

This is a detailed aerial map of the Willamette River area in Portland, Oregon. The map features a grayscale aerial photograph as the base layer, overlaid with a semi-transparent map showing bathymetry and land use. The Willamette River is the central feature, with its channel and various tributaries clearly marked. A blue line indicates a proposed or existing channel alignment. The map includes labels for 'Willamette River', 'Willamette Channel', 'Smith and Hayden Wetlands', 'Kingsley Park', and 'Gaston Creek'. The surrounding area includes industrial zones with large buildings and parking lots, as well as green spaces and parks. The map is oriented with North at the top.

July 2018

The hydrographic survey covered Portland Harbor from RM 1.9 to RM 11.8 and extended down the Multnomah Channel to the Sauvie Island Bridge (Figure 2). The overall footprint of the 2018 survey resultant model shown in Figure 2 covers 2,269.4 acres, of which 2,231.7 acres were filled with multibeam sonar coverage (98.3%) and traversed 32.5 nautical miles of shoreline.

Bridge Piers, Marine Terminals, and other fixed structures which occupy the target survey area that fully block sonar signals;

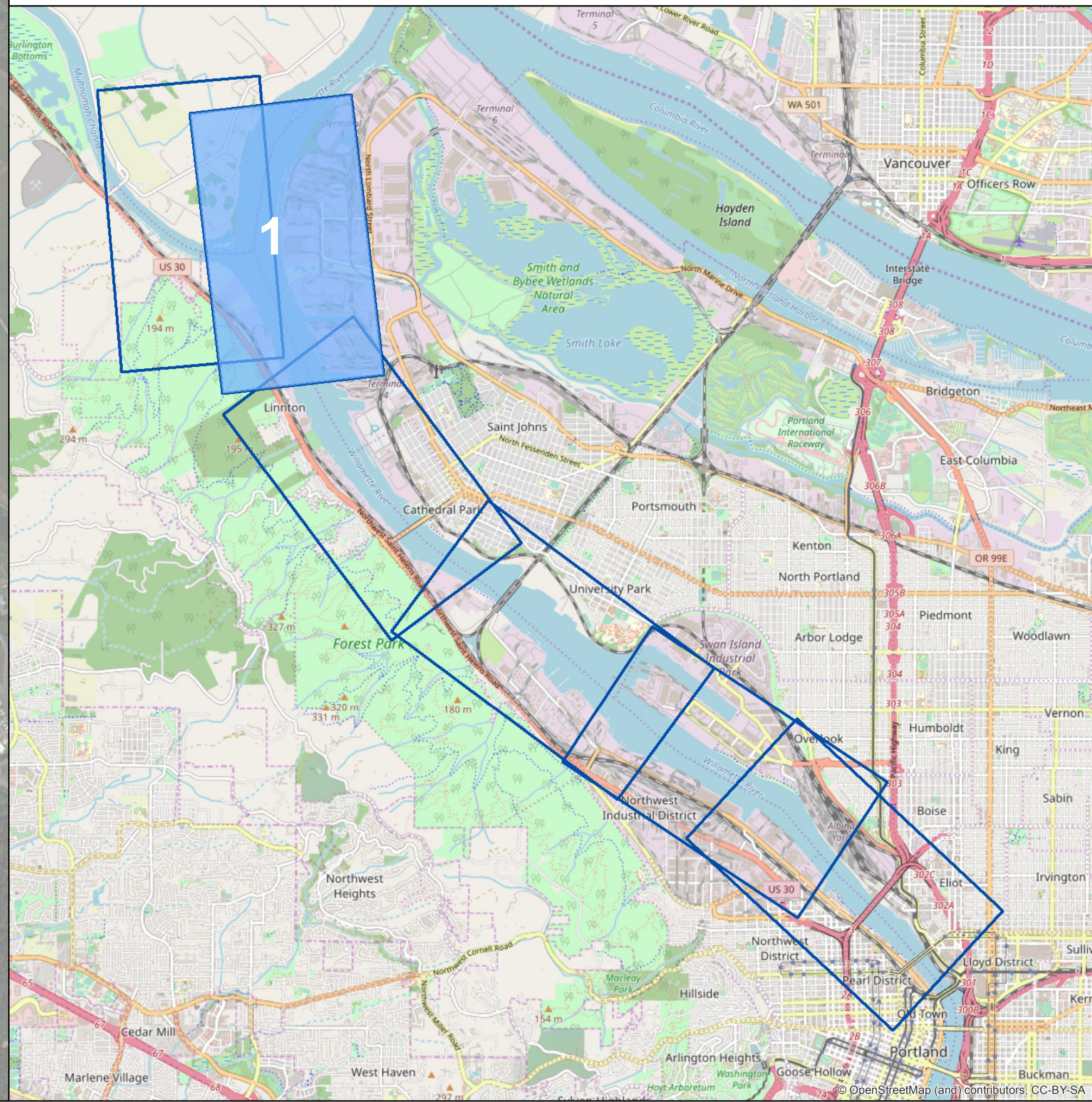
- ☐ Oil booms, low catwalks, docks, mooring lines and low hanging cables that restrict vessel access;
- ☐ Ships and barges at berth or moored in the survey area;
- ☐ Exposed and slightly submerged piling that restrict vessel access; and
- ☐ Shallow water with long gradual slopes that restrict vessel access and limit acceptable sonar range.

