These 31 symposia will be presented from Monday morning through the end of Wednesday. All symposia and contributed papers sessions will be in the DoubleTree. Please check the Program Page (Abstract Scheduling Update) on the Annual Meeting website: http://www.orafs.org/meeting2008/ Annual2008.htm for updates.

Please refer to the PDF file for scheduling information for your symposium and abstract(s). Symposia, contributed papers sessions, and oral presentations will be assigned a data, room, and time in March. Once assigned, the date and room are unlikely to change but times may be adjusted due to abstract withdrawals prior to the production of the final Program Guide. Be sure to check the website for updates. The schedule will be finalized in early-April.

1. Klamath Basin: What Next?

Organizers: Cindy Williams and Rip Shively

This symposium will present information on management objects and next steps following the FERC Settlement, Reclamation's ESA consultation with NMFS & FWS on listed coho salmon, Lost River and shortnose suckers, current status of what we know and don't know in the Basin, & Restoration Activities. The symposium will focus on new material learned, and geared towards recovery and future direction. Questions we hope to answer with the presentations and panel discussion: What should recovery look like? and, What planning elements are necessary for recovery?

2. Meeting the Aquatic Invasive Species Challenge

Organizer: Scott Smith

This symposium will address aquatic invasive species (AIS) research and management. The symposium objectives are to educate attendees on the latest research and management actions that are being implemented to address the growing impact of AIS in the west. AFS members and participants are often forced to deal with the impact of AIS. They will benefit from hearing from researchers and managers that are developing new solutions to minimize the economic and environmental impacts caused by AIS.

3. Overview of the Army Corps of Engineers' Columbia River Mitigation Program

Organizers: Mike Langeslay, Marvin Shutters, and Paul Ocker

This symposium provides an opportunity for Western Division AFS members to learn more about the Corps' strategy to improve salmon and steelhead survival in the Snake and Columbia rivers. Project managers and researchers will describe the Corps' Columbia River Fish Mitigation Program (CRFM) by presenting examples of on-the-ground improvements and the applied research that supports decisions on these improvements. Major elements of the CRFM that will be described include juvenile and adult fish passage at dams, juvenile fish transportation, predation, and estuarine habitat.

4. Hatchery Research: Hatchery Reform

Organizers: Judith Gordon and David Noakes

Fish hatcheries have been operated in the Pacific Northwest for 130 years for a variety of purposes, including production of fishes for harvest, mitigation for the impacts of hydropower dams, and conservation and restoration of native fishes. It is becoming increasingly clear that fish hatcheries can have effects and consequences well beyond their initial designs. The concerns about hatcheries are well known and widely recognized. A growing body of scientific information is directed towards these concerns about hatchery design and operation.

Judy Gordon and Don Campton organized a Symposium at the 2007 Annual Meeting of the AFS in San Francisco, "Hatchery Reform: A Paradigm Shift in Action". This proposal builds on the success of that Symposium, focuses specifically on the Pacific Northwest, and adds the potential publication of the proceedings from this Symposium as an AFS Special Publication. This Symposium will provide examples of how best scientific information is being developed and applied to hatchery design and operation. It will also document how hatchery managers, research scientists and resource managers are collaborating to deal with risks and problems associated with hatcheries. We propose that this is part of an important philosophical shift to incorporate hatcheries as an important component in adaptive management for sustainable conservation and management. This is particularly relevant to the Western Division of the AFS in general, and Oregon specifically, because of the large number of hatcheries in this area, the high profile they have in public debates on this topic, and the important role that hatchery research has in any reform of hatchery design and operation.

5. Population Growth, Climate Change, and Fish Habitat in the Columbia River Basin

Organizers: Susan Hanna, Erik Merrill, and Steve Waste

The Columbia River Basin hosts a wide variety of actions to recover and protect habitat of anadromous and resident fish. Many take place under the aegis of the Northwest Power and Conservation Council's Fish and Wildlife Program. The operating hypothesis of these actions is that protection and restoration of habitat will result in increased habitat capacity and productivity leading to increased fish abundance. The operating assumption underlying the hypothesis is that human population and climate are stable, enabling long-term planning for known habitat conditions. However, it is clear that population and climate are not stable but instead are large-scale drivers of change. Population increases throughout the Basin are projected to continue, accompanied by increasing water demand. At the same time climate effects will alter the timing and quantity of water delivery.

