AFS American Fisheries Society
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Idaho Chapter

Idaho Chapter of the American Fisheries Society

1999 Annual Meeting

Snake River Anadromous Fish Recovery And The Role of Dams

March 4-6, 1999

The Grove Hotel, Boise, Idaho

Agenda

Idaho Chapter of the American Fisheries Society 1999 Annual Meeting

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Thursday, March 4:

8:00 **Welcome and Introduction** - Cindy Deacon Williams, ICAFS President, and Kerry Reese, ICTWS President

8:20 **Introduction to the Title Session** - Ted Koch ICAFS President-Elect

8:30 **Fish and Wildlife Report on The Army Corps of Engineer's Snake River Dam Management Decision-Making Process** - Pat Bigelow, U.S. Fish and Wildlife Service

8:50 *Keynote Address*- **Dams, Uncertainty, and the Salmon Ecosystem** - Dr. Chris Frissell - Research Associate Professor, University of Montana, and member of a Scientific Panel for the Multi-Species Framework Process for the Northwest Power Planning Council

9:35 **Break** - The Wildlife Society breaks off into its own meeting room

Economic, Political and Social Dimensions of Snake River Dams and Salmon and Steelhead

10:00 Rocky Barker, Author of Saving All The Parts, and Reporter for the Idaho Statesman

10:20 Wendy Wilson, Idaho Rivers United

10:40 Lynn Tominaga, Idaho Water Users

11:00 Silas Whitman, Nez Perce Tribe

11:20 **Committee Lunch Meeting Breakouts**

Scientific Dimensions of Snake River Dams and Salmon and Steelhead

12:30 *Introduction* - Dan Schill

12:45 Dave Marmoreck, Facilitator of the PATH Group

1:15 Dan Herrig, U.S. Fish and Wildlife Service, Lower Snake River Compensation Plan Office

1:45 Don Chapman, Chapman Consultants

2:15 Rick Williams, Chairperson, Independent Science Council

2:45 **Break**

3:00 John Williams, National Marine Fisheries Service

3:30 Ed Bowles, Idaho Department of Fish and Game

4:00 *Conclusory Remarks* - Ted Bjornn, University of Idaho

4:10-5:30 **Scientific Dimensions Panel Discussion**

6:30 **Palouse Unit Social - Louie's Restaurant**

Friday, March 5

8:00 **A Model of Risk Analysis and Mitigation for Supplementation Programs.** Chris Beasley-Biologist; Andre Talbot-Senior Fisheries Scientist; Doug Hatch-Fisheries Scientist; and Mark Wishnie-Technician- Columbia River Inter-Tribal Fish Commission

8:20 **Detection of PIT-tagged Subyearling Chinook Salmon at a Snake River Dam: Implications for Summer Flow Augmentation.** William P. Connor and Howard L. Burge, United States Fish and Wildlife Service, Post Office Box 18, Ahsahka, Idaho 83520, USA, and David H. Bennett, Department of Fish and Wildlife, University of Idaho, Moscow, Idaho 83844-1136, USA

8:40 **Genetic stock structure of fall chinook in the Columbia Basin: So what?** André Talbot, Doug Hatch, Chris Beasley, John Netto, Mark Wishnie, and Rian Hooff, Columbia River Inter-Tribal Fish Commission, Production and Restoration Research Group, 729 NE Oregon Street, Suite 200, Portland, OR 97232 (503) 238-0667

9:00 **Are hydrosystem passage "improvements" destroying any chance of recovering Snake River sockeye salmon?** Jeff Fryer, Columbia River Inter-Tribal Fish Commission, 729 NE Oregon, Portland, OR 97232 503-731-1266, jeff.fryer@cwix.com

9:20 **Snake River Chinook Salmon: Should We Conserve Genetic Entities or Evolutionary Processes?** M. S. Powell and E. L. Brannon, Center For Salmonid and Freshwater Species at Risk, University of Idaho/HFCES, Hagerman, ID 83332

9:40 **Break**

10:00 **The need for consideration of evolutionary life history adaptation in the decline and recovery of salmonid stocks: integrating life history strategies and environmental constraints.** Michael Hurley

10:20 **An Insight Into Pacific Lamprey Migration Habits And Ramifications For Recovery -or- Eels Suck at Dam Passage.** Doug Hatch, John Netto, Rian Hooff, Blaine Parker, Mark Wishnie, Chris Beasley, Mike Wakeland, and André Talbot, Columbia River Inter-Tribal Fish Commission, 729 NE Oregon Street, Suite 200, Portland, OR 97232 (503) 238-0667

10:40 **Overview of National Marine Fisheries Service Snake River Habitat Branch Office Programs.** TBA

11:00 **Overview of Idaho Department of Fish and Game Anadromous Fish Programs.** TBA

11:20 **Lunch Break - ICAFS Annual Business Meeting, Bank of America Center, adjacent to Hotel**

2:30 **The Influence of Sampling Efficiency on Analyses of Species Presence/Absence In Relation to Habitat.** James T. Peterson (USDA Forest Service, Rocky Mountain Research Station, 316 E. Myrtle Street, Boise ID 83702; 208/373-4379; Fax: 208/373-4391; jpeterson/rmrs_boise@fs.fed.us)

2:50 **Rainbow Trout Size at Stocking and Return to Creel: Do Bigger Catchables Really Pay?** David Teuscher and Dan Schill, Idaho Department of Fish and Game

3:10 **Using Fisheries Science to Resolve a Public Fishery Conflict - What a Concept! (The Henry's Lake Experience).** Mark Gamblin, Dan Schill, and Bill Schrader, Idaho Department of Fish and Game

3:30 **The Ability of Idaho Anglers to Identify Five Different Species of Trout.** Dan Schill, and Tony Lamansky, Idaho Department of Fish and Game, Nampa, Idaho

3:50 **Water Quality and Primary Productivity of the Lower Snake River: Considering Extrapolation to a Restored System.** Kraemer, Mary and C. Michael Falter, *Dept. Of Fish & Wildlife Resources, University of Idaho, Moscow, ID 83844-1136.*

4:10 **Historical Ecological Changes Downstream From a Large Western Dam.** Mark Vinson, National Aquatic Monitoring Center, Utah State University, Logan, Utah.

