Oregon Chapter AFS Annual Meeting 2009 Abstracts

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Title

An Overview of Decommissioning of the Bull Run Hydroelectric Project

Abstract

In 1999, Portland General Electric (PGE) made the decision to decommission their Bull Run Hydroelectric Project in the Sandy River Basin, Oregon. As part of decommissioning, PGE committed to removing Marmot Dam located on the mainstem Sandy River and the Little Sandy Dam on the Little Sandy River. Deconstruction of the dams was carried out in 2007 and 2008 and represented a significant moment in the history of hydropower in the Pacific Northwest. This presentation will provide an overview of deconstruction activities with emphasis on fisheries issues. Specifically, the presentation will cover the decision to remove the dams, removal of the dams, and fish protection measures taken during and immediately following deconstruction and breaching. Finally the presentation will summarize changes to hatchery and fisheries management within the basin related to removal of the dam.

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Title

Exploring bull trout habitat relationships: where do we need to go from here?

Abstract

Identifying factors affecting the distribution and abundance of bull trout remains to be an important step in recovery and management plans across its native range. Over the past 15-20 years there has been a significant amount of research to identify bull trout habitat relationships across a variety of scales, including microhabitat, channel-unit, reach, and watershed. Despite this growing body of literature, there is an evident need to synthesize these efforts and evaluate the consistency of bull trout habitat relationships across large spatial scales, particularly where hierarchical filters (i.e., temperature) are met. Here we synthesize past efforts and use field data collected as part of the Pacfish/Infish Biological Opinion (PIBO) Effectiveness Monitoring Project within a classification tree analysis (CTA) to help identify differences in stream habitat in networks currently occupied and unoccupied by bull trout. We use reach-level habitat data and perform two separate analyses. First, we consider differences in stream habitat in areas where landscape attributes (i.e., watershed size) are met and water temperatures are below the thermal threshold (16?C) for bull trout. Next, we performed a similar analysis, but evaluated differences in stream habitat in occupied and unoccupied networks where temperatures exceed this thermal threshold. Results from the CTA analysis for streams colder than 16?C generally indicated bull trout were found in reaches with larger substrate, deeper pools, and less fine sediment; however, the specific criteria to delineate occupied and unoccupied systems differed along a gradient of stream depth. We found considerable differences in tree structure in streams where temperatures exceeded 16?C, as size of substrate was the only habitat factor that differentiated occupied and unoccupied streams. We discuss our results in context with our current understanding of bull trout habitat relationships, and identify areas where additional research is needed in the future.

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Title
Seasonal movements of Cyprinids and Catostomids in the upper Grande Ronde River, Oregon.

Abstract
Many nongame species such as minnows and suckers can have an impact on populations of game fish such as salmonids. These nongame species can directly interact with juvenile salmonids for common resources and can also be an important food source for larger salmonids. Due to these interactions it is important to understand abundance and movements of nongame species. As part of research describing juvenile salmonid life history, we operate rotary screw traps in four salmonid rearing areas of the Grande Ronde River subbasin in northeast Oregon. We target juvenile salmonids migrating downstream from rearing and spawning areas; however, non-target species are incidentally collected as they move past these traps. At most trap sites, movement of these non-target species are nondescript as few fish are caught throughout the year. Movement of these species at the trap located in the upper Grande Ronde River however, can be quite large and seasonally dependant, with capture rates between 14 and 100 times that of other rivers in the subbasin. We observed 72% and 79% of the annual catch of redside shiners (Richardsonius balteatus) and northern pikeminnow (Ptychocheilus oregonensis), respectively, in the fall. Median catch for redside shiners and northern pikeminnow typically occurred between 21 September and 4 November. Conversely, 98% and 90% of dace (Rhinichthys spp.) and suckers (Catostomus spp.), respectively, were caught in the spring. Median catch for dace and suckers typically occurred between 15 March and 28 April. Rotary screw traps are designed to catch downstream-migrating juvenile salmonids; therefore we assume these periods of high catch represent downstream migrations by these species. The apparent high relative abundance and large scale migrations of these nongame fish could indicate there is more suitable habitat for these species in the upper Grande Ronde River, compared to other rivers in this subbasin.

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Title
Assessing Potential Impacts of a Proposed Reintroduction of Bull Trout on ESA Listed Salmon and Steelhead in the Clackamas River, Oregon

Abstract
Based on findings from the Clackamas River Bull Trout Reintroduction Feasibility Assessment that was completed in 2007, a proposal to reintroduce bull trout to the Clackamas River, Oregon, is being developed by the U.S. Fish and Wildlife Service and Oregon Department of Fish and Wildlife. Whereas a successful reintroduction of bull trout into the Clackamas River would represent a major success for the species' recovery, there are concerns about the impacts of this effort on other Endangered Species Act listed species (Chinook and coho salmon, steelhead trout). In particular, predation on salmon and steelhead by bull trout has been identified as an area of uncertainty. We assembled an expert panel workshop in July 2008, to provide a scientific assessment of potential impacts to salmon and steelhead from a reintroduction of bull trout to the Clackamas River and to outline monitoring and management strategies that could be implemented to reduce uncertainty and risk following a possible reintroduction. The results of the panelists' scoring of possible degree of impact of bull trout on salmonid probability of extinction ranged from moderately high impact to no impact. The variation in scores expressed the panelists' individual uncertainty, variability among the panelists, and expected differences among the salmonid species. The mode of overall score values suggested that impact was viewed by the panelists in general to be very low or moderately low for spring Chinook, Coho, and winter steelhead; and mostly none to very low for fall Chinook. However, some possible outcomes ranged into higher categories of impact but with far lower score levels.

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Title
Transferability of Models to Predict Selection of Cover by Coastal Cutthroat Trout in Small Streams in Western Oregon

Abstract
We assessed use and selection of cover by coastal cutthroat trout (Oncorhynchus clarkii clarkii) in six headwater streams in western Oregon, USA during the summer low flow period from 1 August and September 30, 2007. We tagged 1037 coastal cutthroat trout (>100 mm) with passive integrated transponder (PIT) tags across all streams. Selection of cover was analyzed by comparing habitat characteristics of used cover and randomly available cover. We measured habitat characteristics for 190 individual fish using cover and 234 randomly available cover points. Coastal cutthroat trout used substrate as cover (78%) more often than all other cover types combined (22%). Availability of different cover types was variable, but overall substrate made up 92% of available cover and the remaining 8% represented all other cover types combined. Habitat characteristics measured for both used and available cover included depth at fish location (cm), surface area of cover (m2), proximity to depth of 20 cm for fish located in < 20 cm in depth, b-axis (mm) for substrate >2 mm, and distance under substrate. Analysis of selection using logistic regression models indicated that cover use was more likely with increasing depth and surface area of cover. A negative interaction effect between the influences of depth and surface area suggested fish were more likely to use cover with smaller surface areas in deeper water. We found good transferability (i.e. predictive capabilities) of the logistic regression models across streams using three different methods: "leave one out" cross validation, Cohen's kappa statistic, and receiver operator characteristic curves. The strong and consistent influence of both depth and surface area of cover on selection of habitat by individual coastal cutthroat trout suggests these features of habitat may be critical to this species during summer low flows.

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Title
Movement, Passage, and Life-history of Redband Trout in the Donner und Blitzen River, Oregon

Abstract
Redband trout (Oncorhynchus mykiss) were tracked between March 2007 and November 2008 in the Donner und Blitzen River in order to examine spawning migrations, seasonal shifts in habitat, and the effects of diversion dams on their movement. We used radio telemetry to obtain detailed information on migrations and PIT tags to determine long-term and large-scale movement patterns. We recorded stream flow and temperature data, and collected scales from a subset of the trout to determine age class and spawning history. We installed PIT tag antennae arrays at three dams to monitor upstream fish passage delays. Our results indicated that spawning occurred primarily in the upper Blitzen River mainstem, and that trout tagged in the lower river had a similar spawning distribution to trout tagged in the middle river. Lower river trout, which had to pass between 1 and 3 dams en route, either reached their spawning locations later than mid-river trout or faced dam passage problems they could not overcome. In the spring of 2007, redband trout of a wide range of sizes (range 190-560 mm) migrated from the lower river to the upper river. A number of those fish returned to the lower river in the fall or winter and repeated the cycle in 2008. According to scale interpretation, the migrating redband trout were found to range in age from 1+ to 5+, but there was no evidence that trout spawned before age 3+. The movement data combined with the scale interpretation suggests that Blitzen River redband trout may make multiple, long-distance migrations in their lifetime and that the migration of some fish is not spawning related.

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Title
Stable isotopes and stomach analysis reveal trophic position and carbon source for non-native rainbow trout (Oncorhynchus mykiss) and brown trout (Salmo trutta) in southern Chilean streams

Abstract
The trophic position (TP) of introduced rainbow trout (Oncorhynchus mykiss) and brown trout (Salmo trutta) in

streams of southern Chile were investigated using stable isotope analysis (SIA) and stomach contents analysis (SCA). Trout are located at the same TP as both juveniles and adults, but trout located are at a lower TP level than native fishes. SIA combined with SCA show that trout juveniles and adults prey mainly on insects (aquatic and terrestrial) followed by benthic items, with almost no predation on fishes. Specifically, rainbow trout feed on drift or terrestrial insects with distinctly allochthonous C levels, indicating their impacts may be more intensive on riparian terrestrial ecosystems. Dietary overlap was observed between brown trout and native fishes suggesting interference competition.

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Title

Age structure metrics for precautionary management: can simpler assessment tools save fish, time and money?

Abstract

Stock assessments today utilize large data sets, complex models, and multiple approaches to dealing with uncertainty. However, they require enormous amounts of data and funding to collect and analyze those data, and still rely on biological assumptions that may be less than precautionary for some species. There may be modeling and monitoring methods to assure sustainable harvest levels and productive stocks that utilize simpler assessment tools and are also cheaper to implement. Our project will investigate the reliability of simple age structure metrics and thresholds for fisheries management. We will examine the cost of data collection, evaluation, modeling, and assessment review to compare our simpler approach with current stock assessment methods. To test our model we will compare the methods retrospectively, using data for US west coast groundfish species that were assessed in the 1990s and were eventually listed as overfished. Our results will provide a concrete test of the utility of age structure metrics in fisheries management, providing critical information for state management agencies and Fishery Management Councils that are seeking more cost-effective ways to assess stocks in a precautionary manner.

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Title

Improved status, research goals and potential downlisting of Oregon chub in the Willamette River drainage

Abstract

Status and trends of abundance of populations of Oregon chub, a small floodplain minnow endemic to the Willamette river drainage of western Oregon, were investigated by estimating fish abundance and from extensive fish surveys of over 700 off-channel habitats from 1991 through 2008. In 1991 only eight populations were known to exist, and Oregon chub were listed as endangered under the federal ESA in 1993. In 2008 we identified 36 populations of Oregon chub. Ten of these populations, including the two most abundant populations, resulted from intoductions. Oregon chub reached their recovery plan goal for downlisting the species to threatened in 2007. Nonnative fishes, which were found to be widespread in off-channel habitats preferred by Oregon chub, remain as the largest threat to full recovery and delisting of this species. Details of the improved status of Oregon chub will be discussed, along with recent developments in the recovery strategy including the safe harbor process, habitat mapping as part of the USFWS critical habitat statement, a new ecological model for conservation banking and research into the feasibility of reintroduction into in connected habitats.

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Title
Are there two subgroups of North Pacific Albacore in the coastal fishery of North America?

Abstract
The Pacific Fishery Management Council regulates the North Pacific Albacore (Thunnus alalunga) fishery, one of the few remaining open-access fisheries along the west coast of North America. The Council is now considering limiting access to control excess capacity. To help ensure the long-term sustainability of this fishery, scientists, managers and policy-makers need a better understanding of the distribution of this species and of the fishery. Currently, all stock assessments and management decisions for North Pacific albacore are based on the assumption of a single, uniform stock. However, there is evidence that the stock may not be as homogeneous as once thought. Tagging studies indicate the possible existence of two sub-groups of albacore in the eastern North Pacific distributed north and south of 40o North. This study investigates the proposed North Pacific albacore sub-groups in the coastal fishery (east of 1300 West) using statistical analysis of more than 40 years of catch records obtained by the Southwest Fisheries Science Center. The study assesses the differences between the two proposed subgroups using three population metrics: 1) the start and end time of the fisheries, 2) catch per unit effort (CPUE), and 3) size characteristics of fish caught. Preliminary results of the start and end timing of the fisheries indicate two seasonally different patterns of catch north and south of 40o North, with the southern fishery lasting longer. Average fish size also appears larger for those albacore caught south of 400 N. These initial results may support the two sub-group hypothesis. If there are, in fact, two sub-stocks of North Pacific albacore, we may need to revise international and national management strategies for this commercially important species to reflect greater stock complexity along finer spatial scales.

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Facilitating Friendships Among Fish Enthusiasts - The Jefferson Fish Society

Abstract
The Jefferson Fish Society formed in 2003 to give professionals and interested public in northern California and southwestern Oregon a venue for exchanging information about rivers, lakes, and wetlands and the plants and animals that use these habitats. Sixteen meetings and 138 members later, the real benefits of the Jefferson Fish Society are demonstrated by the strong friendships, improved working relationships, and increased collaborations among the membership. Jefferson Fish Society has employed a number of approaches to generate and maintain interest among its current and prospective members. We will share our successes and failures in promoting the conservation of fish and the environments that sustain them throughout the state of Jefferson.

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Title
Selective Water Withdrawal / Fish Passage Facilities

Abstract
Portland General Electric
Selective Water Withdrawal / Fish Passage Facilities
American Fisheries Society Abstract

Bartlett, James. Function and Operation of the Round Butte Dam Selective Water Withdrawal fish passage facilities.

Flows into the Selective Water Withdrawal are driven by Round Butte Power plant generation. Normal maximum flow into the V-screens are 7,012 cfs (6,012 cfs into the screens + 1,000 cfs into the surface exclusion plates).

Fish attempting to migrate from Lake Billy Chinook follow increasing surface current into the fish collection entrances (FCE). Velocities at the FCE are approximately 2.5 fps. At the end of the V- screens, fish and 30 cfs from each V-screen combine as the velocity increases to 7.0 fps. A tertiary screen removes 48 cfs from the combined flow of 60 cfs at the downstream end of the fish capture channel. Fish and debris are carried in the remaining 12 cfs over a large fish separator.

Automatic bar separators are used to grade fish by size. The large fish separator is located downstream of the tertiary screen and consists of sloping, parallel, round bars. This separator is designed to let salmonids less than 15 inches long

fall through the bars. Fish larger than 15 inches long slide down the bars and into a large fish holding tank.

Large fish are processed, and then recovered before being released back into Lake Billy Chinook or downstream.

The medium fish, small fish and fry that pass through the large fish separator travel through a 20-inch helical fish pump where they are pumped through a series of PIT-tag detectors to the fish transfer facility (FTF).

The FTF is designed to accomplish the following actions: (1) automatically sort and grade juvenile salmonids, (2) crowd, anesthetize, sort, mark, and recover small and medium fish, (3) load, transport, release and recycle.

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Title

Tide Gate Impacts on Juevnile Salmonid Movement and Predation

Abstract

Tide gates are one-way doors integrated into dyke systems that prevent saltwater intrusion to agricultural land and allow freshwater drainage to the estuary during low tide. Tide gates may act as fish passage barriers for juvenile salmonids, limiting movements during migration and access to rearing habitats. Passage opportunity is determined by how frequently the tide gate is open, whether or not the tide gate culvert is perched, and water velocity at the tide gate outlet. Fish delayed in their movement by tide gates may experience increased predation risks as they congregate in the vicinity of these structures. We conducted our research in Coos Bay, one of the many Oregon estuaries with extensive use of tide gates. We installed stationary passive integrated transponder (PIT) antennae around a top hinged tide gate to track the movement of PIT tagged juvenile coho and chinook salmon as well as subadult and adult cutthroat trout. A tilt logging device allowed us to pair fish detections with tide gate opening angle. We found that most coho smolts moved quickly downstream through the tide gate, often during the beginning of the opening cycle. Few subyearling coho moved through the tide gate during the sampling period. However, several subyearling coho from a neighboring system were detected downstream of the tide gate. Fish upstream movement through the tide gate was very limited. This was a pilot study and fish movement and predation risk in two other streams (one with a side-hinged gate and one without tide gates) will be monitored similarly next year.

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Title

Relative Growth Rates of Coastal Cutthroat Trout in Headwater Streams of Western Oregon

Abstract

Coastal cutthroat trout is the most common fish in forested headwater catchments of western Oregon. Although coastal cutthroat trout display a variety of life history strategies, headwater catchments are typically dominated by a resident form whose movements range from meters to kilometers in extent. Resident trout are highly dependent on local conditions and make excellent candidates for evaluating the effects of disturbance on fish.

Disturbance events such as fire and timber harvest are known to alter abiotic factors such as water temperature, light, oxygen, and sediment routing in stream channels. These factors can influence either the rate at which fish grow or the length of the growing season. Here we present preliminary results on growth rates of coastal cutthroat trout from a paired watershed study evaluating the impacts of timber harvest on forested headwater catchments.

Basin wide electrofishing began in 2001 and occurred each August or September through 2008. All trout = 100 mm forklength were tagged using integrated transponder (PIT) tags. Scale samples were collected from different size-class

fish (including all PIT-tagged fish) and from each segment of the fish-bearing portion of the stream network.

Preliminary results on annular relative growth rates will be presented. Relative growth will be calculated from measured growth in recaptured PIT-tagged fish and back-calculated growth from scales. Data from recaptured PIT-tagged fish will be used to compare growth rates pre- and post-logging at the catchment scale. Growth data from scale samples and recaptured fish will be combined and used to evaluate growth at the stream segment scale for only the pretreatment calibration period. Context will be explored by comparing growth rates in the present study to growth rates observed in a prior study of 40 randomly selected watersheds in western Oregon.

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Title

The Upper South Fork McKenzie River Enhancement Project – an effort to restore processes and recover habitat

Abstract

The Upper South Fork McKenzie River Enhancement Project seeks to restore channel function and recover habitat through restoration of large woody material to mimic historic patterns. The project treats a low gradient channel salvaged of large woody material during the 1960's into the 1980's. Watershed analysis documented channel response to wood removal as abandonment of floodplains, an over 60% loss of side channel area, and 90% loss of pool habitat area. The 8.5 mile enhancement reach is of value to spring Chinook salmon and bull trout, both listed as Threatened under the Endangered Species Act. Technical challenges of restoring wood of sufficient size to function as stable material (average wetted channel width of 70 feet) used the following methods; 1) tipping river adjacent live trees to serve as key features, and 2) helicopter import of upland salvaged large wood, often with root mass. With the objective of restoring channel lateral migration and the processes of substrate storage and channel adjacent wood recruitment, project material was poised during 2008 in historic depositional areas. Jams were not constructed; rather helicopter imported wood was placed upstream of key wood, and will depend upon significant flow events to distribute onto bars and into jam accumulations. Floodplain skid roads and in-stream stumps were used as evidence of historic log jam location and directed current placement strategy. Effectiveness monitoring consists of project wood tagging to track material migration, and bar and jam development. Periodic aerial photography, side channel mapping and Light Detection and Ranging (LiDAR) with thermal imagery, and photopoint monitoring precede and follow significant flow events and will be used to track floodplain and channel response to the enhancement effort.

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Title

Synchronous growth patterns within and among populations of the unionid mussel, /Margaritifera falcata/, and the potential for reconstructing river temperature and discharge

Abstract

Periodic growth increments are a leading data source for reconstructing high-frequency climatic and environmental variability from local to global scales. We are currently developing methodologies to construct growth-increment chronologies from the shells of freshwater mussels (/Margaritifera falcata/) in an attempt to identify the environmental and climatic drivers of growth. Annual growth increments are being analyzed for ten sites across Oregon, Washington, and Idaho. Through examination of variability in the widths of annual growth rings, we propose to 1) determine if individuals within a site exhibit synchronous growth patterns 2) determine to what degree these synchronous growth patterns are shared across sites, and 3) determine the climatic variables that most strongly relate to these synchronous patterns, both within and among sites. Preliminary results from two sites in the Willamette River (Middle Fork Willamette River near Dexter Reservoir and Bryant Park in Albany) indicate that growth within sites is highly synchronous such that mean correlations among samples (after removing age-related growth declines) is 0.71 & 0.67, respectively. Both chronologies were in excess of 20 years in length with a sample depth of no less than six to ensure a high signal to noise ratio. Correlation between the two sites was weak ($r = 0.39$) indicating that growth patterns are more strongly conserved within each site than among sites. Chronologies were compared against records of annual discharge, water temperature, monthly precipitation, mean temperature, and indices of regional climate (Palmer Drought Severity Index, Multivariate ENSO Index). Both chronologies had a highly significant negative

correlation with mean annual discharge ($p<0.01$). Furthermore, the chronologies exhibited a significant negative correlation with seasonal averages of precipitation, PDSI, air temperature, and the MEI. When averaged, the two chronologies capture 46% of the variance in the Middle Fork of the Willamette discharge records.

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Title

Juvenile Chinook Salmon Life Histories, Habitats, and Food Webs in the Columbia River Estuary

Abstract

To determine whether estuarine habitat modifications have contributed to the decline of Columbia River salmon stocks, an interagency research team has studied changes in estuarine habitat opportunities, life histories, and food webs of juvenile Chinook salmon. The results confirm that salmon rearing opportunities in the lower estuary have decreased substantially during the last century, while hatchery programs, watershed modifications, and other changes likely have simplified historical patterns of estuarine migration and residency. In particular, use of the estuary during late summer and fall months may have declined in the last century. Nonetheless, we have documented significant variation in juvenile salmon life histories, longer-than-expected estuarine residence times, and strong selection by salmon for carbon sources that are linked to wetlands and other shallow estuarine habitats. Genetic analyses also revealed that all Columbia River ESUs (Evolutionarily Significant Units) are capable of expressing subyearling, estuarine-resident life histories, but patterns of estuarine habitat use may vary among genetic stock groups. The estuary's role as a nursery ground for stocks throughout the basin suggests that restorative actions above Bonneville Dam alone will not be sufficient to meet salmon recovery goals or to ensure population resilience in a changing environment. However, an important question is whether hydrological and other changes in the basin have caused the estuary to cross an ecological threshhold that could resist future estuary and salmon recovery.

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UPCOMING SAVAGE RAPIDS DIVERSION DAM REMOVAL

Abstract

Savage Rapids Dam is located in southwestern Oregon on the Rogue River 173.2 km upstream from the Pacific Ocean. Despite having 2 fish ladders, the dam is considered a major impediment to anadromous fish migration (steelhead, Chinook, and Coho). The recommended least-cost alternative to improve fish passage and maintain irrigation diversions is to construct a new pumping plant to divert water and remove the main portion of the existing dam. Construction is underway by the Bureau of Reclamation to complete the pumping plant and remove a major portion of the dam in 2009 in accordance with a federal court consent decree.

The dam creates a relatively narrow reservoir that extends 0.8 km upstream during the non-irrigation season and 4 km upstream during the irrigation season using stoplogs to raise the crest 3.4 m for gravity diversion. There is an estimated 150,000 m3 of reservoir sediment, consisting of mostly sand and gravel with no significant hazardous material. Modeling of the reservoir sediment erosion following dam removal predicted that 90 percent of the existing sediments will eventually be eroded from the reservoir. Sediments remaining after the initial flushing will erode during high-flow periods that most likely will occur during the non-irrigation seasons (winter floods and spring snowmelt runoffs) when the new pumping plant is not operating.

A complex plan has been developed to stage the dam removal in phases. One of the most challenging technical components was determining a new pumping plant location that would not impact fish passage, be efficient to

minimize operating costs for the irrigation district, and not subject to sediment deposition in the post-dam river environment. Equally as challenging will be managing flow and fish passage through the dam site during removal of the right side of the dam.

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Title

EVALUATING CORMAC-JOLLY-SEBER AND BARKER MARK-RESIGHT MODELS WHEN PASSIVE INSTREAM ANTENNAE ARE USED TO COLLECT RESIGHT DATA

Abstract

Mark-recapture/resight (MR) techniques have been used extensively to estimate vital rates for fisheries research in the Columbia River Basin. Tagging studies have been greatly enhanced by the advent of passive integrated transponder (PIT) tags and passive instream antennae (PIA), now installed in many tributary systems. Cormac-Jolly-Seber (CJS) models have been well tested and used for survival estimation of marked fish but require captures and recaptures to occur during short, discrete time periods, relative to the period between active sampling occasions. PIAs continuously detect PIT-tagged individuals, and thus this information does not naturally fit within the CJS sampling framework. The Barker MR model may be able to accommodate continuously collected resight and recovery data collected between sampling occasions.

We used Monte-Carlo simulations, based on MR studies of Oncorhynchus mykiss in tributaries of the South Fork John Day, to generate encounter history data sets. These simulated data sets were used to define 'truth' by which to evaluate the bias and precision of survival (S) estimates using the CJS and Barker models. Comparisons were made over a range of model parameters that could be influenced by sampling design for both resident fish only, and a mix of resident and anadromous fish populations. Sample sizes were also estimated to detect specified changes in survival (i.e., effect sizes).

Our analysis suggests that a -25% relative bias existed for CJS estimates of survival. The Barker model performed better than CJS even at low resight probabilities, had lower CVs by almost 50% over all ranges of sampling inputs, and essentially no bias. We recommend using the Barker model for survival estimation when PIAs have been deployed with and to the extent of the population's seasonal (e.g., summer) range.

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Title

Comparison of mark-recapture methods to estimate juvenile bull trout survival.

Abstract

Declines in the distribution and abundance of bull trout have incited research aimed at determining the factors most limiting population growth rates. Demographic models that predict population responses to environmental and demographic stochasticity suggest that bull trout population growth may be sensitive to very small changes in survival during early life-stages. The predictive ability of such models, however, depends upon reliable empirical estimates of demographic rates of survival and fecundity. Current models for bull trout are limited by a lack of field-based, age-specific survival estimates for larval and juvenile stages. We used mark-recapture methods to estimate survival for age-1 bull trout in a relatively high-density spawning and rearing stream in Northeastern Oregon. We compared survival rate analyses and the inclusion of different types of recapture data to determine which approach was most efficient while minimizing bias and increasing precision of estimates. We observed that over-summer survival estimates and standard error were very similar between a simple Cormack-Jolly-Seber model using only data from active mark-recaptures compared with a more parameterized and elaborate Barker model, which allows for inclusion of

data collected continuously between active capture events at passive PIT-tag antennae. These preliminary results suggest that researchers should give careful consideration to the question they want to address before choosing mark-recapture methods and potentially building expensive in-stream PIT tag antennae. Simulations show, however, that over a longer time period of data collection, the Barker model will likely improve the accuracy and precision of future survival estimates, especially if emigrating fish return and are detected at antennae. Estimates of age-specific survival will enhance the predictive ability of demographic models, which can be used to compare the effects of management alternatives on population viability and to prioritize restoration activities.

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Title

Oregon Fish Passage Barrier Data Standard and Inventory Project

Abstract

Data on fish passage barriers are collected by numerous resource professionals and citizen science groups across the state. The format and content of the data vary substantially from watershed to watershed. Where barrier data must be evaluated across watersheds, it is essential to have a standardized format for integrating data from multiple sources. A common data structure enables the development of consistent and comprehensive statewide fish passage barrier data. These data are needed to support a multitude of resource planning efforts including fish distribution mapping, intrinsic potential modeling, fish passage barrier removal prioritization and measuring habitat gains for passage improvement projects.

Through the Oregon Geospatial Enterprise Office Framework process, the Oregon Department of Fish and Wildlife (ODFW) led an effort to develop the Oregon Fish Passage Barrier Data Standard. The initial version of the standard was completed and endorsed by the Oregon Geographic Information Council in 2007. Efforts are now underway to compile barrier datasets from originating entities, convert them into the standard format and integrate them into a more comprehensive Oregon Framework Fish Passage Barrier Dataset. ODFW seeks to raise awareness of the data standard and to develop partnerships with fish passage barrier data originators for furthering this effort.

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Title

Parr-to-smolt survival for spring Chinook salmon in the Grande Ronde and Imnaha Rivers, Oregon 1993-2007

Abstract

We investigated parr-to-smolt survival for spring Chinook salmon in the Grande Ronde and Imnaha Rivers, Oregon from 1993 to 2007. We captured parr in late summer on three tributaries of the Grande Ronde River (Catherine Creek, Lostine and Minam rivers), and on rearing areas of the mainstem Imnaha River and PIT tagged between 500 and 1000 parr from each stream. From 1999 to 2006, we also estimated the abundance of spring Chinook salmon parr rearing in Catherine Creek and the Lostine River during summer. Survival estimates to Lower Granite Dam, the first Snake River dam encountered during seaward migration, ranged between 4% and 29% for populations originating from the Grande Ronde River, and 8% and 32% for the Imnaha River population. Survival appeared to decline for the Catherine Creek, Lostine River and Minam River populations over the study period, although year-to-year variation was relatively higher for the Minam River population. Survival also varied widely for the Imnaha River population, with no apparent trend during the study period. We observed a significant inverse relationship between parr abundance in summer and survival to Lower Granite Dam for the Lostine River population, but not for the Catherine Creek population. This indicates that survival, in part, may be density dependent in the Lostine River. We conclude that in some local populations, survival during the juvenile life stages has continued to decline despite recovery efforts. This study evaluated survival across the juvenile rearing period; however, further evaluation of survival and habitat utilization at different stages within the freshwater rearing period could help determine limiting factors when planning

recovery efforts.

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Title
EVALUATE BULL TROUT MIGRATION BETWEEN THE TUCANNON RIVER AND THE MAINSTEM SNAKE RIVER USING STREAMWIDTH PIT TAG INTERROGATION SYSTEMS

Abstract
Data on the migration timing and distribution of PIT-tagged bull trout Salvelinus confluentus) was collected by streamwidth PIT tag interrogation systems installed in the lower reaches of the Tucannon River.
Interrogation data collected between October, 2005 and October, 2007, documented the use of the mainstem Snake River by bull trout originating from the Tucannon River. During this period, 31 unique bull trout interrogations were recorded at the PIT tag array. One bull trout made repeated, consecutive year migrations in 2006, 2007 and 2008.
Between October, 2007 and October, 2008, five bull trout were interrogated at the PIT tag array and two additional bull trout were tracked downstream of the PIT tag arrays using radio telemetry. Of the 5 bull trout that were interrogated at the PIT tag arrays, 3 returned to the Tucannon River during the spawning migration in 2008; 1 did not return to the Tucannon River in 2008; and 1 outmigrated in late October, 2008.
Bull trout were detected in October through December and March through May, periods that coincide with immigration into the mainstem Snake River and the spawning migration into the Tucannon River.
No bull trout originating from the Tucannon River have been observed using the fishways of lower Snake River dams.