Large data gaps were surveyed where practicable with personal watercraft using single beam sonar to collect data along survey lines. These areas were then filled through interpolation methods between survey lines. All data in the resultant model were acquired by acoustic methods (multibeam or single beam). No supplemental lidar was used.

Although sonar signals to the side of the vessel can map under surface obstructions to a limited extent, there are areas without multibeam full coverage. Some of these areas are within the survey footprint while others are outside the survey footprint but within the target survey area. Coverage gaps are the result of the following:

The **horizontal datum** used for this survey is the North American Datum of 1983, 2011 realization, EPOCH:2010.00 (NAD83 [2011]) projected to the State Plane Coordinate System (SPCS) – Oregon North Zone, with units in International Feet.

The **vertical datum** for this survey is the North American Vertical Datum of 1988 (NAVD88) using the National Geodetic Survey (NGS) separation model Geoid 2012b, which converts NAD83 (2011) ellipsoid heights obtained from Global Navigation Satellite System (GNSS) receivers to NAVD88 orthometric heights.





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# Portland Harbor Bathymetry Data 2018 Map Sheet 2

Pre-RD AOC Group  
Willamette River, Oregon  
River Mile 1.9 to 11.8  
Hydrographic Survey

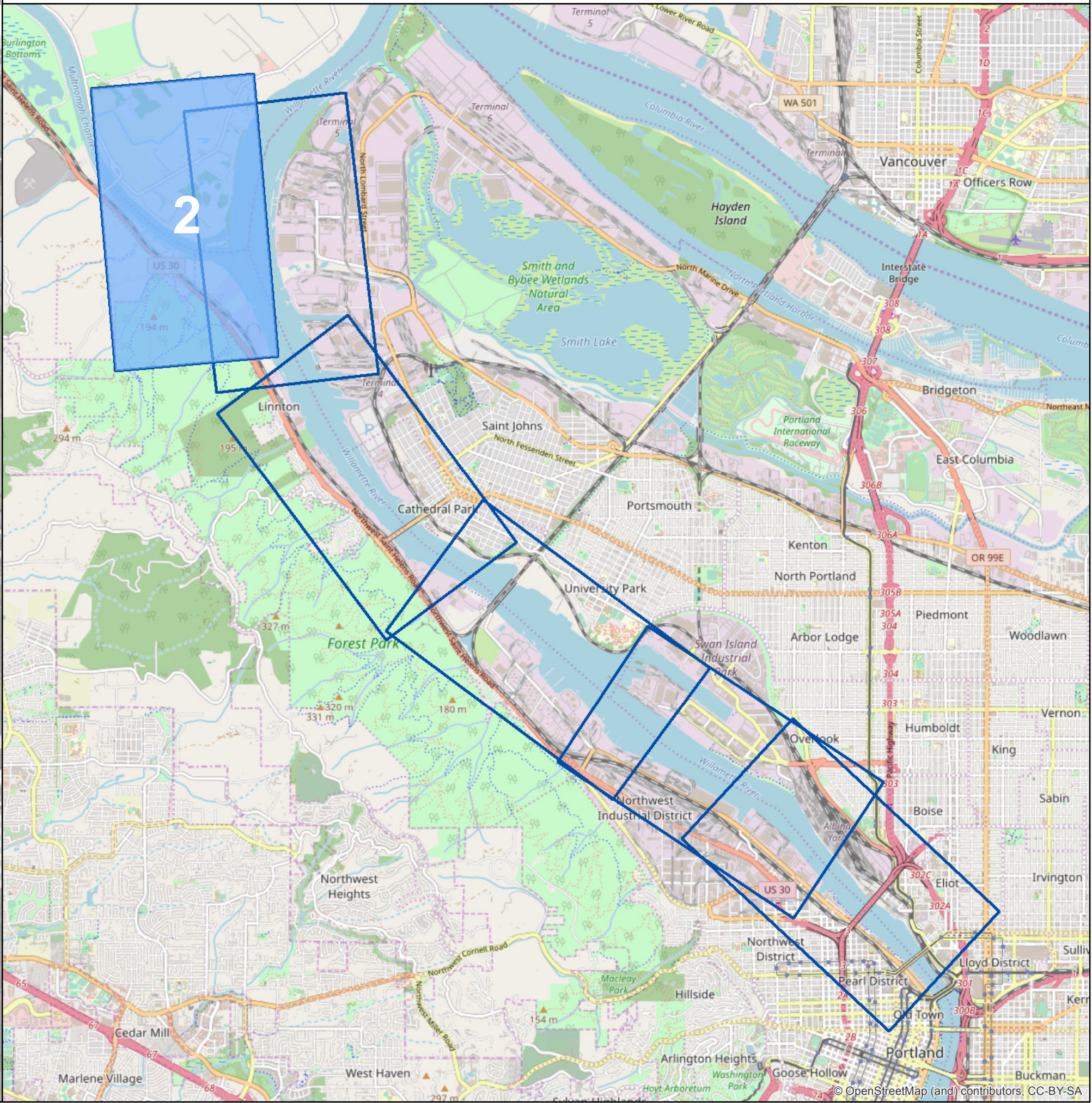
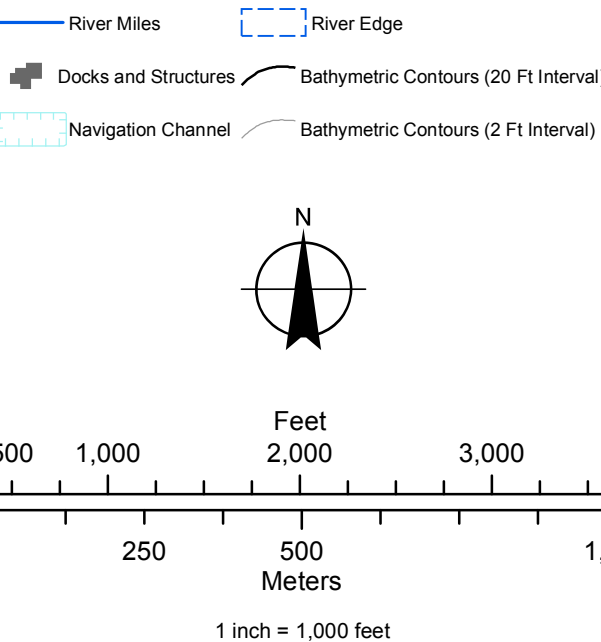
July 2018