4:30 **Monitoring Nutrient Enhancement Effects on High Elevation Oligotrophic Lakes in Central Idaho.** Robert G. Griswold, Biolines Environmental Consulting, Stanley, Idaho 83278 [(208) 774-3345], and Doug Taki, Shoshone-Bannock Tribes, Fort Hall, Idaho 83203 [(208) 238-3914]

4:50 **The relationship between river discharge and shovelnose sturgeon (*Scaphirhynkus platoryncus*) diet and food selection in the free flowing Missouri River above Fort Peck Reservoir, Montana.** Douglas J. Megargle, Idaho Department of Fish and Game

5:10 **Adjourn**

6:00-11:00 **Joint Social and Fundraiser With AFS and TWS Members**

Saturday, March 6:

8:00 **Variation in body condition of small stocked trout and food availability during winter among regulated rivers in Wyoming.** J. Lance Hebdon (jlhebdon@uwyo.edu)and Wayne A. Hubert (United States Geological Survey, Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Box 3166, Laramie, WY 82071; 307/766-5415; FAX 307/766-5400)

8:20 **Prevalence and Extent of Pathology from Whirling Disease in Rainbow and Cutthroat Trout in the South Fork of the Boise River.** Monica Hiner, Christine Moffitt, and Yasunari Kiryu, Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho 83844-1136

8:40 **An evaluation of the rainbow trout population utilizing the Deep Creek drainage, Idaho.** Chris Downs, Idaho Department of Fish and Game, 2750 Kathleen Ave, Coeur d' Alene, Idaho 83814

9:00 **Winter nocturnalism in rainbow trout and brook trout: evidence of concealment behavior by resident adult trout.** J.S. Gregory, Gregory Aquatics, Mackey, Idaho, and K.A. Meyer, Water Resources Team, Winema National Forest, Klamath Falls, OR

9:20 **Effects of Hatchery Trout on Wild Cutthroat Trout (*Oncorhynchus clarki subsp.*) Habitat Use and Behavior, and on Catch and Angler Satisfaction in an Idaho Stream.** Robert K. Brassfield, U.S. Fish and Wildlife Service, 250 S. 4th Avenue, Room 240 Pocatello, ID 83201

9:40 **Not Alota Lota, or the Effects of Winter Flows on Burbot Spawning Migrations in the Kootenai River - Post Libby Dam.** Vaughn Paragamian, Idaho Department of Fish and Game

10:00 **Break**

10:20 **Diet Analysis of Newly Emergent Kokanee in Lake Pend Oreille, Idaho.** Lance Clarke and David Bennett, Fish and Wildlife Department, University of Idaho, Moscow, ID, 83844-1136

10:40 **Predatory Influence of Bull Trout on Kokanee, Lake Pend Oreille, Idaho.** Dmitri Vidergar and Dr. David H. Bennett, Dept. of Fish & Wildlife Resources, University of Idaho, Moscow, USA.

11:00 **A Cooperative Approach to Filling the Data Gap: The History and Status of Fishes in the Little Lost River, Idaho Drainage With Emphasis on Bull Trout.** Bart L. Gamett, USDA Forest Service, Lost River Ranger District, P.O. Box 507 Mackay, ID 83251

11:20 **Evaluation of efforts to remove lake trout from Upper Priest Lake**. Jim Fredericks, Regional Fisheries Biologist, IDFG

11:40 **The use of a backpack electrofisher to remove brook trout from tributaries of the Upper Priest Lake drainage.** Eric Crawford, Idaho Department of Fish and Game

12:00 **Bull Trout Consultation on the West Side of the Payette National Forest.** Rodger L. Nelson, David C. Burns, and Eric R. Veach, Payette National Forest, McCall, Idaho

12:20 **Presentation of Best Paper Awards, Conclusory Remarks**

12:30 **Adjourn**

1:00 **Executive Committee Meeting**

Abstracts

for the

Idaho Chapter of the American Fisheries Society 1999 Annual Meeting

Snake River Anadromous Fish Recovery And The Role of Dams

March 4-6, 1999
The Grove Hotel, Boise, Idaho

Friday, March 5:

A Model of Risk Analysis and Mitigation for Supplementation Programs

*Chris Beasley-Biologist-Columbia River Inter-Tribal Fish Commission
André Talbot-Senior Fisheries Scientist-Columbia River Inter-Tribal Fish Commission
Doug Hatch-Fisheries Scientist-Columbia River Inter-Tribal Fish Commission
Mark Wishnie-Technician-Columbia River Inter-Tribal Fish Commission

Abstract.-- Mainstem dams among other disturbances have reduced many Pacific salmon stocks to levels warranting listing under the Federal Endangered Species Act. Unfortunately, the environmental factors leading to these declines remain, and mitigation such as dam removal is not likely to occur in the time frame necessary to avoid the loss of many salmon stocks. Properly implemented and managed supplementation programs provide a means to avoid the loss of stocks and their associated genetic variability until such time as the environmental factors leading to their decline are addressed. Ideally, after passage issues are resolved, the existence of these supplemented stocks will allow recovery through augmentation rather than reintroduction. However, in recent years scientists have begun to recognize adverse effects resulting from poorly planned or managed hatchery operations. Therefore, the NMFS has proposed that all new hatchery programs be required to perform an analysis of genetic and ecological risks associated with operation. Unfortunately, risk analysis is inherently subjective and may therefore become politically rather than scientifically motivated. We propose that risk analyses should focus on sources of risk and methods of risk mitigation rather than the generation of an arbitrary value of risk or a system of ranks. It is our hope that this type of risk analysis will stimulate discussions aimed at determining sources of risk and methods to mitigate risks by providing a forum for positive input by interested organizations rather than a vote in support or opposition of a project as it is initially presented. In this sense, risk analysis becomes a cooperative mechanism aimed at optimizing supplementation efforts using the best multidisciplinary science given programmatic and environmental constraints. As in all fields of science, supplementation technology can be improved only through experimentation. Monitoring and evaluation of supplementation programs incorporating the best available science will provide information useful for recovery following passage mitigation. This presentation is derived from the model of risk analysis and risk factors addressed

while performing a risk analysis for the proposed Nez Perce Tribal Hatchery in the Clearwater Basin.

Detection of PIT-tagged Subyearling Chinook Salmon at a Snake River Dam: Implications for Summer Flow Augmentation

William P. Connor and Howard L. Burge, United States Fish and Wildlife Service, Post Office Box 18, Ahsahka, Idaho 83520, USA, and David H. Bennett, Department of Fish and Wildlife, University of Idaho, Moscow, Idaho 83844-1136, USA

Abstract.-- Rearing subyearling chinook salmon Oncorhynchus tshawytscha ($\geq$60 mm) were captured in the Snake River and tagged with Passive Integrated Transponders to provide an index of survival to Lower Granite Dam. Lower Granite Dam is the first of eight dams encountered by seaward migrants. Water was released from reservoirs upstream of Lower Granite Dam to augment summer flows to increase subyearling chinook salmon survival. Mean summer flow and maximum summer water temperature in Lower Granite Reservoir were highly correlated (N = 4; r = -0.999). Acknowledging this correlation, we conducted two separate least-squares regressions using detection rate as the dependent variable. Detection rate at Lower Granite Dam was positively related to mean summer flow (N = 4; r^2 = 0.993; P = 0.003) and negatively related to maximum summer water temperature (n = 4; r^2 = 0.984; P = 0.008). Summer flow augmentation increased flow and decreased water temperature in Lower Granite Reservoir especially in low flow years. Results in this paper support summer flow augmentation as a beneficial interim recovery measure for enhanced survival of subyearling chinook salmon in the Snake River.

Genetic stock structure of fall chinook in the Columbia Basin: So what?

