

S2 **BIO Topic Session**

Mechanisms that regulate North Pacific ecosystems: Bottom-up, top-down, or something else?

Session Convenors: Douglas DeMaster (U.S.A.), George L. Hunt, Jr. (U.S.A.), Michio J. Kishi (Japan), Jeffrey M. Napp (U.S.A.) and Andrew Trites (Canada)

Within the PICES region, dramatic changes have been observed in the past 50 years in the structure and function of marine ecosystems. In an effort to understand what caused these, often dramatic, changes, various hypotheses have been proposed as controlling mechanisms for entire ecosystems or for particular components of the ecosystems (*e.g.* fish stocks and apex predators). Each of the hypotheses (*e.g.*, Trophic Cascade, Oscillating Control, Nutritional Stress, and Regime Shift) has at its core a fundamental assumption that control is the result of bottom-up, top-down, or a wasp-waist trophic pyramid restriction. Is it really that simple? Are these hypotheses testable? Will they lead us to a predictive capability? This session will critically examine these hypotheses, as applied to ecosystems and important marine populations from the western and eastern North Pacific Ocean. The goal is to review, based on observations and model results, the basic assumption (source of control), and to evaluate the strength and weaknesses of the individual hypotheses. The session will also explore how the different control mechanisms might affect the ability of managers to maintain sustainable fisheries in the region. The possibility of publishing the results in a special issue of a leading international journal will be explored.

Day 1 Tuesday, October 19, 2004 8:30-17:30

- 08:30-09:00 **Mary E. Power** (Invited)
Food webs, fluxes, and flow paths: A fluvial perspective (S2-2173)
- 09:00-09:20 **John C. Field, Robert C. Francis and Kerim Y. Aydin**
Top-down modeling and bottom-up dynamics: Linking fisheries-based multispecies models with climate hypotheses in the Northern California Current (S2-2003)
- 09:20-09:40 **Jeffrey M. Napp, George L. Hunt Jr., Sue E. Moore and Christine T. Baier**
Who is regulating zooplankton production (or How to resolve issues of control)? (S2-2106)
- 09:40-10:00 **Xuelei Zhang, R.X. Li, M.Y. Zhu, Z.L. Wang, L.H. Zhang, Y. Li and Y.J. Hao**
Changes of net phytoplankton in Sanggou Bay, Northern China: Evidence for consumer regulation of primary producer (S2-1802)
- 10:00-10:20 **Coffee break**
- 10:20-10:50 **Philippe Cury** (Invited)
Who is controlling whom in marine ecosystems: Observed changes, possible mechanisms and trends in top-down, bottom-up and wasp-waist controls (S2-1846)
- 10:50-11:10 **Andrew Bakun**
Mechanisms of “wasp-waist” control in marine ecosystems (S2-1852)
- 11:10-11:30 **William Sydeman, John Calambokidis, Derek Lee, Steve Ralston, Dave Johnston, Chet Grosch and Francisco Chavez**
Phase relationships and controls of the upwelling-dominated central California Current ecosystem (S2-2148)
- 11:30-11:50 **Vladlena V. Gertseva, Thomas C. Wainwright and Vladimir V. Gertsev**
Juvenile salmon survival in coastal waters of the Northeast Pacific Ocean: Top-down or bottom-up control? (S2-1858)

