falls, 6.5 km upstream of Waterhouse Falls. Both waterfalls are partial migration barriers to upstream anadromous migration so a Petersen mark-recapture method is used to estimate annual adult coho salmon spawners. Coho fry and smolts are trapped and marked (i.e. caudal clip) using rotary screw traps installed downstream of each ladder during spring and abundances are estimated using weekly trap efficiency trials pooled for the entire season. Wild coho salmon spawner abundance upstream of Waterhouse Falls ranged from 612 - 4,851 adults ($\bar{x}$ = 1,617 adults), with the two highest spawner abundances (2,094 and 4,851 adults, respectively) and marine survival (9.7% and 16.3%, respectively) estimates occurring in the last two years of monitoring. Coho smolt abundance upstream of Waterhouse Falls ranged from 20,804 to 44,710 out-migrants, with fewer smolts produced since 2005 (21,579 to 29,793 smolts). More smolts were produced in the upper sub-basin (upstream of Fall Creek Falls) than the lower sub-basin (between Waterhouse Falls and Fall Creek Falls) despite the fact that the lower sub-basin contains more rearing and spawning habitat. Reduced smolt production in the lower sub-basin is correlated with high stray rates of hatchery coho from Nehalem Hatchery (~ 3 km downstream) into the area between the traps. Future monitoring will allow us to determine if smolt production increases following recent years of high adult spawner abundance and if the trend for increased spawners in the basin continues.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Reintroduction of Spring Chinook into the Walla Walla River Basin

Abstract

Spring Chinook were extirpated from the Walla Walla Subbasin more than 75 years ago due to over appropriated stream flow, loss of habitat and inadequate fish passage. Today, the Umatilla Tribe and others are working with the local community to restore the subsistence, economic, religious and cultural values of salmon. The Tribes spring Chinook re-introduction program is modeled after its successful Umatilla Fisheries Restoration Program and consists of: 1) habitat and flow restoration, 2) best hatchery management practices, 3) monitoring and evaluation, and 4) adaptive harvest management.

The Tribes management goal is to reintroduce natural spawning spring Chinook populations to the Walla Walla Subbasin in order to provide Tribal and sports tributary harvest. The Tribes spring Chinook reintroduction goal is to meet a return average of 5,500 adults back to the mouth of the Walla Walla River to produce about 2,800 spawners. Bench-mark criteria towards meeting this goal include: 1) a 10 year geometric mean (GM) of 1,100 natural origin spring Chinook returning to the upper mainstem and South Fork Walla Walla Rivers, 2) adult productivity above replacement and 3) a Smolt to Adult Return rate greater or equal to 0.55 percent.

In 2010, total spring Chinook spawning escapement was estimated at 1,196 continuing an upward trend. Adult to adult replacement (1.11 +/- 0.33) for naturalized spring Chinook was achieved for the first time with the 2005 brood year. Total smolt production to McNary Dam has ranged from 54,134 to 112,586 since 2005. Overall mean SAR for PIT-tagged natural and hatchery origin spring Chinook were both 0.30 back to the Walla Walla River.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Sex biased parasitism among threespine sticklebacks in lake Myvatn, Iceland

Abstract

Lake Mývatn in Iceland is a shallow eutrophic lake that supports diverse populations of threespine stickleback, including distinct morphs adapted to different benthic habitats. It is fed by both warm and cold springs creating a large temperature gradient. The different morphs of stickleback typically inhabit either lava rock or muddy bottom substrates. Through observation, female stickleback appeared to be more heavily parasitized than males, which led to our hypothesis that female threespine stickleback would show a greater rate of infection than males. We collected 81 fish (>50 mm) from two coldwater sites and separated them by sex. We examined each fish for the parasite Schistocephalus solidus. After dissection each parasite load was counted and weighed to determine total load and ratio to body weight. We found that males typically had higher counts of S. solidus, and also a greater ratio of parasite to body weight.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Use of In-line Fish Separators at the Round Butte Dam Downstream Fish Facility

Abstract

All fish attempting to emigrate from Lake Billy Chinook are captured at the Round Butte Dam downstream fish facility as the powerhouse intakes are fully screened. Captured fish need to be sorted by size for safe handling, automatic release of sockeye/kokanee fry, and to reduce predation in the holding raceways. To facilitate automatic, in-line separation by size, we constructed a series of three separators using parallel bars of different diameter and spacing within the flow line. Fish screens reduce the 6,000 cfs capture flow down to a 12 cfs fish transport flow. This flow passes through a large fish separator where salmonids greater than 15 inches long are removed before the remaining fish and transport flow is elevated using a hydrostal fish pump. At the beginning of the head works, floor and wall screens reduce the flow from 12 to 6 cfs. The medium fish separator then shunts salmonids between 8 and 15 inches into the medium fish holding raceways. Salmonids smaller than 8 inches long (mostly smolts), pass through the bars of the medium fish separator. These fish enter a flume where bottom screen removes half, or 3 cfs of the remaining transport water. Remaining flow and fish soon encounter the small fish separator and 0.5 cfs with the small fish (2.5 to 8 inches) pass over the separator and down a flume into the small fish raceways. Most fry (<2.5 inches) pass through small fish separator bars with the 2.5 cfs flow, and are released back into the reservoir. During September 2010, the dewatering screens in the small fish flume were replaced by secondary fry separators to increase fry separation efficiency. Separator systems and 2010 evaluation studies will be further described during the presentation.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Modeling of the ceratomyxosis cycle of Chinook salmon in the Lower Klamath River.

Abstract

In the Klamath River (KR) the disease ceratomyxosis is one of the factors impacting the survival of out-migrating juvenile salmon. This disease is caused by the myxozoan parasite Ceratomyxa shasta. C. shasta is endemic to the Pacific Northwest and requires a salmonid host and a freshwater polychaete host (Manyunkia speciosa) to complete its life cycle. Over the past ten years, our laboratory has studied the distribution and densities of both the parasite and the polychaete host within the Klamath system and monitored the severity of disease in juvenile salmon. Recently, there has been a concerted effort between state, federal and tribal agencies to determine the effect of this parasite on the juvenile salmon at a population level. The data collected during this monitoring effort has been utilized in a mathematical model we developed to examine the basic host-parasite interactions necessary for C. shasta to complete its life cycle. From this model, we will be able to determine a basic reproductive number (R0) for ceratomyxosis. Along with R0, we will conduct a sensitivity analysis to determine which parameters may be the most important in the disease transmission and therefore would be targets for interrupting the parasite life cycle. This information can aid future research and management efforts in minimizing the impact of C. shasta on Chinook salmon in the Klamath River.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Mined-Over Matter: Side channel and pond construction in reclaimed mine site benefits coho salmon in southwestern Oregon

Abstract

In 2009, the U.S. Forest Service and Illinois Valley Watershed Council/SWCD constructed a 0.4 mile-long side channel along Sucker Creek, a major anadromous fish-bearing stream in the Illinois River sub-basin in southwestern Oregon. The side channel was excavated in a floodplain heavily impacted by previous placer mining activity. We connected a well-vegetated 0.25-acre former mining settling pond to the side channel to create off-channel winter rearing habitat, primarily for threatened coho salmon. The side channel was built with pools, large wood structures, and spawning glides with over 400 cubic yards of gravel added. Monitoring revealed rapid use of the side channel by spawning coho salmon at densities more than three times greater than corresponding mainstem channel sections.