*André Talbot, Doug Hatch, Chris Beasley, John Netto, Mark Wishnie, and Rian Hooff, Columbia River Inter-Tribal Fish Commission, Production and Restoration Research Group, 729 NE Oregon Street, Suite 200, Portland, OR 97232 (503) 238-0667

Abstract.-- Recently, fisheries managers have been faced with several issues relating to the stock structure of upriver fall chinook, and the relationship between Snake River and Columbia River "stocks". These issues include 1) inclusion of the Deschutes R. population in the Snake R. ESU, 2) straying of Klickitat Hatchery fall chinook into the Snake R. Basin, 3) the existence (or not) of a Marion Drain population distinct from the Yakima R., 4) supplementation across a set of populations. Although much of the debate on population structure has scientific merit, uncertainties have the potential to impair timely recovery of targeted populations. We review the existing data, analyze new genetic and life history information. Available options for restoration of fall chinook in the Snake River Basin are discussed. We propose some guidelines to simplify the management of the upriver fall chinook and the division of the populations into "Evolutionarily Significant Units".

Are hydrosystem passage "improvements" destroying any chance of recovering Snake River sockeye salmon?

Jeff Fryer, Columbia River Inter-Tribal Fish Commission, 729 NE Oregon, Portland, OR 97232 503-731-1266, jeff.fryer@cwix.com

Abstract.-- Snake River sockeye salmon were the first stock of salmon listed under the Endangered Species Act in the Columbia Basin. Despite millions of dollars spent to recover the stock, few sockeye salmon have returned to Redfish Lake since the listing. Sockeye salmon returns to the other two sockeye

lakes in the Columbia Basin, Lake Wenatchee and Osoyoos Lake, are also at record lows. It is hypothesized that a major contributor to the failure of Redfish Lake sockeye salmon recovery efforts, as well as recent declines of other sockeye salmon stocks, has been recent changes in the Columbia Basin mainstem hydroelectric system. Technological fixes, such as the use of screens to divert fish from turbines, and the barging of juveniles around dams, while possibly benefiting some stocks of salmonids, may be destroying sockeye salmon runs. Transporting juveniles adversely affects sockeye salmon homing ability more than other salmonids. Juvenile sockeye salmon also appear particularly vulnerable to descaling from screens, with descaling rates running as high as 30% per dam. Major changes to the hydrosystem will likely be required to save not only Redfish Lake sockeye salmon, but possibly mid-Columbia sockeye salmon as well.

Snake River Chinook Salmon: Should We Conserve Genetic Entities or Evolutionary Processes?

M. S. Powell and E. L. Brannon, Center For Salmonid and Freshwater Species at Risk, University of Idaho/HFCES, Hagerman, ID 83332

Abstract.-- In a position paper issued in 1991, the National Marine Fisheries Service began applying the term "evolutionarily significant unit" (ESU) as a defining term for distinct populations of anadromous salmonids and provided a basis for their description. In a 1994 review, Snake River spring and summer chinook salmon runs were listed as threatened under the Endangered Species Act. Subsequently, captive propagation programs were instituted for several subpopulations in low abundance. Additional subpopulations within the Snake River spring/summer ESU, summarized in the 1998 status review, will likely require the intervention of captive propagation in the near future to prevent extirpation. Captively raised chinook subpopulations within the ESU are currently kept separated in all ongoing programs. Genetic differentiation and reproductive isolation among Snake River spring/summer ESU subpopulations has been examined using protein electrophoresis. The allele frequency data was used to describe genetic entities for conservation management. However, a logistically untenable position will develop if captive propagation becomes necessary for most Snake River chinook subpopulations, as there are no guidelines for combining these genetic entities and the number of conservation hatcheries is limited. Additionally, the current captive propagation programs may compound short-term demographic problems associated with very small numbers of individuals and thus effect the long-term persistence of the ESU. Unfortunately, combining subpopulations based solely upon genetic distance information may also be shortsighted. A complimentary management approach using phylogenetic information and other data to elucidate evolutionary processes may offer a solution and facilitate a justification for combining subpopulations. Information on evolutionary processes helps determine how genetic patterns observed within and among subpopulations arise. This approach has been used in other instances and in this case is directed toward the conservation of all Snake River Basin chinook subpopulations including those that may not otherwise be conserved simply due to logistical constraints.

The need for consideration of evolutionary life history adaptation in the decline and recovery of salmonid stocks: integrating life history strategies and environmental constraints.

Michael Hurley

Abstract.-- The purpose of this presentation is to place salmonid decline and recovery strategies in a conceptual context and to emphasize the need to incorporate concepts of evolutionary life history strategies in the survival and recovery of salmonids. The current salmon crisis illustrates problems with the contemporary goal of integrating science with policy, particularly the confusion with apparently conflicting, competitive approaches to the problem. Traditional frameworks for managing commercial or recreational fisheries as commodities have emphasized a production based paradigm with a reliance on quantitative models (Lotka-Voltera, maximum sustained yield) which incorrectly assume that all fish are of equal value in a population. Furthermore, this perspective has emphasized numeric goals for escapement, project success and now recovery of stocks. The inordinate focus on quantification/production has led to practices that have reduced life history diversity and adaptive capacity of salmonid populations, which may reduce a populations resiliancy to disturbance. A more ecosystem based paradigm emphasizes understanding life history diversity in the context of evolutionary strategies for adaptation to environmental variation in both the analysis of the decline and effective recovery and management of salmonid stocks. As of now, we have only used genetics or ESU's, without considerstion of the adaptive significance of phenotypic expression of life history. Examples are presented, emphasizing chinook life hisory, that a) demonstrate how life history theory can be used to develop working hypothesis relating environmental conditions to life history strategies and variation b) negative selection processes that have reduced life history diversity and productivity c) the need to incorporate life history strategies in recovery goals and for monitoring and interpretation of recovery.

An Insight Into Pacific Lamprey Migration Habits And Ramifications For Recovery -or- Eels Suck at Dam Passage

*Doug Hatch, John Netto, Rian Hooff, Blaine Parker, Mark Wishnie, Chris Beasley, Mike Wakeland, and André Talbot, Columbia River Inter-Tribal Fish Commission, 729 NE Oregon Street, Suite 200, Portland, OR 97232 (503) 238-0667

Abstract.-- Lampreys are a very ancient anadromous species. From the fossil record, they are estimated to be at least 280 million years old. Pacific lampreys are important in Native American culture and are a traditional food resource. Additionally, lampreys are a endemic species that may have provided beneficial effects for Pacific salmon in terms of recruiting marine nutrients to spawning areas, being an alternative prey item for marine mammals, and avian predators. Pacific lampreys also provide us with a unique indicator stock since they share similar life history requirements with salmonids. However, unlike anadromous salmonids, the Pacific lamprey is not highly prized or utilized by non-Indians, consequently, recent declines in lamprey abundance and distribution had gone largely unnoticed by regional fishery managers. An estimate of Pacific lamprey passage at Bonneville Dam reached a peak of 375,000 in 1960 and has declined to approximately 40,000 in 1997. Dams impact Pacific lamprey in numerous ways during migrations. There appears to be heavy mortality associated with turbines and screens during the downstream migration and returning adults have difficulties negotiating existing fish ladders. Losses of over 50% have been reported between entrance and exits of fish ladders. We used radio telemetry to examine the migration habits of adult Pacific lamprey in the lower Columbia River. Preliminary results indicate that lamprey migration patterns differ greatly from salmonids. At certain times, generally early in the migration season, tagged lamprey swam upstream rapidly reaching migration rates of 50 km/day. During other times, tagged fish would remain stationary for up to 3 months before continuing an upstream migration. Ecosystem management, preservation, and restoration requires us to closely investigate habits and requirements of this unique species and then implement changes to the system so that this species may exist for another 300 million years.

