

SIX DECADES OF FISHERY GENETICS:  
A RETROSPECTIVE VIEW AND A VISION FOR THE FUTURE

September 17-18, 2007  
Museum of History and Industry (MOHAI), Seattle

Monday, September 17, MOHAI Auditorium

0800 Arrival and Registration

0830 *Introduction.* Robin Waples, Northwest Fisheries Science Center, Seattle

*Oral Session #1 Population Genetics (session chair Robin Waples)*

0845 *A six-decade perspective of fishery genetics.* Fred M. Utter, University of Washington, Seattle, and Nils Ryman, Stockholm University, Sweden

0915 *Challenges in identifying genetic subdivisions in the face of high gene flow and potentially strong selection.* François Bonhomme, Université Montpellier, France

0940 *Identifying the environmental factors that influence population processes using genetic and environmental data: An application to herring populations from the North and Baltic seas.* Oscar Gaggiotti, Université Joseph Fourier, Grenoble, France

1005 *Use of genetic information to define conservation and management units of salmon.* Anne Marshall, Washington Department of Fish and Wildlife, Olympia

1030 Break

1055 *Project CROOS: a unique collaboration among scientists, commercial fishermen, and fisheries managers.* Michael Banks, Oregon State University, Newport, et al.

1120 *Ecological insights from genetic stock identification of juvenile salmon.* David Teel, Northwest Fisheries Science Center, Seattle

1145 *The FISH-BOL campaign to DNA barcode all species of fish.* Bob Ward, CSIRO, Hobart, Tasmania

1210 *Forensic applications of molecular genetic data.* Linda Park and Piper Schwenke, Northwest Fisheries Science Center, Seattle

1235 Lunch

*Oral Session #2 Ecological Genetics (session chair Jeff Hard)*

- 1335            *Introduction.* Jeff Hard, Conservation Biology Division, NMFS Northwest Fisheries Science Center, Seattle
- 1345            *A quantitative genetic approach to understanding human-induced changes in fish life histories.* Derek Roff and Daphne Fairbairn, Department of Biology, University of California Riverside
- 1410            *Genetic variability in reaction norms and fish population responses to environmental change.* Jeff Hutchings, Department of Biology, Dalhousie University, Halifax, Nova Scotia, Canada
- 1435            *Fishery-induced evolution in Chinook salmon: the role of harvest gear, location and genetic correlations among life history traits.* Willy Eldridge, School of Aquatic and Fishery Sciences, University of Washington, Seattle
- 1500            Break
- 1525            *Observations relating to inbreeding and outbreeding depression in Sashin Creek steelhead.* Frank Thrower, Auke Bay Laboratory, NMFS Alaska Fisheries Science Center, Juneau
- 1550            *The role of gene-environment interactions in determining lake trout morphotypes.* Rick Goetz, Great Lakes WATER Institute, Milwaukee, Wisconsin
- 1615            *Genomic analysis of growth-related traits in two Pacific salmon species, Chinook and coho.* Kerry Naish, School of Aquatic and Fishery Sciences, University of Washington, Seattle
- 1640            *Towards understanding the genes promoting alternative migratory life history strategies in salmonids: genomic analysis of morphological and physiological indices of smoltification in *Oncorhynchus mykiss*.* Krista Nichols, Departments of Biological Sciences & Forestry and Natural Resources, Purdue University, West Lafayette, Indiana
- 1705            Discussion
- 1745 - 1945    Reception and Poster Session – McGurdy Gallery, MOHAI

Tuesday, September 18, MOHAI Auditorium

*Oral Session #3 Hatcheries and Aquaculture (session chair Michael Ford)*

- 0830            *What has changed within three generations: DNA parentage analysis on the Hood River steelhead.* Hitoshi Araki, Oregon State University, Corvallis
- 0855            *Measuring natural selection in the hatchery and wild environments of a supplemented salmon population.* Michael Ford, Northwest Fisheries Science Center, Seattle
- 0920            *Genetic analysis of domestication in salmonids.* Gary Thorgaard, Washington State University, Pullman
- 0945            *Analyzing genetic interactions between wild and hatchery brown trout - a matter of scales.* Michael Hansen, Danish Institute for Fisheries Research, Silkeborg, Denmark
- 1010            Break
- 1035            *Effects of artificial propagation on resident and anadromous life history types of *Oncorhynchus mykiss*.* Shawn Narum, Columbia River Inter-Tribal Fish Commission, Portland, Oregon

