

Geophysical and Permitting Survey

An overview of the seabed survey planned for November 3rd through November 19th 2017, weather permitting, that will help determine the cable path and assembly area for the MAV project off Monhegan Island.

Length	110 ft
Beam	39 ft
Draft	7 ft

The Maine Aqua Ventus (MAV) floating offshore wind turbines demonstration project requires a seabed survey of the cable route from the wind turbine array located approximately 2.5 miles south of Monhegan Island and running approximately 26km north to the Port Clyde area. The proposed cable route follows an existing charted cable way specifically selected to minimize any impact on fishermen and fishing activities. Other areas to be surveyed include the test site 2.3 miles South of Monhegan Island where the floating turbines will be installed and moored, as well as a small area located in upper Penobscot Bay that will be used on a temporary basis for hull assembly and turbine installation. The seabed survey will be conducted by Alpine Ocean Seismic Survey, Inc. (Alpine), a very experienced firm in doing this work, including working collaboratively with the fishing community to minimize interference with fishing gear. A gear compensation program is in place in case of accidental fishing gear interference. The survey will determine the seabottom conditions where the cable may be placed, to help design the cable and determine the cable installation methods. It will provide a geophysical picture of the seabed contours in addition to interpreting the geology which exists along the cable route. The survey will also determine the archeological significance of any potential artifacts that may reside on or below the seabed so that they can be avoided and protected. This survey's products will help to inform the Maine State Historic Preservation Office (SHPO) of the archeological significance of the seabed and will be used to finalize permitting requirements for the installation of the transmission cable and identification of a turbine installation area.



Figure 1 - R/V Shearwater Length 110 ft, beam 39 ft, draft 7 ft

ACOUSTIC SOUND EQUIPMENT TO BE USED

- **Sidescan sonar** which provides a high resolution acoustic image of the seabed and will help identify objects such as pinnacles, rock formations and shipwrecks that may exist along the cable route.
- A **magnetometer** will provide indications of ferrous (metal) objects on the seabed.
- A **Sub-Bottom Profiler** will provide a seismic image of the geology 2 fathoms below the seabed and will help identify the geological substructure and **other** obstructions.
- A **Multi-Beam Echosounder** will provide a detailed map of the seabed bathymetry and geophysical content of the seabed.
- **A Bubbler System** is a seismic sonar system that will provide an acoustic picture of the geological formations found 25 fathoms below the seabed. This system will provide the Maine SHP office with a picture of the coastline prior to the last ice age.

The R/V Shearwater survey vessel (Figure 1) is 110 feet long. The vessel and 22 survey crew members will work 24 hours a day, 7 days a week. The vessel will deploy all of the equipment listed above and will proceed at a speed no greater than 4 knots along the cable route. The vessel and survey crew will make 5 - 6 passes along the route from the turbine test site to Port Clyde and total time towing the equipment at sea is estimated to be 4 days, weather permitting. The total survey time at the Monhegan test site is 3 days, weather permitting. Total time spent in the vicinity of