The following summer, coho parr densities were 2 to 10 times higher in the side channel (0.3 fish/yd2) than mainstem channel reaches. However, side channel coho densities were reduced by 50% by late summer due to desiccation and presumed mortality. Almost 90 coho salmon parr were captured in the pond in early summer 2010. By late summer, coho catch per effort in the pond was reduced by 95%. Pond diel hypoxia may have played a role in fish use as nighttime dissolved oxygen reached low levels (<2 ppm) in the benthos and marginal levels (=5 ppm) near the pond surface. Pond benthic water temperatures remained cold throughout the summer (~55°F) and were 10-15 °F colder than the pond surface. Although less abundant, late summer coho parr in the pond were substantially larger (14-23 mm longer) than fish in mainstem or side channel pools. Constructing habitats that can handle a wide range of flow regimes presents challenges, although this project met or exceeded all intended objectives. Off-channel habitat projects should consider varying seasonal needs of fishes and ensure connectivity between habitats.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Gravel augmentation feasibility below a large, southern Oregon dam; worthy investment or waste of time?

Abstract

Gravel augmentation below dams is growing in popularity as a watershed rehabilitation technique to replace degraded salmonid spawning habitats. We prepared a feasibility study to examine the potential for introducing gravel below Applegate Dam in the mainstem Applegate River in southwestern Oregon. The Applegate River is the second largest tributary to the Rogue River and provides habitat for several salmonid species and other native fishes. The Applegate River was impounded by Applegate Dam, creating the 988-ac Applegate Reservoir in 1980. We were interested in understanding the amount and quality of sediment trapped by the reservoir, historic and current gravel abundance and permeabilities below the dam, changes in average substrate size distribution, and fish spawning metrics. It was estimated over 9 million cubic yards of sediment were trapped by the reservoir between 1980 and 2010, of which at least 14% was spawning-sized gravels. Substrate surveys of the first five miles below the dam revealed gravel was 5 to 8 times less abundant in 2009 than in 1972 prior to dam construction. In 2009, gravel was twice as abundant in potential spawning areas in the lower river than in sites close to the dam. Although spawning-sized gravel was relatively scarce in the upper reach of the Applegate River below Applegate Dam, permeability measurements were comparable throughout the river suggesting the dam had little impact on spawning gravel quality. Chinook salmon spawning densities varied greatly and were related to gravel abundance and proximity to the dam. Immediately below the dam, densities exceeded 150 redds per mile; however these densities fell sharply to less than 5 per mile about 0.25 miles below the dam, staying low before normalizing at 20-40 redds/mile about 4 miles below the dam. Cost-benefit analyses for gravel augmentation and habitat limiting factor modeling results will also be discussed.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

three year effort to improve rearing habitat for the Chinook salmon

Abstract

As part of a three year effort to improve rearing habitat for the Chinook salmon juveniles being reintroduced to the upper Deschutes River Basin, whole trees were added to 6.7 miles of the upper Metolius River at 160 sites. Each site received from 1 to 15 pieces of wood from the year 2008 to 2010. Project objectives were to increase slow water rearing habitat and cover for juvenile Chinook and other salmonids. We used a BACI (Before After Control Impact) design to examine the effects of adding wood to existing riffle or run habitats. Twenty project sites and twenty paired control sites were night snorkeled before and after the wood placement. Velocity, depth, overhead cover, substrate size and number of logs were recorded at fifteen of the control and fifteen of the project sites before and after the wood placement. Numbers of Chinook salmon ($p<0.05$) and redband trout ($p<0.1$) using the project sites significantly increased after the wood placement, while bull trout numbers did not significantly change following wood placement. Velocity measured along three transects at each site decreased in the project sites following the addition of large wood with velocities at the middle transect where wood was most often placed decreased significantly ($p<0.1$). Overhead cover significantly increased following the wood placement ($p<0.1$). Although velocity decreased in the project sites, there was not a significant correlation with the change in fish abundance. There was a significant correlation between salmonid numbers and the percent of substrate <6mm ($p<0.1$). The accumulation of smaller particle sizes in stream systems is often a function of slower velocities. These results indicate that adding woody debris has increased rearing areas for Chinook and redband trout in the Metolius River. Future sampling of these sites following high water events may detect more significant habitat changes over time.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Willamette BiOp Spring Chinook Life-History, In-Reservoir Studies: 2010 Pilot Study

Abstract

The Willamette Reservoirs Project was created in support of implementation of the Willamette Biological Opinion. Our primary objective is to determine how U.S. Army Corps of Engineers (USACE) impoundments in the Upper Willamette Basin affect juvenile spring Chinook (Oncorhynchus tshawytscha) distribution, movement, and growth. The information presented here was collected during the 2010 pilot-studies in Cougar and Lookout Point reservoirs. We have documented that at least two age classes of juvenile Chinook are common within these reservoirs throughout the year, indicating that not all juvenile Chinook are emigrating out of the system during their 'normal' smolt window. Preliminary results also suggest that 1) fry (~36 mm) are mainly distributed at the head of the reservoirs early in the spring, but some travel quickly and survive the 7.0 km journey to the dam face early in the year, 2) juveniles rearing in the reservoir initially grow faster than those that rear in streams, however by the end of summer (Aug) river rearing fish are nearly equal in size, 3) and during summer periods of high surface temperatures, juvenile Chinook descend below the thermocline to rear. In addition, 4) during the Fall (Oct-Dec) reservoir rearing Chinook juveniles continue to grow quickly while stream rearing fish do not exhibit growth during the same time period. These data provide insight into the life-history characteristics of juvenile Chinook in USACE reservoirs that will aid in developing management strategies to recover these populations. Pilot studies have also emphasized the need for additional research tasks, including investigation of temporal Upper Willamette Spring Chinook diet, and pisciverous fish community and diet within the reservoir.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Coastal Cutthroat Trout in the Northern Oregon Cascades: variable habitats and behavior, and an underwater perspective.

Abstract

Powerpoint and underwater video presentation of coastal cutthroat trout habitats, behaviors, and life histories in the Northern Oregon Cascades. Data, images, and video are from coastal cutthroat trout monitoring conducted on the Mt. Hood National Forest beginning in 1998.

Fish surveys were conducted on lakes and first and second order streams on the western slopes of the Cascade Range, adjacent to Mt. Hood. Elevations ranged from 1000-4000'. Behavior and life histories varied from lotic and lentic habitats.

Freshwater life-history forms present were fluvial-adfluvial, lacustrine, lacustrine-adfluvial, and a resident, non-migratory form. Anadromous cutthroat trout are also suspected to occur.

A video of the fish and habitats will also be presented. Eight-minutes in length, it is targeted at the high school level, college, and above. Using underwater imagery along with subtitles and music, the video reveals fish habitat and behavior from an underwater perspective.