*Oral Session #4 Environment, Health, and Physiology (session chair Walt Dickhoff)*

- 1100            *The genome sequence of *Renibacterium salmoninarum* ATCC 33209 suggests reductive genome evolution from environmental *Arthrobacter*.* Mark Strom, Northwest Fisheries Science Center, Seattle
- 1125            *Large-scale gene expression analyses to assess reproductive status.* Julien Bobe, INRA, Rennes, France
- 1150            *Functional genomics of bluefish and winter flounder.* Peter Straub, Richard Stockton College, New Jersey
- 1215            Lunch
- 1315            *Genetic and genomic analyses provide insight into the relationship between infectious hematopoietic necrosis virus (IHNV) and salmonid fishes.* Maureen Purcell and Gael Kurath, US Geological Survey, Western Fisheries Research Center, Seattle.

*Oral Session #5 Future Applications and Emerging Technology (session chair Linda Park)*

- 1340            *Beautiful hypotheses as yet untouched by ugly facts: the next decade in fisheries genetics.* Lorenz Hauser, School of Aquatic and Fishery Sciences, University of Washington, Seattle
- 1405            *Large scale parentage inference for fishery management, gene mapping, and ecological investigation.* Carlos Garza, Southwest Fisheries Science Center, Santa Cruz, California
- 1430            *Application of molecular methods to the study of larval dispersal, connectivity, and recruitment.* Russ Vetter, Southwest Fisheries Science Center, La Jolla, California
- 1455            Break
- 1520            *The next decade of fishery genetics: whole genome sequencing, SNP discovery, and SNP applications.* Jim Seeb, School of Aquatic and Fishery Sciences, University of Washington, Seattle
- 1545            *Emerging molecular tools and technologies for marine biosensing: efforts in the area of Oceans & Human Health.* Kelly Goodwin, Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida
- 1610            Discussion
- 1645            Adjourn

## Posters

**The use of microsatellite markers to compare the population structure of *pseudo-nitzschia pungens* from the pacific northwest and the north sea**

Nicolaus G. Adams<sup>1\*</sup>, Lorenz Hauser<sup>2</sup>, Russell P. Herwig<sup>2</sup>, Gabrielle Rocap<sup>3</sup>, and Vera L. Trainer<sup>1</sup> \* [Nicolaus.Adams@noaa.gov](mailto:Nicolaus.Adams@noaa.gov)

<sup>1</sup>NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

<sup>2</sup>University of Washington, School of Aquatic and Fishery Sciences, Seattle, WA, 98195, USA,

<sup>3</sup>University of Washington, School of Oceanography, Seattle, WA, 98195, USA

**Discovery of genes associated with whirling disease infection and resistance in rainbow trout using genome-wide expression profiling**

Melinda R. Baerwald<sup>1\*</sup>, Ronald P. Hedrick<sup>2</sup>, Bernie May<sup>1</sup>

\* [mrbaerwald@ucdavis.edu](mailto:mrbaerwald@ucdavis.edu)

<sup>1</sup>Department of Animal Science, University of California Davis, Davis, CA, USA

<sup>2</sup>Department of Medicine and Epidemiology, University of California Davis, Davis, CA, USA

**Life history plasticity in Sacramento River winter-run Chinook salmon: interactions among photoperiod at emergence and growth modulate smolting and early male maturation.**

Brian R. Beckman<sup>1\*</sup>, Brad Gadberry<sup>1</sup>, Paul Parkins<sup>2</sup>, Kathleen A. Cooper<sup>2</sup>, and Kristen D.

Arkush<sup>3</sup> \* [Brian.Beckman@NOAA.gov](mailto:Brian.Beckman@NOAA.gov)

<sup>1</sup>NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

<sup>2</sup>University of Washington, School of Aquatic and Fishery Sciences, Seattle, WA, 98195, USA,

<sup>3</sup>University of California Davis, Bodega Marine Laboratory, Bodega Bay CA.

