



The North Pacific Anadromous Fish Commission (NPAFC) was established to promote the conservation of anadromous stocks in the North Pacific Ocean.

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## **NPAFC International Symposium on Bering-Aleutian Salmon International Surveys (BASIS): Climate Change, Production Trends, and Carrying Capacity of Pacific Salmon in the Bering Sea and Adjacent Waters**

*November 23-25, 2008*

*Metropolitan-A, Seattle Sheraton Hotel, Seattle, WA, USA*

### *Registration:*

*November 22, 17:00-19:00 (Lobby North on the ground floor)*

*November 23, 7:30-12:00 (Metropolitan-A Foyer on the 3rd floor)*

## **PROGRAM**

*\*Presenter*

### **November 23 (Sunday)**

#### **1. Introduction**

8:30-9:00     **Welcome, Introduction, and Awards**                     *E. Farley, J. Helle, and V. Fedorenko*

#### **2. Overviews of Climate Change, Bering Sea Ecosystems, and Salmon Production**

*Chairperson: Y. Ishida*

9:00-9:30     **Overview-1: Projected changes in the physical environment relevant to western Alaska salmon**

*N.A. Bond\*, J.E. Overland, and M. Wang*

9:30-10:00   **Overview-2: Contemporary status and tendencies in dynamics of Bering Sea macroecosystem**

*V.P. Shuntov and O.S. Temnykh\**

10:00-10:30   **Overview-3: Abundance and relative contribution of hatchery and wild salmon in the North Pacific Ocean**

*G.T. Ruggerone\*, R.M. Peterman, B. Dorner, and K.W. Myers*

10:30-10:50   *Break*

### 3. Biological Responses by Salmon to Climate and Ecosystem Dynamics

#### 3-1. Migration and Distribution of Salmon

Chairperson: K. Myers

- 10:50-11:15 **Keynote-1: Hot and cold running salmon: lessons from BASIS on stock-specific migration and distribution response to climate change**  
*K. Myers\**, *E.V. Farley*, *J.E. Seeb*, *O.S. Temnykh*, *A.V. Bugaev*, *T. Azumaya*, and *S. Urawa*
- 11:15-11:35 **Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian Economic Zone). Part 1 - chum salmon *Oncorhynchus keta***  
*A.V. Bugaev\**, *E.A. Zavalokina*, *L.O. Zavarina*, *A.O. Shubin*, *S.F. Zolotukhin*, *N.F. Kaplanova*, *M.V. Volobuev*, and *I.N. Kireev*
- 11:35-11:55 **Distribution and CPUE trends of Pacific salmon, especially in sockeye salmon in the Bering Sea and adjacent waters**  
*T. Nagasawa\** and *T. Azumaya*
- 11:55-12:15 **Summer and fall migrations of pink salmon in the western Bering Sea in 2002-2006**  
*O.S. Temnykh*
- 12:15-14:00 *Lunch*
- 14:00-14:20 **The use of genetic stock identification to determine the distribution, migration, early marine survival, and relative stock abundance of sockeye, chum and Chinook salmon in the Bering Sea**  
*J.E. Seeb\**, *S. Abe*, *S. Sato*, *S. Urawa*, *N. Varnavskaya*, *N. Klovatch*, *E.V. Farley*, *C. Guthrie*, *B. Templin*, *C. Habicht*, *J.M. Murphy*, and *L.W. Seeb*
- 14:20-14:40 **Stock-structured distribution and abundance of Western Alaska juvenile Chinook salmon populations in the eastern Bering Sea, 2002-2007**  
*J.M. Murphy\**, *W.D. Templin*, *E.V. Farley, Jr.*, and *J.E. Seeb*
- 14:40-15:00 **Stock-structured distribution of immature sockeye salmon populations south of the Aleutian Arc during the summer**  
*C. Habicht\**, *J.E. Seeb*, *E.V. Farley, Jr.*, *J.M. Murphy*, *L.W. Seeb*, and *W.D. Templin*
- 15:00-15:20 **Stock-specific ocean distribution and migration of chum salmon in the Bering Sea and North Pacific Ocean**  
*S. Urawa\**, *S. Sato*, *P.A. Crane*, *B. Agler*, *R. Josephson*, and *T. Azumaya*
- 15:20-16:00 *Break & Posters*
- 16:00-16:20 **Pacific Rim stock identification of chum salmon (*Oncorhynchus keta*) with microsatellites**  
*T.D. Beacham\**, *J.R. Candy*, *S. Urawa*, *S. Sato*, *N.V. Varnavskaya*, *K.D. Le*, and *M. Wetklo*
- 16:20-16:40 **Regional stock mixture of juvenile chum salmon (*Oncorhynchus keta*) in the western Bering Sea during summer-autumn 2004**  
*M.H. Kang\**, *S. Kim*, and *L. Low*