The objective of this symposium is to present an overview and synthesis of how changes in population and climate are affecting and will continue to affect the availability and quality of fish habitat in the Columbia River Basin. The session will be based on three recent reports produced by science advisory boards of the Northwest Power and Conservation Council and will begin with an overview of the findings of each report. These overview presentations will be followed by a series of more specific presentations on population growth, climate change and their implication for habitat and habitat protection strategies. The symposium will close with a panel discussion synthesizing the main points of the papers and drawing implications for research, monitoring and evaluation of fish habitat protection in an environment of change. The value of the symposium to meeting participants will lie in a synthesized perspective on two major forces of change affecting the Columbia River Basin, and the implications of that change for strategies to protect fish habitat.

6. Honoring the Treaties in the 21st Century: Columbia River Tribal Perspectives and restoration Programs

Organizers: Peter Galbreath, William Bosch, Jens Lovtang, and Neil Ward

The salmon's spirit – *Wy-Kan-Ush-Mi Wa-Kish-Wit* – is sacred life. The salmon was provided a perfect world in which to enjoy its existence, and for thousands of years, the salmon unselfishly gave of itself for the physical and spiritual sustenance of humans. The salmon's spirit has not changed; the human spirit has, and this change has lead to dramatic reductions in the geographic and numerical abundance of salmon. The Native American tribes throughout the Columbia River basin, who are keepers of ancient truths and laws of nature, employ the depths of their hearts and the expanse of their minds to save the salmon. This symposium will discuss the challenges and efforts of the various tribes of the Columbia basin to restore salmon (and other Columbia basin fishes) to a semblance of their previous grandeur. For the four CRITFC treaty tribes, this is expressed in their salmon restoration plan, *Wy-Kan-Ush-Mi Wa-Kish-Wit*. AFS members and symposium participants will be offered an opportunity to better understand Columbia River fishery management issues from a tribal perspective, as well as an opportunity to hear about several innovative and successful fishery and habitat restoration efforts (including reintroduction of extirpated populations) being implemented by the tribes. Presentations within this symposium will be subdivided into the following sessions: Plenary Talks, Anadromous Fishery Restoration - Rebuilding Depressed Populations, Anadromous Fishery Restoration - Reintroducing Extirpated Populations, Resident Freshwater Fish (and Mussels) Restoration, and Habitat Restoration.

7. American Shad in the Columbia and Snake Rivers

Organizers: Christopher Caudill and Michael Parsley

American shad are the most common anadromous fish in the Columbia-Snake River basin, yet relatively little is known about their life history, behavior, ecological interactions, or ecosystem effects. This symposium will provide a forum for the presentation of recent research results on shad biology in the basin including behavior, life history, trophic interactions, commercial and recreational fisheries, disease biology, and potential direct and indirect effects on salmonid fishes. The symposium will begin with an overview of the history and status of the species in the basin and conclude with an overview and panel discussion of current uncertainties and potential future research/management paths.

8. The People-centric Component of Fisheries Management

Organizer: Tony Faast

Collaborations, partnerships, teams, task forces, advisory committees are all attempts to initiate a "conservation conversation" with all parties who need to be involved in managing fishery resources these days. Going it alone is neither wise nor possible in this age of "partnering". This symposium looks at various components of involving the many and varied "publics" as we enlist their assistance and cooperation in managing fishery resources across the landscape.

9. Biological Assessment of Boatable Waters

Organizers: Alan Herlihy and Robert Hughes

The objective of this symposium is to bring together researchers who have been studying boatable river systems throughout the world to share findings and approaches for making biological assessments of these complex systems. Because of logistical difficulties in working with boatable rivers, they tend to be less studied than stream systems. The need for assessing rivers, however, is the same as for streams. The need is also timely in that the U.S. EPA plans to conduct a national probability survey of rivers next summer. In addition, most human population growth occurs in urban areas near large rivers, and that growth fundamentally alters these systems by altering their hydrology, morphology, water quality, and biota. Presentations in this symposium will focus on a wide range of topics related to river assessments including sampling methodology, within-river spatial variability, ecological relationships, and regional assessment results and approaches. This symposium should provide insight to any AFS members working on, or interested in, these boatable river systems.