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Title
ST.E.W.A.R.D.S. of our watersheds, bringing a new generation to the table

Abstract
The STEWARDS (STudents Engaged in Watershed And Resource Discovery Sessions) program works to coordinate partners while integrating fisheries, watershed, and other natural resource education into the current school district curriculum. It includes classroom presentations, field trips, watershed tours for students, as well as a residential outdoor school program(ODS) including pre ODS Discovery Sessions conducted in the classrooms to prepare students for the ODS experience. It also initiates a Junior Watershed Council program (JWC) at Sweet Home High School. The first of its kind, the JWC will serve as a conduit for youth to engage in civic and watershed enhancing endeavors as they learn about local fisheries issues, watersheds, watershed councils, and the opportunities they have to make a difference in their communities through watershed councils. Partners include The Sweet Home School District and Families, Santiam Canyon School District, Community Services Consortium (CSC), The Calapooia, North, and South Santiam Watershed Councils, USFS Willamette National Forest-Sweet Home Ranger District, Sweet Home Community Foundation, Oregon Watershed Enhancement Board, Grey Family Foundation/Oregon Community Foundation, Oregon Department of Fish and Wildlife, Oregon Trout, OSU Extension, City of Albany, City of Lebanon, Confederated Tribes of the Siletz, and the Over the Rivers and Through the Woods Scenic Byway Committee. Together these groups are working to educate the youth of our communities on fisheries and watershed issues so that we may have more educated, connected, and engaged residents that will contribute to local sustainability and protect our valuable natural resources.

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Title

Hey, can you stay still for second? I'm trying to model your microhabitat use.

Abstract
This study began with the intent to construct a statistical model that would explain microhabitat preference of wild salmonids given the presence or absence of residual hatchery winter steelhead. In order for this model to be useful the fish needed to behave as if there was no observer present. That was not the case. Therefore, a study design was developed using underwater video to document changes in fish behavior in the presence of an in-water observer. The underwater video footage was analyzed to document changes in four metrics that can be used to infer a change in fish behavior. These changes in fish behavior can result in erroneous microhabitat preference data. The four behavior metrics are upstream movement, downstream movement, total movement, and relative abundance. In nine out of ten replicates there were significant differences (ANOVA, $P < 0.05$) in at least one of the four behavior metrics. The results of this study suggest that when attempting to document small scale microhabitat preference by juvenile salmonids, in-water observation may alter fish behavior thereby producing erroneous results.

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Title
A Guide for Fishway Design

Abstract
National Marine Fisheries Service (NMFS) engineers have been involved in fish passage facility design dating back into the 1950's when the agency was known as the Bureau of Commercial Fisheries. The "Anadromous Salmonid Passage Facility Design" manual is an effort to capture design details and refinements from the past half century, to provide guidance to others in the design of optimized passage facilities for a range of projects, and to provide internal consistency for design review amongst NMFS engineers. The document was inspired by a request from NMFS Regional Administrator to find ways to fast track mitigation activities to get them on the ground as soon as possible. This document is a first of its kind, providing design criteria and guidelines for most types of passage facilities used for anadromous salmonids including juvenile fish screens, upstream fishways, traps, exclusion barriers and culverts, as well as guidance for the development of experimental fish passage facilities. Part of this document replaces NMFS 1995 juvenile fish screen design criteria, as developed though coordination with the Fish Screen Oversight Committee of CBFWA. The entire document can be found at: http://www.nwr.noaa.gov/Publications/Reference-Documents/Passage-Refs.cfm

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Title
Salvelinus confluentus Curiosity Society – The Beginning

Abstract
In the late 1980s native trout populations in Oregon began to get much needed attention. Del Skeesick, USFS Biologist, suggested that more attention be given to declining bull trout populations in Oregon. Del pulled together interested biologists at the Parkdale Ranger Station near Hood River May 18, 1989. There the name "Salvelinus confluentus Curiosity Society" was chosen for the group. At about the same time, Dave Buchanan and Phil Howell, both active in AFS, helped organize a bull trout workshop which included resampling abundance and distribution in the upper Sprague River during the day and presentation of papers covering the current state of information on the species in the evening. August 16-18, 1989, 45 fisheries professionals from 4 states and 11 agencies and companies gathered at the Corral Creek Campground near the Gearhart Wilderness for the workshop sponsored by OR AFS, ODFW, and the recently-formed ScCS. Since then ScCS has continued to hold the workshop with a similar format each year somewhere in the wilds of the NW where local biologists working on bull trout could use help with field work and bull trout aficionados could gather to exchange information. In 1990 the workshop was held May 10-11 at Pioneer Ford Campground on the lower Metolius River. In 1991, ScCS met May 8-10 at Swift Campground on the upper Lewis River of Washington….and we are going to Alberta in 2008!

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Title
Reestablishing wild coho salmon fisheries in Siltcoos and Tahkenitch lakes

Abstract
Reestablishing wild coho salmon fisheries in Siltcoos and Tahkenitch lakes

Fisheries for wild coho salmon (Oncorhynchus kisutch) were initiated in Siltcoos and Tahkenitch lakes in December, 2003 and have continued through 2008. These fisheries are significant because they are the only targeted recreational harvest of Oregon Coast wild coho salmon since fisheries closed coast wide in 1993 and because they involve direct harvest of a species listed as threatened under the Federal Endangered Species Act (ESA). To allow harvest of a species listed under the ESA, it was first necessary to develop a Fishery Management and Evaluation Plan (FMEP). Spawner abundance targets for wild coho salmon were set independently for each lake at the upper bounds of the confidence intervals for Maximum Sustained Production. A statistical creel survey was conducted and harvest quotas set for the first three years of the fishery. Since the fisheries opened, coho spawner abundance has generally been above goals in both lakes. Harvest rate on coho returning to the two lakes has averaged about four percent. Annual effort for the two lakes combined has been about 14,800 angler hours with an average catch of 508 adult and 375 jack coho salmon. The fisheries have performed as expected and have been adjusted to fixed seasons without quotas.

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Title
Brook trout removal and bull trout restoration in Sun Creek, Crater Lake National Park

Abstract
In the early 1990s, bull trout in Sun Creek, Crater Lake National Park, were threatened with a high risk of extinction from hybridization and competition with introduced brook trout. Two fish immigration barriers were constructed and brook trout were removed upstream of the barriers by electrofishing, snorkeling, trap-netting, and the use of the piscicide Antimycin-A. In response, bull trout abundance and distribution increased from approximately 150 fish occupying 2 km of stream in 1989 to approximately 2800 fish occupying 11 km of stream in 2005. Annual snorkel counts after 2005 indicate bull trout abundance may have stabilized and downstream re-colonization is slow. No brook trout have been observed upstream of the barriers since 2005, however, brook trout are abundant and well-distributed downstream of the barriers. No bull trout have been observed downstream of the barriers. In order to recover this bull trout population abundance and distribution must be increased and extended downstream to provide connectivity with other Klamath Basin bull trout populations and reduce the risk of extinction from catastrophic disturbance or genetic isolation. Alternatives for restoration of an additional 12 km of stream on State Forest and private ranchland include non-native fish removal, fish immigration barriers, stream channel restoration, screening water diversions, and improving reliability and delivery of water for irrigators.

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Title
If we build it, will they come? New fish passage facilities at the Corps' Willamette Project

Abstract
After nearly 50 years of blocked passage to most of its historical spawning habitat, Upper Willamette River spring Chinook salmon will soon have new or improved access to miles of habitat in the upper Santiam, McKenzie, and Middle Fork Willamette River subbasins. The US Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation are the Action Agencies implementing two biological opinions regarding the Willamette Project. The "biops" were issued by National Marine Fisheries Service and US Fish and Wildlife Service on July 11, 2008, and include a range of fish mitigation requirements, from downstream habitat restoration to hatchery improvements. A key component is the requirement that the Action Agencies study fish passage through the

reservoirs and dams and install fish passage at several of the large dams in the McKenzie, Santiam, and Middle Fork Willamette subbasins. Upstream fish passage over the next 15 years will be in the form of collection facilities at the base of the dams with fish trucked and released upstream into historical spawning habitat. Downstream fish passage facilities will be designed based on study results, but could be in the form of screening or surface collection at the face of the dam, head-of-reservoir collection, reservoir drawdown, or other means.

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Title
An innovative, non-lethal electric field to deter marine mammal predation on fishery resources: results of trials on harbor seals and California sea lions.

Abstract
ABSTRACT: Pinniped populations have increased exponentially since passage of the Marine Mammal Protection Act. Increased levels of predation on ESA-listed salmonids are complicating recovery planning in the Columbia River and other drainages, prompting resource managers to seek "lethal take" authority. A NMFS Report to Congress (1999) identified a pressing need for methods to deter pinniped predation in salmonid ecosystems. We describe a new approach and a novel concept to control marine mammal predation on fishes, one that can work in concert with selective management options to possibly lessen the need for lethal removal programs. This new application of existing technologies combines sonar (to identify specific "targets") with an electric gradient (to deter marine mammals) in areas where salmonids and sturgeon congregate. Its passive deterrence design delivers brief, non-lethal pulses of direct current without harm to pinnipeds or nearby fish. The low-voltage, DC gradient does not affect boats or boat traffic. Sonar cues barrier operation and distinguishes marine mammals based on anatomy and swimming patterns. Non-lethal electric pulses occur only when a seal or sea lion "target" is detected. Based on recent tests of this underwater electrode array system on harbor seals (British Columbia) and California sea lions (Moss Bay Marine Labs), marine mammals are extremely sensitive to mild electric fields in water, at levels that are 1/30th the power used during electrofishing surveys. Video clips are used to demonstrate marine mammal responses, both with and without food present. Results suggest selective deterrence of marine mammals and an opportunity to help co-managers resolve controversial resource conflicts with pinnipeds in the Columbia and other river systems, where marine mammal predation complicates fish population recovery.

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Title
Reintroduction of a Listed Species, the Best-Laid Plans of Mice and Fish Biologists

Abstract
In 2006 the Pelton Round Butte Hydroelectric Project received a new license from the Federal Energy Regulatory Commission. This new license is the culmination of 10-plus years of studies and negotiations, including a Settlement Agreement among 22 different entities with significant interest in the Project. One of the major components of the settlement agreement and the new license is reintroduction of anadromous fish.

During the decade of relicensing work, the National Marine Fisheries Service (NMFS) listed the Middle Columbia River steelhead distinct population segment (DPS) as threatened under the Endangered Species Act (ESA) but excluded hatchery stocks from the listing. Fish managers determined that the Round Butte Hatchery stock of steelhead was the preferred stock to start the reintroduction and it helped that this stock was not listed under the ESA. In 2006, after much of the reintroduction planning was completed, NMFS listed several hatchery stocks of steelhead including the Round Butte stock. This created considerable concern among local governments, businesses and land owners. NMFS is working with a number of local governments and organizations to address concerns about potential ESA liabilities.

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Title
Pesticides in the Clackamas River Basin, Oregon, and Potential Impacts to Aquatic Life

Abstract
Pesticide occurrence and distribution in the lower Clackamas River basin was evaluated in 2000–2005 for a suite of 86–198 dissolved pesticides. Sampling included the lower-basin tributaries and the Clackamas River mainstem, along with paired samples of pre- and post-treatment drinking water. In all, 63 pesticide compounds were detected, including 33 herbicides, 15 insecticides, 6 fungicides, and 9 pesticide degradation products.Although pesticides were detected in all of the lower basin tributaries, the highest pesticide loads (amounts) were found in Deep and Rock Creeks. These medium-sized streams drain a mix of agricultural land (row crops and nurseries), pastureland, and rural residential areas. The highest pesticide loads were found in Rock Creek at 172nd Avenue and in two Deep Creek tributaries, North Fork Deep and Noyer Creeks, where 15–18 pesticides were detected. Pesticide yields (loads per unit area) were highest in Cow and Carli Creeks, two small streams that drain the highly urban and industrial northwestern part of the lower basin. Some concentrations of insecticides (diazinon, chlorpyrifos, azinphos-methyl, and p,p'-DDE) exceeded USEPA aquatic-life benchmarks in Carli, Sieben, Rock, Noyer, Doane, and North Fork Deep Creeks. One azinphos-methyl concentration in Doane Creek (0.21 microgram per liter [µg/L]) exceeded Federal and State of Oregon benchmarks for the protection of fish and benthic invertebrates. Concentrations of several other pesticide compounds exceeded non-USEPA benchmarks. Although most of the 51 current-use pesticides detected have multiple uses, 48 (or 94 percent) can be used on agricultural crops. Ninety-two percent can be used on nursery or floriculture crops; about one-half are commonly used on either lawns and landscaping in urban areas (57 percent), on golf courses (49 percent), along roads and right-of-ways (45 percent), and some can be used on forestland (7 percent).

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Title
Pesticides in the Clackamas (continued) - - See first entry for title

Abstract
Please see initial abstract sent earlier. My talk will be 2 slots (40 min), thanks.

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Title
Salmon Watch

Abstract
Since 1993, Oregon Trout's award-winning Salmon Watch has been an effective environmental education program serving middle and high school students in Oregon. Enabling students to witness spawning salmon, one of nature's great spectacles, coupled with classroom instruction and service learning projects, the program is designed to instill a deeper appreciation and understanding of the value of native wild fish, watershed conservation and environmental stewardship.

Salmon Watch is Designed to Foster:
• a deeper connection between humans and the ecosystem with which we live
• a strong recognition of salmon as an important indicator of watershed and environmental health
• a greater respect of the value of restoring native wild stocks to sustainable levels
• an understanding of the importance of salmon to native culture and Native American philosophy about nature
• a sense of stewardship towards the environment through participation in service learning projects

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Title
Pesticides and the Management of Aquatic and Riparian Invasive Species (AIS) in the Pacific Northwest

Abstract
Riparian and aquatic invasive species (AIS) are a serious and growing threat to the aquatic ecosystems and economies of the Pacific Northwest. Through case studies, this paper examines the use, efficacy, known and potential non-target effects of pesticides used in the control major species of AIS (e.g. Spartina spp. and the Knotweed complex) in the Pacific NW and species not yet established, but pose serious threats to the aquatic and riparian environments of Pacific NW such as the Zebra/Quagga mussels and Emerald ash borer. The nature of invasive species establishing and spreading in an aquatic environment, makes eradication difficult without collateral impact to non-target organisms in

the environments they have invaded. Pesticides including herbicides, piscicides, molluscides, insecticides, rodenticides, algaecides and agents for microbial infections are tools to an integrated pest management (IPM) approach to AIS. IPM programs include: monitoring for presence and population levels; understanding aquatic and riparian use practices that might facilitate the establishment of AIS, preventative measures to avoid AIS establishment and spread; identification of biological, ecological and economic thresholds for action; consideration of viable alternatives for control, including cultural, mechanical, biological, chemical and a no action alternative; and accurate monitoring on efficacy and non-target effects to inform future management decisions. Used properly, many of the pesticides for AIS control impose low risks to non-target species. Control of some AIS in the Pacific Northwest may require multiple applications and mixtures of pesticides. Though pesticides are a critical tool for the control of AIS, we do not fully understand the long-term sub-lethal effects of pesticides and their accumulation as mixtures in aquatic systems. Understanding and weighing the risks from harm caused by AIS with un-intended consequences from pesticides, becomes more critical, as threats from AIS continue to increase in the Pacific NW.

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Title
Growth, survival and contribution to fisheries of transplanted white sturgeon in the Lower Columbia River

Abstract
In 1994 and 1995 white sturgeon Acipenser transmontanus were captured live from the Columbia River downstream from Bonneville Dam and released into The Dalles Reservoir as part of a pilot study to evaluate a means of supplementing natural production in impounded reaches. Growth rates of transplanted white sturgeon decreased over time, averaging 12 cm/yr for fish at large less than three years, and 5 cm/yr for fish at large greater than nine years. Average annual survival rates of transplanted fish were estimated at 90% for the 1994 release cohort, and 89% for the 1995 release cohort. The majority (95%) of recaptured transplants came from The Dalles Reservoir, while approximately 4% and 1% of recaptured transplants came from Bonneville and John Day reservoirs respectively. Transplanted fish were observed in Tribal commercial fishery landings each year from 1998 through 2008, and comprised 1% to 9% of total annual harvest. Over the same period, contribution of transplants to recreational fisheries in The Dalles Reservoir ranged from 0% to 7% of total annual harvest. Results from the pilot study suggest that the capture and relocation of white sturgeon (i.e. transplant supplementation) should be considered among available options to mitigate for lost white sturgeon production in areas impacted by hydropower development in the Columbia River.

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Title
Analysis of stable isotopes in fish to identify habitat use and switching

Abstract
In our isotopic studies of fish in Oregon Coast Range streams we have found stable isotopes of carbon, oxygen and sulfur to be surprisingly useful in identifying and discriminating specific habitat or tributary use by a variety of fish species. Stable isotopes of carbon can be useful in discriminating between upstream (or cooler) and downstream (or warmer) sites used by fish. Sulfur isotopes can discriminate between use of sites with fine grained sediments and more chemically reducing conditions (e.g., beaver ponds) versus more free flowing sites. Isotopes of oxygen show a remarkably rapid incorporation into fish tissues and may prove to be very useful in identifying fish that have moved between sites of different evaporative conditions (e.g., between intermittent and perennial streams). The analysis of these stable isotopes either alone or as a suite of analyses may serve as a novel and powerful tool to identifying fish habitat use and switching.

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Title
Fish mucus as a rapidly responding tissue in diet switching studies

Abstract
We are using stable isotopes of C, N, O and S (H planned) to study the ecology of coho salmon in streams of the Oregon Coast Range. One aspect of our work focuses on the incorporation of marine-derived nutrients into the diet of overwintering coho salmon juveniles. These studies are complicated by the short time window of coho spawner returns relative to the time required for muscle tissues to show an isotopic response during periods of slow growth.

To investigate fish mucus as a potentially more rapidly responding "tissue," we performed diet switching studies of steelhead trout in a controlled hatchery setting using diets formulated to have either low d15N (3‰) or high d15N (13‰). Our work to date indicates that mucus responds significantly more rapidly than muscle tissue at growth rates approaching the most rapid we see in wild coho in our Coast Range streams. In contrast, rates of changes in mucus closely parallel those in muscle at hatchery growth rates well beyond what we see in the wild. In non-feeding fish, the composition (percent C, percent N) of mucus changes markedly within 1-2 days, as do d13C and d15N, which both show immediate declines. In ongoing work we are examining rates of change of d13C and d15N of mucus in slowly growing fish.

Fish mucus composition probably is controlled by synthesis from both recently ingested food and recycled amino acids from tissue breakdown, with the relative contributions changing depending on nutritional status. Analysis of mucus in wild fish populations, for both elemental composition and stable isotopes, holds promise as a valuable tool in discerning ebbs and flows in nutritional status and diet sources over ranges of highly variable seasonal conditions.

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Title
From Ideas to Implementation: Adult Lamprey Passage at Dams

Abstract
At the Sunriver meeting AFS a few years ago we discussed the challenges faced with implementing improvements in adult fish passage at dams when criteria for different species varies a great deal, when some species are listed and others are not. The best strategy is to find solutions that benefit all species or to minimize conflicts among species by developing seperate passage routes. This year there are critical test going on at BON dam to evaluate how well this approach will work, whether prototype entrance structures designed to assist both salmon and lamprey really work, how a large scale LPS from tailrace to forebay functions. The success of these tests will determine the future of lamprey passage improvement implementation for the next 10 years.

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Title
Response of rainbow trout populations to reconnection with adult steelhead after removal of century-old barriers

Abstract
The growth, age structure, and movement patterns of rainbow trout were assessed in a number of stream systems that were formerly accessible to steelhead. These systems include the Elwha River above Elwha Dam, the White Salmon River above Condit Dam, and the Methow River's Beaver and Gold creeks above artificial barriers. These systems have been blocked from their anadromous conspecifics for almost a century or more. In some streams, the rainbow trout above dams support popular fisheries, and there is a concern that these fisheries will be diminished upon reconnection with anadromous conspecifics. An opposing dynamic is that existing resident conspecifics could inhibit natural recolonization of steelhead. Looming in the background is the role that hatcheries could be asked to play in jump-starting this recolonization process. Using data collected before and after recent restoration of access to Beaver and Gold creeks, I will present several metrics that are helping us track the process and rate of recolonization. I will discuss the geomorphological and hydrological characteristics of these streams, and the role that these factors and time since last contact can play in the likelihood of success of re-establishing steelhead runs.

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Title
Environmental Drivers of Ecotype Abundance in Interdependent Resident and Anadromous Rainbow Trout Populations

Abstract
Oncorhynchus mykiss populations with ocean access display considerable life-history plasticity. Resident (rainbow trout) and anadromous (steelhead) adults commonly produce offspring of the alternate ecotype, but environmental drivers of this life-history response are not well understood. In an attempt to explain patterns in O. mykiss ecotypic distribution, we simulated flow and temperature effects on anadromous and resident O. mykiss relative reproductive success in the Yakima Basin. As a supplement to more traditional hypotheses about declining steelhead abundance, we propose a theory that more closely resembles evidence from pristine rivers. We hypothesize that flow regimes providing cool temperatures and maintaining depth and velocities necessary to sustain adult O. mykiss throughout the summer and fall seasons result in increased resident rainbow trout abundance and decreased steelhead abundance. This theory is consistent with a commonly referenced adage that “when the animal’s needs are being met, it stays where it is; when they are not, it moves until it finds appropriate conditions for its current demands.” Furthermore, our findings may explain why the upper Yakima Basin supports renowned resident rainbow trout populations, while tributaries in the lower basin continue to produce predominantly steelhead.

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Title
Juvenile coho salmon life history diversity and estuary use

Abstract
The early springtime downstream migration of coho salmon fry to the lower reaches of a river or into an estuary is well documented. In general, studies suggest varied estuarine use among different age and size classes. We investigated whether coho, like Chinook salmon, are able to utilize available estuarine wetlands to increase expressed life history diversities. We examined the life history diversity of juvenile coho salmon in the Grays River, Washington, a tributary in the lower Columbia River estuary. Catch data from tidal wetland channels shows that coho salmon continue to utilize wetlands later into the season than other salmonid species. These data show that smaller size classes utilize wetlands to a greater degree than larger coho and that these fry rear in the estuary for an extended time in the spring and summer. Catch data from a smolt trap above the head of tide show a second peak in downstream subyearling coho migration in late summer/early fall, some of which may move into the wetlands. Quantitative analysis of scales can detail growth patterns and discriminate between different life histories. Analyzing scale patterns from returning adults will describe the relative success rates of these different life history strategies. Variable wetland utilization among age and size classes of coho salmon has important implications for restoration, conservation, and management. Maintaining a diversity of life history strategies could provide greater resilience in the face of environmental change.

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Title
Distribution of wild- and hatchery-origin spring Chinook salmon (Oncorhynchus tshawytscha) redds and carcasses relative to physical habitat characteristics in the Yakima River

Abstract
Hatchery supplementation of spring Chinook salmon in the upper Yakima River basin has raised questions about the interbreeding of wild- and hatchery-origin fish. Acclimation facilities are intended to disperse hatchery-origin adults throughout the upper watershed. The objectives of this study are to (1) evaluate spatial patterns of spawning by hatchery and wild Chinook salmon, and (2) identify physical habitat variables that characterize redd sites used by wild- and hatchery-origin spring Chinook. Extensive surveys of channel morphology and physical habitat (e.g., substrate, depth, wetted width, cover) were conducted in over 180 kilometers of mainstem, floodplain, and tributary river habitat in 2007. Longitudinally linked habitat units were identified based on broad-scale changes in gradient, substrate, or depth. To explain the fine-scale distribution (<250m) of wild-and hatchery-origin Chinook redds and the physical characteristics that affect their distribution, over 70 sites were intensively surveyed in 2008. Preliminary results suggest that redd densities of wild- and hatchery-origin Chinook peak upstream of the Cle Elum River confluence. Within that section, island braided reaches with multiple channels attract the most spawners. Desirable habitat factors include gravel substrate, proximity to deep water and cover, and downwelling zones above riffle crests.

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Title
Effects of intermixing between resident and anadromous rainbow trout on population productivity

Abstract
We assembled the latest information on environmental and genetic factors that drive residency and anadromy in Oncorhynchus mykiss, and we simulated how the two life history types affect the production of the other in basins where both forms co-exist. Life-cycle parameters were fit to data from mid Columbia populations where interbreeding of resident and anadromous individuals has been observed, and genetics show greater similarity between the two forms in one basin than within one form between different basins. Breeding studies have demonstrated that tendencies for either anadromy or residency are inherited traits among O. mykiss, with some populations producing all anadromous individuals, some producing all resident individuals, and some a mixture of both. Both resident and anadromous parents produce smolts that migrate to sea, but a lower percentage of offspring from resident parents become smolts and fewer survive ocean life than do offspring of anadromous parents. Offspring of resident parents experience greater parr-to-adult survival, younger age at maturity, and greater survival to repeat spawning than offspring of anadromous types. Our life-cycle simulations reflected the growing body of evidence that natural recruitment in steelhead populations is achieved by contributions from both resident and anadromous individuals. Residency is an increasingly important life-history expression of steelhead populations as the difficulty or distance of migration to spawn increases. Neither population recruitment nor viability can be accurately assessed without considering production of both life histories.

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Title
Design and construction of the new selective water withdrawal and fish capture facility at Round Butte Dam

Abstract
Round Butte Dam is an earth and rock fill dam approximately 440 feet high with an original powerhouse intake 270 feet below the reservoir surface. The design and construction of a structure that allows surface water withdrawal for temperature control and fish attraction/collection at Lake Billy Chinook presented many challenges. The structure to be complete by spring 2009 consists of three major components; a rectangular floating surface withdrawal structure, a bottom water withdrawal structure resting in front of the original intake, and a 40-ft. diameter vertical flow conduit connecting surface and bottom withdrawal structures. These components will seal together, allow some movement in between to meet seismic standards, while also allowing operational flexibility related to changing reservoir elevations. The 150-ft long by 90-ft wide rectangular floating surface withdrawal structure will be held in place laterally by a 287-ft. long bridge/strut attached to shore. The structure will allow withdrawal of up to 6,000 cfs of surface water through two 30-ft wide by 40-ft deep rectangular fish entrances. All but 60 cfs of the flow will pass through V-shaped channels with fish exclusion screens, down the vertical flow conduit and into the powerhouse. Fish are separated out from the remaining flow of water and pumped out of the surface withdrawal structure and into a fish transfer/sorting facility.

Due to the location and topography of the area and the size of the structure to be built, the majority of the structure was fabricated off-site, shipped and the pieces put together on floating construction barges. This presentation will illustrate and describe the design and construction of the new Selective Water Withdrawal structure at Round Butte Dam.

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Title

Examining Juvenile Chinook Densities in North and Mid Oregon Coastal Estuaries

Abstract

In 2007 Oregon coastal rivers experienced a sharp decline in returning adult Fall Chinook salmon (Onchorhynchus tshawytscha) compared to previous years. Oregon's coastal rivers were also impacted by flood events in the winter of 2007-08. These events led to concern over the production of juvenile Chinook salmon in north and mid Oregon Coast basins. In an effort to understand the effects of low spawner abundance and flood events on juvenile Chinook production in north and mid Oregon coast basins from the Nehalem to the Siuslaw the Oregon Department of Fish and Wildlife implemented an estuary seining project. Beginning in July 2008 and continuing through September 2008 each estuary was surveyed monthly during low tides in deep water habitsts. A 125' beach seine net was used to sample identified sites in each estuary. Captured juvenile chinook were enumerated, measured and released. Preliminary results in 2008 show comparable catch per unit rates to those sampled from 1978-1987 and 1996 which was a major flood year.

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Title

Evolutionary Patterns in Bull Trout as Revealed by Genetic Markers

Abstract

Genetic markers have provided a great deal of insight into the evolutionary history of bull trout at both macro and micro geographic scales. Early genetic studies focused on resolving relationships among members of the genus Salvelinus. Studies which utilized DNA sequence and allozyme data provided genetic evidence that bull trout and Dolly Varden were separate species and helped to clarify the evolutionary relationships among all members of the genus Salvelinus. Later analyses of mitochondrial DNA revealed that bull trout could be divided into two distinct lineages: an interior lineage and a coastal lineage. These lineages presumably reflect patterns of recolonization following glacial retreat. Subsequent analyses of nuclear DNA markers confirmed the presence of these two lineages and also revealed further genetic structure within the interior lineage. More recent analyses of both mitochondrial and nuclear DNA have helped to refine our understanding of structure that exists within the interior and coastal lineages and offer additional insight into patterns of recolonization. A central theme of these analyses has been that high levels of genetic variation exist among populations throughout the species range. Recent genetic studies have also provided insight into patterns of evolution at a local scale. Within river basins bull trout have often evolved as a group of genetically distinct local populations with varying degrees of genetic exchange among them. Both historical processes and contemporary influences on the landscape and habitat have helped shape local patterns of evolution in bull trout.

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Title

Contributions of the Salvelinus confluentus Curiosity Society to bull trout conservation

Abstract

Following formative meetings in 1989-1991, the Salvelinus confluentus Curiosity Society's workshops have continued to be held in the field in proximity to bull trout populations and have featured a mix of presentations, fire-side discussions, and a full day of field work. The annual ScCS workshop has been hosted in Oregon, Idaho, Nevada, Montana, and Washington, covering the range of bull trout in the United States. The first Canadian-based ScCS workshop is planned for 2009 in Alberta. We provide an overview of these meetings with highlights on major

accomplishments and an assessment of the value of this unique and unaffiliated gathering of professionals. We argue that ScCS has played a critical role in the conservation of bull trout, ranging from candid debates of critical issues to providing biologists new to bull trout an opportunity to experience this species in the field for the first time. As this annual tradition and bull trout biologists have matured, our collective understanding of the species has grown in ways that would not be possible outside of the intimate and in-situ settings that ScCS provides.

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Title

Spatial patterns in the occurrence of steelhead in the John Day River

Abstract

We quantified and predicted spatial variation in the occurrence of steelhead in the John Day River catchment basin, Oregon. Occurrence of steelhead was determined by assigning maternal origin (anadromous versus non-anadromous) to juvenile Oncorhynchus mykiss using otolith microchemistry. We used logistic regression to predict probability of anadromy among 69 sample sites in relation to stream size (as indicated by mean annual runoff). The predictive ability of this model was evaluated using a set of unique new individuals at 47 of these sites (where a second fish was collected). The model predicted anadromy in this second set of individuals with a moderate level of accuracy (e.g. 68% correctly predicted with a 0.5 classification threshold). Residuals from the models were not spatially autocorrelated, as indicated by Mantel tests. This result also suggested that remaining variability in the expression of anadromy was due to localized influences, as opposed to broad-scale gradients unrelated to stream size. In summary we demonstrated 1) that it is possible to predict occurrence of steelhead across broad environmental gradients, 2) the validity of a sampling approach that minimizes the need for sacrificial sampling of large numbers of individuals, and 3) influences of broad-scale versus local factors influencing steelhead occurrence.

