Observations of Biogeochemical Conditions in the Columbia River Estuary Associated with the 2014-2015 North Pacific Temperature Anomaly

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Summary
- Water masses from ‘the Blob’ were detected in the Columbia River estuary on multiple occasions in 2014 and 2015.
- Coastal upwelling forced the Blob offshore during the upwelling season.
- Low Columbia Basin snowpack levels in 2015 led to very warm river temperatures during spring and summer 2015.

Ocean Temperature
Nearshore ocean water transported into the estuary was indicative of regional coastal ocean conditions and was dominated by upwelling in 2014 and 2015. When upwelling winds relaxed, waters originating from the blob were transported into the estuary.

Estuarine Temperature, Dissolved O₂, and Nitrate
Biogeochemical observations from observatory platforms within the estuary demonstrated that warm, low nutrient seawater was transported into the estuary in September 2014 when upwelling winds diminished. Warm water persisted intermittently through April 2015. In May 2015 coastal upwelling resulted in the replacement of these warm waters with colder, nutrient replete waters. Intermittent intrusion of warm waters continued through fall 2015.

River Flow and Temperature
Low discharge and high river temperatures persisted during the summer of 2015 as a result of low winter snowpack and subsequent low freshwater inputs to the estuary.