- 16:40-17:00 **Behavior of Chinook salmon in the Bering Sea as inferred from archival tag data**  
*R.V. Walker\* and K.W. Myers*
- 17:00-17:20 **Beyond BASIS - salmon in the Arctic**  
*J.R. Irvine\*, E. Linn, R. Macdonald, E. Carmack, L. Godbout, K. Gillespie, and J. Reist*
- 18:30-20:30 *Evening Social (Cirrus Room on the 35th floor of Pike Street Tower at the Sheraton Seattle Hotel)*

## November 24 (Monday)

### 3-2. Food Production and Salmon Growth

*Chairpersons: S. Kang and T. Azumaya*

- 8:30-8:55 **Keynote-2: Influence of ocean environment on a reduction of Japanese chum salmon (*Oncorhynchus keta*) body size**  
*T. Azumaya\*, Y. Kamezawa, T. Nagasawa, and M.J. Kishi*
- 8:55-9:15 **Physical oceanographic conditions over the Bering Sea shelf, 2002-2007**  
*S. Danielson\*, L. Eisner, and T. Weingartner*
- 9:15-9:35 **Spatial and interannual variability in nutrients, phytoplankton and zooplankton in the eastern Bering Sea: results from U.S. BASIS surveys for 2002-2007**  
*L. Eisner\*, S. Danielson, K. Cieciel, J. Lanksbury, and E. Farley*
- 9:35-9:55 **Effects of diet changes on the energy content of juvenile pink salmon *Oncorhynchus gorbuscha* in the eastern Bering Sea from 2003 to 2007**  
*A.G. Andrews\*, E.V. Farley, J.H. Moss, and E.F. Husoe*
- 9:55-10:30 *Break & Posters*
- 10:30-10:50 **Forage base of Pacific salmon in the western Bering Sea and adjacent Pacific waters in 2002-2006**  
*A.V. Zavolokin*
- 10:50-11:10 **Alaska sockeye salmon scale patterns as indicators for climatic and oceanic shifts and anomalies in the North Pacific Ocean**  
*E.C. Martinson\*, J.H. Helle, D.L. Scarnecchia, and H.H. Stokes*
- 11:10-11:30 **Bias-corrected size trend of chum salmon in the central Bering Sea and North Pacific**  
*M. Fukuwaka\*, N.D. Davis, T. Azumaya, and T. Nagasawa*
- 11:30-11:50 **Juvenile pink and chum salmon foraging conditions, growth potential, and distribution in response to the loss of Arctic sea-ice**  
*J.H. Moss\*, J.M. Murphy, E.V. Farley, Jr., L.B. Eisner, and A.G. Andrews*
- 11:50-12:10 **The relations of food availability and oceanic region to growth of coho salmon: perspectives from the northern California Current**  
*B. Beckman\*, C. Morgan, and M. Trudel*

12:10-14:00 *Lunch*

### **3-3. Feeding Habits and Trophic Interaction**

*Chairpersons: N. Davis and V. Sviridov*

14:00-14:25 **Keynote-3: Review of BASIS food habits studies and considerations on continuing and new research directions**

