

Predicting the response of estuarine copepods to changes in the seasonal delivery of freshwater in a snowmelt-dominated system

Joanne Breckenridge¹ and Evgeny Pakhomov^{1,2}

1. Department of Earth, Ocean and Atmospheric Sciences, University of British Columbia
2. Institute for the Oceans and Fisheries, University of British Columbia, Vancouver, BC, Canada

Due to changes in climate, the magnitude and timing of freshwater input to estuaries is changing, particularly in snowmelt-dominated river systems. How this will influence estuarine mesozooplankton communities is poorly understood. The Fraser River Estuary (FRE), BC, Canada, is a snowmelt-dominated estuary and its river discharge peaks as a large freshet in late spring and summer. Since August 2013, we have been conducting twice monthly plankton surveys of the estuary. These data, along with measurements of vertical distribution, egg production, and hatching rates of abundant species are used in models to predict the population dynamics of abundant taxa under different scenarios of warming and river discharge. Egg production incubations suggest that an estuarine copepod, *Eurytemora affinis*, switches from subitaneous to diapause egg production at the beginning of the freshet. A freshet that occurs early, when abundances are still increasing, thus has the potential to reduce that year's contribution to the egg bank. To our knowledge, the production of diapause eggs to avoid periods of rapid flushing or lowered salinity has not been documented. The production of estuarine copepods in the FRE appears limited by the short resident time of water in the estuary. This has important implications when the positive influence of temperature on copepod production is considered. If the freshet occurs earlier, when water temperatures in the estuary are lower, copepod production in spring will likely decrease. Likewise, an early tapering of the freshet in the summer could lead to an increase in production during that period.

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Contact author: Joanne Breckenridge, Department of Earth, Ocean, and Atmospheric Sciences, UBC, jbrecken@eos.ubc.ca