

# Proceedings of the 54<sup>th</sup> Annual Pacific Northwest Fish Culture Conference



Doubletree Hotel, Lloyd Center  
Portland, Oregon  
December 2-4, 2003

## Preface

The National Marine Fisheries Service (NOAA) is honored and privileged to host the 54<sup>th</sup> annual Pacific Northwest Fish Culture Conference. Fish culturists, scientists and interested

individuals from private, state, provincial, tribal and federal finfish hatchery facilities in the Pacific Northwest and elsewhere in North America have used this unique and informal conference for the exchange of information and ideas about all aspects of fish culture for the past 54 years. These conferences are hosted on a rotating basis by the various fish resource agencies in the Pacific Northwest. The subject matter generally focuses on topics directly applicable to fish culture, although many times the subjects spill over into management and research themes, which are intimately entwined with the science of fish culture. This conference is also used to renew old friendships, begin new ones, and develop personal contacts between those of common interest. All persons interested in fish husbandry are invited to attend and to actively participate.

*These Proceedings contain abstracts and talks presented at the conference. They are unedited, contain progress reports of uncompleted programs, and, as such, should not be considered a formal peer-reviewed publication. Mention in these Proceedings does not indicate approval, recommendation, or endorsement of any proprietary product or material.*

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Files in this section are included in Adobe Acrobat Portable Document Format (PDF), Corel WordPerfect (WP), and/or Microsoft Word (Word). A free Acrobat Reader program can be found in the [Software Section](#).

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### Presentations and Abstracts:

These presentations were primarily created in PowerPoint, but have been converted into PDF format for inclusion in this CD. If you do not have PowerPoint or Acrobat Reader, you will need to install one of the appropriate free viewers from the [software section](#). A few of the presentations are yet unavailable, however abstracts have been included.

### 2003 Northwest Fish Culture Conference Agenda

## **I. Hatchery/Wild Interactions: Dr. Barry Berejikian (NOAA Fisheries Science Center, Behavioral Ecology Team Leader) Convener**

Reducing Risks to Wild Stocks: Hatchery Steelhead Programs Using Wild and Domestic Broodstock Sources on the Kalama River, Washington *Patrick Hulett, Cameron Sharpe, Chris Wagemann, and Chris Gleizes (WDFW)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#)

Assessing the Fitness of Hatchery and Natural-origin Steelhead Trout in the Hood River. *William Ardren (USFWS) and Michael Blouin (Oregon State Univ.)* Abstract [\[PDF\]](#)

Changes in Tulalip Tribal Enhancement Program Practice to Minimize Negative Effects on Natural and Program Fish. *Mike Crewson and Steven Young (Tulalip Natural Resources Division)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Addressing the Potential Effects of Hatchery Interactions on the ESA Listed Species, Hood Canal Summer Chum Salmon. *Tim Tynan (NOAA Fisheries- NWR), Thom Johnson (WDFW) and Chris Weller (Point-No-Point Treaty Council)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Steelhead Supplementation in the Hamma Hamma River, WA: Minimizing Genetic and Ecological Risks to the Wild Population. *Kathy Hopper, Rick Endicott, and Joy Lee (Long Live the Kings) and Barry Berejikian (NOAA Fisheries- NWFSC)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Use of Video Technology to Investigate Hatchery and Wild Fish Interactions and Hatchery Fish Behavior. *Rod Engle and Tom Hoffman (USFWS)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

## **II. Broodstock Techniques: Michael Delarm (NOAA Fisheries, NW Region, Salmon Recovery Division) Convener**

An Overview of Uses and Applications of Ultrasound in Fish Culture. *Marla Chaney (ODFW)* Abstract [\[PDF\]](#)