*N.D. Davis\*, A.V. Volkov, A.Ya. Efimkin, N.A. Kuznetsova, J.L. Armstrong, and O. Sakai*

14:25-14:45 **Zooplankton species composition, abundance and biomass on the southeastern Bering Sea shelf during summer: the potential role of water column stability in structuring the zooplankton community and influencing the survival of planktivorous fishes**

*K. Coyle\*, A. Pinchuk, L. Eisner, and J. Napp*

14:45-15:05 **The role of Pacific salmon in trophic structure of the upper epipelagic layer in the western Bering Sea during summer-autumn 2002-2006**

*S.V. Naydenko*

15:05-15:25 **Feeding behavior of Pacific salmon in the Bering Sea and status of their forage base during 2003-2007 period**

*A.F. Volkov and S.V. Naydenko\**

15:25-16:00 *Break & Posters*

16:00-16:20 **A comparison of jellyfish distribution to oceanographic characteristics and salmon distributions during a warm year (2004) and a cold year (2006) in eastern Bering Sea**

*K. Cieciel\*, E. Farley, and L. Eisner*

16:20-16:40 **Diets and appetites of hatchery-reared and wild coho salmon in the Strait of Georgia**

*R.M. Sweeting\* and R.J. Beamish*

16:40-17:00 **Lipid content of immature chum salmon in the North Pacific Ocean and the Bering Sea**

*T. Kaga\*, S. Sato, M. Fukuwaka, and S. Urawa*

17:00-17:20 **GIS analysis of potential trophic interactions between Pacific salmon and their predators during marine life period**

*V.V. Sviridov*

## November 25 (Tuesday)

### 3-4. Production Trends and Carrying Capacity of Salmon

*Chairperson: M. Kaeriyama*

- 8:30-8:55     **Keynote-4: Perspective on production trends and carrying capacity of Pacific salmon in the North Pacific**  
*M. Kaeriyama\*, H. Seo, and S. Urawa*
- 8:55-9:15     **Climate, growth and population dynamics of Western Alaska Chinook salmon**  
*G.T. Ruggerone\*, J.L. Nielsen, and B. Agler*
- 9:15-9:35     **Population dynamics of Asian chum salmon in relation to climate change during 1943-2005**  
*H. Seo\*, H. Kudo, S. Kim, and M. Kaeriyama*
- 9:35-9:55     **Global and regional elements of ecological capacity of the Pacific salmon habitat**  
*O.F. Gritsenko, N.V. Klovach\*, M.A. Bogdanov, and Y.N. Tananaeva*
- 9:55-10:30    *Break & Posters*
- 10:30-10:50   **Is body size of maturing chum salmon returning to North America and Japan related to population density and/or sea conditions in the eastern Bering Sea?**  
*J.H. Helle\*, E.C. Martinson, and M. Fukuwaka*
- 10:50-11:10   **Role of Pacific salmon juveniles in the epipelagical ichthyocenoses of the eastern and western Kamchatka**  
*M.V. Koval*
- 11:10-11:30   **Growth rate potential of juvenile chum salmon on the eastern Bering Sea shelf: an assessment of salmon carrying capacity**  
*E.V. Farley, Jr.\* and J.H. Moss*
- 11:30-11:50   **The salmon MALBEC project: a North Pacific scale study to support salmon conservation planning**  
*X. Augerot, R. Hilborn, N. Mantua\*, K. Myers, R. Peterman, D. Preikshot, P. Rand, G. Ruggerone, D. Schindler, J. Stanford, N. Taylor, R. Walker, and C. Walters*
- 11:50-14:00   *Lunch*