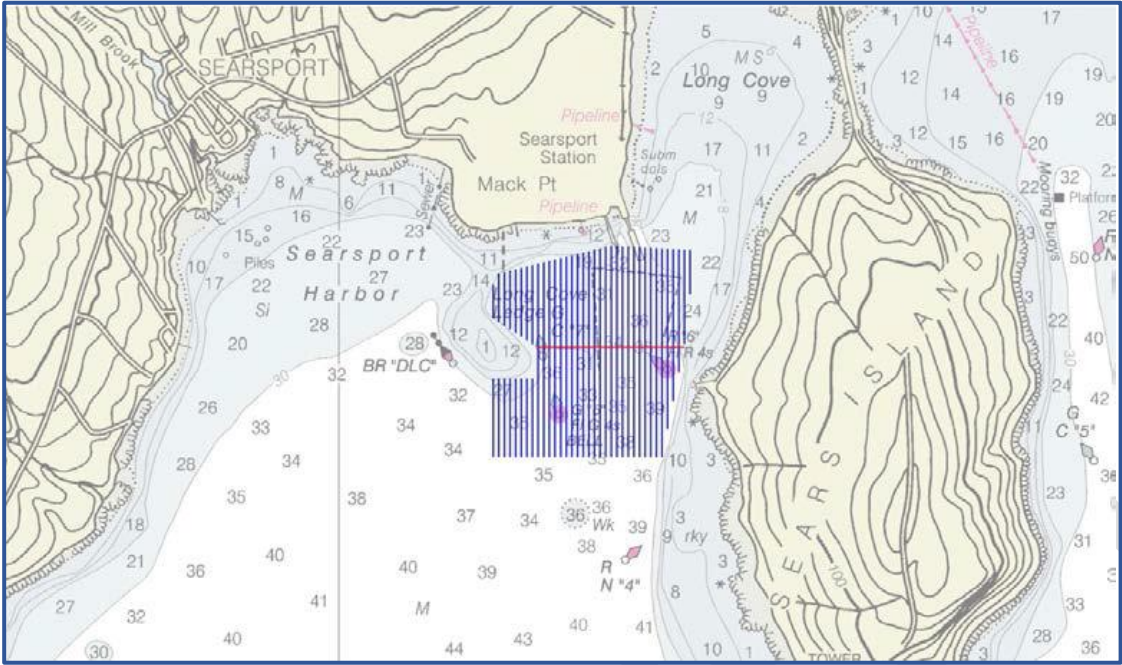
Searsport in upper Penobscot Bay is estimated to be approximately 3 days.

The survey work is a remote sensing of the environmental, geophysical, and geological conditions of the seabed and subsurface along the cable route to Port Clyde and in the Monhegan and Searsport areas. At no time will the equipment touch the seabed or be deployed to the seabed. **Towed survey equipment will be at a depth at least 2 to 4 fathoms off the bottom and at a distance ranging from 10 to 150 fathoms behind the vessel.** In addition, the towed equipment, in this case, the side scan sonar and the magnetometer possess onboard navigational systems, allowing the shipboard operator to know precisely where each device is at all times. The equipment listed above is commonly used by survey companies in the pre-design engineering data collection phase. The data collected will be used by government permitting agencies, the project design team, University of Maine, and power cable suppliers.



Figure 2 - SB-424 Towfish (Sidescan Sonar)