The Use of Ultrasound for Early Determination of Maturation and Sex in Captive Broodstock Chinook Salmon. *Tim Hoffnagle and Marla Chaney (ODFW)* Abstract [\[PDF\]](#) Expanded Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Classification of Gender and Maturity Status In Chinook and Coho Salmon by Short Wavelength Near Infrared Spectroscopy. *Anna Cavinato, Calvin Davis, and Heather Peters (Eastern Oregon University), Tim Hoffnagle (ODFW) and David M ayes (Dsquared Development, Inc.)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

### **III. Non-Salmonid Culture: Dr. Mike Rust (NOAA Fisheries, Northwest Fisheries Science Center, Marine Fish Enhancement Team Leader) Convener**

Proximate Composition and Sensory Evaluation of Juvenile Sablefish (*Anoploma fimbria*) Fed Diets Containing 10% to 30% Lipid. *Sage Chaiyapechara (Univ. of Washington), Faye Dong (Univ. Of Illinois), Ken Masee, Harold Barnett, and Michael Rust (NOAA Fisheries- NWFSC)* Abstract [\[PDF\]](#) \_

The Effects of Light, Feed Type, Artificial Substrate and Stocking Density of Larval Lingcod (*Ophiodon elongatus*) Cultured in Floating Bags. *Ken Masee, Ron Sailor\*, Thomas Scott, and Michael Rust (NOAA Fisheries- NWFSC) and Roderick Campbell and Beverly Braid\*\* (WDFW) [\*Deceased \*\* No longer with WDFW]* Abstract [\[PDF\]](#) \_

Development of Effective Microparticulate Diets for Marine Fish Larvae. *Matthew Cook, Mike Rust, Ronald Johnson, Chris Langdon, Frederic Barrows, Pete Nicklason, and Brendon Clack (NOAA Fisheries- NWFSC)* Abstract [\[PDF\]](#) \_

Beyond the Adipose Fin. *Mike Rust (NOAA Fisheries- NWFSC)* Abstract [\[PDF\]](#)

Pacific Aquiculture Caucus. *Colin Nash (NOAA Fisheries- NWFSC)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

### **IV. Physiology and Fish Health: Dr. Mark Strom (NOAA Fisheries, Northwest Fisheries Science Center, Fish Health/Microbiology Team Leader) Convener**

Controlling Age and Seasonal Timing of Reproduction in Cultured Pacific Salmon. *Penney Swanson and Karl Shearer (NOAA Fisheries- NWFSC) and B. Campbell (Univ. of Washington)* Abstract [\[PDF\]](#)

Effects of Growth on Precocious Male Maturation of Salmon. *Donald Larsen, Brain Beckman, Paul Parkins, Kathy Cooper, and Walt Dickoff (NOAA Fisheries- NWFSC)* Abstract [\[PDF\]](#)

Management of Bacterial Kidney Disease with the “New” Kirkegaard and Perry Antibodies. *Roberta Scott, Douglas Munson, and Keith Johnson (IDFG)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#)

The Potential for Vaccines in Controlling Bacterial Kidney Disease. *Linda Rhodes, Cindra Rathbone, Lee Harrell, and Mark Strom (NOAA Fisheries- NWFSC) and Stephen Corbett (National Park Service- Olympic National Park)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

The Efficacy and Safety of AQUI-S® as an Anesthetic on Freshwater Fish. *Jim Bowker, Molly Bowman, Dab Carty, Bonnie Johnson, and Dave Erdahl (USFWS)* Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Calcein and Florfenicol: Update on a new USFWS INAD and the Completion of and Initial Approval for

Use of Florfenicol-medicated Feed in Aquiculture. **Jim Bowker, Dave Erdahl, Dan Carty, Molly Bowman, and Bonnie Johnson (USFWS)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Profile of Bacterial in the Gastrointestinal Tract of Chinook Salmon (*Oncorhynchus tshawytscha*) Before, During, and Following Administration of Erythromycin Rations. **Jon Amberg, S.M.A Moblin, and Christine Moffitt (Univ. Of Idaho)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#)

Appearance of Squamous Cell Carcinomas in Four Spring Chinook Salmon Populations in Northeast Oregon: A Review of its History, Current Distribution, and Potential Management Implications. **Mary Edwards (Nez Perce Tribe) and John Kaufman (ODFW)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