From this video, it is hoped that students and laypersons will gain a better understanding of, and appreciation for, cutthroat trout/salmonids and their habitats in the Northern Oregon Cascades.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Seasonal size distribution of three-spined stickleback in an intermittent/perennial stream system

Abstract

To better understand patterns of habitat use by fish in an intermittent stream, we have been investigating the early life history of three-spined
stickleback (Gasterosteus aculeatus). We collected three-spined
stickleback and other fishes using dipnets, seines and minnow traps
during the summer low-flow period across an array of sites ranging from
perennial to intermittent in a single tributary of Oak Creek near
Corvallis, OR. Three-spined stickleback were the most widely detected species within the tributary, occurring in isolated headwater pools, free-flowing perennial reaches, and beaver ponds. All three-spined stickleback were measured for standard length, and a sub-sample of fish were retained for otolith increment analysis to assess length-at-age and relative growth rates. Size distributions of three-spined stickleback indicate the possibility of multiple broods over the summer period. A relatively mild winter thermal and flow regime within this tributary might augment survival of late-hatching fry, expanding the spatial and temporal extent of suitable reproductive habitat for three-spined stickleback in this system. We are examining patterns in relative growth of larvae to test this hypothesis.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

A Species Crediting Methodology that Supports Conservation Banking for an Threatened Floodplain Minnow

Abstract

Conservation banks are permanently protected lands that contain habitat elements critical to the protection and recovery of federally listed species. These banks are managed in perpetuity and used to mitigate impacts occurring elsewhere to the species' habitat. We developed a species crediting methodology to assess conservation credits and debits for the endangered Oregon chub (Oregonichthys crameri) to support conservation banking. Our methodology is based on prior studies assessing relationships between population abundance and habitat parameters for the species. The methodology also incorporates ratings for piscivory risk, site location, and the abundance and status of existing and proximal populations. Our approach assigns more credits to functioning bank sites that support abundant, stable populations and requires more credits when impacted sites negatively affect these populations. We provide examples showing the credit value calculations for determining baseline conditions and for assessing impacts to species habitat. Additional examples illustrate the incentives for creating habitats that support abundant, stable populations and the incentives for reducing the severity and duration of impacts to habitats. As the demand to develop prime fish habitat increases and as more conservation banks are developed, managers may benefit by developing similar crediting methodologies to promote adequate compensatory conservation for imperiled species.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Evaluation of direct electronic data entry in the field using a digital pen

Abstract

Direct electronic capture of fisheries data in the field can significantly improve speed and accuracy of converting data into electronic format for analysis, but many electronic instruments have drawbacks that may lessen their appeal to biologists. Biologists often express concerns over reliability and the potential to lose data, difficulty seeing screens in some light conditions, awkward keyboards or touch screens, and the need to carry additional gear in the field. All of these concerns are potentially eliminated by using a digital pen with character recognition software to directly capture data in an Excel spreadsheet in the field and at the same time leave a permanent written field sheet as backup. This potential was tested during 2010 through field use of the pens by Columbia River Inter-Tribal Fish Commission and the Nez Perce Tribe; Montana Game, fish and Parks; and the Pacific States Marine Fisheries Commission. The pens proved to be rugged and reliable, with no problems associated with battery life, data download, cold weather, or even brief immersion in water. The accuracy of character recognition was acceptable, at about one to two errors per filled sampling form, and the software provides easy options for comparing the written data with the interpreted data. Costs for the technology differ based on the number of pens and the platform (stand alone or 'cloud' based) used. Basic standalone cost for one pen and one copy of the software is approximately $1,400. If 5 or more pens are used, there are significant added advantages and lower cost per unit through the cloud computing option. Results in 2010 were successful and encouraging, and more pens will be deployed in 2011.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

Author Meeting: ORAFS11

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Presenting Paper *Student: False*

Co-Authors

Title

Measuring Redd Superimposition by Summer Chinook to Quantify Impacts on Spring Chinook

Abstract

Inter- and intra-specific competition and use of spawning habitat has been commonly observed in salmonids. While spawning surveys have documented such cases, no technique for measurement has been suggested to quantify the amount and to what extent this shared use of spawning habitat has on the progeny. This study was designed to examine the extent of redd superimpostion that occurs between two runs of Chinook salmon. Reviews of published methods for redd measurement and superimposition will be presented, leading into this studies utilization of a Survey Grade Total Station. Specific measurements on area of redds, maximum excavation depth, volume of displaced gravel, percent of area superimposed and location of superimposition were all recorded. Data was then used to answer 1) total percent of summer Chinook redds superimposed on spring Chinook redds, 2) statistical differences between the two runs excavation depths, area and gravel displacement, and 3) location of superimposition (i.e. within the pit, hump or tailings). The ultimate goal of presenting this method is to aid other researchers on how to measure redd superimposition.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Presenting Paper *Student: False*

Co-Authors

Title

Lower Snake River Dams Review: Broaching the Option of Breaching

Abstract

Dam removals across the West have included completion of small and medium projects, implementation of large-scale projects such as the Elwha/Glines Canyon dams, and early planning for other larger-scale removals such as Klamath River dams. Compared to these efforts, the option of breaching or removing four dams on the lower Snake River to help recover salmon and steelhead populations is at an early conceptual stage, despite being part of the recovery dialog for the last 15 years. Although preliminary planning for breaching the Lower Snake dams was initiated in the early 2000s, this effort was soon put aside because other recovery measures were emphasized by federal agencies and because it became derailed by social and political controversy. The topic of dam breaching has tentatively re-emerged in the most recent Biological Opinion documents, although even the study of breaching the dams has been relegated to “a contingency of last resort”. With limited information on which to assess technical, physical, and biological effects of breaching the dams, the stated objective of using “best available science” to develop recovery options will be elusive. Members of the American Fisheries Society at the Chapter and Western Division levels have called for study and serious consideration of breaching dams as a viable recovery option. Breaching the Snake River dams would require a large amount of work and planning. In an effort to move forward, what can we learn from other dam removal projects about sedimentation effects, and how can fisheries scientists best work with other disciplines to initiate comprehensive scientific investigations and assessment of dam breaching?

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Perspectives and Possibilities: Chinook Life Histories and Willamette River Restoration

Abstract

Perspectives about restoration of rivers can be shaped by knowledge of native fish. Research on juvenile spring Chinook in the Willamette River basin is changing the perspective of how these fish are using the river. Juvenile Chinook exhibit a broad diversity of rearing and migratory life histories, each using the river in different ways and at different times of year. Chinook migrate to the Willamette River as newly-emergent fry, subyearlings, and yearlings. Fish may rear in the river for as little as one month up to eighteen months or longer before emigrating. Two year classes of juvenile Chinook simultaneously rear in the river from January through mid June and use different types of habitats. Fry use edges of the river in shallow water, whereas older and larger fish rear closer to the current in deeper water. Seasonal changes in flow and temperature also influence the habitats used by juvenile Chinook. Areas of the Willamette River with active channels provide diverse habitats for multiple size classes of juvenile fish. A variety of seasonal habitats including cold water refuges, side channels, and floodplains are also found in these active areas. Restoration actions that conserve or restore habitat diversity in the Willamette River will be important, but fish must be able to access these habitats. Because flow in the Willamette River is directly affected by operation of dams in the basin, spatial and temporal connectivity will be influenced by flow management decisions. Insights about life history of juvenile spring Chinook can inform decisions about restoration actions and priorities. Life history diversity provides resilience for Willamette Chinook populations. Maintaining this diversity by protecting and restoring diverse habitats will help to insure the continued persistence of Willamette spring Chinook.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Natural Summer Steelhead Survival and Recovery in the Umatilla River Basin

Abstract

The Umatilla River steelhead (Onchorhynchus mykiss) population is believed to be substantially reduced compared to pre-European settlement due to agricultural development and was listed as threatened in 1999 by NOAA Fisheries. A comprehensive rehabilitation program was implemented by co-managers in the late 1980s to supplement steelhead and reintroduce extinct salmon populations. The Juvenile Salmonid Outmigration and Survival Project was established in 1994 to assist in monitoring outcomes of the rehabilitation program. Monitoring was conducted via smolt trapping and PIT tag interrogation at Three Mile Falls Dam (TMFD). Long-term trend data (1995-2010) for natural steelhead smolt abundance and survival, smolts-per-female, egg-to-smolt survival (ESS), and smolt-to-adult return (SAR) were assessed. Smolt abundance remained constant across 15 years even with 63,017 ± 2,828 juveniles estimated in 2010, the highest since 2002. Smolt survival within the Umatilla (37.5%) and from TMFD to John Day Dam (63.8%) was less than desirable. Smolts appeared to be shifting toward a shorter residency time in the system and age-specific size was correlated with egg deposition ($R^2 = 0.63$, P-value = 0.06 age-1; $R^2 = 0.82$, P-value = 0.01 age-2). The SAR trend was increasing and at 2.8% or above in most years. Female escapement increased while number of smolts produced per female decreased. ESS was declining and correlated with summer base flow ($R^2 = 0.51$, P-value = 0.01). Stock-recruitment analysis indicated smolts produced by spawners during any brood year appeared to be limited to approximately 50,000 to 80,000 smolts. These results suggested that density-dependence was a likely mechanism regulating size at emigration. Analysis also suggested that habitat enhancement has not resulted in a significant improvement for steelhead and that the system may be at capacity for production of the species.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Habitat Status and Trends Report: Evaluation of Salmon Habitat Restoration and Iterative Planning using Ecosystem Diagnosis & Treatment