## Survey Area and Coverage Limitations

The hydrographic survey covered Portland Harbor from RM 1.9 to RM 11.8 and extended down the Multnomah Channel to the Sauvie Island Bridge (Figure 2). The overall footprint of the 2018 survey resultant model shown in Figure 2 covers 2,269.4 acres, of which 2,231.7 acres were filled with multibeam sonar coverage (98.3%) and traversed 32.6 nautical miles of shoreline.

- Bridge Piers, Marine Terminals, and other fixed structures which occupy the target survey area that fully block sonar signals;
- Oil booms, low catwalks, docks, mooring lines and low hanging cables that restrict vessel access;
  - Ships and barges at berth or moored in the survey area;
  - Exposed and slightly submerged piling that restrict vessel access; and
  - Shallow water with long gradual slopes that restrict vessel access and limit acceptable sonar ranges.

Large data gaps were surveyed where practicable with personal watercraft using single beam sonar to collect data along survey lines. These areas were then filled through interpolation methods between survey lines. All data in the resultant model were acquired by acoustic methods (multibeam or single beam). No supplemental lidar was used. Although sonar signals to the side of the vessel can map under surface obstructions to a limited extent, there are areas without multibeam full coverage. Some of these areas are within the survey footprint while others are outside the survey footprint but within the target survey area. Coverage gaps are the result of the following:





This is a detailed aerial map of the Willamette River area in Portland, Oregon. The map is tilted and features topographic contour lines indicating elevation. Key locations and features labeled include:

- Willamette River**: The central water body, with a blue line tracing a path along its length.
- Whitwood Court**: A residential area located near the river.
- Cathedral Park**: A green space situated near the riverbank.
- Gasco**: An industrial area located near the bottom of the map.
- Clark & Wilson**: A residential area located near the top of the map.
- Forest Park**: A large green area located near the top of the map.
- Whitwood Court**: A residential area located near the river.
- Cathedral Park**: A green space situated near the riverbank.
- Gasco**: An industrial area located near the bottom of the map.
- Clark & Wilson**: A residential area located near the top of the map.
- Forest Park**: A large green area located near the top of the map.

The map also shows various industrial sites, including storage tanks and buildings, and a dense urban area to the right. A blue line indicates a specific path or boundary along the river.




July 2018

The hydrographic survey covered Portland Harbor from RM 1.9 to RM 11.8 and extended down the Multnomah Channel to the Sauvie Island Bridge (Figure 2). The overall footprint of the 2018 survey resultant model shown in Figure 2 covers 2,269.4 acres, of which 2,231.7 acres were filled with multibeam sonar coverage (98.3%) and traversed 32.5 nautical miles of shoreline.