- 11:50-12:10 **Jennifer L. Nielsen and Gregory T. Ruggione**
Top-down and bottom-up linkages among climate, growth, competition, and production of sockeye salmon populations in Bristol Bay, Alaska, 1955-2000 (S2-2068)
- 12:10-13:30 **Lunch**
- 13:30-14:00 **Bernard A. Megrey and Francisco E. Werner** (Invited)
Evaluating the role of top-down versus bottom-up ecosystem regulation from a modeling perspective (S2-2043)
- 14:00-14:20 **Anne B. Hollowed and Vera N. Agostini**
A review of the role of environmental disturbance and resource partitioning as a source of population regulation in marine ecosystems (S2-2001)
- 14:20-14:40 **Jie Zheng and Gordon H. Kruse**
Recruitment variation of eastern Bering Sea crabs: Density-dependent, "climate-control", or "top-down" effects? (S2-1929)
- 14:40-15:00 **Steven R. Hare**
The Thompson-Burkenroad debate revisited - What drives fluctuations in Pacific halibut abundance? (S2-1904)
- 15:00-15:20 **Coffee break**
- 15:20-15:40 **Kerim Y. Aydin, Sarah K. Gaichas and Patricia A. Livingston**
Wasp-waist control and beer-belly oscillations: An evaluation of population hypotheses in the Bering Sea and Gulf of Alaska (S2-2109)
- 15:40-16:00 **Franz J. Mueter, Michael C. Palmer and Brenda L. Norcross**
Bottom-up and top-down controls of walleye pollock on the Eastern Bering Sea shelf (S2-2038)
- 16:00-16:20 **Yongjun Tian, Hideaki Kidokoro and Tatsuro Watanabe**
Long-term changes in fisheries production of the Japan Sea with emphasis on the impacts of fishing and climate regime shifts during the last three decades (S2-2000)
- 16:20-16:40 **Kenneth F. Drinkwater**
Marine ecosystem responses to the warming of 1920s and 1930s in the northern North Atlantic (S2-2085)
- 16:40-17:00 **Richard J. Beamish and Gordon A. McFarlane**
The natural regulation of long lived fishes and the impact of "longevity over fishing" (S2-2066)
- 17:00-17:30 **Open Discussion**

Day 2 Wednesday, October 20, 2004 8:30-12:10

- 08:30-09:00 **Hiroyuki Matsuda** (Invited)
How to test, use and manage sardine-anchovy-chub mackerel cycles (S2-2117)
- 09:00-09:20 **Akinori Takasuka, Yoshioki Oozeki, Ichiro Aoki, Ryo Kimura, Hiroshi Kubota and Takashi Yamakawa**
Differential optimal temperatures for growth of larval anchovy and sardine: A potential mechanism for regime shifts? (S2-1956)

- 09:20-09:40 **Rubén Rodríguez-Sánchez, Daniel Lluch-Belda and Sofia Ortega-García**
Possible mechanisms underlying latitudinal abundance changes of Pacific sardine in the California Current system during the last warming regime (1980-1997) (S2-1991)
- 09:40-10:00 **Vera N. Agostini, Andrew Bakun and Robert C. Francis**
Larval stage controls on sardine recruitment variability: Predation or food availability? (S2-1934)
- 10:00-10:20 **Coffee break**
- 10:20-10:50 **Yasunori Sakurai, Sachi Miyanaga and Jun Yamamoto** (Invited)
Why do ommastrephid squids increase in abundance during warm regimes? (S2-1939)
- 10:50-11:10 **Andrew W. Trites, Arthur J. Miller and Herbert D. G. Maschner**
Bottom-up forcing and the decline of Steller sea lions in Alaska: Assessing the ocean climate hypothesis (S2-1821)
- 11:10-11:30 **Alexander Kitaysky and Alan Springer**
When, where and why Steller sea lions experience physiological stress - Evidence from stress hormones and diet quality (S2-2116)
- 11:30-11:50 **Douglas P. DeMaster, Paul Wade and Phillip Clapham**
The cascading whale predation hypothesis: Testing with existing data (S2-2145)
- 11:50-12:10 **George L. Hunt Jr.**
Are the control mechanisms of marine birds and mammals scale-dependent? (S2-1826)

Posters

Igor V. Melnikov

Pelagic predatory fishes as consumers of Pacific salmon: Distribution in the Russian exclusive economic zone and adjacent waters, their abundance and some biological features (S2-1948)

Hyunju Seo, Kibeik Seong, Suam Kim and Sukyung Kang

Interannual variability in chum salmon (*Oncorhynchus keta*) growth in relation to environmental change during the 1980s-1990s (S2-2023)