**Phylogeography determined by recent geological history: tui chubs (*Siphateles bicolor*) in the Great Basin and Eastern Sierra**

Natalia M. Belfiore<sup>1\*</sup>, Mark J. Bagley<sup>2</sup>, Eric Waits<sup>2</sup>, Bernie P. May<sup>1</sup>

<sup>1</sup> Department of Animal Science, One Shields Avenue, University of California, Davis CA 95616; \* [nmb@berkeley.edu](mailto:nmb@berkeley.edu) ; [bpmay@ucdavis.edu](mailto:bpmay@ucdavis.edu)

<sup>2</sup> Molecular Ecology Research Branch, United States Environmental Protection Agency, Cincinnati OH, 45268; [bagley.mark@epamail.epa.gov](mailto:bagley.mark@epamail.epa.gov); [waits.eric@epa.gov](mailto:waits.eric@epa.gov)

**Deep-water coral DNA repository for the NE Pacific**

Ewann A. Berntson<sup>1\*</sup>, Elizabeth Clarke<sup>2</sup>, and Linda K. Park<sup>1</sup>

\* [ewann.berntson@noaa.gov](mailto:ewann.berntson@noaa.gov)

NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

<sup>1</sup>Conservation Biology Division

<sup>2</sup>Fishery Resource Analysis and Monitoring Division

**Salmon populations dance the metapopulation limbo: How low can they go?**

Ewann Berntson<sup>1</sup> and Paul Moran<sup>1</sup>

\* [ewann.berntson@noaa.gov](mailto:ewann.berntson@noaa.gov); Paul.Moran@noaa.gov

NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

<sup>1</sup>Conservation Biology Division

**Utilization of microsatellite markers for a preliminary analysis of southern flounder (*Paralichthys lethostigma*) genetic resources on the Texas Coast, applications for stock enhancement.**

Blandon, I.R.<sup>1\*</sup>, R. Ward<sup>2</sup>, R.R.Vega<sup>1</sup>, and K. Cammarata<sup>3</sup> F. Martínez-Andrade<sup>1</sup>

<sup>1</sup> CCA/CPL Marine Development Center, Texas Parks and Wildlife Department, Corpus Christi, TX, 78418. [Ivonne.Blandon@TPWD.State.TX.US](mailto:Ivonne.Blandon@TPWD.State.TX.US) Robert.Vega@TPWD.State.TX.US

Fernando.Martinez@ TPWD.State.TX.US

<sup>2</sup> USGS/BRD Northern Appalachian Research Laboratory, 176 Straight Run Road, Wellsboro, PA , 16901 rward@usgs.gov 570-724-3322 ext232

<sup>3</sup> Texas A&M University - Corpus Christi, 6300 Ocean Drive, Corpus Christi, TX, 78418 Kirk.Cammarata@tamucc.edu

**Genetic population structure of Pacific cod over broad and local geographic scales.**

Canino MF<sup>1</sup>, Cunningham KM<sup>2</sup>, Spies IB<sup>1</sup>, Hauser, L<sup>2</sup>

\* [Mike.Canino@noaa.gov](mailto:Mike.Canino@noaa.gov)

<sup>1</sup>Alaska Fisheries Science Center, Seattle WA 98115

<sup>2</sup>School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA 98195

**Population-of-Origin Assignments for Winter-run Steelhead Captured as By-catch in the Columbia River Tangle Net Fishery**

Cheryl A. Dean<sup>\*</sup>, Cherril M. Bowman, and Todd W. Kassler

\* [deancad@dfw.wa.gov](mailto:deancad@dfw.wa.gov), bowmacmb@dfw.wa.gov, kassltwk@dfw.wa.gov

WDFW Molecular Genetics Laboratory, Olympia, WA 98513

**Forensic Marine Fish Voucher Collection to Aid Law Enforcement**

Anna E. Elz<sup>\*</sup>, Piper Schwenke, and Linda Park

\* [anna.elz@noaa.gov](mailto:anna.elz@noaa.gov), piper.schwenke@noaa.gov, linda.park@noaa.gov

NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

Conservation Biology Division

**Where did these fish come from? Chinook salmon individual assignment to Evolutionary Significant Unit (ESU)**

Anna E. Elz<sup>\*</sup>, Piper Schwenke, and Linda Park

\* [anna.elz@noaa.gov](mailto:anna.elz@noaa.gov), piper.schwenke@noaa.gov, linda.park@noaa.gov

NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

Conservation Biology Division

### **Can the consequences of interbreeding between farmed and wild salmon be predicted from the extent of divergence between parents?**

Dylan J. Fraser\*, Patrick O'Reilly<sup>^</sup> and Jeffrey A. Hutchings

\* [dylan.fraser@dal.ca](mailto:dylan.fraser@dal.ca)

Department of Biology, Dalhousie University, Halifax, Nova Scotia, Canada B3L 4J1.