10. Marine Mammal Predation on Fish in Pacific Coast Bays and Rivers

Organizer: Barry McPherson
This symposium will provide recent information about predation by marine mammals on fish in bays and rivers on the Pacific Coast. Predation by sea lions on salmon, steelhead, and sturgeon near the base of Bonneville Dam, 150 miles up the Columbia River, has become a "hot" issue that will be addressed by speakers in this session. There will also be speak ers presenting comparative and contrasting information on marine mammal predation on fish in other Pacific Coast rivers and estuaries, and the dependence of an Orca pod in Puget Sound on salmonid abundance. Approaches to reducing marine mammal predation in critical situations, particularly on salmonid populations that are at risk of extirpation, will be addressed. Some approaches involve new technologies that are still being tested. Status of the application by state fish and wildlife agencies for permission from the federal government to lethally remove California sea lions in the Columbia River below Bonneville Dam, and arguments against granting such permission, will be addressed.

11. A Western Challenge: Large-scale Disturbances Require large-scale Restoration Programs

Organizers: Dave Ward and Mark Fritsch
Over the past 200 years, stresses to the ecological processes in western North America have been increasing. Examples include human-caused depletion of water sources needed by fish and wildlife, and degradation or elimination of fish spawning and rearing habitat resulting from urban growth. These stresses have been noticed by scientists and by society in localized areas for some time, but the impacts are now evident throughout the west. All parts of the environment have been affected and now we need to seek a balance if ecological processes are to be maintained. This challenge has been experienced elsewhere as the land base has been occupied beyond the capacity of the environment to maintain the balance that had been taken for granted.

The magnitude of environmental stresses are further compounded by the complexity of the situation at hand, including continued population growth and increases in global average air and ocean temperatures. This situation is stressing not only the environment, but also the capacity of society, both politically and financially, to implement restoration approaches to ensure that trends are stabilized or even reversed. Challenges of implementing large-scale restoration programs exist at all levels from implementing actions on the ground to supporting actions through completion.

Four large-scale restoration programs from throughout the western U.S. will be highlighted in this session. These include the Upper Colorado River Endangered Fish Recovery Program, the Columbia Basin Fish and Wildlife Program, the Arctic-Yukon-Kuskokwim Sustainable Salmon Initiative, and a Sacramento River Delta program. These programs all involve multiple government and non-government partners, and are charged with balancing fish and wildlife restoration with continued resource utilization. The session will explore policies, case studies, and management/implementation challenges for each program. The session will conclude with a panel discussion facilitated by questions to promote the difficult issues being raised.

12. Strategies for Broad-scale Monitoring of Salmonid Populations

Organizers: Julie Firman and Kara Anlauf
Long-term, spatially extensive monitoring data have become increasingly important to describing the status and trends of salmonid populations. Monitoring water-dwelling organisms and their habitats brings its own unique set of challenges to bear. The goal of this symposium is to examine the challenges inherent in making accurate and precise estimates of status and sensitive measures of trends. Our aim is to gather representatives from agencies that conduct broad-scale monitoring, agencies and non-governmental organizations that compile data from multiple monitoring entities, and statisticians who are exploring new approaches to broad-scale monitoring. Presenters are encouraged to emphasize methods, i.e. to focus on the questions that they ask, the problems that they encounter in trying to answer those questions, and possible responses to those challenges. Description of specific the tools, techniques and designs would be particularly useful. Evidence that supports the choice of a particular method would also enrich our exploration of different approaches.

