**Daly, Elizabeth – Oregon State University**

**Presentation Title: The Changing North Pacific Ecosystem and Potential Impacts on Steelhead**

Abstract for the 2018 Pacific Coast Steelhead Management Meeting

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Juvenile steelhead *(Oncorhynchus mykiss)* enter the northern California Current from the Columbia River and Northwest coastal rivers and include several populations listed under the US Endangered Species Act. However, relatively little is known about the response of these steelhead populations to interannual variability in ocean conditions. In 2015-2017, anomalously warm ocean conditions (including the ‘warm blob’) persisted in the northern California Current and substantially affected the marine ecosystem. Returns of steelhead that out-migrated during the warm blob in 2015 were the lowest adult returns to the Columbia River in the last 20 years. Forecasts for cooler coastal waters in spring of 2018 are expected to be better for out-migrating salmon. However, winter PDO conditions are still positive, indicating above-average temperatures even during La Niña (cooler) conditions at the equator and the unusual ecosystem responses to the recent ocean conditions continue to be observed, even into 2018. To determine how steelhead respond to annual shifts in temperature, we compared juvenile steelhead diet composition, stomach fullness, size, and body condition across an 11 year time-series (2001-02, 2004, 2006-2011, 2015-16). This time-series included both the recent blob-influenced years as well as other warm, cold, and average temperature years. Steelhead from 2015 and 2016 exhibited some of the poorest body conditions and largest sizes in the time-series. In contrast, steelhead from 2010, a warm El Niño-influenced warm year, exhibited unusually high body condition and stomach fullness, but were quite small compared to the long-term mean. Steelhead diet composition varied between warm and cold years and between warm and average years, with steelhead consuming more insects, juvenile rockfish, and rare and unidentified fish in warm years. Unusual taxa were consumed in both 2015 (salps) and 2016 (juvenile smelts). These findings highlight the potential for warm ocean years to influence the diet composition and morphology of declining Columbia River steelhead populations, and may lead to a better understanding of what affects survival of juvenile steelhead in their early marine residence.