<sup>^</sup>Department of Fisheries and Oceans Canada, Bedford Institute of Oceanography, 1 Challenger Drive, Dartmouth, Nova Scotia, Canada B2Y 4A2

### **Genetic assignment of fish origin enables stray rate calculations**

Kinsey E. Frick<sup>1</sup>, Brian J. Burke<sup>1</sup>, Matthew L. Keefer<sup>2</sup>, Eric S. LaHood<sup>1</sup>

\* [kinsey.frick@noaa.gov](mailto:kinsey.frick@noaa.gov)

<sup>1</sup>Northwest Fisheries Science Center, 2725 Montlake Boulevard East, Seattle, WA 98112

<sup>2</sup>U.S. Geological Survey, Idaho Cooperative Fish and Wildlife Research Unit, University of Idaho, Moscow, Idaho 83844

### **Isolation and characterization of a zebrafish with muscular dystrophy**

Jeffrey R. Guyon<sup>1-2\*</sup>, Julie Goswami<sup>1</sup>, Susan Jun<sup>1</sup>, Marielle Thorne<sup>1</sup>, Melanie Howell<sup>1</sup>, Timothy Pusack<sup>1</sup>, Galdzicki, M.<sup>1</sup> and Louis M. Kunkel<sup>1-3\*</sup>

[jeffrey.guyon@alaska.gov](mailto:jeffrey.guyon@alaska.gov)

<sup>1</sup>Division of Genetics, Children's Hospital, Boston, MA, USA, <sup>2</sup>Department of Genetics, Harvard Medical School, Boston, MA, USA, and <sup>3</sup>Howard Hughes Medical Institute, Boston, MA, USA, Children's Hospital Boston, MA, USA

\* Current address: Alaska Department of Fish and Game, Gene Conservation Laboratory, Anchorage, AK, USA

### **Applying Genetic Data to Management Needs: Sockeye Salmon Returning to Bristol Bay Drainages**

Christopher Habicht<sup>1\*</sup>, Lisa W. Seeb<sup>1</sup>, Joseph Miller<sup>2</sup>, Lowell Fair<sup>1</sup>, Carol Ann Woody<sup>3</sup>, Kristina M. Ramstad<sup>4</sup>, Michael Link<sup>5</sup>, Gina R. Johnston<sup>1</sup>, Eric S. Lardizabal<sup>1</sup>, Richard Wilmot<sup>6</sup>, John H. Clark<sup>7</sup>, James E. Seeb<sup>1</sup>

<sup>1</sup>Alaska Department of Fish and Game, Anchorage, AK; <sup>2</sup>Katmai National Park and Preserve (KATM) and Alagnak Wild River (ALAG), King Salmon, AK; <sup>3</sup>Science and Education toward a Sustainable Future, Anchorage, AK; <sup>4</sup>Victoria University of Wellington, Wellington, New Zealand; <sup>5</sup>Bristol Bay Science and Research Institute, Dillingham, AK & LGL Alaska Research Associates Inc., Anchorage, AK; <sup>6</sup>National Oceanic and Atmospheric Administration, Juneau, AK; <sup>7</sup>Alaska Department of Fish and Game, Juneau, AK

\* Gene Conservation Laboratory, Commercial Fisheries Division, 333 Raspberry Road, Anchorage, AK 99518. [chris.habicht@alaska.gov](mailto:chris.habicht@alaska.gov).

**Population genetics and juvenile life-history evolution of Chinook salmon, (*Oncorhynchus tshawytscha*), in the Skagit River Basin of Puget Sound**

Heeg<sup>1\*</sup>, Elizabeth R., Tricia Lundrigan<sup>2</sup>, David Teel<sup>3</sup>, Paul Moran<sup>3</sup>, and Correigh Greene<sup>3</sup>

\* [erheeg@u.washington.edu](mailto:erheeg@u.washington.edu), [tlundrig@uvic.ca](mailto:tlundrig@uvic.ca), [david.teel@noaa.gov](mailto:david.teel@noaa.gov), [paul.moran@noaa.gov](mailto:paul.moran@noaa.gov), [correigh.greene@noaa.gov](mailto:correigh.greene@noaa.gov)

<sup>1</sup>University of Washington, School of Fisheries, 1122 NE Boat St., Seattle, WA 98105;

<sup>2</sup>Centre for Biomedical Research, University of Victoria, PO Box 3020 STN CSC; Victoria, B.C. V8W 3N5 Canada