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Title

Impacts of Tidal Wetland Prey Export on Juvenile Salmon Diets and Growth Potential in Connected Habitats

Abstract

High primary productivity in estuarine wetlands leads to high rates of secondary invertebrate production. Densities of invertebrate prey available to juvenile salmon are thus hypothesized to be greater in tidal wetlands than in the adjacent river mainstem. Prey densities in the mainstem are dependent not only on productivity in that habitat, but can also be supplemented via connectivity to adjacent estuarine habitats. The degree to which riverine prey levels are enhanced is a product of the area and productivity levels of the wetlands, as well as the geomorphology of the wetland's tidal channels and the wetland's position along the tidal gradient. High levels of prey export would create conditions in the mainstem where salmonid foraging and subsequent growth rates are similar to those in the more productive wetlands. We examined patterns in the diets of juvenile Chinook, coho, and chum salmon in the Grays River estuary, Washington for signatures of wetland prey export. We captured juvenile salmon using a beach seine in the river mainstem at five locations along the tidal gradient and compared diets to prey availability in adjacent wetlands. Although ration sizes were not significantly different along the mainstem, diets of all three salmonids contained a higher proportion of energy-rich drift insects at sites closer to the wetlands. High levels of drift insect biomass in wetland tidal channels suggest that mainstem diet patterns are a function of prey export from these channels. Exported high-energy prey can increase salmon growth potential in the mainstem. Tidal wetlands can thus augment salmonid fitness directly by providing habitat and indirectly by enhancing adjacent habitats. Our results suggest that the impact of estuarine wetland restoration on salmon depends not only on the amount of area restored, but also on the location of restoration along the tidal gradient.

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Title
Predicting and Generalizing the Refuge Function of Intermittent and Ephemeral Streams

Abstract
Intermittent and ephemeral streams can provide important functions within stream networks. For fish, intermittent and ephemeral streams can contribute energy and materials to downstream perennial waters, serve as seasonal habitats, and/or provide refuge functions. Understanding the relative functions of intermittent and ephemeral streams and the relative benefit provided to downstream waters is needed to better inform watershed management and meet federal obligations under the Clean Water Act. Although the potential functions of intermittent and ephemeral streams are relatively well known, predicting and generalizing the relative contributions of these streams remains a challenge. To begin to address this need, we explored the potential for intermittent and ephemeral streams to provide summer thermal refuge functions for coldwater fish in the John Day and Grande Ronde River basins in northeast Oregon. We surveyed intermittent and ephemeral streams at their confluence with warm (>18C) perennial streams in both basins in late July 2008 to identify potential thermal refuge areas defined as patches >3oC colder than the surrounding waters. The occurrence of potential thermal refuges and the characteristics of intermittent and ephemeral /perennial confluence zones differed markedly between basins. Differences in streamflow characteristics, water temperature, and geomorphology among sites were associated with geologic and climatic setting. We propose that Hydrologic Landscape Regions (Wigington et al, this session), designed to capture variation in geologic and climatic factors influencing stream hydrology, may provide a useful template for both predicting and generalizing the potential refuge functions of intermittent and ephemeral streams.

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Title
Lemolo Lake Algal Blooms: Are Tui Chub to Blame?

Abstract
Lemolo Lake is a 182 ha (450 ac) impoundment located at the upstream end of PacifiCorp's North Umpqua Hydropower Project and downstream of Diamond Lake, in SW Oregon. During 2006 and 2007, the lake experienced intense blooms of the cyanobacterium Anabaena, following years of bloom-free conditions, resulting in lake closures for much of the summer. Initial investigations suggested that the Anabaena blooms may have been related to two management events that affected Lemolo Lake in 2005-2006: (1) outflow was modified such that more water was released from the hypolimnion to satisfy higher minimum flow requirements (80 cfs vs. 25 cfs) in the North Umpqua River; and (2) inflow included an extra 29.5 x 106 m3 (24,000 ac-ft) of water from the pre-treatment drawdown of Diamond Lake, which also carried increased nutrients and possibly additional non-native tui chub (Gila bicolor). Abundance of tui chub in Lemolo Lake was greater in 2007 than during any year sampled prior to 2005. In an effort to reduce or eliminate the Anabaena blooms and learn more about causal factors, two actions were taken in 2008. First, PacifiCorp experimentally lowered the lake level from July through September (1.2 m [4 ft] lower than normal) to reduce the hydraulic residence time of the reservoir, and presumably reduce habitat suitability for Anabaena. Secondly, a program of daily trap-netting was initiated to remove as much of the tui chub biomass as possible with available equipment (about 70,000 fish, mostly adults, removed with two nets). Although Anabaena blooms still occurred during 2008, they were less intense than in 2006-07, suggesting that one or both of these actions was beneficial. This presentation describes the conditions in Lemolo Lake from 2006-2008 and evaluates hypotheses to explain the recent Anabaena blooms in the impoundment.

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Title
Capture, Transport and Reintroduction of Lower Columbia River Fall Chinook Salmon Related to Removal of Condit Dam - Results of a Pilot Study

Abstract
The proposed breaching of Condit Dam, near Husum, Washington on the White Salmon River, is expected to temporarily eliminate anadromous spawning in the lower White Salmon River with sediment released from Northwestern Lake. One of the key conservation measures proposed is to limit impacts to Lower Columbia River (LCR) Fall Chinook salmon, a stock listed as Threatened under the Endangered Species Act, that spawn in the lower White Salmon River. In Fall 2008, the U.S. Fish and Wildlife Service in partnership and cooperation with PacifiCorp, Washington Department of Fish and Wildlife, the Yakama Nation, National Marine Fisheries Service and the U.S. Geological Survey conducted a pilot study to capture and transport hatchery-origin Lower Columbia River Fall Chinook Salmon from the lower White Salmon River below Condit Dam and reintroduce fish to the river above. Several capture methods were evaluated and the process of transporting and outplanting was performed to streamline and improve the proposed conservation measure during the year of dam removal. Initial results suggest that in-river seining and the transport methodology performed during the study will be implemented during the year of dam removal and outplanting of hatchery-origin LCR Fall Chinook salmon led to redd building throughout most of the mainstem White Salmon River.

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Title
Explosive Conservation: Larval sucker response to wetlands restoration at the Tulana portion of the Williamson River Delta Preserve, Oregon

Abstract
Historically, the Williamson River delta was a vast expanse of ~2,200 hectares of emergent marsh wetlands, divided by the Williamson River and connected with Upper Klamath Lake (UKL) and Agency Lake. Larval Lost River and shortnose suckers reared in this emergent wetland habitat before entering UKL, as emergent macrophytes have been shown to provide protection from non-native species and better feeding and growth opportunities leading to good year class formation. Beginning in the 1940s, landowners built levees throughout the delta in order to drain the wetlands, convert the land into farmland, and channel the Williamson River directly into UKL. The Nature Conservancy is reconnecting this deltaic wetland through removal of levees to provide hydrologic connectivity. Pilot wetland restoration projects at the Williamson River delta in 2000 and 2003 illustrated that restored wetlands function at least as good as existing lakeshore fringe wetlands along UKL at retaining larval suckers and providing rearing opportunities that may enhance recruitment to adult spawning stages. In October 2007, The Nature Conservancy used over 100 tons of explosives to breach two miles of levees and reconnect the Tulana section of the Williamson River Delta Preserve (WRDP) with UKL, Agency Lake, and the Williamson River. Monitoring during 2008 showed that larval suckers readily used this newly restored portion of the WRDP and on average were larger and had fuller guts than suckers captured in existing lakeshore fringe wetlands along UKL.

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Title
Weak Stock Ocean Fishery Management: How Do California Chinook Salmon Stocks Influence Oregon Fisheries?

Abstract
We review CWT and genetic stock identification data to determine which Chinook stocks are caught off Oregon and how their distribution affects ocean fishery management. Ocean fisheries off California and Oregon are managed on a weak stock basis, where harvest is allowed only to the point that the weakest stock is projected to meet its conservation and allocation objectives. Recent studies have demonstrated that the majority of Chinook salmon harvested off Oregon originated from California's Central Valley and Klamath River. The recent collapse of Central Valley Chinook returns resulted in the closure of ocean fisheries south of Cape Falcon in 2008, and a $170 million disaster relief appropriation to communities in California, Washington, and Oregon. A similar collapse of the Klamath River Chinook stock resulted in a $60.4 million disaster relief fund appropriation to affected communities in 2006. Central Valley and Klamath River stocks are heavily supplemented with hatchery fish. New data indicates that 90% of Chinook in the ocean off California originate from hatcheries. This suggests there is a great potential to selectively harvest hatchery fish. We analyzed the past decade of catch and escapement data to determine how the landings by fishermen and escapement of wild fish would have played out if all hatchery fish had been marked and only marked fish could be retained in the catch. Given the observed ocean populations during 2001-2007, assuming 80% of fish were hatchery origin, and allowing harvesting effort that would have captured 60% of hatchery fish, the total landings of

Central Valley Chinook would have increased by an average 120,000 fish annually, while escapements of natural-origin spawners would have increased by about 30,000 fish annually. Emergency cutbacks in ocean fisheries off Oregon and California, which have frequently been implemented to protect weak stocks, could be substantially reduced.

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Title

The Use of a Resistivity Fish Counter to Passively Enumerate Adult A Run Héeyey (Steelhead Oncorhynchus mykiss) in Camp Creek, Imnaha River Tributary, Oregon

Abstract

In this study, we estimated adult A-run héeyey abundance and passage timing using a resistivity fish counter (Logie 2100C) to passively enumerate adult héeyey escapement in Camp Creek from April 17 through June 11, 2008. Late installation resulted in incomplete coverage of escapement. The counter was powered with 4 deep cell 6 volt batteries run in a series. The resistivity counter detects the passage of fish by a change in conductivity as a fish swims over an array of three electrodes placed across the stream bottom. The counter records the movement direction, time and Peak Signal Size (PSS). Validation of the resistivity fish counter was accomplished by video recordings on a DVR, and the graphing software of the Logie 2100C fish counter. In the graphing program, an upstream fish is in the shape of a sine wave, and a downstream fish is a cosine wave. ODFW conducted a héeyey single pass index area spawning ground survey on April 16, 2008 and found 40 redds and 30 live fish. Our estimated adult héeyey abundance was 300 fish in Camp Creek. During the first 14 days, 131 héeyey passed above the counter. Peak migration occurred from May 3 through May 6, 2008, where an additional 186 héeyey were above the counter. The last observed up and downstream héeyey occurred on June 11. Fish were only considered héeyey if they were larger than 500 mm, had the correct wave pattern in the graphing software, and a PSS value between 75 and 127. The resistivity counter also detected movement of resident rainbow trout and Muq'uc (unidentified sucker species).

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Title

Take your vitamins! Describing the relationship between egg thiamine (vitamin B1) and mortality in Lake Michigan lake trout

Abstract

Lake trout (Salvelinus namaycush) were once the dominant native predator in the Great Lakes and supported valuable fisheries prior to extirpation. Despite an aggressive stocking program, lake trout have shown no substantial evidence of natural reproduction over the past 40 years. Beginning in the 1970s, lake trout, coho, and Chinook salmon production hatcheries documented unusually high levels of mortality between the time of hatching and first-feeding. The mortality was family-specific and was termed Early Mortality Syndrome (EMS). In 1995, it was hypothesized that low levels of thiamine (vitamin B1) in the eggs of Great Lakes salmonines was responsible for the mortality. To determine the extent to which mortality is related to egg thiamine, we quantified the relationship between egg thiamine levels and fry mortality in lake trout collected near Sturgeon Bay, WI, in Lake Michigan. From 1996 through 2003, eggs from 124 adult female lake trout were collected (n varied by year) and fertilized by sperm pooled from several males. Fry were raised to approximately 1100 cumulative temperate units. Egg thiamine concentration was determined by high performance liquid chromatography and was used as the explanatory variable in a regression analysis to quantify the relationship between egg thiamine and mortality. Lower egg thiamine is associated with higher incidence of mortality, although the relationship is non-linear. We also explored how the thiamine-EMS relationship for lake trout in Lake Michigan compares to the same relationship studied in lake trout from Lake Ontario. These

monitoring data serve as a reference point for fishery biologists and assist in establishing the relationship between thiamine deficiency and mortality. Our analysis will help managers assess the risk associated with specific levels of thiamine in lake trout eggs and allow for refinement of prophylactic thiamine treatment in hatcheries.

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Title
Run Timing and Spawning Distribution of Hatchery-and Natural-Origin Spring Chinook Salmon in Three Different Northeastern Oregon Streams

Abstract
We evaluated weir collection data on the Imnaha and Lostine Rivers, and Catherine Creek to examine differences in run timing and spawning distribution between naturally-and hatchery-reared Chinook salmon Oncorhynchus tshawytscha. Hatchery supplementation on the Imnaha River has been occurring since the first adult collections in 1982 and smolt releases in 1984, and on the Lostine River and Catherine Creek since the first smolt releases in 1997 and 1998, respectively. On the Imnaha River, naturally-reared Chinook salmon consistently arrived at the weir earlier than hatchery-reared fish. Arrival time at the weir between natural and hatchery Chinook salmon was different in five of eight years on the Lostine River and in two of seven years on Catherine Creek, but was not consistently different among years. We compared spawning distribution using the percent of female carcasses recovered in each spawning ground survey reach. On the Imnaha River, the percent recovery of natural female carcasses was greater in reaches above the weir than below the weir, and these carcasses were farther upstream than those of hatchery females, which tended to be found in the vicinity of the acclimation site. On the Lostine River and Catherine Creek, there was no difference in the distribution of natural and hatchery female carcasses within a return year. Unlike the Imnaha River, where a divergence in both run timing and spawning distribution has been documented, the same pattern has not been found on the Lostine River and Catherine Creek, where we hope to prevent, or reduce, the divergence in life history characteristics between hatchery and natural salmon.

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Title
The Devil's in the Details: Using life-cycle models to evaluate the probability of extinction.

Abstract
Population Viability Analysis (PVA) is a generic term that describes models designed to determine the probability of extinction within a specified period of time. These tools can evaluate the vulnerability of populations and instruct policy-making, they can reveal critical data needs and guide future research and monitoring, and they can assess the relative effects of different management options and guide the allocation of limited resources. In this study the Species Life Cycle Assessment Modules (SLAM) were used to create life-cycle models of salmon populations in the Lower Columbia. The SLAM models have an advantage over some other models in that the program has the ability to model stochasticity, measurement error, density dependence, cyclic patterns like inter-decadal ocean oscillations, and the delay in the effects of management changes. Results are compared with another modeling approach that does not incorporate these parameters.

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Title
Oregon Department of Fish and Wildlife: Pressure Shock Induction of Rainbow Trout

Abstract
The use of sexually sterile fish has many applications in fish culture and management. The need to produce great fisheries while protecting the genetic integrity of native fish has prompted research into the production of triploid fish. Experimental thermal (heat) shock of Rainbow Trout eggs began in 2003 at Roaring River Hatchery. By 2004, the entire egg production was thermally shocked. Inconsistencies in triploid induction rates coupled with high mortality prompted the purchase of a pressure chamber by ODFW in 2007. In the fall of 2007, pressure shock research began on eggs from the 072 Cape Cod stock at Roaring River Hatchery. Groups of 10000 pooled eggs fertilized with pooled milt were shocked for 5 minutes at 300 TTUs post fertilization with 8000-10000 (at 500 intervals) psi. Duration of shock was researched with groups of eggs pooled (as described above), at 9500 psi for 3-6 minute durations in one minute intervals. Total mortality from green egg to emergence ranged from 36 to 64% and triploidy rates ranged from 75 to 100%. The highest triploid induction rate and survival rate was achieved using 10000 psi for 5 minutes with a combined egg and fry loss of 40.55% and a triploid induction rate of 100%. For 2008 and 2009, the pressure experiment will be repeated with new parameters added including 10500psi and 375 TTUs. The goal is to find a pressure treatment that will yield lower mortality while maintaining 100% triploidy. Additional triploid research includes comparison testing of competition, performance, and survival between diploid and triploid Rainbow Trout and creel comparisons of diploid and triploid catch. Information from such research will hopefully provide professionals the tools to make the best decisions to enable both a great fishery while minimizing genetic interactions with native fish.

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Title
Floating Surface Collector at Baker Hydroelectric Project in Northwest Washington

Abstract
In 2008, Puget Sound Energy completed and began operating a new floating surface collector at its Baker Hydroelectric Project. The Baker Project is located on the Baker River, tributary to the Skagit River in northwest Washington. A keystone of the 2004 Comprehensive Settlement Agreement among Puget, federal and state fish agencies, tribes, and NGOs was a commitment by Puget to construct and operate a full-depth barrier net and fish collection facility in Baker reservoir to provide safe downstream passage. Based on its first season of operation, the facility has high collection efficiency and low injury and mortality of sockeye and coho salmon smolts as well as other fish species.

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Title
The ODFW 25-Year Angling Enhancement Plan

Abstract
How does the Oregon Department of Fish and Wildlife (ODFW) balance use (catch and harvest)of fish resources and protection of the same fish resources? ODFW's mission states the Agency will protect and enhance Oregon's fish and wildlife for use and enjoyment by present and future generations. The percentage of Oregonians that fish is declining but many native fish stocks are also at risk. In response to these trends and to concerns expressed by anglers, ODFW was instructed by the 2007 Oregon Legislature to write a 25-Year Recreational Angling Enhancement Plan (Plan) to guide efforts to enhance recreational fishing opportunities in Oregon. ODFW developed a policy, goals, and action items using an internal agency work group, a public advisory group, and discussions with fish advocacy groups and public partners. Some prominent items debated during Plan development include differing views on the use of hatchery fish; the role of non-native game fish; the ethic of catching versus keeping fish; communication in the electronic age, especially with young people; and funding for new programs. This talk will discuss Plan development, the role of the public in the process, and challenges for implementing the Plan.

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Title
Connectivity in Freshwater Ecosystems: a Literature Synthesis and an Example Conservation Application

Abstract
Connectivity among populations and their habitats is important for species persistence and biodiversity. Connectivity has been well studied in terrestrial landscapes, but progress has been slower in aquatic ecosystems. The challenges, particularly for lotic environments, include the force and direction of flow, the dendritic structure of stream networks, their highly dynamic nature, complex life histories of many aquatic organisms, and anthropogenic influences concentrated near aquatic features. We performed a literature review to learn how connectivity is being studied in streams. We identified five general research questions common in the literature. Researchers asked how connectivity influenced (1) biodiversity and spatial structure, (2) metapopulation dynamics, (3) dispersal and migration as disrupted by barriers, (4) population structure under temporally varying conditions, and (5) potential pathways for the spread of nonindigenous species or pathogens. We suggest several research frontiers for advancing understanding of connectivity in freshwater environments. These include explicit inclusion of anthropogenic influences, acknowledgement of spatio-temporal variation and integration with the physical template upon which biotic interactions play out, a more mechanistic focus, and extension of analyses to assess connectivity within entire ecosystems. Recent progress toward understanding surface water connections in aquatic networks has revealed promising new quantitative approaches; yet there remains significant room for development. As an example, we discuss an application of network theory developed for two-dimensional systems, but modified to study source-sink dynamics of salmon metapopulations in the Willamette-Lower Columbia region. Borrowing from work conducted by Schick and Lindley (2007) for Chinook salmon in California, we used a graph-theoretical approach to evaluate differences in connectivity between existing conditions and presumed historical (i.e., pre-dam) conditions. This type of analysis can highlight restoration actions (i.e., provision of fish passage facilities) that are most likely to support connectivity and therefore persistence for the entire evolutionarily significant unit.

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Title
A likelihood model for incorporating tag loss into the inference of abundance from Mark-Recapture data

Abstract
We present a simple two-step likelihood model which uses data from a mark-recapture study to calculate realistic values for both the point estimate of population abundance and its uncertainty. The model is applicable to studies of closed populations performed over relatively short time periods - conditions which generally correspond to those for studies to estimate spawning escapement of anadromous fish populations. The model initially uses double-tagging data (if available) from the mark-recapture study in a binomial likelihood model to estimate tag loss rate and its variance. These values are then incorporated into a hypergeometric likelihood model to generate an estimate of abundance which has been corrected for the effect of tag loss, and whose uncertainty reflects the combined error introduced by the processes to estimate both abundance and tag loss. The model, an executable file with associated data text file, program editor and tutorial, is available to the public at http://www.critfc.org/tech/08-07report.html. To use the model, one simply enters values for the number of single- and double-tagged fish, the total number of fish captured, and the number among them that were recaptures of single- or double-tagged fish into the data file. Running the program then generates maximum likelihood point estimates for tag loss rate and abundance, and their associated standard errors. Using estimated and/or empirical mark-recapture data for a given population, the model can also be used to predict the uncertainty level of the abundance estimate that will be obtained under various marking and tagging scenarios. Fisheries managers can therefore predict the amount of effort required to obtain a desired level of precision. Also, when the analyses are compared with information on relative costs for the associated marking and recaptures activities, study designs which might be most cost effective can be identified.

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Title
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), the Licensees are implementing a comprehensive fish passage program. The program is centered around the construction of a new Selective Water Withdrawal (SWW) structure coupled with a Fish Passage Facility. The facilities are scheduled be operational in the late spring of 2009. In anticipation of these facilities, ODFW in cooperation with the Confederated Tribes of Warm Springs Reservation of Oregon, PGE, Federal and State agencies, Non-Governmental Organizations, watershed and irrigation districts, landowners, school groups, and volunteers began outplanting summer steelhead fry in 2007 and spring Chinook salmon fry in 2008. The expectation is the SWW will be completed just prior to the smolt outmigration.

In a parallel process, ODFW and the CTWSRO completed the Reintroduction and Conservation Plan for Anadromous Fish in the Upper Deschutes River Sub-basin Edition 1: Spring Chinook Salmon and Summer Steelhead. The Reintroduction Plan is intended to contribute to a successful reintroduction effort by identifying key fish management issues and how they will be resolved in an adaptive fashion. It discusses species and stocks to be reintroduced to areas above PRB, and provides general guidance on methods, release locations, numbers, timing, and adjustments in hatchery supplementation as populations become re-established. The goal of reintroduction is to restore self-sustaining and harvestable populations of native summer steelhead, Chinook salmon, and sockeye salmon in the Deschutes River and its tributaries upstream from PRB, and to reconnect native resident fish populations that are currently fragmented by PRB.

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

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Title
Examination of Differences by Sex in Antibiotic Activity and BKD ELISA Value in Maturing Chinook Salmon

Abstract
The Grande Ronde Captive Broodstock Program has persistent problems with bacterial kidney disease (BKD). We investigated the effect of injection site on antibiotic activity in the kidney during the treatment of BKD. In 2007, when we injected erythromycin into the dorsal sinus, we found that maturing male Chinook salmon Oncorhynchus tshawytscha had lower enzyme-linked immunosorbent assay (ELISA) values (0.1244 vs. 0.4963; $P=0.0006$) and lower equivalent antibiotic concentrations (1.5197 vs. 2.6679; $P<0.0001$) in the kidney than maturing females. Several reasons were suggested for this difference. We wanted to see if this was an anomaly or if it held true across spawn years, and if so, why?

We gave maturing salmon an erythromycin injection after they were determined to be maturing in April or May, and again in August. We collected kidney tissue at spawning for analysis of drug activity by disk diffusion assay and detection of Renibacterium salmoninarum antigens by ELISA. We standardized the kidney tissue collection procedure to reduce the possibility that differing volumes of blood in the sample could have caused the lower values found in males in 2007.

We will examine ELISA values and equivalent antibiotic activity of salmon spawned in 2008 to see if the difference between sexes still exists, as the 2007 data suggest. We will also examine the values to see if there are differences related to brood year rather than gender. Using two years of data, we will be able to compare males and females from the same cohort that spawned at different ages in different years.

These studies will help evaluate the most effective treatment regime against BKD for each sex, allowing us to maximize our treatment effort. This will allow us to increase production in the Captive Broodstock Program and other hatcheries, and potentially offer insight into gender related metabolic differences.

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Title
Intrinsic Potential Models for Salmon and Steelhead in the Pacific Northwest: Regional Applications and Coordination Efforts

Abstract
Intrinsic Potential (IP) models quantify the historical capacity of stream reaches to act as suitable habitat for fish by using geospatial landscape features that are not easily modified by anthropogenic influences over time. The modeling process is two-fold, beginning with the generation of a stream network using digital elevation models, followed by the calculation of species and region-specific IP scores based on landscape attributes. The resulting reach-scale IP values depend not only on the synthesis of landscape features, but also on the parameters used to generate the stream network. The IP scores do not represent current habitat conditions, rather a historic potential for habitat quality and quantity. Data from IP models currently help determine historic distribution of fish and aquatic habitat, and inform population structure analyses, habitat restoration efforts, and resource management for anadromous salmonids. Conservation and recovery plans for ESA-listed salmon and steelhead populations in the Pacific Northwest have also used IP data in their analyses. However, despite the expanding use of this tool, there is no standard methodology for developing the geospatial datasets needed for analyses, nor are there peer-reviewed habitat suitability curves for some anadromous species. Moreover, in areas where IP has been generated by multiple entities, there are differences in the results. A workshop convened in November of 2008 to address these and other issues has highlighted the need for tools to facilitate communication and coordination between IP users as well as consistent metadata documenting the methods used and parameters selected to run the models. The IP model framework has proven to be a useful tool and would benefit from a regionally coordinated approach rather than myriad different versions being generated in isolation.

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Title
Cold Water Refuges for Native Fish Communities in the Willamette River

Abstract
Land use change and industrial/municipal development have directly and indirectly warmed streams and rivers throughout the Pacific Northwest, contributing to the decline of anadromous salmon and trout, resident salmonids, and other cold water species. Distributions of native fish species will undoubtedly shrink and become disconnected as thermal regimes in river networks warm more rapidly due to human influences and climate warming. We have found that floodplain alcoves provide the coldest refuges in the Willamette River, followed by smaller alcoves on gravel bars in the active river channel. We found that more than 90% of the fish species observed in floodplain alcoves that are colder than the mainstem are native species, but 60-70% of the species observed in floodplain alcoves that are warmer than the mainstem are non-native species. Similar relationships were observed between side channels versus isolated floodplain ponds, which contained greater abundances of non-native species. Using radiotracking, we found that more than half of the cutthroat trout released back into cold water refuges remained in these habitats during late summer. In addition, we implanted iButton temperature dataloggers in cutthroat trout to determine the thermal environments used by cold water native species. These trout used habitats that were 2 to 3 degrees C colder than the temperatures in the mainstem river. River conservation must protect cold water refuges if we are to maintain our native fish assemblages in the face of climate change and human population growth. Attempts to harden rivers and reduce natural flood events must be reversed if we are going to restore dynamic channels that create the cold water refuges associated with floodplain dynamics and river channel change.

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Title
Creating a science-based conservation framework for coastal cutthroat trout

Abstract
The status of coastal cutthroat trout (CCT) throughout the subspecies distributional range is largely unknown. The information that is available for CCT is largely found in various state, federal, and provincial agency reports or unpublished data and often is ancillary to monitoring programs for other species. This creates difficulties for resource managers who are charged with maintaining CCT populations and establishing management priorities. Addressing the complicated issue of managing CCT is a priority for state, federal, tribal, and NGO organizations. In 2006, a CCT Working Group consisting of representatives from these organizations began working together with a goal of "developing a consistent framework to help guide and prioritize conservation, management, research, and restoration of CCT throughout their native range". To accomplish this goal the group has worked to identify priority data needs and develop novel approaches to gathering and sharing scientific information that is needed for management actions including the determination of the subspecies status. The CCT database project was initiated in 2008 by Pacific States Marine Fisheries Commission (PSMFC) to address these needs. Additional funding from the Western Native Trout Initiative (WNTI) will result in the following projects: 1) A searchable library housed within the StreamNet Library (www.streamnet.org, www.fishlib.org) with documents pertaining to CCT scanned and available for immediate download; 2) gathering information relating to documented occurrence in a broad geographic area, and 3) an interactive web-based searchable database and map that initially captures documented occurrence in selected regions of Oregon and Washington. A GIS-based map depicting documented occurrence will be presented along with a summary of data types and reporting on our initial success in gathering scientific information on the subspecies.

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Title
Ladders, screens, and barriers on the North Umpqua Hydro Project

Abstract
New and improved fish passage and protection facilities are a major part of PacifiCorp Energy's new license commitments on the North Umpqua Hydroelectric Project. Design, construction, and evaluation began in 2004 and is gaining steam. In 2006, a 1950s era ladder was modified by adding 17 intermediate steps, and proved navigable by resident trout. The same year, a new diversion was built with gates that allow fish passage without need for a ladder. In 2008, a new T-style fish screen was built at the remote 150 cfs Fish Creek diversion, which has proved challenging to keep clean via air-burst. In 2007, a new tailrace barrier was built at Soda Springs Powerhouse which required coffer-damming the mainstem North Umpqua River and created enough summer turbidity to spawn a rash of angler complaints. The structure is 220 ft long, 16 ft tall and holds 20 sets of gates and submerged 8x10 ft pickets to diffuse 1,600 cfs to <1 fps. Challenges include eddying within bays and gravel accumulation against and under pickets. The biggest fish facility project will be built in 2009-2012, and consists of a new 60-ft-high half-Ice-Harbor fish ladder and 1,600 cfs V-screen at Soda Springs dam. Complexities include fitting the structures within the narrow bedrock canyon, and accommodating a 14-ft water level range in the reservoir. Hydraulic modeling indicated that surface flow designs produced unavoidable violent hydraulics within the fish bypass flume-to-pipe transition, hence the transition was replaced with a hopper feeding water into a pressurized bypass pipe. Facilities will be evaluated hydraulically and with fish. We've learned that besides consulting with engineers, biologists, agency representatives, and contractors, it's wise to also consult early and often with the staff that will be operating and maintaining the facilities.

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Title
Hatchery Release Strategies: Maximizing Survival, Minimizing Risk, and Mimicking Wild Migration

Abstract
Anadromous fish hatcheries release juvenile fish in a variety of ways in an attempt to maximize the survival of downstream migrating smolts while at the same time minimizing the impacts to native fish populations in the stream of release. Warm Springs National Fish Hatchery, a spring Chinook salmon hatchery located on the Warm Springs Indian Reservation in north-central Oregon, has attempted to mimic the migration behavior of the wild population by allowing a portion of the hatchery's production to volitionally leave the hatchery as sub-yearlings during a fall release period, and volitionally releasing the remainder of the production as yearling smolts during the following spring. PIT tag technology was used to monitor the magnitude, timing, and survival to Bonneville Dam of fish released from the hatchery during these two time periods. Migration from the hatchery during both the fall and spring periods consisted of a series of peaks, even though flow in the hatchery raceways was held constant. We also found the number of fish leaving the hatchery as sub-yearlings was highly variable, and the apparent survival of the sub-yearlings to Bonneville Dam was lower than spring released yearlings. Sub-yearling fish exhibited a variety of migration behaviors; some sub-yearlings migrated downstream during the winter while others over-wintered in the Deschutes River and migrated to the ocean during the following spring. The ecological effect of the over-wintering sub-yearlings on the wild population is unknown. Hatcheries should evaluate their release strategies to ensure that program objectives are being met while at the same time the impacts to fish populations in the stream of release are minimized.

