

Ferries for Science **Ferry-Based Monitoring of Puget Sound Currents**

Narrator: Technology hitches a ride on the Coupeville – Port Townsend ferry, now equipped to detect and monitor trends and changes in the water below. The ferry makes daily crossings of Admiralty Reach – a 6-km choke point of mixing tides and currents.

Jim Thomson: Fresh water coming in from the rivers, from the mountains, and it has salt water coming in from the ocean.

Narrator: Jim Thompson, Principal Oceanographer at the University of Washington's Applied Physics Laboratory, has studied these turbulent waters for years.

Thomson: That turbulence is one of the reasons we're out here. The whole area has very strong tides – a lot of energy here....

Narrator: Energy generating sometimes extreme water velocities, which are now measured by new sensors installed on the ferry.

Thomson: We had incredible support from Washington State Ferries, their engineering staff helping us design the system, helping us do everything from the actual mount for the instrument, which required cutting a 16-inch hole in the vessel.

The instruments on the ferries are Acoustic Doppler Current Profilers. It's a sonar system that measures the currents from the surface all the way to the bottom.

Narrator: The ADCP system pings the water column. Particles in the column reflect the pings. Bounce-back times and the Doppler shift enable calculations of water speed and direction. That information in turn will help scientists track nutrients and algae blooms and detect low-oxygen water that could harm aquatic life.

Thomson: This project is in collaboration with the Washington Department of Ecology, which has a mandate to understand water quality in Puget Sound. Part of understanding water quality is understanding where the water's coming from.

Narrator: Sensors on ferries began in 2009 when the Washington Department of Ecology intalled oceanographic sensors on the privately-operated *Victoria Clipper*, running twice a day between Seattle and Victoria. That experience helped lay the groundwork for the sensors aboard the ferries crossing Admiralty Inlet.

Thomson: By having our instruments on the ferries, the ferries cross the entire span twelve times per day, that allows you to create virtual stations across the entire inlet and to be able to be counting all the way across. And now we can start to get a total estimate as to how much water is intruding at the bottom from the ocean and how much water is leaving at the top from the rivers and the fresh water than comes in.

The data are available to the public on our website at apl.uw.edu and also on the Department of Ecology's webpage.

This is APL The Applied Physics Laboratory at the University of Washington in Seattle.