Abstract

Habitat restoration is a continuous improvement process aimed to address historic and ongoing degradation, and to protect against future loss. Current observations of habitat status are influenced by historic conditions, long-term degradation, and recent changes in conditions. Within the Columbia Basin, and in some coastal systems, Oregon's salmon habitat restoration actions were developed based on watershed plans developed 5-15 years ago using Ecosystem Diagnosis & Treatment (EDT). Since that time a large number of restoration actions have been implemented, while some habitats have been further degraded. At the same time monitoring and evaluation has reduced information gaps providing an opportunity to learn from specific actions in specific ecosystems. EDT prescribes an iterative process for incorporating this new information, and updating the treatment plan until programmatic objectives are achieved. This learning process is essential in closing the adaptive management cycle. To that end the EDT workgroup developed an "Ecosystem Status & Trends" report which provides an overlay of environmental diagnostics with an estimate of change in attribute sensitivities for each diagnostic-unit, life stage, and the population as a whole. The report describes the change in environmental conditions relative to the influence of each limiting factor on capacity, productivity, and life history diversity. In cases where the nature and intensity of site-specific restoration actions are known the status and trends results can be used to evaluate action effectiveness, and to improve restoration prescriptions accordingly. The overall effectiveness of habitat restoration can be evaluated in terms of the improvement (or degradation) in condition, prevalence of limiting attributes, and severity of impairment. The system can be used to demonstrate accountability at multiple scales, and to more fully integrate habitat restoration programs with adaptive planning processes.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

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Title

Life history responses of Oncorhynchus mykiss to selective processes in early life

Abstract

Territorial fish can experience strong density-dependent displacement and mortality during initial stages of territory establishment and defense. During this time, often described as the "critical period" for salmonids, faster metabolism can give fish a competitive edge. Consequently, metabolic rate may be a trait under strong selection during early ontogeny. Metabolic rate is also associated with life history expression in partially migratory salmonids, providing a connection between performance early in life and the eventual expression of alternative life histories. In a series of experiments in simulated streams, we test the effects of fish density and the predictability of food resources on selection for otolith size-at-emergence (an index of relative metabolic rate) and explore connections between phenotypic selection during the critical period and subsequent adoption of anadromous or resident life histories in Oncorhynchus mykiss.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

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Title

Effectiveness of Electro-fishing as a Tool for Removal of Brook Trout from an East Slope Cascade Mountain stream; Threemile Cree Klamath County, Oregon

Abstract

Brook trout occupying Threemile Creek have been identified as adversely impacting an isolated bull trout population through hybridization and through competition for food and space. Intensive multi-year electro-fishing and snorkel spearing efforts were successful at eliminating brook trout and hybrid trout from a bull trout occupied reach above an impassable culvert. In 2009, an electro-fishing effort was initiated to remove brook trout from below the barrier. The single season effort was unsuccessful in complete removal of brook trout. This presentation describes the effort that would be required for successful brook trout removal using electro fishing techniques in comparison to the use of a fish toxicant (rotenone).

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Executing Innovative Fish Passage Solutions to Restore Corridor Connectivity

Abstract

River Design Group, Inc. has collaborated with a diverse clientle to implement innovative and traditional fishways on tributaries in the Willamette River and Upper Deschutes River watersheds. Fish passage solutions are completed to restore stream corridor connectivity in systems impacted by culverts and dams that do not meet state and federal fish passage criteria. Example solutions include step pool, streambed simulation culvert, roughened channel, and concrete fishway designs. Designs are tailored to work in concert with site constraints and aim to minimize maintanence requirements while ensuring volitional fish passage for target species including Chinook and coho salmon, steelhead, cutthroat trout, among others.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

A comparison of riparian and terrestrial invertebrates at the upper Trask watershed, a managed coastal watershed

Abstract

The Trask Watershed study is a multi-agency long-term study examining the effects of harvest on small headwater streams in the upper Trask River basin. These fishless streams are tightly coupled aquatically with downstream reaches and terrestrially through the riparian and upland forest. Our pre-harvest study, beginning in 2006, explored temporal and spatial differences in the distribution of aquatic and terrestrial invertebrates in 14 tributaries of the upper Trask. Upstream assemblages of benthic invertebrates collected in 2006-2008 were distinctive from those downstream, and spring assemblages tended to be different than summer ones. However, there were no differences in benthic composition between tributaries in the watershed. Benthic invertebrate biomass measured in 2009 and 2010 declined during the year, from April – August; there were no significant differences between upstream and downstream biomass in April or June. Emergence of adult aquatic insects were collected as twice weekly samples taken in summer 2008 and 2009 at 4 sites. There was considerable variation in emergence patterns between sites and years, and emergence rates were generally higher in early July compared to later in the summer. Flying insects, including aquatic and terrestrials, were collected in malaise traps adjacent to streams and upslope at these same sites. Adults in these traps tended to be more abundant in the riparian zone compared to upslope. Dominant riparian songbirds (Swainson's Thrush and Pacificslope Flycatcher) were mistnetted most frequently in the riparian zone, but bird fecal samples contained almost no aquatic adults. The higher bird capture rates near the stream may be linked to the higher invertebrate-prey availability in riparian areas, and provide added evidence for the importance of riparian habitats to biological diversity.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Environmental effects on smolt quality and early male maturation in spring Chinook salmon

Abstract

The plan for developing a supplementation program for spring Chinook salmon in the Hood River includes experimental rearing of fish at 3 different facilities: Parkdale Hatchery (CTWSN), Carson NFH, and Pelton rearing ladder (ODFW) in order to determine an optimal rearing strategy. Each facility combines a unique set of rearing conditions with variations in temperatures, feeding regimes, water flow and raceway design. These differences result in varying rates of early male maturation and smolt development. An initial size check (n=300) was conducted in October of 2009 with more in depth physiology sampling starting in January and continuing through release in April. At each sampling point 25 fish from each treatment group were sacrificed. Size data, gill tissue (for determination of ATPase activity) and plasma (for the determination of IGF1 levels) were collected approximately bi-monthly. In addition, a large collection of fish (n=300) was obtained just prior to release for assessment of plasma 11KT levels. The values were then used to determine the proportion of fish released that were early maturing males (minijacks). In this talk we will report on minijacks rates and ATPase activities of Hood River stock fish reared at Pelton, Carson, and Parkdale as well as Deschutes stock fish reared at Pelton and Carson stock fish reared at Carson. We will attempt to provide insight into how differences in rearing resulted in differences in smolting and early male maturation.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

Using trap catches of salmonid smolts migrating downstream to index population abundance: does it work?