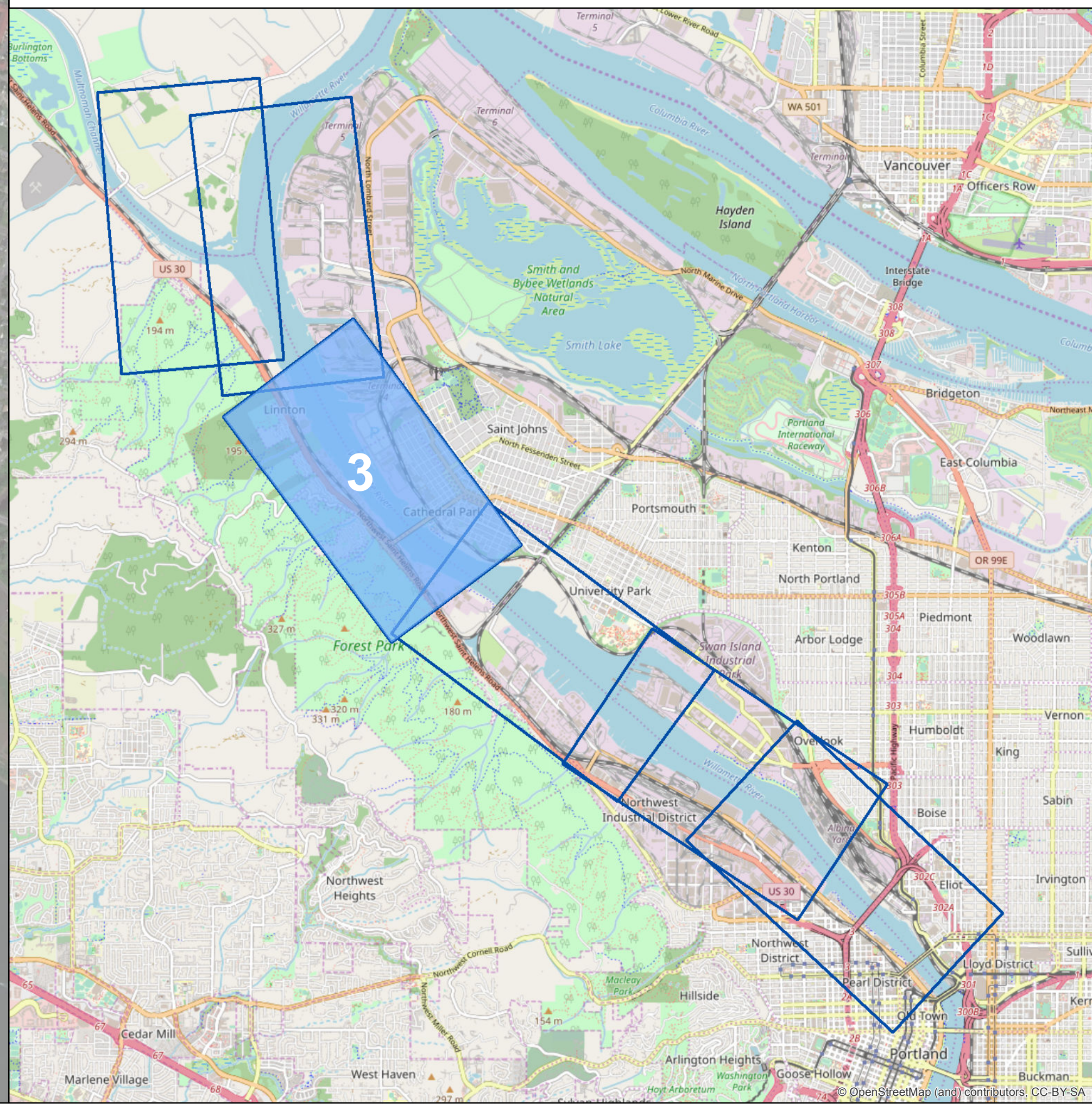
Large data gaps were surveyed where practicable with personal watercraft using single beam sonar to collect data along survey lines. These areas were then filled through interpolation methods between survey lines. All data in the resultant model were acquired by acoustic methods (multibeam or single beam). No supplemental lidar was used.

Although sonar signals to the side of the vessel can map under surface obstructions to a limited extent, there are areas without multibeam full coverage. Some of these areas are within the survey footprint while others are outside the survey footprint but within the target survey area. Coverage gaps are the result of the following:

The **horizontal datum** used for this survey is the North American Datum of 1983, 2011 realization, EPOCH:2010.00 (NAD83 [2011]) projected to the State Plane Coordinate System (SPCS) – Oregon North Zone, with units in International Feet.