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Title
Monitoring the Effectiveness of Culverts Replaced or Retrofitted for Fish Passage in the Upper West Fork of Smith River, Oregon

Abstract
The four culverts in this study passed juvenile coho salmon and cutthroat at a wide range of flows. There appear to be patterns in the timing, frequency, and magnitude of upstream and downstream presmolt movement. The upstream movement of both juvenile coho salmon and cutthroat trout in the West Fork of Smith River appeared to be triggered by the first fall freshets and tapered off through the rest of the year. Downstream movement was spread throughout the year. Virtually all of the upstream movement occured during flows at or below the 2% exceedance level with the vast majority happening at or below the 10% exceedance. Determining the timing and magnitude of flows when fish move could help to refine the design criteria for crossings. While these findings might be used to justify less than stream simulation sized crossings many other factors need to be considered as crossings are sized and designed. Stream simulation crossings provide for many more benefits and functions than just fish passage. Maintenance of stream channel processes, ecological function and delivery of materials downstream are of equal or greater importance and should be considered in culvert design.

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Title
Crayfish, competition, and coexistence: Exploring shelter competition in an invasive crayfish assemblage

Abstract
The Red Swamp Crayfish (Procambarus clarkii) is one of the IUCN's 100 Worst Invasive Species. It is present in Oregon's Willamette Valley along with the indigenous Signal Crayfish (Pacifastacus leniusculus). Both crayfish species are aggressive habitat and dietary generalists, and are largely dependent on shelter: they are prey items for many aquatic and terrestrial predators. We hypothesized that the successful invasion of Red Swamp crayfish into Signal crayfish streams may be due to interactions between habitat, shelter availability, and interspecific competition. We employed a multi-scale approach addressing both abiotic(habitat) and biotic(competition) mechanisms of invasion by using field survey and experimental mesocosm techniques. We used an epicenter survey design that focused on areas of coexistence for both species of crayfish. We sampled water bodies at points (n=26) intersecting concentric circles with radii of 500m, 1km, and 1.5km at two regional field sites: Cox Creek (n=15 sub-sites) in Albany, OR and Amazon Creek (n=11 sub-sites) in Eugene, OR. Within both epicenter surveys, invasive P. clarkii were the dominate species. Habitat types with species overlap were similar across sites, sharing substantial amounts of interstitial spaces for shelter, relatively cool water, and held either deep (>1m) water or substantial canopy cover.

To test the hypothesis that shelter availability and species composition affects shelter occupancy, we performed a 2x3 factorial mesocosm experiment with treatments for shelter density (high, low) and species composition (Signal alone, Red alone, Signal and Red together). We discovered significant differences in occupancy patterns for both species between conspecific only (CO) and conspecific + heterospecific(C+H) treatments, and that shelter availability alters these patterns in C+H treatments. Notably, invasive Red Swamp crayfish exclude Signal Crayfish from shelters when shelter availability is low. In both high and low shelter C+H treatments, Red Swamp crayfish demonstrate elevated aggression relative to CO treatments.

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Title

Where No One is Left Inside

Abstract

Since the 1970s, science and environmental educators have been spreading the word that the entire natural world is closely connected - and that throwing away any part of that world damages the Gaia machinery. Yet, the staggering divide between children and the outdoors has continued to widen. Richard Louv's groundbreaking "Last Child in the Woods" in 2006 was a wake-up call to teachers and parents to reconsider the benefits of a child's life lived outside. New legislation may give us reason to hope that we can bring young people back to the outdoors. Healthy watersheds, and their rivers and creeks, will not survive without reconnecting our youth, and even their parents, to what's happening outside the walls of the school and home.

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Title

Change is on the Horizon: Are Oregon’s Great Basin Redband Trout Ready?

Abstract

Redband trout (Oncorhynchus mykiss newberrii) began to invade the Oregon portion of the Great Basin approximately 70,000 years ago, and populations have persisted despite subsequent isolation and large fluctuations in climate and hydrology. The phenotypic plasticity of redband trout has enabled them to survive in streams and lakes of the Great Basin that commonly experience warm water, high salinity, and low oxygen levels. Current climate models, however, predict increases in air temperature, winter precipitation, and storm intensities in the Great Basin. These factors will likely stress the adaptive capacity of redband trout with unpredictable consequences. Adding to the uncertainty was the 2005 status review of redband trout which identified numerous data gaps and prevented a thorough review of population status and trend. In response, ODFW’s Native Fish Investigations Project initiated a six-year study in 2007 to assess status and trends of redband trout. A primary objective was to capture a range of climatic conditions and evaluate subsequent shifts in population abundance and structure. Sample sites were randomly chosen using the Generalized Random Tessellation Stratified (GRTS) design. Rigorous estimates of abundance, size composition and stream habitat conditions were obtained at each sample site. During the first two years of the study, stream conditions were characterized by low, warm water. Field crews sampled 482 sites across the six interior basins constituting a diverse array of stream habitats. Redband densities averaged 418 fish/km and were highly variable, a result which we expected due to the large spatial scale of the sampling area. Length frequency analyses show populations dominated by age-1 fish, suggesting high productivity and lower extinction risk. We will discuss initial findings in context of impending climate and hydrologic changes to the Great Basin.

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Title

Long-lived marine species and resiliency to overfishing

Abstract

Overexploitation of long-lived marine species is more common than in short-lived species, such that long lifespan is assumed to be a direct, or at least indirect, driver of susceptibility to extinction. We explore the following hypotheses for the apparent increased vulnerability of long-lived marine species: a) their population dynamics are dependent on age structure rather than adult biomass, leading to population responses to exploitation that are fundamentally different from those assumed by the simplified models that are used to determine harvest levels, b) management actions are inadequate to respond to exploitation that targets long-lived species, due to time lags or other factors, or c) data collection and analysis for long-lived species fail to provide the correct signals of population status, thereby leading to overestimates of allowable harvest levels or underestimates of extinction risk. Case studies of deep sea fishes, sea turtles and elasmobranchs suggest that all three of these hypotheses may be viable alternative explanations, but all indicate a need for greater precaution in management. Our analyses with simulated populations of rockfish (Sebastes spp) explore the relationship between age structure, environmental variance and recruitment patterns, indicating conditions and life histories where age structure and maternal effects on offspring quality are essential components of population dynamics and resilience to environmental change. Solutions include management actions that promote establishment of variable and robust age structure of populations, such as area closures and some gear modifications.

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Title

Marine reserves in Oregon: clarifying conservation needs and potential costs and benefits

Abstract

In 2003, Oregon AFS endorsed a white paper on marine reserves and marine protected areas (MPAs) that provided general information on their conservation benefits. This document recommended defining explicit, measurable goals for each MPA or reserve and implementing an appropriate monitoring framework, and emphasized the importance of working with agencies, fisheries and coastal communities to develop sound policy. Since 2003, a flood of scientific papers has contributed to our knowledge of biological responses in reserves, California has implemented a network of reserves and MPAs in the Channel Islands and Central California Coast, and Oregon has identified study areas and two pilot reserve sites. Scientific information plays an essential, if sometimes small role in discussions about the need for reserves, where reserves should be located, how many there should be, and how large they should be in order to maximize conservation benefits while minimizing economic costs to fisheries and other coastal resource users. The collective opinion of Oregon's Chapter of AFS is an important voice in this debate, and fish biologists, ecologists and fisheries scientists can be important resources for the state and its citizens. We will review the current situation in Oregon and facilitate a discussion among AFS members to update the white paper. We will also discuss critical research needs, monitoring recommendations, and how AFS can promote outreach and collaborative efforts on the Oregon coast.

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Title

Maternal effects in Pacific ocean perch (Sebastes alutus) from the Gulf of Alaska

Abstract

Research on live-bearing fishes of the genus Sebastes has shown positive relationships between the age of females and the quality of their offspring, where "quality" is measured as increased size, larger oil globule volume, faster growth rate, longer time to starvation, and/or increased swimming speed. Females of different age classes may also spawn at different times, with younger females generally releasing their larvae later in the parturition season and over a shorter time period. These studies have re-introduced an important concept in life history evolution that should influence fisheries management: the potential need to preserve age structure of the spawning stock, not simply biomass. We are investigating the age-specific characteristics of spawning Pacific Ocean perch (POP) from the Gulf of Alaska to see if

patterns observed in nearshore rockfishes also occur in this deep water species. In general, we have found weak support for age-related differences in reproductive characteristics among females. Our attempt to approximate the timing of parturition for females collected through trawl sampling has been confounded by an interesting phenomenon – a substantial number of females (5-10%) show evidence of differential development in the two ovaries, suggesting that some fish are able to release their larvae one ovary at a time. Our research has not found a strong relationship between mother's age and offspring quality in POP, but has revealed important aspects of reproductive physiology in this species.

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Title
Life History and Survival of Coho Salmon in Tributaries to the Lower Columbia River

Abstract
Coho salmon are federally listed as threatened in the lower Columbia ESU and considered to be at high to very high risk of extinction in the Youngs Bay and Big Creek population areas. The population estimates varied annually from 0 to 281 wild adults in the Youngs Bay and Big Creek areas in 2002-2007. Given the status and limited understanding of coho population dynamics in tributaries to the lower Columbia River, we developed a project to examine juvenile abundance, migration size and timing, habitat use, and survival in Big and Bear creeks. This project coincided with the reintroduction of adult coho into the watershed above Big Creek Hatchery, which provided an opportunity to compare a recently restored population with the hatchery population in Big Creek and an adjacent wild population in Bear Creek. We estimated the juvenile population in Big and Bear Creek watersheds during the summer, the number of outmigrants with a screw trap and PIT array, the mortality due to birds in the lower Columbia River estuary, and survival back to the watersheds. We also estimated freshwater rearing capacity with the Habitat Limiting Factors Model (Nickelson 1992) based on summer and winter habitat surveys to compare with current seeding levels. The findings highlight the challenge of restoring viable coho population to the lower Columbia River.

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Title
Longitudinal Variability in Pacific Northwest River Fish Assemblages

Abstract
We sampled 20-25 sites on each of seven mainstem rivers in the Pacific Northwest to study longitudinal spatial variability in riverine fish assemblages. We sought to determine the number of sites that would yield relatively precise estimates of physical, chemical, and biological condition for raftable rivers 100-200 km long and 20-120 m wide. Sites were selected using a systematic randomized sampling design so that estimates could be made for the entire mainstem river length in two rivers in Washington (Chehalis, Okanogan) and five rivers in Oregon (Willamette, Malheur, Umpqua, Sprague, John Day). The rivers were selected to include those draining cold deserts, dry and wet forests, and agricultural plains. All sites were sampled by a four person crew from two rafts. The crews collected physical and chemical habitat information as well as fish and macroinvertebrate assemblage data using EMAP-West methods. The reach length for each site was 50 times the mean wetted width of the channel, and crews sampled 1-2 sites per day depending on site size and the distance between sites and access/egress locations. Ordination analyses and Bray-Curtis pairwise similarity analyses of fish assemblage data showed different spatial patterns in different rivers. The Willamette River showed distinct zones whereas the Okanogan showed no zonation and only slight differences in assemblages from upstream to downstream. Overall, the data suggest a high degree of spatial autocorrelation between sites that are < 10-40 km apart, and we typically observed no marked changes between adjacent sites. This autocorrelation needs to be taken into account in designing regional or river monitoring surveys.

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Title

Status of the Grande Ronde River Basin Spring Chinook Salmon Captive Broodstock Program: 1995 - 2009

Abstract

The Grande Ronde Basin Spring Chinook Salmon Captive Broodstock Program is a gene conservation program for Chinook salmon Oncorhynchus tshawytscha that was developed due to extremely low adult returns, with a goal of rapidly increasing the number of natural spawners. Up to 500 wild parr were collected in each of three streams (Catherine Creek, upper Grande Ronde River, Lostine River). We were able to collect our target number of parr from each stream in each year, in most years. Parr were raised to adulthood under one of two pre-smolt (accelerated or simulated natural growth) and two post-smolt (freshwater or saltwater) rearing regimes. We compared survival, growth and spawning between treatments. A greater percentage of fish reared in freshwater (56%) survived to spawn than those raised in saltwater (48%). Accelerated pre-smolt rearing produced larger smolts and freshwater post-smolt rearing produced larger males and females at maturation. Most females (85%) matured at age 4 and most males (69%) matured at age 3, with little difference among post-smolt treatments. However, pre-smolt rearing did affect age of maturation, with both males and females maturing earlier when reared under an accelerated pre-smolt regime. Bacterial kidney disease has been the largest cause of mortality. Mean fecundity was higher in freshwater females. Production did not meet goals of 150,000 smolts / year due to small size of females and the resulting low fecundity. We have spawned 11 brood years (1998-2008), released nine brood years of the F1 generation and six full brood years of the F1 generation have returned to spawn in nature. Mean smolt-to-adult return rates have exceeded the goal of 0.1% for all stocks. These results will be used to improve rearing methods in this and other captive broodstock programs.

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Title

Sockeye Development strategies for the Deschutes Basin

Abstract

Sockeye Development Strategies for the Deschutes Basin

Oregon historically had two sockeye salmon (Oncorhynchus nerka) populations; the Wallowa Lake population in the upper Grand Ronde River Basin and the Suttle Lake population in the Deschutes River Basin. The anadromous portion of Deschutes population was officially extirpated in 1966 with the failure of downstream passage facilities at the newly-constructed Round Butte Dam. Redevelopment of an anadromous sockeye run in the Deschutes Basin is proposed through this project, in coordination with the Oregon Department of Fish and Wildlife, the Pelton Round Butte Hydro Project Co-Licensees, Portland General Electric Company and the Confederated Tribes of Warm Springs Reservation of Oregon Warm Springs. The Co-licensees are constructing a selective water withdrawal (SWW) and new downstream fish-passage facilities at Round Butte Dam with the long-term goals of providing safe downstream guidance and passage for steelhead (O. mykiss), spring Chinook (O. tshawytscha), and sockeye.

Guiding management direction of O. nerka in the Deschutes Basin, are three overarching objectives:

- Establishing a self sustaining population of sockeye salmon.
- Maintaining the popular kokanee recreational fishery in Lake Billy Chinook.
- Maintaining a forage base to support a viable, conservation level bull trout population.

Critical information is needed to successfully meet O. nerka management in the Deschutes Basin. Basin fish managers and biologists are seeking to understand the role of O. nerka in the Lake Billy Chinook-Metolius River ecosystem; The response of O. nerka populations to changing limnological conditions resulting from activating of the SWW facility; level of O. nerka emigrating from the reservoir and resultant adult return rates, and appropriate distribution of juvenile O. nerka to meet the three overarching management objectives.

This information will serve as the foundation for developing and implementing a strategy to promote the successful re-establishment of sockeye salmon into historic habitat in the Deschutes River Basin.

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Title
Monitoring bull trout abundance: How good are redd counts?

Abstract
The use of redd surveys to monitor abundance and trend of bull trout has been clouded by uncertainties concerning survey design, measurement error, differences in life histories, and correspondence to adult population size. We compared complete census redd counts to population estimates of mature female bull trout for a fluvial (primarily >300mm), largely migratory population over 10 years and for a separate population of small (<200mm), likely resident bull trout. We also compared the measurement error of experienced and inexperienced surveyors. Although the regression of redd counts on adult females for the fluvial population was statistically significant, there was large unexplained variation in the relationship (r2 = 0.47). Redd counts accurately reflected a >50% decline in the population over 10 years, but 5-year trends could be misleading. Power analysis indicated that minimum declines of 41-65% or increases of 69-181% over 10-15 years would be necessary to be detected. Geomean abundance estimates of fluvial adults derived from redd counts and adults/redd in Mill Creek were similar to the geomeans of measured adult numbers. Geomean adult estimates based on average adults/redd values from the literature were higher but mostly not statistically different. Redd counts of experienced surveyors were substantially more accurate and precise than those of inexperienced surveyors for both fluvial and resident populations. Redd counts for the fluvial population were likewise more accurate and precise than for the resident population. Redds counts of the resident population were consistently negatively biased. Resident redds were significantly smaller and could account for some of the discrepancy. Thus, bull trout redd counts can be used to detect substantial longer term changes in abundance and estimate abundance levels, particularly of migratory populations. However, their reliability depends on the skill of the surveyors.

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Title
Connecting Kids with Creeks and Watersheds

Abstract
Connecting kids with creeks and watersheds takes knowledge and skills, of course, but most importantly, it takes confidence to use a local stream as a learning site. The Creeks & Kids Educator Watershed Workshop Program provides all of that, and much more, to K-12 educators in Oregon. First held in the late 1980s, the workshops have successfully helped educators create comprehensive watershed experiences for their students. The workshops balance activities from Stream Scene: Watersheds, Wildlife and People, Project WET (Water Education for Teachers) and Aquatic Project WILD, with field experiences. Participants leave the workshop with everything they need to make big changes in their teaching methodology. And something else – a renewed excitement and confidence about teaching science.

Educators are taken from basic concepts such as water cycle and watershed through watershed function, mapping, macroinvertebrates, fish sampling, water quality, wildlife inventory and related topics. Field work includes a complete stream survey. Teachers become immersed in work in groups to take measure of a stream and apply what they discover to stream and watershed health, and to restoration and enhancement efforts by resource agencies, such as the Oregon Plan for Salmon & Watersheds. They also learn how to engage resource agencies and community partners in their students' efforts to improve their home watershed.

The Creeks and Kids Educator Workshop Program is time-tested and is increasingly relevant to schools and students in our post-"Last Child in the Woods" world. Educators and schools who get their students involved in watershed education and restoration involve the entire community in the effort, and have built close relationships with state and federal resource agencies as a result. Oregon K-12 teachers and students have most definitely found a valuable niche for themselves in restoring the state's watersheds and fish resources.

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Title
The Aliens are Coming! (or at least expanding their ranges in a river near you)

Abstract
Alien invasive fish species are a concern to aquatic ecologists and a recreational and food resource to many fishers, but how do they affect Oregon's river ecosystems and why might their ranges be expanding? In the summers of 2006-2007, we sampled 20-24 mainstem sites on each of 7 Oregon and Washington mainstem rivers to assess ecosystem patterns. In 4 of them (John Day, Okanogan, Sprague, Umpqua), alien aquatic vertebrates dominated the electrofishing catches of 50-90% of the mainstem river lengths. In the other 3 (Chehalis, Malheur, Willamette), aliens comprised a major portion of the catch in 16-20% of the length. Comparisons between our samples and previous surveys indicate either a greater sampling effectiveness or range expansions for American shad, fathead minnow, common carp, goldfish, golden shiner, grass carp, banded killifish, largemouth bass, smallmouth bass, white crappie, black crappie, warmouth, pumpkinseed, bluegill, channel catfish, yellow bullhead, brown bullhead, flathead catfish, tadpole madtom, yellow perch, walleye, western mosquitofish, and bullfrog. These results are placed in context with a previous fish assemblage survey of the conterminous western USA states (2000-2004) wherein alien aquatic vertebrates were found in 60-90% of the 63,200 km of nonwadeable river length assessed. Connections are also drawn with increased proportions of aliens found in southwestern USA rivers, urban streams, climate warming, and global economic growth. All those changes suggest future increased 'alienation' of Oregon rivers, including disease introductions and competition with or predation on native riverine fish species. Other data suggest that aliens may occupy vacant niches that are simply more hospitable to species tolerant of anthropogenic disturbances.

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Title
Ceratomyxa shasta Distribution and Host Specificity in the Williamson River

Abstract
Ceratomyxa shasta is a myxozoan parasite endemic to the Klamath River (KR) basin. The parasite is dependent upon both a polychaete worm (Manayunkia speciosa) and a salmonid to complete its life cycle and is established throughout the main-stem KR, with levels highest below Iron Gate Dam and in the lower Williamson River. Chinook salmon (Oncorhynchus tshawytscha) were extirpated from upper KR basin with the construction of Copco dam in 1917, and the severe effects of the parasite on Chinook salmon in the lower KR raises questions about the outcome of reintroducing these fish into the upper basin. To determine the parasite distribution and to identify any point sources of C. shasta in the Williamson River, water samples were collected throughout the river and its major tributaries and were analyzed using a C. shasta-specific quantitative PCR assay. Additional studies from our laboratory indicate that C. shasta may have evolved into four strains, each specific for certain salmonid hosts. To test this hypothesis, we have seeded populations of polychaete worms with each of the parasite strains and will expose the four species of salmonids present in the KR basin; Chinook and coho (Oncorhyncus kisutch) salmon, rainbow trout and steelhead (Oncorhynchus mykiss). Data thus far provide additional information about the parasite's distribution. These results, in concert with genetic analysis of C. shasta strains in exposed fish, will provide information critical for successful salmon reintroduction into the upper KR.

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Title
Patterns in the marine distribution and behavior of Chinook salmon stocks along the Oregon Coast

Abstract

Restrictions imposed on the 2006 commercial salmon season after a poor spawning run of Klamath River Chinook (Oncorhynchus tshawytscha), and the 2008 fishery closure following the severe decline of Central Valley Chinook emphasize the desirability for a more detailed understanding of the migration behavior and habitat segregation of discrete stocks. Project CROOS (Collaborative Research on Oregon Ocean Salmon), a unique partnership of scientists and commercial fishermen, combines catch location data with stock assignments obtained from genetic micro-satellite analysis to investigate the fine scale temporal and spatial distribution of Chinook stocks.

Oceanographic analysis of data collected by Project CROOS is focused on two principle questions of interest. Is there an observed tendency for adult Chinook salmon to spatially aggregate by discrete population units and do average ocean conditions and short-term, spatially limited, anomalous events affect the local and coast-wide ocean distribution of Chinook salmon? Just as local populations develop unique variations in run timing, freshwater holding periods, and downstream migration in response to the prevailing hydrological conditions of their home stream, genetic disposition is thought to be reflected in the ocean migration patterns of Chinook.

We examine the latitudinal distribution and small-scale association of discrete population units for the 2006 and 2007 Oregon Chinook catch of eight genetically isolated stocks. Excepting the Central Valley stock, which appears to travel widely, most stocks of interest are broadly associated with their region of origin. Using nearest neighbor techniques, the degree of stock aggregation observed in 2006 catch is compared to a permutation of random stock assignments at the given catch locations. We find discreet stocks are more closely aggregated than would be expected if stocks mix uniformly while at sea. We also observe changes in catch distribution in response to sea surface temperature variations associated with upwelling fronts.

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Title

Diamond Lake: Looking at the Links

Abstract

Diamond Lake was fishless until 1910 when it was stocked with rainbow trout (Salmo gairdneri). The lake provided a valued recreational trout fishery until invasive tui chub (Gila bicolor) impacted the lake's ecosystem. Rotenone was used to eradicate tui chub in 1954 and the trout fishery was re-established. In 1992, tui chub were again discovered in Diamond Lake. Monitoring efforts increased as the chub population increased. Trout growth, water clarity, large zooplankton species, and benthic macroinvertebrates all declined while pH and blue-green algae such as Anabaena increased. Post-treatment monitoring has continued to measure responses of various trophic links and water quality parameters related to chub eradication and subsequent reintroduction of trout. The elimination of over 98 million chub helped reduce phosphorous loading in the lake caused by chub waste products. Anabaena cell density declined from hundreds of thousands of cells per milliliter commonly observed from 2001 to 2005 to a maximum of 49 cells/mL in 2008. Since the eradication, both large zooplankton and benthic productivity have increased. Likewise water clarity has increased and pH has dropped from over 8.5 measured in 2006 to less than 7.8 in 2008.

Trout stocking has had less impact on Diamond Lake. A stabilized stocking of about 400,000 fingerlings during the 1970's and 1980's maintained a benthic productivity of over 100 lbs/acre of biomass and a trout growth rate and condition factor indicative of adequate food resources. Post-treatment stocking has been conservative to allow recovery of the lake's benthic and zooplankton community. In 2007, 100,000 fingerlings and over 84,000 8-inch or larger trout were stocked. Growth rates and condition factor of the fingerlings returned to pre-chub rates. In 2008, 200,000 fingerlings and nearly 86,000 larger trout were stocked. Growth rates continued to flourish, while water quality parameters have remained positive.

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Title

Research and Monitoring of Oregon's Bull Trout: An Overview of Investigations by the ODFW Native Fish Project

Abstract
In 1995, the ODFW Native Fish Investigations Project, spurred by conservation concerns, began bull trout research. Since then, the project has completed studies throughout the species range in Oregon on distribution, life history, competitive interactions with introduced brook trout, and population monitoring. In this talk, we share some results and lessons learned from five studies that are representative of our past work. First, we tracked the annual movement patterns of radio-tagged fluvial adults in several northeastern Oregon basins. Second, we evaluated the utility of a Generalized Random Tessellation Stratified (GRTS) design to determine bull trout population status and trend through redd counts in the Oregon portion of the Columbia River Plateau and compared the results to those of other sampling designs. The last three studies were focused on some of the most imperiled bull trout populations in Oregon: Gearhart Mountain (Klamath River basin), Odell Lake (Deschutes River basin), and Clear Branch (Hood River basin). These studies included the use of various methods of estimating abundance, investigating kokanee redd superimposition as a potential limiting factor, and the development of long-term monitoring protocols. The unique life history patterns displayed by Oregon populations have expanded our knowledge of potential migratory behavior for the species, we have gained appreciation for the extant life history diversity, and we are beginning to understand the magnitude of the diversity lost. Through our work on bull trout, we have begun to wrestle with the many challenges involved in population monitoring for both large populations broadly distributed and small isolated populations, which each have their own unique challenges.

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Title
Introducing Educational Solutions' High School Dialogue Project for the State of Jefferson "Sharing the Klamath River Watershed: Bringing Together the Next Generation of Stakeholders"

Abstract
Problem Drought threatens the Klamath River Basin and related coastal communities of Oregon and California. After years of conflict over water, Klamath Basin stakeholder leaders are working together to find solutions; however, students know little about their leaders' work or about each others' communities.

Educational Solutions (ES) Model ES developed this program with stakeholder leaders, scientists, and five Basin school districts. ES created and tested educational materials that present balanced information and conflict resolution exercises to enable students to address divisive issues. Students from different stakeholder communities dialogue via Internet, cell phone, video-conferencing, and face-to-face meetings. At the end of five weeks, students present solutions to Klamath River water problems. Students who successfully complete the program earn one college credit from the Oregon Institute of Technology.

Fall 2008 Project The fall 2008 project served 324 biology students from nine Oregon/California schools. Funded by the Oregon Watershed Enhancement Board (OWEB) and California's W. S. Johnson Foundation, the five-week project ended in December. Evaluation of the program and a funny short student project will be presented.

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Title
The Plan is the Process and the Process is the Plan: White Sturgeon Conservation Planning Efforts for the Columbia River Downstream of Bonneville Dam

Abstract
White sturgeon Acipenser transmontanus are uniquely adapted to the large river systems they inhabit and the Columbia River below Bonneville Dam supports the most productive population in the world. White sturgeon sustain commercial and recreational fisheries, are an ecological cornerstone species, and are culturally important to indigenous tribes. Threats to white sturgeon populations are numerous, and combined with their longevity and delayed maturation (up to 25 years), make this species vulnerable to over-exploitation and recruitment failures, and slow to recover from depressed population sizes. Thus, a Lower Columbia River White Sturgeon Conservation Plan (Conservation Plan) is needed to provide a framework from which to manage this important population segment. We will gather the most up to date information from throughout the region, summarize current knowledge regarding white sturgeon biology, ecology, genetics, and species status, and formulate target population parameters. A panel of regional white sturgeon and conservation experts has been convened to vet the gathered materials for technical merit; followed by public review and comment prior to finalization of the plan. The completed Conservation Plan should describe current species status and population dynamics; include explicit white sturgeon conservation objectives for this jointly managed (Oregon and Washington) section of the lower Columbia River; and define research, monitoring and evaluation necessary to address limiting factors, threats and critical uncertainties relevant to population status and

resource management impacts. A comprehensive Conservation Plan will benefit Oregon and Washington watersheds along the Columbia River as well as white sturgeon conservation efforts in the greater Pacific Northwest, while ensuring sustainable harvest opportunities and other ecological and societal benefits in perpetuity.

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Title

Recovery of Wild Coho Salmon in Salmon River Basin

Abstract

Recovery and conservation of naturally self-sustaining salmon populations is a central goal of the Oregon Plan for Salmon and Watersheds. We started a project to examine the dynamics of coho salmon population in the Salmon River basin on the central Oregon coast and to determine whether management changes targeting two predominant limiting factors—hatchery influence and stream habitat complexity—improve population viability. These results are needed to validate assumptions about factors limiting coho recovery and to determine whether recovery measures proposed by the Oregon Conservation Plan for the Oregon Coast Coho Evolutionary Significant Unit are effective.

The principal goal of the research is to determine whether cessation of coho salmon releases from the Salmon River Hatchery improves viability of the naturally-reproducing population in the basin. The final release of hatchery coho occurred in spring 2007, and intensive, landscape-scale monitoring began in spring 2008. Research will address the following questions and corresponding objectives:

•Does viability of the Salmon River coho population respond to changes in hatchery management?
•What other variables (e.g. habitat quantity and complexity) alone or in combination with the hatchery program affect population viability?
•Do Salmon River coho salmon rear in estuarine habitats, and if so, do juveniles with estuarine life histories contribute significantly to adult returns?
•Does restoration of estuarine wetland benefit the Salmon River coho population?

Our approach integrates original research, existing Oregon Plan monitoring, and past research in Salmon River. We will present the background and rationale of the study, study design, and findings to date.

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Title

Achieving Optimum Fish Health at Your Propagation Facility

Abstract

Any fish propagation program, whatever its management goals, should seek to release the healthiest animals possible. This requires that we reduce external and internal stressors to the best of our abilities. We sometimes take for granted that what we've been doing for decades, what we learned from our mentors is the best that can be done. We may well be at a critical cross roads in fish culture where we are faced with ever more stringent regulations on the use of the public resource. We can be and should be proactive in seeking ways to blend the need to be "green" while at the same time improving the quality of fish we produce.

These converging realities necessitate that we re-think how we handle broodstock, gametes, swim-up fry and smolts and the water in which we grow them. We are committed to advancing the way we approach age-old problems of water quality, fish health, fish handling, and associated protocols. We draw from our own experience operating state and private hatcheries, floating net pens, conducting remote site brood stock capture, gamete disinfection and transport, research in improved incubation systems, and environmental measurements to maximize SARS.

Some of the types of things we are working on are:

- Water treatment to remove suspended solids

- Depuration of water to avoid pathogen transmission
- Incubation options to avoid use of restricted chemicals
- Incubation options to produce heavier, healthier swim up fry
- Avoiding unnecessary handling of fry/smolts
- Raceway retrofits and design to avoid DEQ “incidents”
- Water quality enhancement through oxygen supplementation
- Smolt guidance systems with artificial current

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Title

Migration dynamics of released hatchery steelhead smolts determine type and magnitude of potential ecological and genetic risks

Abstract

Hatchery steelhead migration behavior upon release can determine the type and magnitude of ecological and genetic risks posed to the receiving wild populations. To evaluate the success or failure of integrated conservation steelhead hatchery programs, relationships between migration and risk must be addressed. Therefore, the objective of this presentation is to link migration dynamics to ecological and genetic risks posed by a genetically integrated steelhead hatchery on the lower Columbia River. We found the majority of released hatchery smolts migrated rapidly downstream upon release and posed minimal ecological risk. However, a portion of steelhead did not migrate and instead residualized near the release point or migrated upstream. This behavior combined with evidence of behavioral interactions, habitat use overlap and diet similarities suggest negative ecological effects may be present. Additionally, evidence of successful reproduction by upstream residual migrants indicates negative genetic effects are possible. We recommend that hatcheries producing steelhead assess migration dynamics of residual steelhead. Risk reduction through the use of electrofishing to remove residuals, reducing the number of hatchery adults allowed on spawning areas, and weirs to prevent upstream migration may be warranted.