Abstract

Quantifying the number of salmonid smolts migrating to the ocean can offer critical insights into population dynamics, stock performance in freshwater and potentially, effects of stream and watershed restoration. Downstream migrant traps and mark/recapture techniques are typically used to determine smolt population abundances on a weekly and seasonal basis. Given enough consecutive study years, population data is tested for trends over time to determine whether the smolt populations are increasing, decreasing, or remaining stable. However, a major obstacle can occur when mark/recapture experiments fail, and when the resulting point estimates (of abundance) are considered unreliable. I analyzed techniques that used total catch data instead of population data for trend analysis purposes, using eleven consecutive years of smolt data collected in a free flowing coastal stream supporting wild Chinook salmon and steelhead trout. Results showed that catch data closely followed population data on a weekly and seasonal basis for both 0+ Chinook salmon smolts and 2+ steelhead trout smolts. The same conclusions drawn from testing trends in population data occurred when using catch data. For 0+ Chinook salmon, both catch data and population data showed a non-significant trend ($p > 0.05$), and for 2+ steelhead trout, catch data and population data showed a significant, negative trend over years ($p < 0.05$). In those cases where mark/recapture assumptions cannot be met, or when sparse data lead to unreliable point estimates of abundance, trap catch data may prove to be useful to draw inferences about population trends.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Co-Authors

Title

The Deschutes Restoration Outreach Program (DROP): Empowering and Training Adults to be Active Watershed Stewards to Serve Strategic Restoration Needs

Abstract

This presentation will be focused on a new outreach program initiated by Trout Unlimited, but serving a diversity of agencies, non-profit partners, and their Upper Deschutes projects. The DROP Program has been designed for college students, our transitioning workforce, and other interested adults who seek knowledge, training and experience for work in the watershed restoration field. The program provides 10 hours in training and 30 hours of field time each season to all interested adults, creating a team of "Deschutes Basin Stewards" who give back to watershed through active service and leadership on key efforts. During 2009, 55 adults participated in the outreach program and provided over 500 hours in volunteer service. Stewards from the Outreach Program supported a mix of monitoring work, active stewardship work (including clean ups, riparian plantings, non-native weed removals, and riparian fencing projects), and teaching watershed ecology through field trips and events. Project work, trainings and field projects are coordinated with a diversity of partners, including Oregon State University, Deschutes and Ochoco National Forest, Oregon Department of Fish and Wildlife, Upper Deschutes Watershed Council, Deschutes Land Trust, and the Bureau of Land Management. This presentation will share the planning and pedagogy behind the program, where program leaders use service learning to meet college curriculum and student development needs, while also meeting community and watershed service needs. In this growing field of volunteerism and citizen science, we hope participants will be willing to also share best practices from their basin to engage and empower adults from your community to support goals and needs to restore your local watershed.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Freshwater residence of adult Pacific lamprey in a coastal Oregon river basin

Abstract

The freshwater life history of adult Pacific lamprey remains largely undescribed, particularly in Oregon coastal streams. We used radio telemetry to investigate freshwater migration, holding, and spawning of adult lampreys in the Smith River (Umpqua River basin). We radio tagged 91 adults caught in a fish ladder trap at Smith River falls (RK 48) from April to July in 2006-07 and 2009-10. Fifty-six were tracked to holding locations distributed 3 to 72 km upstream of Smith River falls. Individuals began holding from June through August, were strongly associated with glides, disproportionately used boulders as cover, and experienced summer temperatures as high as 30 C. From 1 November to 7 March, 75% of holding fish moved at least once. Winter movements were mostly upstream, ranged 0.1 to 22 km, and were associated with high flow events. We tracked 38 fish into the second spring (>March 7). They began moving from winter holding locations between 9 March and 28 April (median, 10 April). We recovered three spawned out carcasses and seven fish were observed spawning in April and early May. Most movement in this period (89%) was in a downstream direction and spawners were seen on redds between 0.4 and 16.8 km downstream of their holding locations. We observed lampreys spawning on multiple redds as far as 16 km apart. Substantial mortality of tagged fish occurred in April through June. We estimated at least 51% was due to predation. To evaluate the effects of radio tagging in 2009, we PIT tagged all radio-tagged lamprey plus 56 others and installed a detection antenna at RK 67. Radio tagging, relative to PIT tagging, did not significantly affect short-term survival or movement into the upper basin.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Distribution of Ceratomyxa shasta genotypes in the Pacific Northwest

Abstract

The myxozoan parasite Ceratomyxa shasta (Cs) is endemic to the Pacific Northwest and causes varying degrees of mortality among local salmonid stocks. Recently, markers were identified in the ribosomal operon that correlates to four distinct genotypes (I, II, III, and 0). These different genotypes in turn have been shown to have host-specific pathogenicity. This finding has prompted us to re-evaluate this parasite in other endemic drainages. In several rivers, removal or upgrades of dams is proposed so that they no longer serve as barriers to fish passage. This creates the potential for introducing previously isolated parasite genotypes into new habitat. Sentinel fish exposures in the Willamette and the Deschutes Rivers of the Columbia Basin with a variety of native trout and salmon species were used to assess the distribution of these specific genotypes and their pathogenicity for salmonids present in these systems. Analysis of parasite DNA from water samples and returning adult spawners provided additional data from these rivers and other locations in the Pacific Northwest. The Deschutes River study identified salmonid species that were resistant to Cs, and revealed that one strain of Cs infected a broad range of salmonid species. Studies in the Willamette River revealed that there is seasonal variation in the presence of different Cs strains, which is likely linked to the life cycle of the salmon. The effects of Cs on different salmonids, including habitat and seasonal effects can be used in stocking strategies and assessing the potential risks associated with dam removal.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

A stable isotope food web analysis of a Mojave Desert geothermal spring system supported by allochthonous inputs and exhibiting longitudinal algal d 13C enrichment

Abstract

Shallow streams with open canopies are most frequently supported by autochthonous production due to the labile nature of algae. We identified dominant energy sources in the Muddy River Warm Springs area, Clark county, NV using carbon and nitrogen natural abundance stable isotope analyses. We examined specific food resources for the critically endangered and endemic Moapa dace (Moapa coriacea). We also looked for changes in isotopic ratios over the stream gradient. The Muddy River Warm Springs are, in fact, supported primarily by allochthonous energy sources, despite its small size and relatively open canopy. M. coriacea is a general drift feeder, and did not focus on specific invertebrate taxa. We characterized a pattern of downstream d 13C enrichment, which is seemingly common in groundwater-fed systems but discussed very little in the literature. A number of physical and biological factors contribute to a wide range d 13C values in primary producers and in the downstream enrichment pattern in the Muddy River Warm Springs. These factors include ground water carbon of marine origin, heterotrophic respiration, and fractionation and depletion of the d 13C pool by autotrophs.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Disease Resistance of First-Generation Hatchery and Wild Steelhead Trout (Oncorhychus mykiss) to Infectious Hematopoietic Necro Virus

Abstract

Salmonid hatcheries have been used to supplement wild stocks for conservation of threatened species and enhance sport fisheries programs, but the effects of hatchery practices on population fitness have not been comprehensively assessed. In this study we tested for differences in disease resistance between groups of hatchery and wild ancestry by challenging them with Infectious Hematopoietic Necrosis Virus (IHNV), a significant salmonid pathogen in the Pacific Northwest. Wild steelhead (W) and first-generation hatchery steelhead (H; produced by WxW crosses in the previous generation) from Hood River, OR were used in a 2x2 matrix spawning design to create fish of four genetic backgrounds, WxW, HxH, WxH and HxW. These unmarked genetic groups were pooled together to create a blinded trial, two exposure groups and one unexposed control were replicated three times. All IHNV exposure groups were challenged to a single dose of ~2.4 x 10-4 plaque forming units, which achieved approximately 50% mortality. Mortalities and survivors are compared according to hatchery/wild origin and family membership.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Passage of juvenile fall Chinook salmon past lower Snake River dams during winter

