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Salish Sea Ecosystem Conference

2018 Salish Sea Ecosystem Conference  
(Seattle, Wash.)

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Apr 6th, 12:00 AM - 12:00 AM

## The Salish Sea Marine Survival Project: Phytoplankton and Zooplankton

Brian E. Riddell

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## Salish Sea Marine Survival Project Session Descriptions

Chairs: Dr. Brian Riddell (PSF), Michael Schmidt (LLTK), Dr. Isobel Pearsall (PSF), Iris Kemp (LLTK)

Code	Title	Chair
SPECIES 4	The Salish Sea Marine Survival Project: Bottom-up and top-down processes	Isobel Pearsall PSF (Pacific Salmon Foundation) SSMSMP Project Co-ordinator for Canada Email: <a href="mailto:pearsalli@shaw.ca">pearsalli@shaw.ca</a>
SPECIES 5	The Salish Sea Marine Survival Project: Juvenile salmonid growth and survival	Michael Schmidt LLTK (Long Live the Kings) SSMSMP Project Co-ordinator for US Email: <a href="mailto:MSchmidt@lltk.org">MSchmidt@lltk.org</a>
SPECIES 6	The Salish Sea Marine Survival Project: Understanding salmon survival	Iris Kemp LLTK Biologist Email: <a href="mailto:IKemp@lltk.org">IKemp@lltk.org</a>
SPECIES 7	The Salish Sea Marine Survival Project: Phytoplankton and Zooplankton	Brian Riddell PSF CEO Email: <a href="mailto:briddell@psf.ca">briddell@psf.ca</a>

Dates and Times as follows:

- The Salish Sea Marine Survival Project: Juvenile salmonid growth and survival  
Thursday, April 5, 10am-11:30am
- The Salish Sea Marine Survival Project: Understanding salmon survival  
Thursday, April 5, 1:30pm-3:00pm
- The Salish Sea Marine Survival Project: phytoplankton and zooplankton  
Thursday, April 5, 3:30pm-5:00pm
- The Salish Sea Marine Survival Project: Bottom-up and top-down processes  
Friday, April 6, 8:30am-10:00am

**Brief abstract for the 4 sessions as follows:**

SSMSP was provided 4 full sessions at SSEC 2018. Sessions were well attended and covered a number of key topics. Brief overviews are as follows:

**SPECIES 4: The Salish Sea Marine Survival Project: Bottom-up and top-down processes**

Over the past 30-40 years, marine survival of Chinook, coho, and steelhead populations in the Salish Sea has declined precipitously, and total abundance today remains well below 1970s-1980s abundances. Historically, our understanding of what drives salmon and steelhead survival in saltwater has been limited. In response to this need, Long Live the Kings (U.S.) and the Pacific Salmon Foundation (Canada) developed a comprehensive transboundary approach to determine the primary factors affecting salmon and steelhead survival in the Salish Sea.

The Salish Sea Marine Survival Project (SSMSP; [www.marinesurvivalproject.org](http://www.marinesurvivalproject.org)) brings together multidisciplinary international expertise from over 60 U.S. and Canadian agencies, Tribes and First Nations, academia, and non-profit organizations. The project's integrated, ecosystem-based research framework incorporates coordinated data collection and standardization, information sharing, and international collaboration to better understand population dynamics within the Salish Sea ecosystem, improve forecasting and management, and aid recovery. The research phase of the Project is 2014-2018; it culminates with a focus on converting research results into conclusions and management actions.

This session included presentations addressing both bottom up (environmental drivers, spatial and temporal patterns in productivity, prey availability, etc.) and top down (size selective predation, predation by piscivorous fishes and harbour seals, hatchery inputs etc.) processes, and their interactions. Talks highlighted novel approaches using geoducks to reconstruct long term patterns in primary productivity, identification of spatial "hotspots" of productivity in the northern Salish Sea, predation by harbour seals in both the Strait of Georgia and Puget Sound, as well as the impact of hatchery releases in the Salish Sea on predation and conservation of wild fish. The final talk directly addressed the interaction between both bottom up and top down processes impacting marine survival of Puget Sound Chinook salmon.

**SPECIES 5: The Salish Sea Marine Survival Project: Juvenile salmonid growth and survival**

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The presentations in this session explored the impacts of prey availability, prey quality, habitat use, and ocean conditions on juvenile salmon growth and survival in the northern Salish Sea. Results suggested that juvenile salmon in the Strait of Georgia occupy a broad range of habitats and exhibit individualized behavior with regards to habitat use. Localized prey production and ocean conditions may impact juvenile

salmon health and survival, and growth during the juvenile phase is positively related to survival to adulthood for some stocks.

#### **SPECIES 6: The Salish Sea Marine Survival Project: Understanding salmon survival**

Over the past 30-40 years, marine survival of Chinook, coho, and steelhead populations in the Salish Sea has declined precipitously, and total abundance today remains well below 1970s-1980s abundances. Historically, our understanding of what drives salmon and steelhead survival in saltwater has been limited. In response to this need, Long Live the Kings (U.S.) and the Pacific Salmon Foundation (Canada) developed a comprehensive transboundary approach to determine the primary factors affecting salmon and steelhead survival in the Salish Sea.

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The presentations within this session built towards a better understanding of salmon survival in the Salish Sea, from individual fish tracking to end-to-end ecosystem models. Presenters discussed population-specific contaminant impacts and effluent exposure through outmigration, declining eelgrass condition and increasing shoreline structure in the Strait of Georgia, commonalities in survival patterns across chinook salmon, coho salmon, and steelhead, and effects of migration routes, pathogen loads, and density of conspecifics at marine entry on survival. An end-to-end ecosystem model of Puget Sound is currently being created to simulate trophic dynamics, fisheries, nutrient dynamics, microbial cycles, and habitat. This model is intended to evaluate the strength of evidence for hypotheses around declining chinook, coho, and steelhead survival, and can facilitate development of ecosystem-based management strategies.

#### **SPECIES 7: The Salish Sea Marine Survival Project: Phytoplankton and Zooplankton**

Over the past 30-40 years, marine survival of Chinook, coho, and steelhead populations in the Salish Sea has declined precipitously, and total abundance today remains well below 1970s-1980s abundances. Historically, our understanding of what drives salmon and steelhead survival in saltwater has been limited. In response to this need, Long Live the Kings (U.S.) and the Pacific Salmon Foundation (Canada) developed a comprehensive transboundary approach to determine the primary factors affecting salmon and steelhead survival in the Salish Sea.

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This session focused on the biological oceanography, phytoplankton, and zooplankton that determines the annual production of dietary items for juvenile salmon. Annual variation in environmental conditions is a strong determinate of the survival and growth of these juveniles in the Salish Sea.