PROPOSED CABLE MAP AND SURVEY LOCATIONS

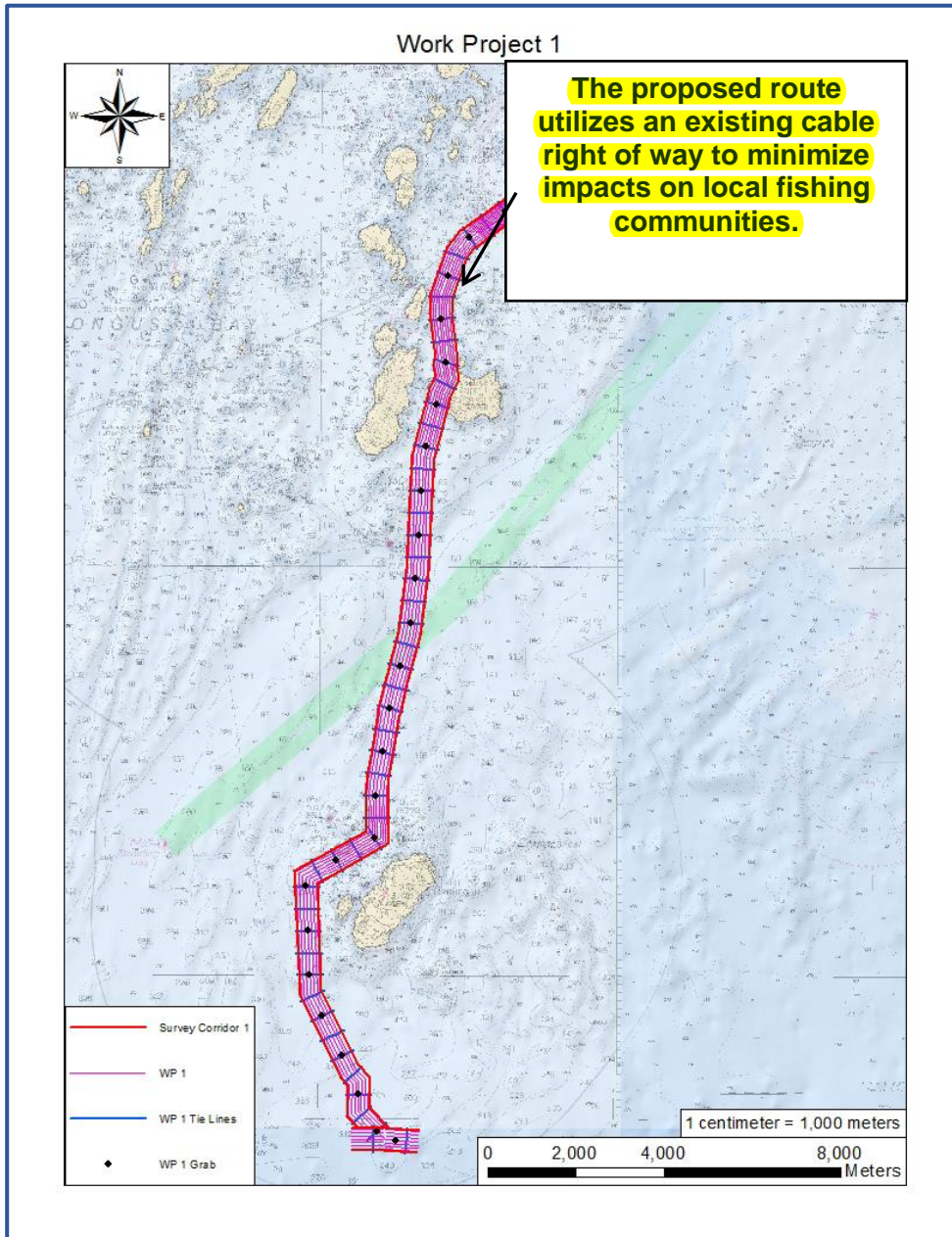


This map shows the current proposed turbine assembly areas off of Searsport that will be finalized after the seabed survey conducted by Alpine, Inc.

Task	Units
Total Number Survey Lines	44 lines @ 98ft line spacing
Total Number of Tie Lines	1
Total Line Miles	21
Total Number Grab Samples	2

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PROPOSED CABLE MAP AND SURVEY LOCATIONS (CONTINUED)