#### **4. Discussion and Summary on BASIS 2002-2006: Where Do We Go from Here?**

*Chairperson: E. Farley*

- 14:00-14:20 **The SALSEA Programme – improving understanding of the migration and distribution of salmon in the North Atlantic**  
*M.L. Windsor and P. Hutchinson\**
- 14:20-14:40 **Future salmon research: insights from the Long-term Research and Monitoring Project**  
*D. Beamish*
- 14:40-15:00 *Break*
- 15:00-15:10 **Session Summary-1: Migration and Distribution of Salmon**  
*K. Myers*
- 15:10-15:20 **Session Summary-2: Food Production and Salmon Growth**  
*S. Kang and T. Azumaya*
- 15:20-15:30 **Session Summary-3: Feeding Habits and Trophic Interaction**  
*N. Davis and V. Sviridov*
- 15:30-15:40 **Session Summary-4: Production Trends and Carrying Capacity of Salmon**  
*M. Kaeriyama*
- 15:40-17:00 **Discussion: Where do we go from here?**

## POSTER SESSIONS

November 23-25, 2008

Metropolitan-A Foyer (3rd Floor), Sheraton Seattle Hotel

### 3. Biological Responses by Salmon to Climate and Ecosystem Dynamics

#### 3-1. Migration and Distribution of Salmon

- Poster-01     **Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian economic zone). Part 2 - sockeye salmon *Oncorhynchus nerka***  
*A.V. Bugaev*
- Poster-02     **Bering-Aleutian Salmon International Survey (BASIS): population-biological researches in the western part of Bering Sea (Russian economic zone). Part 3 - Chinook salmon *Oncorhynchus tshawytscha***  
*A.V. Bugaev*
- Poster-03     **Origin and distribution local stocks of sockeye salmon *Oncorhynchus nerka* in the western part of the Bering Sea in August - October 2006**  
*A.V. Bugaev\*, I.I. Glebov, E.V. Golub, K.W. Myers, J.E. Seeb, and M. Foster*
- Poster-04     **Water dynamics of the Southwestern Bering Sea and its effects in distribution of juvenile pink salmon (*Oncorhynchus gorbuscha*) on the north-east coast of Kamchatka in September**  
*O.B. Tepnin*
- Poster-05     **Do Bering Sea temperatures regulate catch rates in the South Alaska Peninsula June fishery?**  
*P.C. Martin*
- Poster-06     **Mixed stock analysis of autumn schools of immature sockeye salmon in West Bering Sea (West Pacifics)**  
*O.F. Gritsenko, N.V. Klovach\*, D.A. Zelenina, A.M. Khrustaleva, and N.S. Mogue*
- Poster-07     **Reproduction short-term vertical movements of chum salmon (*Oncorhynchus keta*) using a simple model**  
*T. Azumaya\* and T. Nagasawa*
- Poster-08     **Some aspects and results of hydroacoustic researches of Pacific salmon in the Bering Sea (Russian EEZ) in summer-autumn 2003-2007**  
*A.V. Nikolaev\*, M.Y. Kuznetsov, and E.V. Syrovatkin*
- Poster-09     **Distribution of otolith-marked chum salmon in the Bering Sea and North Pacific Ocean in 2006 and 2007**  
*M. Takahashi\*, N. Watanabe, S. Kitatsuji, B.A. Agler, S. Sato, and S. Urawa*

- Poster-10     **Nonrandom distribution of chum salmon stocks in the Bering Sea and North Pacific Ocean during summer and fall in 2002 to 2004**  
*S. Sato\**, *S. Moriya*, *T. Azumaya*, *H. Nagoya*, *S. Abe*, and *S. Urawa*
- Poster-11     **Origin of juvenile chum salmon caught on the 2007 U.S. BASIS survey of the Bering Strait and Chukchi Sea using genetic markers**  
*C.M. Kondzela\**, *M.R. Garvin*, *J.M. Murphy*, and *J.H. Moss*
- Poster-12     **High-resolution stock identification for migratory studies of Chinook salmon**  
*W.D. Templin\**, *L.W. Seeb*, *J. Murphy*, and *J.E. Seeb*
- Poster-13     **Monitoring of viruses in chum salmon (*Oncorhynchus keta*) migrating to Korea**  
*D.J. Jeon*, *C.H. Lee*, *C.S. Lee*, *K.B. Seong*, and *J.H. Kim\**
- Poster-14     **Management of salmon bycatch in the eastern Bering Sea pollock fishery**  
*D.L. Stram\** and *J.N. Ianelli*

