

Acoustic Array at Port Gravina, Prince William Sound

A project of the Prince William Sound Science Center, P.O. Box 705, Cordova, AK 99574 – www.pwssc.org

Project Description

The Prince William Sound Science Center proposes to establish a long-term hydrophone array in eastern Prince William Sound for monitoring a wide variety of tagged fish and marine species. This is a collaborative project with the Pacific Ocean Shelf Tracking (POST) project and is part of a large-scale acoustic telemetry network along the entire length of the West Coast of North America. Similar acoustic arrays have been deployed since 2002 in British Columbia and also, more recently, in Graves Harbor, Southeast Alaska.

We plan to deploy across the mouth of Port Gravina an acoustic array consisting primarily of ten Vemco VR3 underwater receivers. Two smaller arrays of four VR2W underwater receivers will also be deployed at Gravina Island and Gravina Rocks, two sites located near the VR3 array. Once the arrays are in place, they can be used by any research group to track individual fish or other marine species. Other entities who have already expressed interest in using this array include the Alaska Department of Fish and Game, Stanford University and Alaska Pacific University.

The PWS Science Center will initially capture and tag lingcod with acoustic transmitters in and around the arrays at Port Gravina in order to track their movements and residency in Prince William Sound. Lingcod, a bottomfish species unique to the coastal waters of the Pacific Coast of North America, support an important commercial and recreational fishery. Because of their depressed stock sizes, lingcod are currently a species of critical concern to fisheries managers throughout the Pacific Coast. Another research group, from Stanford University, will be tagging salmon shark with acoustic transmitters in Port Gravina. We anticipate that additional researchers and resource managers will use this array for many species of interest including salmon, sablefish, rockfish and octopus.

Acoustic tracking technology has proven to be a valuable tool in fisheries ecology. Results from the British Columbia arrays have demonstrated the utility of these marine tracking systems and have helped answer questions about salmon migration. The data from all receivers in these arrays are regularly downloaded and maintained through one web-based database. Deployment of the receiver arrays is the most expensive part of the system. Once an array is in place, any researcher can tag fish or other marine species and will be able to receive data from their individual fish through the POST-maintained database.

The Pacific Ocean Shelf Tracking Project is a non-profit organization intent on facilitating the development and coordination of a large-scale acoustic telemetry network along the entire length of the West Coast of North America. It works operationally through contractors engineering and deploying the array, and collaboratively through principle investigators conducting specific research projects using the array. (www.postcoml.org)

Details regarding the Array Deployments, Fish Tracking and Retrieval

In October 2008, we plan to install one, large-scale array across the mouth of Port Gravina. The array will consist of ten VR3 receivers in the deeper waters, and three VR2W receivers in more shallow waters. Battery life of VR3 receivers is estimated at 4-7 years. Each receiver will be attached to a 50 kg mooring with the receiver positioned approximately 1-2 m above the seafloor. Data from the VR3 receivers will be uploaded every two months using a VR3 surface modem. For further detailed specifications on these VEMCO receivers and modems, see <http://www.vemco.com/products/receivers/vr3uwm.php>

At each of the lingcod tagging sites located at Gravina Rocks and Gravina Island, we will also deploy a smaller array consisting of four VR2W receivers moored at 15 and 25 m depths. VR2W receivers will be retrieved by SCUBA divers for data retrieval and a battery change midway and at the end of the field component of the project in late October 2009. At the end of the battery life of the VR3 receivers, located in the deeper waters, a vessel will be used to drag and recover them by hooking onto a vertical tether line with a grapple. The battery life is estimated between 4-7 years.

With the proposed V13 acoustic transmitters which will be used with the lingcod project, the hydrophones each have a detection radius of >400m in sea conditions of 10-16 knot winds (www.vemco.com/cgi-bin/rangecalculator). Prior to the start of the tagging experiments, in situ examination of detection range will be conducted for both the fixed and mobile hydrophones. During the tagging experiments one active tag will be moored in the area to determine reliability of signal capture.

Our proposed array of independent (non-networked), autonomously logging hydrophones will permit us to measure short-term centers of activity that can be used to estimate spatial location of tagged animals in relation to the habitat and evaluate residence times. This approach has been used successfully in studies of other nekton (e.g. Grothues et al. 2005; Simpfendorfer et al. 2002) and employs relative proportions of reception events at each hydrophone to develop a weighting function, which is used to localize the target relative to hydrophone locations.

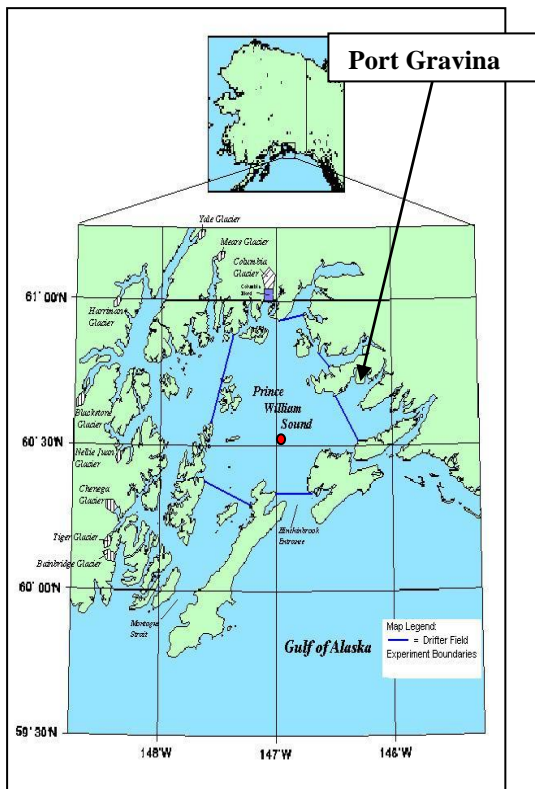


Fig. 1. Port Gravina acoustic array sites. Eastern PrinceWilliam Sound, Alaska. Triangles =VR3 receivers; circles = VR2W receivers.