13. Getting Native Lampreys on the Management Radar

Organizers: Bianca Streif, Matthew Mesa, and Mary Moser
The organizers of this symposium hope to highlight recent research on native lampreys in the Pacific Northwest and use this symposium to generate discussion about lamprey management and conservation. Practical information about field identification of native lampreys of the west, proven methods to improve lamprey passage, opportunities for lamprey restoration, and conservation actions will be shared. Opportunities to include native lampreys in monitoring, restoration, and conservation plans are sometimes missed due to the lack of knowledge about basic identification, life history, and status of these important native fishes. In addition, the ecological and cultural value of lampreys is often overlooked. This symposium will serve to bring this information to a broad range of management agencies and will hopefully generate

discussion about ways to incorporate our native western lampreys into existing monitoring, restoration, conservation, and research programs.

14. Flow and Temperature Effects on Salmonid Production

Organizer: Ian Courter

This symposium will bring together recent information on the relationship between salmonid production and stream temperature and flow. The relationship between flow, temperature and salmonid production has been an ongoing debate in many of the Pacific Northwest's regulated river systems, and the correlation between temperature and flow has made delineation of independent effects problematic. Recent emphasis on flow manipulations and mitigation for temperature impacts on ESA listed salmonid populations has resulted in a considerable number of investigations that attempt to quantify the independent effects of temperature effects of temperature and flow on salmonids. Additionally, hydrodynamic modeling has revealed insight into the effects of flow changes on stream temperature regimes. The symposium will focus on salmonids and include both resident and anadromous populations. In addition to studies of the direct effects of flow and temperature on salmonids, presentations that emphasize flow and temperature effects on variables important to fish survival, such as disease or invertebrate production, are acceptable. The symposium will be of interest to a wide audience because of the surge in recent investigations to support ESA consultations, FERC relicensing processes and TMDL implementation.

15. Achieving Tangible Fisheries Benefits through Public Involvement: Volunteerism, Education, and Outreach

Organizers: Tom Friesen and Laura Tesler

Active public participation has become a vital component of many fisheries management activities, with volunteers making considerable donations of time, labor, and expertise. Managers in many areas have come to rely on volunteer assistance as the complexity and expense of fisheries issues have increased. Recognizing the value of public involvement, formal volunteer programs such as Canada's Salmon Enhancement Program and Oregon's Salmon and Trout Enhancement Program have been implemented, emphasizing fish culture, monitoring, education, and habitat improvement. Volunteers also staff watershed councils, boards, and advisory committees, providing direction to conservation efforts and feedback to government agencies. Natural partners of volunteer programs, public education and outreach serve to promote awareness, foster communication, and provide guidance and instruction relative to fisheries and aquatic ecology. Declining angling revenues throughout the U.S. in recent years has elevated the importance of public outreach efforts to fisheries agencies; many now have directed efforts to recruit new anglers and maintain public interest in aquatic resources and watershed health. This symposium will provide a forum for presenting examples of public involvement from the perspectives of fisheries biologists, watershed stewards, educators, and volunteers.

16. Fish Monitoring to Support Large-scale Management Decisions: What's Worked and What Hasn't

Organizers: Ken MacDonald and Charlie Paulsen

Monitoring of fish populations is done routinely to answer myriad questions, ranging from whether fish numbers are trending up or down, to establishing geographic ranges, or to assess the effects of habitat enhancement. In this symposium, we propose to examine large-scale monitoring efforts intended to inform management decisions regarding restoration actions to benefit freshwater fish. These decisions may cover habitat enhancement, hatchery management, and hydrosystem/irrigation passage. The fish monitoring will likely include population status and trends over time, survival rates of different life-stages, recruitment/reproductive performance, population range or extent, and the extent of invasive species influence. We take large-scale monitoring to include large lake or river basins and individual tributaries, so our focus will not include smaller reach-scale subpopulation assessments. Similarly, the temporal scale will include annual or seasonal estimates, but in most cases will not include finer-scale measurements of fish movement, habitat use, etc., although coarse-scale summary information based on finer-scale measurements will almost certainly play a role in management decisions (e.g., to determine effective means to improve survival at dams, road crossings, and irrigation diversions). We will place an emphasis on the application of monitoring information to real-world restoration and management decisions, as opposed to monitoring designed mainly to answer research questions. We realize that large-scale population monitoring is time consuming and expensive, and we are interested in learning about failures as well as successes. In addition to monitoring per se, we will be interested in presentations describing how information is used in decision-making, and in how ongoing monitoring could be re-designed to better support management decisions and actions.