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Title

Evidence for Behavioral Thermoregulation by Subyearling Fall Chinook Salmon Oncorhynchus tshawytscha in Lower Granite Reservoir

Abstract

A field evaluation of temperature use patterns by subyearling fall Chinook salmon was conducted during summer 2004 in Lower Granite Reservoir near the confluence of the Snake and Clearwater rivers. Subyearlings implanted with temperature-sensing radio transmitters were released during three blocks of time, and mobile-tracking was conducted to collect water temperature data where fish were located. Vertical temperature profiles were collected to measure temperature and depth use as subyearlings moved downstream 6.0-13.8 km (5.6 – 7.2 h). We found that subyearlings maintained mean body temperatures that differed from mean ambient water temperatures. Subyearlings generally selected for temperatures in the 16-20o C range for optimal growth. This result corroborates findings from laboratory studies. We found that temperature availability varied little between day and night periods. However, we observed notable differences in temperature selection and longitudinal movements made by subyearlings during these periods. We found that during nighttime periods subyearlings made fewer upstream excursions, had higher downstream movement rates and relaxed their selection of temperatures around 17o C. As a result temperature use by subyearlings during nighttime periods was mostly constant within the 16-20o C range as compared to daytime periods when temperature use peaked near 17.5o C. Our results provide the first evidence for behavioral thermoregulation by subyearling fall Chinook salmon in a field setting. These results may help to explain factors that provide for enhanced growth opportunity and life history diversity in the Snake River population of fall Chinook salmon.

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Title
Naive prey versus nonnative predators: the role of behavior in endangered species conservation

Abstract
Fish are one of the most imperiled groups of vertebrates worldwide. Threats to fish fall into one of four general categories: physical habitat loss or degradation, chemical pollution, overfishing, and nonnative species. Nonnative predatory fish often have a devastating impact on native prey. This is especially true with endemic fish, whose restricted distribution and often limited evolutionary history with predators make them particularly susceptible to an effective nonnative predator. Common management strategies involve removal of nonnative fish through chemical or mechanical means, coupled with captive propagation of the species of concern. In many systems, strategies for removal of nonnatives is not logistically possible, resulting in large losses of hatchery-raised fish to predation. One reason nonnative predators are often so effective is that the native fish do not recognize the predator as a threat. Fish learn to recognize novel threats through a variety of methods including chemosensory information. Many fish possess chemical alarm cues which are stored in the skin and are released when skin cells are ruptured, warning conspecifics in the area. There have been many studies showing that fish may learn to recognize novel predators through exposure to a predator's odor in conjunction with conspecific alarm cue. Here we show that it is possible to train hatchery-raised fish (june sucker, Chasmistes liorus) to recognize a nonnative predator odor (largemouth bass, Micropterus salmoides) through exposure to the odor of a predator that has eaten conspecifics. We also show that this training can translate into higher survival in subsequent encounters with predators. We propose that training hatchery-raised fish prior to stocking may increase survival of hatchery raised fish through anti-predator behavior.

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Title
Invasive Species Disinfection Protocol of the Aquatic and Riparian Effectiveness Monitoring Program

Abstract
Aquatic and Riparian Effectiveness Monitoring Program (AREMP) personnel conduct physical and biological surveys in wadeable streams located throughout the Northwest Forest Plan area, a region generally west of the Cascade Range in Washington, Oregon and northern California. Invasive non-native aquatic and terrestrial species and diseases, such as New Zealand mud snails Potamopyrgus antipodarum, whirling disease Myxobolus cerebralis, Sudden Oak Death Phytophthora ramorum and Port Orford cedar root disease Phytophthora lateralis are present in the area. The AREMP disinfection protocol is employed to sanitize sampling gear and vehicles to reduce the spread of non-native invasives within and between 6th-field subwatersheds. In this presentation, I describe the threat of invasive species, as well as the gear requirements, safety issues, and environmental and programmatic advantages and disadvantages of the protocol.

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Title
Impact of a new artificial shelter on Arctic charr (Salvelinus alpinus, L.) behaviour and culture performances during the endogenous feeding period

Abstract
Shelter is of major importance in many species of fish both in the wild and in aquaculture. Sheltering behaviour of Arctic charr, a salmonid species well known for being phenotypically plastic has been poorly studied in aquaculture. A new type of shelter made of PVC agricultural drain cut in half was tested on culture performances and behaviour during the endogenous feeding period. This device offered grooves where alevins could position themselves and lie in a vertical plan. A first experiment compared fish provided or not with shelter in incubator compartments. Fish provided

with shelter showed better growth performances, lower mortality and started first exogenous feeding about six days later when compared to fish without shelter. These effects from shelter provision were also associated with much less mobility in fish provided with shelter. At 126 days post fertilization (dpf), all fish provided with shelter were immobile while other fish displayed horizontal stationary body movement (86%) or swam against current (7%). At 157 dpf, 85% of fish without shelter were immobile versus 95% in fish provided with shelter. In most cases, there was one single fish per groove and a 2.4 cm average space between two successive fish was observed. In the preference test experiment, we found that 61% of fish were located under the shelter at 122 dpf while at 157 dpf, 58% were on the shelter and 42% out of the shelter. The present results revealed Arctic charr behavioural characteristics in presence of a new type of artificial shelter at very early stage of development. This shelter enables the fish to stabilize in the vertical plan without producing any movement and to choose by itself its favourite location throughout development. This device could be used to improve yolk sac alevins growth, performance and fish welfare during the endogenous feeding period.

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Title
Low Cost Weir Design for Monitoring Fish Movement in Small Headwater Streams: Examples from the Trask River Watershed Study

Abstract
Recent work suggests that low-flow periods occurring in late summer can be critical for coastal cutthroat trout in small headwater catchments. In some streams this time represents the period of greatest mortality and lowest growth. Understanding factors that affect survival and growth of fish is critical for effective management of forested catchments. Fish are mobile, making it difficult to interpret these factors without collecting information on individual movement patterns, which can be expensive.

As part of a larger study evaluating impacts of forest management on fish that inhabit headwater streams, we designed a low cost portable weir with two-way fish traps suitable for use in small streams. By modifying and combining design elements of portable downstream angled weirs and pipe traps we built a structure that captured fish moving in and out of study reaches. Weir panel and trap box frames were constructed of 1" aluminum. Coverings were 1/8" mesh Trical netting for panels, and 1/8" mesh stamped aluminum for trap boxes. This mesh size effectively restricted movement by salmonids and cottids as small as 50mm(FL) and 55mm(SL) respectively. Panels were bolted together and supported by a length of aircraft cable stretched perpendicular to the stream channel. Trap boxes were connected to the panels via 6" PVC pipe. Seven weirs were installed in channel segments ranging from 3-9m wide. Installation included minimal in-stream excavation with hand tools and required approximately 25 person hours per weir. Cost of parts averaged $800 per installation. In 2007 and 2008 weirs were operational from August through September. The downstream angled design operated successfully during variable flows. All weirs effectively captured immigrating and emigrating fish. Downstream angled weirs with two-way traps are an effective tool for monitoring movement of salmonids and cottids in small streams.

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Title
Bull Trout Restoration in the Deschutes River Basin

Abstract
The U.S. Fish and Wildlife Service and other parties are working to restore and recover bull trout in the Deschutes River basin. Restoration efforts are focused on several points, including maintaining the existing five populations; increasing the distribution of subadult and adult fish; and investigating possible reintroduction in extirpated areas of the upper Deschutes. Bull trout are currently distributed throughout the lower Deschutes, and new data collected by the Confederated Tribes of the Warm Springs shows that adults migrate downstream as far as the Columbia River. Beginning in April of 2009, fish passage facilities under construction at the Pelton Round Butte Dams will help to reconnect the Deschutes's five bull trout populations. Additional fish passage efforts in the Crooked River, Whychus Creek, and Lake Creek will also help to restore bull trout to areas of their historic range. Recent Metolius River basin genetic studies have confirmed that there are three Metolius bull trout populations. This information will help fisheries managers in their decisions on how to manage Metolius bull trout, including possibly using them as donor stock to restore extirpated runs. The Deschutes Bull Trout Working Group has planned and funded several studies for

2009 in the Metolius River, including disease transmission, adult population size, and number of spawners per redd. The Pelton licensees will also initiate a pilot study on smolt predation in Lake Billy Chinook that will include bull trout. Thanks to efforts by numerous parties in the basin, many of the tasks identified in the 2002 Draft Deschutes River Bull Trout Recovery Plan are being accomplished.

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Title
Radio Telemetry of Spring Chinook Salmon in the Warm Springs River

Abstract
The majority of returning adult spring Chinook salmon in the Deschutes River Basin migrate into the Warm Springs River to spawn. The fish typically pass the Warm Springs National Fish Hatchery (WSNFH) in May and June, and spawn in the upper Warm Springs River Basin in September. However, the movement patterns of these fish during these summer months are only speculative. To investigate this issue, 35 hatchery-origin adult spring Chinook salmon were gastrically fitted with radio tags (Lotek Model # MCFT-3A) and released upstream of the WSNFH in the late spring and summer of 2008. These fish were then located monthly (from May until October) via fixed wing surveys. A fixed antenna was placed downstream of the WSNFH to detect fish moving back downstream of the hatchery, and additional surveys were conducted via vehicle and kayak.

Results indicated that the majority of the tagged fish moved into and stayed in the approximately 10 miles of the Warm Springs River above the WSNFH. However, fewer fish than expected were located in the "spawning grounds" of the upper Warm Springs River during the peak of spawning, indicating that more spawning may be occurring further downstream than was previously thought. Additionally, about 1/3 of the fish moved back downstream of the WSNFH, including at least 4 fish that moved all the way back into the mainstem Deschutes River. The majority of these downstream-moving fish eventually made their way back upstream of the WSNFH. The large number of fish moving downstream of the WSNFH after tagging may have implications in the enumeration of spawning escapement, as some fish may be double counted. The results of this study have given new insight to management of spring Chinook salmon in the Warm Springs River.

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Title
Trophic relations and seasonal effects of predation on Pacific salmon by fluvial bull trout in a riverine food web

Abstract
Bull trout *Salvelinus confluentus* occupy upper trophic positions in most ecosystems where they occur. Since federal listing, natural resource managers are frequently challenged to manage bull trout and their prey which can often include federally listed Pacific salmon *Oncorhynchus* spp. The Skagit River in Northwest Washington State contains one of the largest populations of bull trout *Salvelinus confluentus* and Chinook salmon *O. tshawytscha* in the Puget Sound region, and a regionally large population of steelhead *O. mykiss*; all three species are listed as threatened under the Endangered Species Act (ESA). I sampled distribution, diets, and growth of bull trout in mainstem and tributary habitats during 2007 and winter and spring 2008. Consumption rates were estimated with a bioenergetics model to determine annual and seasonal energy budgets of bull trout and to estimate their potential predation impacts on juvenile Pacific salmon populations. Salmon carcasses and eggs contributed approximately 50% of the annual energy budget for large bull trout in mainstem habitats. The remaining 50% was acquired from juvenile salmon, resident fishes, and immature aquatic insects. Predation on listed Chinook salmon and steelhead/rainbow trout was highest during winter and spring (January-June). Inter-annual variation in juvenile salmon predation was detected between 2007 and 2008, and was likely due to the dominant odd-year spawning cycle for pink salmon *O. gorbuscha*. The population impact on Chinook salmon was negligible while the impact on steelhead/rainbow trout was potentially very high. Due to the ESA-listed status of bull trout, steelhead, and Chinook salmon, the complex trophic interactions in this drainage create both challenges and opportunities for creative adaptive management strategies.

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Title
Oregon Pesticide Stewardship Partnerships: Improving Water Quality Through Collaboration

Abstract
The Oregon Department of Environmental Quality (DEQ) works with multiple agencies and organizations in five watersheds to identify streams with elevated concentrations of pesticides and work collaboratively to improve water quality. The Pesticide Stewardship Partnership program started in the Hood River watershed, an area dominated by tree fruits. After organophosphate insecticides were detected in salmon-bearing tributaries to the Hood River, local fruit growers teamed with other groups to make improvements in application practices, leading to subsequent reductions in stream pesticide concentrations.

The most recent demonstration of this collaborative model is in the Walla Walla River watershed in eastern Oregon, where fruit orchards are also the primary agricultural commodity. DEQ's water quality monitoring in 2005 and 2006 showed high concentrations of organophosphates chlorpyrifos, azinphos-methyl, diazinon and dimethoate in tributaries to the Little Walla Walla River. Before the 2007 pesticide application season, the local grower association worked with the agricultural extension service and the watershed council to conduct applicator training and implement other best management practices, such as installing buffer strips. Monitoring results showed dramatic reductions in pesticide detection frequency and average concentrations of organphosphates between 2006 and 2007. . Median chlorpyrifos concentrations fell by nearly 70% in the watershed and diazinon detections dropped from 10 to 1, with even greater reductions at the two monitoring locations with the highest 2006 concentrations. New 2008 monitoring data shows continuing declines in median concentrations of chlorpyrifos in those Walla Walla tributaries

DEQ and its partners are also working in 3 north Willamette Valley watersheds, where diverse agricultural land uses, as well as urban and forestry pesticide applications,

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Title
Challenges to Providing Harvest Opportunities in Oregon Marine Recreational Fisheries

Abstract
Managing marine recreational fisheries has unique challenges including multi-state jurisdiction, multi-agency management, multi-species complexes and limits on depleted species. Stock assessments are completed by various agencies including state agencies, the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the International Pacific Halibut Commission (IPHC); regulations are recommended by the Pacific Fishery Management Council and IPHC; and are set by NOAA Fisheries and the Oregon Fish and Wildlife Commission. In recent years, salmon, groundfish and halibut fisheries regulations have become increasingly complex in an attempt to provide fishing opportunities through as much of the year as possible, while still staying within harvest restrictions for both target and limiting species. The Oregon Department of Fish and Wildlife (ODFW), with input from the public, is using new and creative approaches to managing marine fisheries such as: area and depth closures, catch and release, size limits, bag limits, gear restrictions and day of the week closures to provide harvest opportunities while staying within regulations and harvest guidelines. One of the biggest current challenges is reducing impacts to yelloweye rockfish (Sebastes ruberrimus), while allowing anglers opportunities to access lingcod (Ophiodon elongates), kelp greenling (Hexagrammos decagrammus), Cabezon (Scorpaenichthys marmoratus), Pacific Halibut (Hippoglossus stenolepis) and other rockfish (Sebastes spp) and flatfish (Families Paralichthyidae and Pleuronectidae). This presentation will speak to the challenges of providing marine recreational fishing opportunities and present some recent examples of management measures taken to maximize those fishing opportunities.

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Title
Physiological Development and Vulnerability to Ceratomyxa shasta of Fall-run Chinook Salmon in the Upper Klamath River Watershed

Abstract
We evaluated a stock for restoring runs in the Upper Klamath Basin by monitoring the development of fall Chinook salmon (Oncorhynchus tshawytscha) in Iron Gate Hatchery and in netpens in the Williamson River (WR) and Upper Klamath Lake (UKL). We transferred age 1+ hatchery fall Chinook salmon to netpens in October 2005 and age 0+ fall Chinook salmon in May 2006. Indices of smolt development were assessed in fish in the hatchery and after 3 and 14 days in netpens. Based on gill Na+, K+-ATPase activity, and plasma thyroxine (T4) concentration, age 1+ Chinook salmon were not developing smolt characteristics in the hatchery during October. Fish transferred to WR or UKL had increased plasma cortisol in response to stress and increased T4 accompanying the change in water, but did not have altered development. Variables in age 0+ Chinook salmon indicated that fish in the hatchery were smolting. Fish in the WR netpens lost weight and had gill ATPase activity similar to fish in the hatchery, while fish transferred to UKL gained weight and length, had reduced condition factor, and higher gill ATPase compared to WR fish. These results, along with environmental variables, suggest that conditions in UKL were conducive to smoltification and accelerated the development of Chinook salmon as compared to conditions in WR. No Chinook salmon in the hatchery or either netpen became infected with Ceratomyxa shasta (presence in WR and UKL was confirmed) during either trial, or when held for 90 d after a 10-d exposure in netpens (2006). We concluded that that there is little evidence of physiological impairment or significant upriver vulnerability to C. shasta of this stock of fall Chinook salmon to preclude them from reintroduction into the Upper Klamath Basin.

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Title
Cooperative Habitat Restoration in the Upper Deschutes River Basin

Abstract
In 2006, the Upper Deschutes Watershed Council (UDWC), Crooked River Watershed Council (CRWC), Deschutes Land Trust (DLT), and Deschutes River Conservancy (DRC) developed a joint restoration strategy to support the reintroduction of anadromous fish above the Pelton-Round Butte Project. The strategy leverages each organization's strengths to restore the physical habitat necessary to support anadromous fish.

The joint strategy focuses on the lower Crooked River watershed, Lake Creek, and Whychus Creek. It highlights goals, objectives, and desired outcomes in each reach and creates a framework for restoration. Defined tasks, timelines, benchmarks, and responsibilities set each organization's role in each reach. The strategy includes metrics to help with effectiveness monitoring, inform target setting, and improve future project design.

Since completing the plan, the partners have implemented a range of projects. The DRC has increased instream flows in Whychus Creek and in the lower Crooked River watershed. The DLT completed a major conservation easement within the Whychus Creek watershed and is currently working towards additional land protection agreements. The UDWC finalized restoration designs for two large-scale projects on Whychus Creek and has implemented fish passage projects on Lake Creek. The CRWC is currently implementing several restoration and fish passage projects in partnership with landowners in the lower Crooked River watershed.

Each of the projects successfully implemented to date have been the result of cooperative partnerships between a wide array of agencies and organizations. Key financial contributions for project design, management, and implementation in support of the joint restoration strategy have been made by the Oregon Watershed Enhancement Board, Portland General Electric, and the Confederated Tribes of Warm Springs.

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Title
Restoration Planning, Actions and Outcomes in Tryon Creek, Portland Oregon

Abstract

The City of Portland (City) has responsibility to manage watersheds within the Portland urban area to provide a range of ecological services. These services include stormwater management, improved water quality, and enhancement of the Portland quality of life. In addition, the City has legal responsibilities to responsibly manage Portland urban streams under the federal Endangered Species Act (ESA) and the federal Clean Water Act. To meet these needs the City has developed the Portland Watershed Plan. The Portland Watershed Plan lays out strategies and broad action categories to provide guidance to City bureaus and acts as a roadmap to guide the City in managing its watershed resources.

To help move from the broad outline of the Portland Plan for Watershed Health, the City requested that ICF Jones & Stokes conduct an analysis of management projects undertaken in Portland watersheds to show how investments relate to City obligations to recovery salmon populations listed under the ESA with respect to their potential contribution to the recovery of ESA-listed coho salmon (Oncorhynchus kisutch) and steelhead trout (O. mykiss). We expanded the Ecosystem Diagnosis & Treatment model to evaluate actions based on their predicted level of effectiveness and intensity in Tryon Creek in terms of the productivity and capacity of juvenile and adult fishes. The analysis provides the City with a consistent, science-based methodology for understanding the potential effect of actions that can be applied within and between watersheds. In particular, the analysis allows the City to take a strategic approach to watershed recovery that considers the cumulative and synergistic effects of projects.

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Title

Redd Counts as a Measure of Summer Steelhead Escapement Using the Environmental Monitoring and Assessment Program (EMAP) in the John Day Basin.

Abstract

Redd counts are used throughout much of the Columbia Basin to estimate or index summer steelhead Oncorhynchus mykiss abundance, but have been criticized as a means of measuring escapement. Criticisms point to sources of sampling error such as, redd life, observer variability, redd identification, and sample representation. There are also questions concerning the reliability of converting redd counts to escapement estimates. In 2004, we implemented the EMAP sampling design and standard survey protocols to quantify redd abundance and spawner escapement in the John Day River basin. Index redd surveys have also been conducted annually in the John Day since 1959. To convert redds to spawners, we currently use an out of basin weir (Deer Creek, Grande Ronde Basin) to develop an annual fish per redd multiplier. To evaluate our estimates, we used correlation and regression analysis to examine the relationship between EMAP estimates, index redd counts, fish passage counts, and passive integrated transponder (PIT) tag detections. We found a significant relationship between index and EMAP redd densities. However, EMAP estimates were not significantly correlated with wild steelhead counts at Bonneville Dam nor net wild steelhead between John Day and McNary Dams, or Bonneville and Ice Harbor Dams. Poor correlations suggest that our redd counts and escapement estimates may not be adequately tracking actual adult steelhead abundance. We continue to seek ways to improve this monitoring technique including refining our fish per redd multiplier to achieve a more accurate escapement estimate.

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Title

Understanding the Behavior and Development of Freshwater Maturing Male Oncorhynchus Mykiss

Abstract

As with many salmonid species, rainbow and steelhead trout (Oncorhynchus mykiss) exhibit alternative male life history strategies. Depending on their strategy, individual males can range in size from less than 100 mm to longer

than 115 cm. I described the distribution and mating behavior of larger anadromous and smaller resident O. mykiss in the Quileute River basin, Washington, over the winters of 1999-2003. I found significant differences in the presence and behavioral tactics of anadromous and resident males mating with anadromous females. The results of this study suggest resident males may serve as a reproductive vector between anadromous and resident life histories. To better understand factors influencing resident life history development, I quantified patterns of freshwater male maturation in the John Day River, Oregon. Within this system, I focused on age 1+ males and found that freshwater maturing males had faster growth rates than non-maturing males and that growth rates were associated with water temperature and competitor density. These results provide support for the theory that growth rate is a key factor influencing male life history development. In combination, the studies in two different systems underscore the importance and prevalence of diverse male O. mykiss life histories and provide insights into the influences of sexual selection and environmental conditions.

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Title
Salmonid Spawning Video

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Title
Landscape and life history influences on genetic diversity in Oncorhynchus mykiss around the Pacific Rim

Abstract
The link between genetic and life history diversity is of keen interest to those who wish to understand and conserve biodiversity in Pacific salmonids. Due to the complex management issues surrounding steelhead/rainbow trout (Oncorhynchus mykiss), understanding the genetic structure of life history variation is particularly important in this species, as is assessing the genetic consequences of losing particular life history forms. In this paper I explore how life history and landscape variables, such as geographic position and drainage characteristics, affect genetic diversity in pristine populations of O. mykiss around the Pacific Rim, from Kamchatka to British Columbia. I will also discuss on-going studies exploring the genetic basis for anadromy in natural O. mykiss populations.

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Title
Bull trout at 47° and 42° latitude—contrasting life styles of fish in the northern Cascades and the extreme southern margins of the Owyhee uplands

Abstract
We studied the life history of bull trout Salvelinus confluentus living in two very different, spatially-distant watersheds: (1) the Cedar River, a wet, northwestern Cascades drainage just east of the city of Seattle; and (2) the Jarbidge River, a dry, high elevation, Great Basin drainage at the southern margins of their range. Over several years, we implemented large-scale PIT-tagging projects to monitor the movements, distribution, and growth of bull trout in each watershed. We compared and contrasted aspects of the basic biology and ecology of bull trout in each watershed, including their size and age structure, the timing and distances of fish movements, the size and age of fish that moved, their seasonal and annual growth rates, and their general distribution. Collectively, our results show how the life history of fish is influenced by local environmental conditions and the presence of other species, particularly rainbow trout Oncorhynchus mykiss, and will be useful for the management and conservation of these threatened fish.

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Title
Public Perspectives on Wild Trout Harvest; wWen did Harvest Turn into Killing?

Abstract
Fishery managers must address a variety of biological, social and administrative factors when considering harvest options for native fish. During the development of the 2009 Oregon Sport Fishing Regulations extensive public comment and testimony was presented to the Oregon Fish and Wildlife Commission in consideration of a public proposal to reinstate harvest of wild coastal cutthroat trout (Oncorhynchus clarkii) on the northern Oregon coast. This was submitted as part of a public process that allows members of the public to submit proposals for new or modified angling regulations. The proposal ignited an extensive public debate on public attitudes and opinions toward consumptive vs. catch-and-release fisheries. Public comment and testimony provide valuable insight into public opinion but do not always represent views of the majority of anglers. In 2006, the Oregon Department of Fish and Wildlife (ODFW) conducted a survey of licensed Oregon anglers to assess angler's opinions on a variety of fish management issues including harvest of wild trout. This presentation will take a retrospective look at public comments submitted as part of the angling regulation development process and incorporate information from the 2006 angler survey to gain insight into the social views on this proposed cutthroat trout fishery and the challenges facing fishery managers.

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Title
UPPER WILLAMETTE BULL TROUT TRILOGY PART 1: The Tale of Two Rivers and the Recovery Process

Abstract
Historically, the Upper Willamette River basin contained healthy, interconnected populations of bull trout (Salvelinus confluentus). However, as human development spread, bull trout numbers declined. Impassable dams and culverts, forest management, roads, reduced water quality, introduced species/hybridization and overharvest all likely contributed to their decline. In the early 1990's, the Upper Willamette Bull Trout Working Group recognized diminished bull trout populations and began an extensive monitoring and recovery effort. At that time, only one tributary to the McKenzie River, Anderson Creek, was known to have bull trout spawning, and the population in the Middle Fork Willamette River (MFWR) was considered "probably extinct" (Buchanan et. al. 1997). Following culvert replacements to restore access to historic habitat, the Working Group initiated bull trout fry transfer from Anderson Creek to two historic spawning tributaries in the McKenzie River – Olallie and Sweetwater Creeks. To complement reintroduction efforts, tighter angling regulations were implemented, public awareness was improved, and habitat enhancement projects were completed. By 2008, there were 161 bull trout redds in 6 different tributaries of the McKenzie River. In 1997, the Working Group also initiated a reintroduction program in the MFWR. Fry from Anderson Creek have been transferred annually for 12 years to a complex of springs. To ensure the habitat was suitable to sustain natural reproduction, a large scale habitat enhancement program was launched that included large wood, boulder and gravel augmentation, culvert replacements and road decommissioning. Natural reproduction was confirmed in the MFWR in 2006 and the population shows signs that it is increasing. Habitat enhancements and important management actions have contributed to increasing bull trout populations in the Upper Willamette River basin. The Working Group intends to continue a rigorous bull trout recovery program until healthy, sustainable populations of bull trout reside in the Upper Willamette River basin.

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Title
Research Permits: How to do what you have to do so that you can do what you want to do

Abstract
Individuals wishing to handle fish or shellfish and other marine invertebrates for research or educational purposes must be issued an Oregon Scientific Take Permit (STP). In 2002, the Oregon Department of Fish and Wildlife (ODFW) worked with the National Marine Fisheries Service (NMFS) to develop and implement an online database for individuals to apply for both an Oregon STP and a NMFS 4d research authorization. The NMFS 4d research

authorization is one way to cover the handling of listed threatened salmon and steelhead for research purposes. The database greatly improved efficiency and consistency among the applications and their review and improved the agencies abilities to track the status of applications and year-end reporting. In 2008, the database was updated to include more NMFS permits and authorizations and improve functionality (https://apps.nmfs.noaa.gov). Individuals wishing to apply for a new permit will be led through a series of questions, the Pre-Application Guide, which helps identify the type(s) of permits needed. Researchers with an existing Oregon STP or NMFS 4d authorization can use the Renew function to facilitate the application process. Applicants must be prepared to provide a detailed project description, evidence of federal coverage for the activity (if not applying for 4d but handling listed fish), and details regarding the species, research activities and procedures, and numerical estimates of the number of fish handled and indirect or incidental mortality. In addition, individuals must coordinate with the appropriate ODFW district biologist. Upon submittal, the application will be reviewed for completeness and the applicant will be contacted for follow-up. Both the approved STP and NMFS 4d authorization will be emailed to the successful applicant. Applicants will receive automatic emails upon successful submission of an application, when a report is due, and when the permit expiration date is approaching. Reporting is also completed online.

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Effects of Irrigation Canals on Stream Ecosystems: A Tropical Dry Forest Case Study in Costa Rica

Abstract

Much of northwestern Costa Rica experiences distinct dry (November to April) and wet (May to October) seasons. Near Palo Verde National Park, a large irrigation canal cuts the courses of several tropical dry forest streams to enable rice and sugar cane cultivation in this water scarce region. One lined canal section allows streams to maintain their course and seasonality due to culvert installation and canal lining. Another unlined section leaks water, resulting in permanent flow in typically seasonal streams. How does this change in hydrology affect stream structure and function? Addressing this question involved sampling naturally seasonal and canal-influenced streams throughout the wet and into the dry season (May 2007-January 2008). Macroinvertebrates in situ and drift, fish, streamflow and other physical-chemical parameters were sampled. Both stream types had flow during three separate sampling periods (May-June, September, and October). The two stream types had significantly different temperature, total dissolved solids, and conductivity. In situ and drift macroinvertebrates in both stream types were dominated by Diptera, mostly chironomids, and Ephemeroptera, primarily Caenis. Major differences between the two stream types were that the macroinvertebrate community in the seasonal streams changed markedly as the wet season progressed and taxa richness was greater in canal-influenced than seasonal streams. The two streams also had different dominant fish but shared the same species assemblage. Functional feeding groups, ordinations, and indicator species for macroinvertebrates will be covered. Impacts of altered hydrology on stream ecosystems and implications for water resources management in the region will be discussed.

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Title

Eau de Entosphenus: The role of pheromones and current velocity in mediating adult lamprey movements.

Abstract
Orientation and navigation in fishes is often based on a complex mix of environmental cues. For some lamprey species, olfaction clearly plays an important role in directing riverine migratory movements. For example, sea lamprey (Petromyzon marinus) use both larval and adult sex pheromones to find spawning areas and mates. The relative role of olfaction and abiotic factors in mediating movements of adult Entosphenus lampreys is unknown and has important implications for their management in the Columbia River Basin. We conducted behavioral assays in a Y-maze using both early and spawning-phase Entosphenus migrants to determine whether lamprey movements were affected by: 1) pheromones produced by conspecific larvae, 2) pheromones produced by congeneric larvae, and/or 3) increased current velocity. Each experimental animal was tagged with a passive integrated transponder (PIT) tag and allowed to acclimate in the Y-maze. The treatment (pheromone or current) was then introduced into only one arm of the maze and lamprey movements during the following night were documented by PIT detectors located in the maze. Lamprey exhibited clear diurnal activity patterns and responded positively to both the pheromone and current velocity treatments. However, our preliminary study did not test relative attraction to competing cues or the effects of repeated exposure (i.e., acclimation). Consequently, additional experimentation is needed to fully evaluate the relative roles of these and other environmental cues.