<sup>3</sup>Northwest Fisheries Science Center, NMFS, NOAA; Conservation Biology; 2725 Montlake Blvd. E.; Seattle, WA 98112

**The Use of Molecular Genetics for Species and Stock Identification of Southern Resident Killer Whale Prey**

Jennifer Hempelmann<sup>1</sup>, M. Bradley Hanson<sup>1</sup>, Don Van Doornik<sup>1</sup>, Robin W. Baird<sup>2</sup>, Candice Emmons<sup>1</sup>, Gregory S. Schorr<sup>2</sup>, and John Sneva<sup>3</sup>

\* [Jennifer.Hempelmann@noaa.gov](mailto:Jennifer.Hempelmann@noaa.gov)

<sup>1</sup>NOAA-Fisheries, Northwest Fisheries Science Center, 2725 Montlake Boulevard E., Seattle, WA 98112

<sup>2</sup>Cascadia Research Collective, 218 ½ West Fourth Avenue, Olympia, WA 98501

<sup>3</sup>Washington Department of Fish and Wildlife, 600 Capital Way North, Olympia, WA 98501

**Discordant genetic breaks along the Northeastern Pacific coast for sympatric sister species of rockfish**

Hess\*, Jon E.

*Northwest Fisheries Science Center, Conservation Biology Division, 2725 Montlake Boulevard East, Seattle, WA 98112-2097, USA. [jon.hess@noaa.gov](mailto:jon.hess@noaa.gov)*

**Conservation implications of genetic structuring in North American green sturgeon in western rivers and estuaries**

Joshua A. Israel<sup>\*</sup> and Bernie May

\* [jaisrael@ucdavis.edu](mailto:jaisrael@ucdavis.edu), [bpmay@ucdavis.edu](mailto:bpmay@ucdavis.edu)

Department of Animal Science, University of California, Davis, 1 Shields Ave, Davis CA 95616

**Assessing relatedness estimators for kin group inference and spawner estimation in North American green sturgeon**

Joshua A. Israel<sup>\*</sup> and Bernie May

\* [jaisrael@ucdavis.edu](mailto:jaisrael@ucdavis.edu), [bpmay@ucdavis.edu](mailto:bpmay@ucdavis.edu)

Department of Animal Science, University of California, Davis, 1 Shields Ave, Davis CA 95616

**The Role of Microsatellite Allele Ladders to Facilitate Inter-laboratory Standardization: An Example from the Genetic Analysis of Pacific Salmon (GAPS) Research Community**

Eric S. LaHood<sup>1</sup>, Ora Schlei<sup>2</sup>, Paul Moran<sup>1</sup>, John Wenburg<sup>2</sup>, and Jeffrey Olsen<sup>2</sup>

\* [eric.lahood@noaa.gov](mailto:eric.lahood@noaa.gov)

<sup>1</sup>Conservation Biology Division, Northwest Fisheries Science Center, 2725 Montlake Boulevard East, Seattle, Washington 98112, USA. <sup>2</sup>Conservation Genetics Laboratory, USFWS, 1011 East Tudor Rd., Anchorage AK 99503, USA

**Genomic biomarkers for assessing fish reproductive health.**

J. Adam Luckenbach<sup>1,2\*</sup>, Tristan J. Stringer<sup>1,2</sup>, Frederick W. Goetz<sup>3</sup>, Graham Young<sup>2</sup>, Penny Swanson<sup>1</sup>.

\* [Adam.Luckenbach@noaa.gov](mailto:Adam.Luckenbach@noaa.gov)

<sup>1</sup>Northwest Fisheries Science Center, NOAA, Seattle, WA 98112, USA, <sup>2</sup>School of Aquatic & Fishery Sciences, University of Washington, Seattle, WA 98195, USA,

<sup>3</sup>Great Lakes WATER Institute, University of Wisconsin, Milwaukee, WI 53201, USA

**AFTC's Applied Research Program in Conservation Genetics: providing restoration & management support in the Pacific Region**

William Ardren, Patrick DeHaan, Matt Diggs, Lindsay Godfrey, Amanda LaGrange, Andrew Matala\*, Jonathan Nelson, Christian Smith

\* [andrew\\_matala@fws.gov](mailto:andrew_matala@fws.gov)

*U.S. Fish and Wildlife Service (USFWS), Abernathy Fish Technology Center, Applied Research Program in Conservation Genetics, 360-425-6072*