Freshwater Fish of Arid and Semi-arid Systems

Organizers: Amy Unthank

This symposium is accepting oral presentations that focus on fishes that inhabit waters of western North America. Focusing on ecoregions delineated by Abell et al. (2000) including the Great Basin Complex (Bonneville, Lahontan, Oregon Lakes, Death Valley); the Colorado Complex (Colorado, Vegas-Virgin, Gila); and the Rio Grande Complex (Rio Grande, Guzman, Rio Conchos, Pecos, Rio Salado, Cuatro Cienagas, and Rio San Juan), as well as the Mexican Transition Bioregion (i.e. Sonoran and Sinaloan Coastal). Fishes in

these bioregions have declined markedly from historic occurrences due to the introduction and establishment of non-native aquatic organisms, habitat loss, and modifications or degradation from channelization, mining, deforestation, grazing, agriculture, and growing human populations that create overuse of surface and ground water. Scientists, managers, and non-governmental organizations that are involved in conservation and management of fishes occupying these bioregions will benefit by sharing their information on life histories, restoration efforts, basic research, applied research, and assessment of land management impacts on the fishes of these ecoregions.

18. Native Freshwater Mussels of the West: Silence of the Clams or Enlightened Protection through New Knowledge

Organizer: Al Smith

This symposium will include research and management presentations on western native freshwater mussels. The objective of the symposium is twofold: increase the inadequate knowledge base for freshwater mussels among aquatic scientists in the West and stimulate interest among these biologists which will lead to increased surveys, research and protection for freshwater mussels. This symposium will be the first opportunity for most Western AFS members and attendees to hear first hand and understand the complexities of freshwater mussel life history and human impacts on this group of overlooked aquatic animals. In North America, the center of the
world's distribution of freshwater mussels, approximately 80% of the 300 original species carry some imperiled label, world's distribution of freshwater mussels, approximately 80% of the 300 original species carry some imperiled label, from a species of concern to endangered. More than 10% are extinct. There is inadequate information about western mussels to determine their status. Interest in western mussels is new and the presenters will cover the latest on mussel research approaches and results. Topics will cover life history, genetic relationships, status, human impacts and restoration efforts.

19. The Use of PIT Tags in Fisheries Research and Management Applications: Advances, Adaptations, and Aggravations

Organizer: Dave Marvin

The use of passive integrated transponder (PIT) tags to mark and identify individual fish was pioneered almost 25 years ago. PIT tags are now used to address a broad variety of fisheries research and management concerns. As with any mark/recapture methodology, researchers often encounter, and must resolve, problems with the tagging, detection (recapture), and analysis techniques appropriate to their studies. This symposium will allow participants from throughout the Western Division's states and provinces to share personal observations and recommendations gleaned from their experiences using both half- and full-duplex PIT tags to mark and monitor fish behavior and movement. The symposium will focus on the PIT tag techniques and technologies used to implement research studies, and how (or if) those implementations supported the study objectives. The goal of the symposium is to provide AFS members and other participants with a broad understanding of how PIT tags are and can be used, and how these techniques can be applied or modified to improve both current and future research and monitoring studies.

20. Recent Success Stories in Western Aquatic Invasive Species Management

Organizer: Ian Reid

Invasive species and their management cost the U.S. over $138 billion. Aquatic invasive species issues have increased at alarming rates, and may continue to multiply given forecasted human population growth and changing environmental conditions. Although a diversity of resources (e.g. taskforces, working groups, databases, symposia) have been established to combat invasive species, the mainstream and refereed literature documenting actual success stories defeating invasive species—particularly aquatic ones—is depressingly depauperate. This symposium will examine recent success stories in invasive aquatic species management in the western U.S, in a variety of aquatic systems (e.g. lentic, riverine, headwater stream), geographic areas, and treatments (e.g. piscicide, mechanical removal, barriers, other). The presentations will be heavy on methodology but will also address the philosophy, persistence, and fortitude needed by biologists and fisheries scientists to accomplish these often lengthy, controversial, and wickedly complex projects. All of the presentations will incorporate some type of indicator monitoring to evaluate their success and identify common themes in designing projects to meaningfully manage aquatic invasives in the West.

