



### Effect of climate change stressors on Salish Sea bull kelp populations

In Puget Sound, local declines of bull kelp have been detected. The purpose of this proposed study is to examine the effects of climate change stressors on the survival and growth of different life stages of bull kelp (*Nereocystis luetkeana*). Bull kelp (also referred to as bullwhip kelp) is an annual plant that recruits each spring and dies off in the winter. This plant grows quite rapidly—up to 0.5 meters per day. From its bottom holdfast, the stipe can grow tens of meters up to the water surface. Bull kelp form dense stands, with a gas filled cyst containing oxygen and carbon monoxide at the top that provides buoyancy for the large, fleshy blades. The bull kelp lifecycle includes this large plant phase, and a microscopic spore phase. Production of spores begins several weeks after the blades reach the water surface. The spores mature during the summer and fall then are released to the water column in the winter. They then germinate into male and female gametophytes. The female gametophyte settles to the sediment and is fertilized by the diflagellate male gametophyte to produce the next generation of bull kelp plants. Understanding of the kelp spore phase is limited, though it is known they are photosynthetically active, have no cell walls and are motile. They are therefore assumed to be potentially sensitive to environmental conditions. A number of recent studies indicate bull kelp distribution and abundance may be influenced by changes in ocean conditions such as increased temperature.



The buoyancy bladder of the bull kelp is filled with a combination of oxygen, nitrogen and carbon dioxide. Photo source: National Oceanic and Atmospheric Administration

### Why does this matter to DNR?

Bull kelp (*Nereocystis luetkeana*) is a species of submerged marine aquatic vegetation that grows along the in the Puget Sound providing important habitat for fish, birds and mammals, buffers the shore from high wave energy, stabilizes bottom sediments and sequesters carbon. Kelp and other macroalgae have been used as indicators of estuary health, with changes in their distribution and abundance reflecting changes in environmental conditions. In Puget Sound, local declines of bull kelp have been detected, and investigations to determine causal factors of the declines have been recommended. The purpose of this proposed study is to examine climate change stressors on the mature and juvenile stages of *N. luetkeana*.

### For more information

This project is being conducted in the Padilla-Gamiño Lab at the University of Washington School of Aquatic and Fishery Science]

