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**Foodweb Dynamics and Trophic Interactions among
Juvenile Pacific Salmon in the Bering Sea Ecosystem**

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Current literature suggests climate variability, fishing, carrying capacity, and nutrients as important forces driving the growth and survival during the early life stages of salmon in the ocean. There is still a major gap in our understanding of the foodweb dynamics and trophic interactions among salmonid and non-salmonid species in the marine ecosystems. We hypothesized that if the Bearing Sea ecosystem is at its carrying capacity, we should see intense trophic interactions among species, rapid ontogenetic niche shifts as a function of size within species, and significant diet overlaps among species. As a part of BASIS project, we analyzed stable isotopes of N and C of over 8,000 samples for five salmon species, forage fish species and zooplankton collected over three years from 182 stations along north-south and east-west transects covering over 36,000 square miles of the Bearing Sea ecosystem. Will present results showing significant inter-annual variability in diet overlaps and trophic interactions among salmon species, and trophic shifts within each of the species as a function of body size, which seemed to vary significantly from near-shore to off-shore zones, and discuss their implications for growth, survival and productivity of salmon.

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Exceptional Conditions in the Early Marine Rearing Period in 2005 in the Strait of Georgia

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In 2005 there was exceptionally poor early marine survival of coho and chinook salmon yet exceptionally good survival of chum salmon. The spring bloom was very early and ocean temperatures in the spring were exceptionally warm. There also were reduced wind events during this time. It appears that the early production of plankton benefited species that entered the Strait of Georgia early, such as chum and herring. Species such as coho and chinook salmon that entered later appear to have suffered high mortalities as a direct or indirect result of reduced prey abundance. There has been a general warming trend in the Strait of Georgia in the past 25 years that is expected to continue. There also have been changes in trends in salinity and in winds. The question is if these changes are an early indication of global warming.

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**Effect of Climate Change on Growth and Survival of
Juvenile Chum Salmon during the First Marine Life Period**

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In order to evaluate relationship between the climate change and the growth-pattern/survival of Pacific salmon, annual growth pattern by age of adult chum salmon returning to the Ishikari River in 1970–2001 was estimated using the back-calculation method from the scale analysis. Hokkaido chum salmon are distributed in the Okhotsk Sea after spending the early marine life in the coastal waters of Hokkaido, then move to the Western Subarctic Gyre for the wintering during the first marine life period. Hokkaido chum salmon were controlled the growth pattern by the ocean environmental condition such as the sea-surface temperature (SST) and the sea-ice cover (SIC) relating the climate change in the Okhotsk Sea. Marine survival of Hokkaido chum salmon populations was significantly related with body size at the release, but neither by the Aleutian low pressure index (ALPI) nor the SST around coastal Hokkaido in spring, although there is some correlation between survival rate and the summer SST in the Okhotsk Sea. This result suggests that the critical mortality will occur higher in the early marine life period than in the first wintering period.