The Influence of Sampling Efficiency on Analyses of Species Presence/Absence In Relation to Habitat

James T. Peterson*(USDA Forest Service, Rocky Mountain Research Station, 316 E. Myrtle Street, Boise ID 83702; 208/373-4379; Fax: 208/373-4391; jpeterson/rmrs_boise@fs.fed.us)

Abstract.-- Presence and absence data are increasingly being used by natural resource professionals to assess the current status and changes in species distribution at scales ranging from stream reaches to entire basins. These data are thought to be less affected by sampling efficiency than abundance or density data and are often collected with cheaper, less intensive methods, such as snorkeling surveys. However, the probability of detecting a species is influenced by its probability of capture and its density, both of which can be affected by habitat features. Analyses of simulated data, based on empirical data for Inland Northwest streams, indicates that fish-habitat relationships, suggested by fish presence/absence, could be significantly biased by some habitat characteristics. In addition, analyses of the influence of longitudinal patterns of habitat characteristics and fish abundance on the probability of detection, suggest that species' distributions may be underestimated at larger scales. I suggest ways that natural resource professionals can minimize the influence of detectability, so comparisons can be made across different stream reaches and basins.

Rainbow Trout Size at Stocking and Return to Creel: Do Bigger Catchables Really Pay?

David Teuscher and Dan Schill, Idaho Department of Fish and Game

Abstract.-- We used tag returns and rearing costs to evaluate the performance of standard (mean TL = 9.3 in) and large (mean TL = 11.2 in) catchable rainbow trout in 19 Idaho streams. Eyed eggs were purchased from a commercial source on 25 June and 27 July 1997. The catchables were reared in separate raceways at the Nampa State Fish Hatchery. Production costs were estimated by recording the amount of feed used to grow the catchables to their designated stocking sizes. Prior to release, each fish was fitted with a numbered monel jaw tag. Equal numbers of standard and large catchables were stocked in each stream. Reward tags and streamside signs were used to encourage angler tag returns. Total tag returns were 14.9% for large and 13.1% for small catchables. Our null hypothesis that tag returns were equal for large and standard catchables was not rejected ($p = 0.12$). Production costs were $0.34 per fish for large catchables and $0.15 per fish for the standard group. Our economic and return to creel results support the continued stocking of standard sized catchable rainbow trout.

Using Fisheries Science to Resolve a Public Fishery Conflict - What a Concept! (The Henry's Lake Experience)

Mark Gamblin, Dan Schill, and Bill Schrader, Idaho Department of Fish and Game

Abstract.-- Henry's Lake, in eastern Idaho, supports one of the most productive and renowned wild trout fisheries in North America. Henry's Lake anglers are represented by a diverse preference in angling philosophies and gear preferences which leads to different expectations for the fishery. The result is a polarized angler constituency, demanding differing management priorities. Fishery Managers have the responsibility to make management decisions or recommendations that serve the best interests of all public owners of the resource, taking into account the obvious need to preserve and perpetuate the resource. During 1995, fisheries management and research biologists attempted to resolve a brewing conflict over angling regulations at Henry's Lake. The demand of one group for more restrictive harvest and gear regulations was opposed by an equally passionate group of harvest- oriented anglers. Results of field evaluations revealed an unusually productive trout population (> 500,000 trout over 14 inches in length) with low annual angler exploitation (3% to 6%) and high annual natural mortality (70%). Using these extensive trout population data, MOCPOP (a computer model), and an educational workshop format, we attempted to reach a consensus with both angling factions on a socially and biologically balanced fishing rules package. We first explained basic principles of fish population dynamics to the meeting attendees. We then modeled various bag limit scenarios and gear restrictions for the fishery as suggested by workshop

participants. The result of the total effort (collecting extensive fishery statistics and bringing constituents together in a structured but relaxed informational environment) was a uniform agreement among attending anglers that changes in the fishery management program would not be beneficial. We suggest that many conflicts revolving around conflicting philosophies and un-realistic expectations for different regulation strategies can be effectively resolved by intense efforts to educate skeptical or opposing constituencies in an open and frank forum.

The Ability of Idaho Anglers to Identify Five Different Species of Trout

Dan Schill, and Tony Lamansky, Idaho Department of Fish and Game, Nampa, Idaho

Abstract.-- The ability of anglers to identify fish they catch is fundamental to the success of fishery management that relies on differential harvest by species. We assessed the ability of anglers to identify five different trout species by conducting interviews on two Idaho waters using replica mounts, full color pictures, and inspecting actual fish in the creel. The species we used were rainbow trout *Oncorhyncus mykiss*, cutthroat trout *Oncorhyncus clarki*, brown trout *Salmo trutta*, brook trout *Salvelinus fontinalis*, and bull trout *Salvelinus confluentus*. Four of the five species may be encountered in the drainages surveyed; brown trout do not reside in the study area, but are found lower in the system. Of the 671 anglers contacted, 83.3% correctly identified rainbow trout, 48.1% cutthroat trout, 47.4% brown trout, 38.0% brook trout, and 32.8% bull trout. Only 13.9% of anglers identified all five species correctly while 7.5% could not correctly identify any of the species. In addition, only 65.1 % of anglers were able to correctly recite the statewide regulation for bull trout. We tested identification success against gear type, age, sex, residence, angling experience, regulation knowledge, and years of education. We found a significant difference in identification success between fly anglers and lure and bait fishermen. Anglers that could recite the regulations had higher identification rates than those that did not. Angler age and years of education also influenced fish identification rates. The ability of anglers to identify different trout species is poor; however the proportion of anglers interviewed with a bull trout in the creel was low (1.5%). To increase angler regulation awareness and fish identification ability, a vigorous educational effort, including increased signing, personal contacts, and other multi-media options is being planned.

Water Quality and Primary Productivity of the Lower Snake River: Considering Extrapolation to a Restored System.