Abstract

Each year some juvenile fall Chinook salmon in the Snake River deviate from their typical subyearling life history pathway, delay seaward migration, and overwinter in lower Snake River reservoir. Because juvenile fish bypass facilities are not operated during the late fall and winter, there is little information on the passage of these fish, which would take place through the turbines during this time of year. We conducted a passage study using radio-tagged fish during the winters of 2004-2006, in which fish were collected and tagged in the forebay of Lower Granite Dam and their passage was monitored using radiotelemetry at the four lower Snake River dams. We documented winter passage past each dam, which varied by year and dam. In 2006, 13% of our tagged fish exited the Snake River and passed Bonneville Dam. Passage was highest at Lower Granite Dam (>80% of tagged fish) and decreased at each successive downstream dam. Passage generally decreased from November through to March, but then increased as fish resumed seaward migration in late March and April. Many of the fish passed the dams when fish bypass facilities were not operated, or passed via spill during spring and would have not been detected by traditional monitoring. Winter passage is likely the result of non-directed movement and chance encounters with the dams rather than directed seaward migration.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Year-class regulation of mid-upper Columbia River spring Chinook salmon Oncorhynchus tshawytscha

Abstract

Early ocean residence is assumed to be a critical period for juvenile Pacific salmon Oncorhynchus spp. However, specific mechanisms regulating growth and survival have not been identified for most populations. The growth-mortality hypothesis, which addresses mechanisms of early marine survival, was evaluated for mid-upper Columbia River spring Chinook salmon using ocean-caught juveniles collected in 1999-2008 (except 2001 and 2005). The mechanisms comprising the growth-mortality hypothesis are contained in the 'bigger is better', 'growth-selective predation', and 'stage duration' hypotheses. These mechanisms were evaluated with four metrics describing juvenile condition and migration history: 1) size at freshwater exit; 2) size at ocean capture; 3) initial ocean growth rate; and 4) freshwater exit date. Retrospective estimates of size and growth using otoliths rely on otolith and somatic size proportionality, which was evaluated using eight juveniles with known history. Fish length and otolith width were positively correlated ($r > 0.92$) as were estimated and observed growth rates ($r = 0.96$). Annual adult abundance (-2 yr lag) at Priest Rapids Dam on the Columbia River, a proxy for survival, was related to mean size at capture ($r2 = 0.59$, $p = 0.03$) and growth rate ($r2 = 0.74$, $p = 0.006$), providing support for bottom-up population regulation. Growth during the early ocean period accounted for more of the variation in future year-class abundance than size attained during freshwater residence. Growth rate was negatively related to the multivariate El Nino southern oscillation index, an index of ocean conditions ($r2 = 0.53$, $p = 0.04$), but not to physical or biological indices of the transition to upwelling conditions, which indicate the beginning of seasonal productivity ($p > 0.25$). Future studies should address the influence of migration timing and ocean conditions on growth to further elucidate the mechanisms of early marine survival for Chinook salmon.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Examining the Potential for Overcompensation by the European Green Crab, Carcinus maenas

Abstract

Overcompensation, or the hydra effect, is when an increase in adult mortality results in an increase in the number of individuals in a given population. In at least one instance overcompensation has occurred as the result of efforts to control invasive species. The European green crab, Carcinus maenas, is native to Western Europe but is now found throughout the world. This species and other destructive non-indigenous species are the targets of current efforts to remove them from their non-native ranges, but there has been no effort to determine if they might overcompensate. Species that overcompensate can still be reduced/ eradicated from discrete areas, but require a larger percentage of the population be removed. Failure to remove a sufficiently large percentage could lead to severe ecological and economic consequences. Therefore it is imperative to determine if a species might increase as a result of harvest. Species that exhibit strong negative interactions between adults and juveniles are more likely to overcompensate. In an effort to examine the overcompensation potential of C. maenas, three experiments were performed during the summer of 2010 in Bodega harbor, CA. These experiments examined cannibalism rates by C. maenas with and without alternative prey, survivorship of juvenile C. maenas at varying adult densities, and impacts of the presence of adults on the foraging rates of juveniles. While adults were not found to have strong direct impacts on juveniles, foraging rates of juveniles were found to decrease in the presence of adult conspecifics. Further analysis of adult impacts, specifically survivorship at extremely high density and further replications of the foraging work, are necessary to understand how adult removal will affect juveniles.

Oregon Chapter AFS Annual Meeting 2011 Abstracts

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Title

Larval Pacific Lamprey (Entrosphenus tridentata) Exposed to Port of Portland Sediment: Method Development for Monitoring Behav Individual Growth, and Survival and Preliminary Results

Abstract

Nothing is known about the effects contaminated sediment from Portland Harbor may have on larval Pacific Lamprey (Entrosphenus tridentata). This pilot project aimed at developing experimental methodologies that could assess effects of contaminated sediment on growth of ammocoetes held individually in the laboratory. In addition, we are providing some initial results from behavior trials utilizing sediments collected from the Portland Harbor Superfund site. The initial research focused on a) potential effects of chronic exposure to contaminated sediment on survival and growth and b) whether or not ammocoete behavior demonstrates a preference of uncontaminated over contaminated sediments. Ammocoetes collected from the Siletz River were transferred to the Fish Performance and Genetics Laboratory in Corvallis, Oregon, and acclimated in large holding tanks. Weight change was comparable in ammocoetes held individually in 3", 4" or 6" diameter mesh bags and those tested as a sympatric group in larger tanks. As part of tests aimed at optimizing feeding, we found that a Baker's yeast slurry supplemented with a larval fish diet injected into the sediment yielded substantial growth when compared to providing the same feed formulation just on the surface of the sediment or by introducing biologically conditioned well water to the tanks. Initial results from sediment exposure trials demonstrated that growth was predominately observed in Siletz River sediment, no statistical difference was found between contaminated and control hatchery pond sediment. Preliminary behavioral trials indicated a preference for Siletz River sediment over both contaminated and control hatchery pond sediments. Rearing and experimental methods developed from these trials are being used to conduct bioassays on ammocoetes exposed to sediment collected from a number of areas within the Portland Harbor Superfund site, including "clean" reference sites to establish effects on survival, growth, and sediment preference.

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Title

Black rockfish (Sebastes melanops) Pit Tagging in the primary recreational fishery off of Newport, Oregon.

Abstract

Successful sport bottomfishing seasons in Oregon's nearshore waters are driven by the abundance and availability of black rockfish (Sebastes melanops). From 2002 to the present, the Oregon Department of Fish and Wildlife, Marine Resources Program has tagged black rockfish in the nearshore waters off of Newport, Oregon. To date the project has tagged nearly 30,000 fish. Daily catches from the charter and recreational fisheries are scanned for tagged fish. We have recovered 2445 tagged fish. These fish are collected and processed for length, sex, maturity, internal and external condition, tag migration, and extraction of the physical tag. Tag recoveries are used to assess the fishery population size by using the Brownie Model for recovered marks. The Brownie model can estimate an annual survival rate and recovery rate. Using these statistics an annual exploitation rate and an estimate of abundance of black rockfish off of Newport can be determined. Results from this study were used in the 2008 stock assessment for Black rockfish. An investigation of movement by black rockfish will be assessed by using positional data from 154 previously tagged fish which were caught a second time during the tagging season. In 2010 the study will begin electronic data collection.