## **V. Hatcheries and Conservation/ Restoration: Tom Flagg (NOAA Fisheries, Northwest Fisheries Science Center, Program Manager, Fisheries enhancement) Convener**

Management Goals for Hatchery Broodstock- Genetic Integration vs. Segregation. **Don Campton (USFWS)** Abstract [\[PDF\]](#) \_

Broodstock Protocols. **Herb Pollard (NOAA Fisheries- NWR) and Tom Flagg (NOAA Fisheries- NWFSC)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

A Review of Recent Studies investigation Seminatural Rearing Strategies as a Tool for Increasing Pacific Salmon Post-release Survival. **Des Maynard, Tom Flagg, Robert Iwamoto, and Conrad Mahnken (NOAA Fisheries- NWFSC)** Abstract [\[PDF\]](#)

Monitoring and Evaluation of a Production Chinook Supplementation Facility. **Dave Fast (Yakama Nation)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Use of Hydraulic Sampling Methods to Source Spring Chinook Salmon Eggs for a Captive Propagation Program. **Jeff Heindel, Danny Baker, Paul Kline, and David Vendetti (IDFG ) and William McAuley (NOA A Fisheries-NWFSC)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Effects of Growth Rate Modulation on Age at Maturity of Redfish Lake Sockeye Salmon Captive Broodstock. **William Fairgrieve (Pacific States Marine Fisheries Commission) and Carlin McAuley and Deborah Frost (NOAA Fisheries- NWFSC)** Abstract [\[PDF\]](#)

## **VI. General Hatchery Practices: RZ Smith ( NOAA Fisheries, NW Region, Salmon Recovery Division, Director- Columbia River Fisheries Development Program) Convener**

Oregon's New Hatchery Research Center. **Mark Lewis, Mary Buckman, and Mario Solazzi (ODFW)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Freshwater Fisheries Society of B.C.– A New Model For Delivery of Government Fish Culture Programs. **Donald Peterson (Freshwater Fisheries Society of British Columbia)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

The Culture, Monitoring, and Evaluation of Reconditioned Kelt Steelhead in the Yakama River Basin. **David Fast (Confederated Tribes of the Yakama Nation)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

An Evaluation of Electro-anesthesia Techniques Using Adult Spring Chinook Salmon at Carson National Fish Hatchery. **William Gale, Gayle Zydlewki, John Holmes, Jeff Johnson, Bill Thorson (USFWS), and Troy Brigham (Smith-Root, Inc.)** Abstract [\[PDF\]](#)

Upwelling Incubator Modifications, or “Go Up Young Man, Go Up!” **Peter Brown, Peter Spyksma, and Bob Swinhoe (FFSBC)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Effect of Elevated Water Temperatures on Smolt Development and Non-specific Immune Functions in Trinity River Chinook Salmon Smolts. **Scott Foott, R. Harmon, and R. Stone (USFWS)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#)

Automated Fish Marking – Using the AutoFish System in Oregon. **Christine Mallette and Goeffrey Gribble (ODFW)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

Optimizing Water Supply Well Performance. **Jim Bailey (Golder Associates)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

An Evaluation of Fresh water Recoveries of Fish Released from National Fish Hatcheries in the Columbia River Basin, and Observations of Straying. **Steve Pastor (USFWS)** Abstract [\[PDF\]](#)

Cryopreserved Sperm – How much is enough? How much is too much? **Loren Jensen and Marla Chaney (ODFW)** Abstract [\[PDF\]](#)

Outplanting Adult Hatchery Fish into the Stream as a Way to Increase Natural Production. **David Hand, Doug Olsen, and Tom Hoffman (USFWS) and Bob Spateholts and Geoff FitzGerald (Confederated Tribes of the Warm Springs Reservation)** Abstract [\[PDF\]](#) Presentation [\[PDF\]](#) \_

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# Software

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