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Title
A Protected Area for Native Fish in Southwest Oregon

Abstract
A unique opportunity exists in the Siskiyou Mountains of Southwest Oregon to create a protected area for native, naturally-produced fish in the Siskiyou National Forest and adjacent Bureau of Land Management Lands. Locally known as the “Wild Rivers Area” for its free flowing wild and scenic rivers the Wild Rivers Area also sustains naturally reproducing populations of winter steelhead, fall Chinook salmon, coho salmon, Pacific lamprey, cutthroat trout and the rare green sturgeon. Some of the area is currently protected with Wilderness and Wild and Scenic designations but many of the watersheds are vulnerable to logging, road sediment, large scale mining, off highway vehicles and forest disease. The Siskiyou Project, a grassroots non-government organization, has been pursuing protection for salmon in this area for 25 years. Support and input from the scientific community is vital for creating a protected area that will meet the needs of salmon in the 21st century.

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Title
Humpback whitefish migration and movements on the Copper River Delta, Alaska

Abstract
Research conducted on humpback whitefish (Coregonus pidschian) on the Copper River Delta, Alaska has revealed a complex life history involving annual migrations and the occupation of a variety of habitats including estuarine, tidal sloughs, rivers, and lakes. Thirty humpback whitefish were tagged with radio transmitters in 2006 and 2007 at McKinley Lake. Another 29 whitefish were tagged with acoustic tags in 2008. Movements and migration of tagged fish were tracked using telemetry techniques from boats, airplanes, and fixed receiver stations throughout the spring, summer, and fall. Telemetry results revealed that tagged fish migrate into McKinley Lake in mid to late spring and leave by early fall. Tagged fish migrated to the Copper River in the fall by traveling down the Alaganik River through an estuarine environment and then up riverto their spawning grounds. The reverse route was used in the spring. Eleven tagged fish returned to McKinley Lake in 2007 and 2008 revealing fidelity to the summer feeding site. Diel movements of acoustic tagged fish were monitored in 2008 using an acoustic hydrophone array throughout McKinley Lake. Analysis of this movement is in progress. Diet was also examined in humpback whitefish on the Copper River Delta with benthic invertebrates representing the primary prey source and juvenile three-spine stickleback

(Gasterosteus aculeatus) to a lesser extant.

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Title
Getting the story straight in the Crooked River: evaluating movement patterns of Redband trout and Mountain whitefish

Abstract
Over the last decade, redband trout (Oncorhynchus mykiss gairdeneri) in the wild and scenic section of the Crooked River, below Bowman Dam, have declined from an estimated 8,000 fish per mile to approximately 600 fish per mile while at the same time populations of mountain whitefish (Prosopium williamsoni) have remained abundant. The reduction in redband trout led ODFW to partner with Oregon State University to study the effects of river flows and species overlap as potential explanatory variables for why we have seen a decline in redband trout. We undertook a radio telemetry study in the fall of 2007 to determine redband trout and mountain whitefish spatial distributions, migration patterns, spawning timing, home ranges and habitat overlap. We are evaluating the movement patterns of redband trout and mountain whitefish in the Crooked River; further determining how these movement patterns relate to each other, to flow regimes, time of the year, and water quality. Gaining a better understanding of how flow regimes affect fish movements and distribution will help determine appropriate outflow regulation in order to protect fish diversity and fish resources in the Crooked River below Bowman Dam.

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Title
What olive ridley sea turtles and salmonids have in common: a discussion of density-dependent impacts on egg survival

Abstract
Olive ridley sea turtles (Lepidochelys olivacea) and some salmonids both exhibit con-specific egg destruction from nest disturbance and superimposition. In this poster, I lay out these two parallel stories of female nesting and spawning behavior to see what can be learned from a comparison of their similarities and differences. Both taxa exhibit aggregated egg laying, lack of parental care, and large clutch sizes that provide fodder for predators; however, there are various differences in their reproductive strategies. On only a few beaches worldwide, up to tens of thousands of olive ridley females gather several times a year for multiple day mass-nesting events called arribadas. During these events, it is common for later-nesting females to uncover previously laid nests and destroy eggs before hatchlings have emerged. There are many examples of salmonids excavating previous redds as they create new spaces for their eggs. While impacts of nest destruction are targeted in olive ridleys, salmonid species impact redds of other species, providing for interesting inter-specific competition as well. These density-dependent behaviors greatly affect egg survival, particularly during periods of high nesting or spawning densities. The mechanisms behind these behaviors incorporate habitat selection and scarcity, cues provided by other females, as well as yet unknown factors. There are many speculations as to why these behaviors evolved and perhaps comparison of these two behaviors may provide us with some new perspective.

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Title
Fluvial Response to Removal of Marmot Dam, Sandy River, Oregon

Abstract
The 19 October, 2007, removal of the 14 m high temporary coffer dam standing in stead of Marmot Dam provided fluvial access to ~730,000 m3 of sand and gravel filling the former reservoir. On the basis of sediment transport measurements, photogrammetry, and repeat surveys between transport events, we documented the rapid erosion and redeposition of this sediment in the ensuing minutes, days, and months. Measurements of suspended load and bedload documented an initial high flux of suspended silt and clay in the minutes after breaching followed by high bed- and suspended-load transport rates of sand. Significant gravel transport did not begin at the measurement site 0.5 km downstream of the dam until 18-20 hours after breaching and attained peak rates of 40 kg per second—a rate greatly exceeding concurrent measurements upstream and downstream. Bedload transport rates remained relatively high through subsequent high flow events during the following winter and spring.
Much of the elevated sediment load was derived from the reservoir, first eroded by a series of tall knickpoints migrating upstream 200 meters in the first hour, but then more slowly, gradually working its way up the channel, lowering and becoming less distinct. At the end of high flows in May 2008, the remnant knickpoint persisted as a riffle-like feature 2 km upstream from the breach, but still 1.5 km downstream from the upper extent of reservoir deposits. Knickpoint and lateral erosion evacuated ~100,000 cubic meters of sediment from the reservoir in the first 48 hours, and about 350,000 cubic meters by the end of high flows in May 2008. About 40% of this eroded sediment was redeposited in a downstream thinning wedge of sediment now extending 3.5 km from former dam site. The balance of the eroded sediment is likely within pools in the downstream gorge reach.

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Title
Powerdale Dam Removal – Plan, Process, and Permitting

Abstract
Powerdale Dam is located on the Hood River, approximately 4.5 miles above the Bonneville Pool near the town of Hood River, Oregon. On June 6, 2003, a settlement agreement was signed by nine parties consisting of agencies, tribes and non-governmental organizations with the intent to remove Powerdale Dam starting in 2010. Subsequently the Oregon Department of Environmental Quality issued a 401 certificate and the Federal Energy Regulatory Commission issued a Surrender Order approving the decommissioning. Currently PacifiCorp is preparing dam removal plans and permit applications. This presentation will provide the background leading to the decision to decommission the project, describe the proposed dam removal, site restoration, and identify the expected effects of the removal.

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Title
Education and Outreach at the Oregon Hatchery Research Center

Abstract
The Oregon Hatchery Research Center has been tasked with a directive to “Educate the public on the relationship between hatchery and wild fish; the connection between fish and watershed, estuarine and ocean systems; and the implications for fish management and stewardship. Provide educational facilities and programs for K-12 students. Design and manage the facility to provide an environment of passive and active learning for visitors. Conduct undergraduate programs and classes at the facility. Provide opportunities for educators and others to use the facility for meetings workshops and programs that advance public understanding of the relationship between fish and watershed health,” In attempting to reach out to the K-12 educational community the center started a collaborative effort with the Lincoln County School District to design a program at the Waldport Schools to involve youth in activities at the center. This presentation outlines the steps taken to engage the local school district its teachers, administrators and students. The presenter will give an overview of the process along with the pitfalls and successes of the endeavor.

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Title
Abstract for the poster "Comparisons of thermal tolerance between West Coast and South Japanese Pacific oyster (Crassostrea gigas) populations"

Abstract
Two stocks of Pacific oyster, from South Japan and from the US West Coast (WC) are thought to differ in their tolerance of short exposures to extreme heat (40-45 ˚C). The populations were heatshocked by family in the laboratory to determine if there exists a significant difference in heat tolerance between the two populations and between different families. It was concluded that WC Pacifics had significantly higher mortality than Japanese Pacifics, but that there was no significant difference among families of oysters.

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Title
Individual- and population-level dynamics of coastal cutthroat trout:Examining roles of physical and biotic processes using individual-based models and manipulated experiments

Abstract
I will study responses of coastal cutthroat trout to local physical conditions, biotic interactions, and disturbance by connecting processes at the individual-level to population dynamics using individual-based model computer simulations and manipulated experiments. My main research objectives are: 1) to examine relationships of coastal cutthroat trout to physical and biotic processes in small headwater streams under a wide range of conditions; 2) to determine population demographic and behavioral responses in coastal cutthroat trout to varying levels of a specific physical factor: in-stream cover; and 3) to evaluate individual- and population-level patterns for habitat selection of in-stream cover by coastal cutthroat trout. For objective 1, I will use an individual-based model computer simulation of a virtual cutthroat trout population and stream environment to determine the importance of physical factors, biotic factors, their interaction, and disturbance events. For objective 2 and 3, I will perform manipulated and replicated experiments at the Oregon Hatchery Research Center to test predictions based on model responses and to determine the importance of in-stream cover for coastal cutthroat trout. Individual-based modeling will allow me to examine a wide range of scenarios that are not possible to address with observational field studies. From my work, I hope to derive a generalized understanding of the relative roles of physical versus biotic factors that may drive population dynamics of coastal cutthroat trout in coastal Oregon headwater streams, especially during the seasonal low flow. Experimental approaches will allow me to manipulate and examine the influences of a specific physical feature (i.e. in-stream cover) in streams and evaluate how cover affects individual responses and how those responses emerge as population dynamics.

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Title
Acoustic transmitter and receiver performance in freshwater and estuarine environments

Abstract
We report on the performance of passive acoustic receivers intended to detect the passage of 281 acoustically tagged migratory salmonids in two Oregon coastal watersheds. We found that ambient acoustic noise can vary considerably with location, and that “sync” pulses thought to be characteristic of transmitter code emissions can also occur on a regular basis in the natural environment. We show how using transmitters with lower power output, or longer transmitter off times, can affect the detection of transmitters. Deploying multiple receivers in arrays along the migratory route helped greatly to ensure fish did not pass the array location without detection. However, we noted considerable differences among the receivers in the arrays with regard to the odds they would detect a fish + transmitter known to be in the area, but cannot distinguish whether this is a result of receiver placement or fish using preferred routes past the arrays. We present analytical methodologies that can be used during planning and implementation of a telemetry study to ensure the best possible results are achieved.

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Title

To be with barotrauma or not to be with barotrauma? A physiological survey of six rockfish species

Abstract

Overfished species of rockfish (Sebastes spp.) from the Northeast Pacific experience high bycatch mortality due to "barotrauma," a condition induced from the rapid decompression during capture. Earlier work has shown that not all rockfish species respond to decompression in the same way, and how a species responds could impact its potential for survival if released. Previous studies have documented the external signs of decompression, but little work has investigated the physiological response to decompression. In this study we captured 16 rockfish of each of the following species via hook and line: black (S. melanops), blue (S. mystinus), yellowtail (S. flavidus), canary (S. pinniger), yelloweye (S. ruberrimus), and quillback (S. maliger). Rockfish were immediately sampled for blood, examined for external barotrauma indicators, dissected for internal examination, and the heart, liver, head kidney, rete mirabile, and gill were sampled for histology. Previous work shows approximately a 5 minute lag time before cortisol levels (the primary stress response hormone in fishes) increase in rockfish subjected to a stressor. Because blood samples were collected within 5 minutes of a fish being hooked, we have baseline cortisol values for each species of fish. Results on external barotrauma indicators, baseline cortisol levels, and organ injury at the cellular level will be reported for the six species of rockfish. This study helps increase our understanding of the physiological effects of barotrauma in different species of rockfish.

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Summer international research opportunitiy for graduate students

Abstract

The National Science Foundation offers funding to graduate students every year for a 2-month international summer research experience called the East Asia and Pacific Summer Institutes Program (EAPSI). The purpose of the program is to introduce U.S. graduate students in science and engineering to research in East Asia and the Pacific, and to help graduate students initiate a scientific relationship with future foreign collaborators. Countries currently participating in the program include: Australia, China, Japan, Korea, New Zealand, Singapore and Taiwan. I will give a broad overview of the program and a brief description of my experience as an NSF EAPSI fellow where I conducted a 2-month research project at the University of Auckland in New Zealand.

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Title

The ecological relevance of seasonal and spatial variability in diet and consumption by cottid and salmonid fishes in headwater streams in western Oregon

Abstract

Freshwater sculpins (cottidae) are ubiquitous throughout coastal streams of Oregon and are potential competitors/predators and prey of juvenile salmonid species. The traditional view of salmonid habitat relationships in headwater streams assumes a bottom up control whereby instream and riparian habitats control the flow of energy up through successive trophic levels. Sculpins may greatly outnumber salmonids in biomass and abundance, possibly superseding the influences of bottom up control and may potentially alter food availability to salmonids. This project focuses on how intraspecific and interspecific foraging interactions between salmonids and cottids are reflected in the relative fitness of individuals, giving guidance on how these interactions actually scale up to processes of population dynamics of the two species. Diet overlap between and within species and age classes will be compared to further understand the levels at which interspecific and intraspecific interaction are or are not taking place. The bioenergetic model will compute consumption for the amount of growth accumulated over a specified time period. Output from bioenergetics modeling includes estimates of consumption, growth efficiency (weight gain/consumption) and a p-value

of the estimated consumption (C/Cmax) representing the proportion of maximum consumption rate for an individual fish after accounting for the effects of body mass and temperature. This p-value, if low, indicates a fish encountering food-limited scenarios or access to food reserves is somehow restricted. Bioenergetics allows for exploration of potential scenarios whereby we can manipulate temperature (e.g. representing removal of canopy) or reduce available prey (representing density-dependant effects) evaluating potential outcomes of logging on fishes in headwater streams within the context of how mechanisms of energy acquisition operate in the patterns of predation between salmonids and sculpins.

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Title
Historical Perspective of the Round Butte Project and the Fish Passage Effort

Abstract
The Pelton Round Butte Hydroelectric Project was constructed on the Deschutes River near Madras between 1956 and 1964. While all 3 dams included fish-passage facilities, after construction of Round Butte Dam with its' bottom intake, it was found that surface currents were confusing for downstream-migrating smolts. Most fish could not find the dam and downstream facility. Passage was terminated in 1968, and mitigation during the first federal license period centered around spring Chinook and summer steelhead smolt production from Round Butte Hatchery. During the relicensing period from 1995 through 2003, PGE and the Warm Springs Tribes worked with agencies and environmental groups to develop a fish passage plan adopted into the new license in 2005. One of the major tools used to show that a selective water withdrawal structure could solve both fish guidance and water temperature management challenges was a three-dimensional hydrodynamic model of Lake Billy Chinook, the reservoir behind Round Butte Dam. Because Round Butte is an earth and rock fill dam, it presented tremendous design and engineering challenges. The original design proved too complicated and expensive. A value-engineering study including state and federal engineers lead to a more affordable and better design with fish capture flow increased from 3,000 to 6,000 cfs. The new facility will capture downstream-migrating fish, separate them by size, and transfer smolts to a floating shoreline facility for marking and transport to the lower Deschutes River. Only surface water will be withdrawn from October through July while colder bottom water will be metered out of the reservoir during summer to manage lower Deschutes temperatures until fall turnover. The Selective Water Withdrawal facility will be completed in late winter, and we will be passing downstream-migrating salmonids starting in April 2009.

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Title
Modeling 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. Ceratomyxa shasta, endemic to the Pacific Northwest, requires a salmonid host and a freshwater polychaete host (Manyunkia speciosa) to complete its life cycle. Over the past ten years, research in our laboratory has been conducted to determine the distribution and densities of both the parasite and the polychaete host within the Klamath system and also to monitor the severity of disease in juvenile salmon. In summer 2008, field exposures were conducted in June and September in the KR using Chinook salmon to determine parasite infectious dose and resulting spore production. Exposures in June resulted in 100% mortality with exposure doses exceeding 140 million spores; in September mortality was 37%. In conjunction with this data and that collected by other agencies, we have developed a mathematical model 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 also 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 Ceratomyxa shasta on Chinook salmon in the Klamath River.

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Title

Low-Tech Solutions to a High-Profile Problem: Tui Chub Management through Netting and its Implications for Sport Fishing and Blue-Green Algae Dynamics in Fish Lake, Jackson County, Oregon

Abstract

In 2008 we concluded the second year of a 3-year pilot project to remove exotic tui chub (Gila bicolor) biomass in Fish Lake, Jackson County, Oregon. Objectives were to improve water quality through increased water clarity and decreased blue-green algae blooms; and to improve the recreational rainbow trout (Oncorhynchus mykiss) fishery through increased growth, catch rates, and aesthetics. About one million exotic tui chubs had adversely affected the Fish Lake trout fishery. Growth in stocked rainbow trout had been extremely low, as the invasive tui chubs had essentially depleted most of the available invertebrates in the lake. Tui chubs had also been associated with degraded water quality in Fish Lake including blooms of the potentially toxigenic cyanobacteria Anabaena flos-aquae. Netting results to date have far surpassed initial expectations. In two years we fished 95 trap nights and removed approximately 576,000 tui chubs—about 20 tons of biomass—using a combination of unbaited hoopnets, Oneida trapnets, and commercial gillnets. The amount of tui chub biomass removed represents about 58 percent of the original pre-project population estimate. Catch per effort dropped sharply in year 2 suggesting the project might be fishing down the chub population faster than natural recruitment. Fish Lake also experienced higher water quality in the two years of tui chub removal, based on increased secchi disk transparencies and decreased Anabaena flos-aquae abundance. Recent monitoring has also revealed increased angler use and a higher condition factor in stocked rainbow trout than before project implementation. Monitoring results suggest biomanipulation facilitated by mechanical tui chub removal is occurring in Fish Lake and having the desired effect on water quality parameters, in addition to benefiting anglers.

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Finding the Answers to Burning Questions: Rainbow Trout Habitat and Population Response to Wildfire and Subsequent Habitat Enhancements in a Southwestern Oregon Stream

Abstract

In 2001, the Quartz Fire burned about 43% of the Glade Creek sixth-field subwatershed in southwestern Oregon. The wildfire burned at varying severity levels, however, some stand replacement occurred and included canopy and understory loss in the inner riparian zone. The fire also resulted in changes to stream habitat including increases in bank instability, sediment transport and deposition, and potentially maximum summer water temperature. Resident rainbow trout abundance also decreased substantially at the reach scale (79 to 89%) one year after the Quartz Fire, as determined by backpack electrofishing. In 2003, instream habitat structures consisting of large, unanchored logs were installed in portions of Glade Creek as part of a post-fire watershed rehabilitation program. Post-fire salvage logging did not occur on federal lands but happened on adjacent private lands in the watershed. After the initial population decline of rainbow trout and stream amphibians in the fire area, the trout and amphibian population sizes increased over the next five years, eventually rebounding to pre-fire levels. Habitat structures were important in sediment storage and pool formation, although substantial natural, instream wood recruitment occurred after the fire. Habitat structures did not appear to change the size or age class composition of trout in the enhanced areas. Temperature profiles from summer 2008 showed the stream reaches with the highest rate of temperature increase corresponded with high severity burn areas. However, stream maximum weekly temperatures at the mouth were similar before and after the fire and still below salmonid thresholds. Monitoring suggests moderate to high severity wildfires are likely to affect stream habitat and fish populations in this region—including short-term declines, although natural recovery could occur rapidly if watersheds are functioning properly. Installing instream structures might help to stabilize or even increase salmonid populations after wildfires, especially in areas lacking natural large wood recruitment.

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Title

It’s not all about exploitation: fish societies in the Northwest

Abstract

A fishery is the occupation or industry of catching or rearing fish. A fisheries biologist studies those aspects of biology that relate to fisheries, but there is much more to fishes in the Northwest than catching and eating them. The American Fisheries Society should be given credit for broadening its scope. However, a number of smaller societies in the Northwest promote the study and conservation of fishes without regard, and often in substantial contrast, to their

perceived value as a commercial resource. These include the Gilbert Ichthyological Society, Desert Fishes Council, Jefferson Fish Society and Society for Northwestern Vertebrate Biology.

The primary purpose of the Gilbert Ichthyological Society is to foster communication in the Pacific Northwest concerning all things ichthyological. (http://artedi.fish.washington.edu/gis/home.html)

The mission of the Desert Fishes Council is to preserve the biological integrity of desert aquatic ecosystems and their associated life forms. (http://www.desertfishes.org/)

The Jefferson Fish Society exists to promote the conservation of fish and the environments that sustain them throughout the State of Jefferson by exchanging scientific information and ideas among fishery professionals, aquatic scientists, and citizen enthusiasts. (http://jeffersonfishsociety.com/)

The Society for Northwestern Vertebrate Biology strives to promote close working relationships among ichthyologists, ornithologists, mammalogists and herpetologists in our region by fostering exchange of scientific information and interest in the study of vertebrates, and offering a forum for these activities through meetings and publications. (http://www.snwvb.org/)

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Title
Temperate marine reserve response and implications for Oregon's marine reserve science

Abstract
The ongoing process of establishing marine reserves in Oregon has many people questioning if and why marine reserves are necessary in Oregon and what their anticipated benefits might be. Specifically, coastal residents and stakeholders want to know what scientific evidence exists to support assertions that marine reserves in Oregon will increase biodiversity and biomass, protect habitat, and result in numerous other benefits. There are few marine reserves established in the Pacific Northwest, so analysis of reserve response from other areas must be used to make predictions about what changes to expect in the fish, invertebrates and habitats of reserve sites in nearshore Oregon. The majority of marine reserves have been established in tropical marine systems and because of this, tropical reserves dominate marine reserve response studies. I will present initial results from a meta-analysis of marine reserves restricted to temperate (>30 degrees) latitudes. These results are part of a larger analysis to determine if temperate marine reserves show different responses from and tropical ones. There are many ecological, social, economic and other reasons why tropical and temperate systems may differ in marine reserve response. For example, ecologically, tropical systems are low-energy, low resilience systems whereas temperate areas are high-energy, resilient systems, strongly driven by tidal forcing and seasonally variable winds, currents, upwelling, and productivity. Based solely on these differences, responses to fishing or subsequent absence of fishing from marine reserves could be very different. The results from this literature analysis will provide local scientists and managers with information to present to stakeholders and others with vested interest in the science behind marine reserves.

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Title
Current Taxonomic Status of Hutton Spring and Summer Lake tui chubs (Siphateles: Cyprinidae).

Abstract
The Hutton tui chub was listed as a threatened, undescribed subspecies in 1985, but with no description and no way to know if the protected entity was found elsewhere. Previous research had suggested it was either a subspecies of S. bicolor or a more broadly distributed species, S. oregonensis, related to Lahontan tui chubs. We review this history with new information and conclude that S. oregonensis is a unique isolate of the Lahontan lineage and is found in Alkali (Hutton Spring), Abert (XL Spring) and Summer basins. Fish from Alkali and Abert basins are closely related and could be considered an ESU. Additional information would be required to justify ESU status for Hutton Springs separate from

Abert Basin fish. Fish from Summer Basin co-occur with apparently introduced light belly chubs, S. thalassinus from Goose Lake, which may hybridize or compete with them. The small isolated populations in Alkali and Abert basins and the potential threats in Summer Basin could justify protection for all S. oregonensis.

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Title
Pesticides and Water Quality in Oregon

Abstract
The following are the major topics covered in this paper:

1. The current situation and the issues we face in Oregon concerning the contamination of both surface and groundwater with agricultural and urban use of pesticides
2. Current Pesticides of Interest and Concern based on recent monitoring results
3. Description of an integrated State Agency Team and its role and activities.
4. Various pesticide mitigation methods to prevent/reduce pesticide contamination in water.
5. Q&A

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Title
Conversion of Macrophytes to Cyanobacteria in Devils Lake, an Unintended Consequence of an Experimental Introduction of Chinese Grass Carp

Abstract
Devils Lake is a shallow lake on the central Oregon coast that historically had abundant macrophytes throughout most of the lake. This problem became particularly acute in the mid 20th century when invasive species of macrophytes (Egeria densa and Myriophyllum spicatum) became so widespread and dense that recreational activities were severely impaired. In the 1980's an EPA funded and sponsored Clean Lakes Program led to an experimental macrophyte control program through the introduction of triploid grass carp (Ctenopharyngodon idella). To implement the program and for the long-term management of the lake the residents formed a special taxing authority, the Devils Lake Water Improvement District, which remains the active lake management entity. With macrophyte reduction, not eradication as the goal, a phased introduction of a total of 32,050 grass carp were introduced into Devils Lake with stockings in 1986, 1987, and 1993. By 1994, however, all submersed macrophytes had been eliminated from the lake, leaving only small patches of deeply rooted species such as water lilies. Cyanobacteria blooms were noted in 1991 and were also observed again in 1994. Since then, cyanobacteria blooms have become more frequent and intense, resulting in lake closures in 2007 and 2008. Sediment cores collected in 1993 and 2004 have shown trends toward more planktonic diatoms and taxa that are indicative of eutrophic conditions. The sediment reconstructions also show a pronounced increase in the rate of cyanobacteria resting cells during the later part of the 20th century. The Oregon Department of Fish & Wildlife has indicated that it will not support continuation of the experimental stocking program of grass carp. Consequently, the water improvement district is exploring other interventions for both control of the current level of cyanobacteria and the anticipated return of submersed macrophytes once the last of the grass carp expire.

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Title
Research Permits: Do I need a permit and how do I get one?

Abstract
Since 1991 NOAA Fisheries has listed a total of 28 salmonid populations, with six listed as endangered and 22 as threatened. Fifteen of these salmonid populations are found in Oregon, as well as the recently listed southern DPS of

North American green sturgeon. Research and monitoring related to abundance, distribution, life history, genetics, survival, and habitat utilization are essential for the continued conservation and recovery of all aquatic species. Research is essentially the only way to answer key questions associated with difficult resource issues that crop up in every management arena and involve every salmonid life history stage. Individuals planning to conduct research or monitoring on listed salmon or steelhead must obtain approval from NOAA Fisheries to perform that activity. The recently launched NMFS website (http://apps.nmfs.noaa.gov/) called Authorizations and Permits for Protected Species (APPS), can help fishery biologists determine if an authorization is needed, identify what type of authorization is available, apply for a permit or authorization, submit an annual report, and find appropriate local or regional contact information. Through the website, researchers are able to apply for ESA section 4(d) research approvals and section 10(a)(1)(A) research permits. The Oregon Department of Fish and Wildlife is a partner in the development of the website. Researchers conducting research, monitoring, or rescue/salvage of any freshwater or marine fish or invertebrate can also apply for an Oregon Scientific Take Permit (OR STP) through this web site.

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Title

How can stable isotope analysis contribute to our understanding of stream food webs?

Abstract

Tracking the ratios of stable isotopes in terrestrial and aquatic ecosystems has provided unique insights of the structure and function of food webs. In general, stable isotope ratios function as chemical tracers of an organism's diet and consequently provide insights into trophic dynamics. Also, anadromous fish are more enriched in the heavier isotopes of these two elements compared to watershed sources; therefore, we can quantify the relative importance of nutrients and energy derived from salmon compared to those from the watershed. Given this, isotope data let us to ask questions fundamental to understanding how stream and riparian food webs function. We have been analyzing isotopes of carbon (C) and nitrogen (N) to answer a number of such questions about the ecology of aquatic and riparian habitats throughout the Pacific Northwest. For example, (1) How rapidly are marine derived nutrients from salmon carcasses incorporated into stream food webs and how long are they retained? And, (2) how do disturbances such as wildfires or the introduction of nonnative predators influence stream food webs? And, (3) do stable isotope signatures confirm our general understanding about the functional role of fish and invertebrates in these systems? To address these and other questions, we summarize results from d15N and d13C monitoring of stream food webs in the Salmon River basin (Idaho), John Day basin (Oregon) and the Cedar and Elwha River basins (Washington). We synthesize the results of our efforts in these watersheds to examine whether the integration of stable isotope data into regional monitoring programs for salmon might help identify specific management actions to improve growth and survival of listed salmon species.

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Title

Monitoring the Status of the Endangered Borax Lake Chub, Gila Boraxobius, in a Geothermal Lake in Southeastern Oregon

Abstract

Borax Lake chub, Gila boraxobius, is a small minnow that is endemic to a natural 4.1 hectare geothermally-heated alkaline lake perched ten meters above the desert floor in Oregon's Alvord basin. The Borax Lake chub was listed as endangered under the federal Endangered Species Act in 1982 due to threats of habitat alteration caused by geothermal energy development and alteration of the lake shore crust to provide irrigation to surrounding pasture lands. From 2005-2008, the Oregon Department of Fish and Wildlife developed survey protocols to monitor population abundance

using mark-recapture protocols and snorkel index surveys. We found that snorkel surveys lacked sensitivity to detect all but major changes in population abundance. We found that we could obtain mark-recapture estimates of the Borax Lake chub with a relative precision of +14-20% while marking approximately eight percent of the population and handling approximately 20 percent of the population. With a precision of +14-20%, we have the ability to detect a 26-34% decline in abundance. We will compare these results to previous monitoring efforts that occurred in 1986-1997 when a significantly larger effort and proportion of the population was sampled. We will also discuss the substantial progress has been made in reducing threats to the habitat which have improved the conservation status of this species, the primary remaining threats, (increased recreation use, potential geothermal development, and nonnative species), and provide recommendations for future investigations and monitoring.

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Title

Using EMG telemetry to assess relative activity and habitat use of over-summering steelhead

Abstract

Anadromous adult summer steelhead, Oncorhynchus mykiss, undertake an extensive, and energetically costly, migration from ocean feeding grounds to their natal rivers. Individuals may then spend up to nine months in freshwater before spawning in the late autumn or winter. The reproductive fitness of an individual will be related to the allocation of its energy resources. The behavior of these fish while in freshwater is likely to have a large effect on their energy requirements. We used electromyogram (EMG) radio telemetry to evaluate their habitat use and activity levels. The fish tended to reside in pools and showed relatively low activity levels during the summer and autumn. We conclude that this behavior and habitat use enables the fish to conserve energy prior to spawning. During the study, we also documented the first known capture of an EMG tagged steelhead by an angler. Activity levels were extremely high during capture but returned to baseline within minutes as the fish returned to the site it had occupied prior to capture.

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Title

The Ecotoxicology of Pesticides and Pacific Salmon

Abstract

For more than a decade, numerous pesticides have been detected in river systems of the western United States that support anadromous species of Pacific salmon and steelhead. Over the same interval, several declining wild salmon populations have been listed as either threatened or endangered under the U.S. Endangered Species Act (ESA). Because pesticides occur in surface waters that provide critical habitat for ESA-listed stocks, they represent an ongoing concern for the near- and long-term conservation of salmon throughout California and the Pacific Northwest. In recent years, researchers from NOAA's Northwest Fisheries Science Center, together with collaborators from regional universities, have been investigating the ecotoxicological impacts of pesticides on salmon. The overall aim of this work is to determine the extent to which pesticides may limit the recovery of at-risk salmon populations. This presentation will highlight progress on several fronts, including 1) the effects of low-level exposures on salmon physiology and behavior; 2) the cumulative impacts of pesticide mixtures; 3) the links between sublethal effects on individuals and population productivity and abundance; and 4) the potential for cascading effects on salmon growth and survival via aquatic food webs.