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Title

The Clackamas Basin in Three Dimensions: an educational watershed model

Abstract

The Clackamas River Basin Council was pleased to receive an Education & Outreach grant from the Oregon Chapter of the American Fisheries Society to construct a three-dimensional watershed model. CRBC staff and AmeriCorps interns used topographic maps, watershed atlases, and watershed assessments to create a scaled watershed model of the Clackamas basin. Details such as fish hatcheries, dams, and land use are showcased on the model.

The model is being used as an educational tool for Clackamas basin residents. It showcases the concepts of watershed boundaries, nonpoint source pollution, and the importance of tree canopy in a hands-on, interactive way. Furthermore, students and residents are able to identify exactly where they live in the watershed, connecting them to place.

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Title

Abundance, distribution, and timing of Lower Columbia River "Tule" Fall Chinook in Oregon

Abstract

Fall Chinook of the lower Columbia River Basin are listed as a "Threatened" species under the US federal Endangered Species Act. While the ESU includes nine distinct populations on the Oregon side the only wild fall-run population with a good historic abundance data set is in the lower Sandy River. Spawning ground counts have been conducted in other lower Columbia River tributaries within Oregon, but the information is mainly from hand selected "standard" surveys and has been confounded by the presence of large numbers of unmarked hatchery fall Chinook released from Big Creek, Bonneville, and Washington hatcheries. Oregon began 100% marking of hatchery fall Chinook with the 2006 brood year. The 2011 spawning year will be the first return where hatchery adults are 100% marked, allowing for the first time a comprehensive survey of wild (unmarked) fall Chinook in Oregon basins. During the 2009 and 2010 spawning seasons exploratory work began to establish an ongoing monitoring program for fall Chinook escapement in the Oregon portion of the Lower Columbia River ESU. Site selection and survey methods mirrored those used by Oregon for coho spawning ground surveys in the Lower Columbia. Surveys were conducted weekly from the beginning of September to mid-December during both years. Information on population abundance and timing was confounded by the presence of Spring Chinook in some populations, trouble meeting survey protocols on main-stem float surveys, and variation in spawning residence time among populations. Preliminary results suggest high proportions of hatchery fish in most all populations, distributed in close proximity to hatcheries.

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Title

Juvenile coho salmon movement, habitat use and growth in a small coastal watershed of southern Oregon

Abstract

Juvenile salmonids display highly variable spatial and temporal movement patterns that are influenced by density dependent (e.g., competition, predation) and density independent (e.g., genetics, stream discharge, physical habitat conditions) factors. The effects of these factors differ with fish life history stage, but will ultimately affect how salmonids utilize freshwater nursery habitats and influence their size at smolting. Although juvenile coho salmon movement patterns and their relationships with body mass have been previously examined, the spatial scale considered in most studies has been that of the stream reach. In this study, we monitored the movement of PIT tagged juvenile coho salmon throughout an entire southern Oregon coastal watershed to identify the prevalent resident vs. nomadic strategies these fish may adopt and to examine possible relationships between those strategies and fish body mass, growth and survival. Specific objectives include: 1) to describe seasonal juvenile coho salmon movement patterns in a coastal sub-basin; 2) to estimate the prevalence of each movement type; 3) to establish whether seasonal growth rates and late summer fish body mass correlate to habitat quality; 4) to determine if there is a relationship between growth rates or fish body mass and movement strategy; and 5) to examine whether apparent survival is affected by movement strategy type. Results of the first year of research reveal clear differences in movement patterns exhibited by juvenile coho salmon inhabiting estuarine, tidally affected and riverine habitats. Juvenile coho salmon with highly mobile strategies were larger and grew faster than sedentary individuals. These preliminary results suggest that mobile juvenile coho are not necessarily competitively inferior and represent a viable segment of stream populations. In a broader context, variable spatial patterns reflect the capacity for plastic behavior in salmonids and the importance of maintaining diverse freshwater and estuarine nursery habitats.

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Title

Trends in pre-spawning mortality of spring Chinook salmon in tributaries of the Willamette River

Abstract

Spring Chinook salmon in the Willamette drainage migrate into the river in spring and must survive until fall, when they spawn. Because these fish must hold in the river and in spawning tributaries through summer and early fall, they are vulnerable to stressors that may lead to mortality prior to spawning. Pre-spawning mortality is highly variable within the upper Willamette Basin, although surveys conducted by Oregon Department of Fish and Wildlife have revealed trends among tributaries and years. Within years, Chinook salmon consistently have lower pre-spawning mortality in the more normative rivers than in rivers that have been highly altered. The overall pattern of mortality among the different subbasins has remained consistent, although pre-spawning mortality among years can be variable. For example, pre-spawning mortality in some years was especially low across all sub-basins. We continue to investigate potential factors that affect these trends and our data suggest that pre-spawning mortality is affected by factors both within and outside of the Willamette Basin. Pre-spawning mortality was generally higher downstream of passable dams than upstream of them and hatchery fish typically had higher pre-spawning mortality than wild fish. Causative factors affecting pre-spawning mortality are likely to be complex and cumulative. However, environmental conditions in the Willamette River and spawning tributaries, especially water temperature, are likely to be important. High pre-spawning mortality in Willamette spring Chinook is a critical limiting factor that affects the viability of populations, therefore understanding the causes will be an important component for successful recovery.

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Title

A landscape scale human disturbance classification for 6th field HUCs in the Pacific Northwest

Abstract

We used landscape-scale GIS measures of human activity to develop a hierarchical disturbance classification for the 8438 sixth-field HUCs in the Pacific Northwest. We used national GIS coverages to estimate the percent of each HUC in urban land use and agricultural land use, and road density and impervious surface density in each HUC. Each of the four disturbance measures were log transformed and then scaled to a range of 0 to1. A flexible Beta clustering on the scaled measures produced a balanced dendrogram, with the top-level division distinguishing low disturbance from high disturbance HUCs. The low-disturbance cluster divided into an essentially undisturbed cluster and a low disturbance cluster. The low disturbance cluster divided into a moderately low disturbance cluster and a very low disturbance, but moderately well roaded cluster. The top level disturbed cluster divided into five clusters that describe a moderately- to highly-disturbed landscape gradient, and distinguished between typically westside and eastside disturbances, and between urban and agricultural disturbances. Finally we relate this disturbance classification to our previously developed natural landscape classification and to a network of intensively monitoring watersheds across the Pacific Northwest.

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Title

Who needs complex bioassessment indexes when EPT taxa richness will do?

Abstract

Biological assemblage indexes, such as the index of biotic integrity (IBI), the observed to expected species ratio (O/E), and the assemblage tolerance index (ATI), are currently viewed as "gold-standards" for biological assessment of aquatic ecosystem condition. However, these indexes can be difficult to develop, to apply to new field collection data, and explain to the lay public. Prior to the development of these indexes, many practitioners used the number of mayfly, stonefly and caddisfly (Ephemeroptera, Plecoptera, and Trichoptera; EPT) taxa to indicate stream health. In this talk we use macroinvertebrate assemblage data from 119 Willamette Valley ecoregion sites and 443 western Oregon mountains ecoregions sites to evaluate the IBI, O/E ratio, ATI, and EPT taxa richness at both the genus level and family level of taxonomic resolution, for both the valley and the western mountains ecoregions. We evaluated each indicator's responsiveness to human disturbance and repeatability. Distributions of EPT richness scores showed essentially the same patterns among site disturbance classes as did the IBI and ATI scores in both regions. Biological condition classes (Good, Fair, Poor) based on IBI and EPT richness agreed for 80% of the Mountains sites and for 78% of the Valley sites. Indicators developed at family level taxonomic resolution performed nearly as well as those develop at the genus level.