21. Relicensing of the Hells Canyon Hydroelectric Complex

Organizer: Colleen Fagan

The Hells Canyon Hydroelectric Project (HCC), owned and operated by Idaho Power Company (IPC), is a three-dam complex located on the Oregon-Idaho border of the Snake River. It is one of the largest privately owned hydroelectric projects in America and central to IPC's hydroelectric system. Combined, the three dam and project reservoirs inundate over 97 miles and 180,000 surface acres. IPC operates the HCC to maximize power production, provide springtime flood control, provide a suitable flow regime for spawning and incubating fall Chinook salmon, and to provide recreational benefits. Project facilities contribute to the property tax base of several Oregon and Idaho counties. Popular warmwater fisheries in all three reservoirs

provide economic benefits to Oregon and Idaho. The project does, however, have substantial impacts on fishery resources. The HCC forms the upstream boundary (RM 247) for anadromous fish migration and production in the Snake Basin, fragments resident fish population, and affects remaining habitats downstream. Wild fish populations impacted by the Project include federally ESA listed spring, summer, and fall Chinook salmon, summer steelhead, and bull trout. This symposium provides an opportunity to update AFS members on the HCC relicensing process, including impacts of the project and measures proposed by IPC, the Federal Energy Regulatory Commission (FERC), natural resource agencies, and tribes for addressing those impacts. IPC initiated consultation for relicensing with state and federal agencies and other stakeholders in January 1997. A substantial number of mitigation and enhancement measures have been proposed by IPC and included in the Final EIS released by FERC in August 2007. Considerable disagreements remain, however, on important issues such as fish passage, water quality, and project operations. Some of these issues are important on a regional scale and tied to operation of federal projects in the Upper Snake and Columbia basins.

22. Identifying, Protecting, and Restoring Thermal Refuges for Coldwater Fishes

Organizers: Joseph Ebersole, Christian Torgersen, and Dru Keenan

High summer water temperatures are a widespread factor implicated in reduced distribution, abundance, and health of coldwater fishes such as salmon. Increased human water use, landscape alteration, and climate change are further stressing the thermal environment for native fishes. Can thermal refuges, defined as discrete locations of suitably cold water within an otherwise warm river or stream, help ameliorate or buffer the effects of thermal stress on coldwater fishes? How can thermal refuges be identified and characterized, such that their function and role can be protected and restored? This symposium will address the need to better identify, characterize, protect and restore critical thermal refuges for coldwater fishes. The objectives of this symposium are to:

- Review and develop physical and biological concepts for understanding coldwater refuges and salmonids in Pacific Northwest rivers and streams.
- Characterize approaches for identifying refuges (e.g., technological tools, landscape predictors, in-stream surveys/census).
- Illustrate characteristics (geomorphic, hydrologic, ecologic) of coldwater refuges at regional to local scales.

Through case studies, example applications of new technologies, and applications of modeling approaches, this symposium will provide participants the opportunity to share, discuss, and synthesize information on protecting and restoring coldwater refuges for salmonids. Outcomes of this symposium will assist governmental entities in implementing the new water quality standard for temperature as laid out in the "EPA Region 10 Guidance for PNW State and Tribal Temperature Water Quality Standards". Participants will acquire new information that will encourage new research approaches, stimulate additional synthesis, and provide useful tools for better identifying, protecting and restoring thermal refuges.