**Recombination is suppressed over a large region of the Y chromosome in rainbow trout**

Ruth B. Phillips<sup>1\*</sup>, Jenefer J. DeKoning<sup>1</sup>, Abigail B. Ventura<sup>1</sup>, Krista M. Nichols<sup>2</sup>, Robert E. Drew<sup>3</sup>, Kent M. Reed<sup>4</sup>, and Gary H. Thorgaard<sup>5</sup>

\* [phllipsr@vancouver.wsu.edu](mailto:phllipsr@vancouver.wsu.edu)

<sup>1</sup>School of Biological Sciences, Washington State University, Vancouver, WA 98686,

<sup>2</sup>Department of Biological Sciences, Purdue University, West Lafayette, IN 47907,

<sup>3</sup>Department of Biology, University of Idaho, Moscow, ID 83844,

<sup>4</sup>Department of Veterinary and Biomedical Sciences, University of Minnesota, St. Paul, MN 55108, <sup>5</sup>School of Biological Sciences, Washington State University, Pullman, WA

99164

**Inhibition by the sortase inhibitor phenyl vinyl sulfone of *Renibacterium salmoninarum* adherence and invasion of host cells**

Sudheesh Ponnerassery and Mark Strom

\* [Sudheesh.Ponnerassery@noaa.gov](mailto:Sudheesh.Ponnerassery@noaa.gov), mark.strom@noaa.gov

Northwest Fisheries Science Center, NOAA Fisheries Service, 2725 Montlake Boulevard East, Seattle, Washington 98112, USA.

**Toxicogenomic responses of salmonids exposed to contaminants.**

Irvin R. Schultz and Sharon E. Hook

\* [irv.schultz@pnl.gov](mailto:irv.schultz@pnl.gov)

Battelle Pacific NW National Laboratory – Marine Science Lab, Sequim WA

**Using Single Nucleotide Polymorphisms (SNPs) to Identify Hybrid *Sebastes* in Puget Sound, Washington**

Piper Schwenke<sup>1</sup>, Linda Park<sup>1</sup>, and Lorenz Hauser<sup>2</sup>

\* [piper.schwenke@noaa.gov](mailto:piper.schwenke@noaa.gov), [linda.park@noaa.gov](mailto:linda.park@noaa.gov)

<sup>1</sup>NOAA-Fisheries, Northwest Fisheries Science Center, Seattle, WA, 98112, USA

<sup>2</sup>University of Washington, School of Aquatic and Fishery Sciences, Seattle, WA, 98195, USA

**Ecology, life history, and apparent genetic panmixia in the marine fish species, Atka mackerel (*Pleurogrammus monopterygius*)**

Ingrid Spies\*, Sandra Lowe, and Michael Canino

\* [Ingrid.Spies@noaa.gov](mailto:Ingrid.Spies@noaa.gov)

Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA

**SNP-based assessments of hybridization: implications for the conservation of endemic golden trout, *Oncorhynchus mykiss aguabonita* and *O. m. whitei***

Molly R. Stephens\*, Neil W. Clipperton, Amanda J. Finger, and Bernie P. May.

\* [mrstephens@ucdavis.edu](mailto:mrstephens@ucdavis.edu), [bpmay@ucdavis.edu](mailto:bpmay@ucdavis.edu)

Department of Animal Science, University of California, Davis, 1 Shields Ave, Davis CA 95616

**Assessing effects of endocrine disrupting chemicals on pacific salmon reproduction and growth using gene expression analyses**

Penny Swanson<sup>1\*</sup>, Irvin R. Schulz<sup>2</sup>, Graham Young<sup>3</sup>, Jon T. Dickey<sup>3</sup>, Kathleen A. Cooper<sup>3</sup>, and Larissa Felli<sup>3</sup> \*[penny.swanson@noaa.gov](mailto:penny.swanson@noaa.gov)

<sup>1</sup>NOAA Fisheries, Northwest Fisheries Science Center, Seattle, WA, <sup>2</sup>Battelle Marine Sciences Laboratory, Pacific Northwest Division, Sequim, WA, <sup>3</sup>School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA

**Finding the best subset of SNPs for distinguishing populations of Yukon River Chinook salmon**

William D. Templin and Anton B. Antonovich

\* [bill.templin@alaska.gov](mailto:bill.templin@alaska.gov)

Division of Commercial Fisheries, Alaska Department of Fish and Game, Gene Conservation Laboratory, Commercial Fisheries Division, Alaska Department of Fish and Game, 333 Raspberry Road, Anchorage AK, 99518. USA