Kraemer, Mary and C. Michael Falter, *Dept. Of Fish & Wildlife Resources, University of Idaho, Moscow, ID 83844-1136.*

Abstract.-- The downstream 155 miles of the Snake River in Idaho-Washington (the lower Snake River) is actually a sequence of stream reaches of very different physical and biological characteristics. An upstream free-flowing reach flows into a sequence of hybrid free-flowing//impounded reaches, each which flows into a true impounded (albeit run-of-the-river) reach. Four cycles of this pattern occur before the river delivers into another hybrid free-flowing/impounded reach in the receiving Columbia River. Controlling factors in these different habitats must be delineated before predicting eventual conditions should all or part of the lower Snake River be converted back to a normative river state. These are water velocity, water depth, retention time leading to estimates of turbulence, light, and estimates of total light energy available to a community., and nature of the benthic substrate. These factors will in turn control the major biotic responses of the system's carbon source and the autotrophic:heterotrophic balance of the benthic and water column communities, plankton vs. attached benthic algae, and faunal shifts in benthic communities. Most of these controllers were assessed throughout the lower Snake River in the summer-fall seasons of 1997 and 1998, high flow and near average flow years, respectively. Computer modeling emphasized comparison of impounded Snake River reaches with the true free-flowing upstream reach of the

Snake River.

Historical Ecological Changes Downstream from a Large Western Dam.

Mark Vinson, National Aquatic Monitoring Center, Department of Fisheries and Wildlife, Utah State University, Logan, Utah 84322-5210

Abstract.-- A century of hydrologic data (1895-1997), 35 years (1963-98) of fish data, and 50 years (1947-98) of aquatic macroinvertebrate data were summarized for the Green River near Flaming Gorge Dam in northeastern Utah. The major effect of the dam on hydrology was a decrease in annual and seasonal fluctuations in discharge, water temperature, and sediment transport. Native fish and invertebrate biodiversity declined rapidly following dam closure in 1963. Fish species richness decreased from 21 species, 8 indigenous and 6 exotic species, to a single common exotic species, rainbow trout. Aquatic macroinvertebrate genera richness declined from more than 70 to less than 30. After installation of a multilevel water intake structure in 1978, mean summer water temperatures increased from 6 to 12_C and the number of annual degree days were now similar to pre-dam conditions. Since 1978, rainbow trout have decreased and brown trout have increased in abundance and in contrast to an expected increase in invertebrate taxa richness, the number of aquatic invertebrate taxa routinely collected since thermal modification was similar to or lower than that observed before thermal modifications and the invertebrate assemblage became dominated by a previously uncollected taxon, Hyallela azteca.

Monitoring nutrient enhancement effects on high elevation oligotrophic lakes in Central Idaho.

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Phone: (208) 774-3345, Fax: (208) 774-3355, E-mail: biolines@cyberhighway.net, and Doug Taki, Shoshone-Bannock Tribes, P.O. Box 306, Fort Hall. ID 83203, Phone:(208)238-3914, Fax: (208) 238-3742, E-mail: fishdepi@cyberhighwav.net

Abstract.-- Snake River sockeye salmon *Oncorhvnchus nerka* once inhabited five Sawtooth Valley Lakes (Redfish. Pettit, Alturas. Stanley, and Yellowbelly), Big Payette Lake and Warm Lake in Idaho and Wallowa Lake. Oregon. Currently Snake River sockeye salmon are reduced to a remnant population in Redfish Lake, the largest of the Sawtooth Valley Lakes. Declining returns to Redfish Lake in the 1980's prompted the National Marine Fisheries Service to list Snake River sockeye salmon as endangered under the Endangered Species Act of 1973. As a result of the listing a multi-agency recovery effort was initiated in 1991 to prevent the extinction of the Redfish Lake sockeye salmon.

The recovery effort focused on development of a captive broodstock coupled with evaluation and enhancement of the nursery lake habitats. Large populations of non-endemic kokanee and the oligotrophic conditions of these lakes raised concerns about overstocking *0. nerka* and causing the collapse of macrozooplankton populations. To minimize these risks and to improve sockeye salmon rearing conditions, the Shoshone-Bannock Tribes initiated fertilization of Redfish Lake in 1995. Supplemental nutrient additions to sockeye rearing lakes has been successfully used to replace nutrients formerly derived from adult salmon carcasses and enhance sockeye populations in British Columbia and Alaska.

Beginning in 1995. liquid ammonium nitrate and ammonium phosphate was added weekly during the growing season to the surface of Redfish Lake. Nutrient additions were skewed toward high nitrogen loads (20; 1. N:P by mass) to prevent the stimulation of nitrogen fixing Cyanophytes. Approximately 2.2 to 2.6 mg P/m^2/week were applied for 14-18 weeks each year. except in 1996 when an abbreviated schedule

resulted in the application of 1.4 mg Pm^2/week for 6 weeks. Stanley Lake, a small unfertilized lake in the Sawtooth Valley was monitored io allow comparisons between a fertilized and an unfertilized system.

During fertilization of Redfish Lake (1995-1998), euphotic zone depth decreased 22%. surface TN increased 13% the TN:TP ratio doubled, surface chlorophyll a concentrations doubled and primary production increased 127% compared to the pre-fertilized years of 1992-1994. However, data from Stanley Lake indicates that this increase in lake productivity was partly a result of lake fertilization and partially caused by above average precipitation during the fertilized years of 1995-1998 which increased natural nutrient loading to the Sawtooth lakes. During 1995-1998 in Stanley Lake. the euphoric zone depth decreased by 27% (a larger percent reduction than observed in Redfish Lake), chlorophyll a concentrations increased by 18% and primary productivity increased 26% Disproportionate increases in chlorophyll a and primary productivity in Redfish Lake provide evidence that nutrient supplementation increased the productivity of Redfish Lake. Uniformity of phytoplankton communities indicated that the Redfish Lake food web was efficient (without sinks) and should have improved forage conditions for macrozooplankton. Daphnia biomass remained relatively stable under increased *0. nerka* biomass and overwinter survival of pre-smolts in Redfish Lake increased 240% since fertilization began.

The relationship between river discharge and shovelnose sturgeon (*Scaphirhynkus platoryncus*) diet and food selection in the free flowing Missouri River above Fort Peck Reservoir, Montana.

Douglas J. Megargle, Idaho Department of Fish and Game

Abstract.-- Seasonal variation in discharge impacts aquatic invertebrate distribution and production in rivers and may influence the foraging efficiencies of invertebrate predators. I investigated the relation between variations in discharge and shovelnose sturgeon (*Scaphirhynchus platorynchus*) diet, gut fullness and sturgeon prey availability within a free-flowing section of the Missouri River above Fort Peck Reservoir, Montana. Results of this study were compared to those of similar studies conducted in the dammed (disturbed) Missouri River below Gavins Point Dam, South Dakota. I sampled prey availability (N=105) and sturgeon stomachs (N=99) monthly during ice-free periods in 1994. In Montana, shovelnose sturgeon diets consisted of invertebrates from 12 aquatic orders and included traces of terrestrial invertebrates and larval fish. Sturgeon consumed mainly ephemeropterans, dipterans, tricopterans, and plecopterans. The proportion of these prey items found in sturgeon stomachs varied among months. The relative importance indices of food items generally showed Ephemeroptera as most important followed by Tricoptera, Plecoptera and Diptera. Sturgeon from Montana and South Dakota consumed similar prey items, but at different rates. Shovelnose sturgeon in South Dakota fed predominantly on chironomids and ephemeropterans. I found little evidence that variation in discharge influenced either forage availability or shovelnose diet composition. However, a negative relationship was found between discharge and gut fullness. In South Dakota, discharge was positively related to gut fullness. Seasonal trends in average gut fullness were similar in Montana and South Dakota and the conflicting relation between discharge and gut fullness may be explained by the negative correlation between river flows in the different study areas.