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Title

Urban Pesticides: Assessment Difficulties and Lessons From Pristine Environments (National Parks)

Abstract
Assessment of biological effects of pesticides applied to the urban landscape is confounded by numerous factors. These include but are to limited to: (1) pesticides my enter urban waters via routes more unique to urban settings, (2) there is a paucity of data regarding the concentration of pesticides in urban effluents or streams, (3) fish are exposed to mixtures of pesticides, (fish are exposed to other contamination addition to pesticides, and (5) information on effects of long-duration, low concentration-exposure is very sparse. Lessons can be learned by examining response of fish to contaminants, including pesticides, in "pristine" settings. Salmonids were collected from lakes of National Parks ranging from north of the Arctic Circle to southern California and from the Pacific Coast to the Rocky Mountains. Some male trout collected from parks in the Rocky Mountains exhibited significantly elevated Vg. Some trout appeared to be intersex males and others appeared to have abnormal gonadal tissue, perhaps undeveloped testes, containing some oogonia or oocytes. All fish from other parks appeared normal. The frequency of gonadal anomalies in populations where this condition was extant appears significantly higher than in old museum specimens examined for comparison. Affected specimens contained various contaminants known to be endocrine disrupting. We also found the presence of splenic and nephric pigmented macrophages in fish from several regions. Macrophage abundance correlated with whole body mercury content. It is likely that airborne contaminants are having adverse, endocrine disrupting effects in fishes in waters at remote locations held to be pristine. Analysis of historic collections of salmonids reveal that the frequency of intersex salmonids may be on the rise in these areas.

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Title
Looking for Pieces of the Puzzle: Life History of Spring Chinook Salmon in the Willamette Basin

Abstract
Spring Chinook salmon in the Willamette River basin have been listed as a threatened species under the federal Endangered Species Act. Dams constructed for flood control blocked access to historical spawning and rearing areas, and have altered patterns of water temperature and flow. Recovery of spring Chinook salmon depends on understanding life history patterns and how life histories may be affected by environmental changes. We have begun to piece together a picture of the diverse expression of life histories in Willamette spring Chinook using investigative studies and field observations. Juvenile fish migrate from spawning areas into the lower reaches of large tributaries and the main stem of the Willamette River as fry (late winter-spring), subyearlings (spring-summer), and yearlings (fall-spring). Significant numbers of juvenile fish emigrate from the Willamette River as subyearlings after a short rearing period, whereas other fish rear in the river through summer and winter as subyearlings before emigrating in the following spring as yearling smolts. Yearling smolts that rear closer to spawning areas spend a shorter amount of time in the Willamette River than the other life histories. Juvenile Chinook salmon have been captured in the winter in intermittent streams and seasonally flooded areas, up to 20 miles from the Willamette River. The proportion of returning adults with a subyearling or yearling life history is variable between years and among subbasins. Recovery efforts should include conservation and restoration of diverse riverine habitats. Dams in the basin should be managed to help return the river to more normative conditions as measured by indicators such as water temperature, and flows sufficient for channel-formation processes to occur and to provide access to seasonally important habitats.

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Title
Development of a basin-wide fish tagging database for centralized data storage and to facilitate the sharing of capture-recapture data among resource agencies in the Klamath Basin

Abstract
Irrigators, municipalities, and recreationists compete with imperiled fish populations for limited water resources in the Klamath Basin. Recently, a proposed Klamath Basin Restoration Agreement was signed providing a non-binding agreement to remove four Klamath River dams that separate the upper and lower basins. State, federal, and tribal natural resource agencies in the upper and lower basin currently use fish-tagging methods to study threatened and endangered species and salmonid populations. In addition to traditional capture methods, researchers have implemented remote sensing systems to improve data-collection efficiency of previously tagged fish. Currently, each agency is individually responsible for managing their tagging data. Because a number of species being studied are anadromous or migratory, there is potential for fish tagged by one agency to be recaptured by another. This potential will increase if dams are removed and the upper and lower basins are reconnected. We propose to create a web database application that will be housed in a relational database management system (RDBMS). This application will be created

using the open source database software MySQL and will centralize tagging data storage and retrieval for the entire Klamath Basin. This basin-wide database will be modeled after a database developed by the U.S. Geological Survey to monitor Lost River and shortnose sucker populations in the Upper Klamath Basin, which consists of nearly 70,000 tagged fish and 1.9 million capture events. For the upper basin database, we developed a custom application that reads and inserts remote PIT tag detection text files into the RDBMS. Researchers can retrieve data using one of 15 summary queries or create encounter history files formatted for capture-recapture software programs. The basin-wide database will eliminate the need for natural resource agencies to manage separate databases, thereby avoiding redundant effort as well as simplifying and facilitating the process of sharing data among agencies.

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Title

Equipment Decontamination with Sparquat 256: Preventing the Spread of Aquatic Nuisance Species

Abstract

Controlling the spread of aquatic nuisance species (ANS) has become a priority for government agencies. Introduced species such as the New Zealand mudsnail (Potamopyrgus antipodarum), the parasite that causes whirling disease (Myxobolus cerebralis), the zebra mussel (Dreissena polymorpha), and 'rock snot' (Didymosphenia geminata) have harmful impacts on aquatic ecosystems by changing local food webs and altering habitat regimes. PACFISH/INFISH Biological Opinion Effectiveness Monitoring (PIBO – EM) has approximately 2500 sample locations throughout the upper Columbia and upper Missouri River drainages which creates a great potential for the spread of ANS. As a result PIBO – EM has implemented a decontamination procedure using Sparquat 256, a quaternary ammonium disinfectant that has been shown to be an effective treatment for New Zealand mudsnails, whirling disease, and other fish pathogens. Effective decontamination methods used by government agencies include bleaching, boiling, and drying. While more expensive than other methods, PIBO – EM has chosen Sparquat 256 because it is easily transported by field crews, safe to use, and time efficient. The procedure requires removing excess dirt and debris from potentially contaminated sampling equipment and soaking gear in a 4.7% solution (6 oz Sparquat 256 per gallon of water) for ten minutes. A solution of Sparquat 256 can be re-used until it becomes diluted with mud and debris and stops producing copious amounts of suds when agitated. A used solution should not be discarded in the field but brought back to an office location and poured down a drain that will run into a waste water treatment facility.

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EVALUATION OF PASSAGE AND SURVIVAL FOR JUVENILE CHINOOK SALMON AND STEELHEAD AT WILLAMETTE FALLS HYDROELECTRIC PROJECT, 2008

Abstract

The Willamette Falls Hydroelectric Project is the oldest hydroelectric development in Oregon and is located on the Willamette River at RM 26.2 To help Portland General Electric (PGE) meet its performance standards of 98% survival rate for juvenile salmonids passing T.W. Sullivan Powerhouse, modifications were made to the powerhouse including realignment of the trashracks, construction of a new guide wall and concrete flooring to smooth and accelerate flow as it moves downstream through the inner forebay. In addition, PGE constructed a second bypass structure to facilitate downstream passage. The new North Fish Bypass (NFB) was constructed with a design flow of 500 cfs and works in conjunction with the existing Eicher screen bypass system located on turbine unit 13 (Unit 13 Bypass). Modifications to the inner forebay and construction of the NFB were completed in fall 2006.

Fish Guidance Efficiency (FGE) for juvenile steelhead (Oncorhynchus mykiss) and Chinook (O. tshawytscha) passing through the inner forebay of the T.W. Sullivan Powerhouse was evaluated using passive integrated transponder (PIT) tags. Paired calibration and treatment releases of PIT tagged smolts were conducted in 2007 and 2008. Estimates of FGE under the "normal" powerhouse operating condition were 100% (± 13%) for juvenile steelhead and 100% (± 9%) for Chinook smolts.

Survival and injury rates estimated for smolts passing through the new bypass structure were evaluated using HI-Z balloon tag technology in spring 2008. Estimates of survival were greater than 99% for all flow scenarios tested using juvenile steelhead and Chinook. Overall, injury rates were less than 2% for both juvenile salmonid species. The

combined results from the FGE and survival testing indicate that modifications to the T.W. Sullivan Powerhouse are meeting expectations for downstream migrating salmonids. Continued testing is planned for 2009.

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Title
Assessing the feasibility of native fish reintroductions: a framework and example applied to bull trout in the Clackamas River, Oregon.

Abstract
Bull trout (Salvelinus confluentus) is an ESA-listed species with a widespread, but declining distribution in western North America. A major reason for its decline is habitat loss and fragmentation, however, many suitable unoccupied habitats still exist within its historic range. Translocations are a common activity in species conservation and recovery, yet most published studies evaluating such efforts involve mammals and birds – fishes are strongly underrepresented. We focused on translocation of bull trout from a wild source to re-establish a population in formerly occupied habitat (i.e., "reintroduction"). We developed a decision framework to assess the feasibility of bull trout reintroduction and applied it to Clackamas River, Oregon. We consulted American Fisheries Society guidelines and others for species translocations and constructed a two-tiered, decision support model that addresses seven questions. Tier 1 addresses: 1) Was the recipient habitat historically occupied?, 2) Is bull trout unlikely present now?, 3) Is the recipient habitat potentially suitable?, 4) What are the current threats in the recipient habitat?, and 5) What is the short-term recolonization potential? Tier 2 addresses: 6) Is there at least one compatible donor stock available? and 7) Can propagules be provided without damaging the donor stock? Specific data and information are evaluated to provide evidentiary support for each question. The model quantitatively assesses overall reintroduction feasibility on a scale from +1 to -1, where +1 indicates high confidence reintroduction is feasible, -1 indicates high confidence reintroduction is not feasible, and 0 indicates unknown. For the Clackamas River, Oregon, the overall feasibility score is +0.95, indicating a high level of confidence that bull trout reintroduction is feasible. Other factors to consider, such as potential for disease transmission, ecological interactions with other species, and social acceptance, require additional examination during formal administrative procedures should a reintroduction be proposed.

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Title
Removal of the Condit Hydroelectric Project - Navigating the Maze of Permits and Politics

Abstract
Condit Dam is located on the White Salmon River, Washington approximately 3 miles above the Bonneville Pool near the town of White Salmon Washington. In 1999 a Settlement Agreement was signed by twenty-three agencies, tribes and non-governmental organizations with the intent to remove Condit Dam by October 2006 pending receipt of all appropriate permits and completion of a removal plan. Since completion of required pre-removal studies and dam removal plans PacifiCorp has, with agreement from the settlement parties, postponed dam removal pending receipt of a State Environmental Policy Act (SEPA) permit and a Clean Water Act 401 Water Quality Certificate both of which are issued from the Washington Department of Ecology. In addition, PacifiCorp is waiting for a U.S. Army Corps of Engineers 404 permit and, finally, a Federal Energy Regulatory Commission Surrender Order. In terms of the actual dam removal, we will present information on the dam removal procedures, expected effects of the removal and site restoration.

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Title

Seasonal Foraging and Piscivory by Sympatric Wild and Hatchery-reared Steelhead from an Integrated Hatchery Program

Abstract

We compared the diet of hatchery-reared steelhead produced from an integrated hatchery program and their sympatric wild counterparts, both as spring smolts and as non-migrating summer parr. Our results suggest that although there is a potential for hatchery fish to affect wild steelhead populations due to dietary overlap and salmonid fry predation, diet composition appears to be more strongly affected by seasonal and yearly differences in prey abundance and presence rather than differences in rearing environments. Hatchery and wild steelhead showed small but important foraging differences. Hatchery smolts did not consume as many fry as wild fish and hatchery residuals showed stronger surface oriented feeding behavior than wild parr. Predation by hatchery smolts was related to release timing, but not experience with native fry. Because most hatchery smolts emigrated shortly after release and the overall number of residuals in the study creek was low, we speculate that in this case dietary similarities and predatory behavior exhibited by hatchery steelhead produced from an integrated hatchery program had little adverse affect on the native steelhead population.

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Title

Processes influencing stream temperature and juvenile habitat suitability for southern steelhead (Oncorhynchus mykiss) in a dynamic system

Abstract

Comparison of maximum stream temperature and juvenile Oncorhynchus mykiss presence demonstrated the importance of riparian shade and hyporheic exchange for maintaining patches of suitably cool summer rearing habitat in Sisar and Santa Paula Creek, CA. These two adjacent sub-basins near the southern margin of the species' range differ in extent of riparian forest and frequency of groundwater input to the channel. Large flood events periodically remove all riparian vegetation from Santa Paula Creek, while a mature deciduous riparian forest persists along Sisar Creek. Where present, riparian shade dampened daily fluctuation in temperature and slowed longitudinal stream heating. In the absence of riparian shade, stream temperature increased rapidly from point sources of cool groundwater. Because of the association of cool groundwater sources with topographic nick points, stream temperature was negatively correlated with channel confinement and showed complex patterns of heating and cooling across a sequence of alternating confined and unconfined stream reaches. These temperature patterns influenced the distribution of fish. At the beginning of summer, fish were present across the full range of maximum daily temperatures observed (16 – 27ºC), and temperature was not a reliable predictor of fish occurrence. As the range of maximum daily temperatures increased to 22 – 34ºC over the summer, the probability of fish presence became negatively associated with stream temperature, declining precipitously as maximum temperatures exceeded 30ºC. Examination of a time series of aerial photographs following large floods suggests a dynamic relationship between thresholds for channel mobility, removal of riparian vegetative shade, and the extent of suitably cool habitat available for summer rearing of O. mykiss.

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Title

Distribution of the freshwater mussel Margaritifera falcata in Oregon coastal streams

Abstract

Freshwater mussels are known to be a bio-indicator of water quality and watershed health due to their long life spans and filter feeding. The declines observed in freshwater mussel populations coincide with native salmon declines due the commensal relationship between mussel glochidia (larvae) and the gills of host salmonids. These declines in both

species are correlated with changes in land use due to timber harvest, urban development, and agriculture. The goal of this ongoing study (2007-present) is to obtain baseline data on the presence/absence and distribution of the native freshwater mussel Margaritifera falcata in watersheds of the Central Oregon coast. Since 2007, 15 sites have been surveyed. Surveying tributary sites consisted of walking a one mile reach, while 500 ft reaches were snorkel surveyed on mainstem sites. Where mussels were found the habitat type, depth, channel width, and substrate composition were recorded. Out of the 15 sites surveyed, only five contained mussels. Of these, four are known salmon bearing streams. Also, Green River consistently contained the highest mussel densities. This may be due to the Coho salmon habitat restoration efforts that have been in place since 2002. The data from this ongoing study is serving as a baseline for future monitoring and restoration programs.

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Title

Lower Deschutes River Experimental Gravel Augmentation Project

Abstract

As a requirement of relicensing of the Pelton Round Butte Hydroelectric Project on the Deschutes River, Oregon, co-licensees Portland General Electric Company and The Confederated Tribes of the Warm Springs Reservation of Oregon are implementing the Lower River Gravel Study. Components of the Gravel Study will assess the geomorphic and biological processes in the Lower Deschutes River downstream of the Project. In August 2008, 300 yards of gravel was placed at three sites using specialized cable skyline equipment. The experimental augmentation patches were designed to match topography, location and particle size distribution of existing gravel bars. The cable skyline method allowed for relatively precise application of the gravel with minimal effects to riparian areas adjacent to the sites. Pre- and post application total station surveys and low elevation aerial photography were implemented at each augmentation site. Painted, PIT tagged tracer rocks were placed in grid patterns on the surfaces of the patches. Monitoring will be conducted after high flow events to assess changes in volume and composition resulting from bedload tansport. Intragravel dissolved oxygen, gravel permeability and use of the augmentation sites by spawning salmonids will also be monitored. Fall chinook were observed spawning at two of the sites in November 2008. Changes in tophography and displacement of tracer rocks were evident.

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Title

Coho salmon in Santa Cruz and San Mateo Counties: Detecting rare fish species using snorkel surveys

Abstract

From 2006 to 2008, we conducted snorkel surveys to examine the distribution of juvenile coho salmon in streams of San Mateo and Santa Cruz counties (California) to (1) establish baseline occupancy rates for assessing future status, recovery, and recolonization of local streams, and (2) evaluate protocols and statistical methods for estimating occupancy rates in regions where abundance is low and distribution is highly patchy. Each year, we surveyed every second pool in 46-47 randomly selected one-kilometer stream reaches, representing 13%-15% of accessible habitat in the region. Repeat visits were made to half the sites to evaluate detection probabilities at the unit level (by sampling the same pools) and the reach level (by surveying pools skipped on the first pass).

Standardized surveys indicate that reproductive success of coho salmon in streams south of San Francisco was extremely poor the past three years. Juvenile coho salmon were detected at 2 of 47 reaches surveyed in 2006, 0 of 47 reaches in 2007, and 5 of 46 reaches in 2008. In only two cases were more than 25 individual fish counted in a reach. Extensive surveys conducted in four streams that have recently supported coho salmon confirmed their dire status in the region. Coho were not detected in Gazos Creek (9 km surveyed), and were extremely low in abundance in Waddell (34 fish over 7.5 km), Scott (4 fish over 6.1 km), and San Vicente creeks (188 fish over 4.8 km). Results from repeat

visits to coho-bearing reaches indicate that (1) the probability of detecting coho salmon at the unit level is generally high, but (2) that the practice of skipping pools increases the probability of "false absences" at the reach level when abundances are as low as they currently are in this region.

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Title
What is a natural thermal regime and what does it mean for salmon?

Abstract
Water temperature is a key regulator of aquatic communities. Human impacts on the variability and complexity of water temperature regimes and biological response to these human impacts are just beginning to be understood. Thermal regimes have been altered by big dams in many regions and are predicted to be altered by climate change over large spatial extents across Puget Sound. Alterations in thermal regimes may include not only increases or decreases to means, minimums, and maximums but reductions or increases in variability at multiple temporal scales. Changes in thermal regime have the potential to impact food web dynamics, fish physiology, fish behavior, and community composition. Understanding, comparing, and predicting natural and altered thermal regimes is essential to management and recovery of ESA-listed salmonids as well as to effective management of freshwater habitats for all species. We summarize 4 complementary approaches to understanding the relationships between human actions, thermal regimes, and biological response. First, we provide evidence that anthropogenic impacts to river systems can include reductions in temporal variability, an often-overlooked regulator of riverine communities. Next, we introduce research to investigate the impacts of large-scale land-use patterns on variability in water temperature and flow regimes. Third, we present data from the Sauk River, Washington. We summarize 7 years of thermal data on multiple channels within a floodplain to examine natural temporal and spatial variation in water temperature regimes. Finally, we report on a theoretical study of the potential for salmon to adapt to anthropogenic thermal changes. An understanding of temperature patterns in rivers is essential to freshwater habitat management. It will require attention to the complexities of natural thermal regimes, a better understanding of how humans impact thermal regimes, and research on the biological and evolutionary implications of human alterations to natural thermal regimes.

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Title
Overwinter Survival of Juvenile Spring Chinook Salmon in the Grande Ronde River Subbasin

Abstract
Understanding life-stage specific survival rates during freshwater rearing is important for management and restoration of Chinook salmon. Due to the climate in northeast Oregon water temperatures in the Grande Ronde River Subbasin drop below optimal rearing temperatures (10-15.6 Celsius) for juvenile spring Chinook salmon (Oncorhynchus tshawytscha) during winter months. From 1994 to 2007 we investigated survival rates for juvenile Chinook salmon overwintering in Catherine Creek, and Lostine and upper Grande Ronde rivers. We used snorkeling techniques to capture and PIT tag Chinook salmon in December, and rotary screw traps to capture and PIT tag migrating Chinook salmon in the spring (March-May). To evaluate overwinter survival we compared the survival rates of the two tag groups to Lower Granite Dam as determined by PIT tag detections at mainstem Snake and Columbia River dams. The ratio of the survival rate of the winter tag group to the spring tag group is the overwinter survival for juvenile Chinook salmon in their respective streams. Overwinter survival estimates in Catherine Creek, and Lostine and upper Grande Ronde rivers have ranged from 20%-70%, 19%-64%, and 23%-60% respectively. The survival rates for overwintering Chinook in the Lostine River have shown a downward trend (P=0.002, Pearson Correlation), whereas rates at Catherine Creek and the upper Grande Ronde River have fluctuated year to year. Further investigation is needed to understand the decreasing overwinter survival rates in the Lostine River.

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Title

Movement patterns of outmigrating yearling chinook salmon at Fall Creek Dam.

Abstract

The downstream migrant passage system at Fall Creek Dam, completed in 1966, was designed with intakes at multiple elevations to pass chinook salmon downstream into Fall Creek and the Middle Fork of the Willamette River. However, studies in the early 1990s documented very high mortality and injury rates for fish using the system. Current operations have focused on downstream fish passage through the regulating outlet at the base of the dam. We used acoustic telemetry to evaluate the distribution of yearling chinook as they emigrated from the reservoir using the regulating outlet. Direct observation of chinook position in three dimensions with sub-meter resolution allowed evaluation of milling and sounding behavior in the immediate vicinity of the reservoir outlet. Observations of the distribution and behavior of outmigrating chinook will inform alterations of the regulating outlet associated with the proposed retrofit hydroelectric project at Fall Creek Dam.

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Title

Deschutes Basin Fish Health Monitoring During the Reintroduction Process

Abstract

The purpose of Fish Health Services (FHS) is to monitor and make recommendations that minimize the impact of fish diseases on the State's resources. In most cases FHS is involved with State hatchery operations where rearing densities increase the risk of fish loss to infectious diseases. In the case of the Deschutes Basin, FHS has also become involved with efforts to reintroduce spring Chinook (Oncorhynchus tshawytscha) and summer steelhead (O. mykiss) into locations above the Hydroelectric Projects. These efforts, although promising, come with a number of challenges for FHS including maintaining fish health in the hatchery under increased fish loads for reintroduction purposes, minimizing the amplification of serious fish pathogens into the hatchery water supply and preventing the introduction of new and exotic diseases (e.g. Whirling Disease). In addition, habitat alterations and certain highly aggressive fish pathogens, endemic to waters of the upper basin, may determine when, where and how well some populations become established. This paper will highlight the past, present and future efforts of FHS to address concerns surrounding the reintroduction of salmonids into their native grounds and will include a discussion on shifts in host-parasite dynamics in the Deschutes Basin.

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Title

Catch and release in the live rockfish fishery: can release of pregnant females be a conservation tool?

Abstract

The market for live fish in Port Orford, OR has increased rapidly over the past decade. The sensitive life history characteristics of rockfish in addition to this increased fishing effort make them vulnerable to over-exploitation. To ensure that these stocks have resilience to market pressures, the Port Orford Ocean Resource Team, a local non-profit organization, initiated a voluntary conservation measure in which obviously pregnant female rockfish are released if caught. Rockfish are prone to barotrauma (rapid swim bladder expansion), and releasing the gravid "big old fat fertile female fish" (BOFFFFs) is thought to preserve the effective population of local stocks, allowing those fish to produce healthier, more vital offspring to seed local stocks. Treatment of barotrauma is achieved by venting the swim bladder of the fish. Released fish can be considered an economic loss to fishermen as they are caught within catch limits and could be harvested, and bigger fish deliver a higher price. According to personal communication with the local fish buyers, the overwhelming majority of the fleet abides by this effort and does not harvest gravid female rockfish. The survivability of released females is not known. We are conducting a tagging study to evaluate the effectiveness of this conservation measure. The results of our tagging study could also inform management decisions regarding the rockfish

stocks harvested off Port Orford. Along with survivability of BOFFFF's, this study will yield valuable information on growth rate, home ranges, migration, habitat preference, natural mortality, release methods, exploitation rate, and abundance. Such information informs potential limiting regulations like spatial and temporal closures, slot limits, and seasonal fishery closures. Information could also increase opportunities like retention of gravid females, increased catch limits, and modified venting procedures. A description of this study and potential outcomes will be presented.

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Title
Overview and update of Bull Trout Status in Oregon

Abstract
The U.S. Fish and Wildlife Service met with bull trout working groups in Oregon to update the current status of bull trout in each core area. Local biologists provided data and updates on local conditions and priorities for the species. Overall, bull trout status in Oregon remains insecure; future climate change may exacerbate declining trends and our lack of ability to control non-native fish also poses challenges. Other high priority threats that need to be addressed in various core areas include passage issues, water quality problems, and adequate stream flow. New information suggests that refinements to local population and core delineations may be needed. A need to continue to collect abundance data in many areas to establish status and trends using a consistent methodology for tracking abundance without harming bull trout was also identified. In Oregon, status updates will be conducted on an annual basis. An interim recovery effort includes the development of core area action plans to identify and fund priority actions for bull trout recovery in Oregon.

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Title
Estimates of winter rearing capacity for coho salmon in Oregon coast watersheds

Abstract
The availability and quality of winter rearing habitat limits the productivity of coho salmon (Oncorhynchus kisutch) in Oregon's coastal basins. While we prefer to assess habitat conditions during the winter, surveys can be logistically challenging on a coastwide scale. An alternative approach is to draw on the much more extensive set of summer data to infer rearing capacity during the winter. We surveyed 249 sites within the Oregon Coastal Coho Evolutionary Significant Unit (ESU) during the summer and winter between 1999 and 2007 to describe habitat conditions and estimate the rearing capacity for juvenile coho salmon. Sample sites were randomly selected and spatially balanced within the distribution of coho salmon (juvenile and adult) in coastal basins. Using the Habitat Limiting Factors Model (HLFM) developed by Nickelson (1992) and updated to include the effects of large wood and stream size, we estimated the capacity of streams to support juvenile salmon based on quantitative descriptions of summer and winter habitat. We described the differences observed in stream habitat measured in both seasons, compared habitat capacity estimates between winter and summer habitat surveys, and developed a regression model to rigorously predict the winter rearing capacity based on summer surveys. These estimates will allow us to infer winter rearing capacity estimates at an additional 2500 stream reaches within the range of Oregon coastal coho.

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Title
Upper Willamette Bull Trout Trilogy Part II: Sweetwater Creek Reintroduction

Abstract
In 1962, US Highway 126 was reconstructed adjacent to Trail Bridge Reservoir on the upper McKenzie River, Oregon. Prior to the reconstruction of Highway 126, Sweetwater Creek was accessible to fish and likely supported bull trout. The highway reconstruction resulted in the installation of an impassable culvert for Sweetwater Creek. In 1992, a partnership of interested organizations devised a plan to install a second baffled culvert for bull trout passage alongside the impassable culvert. Providing passage into Sweetwater Creek from Trail Bridge Reservoir was the first step in re-establishing bull trout in this cold, spring-fed stream. For the next 7 years (1993 – 1999), bull trout fry were captured from nearby Anderson Creek and transplanted into Sweetwater Creek. Spawning surveys were conducted annually in Sweetwater Creek beginning in 1994, with the first redds observed in 2000. Redd counts remained in the single digits for the first six years until more than doubling in 2006, 2007, and 2008 with 21, 22, and 20 redds observed respectively. Factors contributing to the increase in observed redds include transporting adult fish from below Trail Bridge Dam into Trail Bridge Reservoir, changes in Trail Bridge Reservoir management, and the beginning of natural production in Sweetwater Creek. On-going management actions to improve passage at the Sweetwater Creek fish culvert include adjustments to flow divided between the two culverts and manipulations to Trail Bridge Reservoir pool elevations to assist bull trout entering the culvert.

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Title
Chutes and Ladders: Designing fish passage at Trail Bridge Dam

Abstract
Trail Bridge Dam is the furthest downstream of three dams at the Carmen-Smith Hydroelectric Project (Project) on the upper McKenzie River. Construction of the Project was completed in 1963 with an artificial spawning channel downstream of Trail Bridge Dam in lieu of fish passage. Eugene Water & Electric Board (EWEB) is designing and will build an upstream ladder and downstream screen and bypass system to provide passage for federally listed spring Chinook salmon and bull trout and other native migratory species. For the upstream ladder, EWEB started with four alternative routes using a vertical slot type design. Factors that influenced decisions on ladder routing include placement of ladder entrance relative to the spawning channel and existing tailrace barrier, how to get the ladder through, over, or around the 80 foot high earth filled dam, and how to exit fish into Trail Bridge Reservoir which fluctuates of up to 12 feet vertically per day. For the downstream bypass system EWEB started with three screen options and three bypass routes. Factors that influenced decisions on screen design include the 12 foot daily fluctuation, size of screen to achieve criteria velocities, and placement relative to the spillway. Factors that influenced the bypass route decisions include getting the bypass pipe through, over or around the dam, topography downstream of Trail Bridge Dam, and location of the exit. While drawings and exact routings for passage components are not finalized the passage elements accepted for the Settlement Agreement will be presented.

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Title
Anadromy and residency in brook trout: environment, genetic and effect of recreational fishing on evolution of life-history form

Abstract
Similar to O. mykiss, brook trout, Salvelinus fontinalis, often presents an anadromous form, migrating to sea before coming back to the river to reproduce, and a resident form, spending its entire life-cycle in freshwater. When found in sympatry, the relative influence of environmental and genetic factors responsible for determining these two forms is unclear. Data from a 10 year study on the Ste-Marguerite River in Quebec, Canada, revealed interbreeding between anadromous and resident individuals and the combined influence of environment and genetics in the adoption of one form or the other. Differences in growth rates and energetic status in early life stages were linked to the adoption of alternate life-history forms. Moreover, we found significant heritability, meaning that the form adopted is in part determined by the genes inherited. Based on these results, we developed an individual-based model to assess the impact

of recreational fishing on the evolution of anadromy and residency, as well as on population parameters such as abundance and yield. Because fishing is directed only towards the anadromous form, this directional selective pressure has the potential to cause evolutionary changes in this important life-history trait, often harder to reverse than plastic changes.

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Title
Loop analysis as a potential tool to study ecosystem changes in the Gulf of Alaska

Abstract
Ecosystem management is now mandated by the Magnuson-Stevens Act; however a definite methodology of multispecies assessment has not yet been determined. Quantitative tools are emerging that address this need; for example, multi-species virtual population analysis and mass-balance models, such as Ecosim with Ecopath. Loop analysis may be another valuable methodology to make ecosystem predictions of perturbations in a system. This is a qualitative methodology based on positive or negative interactions between species that are derived from empirical ecological data. While precise magnitudes cannot be attained, general responses in biomass and age structure can be predicted from the models, allowing the results to be compared to sampling data and models generated with different methodologies. The Gulf of Alaska represents an interesting study system for application of loop analysis as it includes a number of important fisheries and there is a large database of diet, age and growth, and abundances of species over time. This rigorous data collection has yielded mass-balance models of the system as well as numerous single-species stock assessments. Loop analysis can be applied to these data to make predictions of ecosystem responses from changes in fishing pressure, species regimes, climate and other various environmental or stochastic events. Our analyses may be especially useful for determining changes in complexes of closely interacting species without the parameter complexity of a full mass-balance model. We will compare results of our loop analysis models with existing ecosystem-based models to determine their utility, focusing on interacting groundfish and flatfish species, many of which are commercially important. Our goal is to determine the predictive ability of these models and their efficacy as a tool in ecosystem management.