23. Sockeye on the Brink: Restoration of Declining Sockeye Salmon Populations in the Pacific Northwest and Southern British Columbia

Organizers: Jeff Fryer, Kim Hyatt, and David Marmorek

This symposium will present the plight of sockeye salmon populations of the Pacific Northwest and southern British Columbia as well as restoration options. Currently, two stocks are listed as endangered and several more likely qualify while sockeye are already extirpated from over 20 lakes in the Columbia Basin alone. Two more stocks have been proposed for listing under the Species at Risk Act in Canada. The remaining stocks in the area are threatened by the rapidly expanding human population in the Pacific Northwest. In addition, these stocks, being at the southern end of their range, are most vulnerable to the impacts of climate change. Although many sockeye stocks in the region are declining and face an uncertain future, there are considerable efforts being made to reverse this decline. Listing under the Endangered Species Act has resulted in an influx of funds for Ozette and Snake River sockeye salmon. Hatcheries are being used to boost production of Wenatchee, Okanogan, Snake, Lake Washington, and Quinault stocks. In the Okanogan Basin, sockeye are being restored to Skaha Lake, while there are proposals to restore extirpated populations in the Yakima, Deschutes, and Grande Ronde Basins. Okanogan sockeye salmon are also benefiting from habitat restoration as well as an innovative water management tool

24. New Tools for Evaluating River and Stream Restoration

Organizers: Martin Liermann, Sarah Morley, and Todd Bennett

While effectiveness monitoring for watershed restoration efforts has become more prevalent, data collection still tends to follow a scripted list of established methods. As interest shifts towards measuring larger scale watershed-level responses, estimating more biologically meaningful measures of "success" such as fish survival and growth, and providing a more mechanistic based explanation of how projects affect ecological processes, new approaches are necessary. Tools such as PIT tagging to measure fish growth, movement and survival, otolith microchemistry analysis to identify different life history strategies, the use of stable isotopes

to trace nutrient and contaminant pathways in aquatic foodwebs, and the application of imaging sonar to measure fish escapement have proven invaluable in recent aquatic research. However these are rarely if ever applied to assessing restoration effectiveness. Better use of these types of tools would allow for the evaluation of restoration success based on more relevant metrics, and provide us with opportunities to leverage these costly manipulations of aquatic habitat towards a better understanding of river ecology. The goal of this symposium is to present a number of technologies/methodologies that have potential to redirect restoration monitoring towards more pertinent questions and indicators of restoration effectiveness. Proposed methodologies include passive integrated transponders (PIT), radio and acoustic fish tagging, nutrient limitation experiments, instantaneous growth factor (IGF) hormone for fish growth measurement, imaging sonar to develop accurate escapement estimates, otolith ring interpretation and microchemistry, stable isotope analysis, characterizing physical habitat at appropriate spatial scales, and novel statistical approaches for data analysis. Speakers will be asked to address the strengths and weakness of these tools, suggest potential applications in restoration monitoring, and present examples of successful use in aquatic research.

25. Bull Trout and Climate Change: Risks, Uncertainties, and Opportunities, for Mapping the Future

Organizers: Dan Isaak and Jason Dunham

Bull trout (*Salvelinus confluentus*) are a threatened species with a highly fragmented distribution throughout the Pacific Northwest. Habitat loss and fragmentation by human activities in watersheds have been identified as major threats or limiting factors. Mitigating these threats is a major ongoing effort, with annual costs totaling millions of dollars according to USFWS estimates. Among the critical requirements for bull trout are a need for large, interconnected habitats of cold water. Restoration of connectivity among cold water habitats has been identified as a primary need and is the focus of habitat management activities for bull trout in their range. Whereas the needs of bull trout for cold water and ongoing restoration actions are well known and being addressed, much uncertainty remains about the future security of bull trout and their habitats within the US due to environmental trends associated with climate change. Changing hydrologic regimes, water temperatures, and channel configurations could result in major losses and redistributions of habitat for this species. Accurate modeling and forecasting of these changes will be critical if conservation resources are to be efficiently allocated. Many previous climatic assessments have relied on relationships between air temperature and fish distributions, but recent assessments incorporate a wider array of physical processes that enable detailed predictions of stream habitat at broad scales. The goal of this symposium is to provide an overview of bull trout, their relationship to climate, and to discus alternatives for modeling future habitat and population distributions.