Saturday, March 6:

Variation in body condition of small stocked trout and food availability during winter among regulated rivers in Wyoming.

J. Lance Hebdon (jlhebdon@uwyo.edu)and Wayne A. Hubert (United States Geological Survey, Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Box 3166, Laramie, WY 82071; 307/766-5415; FAX 307/766-5400)

Abstract.-- Wyoming Game and Fish Department has observed high overwinter mortality of 15 to 30 cm TL (subadult) trout stocked the previous summer in regulated rivers (tailwaters) that are not covered by ice during the winter. A preliminary investigation conducted on the Big Horn River during 1995-1996 indicated that food availability may limit overwinter survival. Our study was initiated to compare three regulated rivers through the 1997-1998 winter to determine if food appeared to limit overwinter survival of subadult trout and if the same dynamic occurs among all three rivers. Trout were sampled monthly on each river from October through February, weighed, measured and stomach contents were removed using gastric lavage. Invertebrate drift samples were collected to assess food availability coinciding with fish sampling. Body condition (Wr) remained relatively high and stable for subadult trout in two rivers, but fish in the third river showed a gradual but not serious decline. Invertebrate drift densities declined during midwinter in two rivers, but remained relatively abundant throughout the winter in the third river. Among all three rivers changes in stomach contents of fish reflected the abundance of drifting invertebrates, but food availability did not appear to become limiting. This study indicates that in 1997-1998 food availability was not a major factor limiting overwinter survival of subadult stocked trout in three tailwaters.

Prevalence and Extent of Pathology from Whirling Disease in Rainbow and Cutthroat Trout in the South Fork of the Boise River

Monica Hiner, Christine Moffitt, and Yasunari Kiryu, Department of Fish and Wildlife Resources, University of Idaho, Moscow, Idaho 83844-1136

Abstract.-- We placed newly emerged cutthroat (Henry's Lake stock) and rainbow trout (Troutlodge stock) in replicated enclosures along a 25 km section of the South Fork of the Boise River below Anderson Ranch Reservoir during June, July, and August of 1998. Four sites with suitable fry habitat were selected to represent a range of habitats that fry might inhabit. Habitats ranged from representative cobble/rubble substrate at the uppermost site (just below Anderson Dam) to a heavily organically loaded lower site below a beaver dam with deep silt and fine sediments. Fish were exposed for ten days to river water, then transported to the University and reared for at least 1000 temperature units. All fish were evaluated at the end of rearing for clinical signs of whirling disease (black tail, scoliosis, head/jaw deformities, and exophthalmia) and the heads of at least ten fish per replicate were fixed, sectioned, examined by light microscopy for spores and pathology typical of *Myxobolus cerebralis*, and scored for severity of infection (0 to 4).

Prevalence of *M. cerebralis* determined by histology ranged from zero for groups of fish exposed below Anderson Dam to 90-100% of all fish at the lowest site. The severity of infection among these sites was significantly different (P=0.0001). We found no significant differences between the histological ranks of the two trout species in July, but cutthroat trout were more likely observed with exophthalmia and head/jaw deformities ($P \leq 0.01$). For both species, the lowermost site had the highest prevalence of exopthalmia, head/jaw deformities, and the highest histological ranks. These differences among the four sites illustrate the importance of considering habitat type in future wild fish sampling or live box studies for *M. cerebralis* within a river drainage.

An evaluation of the rainbow trout population utilizing the Deep Creek drainage, Idaho.

Chris Downs, Idaho Department of Fish and Game, 2750 Kathleen Ave, Coeur d' Alene, Idaho 83814

Abstract.-- Historically, the Deep Creek drainage in Idaho was believed to provide the majority of the rainbow trout recruitment to the Idaho reach of the Kootenai River. We employed a rotary-screw trap and a mark-recapture technique to quantify out-migration of juvenile rainbow trout *Oncorhynchus mykiss* from the Deep Creek drainage, and used radio-telemetry and reward-tag returns of post-spawn rainbow trout leaving the drainage to identify life-history strategy. The total out-migrant estimate for March through June, 1998, was 33,197 juvenile rainbow trout. Age determination based on scales and otoliths suggests most out-migration from the Deep Creek drainage takes place at age-1 and age-2, during the spring runoff period. Twenty-two adult rainbow trout were captured in Deep Creek during the spawning migration and radio-tagged. Of the 15 radio-tagged rainbow trout that out-migrated from Deep Creek following spawning, 13 traveled downstream to Kootenay Lake, British Columbia, 135 river kilometers downstream of the tagging site. No radio-tagged rainbow trout traveled upstream to the most suitable fluvial salmonid habitat after leaving Deep Creek. From 1996 to 1998, 190 adult rainbow trout were tagged with $10.00 reward T-bar anchor tags. Six of the fifteen tags returned to date have come from Kootenay Lake. Only one reward tag was returned from a section of the Kootenai River located upstream of Deep Creek. These data suggest the rainbow trout population spawning in Deep Creek is largely comprised of adfluvial rainbow trout from Kootenay Lake. Aside from straying, the juveniles produced in the Deep Creek drainage will also likely recruit to the Kootenay Lake fishery.

Winter nocturnalism in rainbow trout and brook trout: evidence of concealment behavior by resident adult trout

J.S. Gregory, Gregory Aquatics, Mackey, Idaho, and K.A. Meyer, Water Resources Team, Winema National Forest, Klamath Falls, OR

Abstract.-- It has been assumed, with apparently little nighttime investigation, that in winter adult trout do not conceal themselves during the day as do juvenile salmonids, but instead hold daytime positions above the substrate in deep pools. We compared day vs. night underwater counts of adult rainbow trout and brook trout from four streams. At water temperature between 1 and 9 °C, daytime counts accounted for 44% and 16% of nighttime snorkeling counts for rainbow trout and brook trout adults, respectively. Nighttime counts declined for both species as winter progressed, more so for brook trout than rainbow trout. Nocturnalism of both species was higher in streams with colder water temperatures. During the day the number of adult trout observed by snorkeling was 10 times less than the number captured less than 1 hr later by electrofishing the same reach. Adult trout were observed in cobble-boulder substrate and woody

debris during the day.

Effects of Hatchery Trout on Wild Cutthroat Trout (*Oncorhynchus clarki subsp.*) Habitat Use and Behavior, and on Catch and Angler Satisfaction in an Idaho Stream.