— River Miles        River Edge  
 Docks and Structures       Bathymetric Contours (20 Ft Interval)  
  Navigation Channel       Bathymetric Contours (2 Ft Interval)

N  
 Feet  
 0 500 1,000 2,000 3,000 4,000  
 Meters  
 0 250 500 1,000  
 1 inch = 1,000 feet





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# Portland Harbor Bathymetry Data 2018 Map Sheet 4

Pre-RD AOC Group  
Willamette River, Oregon  
River Mile 1.9 to 11.8  
Hydrographic Survey

July 2018

### Survey Area and Coverage Limitations

The hydrographic survey covered Portland Harbor from RM 1.9 to RM 11.8 and extended down the Multnomah Channel to the Sauvie Island Bridge (Figure 2). The overall footprint of the 2018 survey resultant model shown in Figure 2 covers 2,269.4 acres, of which 2,231.7 acres were filled with multibeam sonar coverage (98.3%) and traversed 32.5 nautical miles of shoreline.

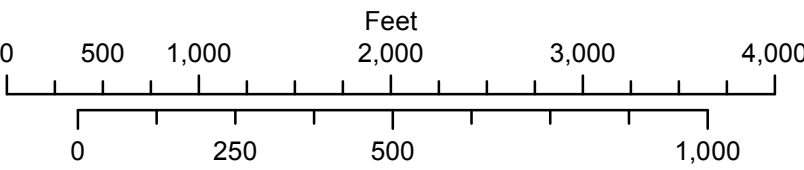
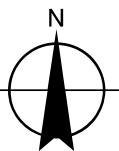
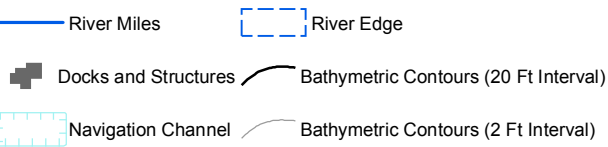
Bridge Piers, Marine Terminals, and other fixed structures which occupy the target survey area that fully block sonar signals;  
Oil booms, low catwalks, docks, mooring lines and low hanging cables that restrict vessel access;  
Ships and barges at berth or moored in the survey area;  
Exposed and slightly submerged piling that restrict vessel access; and  
Shallow water with long gradual slopes that restrict vessel access and limit acceptable sonar ranges.

Large data gaps were surveyed where practicable with personal watercraft using single beam sonar to collect data along survey lines. These areas were then filled through interpolation methods between survey lines. All data in the resultant model were acquired by acoustic methods (multibeam or single beam). No supplemental lidar was used.  
Although sonar signals to the side of the vessel can map under surface obstructions to a limited extent, there are areas without multibeam full coverage. Some of these areas are within the survey footprint while others are outside the survey footprint but within the target survey area. Coverage gaps are the result of the following:

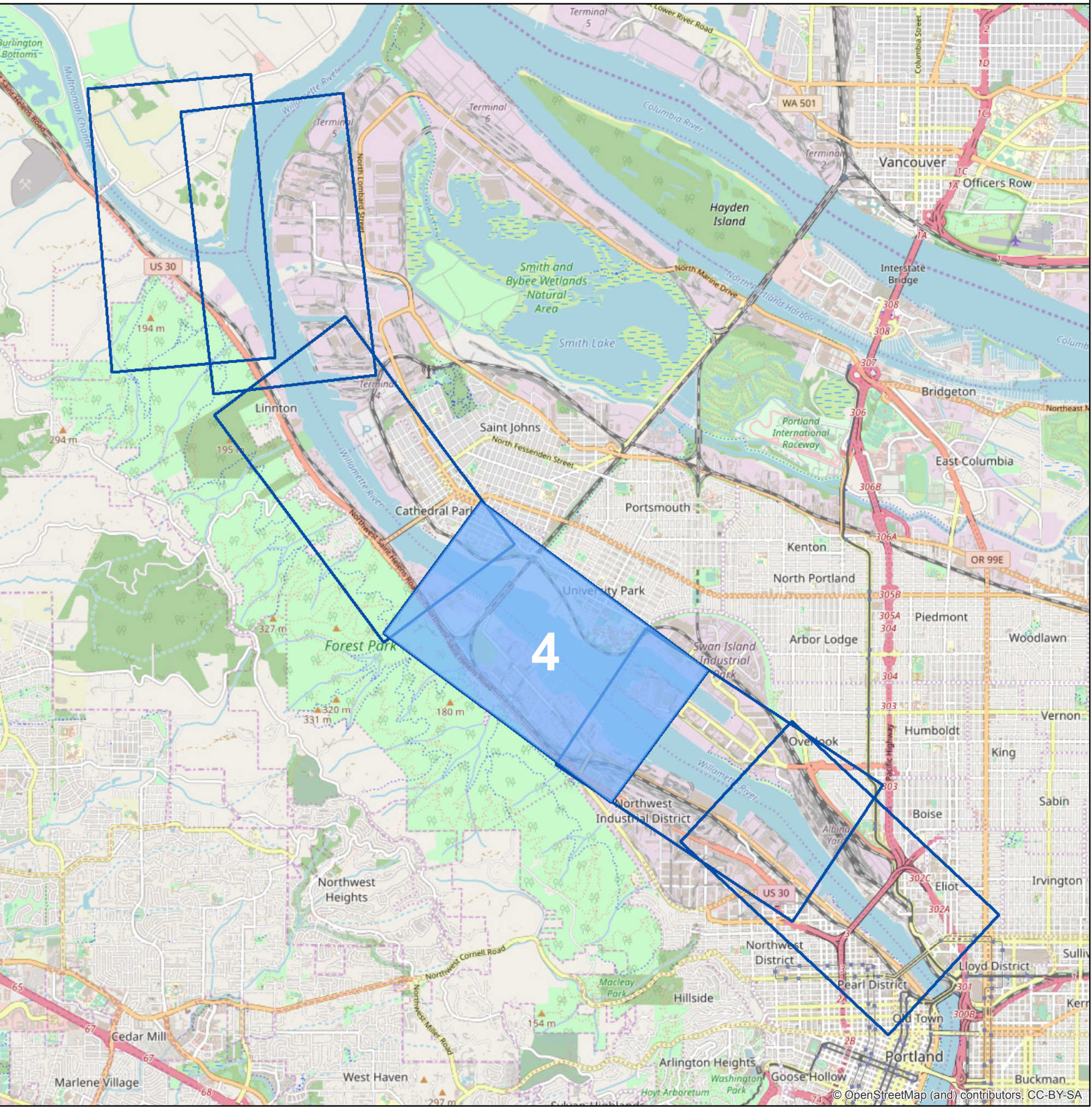
### Projection Information

The **horizontal datum** used for this survey is the North American Datum of 1983, 2011 realization, EPOCH:2010.00 (NAD83 [2011]) projected to the State Plane Coordinate System (SPCS) – Oregon North Zone, with units in International Feet.

The **vertical datum** for this survey is the North American Vertical Datum of 1988 (NAVD88) using the National Geodetic Survey (NGS) separation model Geoid 2012b, which converts NAD83 (2011) ellipsoid heights obtained from Global Navigation Satellite System (GNSS) receivers to NAVD88 orthometric heights.



1 inch = 1,000 feet





This aerial map of the Port of Portland, Oregon, illustrates the Willamette River and its surrounding urban and industrial landscape. The map features a large, semi-transparent, tilted rectangular overlay that defines a specific project area. Within this area, the river is shown with detailed bathymetry and a blue line indicating a proposed or existing boundary. Key locations labeled on the map include Lake Yard, Northwest Industrial, Overlook, Madison Park, Mock's Creek Property, Port of Portland, and Dillon. The surrounding area is densely packed with industrial buildings, parking lots, and residential neighborhoods, with a major highway (I-5) visible on the right side. The map is oriented with North at the top, and the tilted overlay is rotated approximately 30 degrees clockwise.