### 3-2. Food Production and Salmon Growth

- Poster-15     **Interannual variation in phytoplankton biomass, spatial distribution, and taxonomic assemblage structure on the eastern Bering Sea shelf**  
*J.A. Lanksbury\** and *L.B. Eisner*
- Poster-16     **Density-dependent growth of Alaska sockeye salmon under varied climate and production regimes in the North Pacific Ocean, 1925-1998**  
*E.C. Martinson\**, *J.H. Helle*, *D.L. Scarnecchia*, and *H.H. Stokes*
- Poster-17     **Growth and survival of sockeye salmon from Karluk Lake, Alaska in relation to climatic and oceanic regimes and indices, 1922-2000**  
*E.C. Martinson\**, *J.H. Helle*, and *D.L. Scarnecchia*

### 3-3. Feeding Habits and Trophic Interaction

- Poster-18     **Feeding selectivity of Pacific salmon in the western Bering Sea and adjacent Pacific waters**  
*A.V. Zavolokin\**, *A.M. Slabinskiy*, and *A.Y. Efimkin*
- Poster-19     **Winter food habits of Chinook salmon in the eastern Bering Sea**  
*N.D. Davis\**, *K.W. Myers*, and *W.J. Fournier*
- Poster-20     **Pacific salmon feeding behavior in the eastern Bering Sea in August-October of 2003-2007**  
*N.A. Kuznetsova\**, *E.V. Farley*, *J.M. Murphy*, *L. Eisner*, *J. Moss*, *K. Cieciel*, *A. Middleton*, and *O.A. Ivanov*
- Poster-21     **Genetic techniques provide evidence of Chinook salmon (*Oncorhynchus tshawytscha*) feeding on pollock offal**  
*T. Buser\**, *N.D. Davis*, *L. Hauser*, and *I. Jiménez-Hidalgo*

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- Poster-22     **Changes of zooplankton structure and bioproductivity in the Bering Sea at the beginning of the 21st century**  
*E. Dulepova\* and A. Volkov*

### **3-4. Production Trends and Carrying Capacity of Salmon**

- Poster-23     **Food supply of Pacific salmon in the western Bering Sea and adjacent Pacific waters**  
*A.V. Zavolokin\*, E.A. Zavolokina, I.I. Glebov, A.M. Slabinskiy, and A.Y. Efimkin*
- Poster-24     **Changes in size and growth rate of Anadir River chum salmon (*Oncorhynchus keta*) in 1962-2007**  
*E.A. Zavolokina, A.V. Zavolokin\*, and Y.N. Khokhlov*
- Poster-25     **Can juvenile sockeye salmon research be utilized for stock-specific forecasts of returning adults to Bristol Bay Alaska?**  
*E.V. Farley, Jr.\*, J. Murphy, and C. Habicht*
- Poster-26     **Effect of salmon-derived matter and nutrients on Dolly Varden, brown bear and vegetation in the Rusha River, Shiretoko World Natural Heritage area**  
*Y. Koshino\*, Y. Yokoyama, H. Kudo, and M. Kaeriyama*
- Poster-27     **Salmon distribution in the northern Japan during the Jomon Period**  
*Y. Ishida\* and A. Yamada*
- Poster-28     **Genetic population structure of the Yurappu River chum salmon *Oncorhynchus keta* determined with the mitochondrial DNA analysis**  
*R. Yokotani\*, S. Kitada, H. Kudo, S. Abe, and M. Kaeriyama*
- Poster-29     **Dynamics of escapement and spawning of pink salmon (*Oncorhynchus gorbuscha*) at rivers in the Shiretoko World Natural Heritage area, 2007**  
*Y. Yokoyama\*, Y. Koshino, H. Kudo, and M. Kaeriyama*
- Poster-30     **Cyclic climate changes and salmon production in the Bering-Aleutian region**  
*L. Klyashtorin\* and A. Lyubushin*