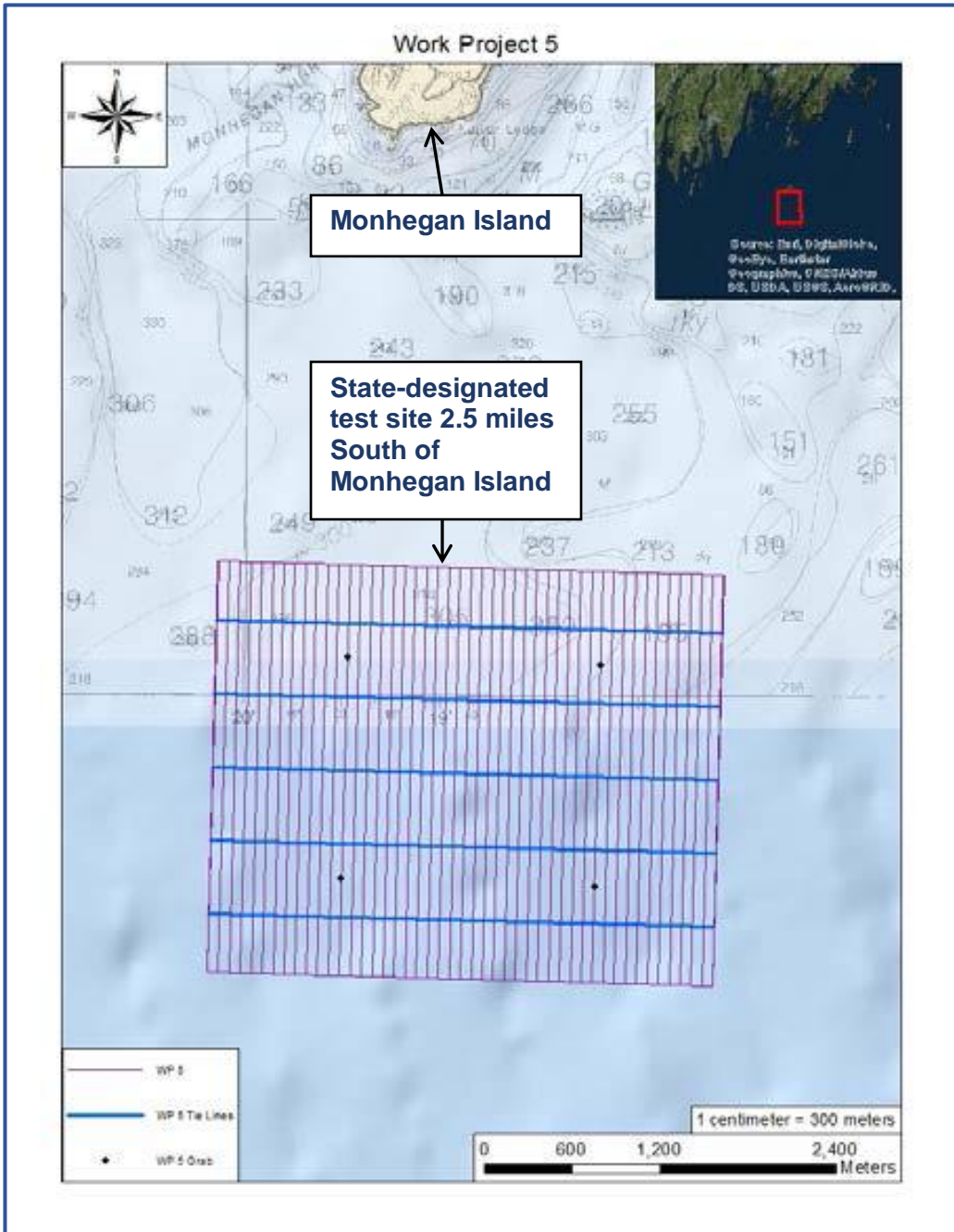


This map shows the current proposed cable route from Monhegan Island to Port Clyde that will be finalized after the seabed survey

Please note the proposed route utilizes an existing cable right of way to minimize impacts to local communities. Additionally, please note that there has been no cable landing point determined at this time. The cable landing point and onshore cable route will be selected to minimize inconvenience to local communities.

Task	Units
Total Number Survey Lines	15 lines @ 114ft line spacing 18 lines @ 196ft line spacing 14 lines @ 246ft line spacing
Total Number of Tie Lines	54
Total Line Miles	167
Total Number Grab Samples	26

PROPOSED CABLE MAP AND SURVEY LOCATIONS (CONTINUED)



This map shows proposed geophysical survey activities at the MAV ocean energy demonstration site 2.5 miles South of Monhegan Island.

Task	Units
Total Number Survey Lines	47 lines @ 246 ft line spacing
Total Number of Tie Lines	5
Total Line Miles	99
Total Number Grab Samples	4



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