26. Advances in Modeling Populations and Habitat

Organizers: Kelly Burnett and Julie Firman

It is often difficult, if not impossible, to design experiments or monitoring designs that adequately describe widely distributed species inhabiting large and complex landscapes. Comprehensive field data with the necessary spatial extent are generally lacking, and obtaining them can be prohibitively expensive. Recent advances in modeling provide new tools and techniques for describing populations and landscapes, prioritizing conservation or restoration, and for developing testable hypotheses that can guide field studies. This symposium in intended to be a forum in which to explore modeling approaches that have recently made significant contributions to our understanding of fish populations, their interactions with habitat, and the interaction between landscape features and populations of both fish and habitat.

27. Discoveries and Diversity in the State of Jefferson

Organizers: Robert Coffan and Jeannine Rossa

This symposium will embrace the timely theme set by the Western Division of the AFS for the Annual Meeting (Human Population Growth and Fisheries: the Western Challenge). However, it will be specifically related to the State of Jefferson, a rugged region in southern Oregon and northern California encompassing the Rogue and Klamath systems, as well as the Umpqua and other, smaller, coastal rivers. The “State” almost came into being in 1941 until the secession vote was derailed by the Pearl Harbor invasion. Due to its geographic distance from both Salem and Sacramento, the State of Jefferson remains a region where independence is valued and cooperation is essential. The eco-regions are diverse, and cultural groups live in....well, relative harmony. Like many places in the West, some areas of the State of Jefferson are experiencing unprecedented growth and consequent urban problems; others areas are experiencing economic hardship, putting people in apparent conflict with our desire as aquatic professionals to restore stream function and fish habitat. This symposium will address a breadth of fish and fishery-related topics and interesting discoveries about the biodiversity of our region.

28. Restoration of Salmon in the Cowlitz River Basin: Historical Perspectives, Current Status, and Future Plans

Organizers: Theresa Liedtke and Julie Henning

This symposium will focus on the restoration of anadromous salmon in the Cowlitz River Basin, including the Cowlitz and Toutle rivers. The upper part of this basin was severely impacted by the 1980 eruption of Mount St. Helens. Specifically, the upper North Fork of the Toutle River was inundated with vast amounts of

mud, ash, and debris generated by the eruption. Management actions aimed at controlling the downstream transport of sediment have influenced fish movements in the system. The construction of Mayfield and Mossyrock dams on the Cowlitz River and the Sediment Retention Structure on the North Fork of the Toutle River adversely affected native anadromous salmon stocks, creating permanent barriers to volitional upstream and downstream fish movements. Trap and haul operations are currently operated on both the Cowlitz and Toutle rivers in an effort to reintroduce salmon to spawning and rearing habitat upstream of barriers. There have been some successes and some failures with these restoration efforts, and the goals of this symposium will be to: 1) provide a historical perspective on native salmon runs and the construction of the barriers, 2) describe the current efforts, especially the trap and haul operations, 3) present findings from evaluations of the current operations, and 4) describe future research needs and plans. Invited speakers will be selected to represent the expertise of the variety of state, federal, tribal, and non-government entities involved with these issues. This symposium will provide AFS members with insights into a system-wide salmon reintroduction effort which can serve as an example for other systems. The challenges of restoration in this system are significant due to the diversity of entities involved and the limited data available to guide management actions.

Bovines and Waterways

Organizers: Jimmy Eisner

This symposium will cover numerous topics and studies involving livestock and stream channels from across the West. The list of presenters are from Oregon, Montana, Nevada, California, Idaho, and New Mexico. Topics include stream function, riparian grazing prescriptions, additional management techniques to protect riparian areas, macroinvertabrates and livestock distribution, state and transition models, affects of riparian grazing after fires, results of effectiveness monitoring, bank alteration under different management prescriptions, livestock impacts to fish and fish habitat, the effects of supplements on livestock distribution, and a collaborative project in northeastern Nevada involving BLM, TU, and the livestock operator.

30. Large-scale Habitat Assessments

Organizer: Steve Lanigan

This symposium will provide a forum for describing latest methods of conducting state, federal and tribal large scale aquatic habitat assessments/monitoring. This would include which attributes are being collected, what sort of analyses are conducted, and how data are assembled and presented to decision makers and other specialists. AFS members would learn what others are doing and what assessment/monitoring results are showing.

31. Student Paper Symposium

Organizer: Shivonne Nesbit