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Title

Estimating endangered sucker passage at a high-tech fish screen: Using diel presence to assess seasonal abundance

Abstract

The A Canal is the largest agricultural diversion in Oregon and draws water from Upper Klamath Lake, the location of the largest populations of two species of endangered catostomids: Lost River sucker Deltistes luxatus, and shortnose sucker Chasmistes brevirostris. A fish screen was installed at the A Canal intake in 2003 and includes a pumped bypass that returns screened fish to the lake. To estimate seasonal fish abundance at the screen we sampled the whole bypass using consecutive 30 minute net sets repeated for 24 hours (diel samples). Diel sampling efforts were conducted once every three weeks from July to October 2010. We took additional 30 minute samples each week beginning 30 minutes after sunset (sunset samples) from May to October. Relative sucker presence peaked near sunset for all diel samples, and then decreased throughout the night. However, suckers were present in relatively high numbers throughout the night during peak seasonal abundance, which occurred in mid-August. Estimating total sucker abundance at the A Canal fish screen when presence is low can likely be accomplished with a limited number of 30-minute samples taken near sunset. However, estimating sucker abundance when presence is high will require more sampling throughout the night because diel patterns of sucker presence change with increased abundance. Determining the seasonal timing of peak sucker presence at the A Canal fish screen can be accomplished with weekly sampling at 30 minutes after sunset, but does not provide sufficient information to estimate total abundance. Diel catches of other fishes, such as tui chub Gila bicolor, sculpin Cottus spp., and fathead minnow Pimephales promelas were higher at night, with tui chub and fathead minnow presence peaking at sunset. Blue chub Gila coerulea were captured throughout the diel cycle.

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Title

Migratory and Passage Assessment of Spring Chinook Salmon in the Lostine River Using Radio-Telemetry Techniques

Abstract

Radio telemetry was used to determine the migration behavior of adult Chinook salmon in the Lostine River during the 2008 return year. The purpose of the study was to assess potential impediments to upstream passage and examine other characteristics of migrating salmon as they moved toward their spawning grounds. Fifty five fish were tagged during the course of the study at the Lostine River weir site. Forty seven of those fish supplied relevant data for assessment. Fixed telemetry sites and stream flows at specific irrigation diversion were monitored during the migration season. Mobile telemetry surveys were also conducted to detect tagged fish between and above fixed sites. The Clearwater and Sheep Ridge diversions were not barriers to migrating salmon during stream flows experienced by fish in 2008. Fish were able to pass over the Clearwater structure during stream flows as low as 28 cfs and as low as 36 cfs at the Sheep Ridge structure. Passage delay was evident in terms of time needed to cross over the structures. Fish arriving at the Clearwater Diversion required a mean time of 7 hours and 9 minutes to pass over the structure. The mean duration of upstream passage over the Sheep Ridge Diversion was 3 hours and 24 minutes. Eighty six percent of tagged fish were able to pass above the diversion structures on the first attempt. Fish moving upstream of the weir traveled an average of 9.5 km after release. Fish arriving at the Lostine River weir during the later part of the run moved faster upstream than earlier arriving fish. Final tag locations did not correspond to typical Lostine spawning locations. The relationship between when a salmon enters the Lostine River and where it eventually spawns is not yet clear.

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Title

Unraveling Migratory Behavior and Habitat Use in Adult Pacific lamprey of the Willamette Basin

Abstract

Pacific lamprey, Entosphenus tridentatus, populations are declining significantly in the Pacific Northwest. These native fish are important not only to the structure and health of the river systems in which they reside, but also culturally to Native Americans. Data on adult Pacific lamprey migratory biology is severely limited although much needed for informing conservation initiatives. We report on preliminary results of our second year of research on the migration behavior and habitat use of radio-tagged adult Pacific lamprey in the Willamette Basin above Willamette Falls. Fish were tracked by boat throughout the mainstem above Willamette Falls. Tracking by airplane was also done on the mainstem Willamette and its major tributaries. During 2009, 43% (125 of 294 radio-tagged fish) were detected in the mainstem Willamette River. Fish were distributed throughout the basin, but most detections occurred in the lower river with many in the deep, slow-moving Newberg pool. Of the detected fish, 61% held in the same location over a period of several weeks to months, the majority of which held in equal proportions in either rock revetments or in the main channel. By contrast, in 2010 which was a comparatively high flow year, 57% (125 of 219 radio-tagged fish) were detected in the mainstem Willamette River and were more evenly dispersed throughout the mainstem. Of the detected fish, 90% held in the same location over a period of several weeks to months. Habitat use also shifted in 2010 with the majority of detected fish holding in the main channel followed by rock revetments. Plane surveys during the spring and summer of 2010 suggest that the Santiam River system and the mainstem Willamette are popular destinations, either for continued holding or spawning. These data suggest that lamprey migration behavior varies in tandem with river flow.

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Title

Freeing the Rogue River - the Gold Ray Dam Removal

Abstract

A dam removal-restoration team comprised of Slayden Construction Group, Inc., River Design Group, Inc., and HDR, Inc. was retained by Jackson County Roads and Parks to prepare a plan for removing Gold Ray Dam located at RM 125.8 on the Rogue River near White City, Oregon. Project elements included developing environmental studies, procuring necessary permits, removing Gold Ray Dam, and restoring unhindered fish passage at the project site. A detailed fish passage and salvage plan was developed to minimize non-passage conditions for less than three days throughout the duration of the project. Additional work included restoration planning for Kelly Slough, Tolo Slough, and the confluence of Bear Creek, a tributary to the Rogue River upstream of the former dam site. The dam removal-restoration team completed all project planning and the dam removal in a one year timeframe. Target fish species included Southern Oregon Northern California coho salmon, spring and fall Chinook salmon, and summer and winter steelhead.

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Title

Bull Trout Population Dynamics, Life History, and Response to Dam Alterations and Fishery Management Efforts in the South Fork McKenzie River Basin

Abstract

The South Fork McKenzie River holds an isolated bull trout population that was deemed at high risk of extirpation in the 1990s. ODFW implemented changes to stocking and angling regulations, and the USACE made modifications to Cougar Dam that brought dramatic habitat changes to Cougar Reservoir and the South Fork McKenzie River. Construction of water temperature control and upstream fish passage facilities afforded the opportunity to study this population and monitor the effects of construction and operation of these facilities. We used several methods to assess distribution, abundance, and movements of bull trout in the project area over the past decade. Radio telemetry indicated adults overwintered in Cougar Reservoir, began upstream migration in late spring, and briefly entered a single spawning tributary in September before rapidly returning to the reservoir. Trapping in 2001–2004 indicated juveniles emigrated from the spawning tributary primarily at age-0 (March–May; point estimates = 2,800–7,800 annually) and age-1 (May through July, 80–400 annually), and highest densities in the mainstem occurred within two miles of this source. Trapping results indicated that spawners averaged 590 mm FL (218–815 mm, 90% >500 mm) and returned up to 7 consecutive years. Extreme reservoir drawdown in 2002–2004 resulted in some stranding mortality and a substantial rate of downstream passage, but we manually recovered and transported most bull trout detected in the tailrace. Annual redd counts increased from =13 prior to 1999 to 25–35 during 2000–2006. After completion of temperature control facilities, we detected few bull trout below the dam, and new upstream passage facility yielded only one bull trout in 2010. However, redd counts increased to =70 in 2009 and 2010. Improved population status likely owes to combined effects of fisheries management changes and resumption of normal reservoir operations.