Robert K. Brassfield, U.S. Fish and Wildlife Service, 250 S. 4th Avenue, Room 240 Pocatello, ID 83201

Abstract.-- Summer habitat utilization, focal point use, aggressive behaviors, and migration patterns of adult wild cutthroat trout (*Oncorhynchus clarki subsp.)* were quantified in the presence and absence of hatchery-reared catchable-sized cutthroat trout in Tincup Creek, Idaho. Approximately 65% of wild trout focal points were located in the upstream one-third of pools. Most of these focal points were located in current less than 0.2 m / sec., were within 0.5 m of velocities greater than 0.3 m / sec., and were located where stream depths exceeded 0.4 m. Approximately 50% of the hatchery trout occupied focal points similar to focal points held by wild trout. During summer 1997, significantly fewer wild trout were observed at focal points following stocking. Following stocking in summer 1998, 32% of focal points previously held by wild trout were held by hatchery trout. No significant changes in migration of wild trout or the frequency of aggressive behaviors were observed after stocking. Angler catch rate increased from 1.3 trout per hour without stocking to 1.8 trout per hour with stocking. After stocking angler effort increased by 38%, and harvest increased by 62%. However, harvest of wild trout, and angler satisfaction did not change with stocking.

Not Alota lota or The Effects of Winter Flows on Burbot Spawning on Burbot Spawning Migrations in the Kootenai River - Post Libby Dam

Vaughn L. Paragamian, Idaho Department of Fish and Game, 2750 Kathleen Avenue, Coeur d' Alene, Idaho 83814 USA.

Abstract.-- Burbot *Lota lota* are at risk of demographic extinction in the Kootenai River, Idaho, and Kootenay Lake, British Columbia. Burbot fisheries collapsed soon after Libby Dam was constructed in 1972 for flood control and hydropower. Libby Dam reversed the river hydrograph and flows are now three to four times higher during the winter. Burbot are winter spawners and are known to have low swimming endurance. The objective of this investigation was to determine if winter operation of Libby Dam effected burbot movement. Burbot were captured with baited hoop nets from 1994 through 1998 and each year up to 12 fish were implanted with sonic transmitters to monitor movement. Preliminary study the winter of 1994-1995 suggested that water management of Libby Dam effected the upstream migration of burbot during the spawning period. I then tested the hypothesis Ho: high winter flow does not inhibit burbot migration to spawning areas. A conditional agreement was made with the U S Army Corps of Engineers to provide three scheduled periods of low flow (113 n3/8) for a five-day period in November, December, and in January (low flows would be controls). High flow during the winter of 1995-1996 precluded testing and during the winter 1996-1997 no tests were provided. In 1997-1998 three controlled flow tests were completed with minimum discharge periods from Libby Dam of approximately five days duration each during November, December, and January. The Ho,, hypothesis was rejected. There was significantly more burbot movement during the low flow periods than the unrestricted periods ($P =<0.01$) and significantly more movement upstream ($P<0.01$). There was no detectable difference in the direction of movement in November and December ($P>0.01$) but I found movement upstream during the control conditions were significantly higher in January ($P<0.01$). Testing also indicated nose velocities of burbot measured during the control periods were significantly lower than the days of unrestricted dam operation ($P = 0.01$). Burbot also appeared to be attracted to cold water. The river is now warmer than pre Libby Dam years. These findings suggest spawning migrations of burbot in the Kootenai River are disrupted by high flows produced during hydropower production and flood control. Load following was an additional problem for burbot

migrations. The disruption to burbot spawning migration may reduce spawning fitness, reduce stamina, and may have disrupted spawning synchrony. Any of these factors could be have been important to the collapse of burbot.

Diet Analysis of Newly Emergent Kokanee in Lake Pend Oreille, Idaho.

Lance Clarke and David Bennett, Fish and Wildlife Department, University of Idaho, Moscow, ID, 83844-1136

Abstract.-- A project was initiated in June of 1997 to investigate whether food is the limiting resource for zooplanktivorous kokanee *Oncorhyncus nerka* in Lake Pend Oreille. We examined the diet of newly emergent kokanee fry in Lake Pend Oreille from May and June, 1998. We collected 319 fish by trawling the south end of Lake Pend Oreille during the 4 hour period immediately following sunset, and fish were preserved for stomach contents analysis. A dietary index of relative importance, calculated for the entire sampling period, showed that two copepod species, *Cyclops bicuspidatus thomasi* and *Diaptomus ashlandi*, were the most important prey items representing 66% and 18% of the index, respectively. However, in late June species of the larger cladoceran zooplankton *Daphnia* appeared in stomach contents. Although these prey items were present, 26.7 % of all stomachs were empty; the percentage of empty stomachs declining significantly over the sampling period. A stomach fullness index by week showed increasing fullness throughout the sampling period. Results of our diet analysis will be compared with the relative abundance of zooplankton in Lake Pend Oreille to determine if kokanee fry were selectively feeding in May and June

Predatory Influence of Bull Trout on Kokanee, Lake Pend Oreille, Idaho.

Dmitri Vidergar and Dr. David H. Bennett, Dept. of Fish & Wildlife Resources, University of Idaho, Moscow, USA.

Abstract.-- Lake Pend Oreille, Idaho has produced the world record rainbow trout (kamloops) *Oncorhynchus mykiss* and bull trout *Salvelinus confluentus*, and supported a commercial harvest of kokanee salmon *O. nerka* and opossum shrimp *Mysis relicta*. In the last 40 years, the sport fishery for kokanee, rainbow, and bull trout have declined, while the sports fishery for lake trout *S. namaycush* has increased. To identify possible reasons contributing to the decline of kokanee we are examining the impacts of selected predatory fishes on kokanee abundance and survival in Lake Pend Oreille. We trained volunteers through an extensive public education effort to correctly tag and document recaptures of bull trout. Between April 1997 and September 1998, 348 bull trout > 406 mm were caught, tagged, and released in Lake Pend Oreille. Population abundance for bull trout seems to be similar to that of kamloops. Dietary analysis from Lake Pend Oreille shows that bull trout over 406 mm rely heavily on kokanee as a prey item (67%) and on other fishes (18%). Bioenergetic modeling indicates that a significant number of kokanee are consumed per year by bull trout over 406mm. Our results indicate that bull trout constitute one source of mortality to subadult/adult kokanee in Lake Pend Oreille.