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Title
O. mykiss population structure response to environmental changes in the Cedar River, Washington

Abstract
Oncorhynchus mykiss present in the Cedar River watershed (Washington, Puget Sound) express both resident and anadromous ecotypes. Since 1900, Cedar River O. mykiss have experienced substantial habitat modifications including a dam diverting a portion of the upper basin's flow for Seattle's drinking water, re-routing the outlet to Puget Sound through Lake Washington and a shipping channel, and alteration of the salmonid community by introduction of non-local sockeye salmon. A fish ladder at the water diversion dam became operational in 2003, providing passage for native salmonids to the upper river with the intent of restoring anadromous fish productivity. Anadromous O. mykiss (steelhead) in Puget Sound were ESA-listed as threatened in 2007. Due to the decline of steelhead, resource management agencies have collected an extensive amount of data for Cedar River anadromous and resident O. mykiss. With this large dataset, unique for Puget Sound, we examine the response of O. mykiss ecotypes to environmental changes and different fishery management regimes. We analyze O. mykiss population abundance and structure using a time series of steelhead escapements, estimates of resident trout population sizes above and below the dam, migration behavior from smolt trapping and PIT tag detection, and genetic characteristics of both ecotypes.

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Title
Can the otolith microchemical fingerprint distinguish naturally-spawned and hatchery-reared mid-upper Columbia River Chinook salmon?: Validation of a de-facto 'hatchery mark'.

Abstract
Columbia River Chinook salmon populations have declined dramatically. The presence of large numbers of hatchery fish make it difficult to quantify or to determine causative mechanisms for these declines. There may be differences in migration patterns, freshwater and marine growth, and overall survival between the two groups. Investigating differences between groups depends on the ability to determine group membership for each individual. Previous observations of an anomalous increase in the ratio of otolith strontium (Sr) to calcium (Ca) in mid-upper Columbia River Chinook salmon led to this study testing the hypothesis that increased Sr/Ca prior to freshwater exit was a de-facto 'hatchery mark' distinguishing hatchery fish from naturally-spawned fish using juvenile mid-upper Columbia River Chinook salmon. Otoliths of 15 pre-release fish from Tucannon and Chiwawa hatcheries (2008) and 39 coded-wire tagged (CWT) mid-upper Columbia River spring Chinook collected in coastal waters (1999, 2003, 2004, 2006) were analyzed. CWT Chinook were genetically identified using the Genetic Analysis of Pacific Salmon baseline. Otolith microchemical (Sr/Ca concentrations) and microstructural analyses were used to test this hypothesis. Sr/Ca increased = 20% in 90.6% of the otoliths and = 10% in 96.2%. An otolith Sr/Ca increase of = 10% is considered a positive 'hatchery mark'. Increased otolith Sr/Ca may be caused by medicated feed; data on treatment size and time are being compiled. Naturally-spawned and hatchery mid-upper Columbia River Chinook salmon juveniles can be distinguished based on differences in the otolith microchemistry. The 'hatchery mark' described here was present in 100% of pre-release hatchery juveniles and 94.9% of post-release CWT juveniles examined. The ability to distinguish between hatchery-reared and naturally-spawned individuals will enable researchers to quantify the proportion of naturally-reared fish and investigate differential responses to biotic and abiotic factors.

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Title
Seasonal and interannual variability in the structure of small demersal fish assemblages along the central Oregon coast

Abstract
Small demersal fishes were collected off Central Oregon using a commercial shrimp trawl with a 6.4-mm liner. Samples were collected bimonthly in 1989 along three transects and in March of 1989-1994 along a single transect. Depths ranged from 50-400m. We examined community structure using a variety of multivariate techniques, including multi-response permutation procedure (MRPP), hierarchical cluster analysis, ordination, and indicator species analysis (ISA). Forty-three species occurred in >5% of samples. MRPP analysis indicated that species assemblages were structured primarily by depth and season, and weakly by interannual variations, but there were no differences among transects. Five depth-related assemblages were identified based on cluster analysis. Flatfish species comprised 38% of the shallowest assemblage, 45% of a mid-depth group, and 0-12% of the three deepest groups. Two of the deeper assemblages were dominated by bottom-associated rockfishes, sablefish, eelpouts, and hagfish; a third was dominated by mesopelagic species. Seasonally, there was an inshore movement of most species during summer months and an offshore movement during winter, as indicated by ISA. However, since many species moved together, there was a relatively small impact of season on community structure. The seasonal pattern reflects a combination of ontogenetic movements of recently-settled juveniles from the outer shelf and slope to inshore nursery areas and seasonal movements of individuals of the same size and age. March community structure was similar between years, in spite of environmental conditions ranging from the cold La Niña of 1989 to the warm El Niño of 1992, and no environmental correlations explained the annual variation in community structure. Average abundance and species diversity were highest in March 1990 and lowest in March 1994 and 1991. The main difference among years was the relative proportion of smelt species.

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Title
Collaborative and community art projects

Abstract
Over the last couple of decades Ray Troll has collaborated with other artists in creating large community artworks, many of them fish-centric in nature. Ray will show examples of this work including large murals created for NOAA labs on the west coast, illustrated mobile classrooms for Alaska's Fish and Game Sport Fish Division, jelly murals for the Monterey Bay Aquarium and mega-fossil murals for the Denver Museum of Nature & Science. Ray will discuss the blending of artistic and cross cultural styles when creating works with others and how to gain community support when planning large public art projects.

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Title
Vicious fishes of the Amazon

Abstract
If you're interested in weird fish all roads eventually lead to the Amazon, the world's largest river system and home to well over three thousand species of freshwater fish. The numbers are staggering yet immensely inspirational to artists and scientists alike.
Ray Troll will share artworks he has created after three trips to the Brazilian Amazon including large murals, countless drawings and museum inter-actives created for the Miami Museum of Science's traveling museum show called Amazon Voyage. Ray's interest in South American fishes began when he visited the fish collection at Oregon State University and met Paulo Petry. Paulo got Ray's attention with tales of the dreaded Candiru catfish and the rest is history.

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Title
Fish worship and the art of Ray Troll or How I became a Scientific Surrealist

Abstract
Alaskan artist Ray Troll will share the twists and turns of his unique fish inspired career. Ray moved to the Northwest in the late 1970's and eventually on to Alaska in the early 80's with a couple of art degrees in his back pocket and a life long interest in natural history. He settled in the rain-swept, coastal town of Ketchikan and began producing offbeat fish-filled T-shirts that soon gained him an audience with cannery workers, anglers, commercial fishers and scientists. His art has toured in exhibitions at major museums across the United States. He has co-authored and illustrated 7 books. The latest is "Cruisin' the Fossil Freeway", a fact and fun filled romp through the American west with paleontologist Kirk Johnson. Ray also wrote and illustrated a unique alphabetical children's book of living and prehistoric sharks called "Sharkabet". "Rapture of the Deep" is a career overview of Ray's work with an introduction by Brad Matsen. Ray acted as the art director for the Miami Museum of Science's major traveling exhibit "Amazon Voyage: Vicious Fishes and Other Riches" currently on tour across the country. He is also an avid garage band "a-fish-ianado" and has just released a CD of original "sub-aqua-punk-bush-rock" music called 'Where the Fins Meet the Frets'. You can find out more about Ray by visiting his website at http://www.trollart.com/

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Title
The Roles of Lake Hydrodynamics and Fish Stocking on Water Quality in Odell Lake, Oregon

Abstract
The physical and biological attributes of Odell Lake, a sub-alpine 84 m-deep lake in the Oregon Cascades, were investigated in an effort to elucidate the range of factors contributing to intense blooms of the cyanobacterium, Anabaena, sp. The lake historically had high transparency (~14 m) and supported native populations of bull trout

(Salvelinus confluentus), rainbow trout (Oncorhynchus mykiss), and mountain whitefish (Prosopium williamsoni). The lake has been stocked with a variety of fish beginning around 1910 and now supports introduced populations of kokanee (Oncorhynchus nerka), lake trout (Salvelinus namaychus), and tui chub. Kokanee are currently the most abundant fish and during the summer occupy much of the thermocline. Thermister arrays were used to measure the wind-induced seiche, with results indicating an amplitude of 10 m and a frequency of 12 hr. The hydrodynamic model, CE-QUAL-W2, was implemented to simulate the hydrodynamics, as well as lake water quality, including zooplankton and algae. Model calibration was developed based upon data collected during the summer of 2004. We hypothesize that much of the increased primary production in Odell Lake can be explained by the nutrient recycling associated with the introduced kokanee population. In an effort to quantitatively test this hypothesis, the model was expanded to include a fisheries subroutine that reproduced the diel vertical movements of the 3 dominant fish species, allowed for predation of the zooplankton, and included internal cycling of nitrogen and phosphorus. Modeling results are consistent with the hypothesis that the introduced fishery plays a significant role in current lake water quality.

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Title
Identifying canary rockfish (Sebastes pinniger) habitat off Washington and Oregon from environmental data and trawl logbooks.

Abstract
The aim of this study is to characterize canary rockfish (Sebastes pinniger) habitat along the Washington and Oregon Coasts by analyzing the relationships between canary rockfish spatial distribution and various biological and environmental factors. This analysis combines data from three sources. The Alaska Fisheries Science Center's triennial bottom trawl surveys (1986 to 2001) provided data on canary rockfish densities relative to location, bottom depth, bottom water temperature, and the presence/absence of various groundfish and invertebrate species. The Active Tectonics and Seafloor Mapping Laboratory at Oregon State University provided slope and bathymetry roughness information, along with data on substrate type for each survey tow, obtained from the Interim Seafloor Lithology Maps for Oregon and Washington. Data on the proximity of each survey tow to apparent 'hotspots' having high canary rockfish catch were developed from an analysis of trawl logbook data from 1995 to 2001 (prior to the establishment of the Rockfish Conservation Area). Our research objective is to use available habitat variables and trawl logbook data to develop a statistical model that will predict areas where canary rockfish are likely to be found. The model can also be used to make ecological inferences. The statistical analysis will be conducted using a non-parametric regression technique, namely the generalized additive model (GAM), which is well suited to derive nonlinear species-environment interactions. If the resulting model is sufficiently accurate, it can be used to produce better and more efficient groundfish assessment surveys by concentrating the sampling in areas of high canary rockfish abundance, reducing both the amount of time and the resources needed to perform the survey. In addition, by studying the relationships between species and their environment, we can address the effect of environmental variability on habitat quality and species distribution.

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Title
Capabilities of the Cable Machine for Stream Restoration

Abstract
Cable and pulley systems offer a variety of applications for stream habitat restoration, including tree pulling, log placement, boulder placement/repositioning and gravel augmentation. Cable methods eliminate the need for equipment in the stream channel, can be used where access is problematic, and have higher weight capacities than other methods. A knowledge of the cable machines capabilities and limitations can enable project designers to incorporate these techniques into their restoration plans.

An understanding of selection criteria for tree-pulling is essential for efficient project design. When selecting candidates for tree pulling, proximity to adjacent trees and obsticles must be considered. Defects in the chosen tree may affect uprooting potential, topography of streambanks also play a key role in tree selection. Species and soil conditions are also determinants of pullability; root soaking or explosivies may be used in some cases to soften the soil.

Trucked in logs can also be placed with the cable method with a maximum effective range of about 1000'. Species differences in longevity should be considered when selecting logs for placement. Boulder repositioning capabilities of the cable machine is up to 20 cubic yards. boulders up to 2 cubic yards can be trucked in and placed with full or partial

suspension.

Gravel augmentation is a relatively new use for the cable machine. Cable system delivery allows cost-effective, remote(up to 1500') delivery of spawnable-sized aggregate in unlimited quantities. A clear line of sight between stockpile and delivery sites and adequate anchoring points are the main requirments for this technique.

The cable machine's great flexability can make many difficult projects feasible.

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Title

Effects of prescribed fire in riparian areas of Southwest Oregon mixed-conifer forests on riparian function and biological integrity.

Abstract

Past studies in Southwest Oregon have suggested that many riparian areas of mixed-conifer forest historically burned with similar frequencies and intensities as associated upland areas did, and that fire played an important role in maintaining these areas. However, extensive fuels treatments implemented by the local BLM have not been incorporating riparian areas, due to the perception that these areas are sensitive to any type of anthropogenic disturbance. Land managers lack needed data to support decisions regarding whether or not to include riparian areas in landscape treatment projects. Our study implemented thin/pile burn and broadcast burn treatments in riparian areas of intermittent and perennial stream basins, paired with control sites that were treated only in the upland, as is the typical prescription. The health of these areas before and after treatments was quantified using standardized techniques to examine a number of indicators including: riparian vegetation, hydrological parameters, and avian communities. We present results that determine the effectiveness of the project in reducing the threat of wildfire across the landscape and the effect on riparian functions and integrity. Results of this study will offer guidance to land managers in implementing riparian fuels prescriptions in southwest Oregon.

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Title

Using Visual Implant Elastomer tags to track movements of fall Chinook juveniles in Coos Bay, Oregon.

Abstract

There are multiple hatchery fall Chinook release sites within the Coos Bay basin that are operated by the Oregon Department of Fish and Wildlife (ODFW) and several volunteer groups working under the Salmon Trout Enhancement Program (STEP). The Coos Fall Chinook Monitoring and Evaluation (M&E) Plan was developed because there is limited information about hatchery/wild interactions of these fish. Part of the M&E Plan is to use ODFW estuary seining data to help evaluate the effects hatchery releases have on wild juveniles. ODFW has 30 years of estuary seining data but little is known about resident timing and movements of juvenile fall Chinook in the bay. During the 2008 estuary seining season we used Visual Implant Elastomer (VIE) tags to help evaluate juvenile fall Chinook use of Coos Bay. In this talk I will outline my study design and discuss the challenges and results of using VIE tags to monitor juvenile fall Chinook movements.

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Title

Marine Climate Indicators and Salmon Stock Forecasts

Abstract

Numerous studies have linked various long-term climate indices (regional upwelling, local sea surface temperature, date

of the spring transition, El Niño/Southern Oscillation indices, Pacific Decadal Oscillation) with salmon marine survival or stock abundance. More recent work has focused on a number of biological indicators of ecosystem status (plankton production, copepod community structure, and abundance estimates for juvenile salmon, forage fishes, and predaceous fishes). However, it has been shown that the predictive skill of individual indicators varies over time, so that what might appear to be a good predictor now will generally fail in a few years. We may be able to improve this situation by (1) using multiple indicators and (2) considering their functional relationship to fish growth and survival. In this talk, I explore a fuzzy-logic approach to multi-indicator stock forecasts for coho salmon, and compare it to existing forecast methods.

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Title

Implications of individual pesticides and accumulating low-level mixtures on aquatic resources in the Pacific Northwest

Abstract

Pesticides are an important management tool for controlling invasive/nuisance species. Recent studies in the Pacific Northwest have documented low-level accumulations of pesticides from the urban and urban-rural interface in streams that provide source drinking water and fish habitat. Individual pesticides can have adverse effects on salmonids and residential fish species. Effects of low concentration mixtures of pesticides that accumulate in aquatic environments are not well known. Emerging research suggests that low levels of pesticides, accumulating as mixtures in the environment can affect the physiology and migration of anadromous species. This issue is becoming an increasing problem for already declining populations of various fish species. Information on adverse affects is limited due to lack of research and complexity of combinations of pesticides. This symposium is organized and facilitated by senior status undergraduate fisheries and wildlife students as part of an “Integrated Group Problem Solving” class at Oregon State University. Speakers are experts in the field who will discuss: 1) uses, sources and accumulation of pesticides in streams, 2) ecotoxicology and what is currently known and not known about the effects of pesticides on salmonids and other species, 3) Regulation and monitoring of pesticide use, 4) management implications, tradeoffs, options and outreach. This symposium is intended to increase awareness of managers and researchers to potential adverse effects from accumulation of pesticides in streams and provide a forum for discussing options that can lead to solutions.

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Title

Oxygen Supplementation at a Coastal Hatchery

Abstract

Gnat Creek Hatchery located 25 miles east of Astoria, Oregon is an integral part of the Select Area Fisheries Enhancement Project. The facility was designed to rear up to 1.2 million steelhead but since 1998 has also been rearing spring Chinook, which are transferred in late fall to floating net pens. Clatsop County Fisheries assumes responsibility for feeding and release from the net pens. Gnat Creek provides high quality water that is primarily spring fed but is subject to low flows and elevated temperatures in the summer. The Columbia River estuary begins to cool in October and appropriate temperatures for pen rearing arn't achieved until November. Due to the flow and temperature regimes pre-smolts have to been transferred to the net pens before optimum conditions resulting in epizootics resulting in repeated treatments. This is costly and ultimately SARs are reduced as fish health is compromised.

Gnat Creek staff installed a Low Head Oxygen unit in one raceway, supplied with 97% pure oxygen. O2 was provided at 5 lpm from a liquid O2 system funded by Clatsop County Fisheries in 2006. Fish health was excellent with loading densities increased by 25%. The encouraging results prompted a request to Oregon Restoration and Enhancement Board for funding to install an O2 supplementation system on all 15 raceways. That grant for $103,000 was approved

and implementation began in 2007. Pre-smolts are now held at the hatchery until November when the estuary has cooled. In addition, production increases in 2008 and 2009 have now increased the healthy animals produced from 850,000 to 1,000,000. O2 supplementation has been used in many trout hatcheries and has been shown to reduce diseases as well as material and suspended solids in rearing raceways by 17%.

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Title
Indexing Northern Pikeminnow Predation 1990-2008

Abstract
We used indices of abundance and consumption to describe trends of predation on juvenile salmonids by northern pikeminnow in the lower Columbia and Snake rivers from 1990-2008. Our evaluation utilizes catch, stomach content, and growth information collected from standardized sites to describe trends related to the Northern Pikeminnow Management Program. Since initiation of the program, abundance and consumption indices have trended downward, describing an overall reduction in relative predation. Exploitation levels of northern pikeminnow have reduced predation on juvenile salmonids by 25-50%. Continued evaluation is needed to identify additional program trends and describe compensatory responses from this native cyprinid.

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Title
Predicting consumption rates of juvenile O. mykiss using abundance of drifting invertebrates

Abstract
Criteria used to characterize lotic salmonid habitat suitability are often based on observed correlations between physical habitat characteristics and salmonid abundances. A focus on physical habitat features ignores components, such as an adequate supply of food that set the physiological limitations on salmonid growth and survival. In this study, we developed a habitat suitability assessment approach that focuses on how invertebrate food availability interacts with stream temperatures to determine salmonid growth. We measured the abundances of benthic and drifting invertebrates, stream temperatures, and juvenile steelhead trout (Onchorhynchus mykiss gairdneri) summer growth rates and abundances within 10 distinct stream segments in central Oregon. Stream temperatures and growth rates were used as inputs for bioenergetics model simulations to produce estimates of O.mykiss summer consumption rates. Measures of invertebrates providing the best description of food availability were chosen based on their ability to explain observed variation in salmonid consumption. Much of the variation in O.mykiss consumption estimates was explained by measurements of total drift biomass along a type II predator response curve. A random effects analysis of variance was used to partition variation in invertebrate abundances across spatial and temporal scales. Quantification of variation at multiple scales allowed identification of a relevant spatial scale at which to assess macroinvertebrates relevant to salmonid populations, and compare the precision associated with measures of benthic and drifting invertebrate abundances. Results suggested that spatial variation in drifting and benthic invertebrate abundances are greatest at the scale of streams. Total drift biomass and total benthic biomass were more precise at the stream and stream reach scale than drift and benthic density. The information provided by this study will be used to guide the development of sampling approaches that describe invertebrates in a manner more directly related to salmonid production.

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Title
Oregon Hydrologic Landscape Regions

Abstract
Individuals who spend time working with streams intuitively come to understand that stream hydrologic and ecological characteristics are related to the attributes of the watersheds in which they occur. This is easy to see in Oregon with its large climatic and geologic variations throughout the state. Resource managers are constantly seeking tools by which they can bound the hydrologic and ecological expectations of streams within a given watershed or landscape. We used principles of Winter (2001) and Wolock et al. (2004) to create and map Oregon hydrologic landscape regions (HLRs). Four layers of GIS data were employed to define the HLRs: 1) climate, 2) terrain, 3) soil permeability, and 4) bedrock hydraulic conductivity. Occurrence of snowpack and melt explicitly are included as components of the climatic data. We believe the HLRs will provide a good broad-scale representation of the variability of stream hydrology in Oregon and may prove useful to managers as they plan restoration or other management activities.

Winter, T.C. 2001. The concept of hydrologic landscapes. Journal of the American Water Resources Association 37:335-349.

Wolock, D.M., T.C. Winter, and G. McMahon. 2004. Delineation and evaluation of hydrologic-landscape regions in the United States using geographic information system tools and multivariate statistical analyses. Environmental Management 34 (Suppl 1):S71-S88.

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Title
Historical population structure of coho salmon in the Southern Oregon/Northern California Coasts Evolutionarily Significant Unit

Abstract
For salmon recovery planning, an understanding of historical population structure of populations within an Evolutionarily Significant Unit (ESU) is a prerequisite to developing appropriate biological viability criteria. Here we describe the historical population structure of Southern Oregon/Northern California Coho Salmon. Potential types of information considered included historical distribution, geographic isolation, dispersal rates, genetic data, life-history information, population dynamics, and environmental and ecological diversity. Because of data constraints, our analysis was based primarily on a simple conceptual model of spatially dependent demographics of populations considered to be historically present. Populations were evaluated in terms of the likelihood of sustaining themselves over a 100-year time period and demographic independence from adjacent populations, yielding an estimate of their viability-in-isolation. Populations were characterized as Functionally or Potentially independent, Dependent, or Ephemeral. In general, the historical population structure of coho salmon in the SONCC ESU was characterized by small-to-moderate-sized coastal basins where high quality habitat was in the lower portions of the basin and by three large basins where high quality habitat was located in the lower portions, middle portions of the basins provided little habitat, and the largest amount of habitat was located in the upper portions of the sub-basins. Nineteen populations that were determined to have minimal demographic influence from adjacent populations and were viable-in-isolation were classified as Functionally Independent populations. Twelve populations were classified as Potentially Independent populations, 17 populations were classified as Dependent, and two populations, Hubbard and Euchre creeks, were determined to be Ephemeral. Independent and dependent populations of coho salmon in the SONCC ESU were placed into diversity strata largely based on the geographical arrangement of the populations and basin-scale environmental and ecological characteristics.

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Title
Framework for assessing viability of threatended coho salmon in the Southern Oregon/Northern California Coast Evolutionarily Significant Unit

Abstract
The main purpose of technical recovery planning for Pacific salmon is to produce biologically based viability criteria for listed Evolutionarily Significant Units (ESUs) that will be considered in setting recovery goals. Here we develop a framework and provide guidance on the types of population and ESU performance measures (e.g., VSP characteristics of abundance, productivity, spatial structure, and diversity) needed to assess the viability of the Southern Oregon/Northern California Coast Coho Salmon ESU. We employ criteria representing three levels of biological organization: populations, diversity strata, and the ESU as a whole. A viable ESU comprises sets of viable populations that, by virtue of their size and spatial arrangement, result in a high probability of persistence over the long term. Evaluation of population extinction risk is based on the use of five surrogate criteria related to effective population size per generation, population decline, catastrophic decline, spawner density, and influence of hatchery fish. In addition, a rigorous, model-based population viability analysis (PVA) can be used to provide additional insight into extinction risk if appropriate data are available. In our proposed scenario for a viable ESU, we do not list specific sets of populations that must be viable to have a viable ESU. Instead, we provide a set of rules that will result in certain configurations of populations that we believe will result in a viable ESU. The rules we propose are intended to capture our objectives of maintaining diversity throughout the ESU, providing connectivity among populations to maintain long-term demographic and genetic processes, and providing a buffer against potential catastrophic risks. Our overarching goal in developing these rules is that we desire an appropriate number and arrangement of populations that allows for the populations to track changes in environmental conditions and therefore be viable.

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Title
Preoccupied with occupancy: Monitoring bull trout for recovery

Abstract
The USFWS is responsible for evaluating status of, distribution of, and threats to threatened bull trout. As part of that responsibility, the USFWS established a multi-agency technical team, the Bull Trout Recovery Monitoring and Evaluation Group (RMEG), charged with helping to direct and prioritize future monitoring efforts. Guidance from the group is aimed at assessing progress toward meeting recovery objectives concerning abundance, distribution, and connectivity. Here, I focus on efforts to assess changes in occupancy of local populations ("patches") within bull trout core areas. Imperfect detection using any method of sampling for occupancy requires use of models accounting for imperfect detection and false negatives, such as GENPRES. Challenges in designing appropriate sampling include logistical constraints, estimating detection probability, simulating changes in occupancy realistically, and accounting for deviation from model assumptions. Some results using information from the Lewis River (Washington) core area to investigate different sampling strategies are presented.

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Title
Ultraviolet Disinfection at Leaburg Hatchery

Abstract
Leaburg Hatchery is located along the McKenzie River in the Willamette Basin, rearing 700,000 legal sized rainbow trout (Oncorhynchus mykiss) for stocking throughout the northwest region of Oregon. Since the first major outbreak of infectious hematopoietic necrosis virus (IHNV) in 2002, Leaburg only hatches approximately 100,000 sentinel fish annually while all production fish are started at other facilities. Historically, a large percentage of trout hatched on site developed internal fungus and bacterial coldwater disease during the fry stage, leading to excessive mortality and making the fish more susceptible to IHNV infection.

In 2007 an integrated filtration system comprised of a drum filter and ultraviolet lamps was installed in the hatch house to treat incoming water, resulting in significantly decreased fry mortality. Regular testing of filtered water has indicated an absence of pathogens in treated water. Additionally, this new source of clean water affords the ability to conduct a variety of studies such as captive rearing bull trout (Salvelinus confluentus) and accelerating rainbow trout growth through water temperature manipulation.

Early rearing on pathogen free water is meant to minimize stress and exposure times to IHNV before fish are transferred into untreated McKenzie River water, giving our trout the best possible chance for survival. Ultimately, a whole hatchery ultraviolet disinfection system is needed to supply water throughout the entire hatchery rearing cycle.

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Title
Responses of fish to low-head dams and water withdrawals in an aridland river

Abstract
Water obstructions and low head dams are ubiquitous features of watershed landscapes that have important impacts on river hydrographs and the physical features of river ecosystems. A growing literature indicates that these impacts have important consequences for aquatic macroinvertebrates; however, relatively little work has examined fish responses to these disturbances at the stream reach scale. Here we examined the impact of a series of low-head dams, some which withdrew surface water and some which did not, on the fish community of an agriculturally impacted river in eastern Oregon. Despite withdrawals of greater than 90%, taxa richness, diversity, and total fish abundance did not appear to respond to either water withdrawals or to low-head dams as potential passage barriers. Of fourteen individual taxa found in the study area only sculpin spp. and redside shiners showed consistent patterns in response to water withdrawals and/or low-head dams. Low-head dams appeared to be passage barriers to sculpin spp. as their distribution was, generally, linearly related to the number of dams and was greatest above all low-head dams. Redside shiner abundance increased in a zone that experienced high levels of withdrawal with no corresponding increase in water temperatures. This response appeared to be the result of increased recruitment of age 0 fish in this zone. The overall lack of strong responses to water withdrawals and low-head dams in this system most likely reflects a fish community composed of resistant taxa that have adjusted to a century of water withdrawals as well as a variety of other anthropogenic stresses. This lack of a response may occur in river systems in which water withdrawals and low-head dams are just one of many anthropogenic stresses to which riverine communities have adjusted.

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Title
Variations in juvenile migration timing for local populations of spring Chinook salmon from the Grande Ronde River, Oregon

Abstract
Understanding life history strategy is essential to implementing sound recovery strategies for threatened species. For salmon, life history can describe the timing and degree to which individuals of the same population occupy different habitats during freshwater rearing. From 1994 to 2007, we studied tributary and mainstem migration timing of four populations of Chinook salmon in the Grande Ronde River Subbasin. We captured migrating fish with screw traps, and rearing juveniles with snorkeling methods. Fish were PIT tagged and subsequently detected at Lower Granite Dam, the first downstream dam on the Snake River. We observed a bimodal annual migration from each population where juveniles leave spawning tributaries in fall (September-November) and winter in downstream habitats, or remain within the spawning tributary and migrate seaward in spring (March-April). The relative proportions of these two strategies vary between populations, and we estimate that between 22% and 78% of juveniles in the Grande Ronde River winter outside their respective spawning tributary. Migration timing in fall and spring from spawning tributaries varied little among populations. We found that juveniles wintering within the spawning tributary arrived later at Lower Granite dam in the spring than those wintering in downstream habitats, although migration timing among tributary origin was similar. Fall and spring migrants migrated through Lower Granite Lake on the rising hydrograph and before water temperatures exceeded acceptable limits for salmonids. Although migration strategy may not provide differential benefit in the Snake River we conclude that individuals, and in some cases the majority, of local populations disperse during the freshwater rearing cycle and occupy habitats outside spawning tributaries. While tributary restoration continues to be an important strategy, our data suggests that evaluating rearing opportunity in higher-order reaches may benefit significant portions of a local population.

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Title

Upper Willamette Bull Trout Trilogy Part III: If we build it, will they come? Gravel augmentation for bull trout in the Middle Fork Willamette River, Oregon.

Abstract

By the early 1990's, bull trout were considered probably extirpated from the Middle Fork Willamette River, Oregon. After a five year search failed to find bull trout residing upstream from Hills Creek Dam, the Upper Willamette Bull Trout Working Group developed a re-introduction plan for the upper basin. This plan was reviewed during the 1996 Annual Meeting of the Salvelinus confluentus Curiosity Society, where group consensus was to support the re-introduction proposal. Over the next 10 years, over 10,000 bull trout fry were transferred from the McKenzie Basin to cold springs in the upper Middle Fork Willamette River. Although these springs contained adequate juvenile rearing habitat, the quantity and quality of spawning substrate was largely poor. On August 23, 2005, approximately 58 cubic yards (33 cy in Iko Springs and 25 cy in Chuckle Springs) of sorted spawning gravels were deposited into two bull trout release-site springs by helicopter. Gravels were washed, round rock of which 80% was 1½ inches and 20% was ½ - ¾ inches in diameter. Spawning surveys began in Iko and Chuckle springs in 2001, and in 2006 the first four redds counted were observed in the deposited gravel in Iko and Chuckle springs. Redd counts in these two springs have increased from 2 redds in 2006 to 9 redds in 2008. Sixty seven percent of the redds observed in these springs have been constructed in deposited gravels. Additional redds have been counted in Indigo Springs (another release site); in the water exiting Indigo Springs and in the mainstem Middle Fork Willamette. Restoration of bull trout in the upper Willamette River is moving out of infancy and more projects are planned or are underway to increase key habitat components, fish passage, fish abundance, and genetic diversity.