A Cooperative Approach to Filling the Data Gap: The History and Status of Fishes in the Little Lost River, Idaho Drainage With Emphasis on Bull Trout

Bart L. Gamett, USDA Forest Service, Lost River Ranger District, P.O. Box 507 Mackay, ID 83251

Abstract.-- Resource management efforts in the Little Lost River drainage have been hindered by a lack of information relating to fish populations. Between 1992 and 1998 an intensive inter-organizational effort was undertaken to remedy this problem by assessing the history and status of fishes in the basin. Historical information was collected from published literature, museum records, stocking records, photographs, journals, family histories, newspaper articles, agency files, and interviews. The current status of fish populations was determined through a systematic assessment of waters in the drainage. A total of 171 stream sections were surveyed by electrofishing, visual observation, angling, or snorkeling. Habitat data were collected using the Forest Service R1/R4 Fish and Fish Habitat Standard Inventory Procedures. Stream temperature data were collected with electronic temperature loggers. Species documented in the drainage include bull trout *(Salvelinus confluentus)*, brook trout *(S. fontinalis)*, rainbow trout *(Oncorhynchus mykiss)*, cutthroat trout *(O. clarki)*, rainbow trout x cutthroat trout hybrids, brook trout x bull trout hybrids, grayling *(Thymallus sp.)*, shorthead sculpin *(Cottus confusus)*, guppy *(Poecilia reticulata)*, green swordtail *(Xiphophorus helleri)*, amelanic convict cichlid *(Cichlasoma nigrofasciatum)*,

Mozambique tilapia *(Tilapia mossambica)*, and goldfish *(Carassius auratus)*. Although mountain whitefish *(Prosopium williamsoni)* have not been documented in the drainage, local accounts indicate they were present in the river in the early 1900's. Brown trout *(Salmo trutta)* were apparently introduced into private ponds in recent years although the species has not been documented in the drainage. A single introduction of golden trout *(O. aguabonita)* into a high mountain lake did not establish a population. Bull trout are widely distributed, exhibiting both fluvial and resident life-history strategies, but their distribution is fragmented. Bull trout occupy approximately 164 km of stream and are the only salmonid present in approximately 32 km of stream. Natural and altered stream temperatures appear to be the most significant factor limiting bull trout abundance and distribution. Brook trout have completely replaced bull trout in Dry Creek and have nearly replaced bull trout in Big Creek, Mill Creek, portions of Squaw Creek, and portions of the North Fork of Squaw Creek. Additional threats to bull trout include disruption of migratory corridors, habitat loss and fragmentation, loss through irrigation diversions, and illegal angler harvest.

Bull Trout Consultation on the West Side of the Payette National Forest

Rodger L. Nelson, David C. Burns, and Eric R. Veach, Payette National Forest, McCall, Idaho

Abstract.-- Final listing of Columbia River bull trout last year presented the Payette National Forest with some interesting questions with respect to assessing the effects of ongoing management actions on the listed species. Bull trout are known to be relatively widespread and sympatric with anadromous fish in the Forest's portion of the Salmon River Basin, where we have previously consulted with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. Outside the Salmon River Basin on the Council and Weiser Ranger Districts, where anadromous species are absent, the distribution of bull trout is more of a mystery. In counterpoint, the latter side of the forest is also more intensively managed than the east side, particularly with respect to timber harvest and grazing.

There are two principal subbasins on the west side of the Payette National Forest, the Weiser River Subbasin and the Brownlee Reservoir Subbasin. Bull trout are well known from the upper portions of the Weiser River on the western flank of Council Mountain, but were unknown elsewhere in the watershed. In the Brownlee Reservoir Subbasin, there are few large watersheds, with most streams draining more-or-less directly to the Snake River above Hells Canyon Dam, and only one population was known to exist. Consultation was clearly required for the activities in watersheds where bull trout were known to exist, but what was to be done outside these limited areas?

Our objective was to be conservative with respect to protection of fish without interfering unnecessarily with ongoing actions, so we applied some probablilistic modeling based loosely on the work of Rieman and McIntyre (1995). Areas above 1600m on the west side of the Forest were mapped by watershed with GIS and acreages of several polygons with connected habitat above this were estimated. Several criteria were used to decide which polygons were "reasonably" likely to support bull trout; likelihood was estimated on a combination of patch size, probable accessibility, population sampling records, and professional judgement. In general, the known populations on the west side of the Forest were in areas that would have been selected by the model as likely areas, though some populations were known from the Weiser to extend below 1600m. We pursued consultation for the known and likely watersheds.

Beyond simply allowing us to focus our consultation on ongoing Forest actions, another important result of this effort was to promote looking for bull trout in the most likely areas. One of the mitigation efforts required of actions determined to possibly affect bull trout survival in watersheds where we felt they were likely to occur was better fish population surveys. Initially, we had some "negative success" in Rush Creek, which has a patch area of sufficient size but above a waterfall over the fault scarp on the southwest side of Cuddy Mountain. We initially rejected this area as a likely patch because of the nature of the barrier, and when we looked, only introduced species were found. There was also some positive success. We have found two local, probably resident, populations on the west side that were formerly unknown, one in the Weiser River watershed and one in the Brownlee Reservoir Subbasin. The former population is in an area essentiaslly predicted by the model; in fact, we had identified it as being the place we thought that we were most likely to discover a population in the Brownlee Reservoir Subbasin. The other newly-discovered population is in an area that deviates somewhat from model criteria, but its discovery was not really very surprising given the stream's northerly aspect and attachment slightly below 1600m to a patch our model would have determined as being likely to support bull trout.

Evaluation of efforts to remove lake trout from Upper Priest Lake

Jim Fredericks, Regional Fisheries Biologist, IDFG

Abstract.-- In 1998, IDFG received funds from the U.S. Fish and Wildlife Service (USFWS) through Section 6 of the Endangered Species Act to begin removing lake trout from Upper Priest Lake. The project was intended to reduce the potential threat to bull trout and to provide an opportunity to evaluate removal efforts. We used experimental gill-nets from June through November to capture and remove lake trout. To minimize incidental mortality to bull trout, netting was suspended in August and September, and nets were pulled every 40-50 minutes. We removed a total of 912 lake trout from Upper Priest Lake, which we believe was over half of the initial Upper Priest Lake population. Declining catch rates through September suggested that we were effectively depleting the lake trout population. Increasing catch rates in October and November, combined with information from tagged-fish, indicated that immigration from Priest Lake may have compromised the removal efforts. Forty-six bull trout were incidentally netted during the lake trout removal efforts, three of which were mortalities. Based on a multiple census estimate using recaptured fish, the adult bull trout population in Upper Priest Lake at the time of the study was approximately 93 fish. In 1999, we plan to evaluate the feasibility of a preventing lake trout immigration to Upper Priest Lake with a fish passage barrier in the Thorofare.

The use of a backpack electrofisher to remove brook trout from tributaries of the Upper Priest Lake drainage.

Eric Crawford, Idaho Department of Fish and Game

Abstract.-- We used snorkeling and electrofishing to evaluate distribution and relative abundance of brook trout, cutthroat trout, and bull trout in the thirteen major tributary streams within the Upper Priest Lake drainage. Five of the streams were identified with sympatric populations of brook trout and bull trout, but only three were small enough to be conducive to electrofishing. In August and early September, we used backpack electrofishing equipment to remove brook trout from the three smaller tributary streams. Based on depletion estimates, we were successful in removing over 90% of the brook trout in two of the streams, but we removed only approximately 50% of the brook trout from the third stream, where success was limited by woody debris and dense riparian cover. Depletion efficiency was positively related to size-class. We collected several fish believed to be brook trout x bull trout hybrids.