July 2018

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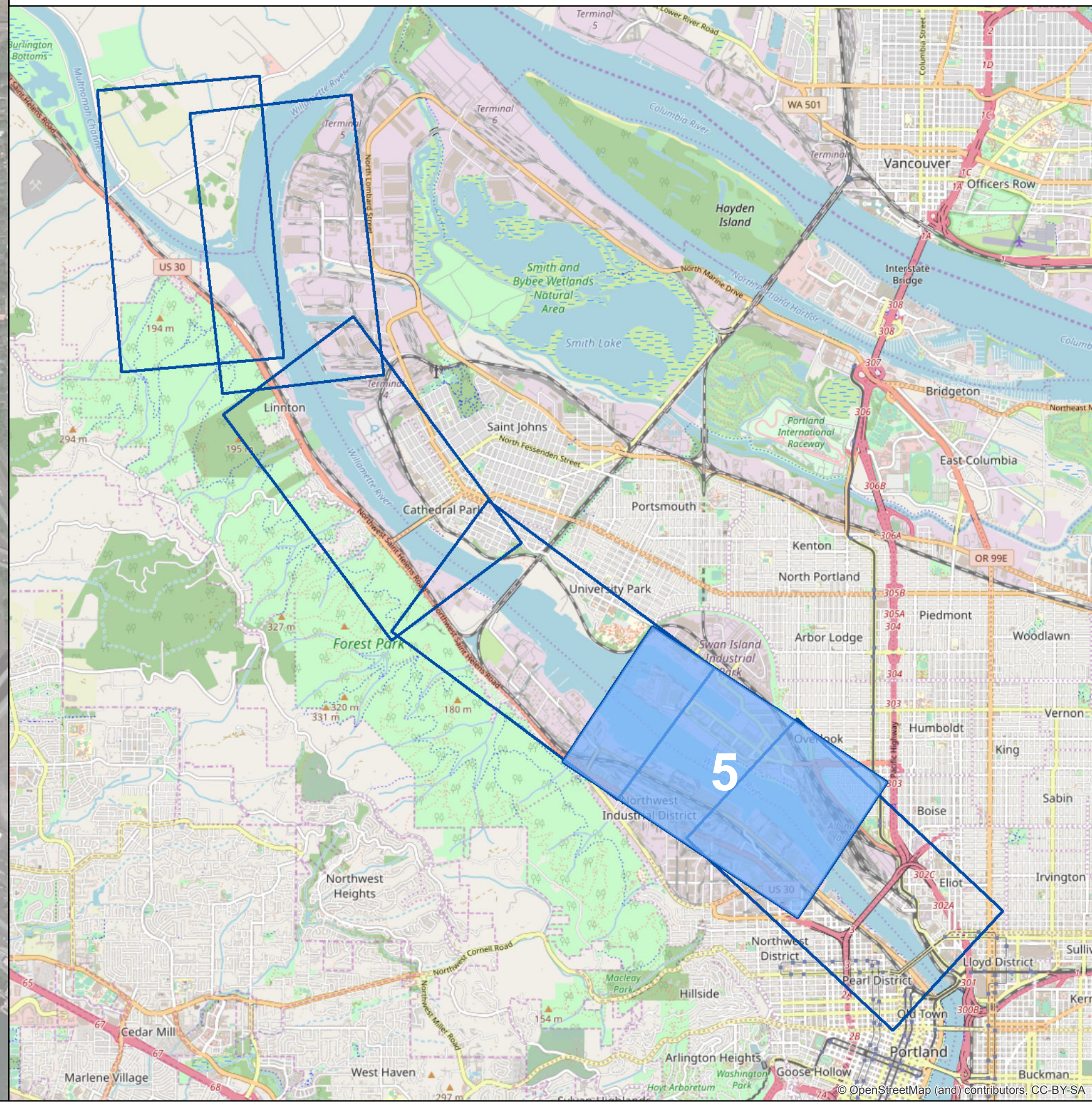
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The **horizontal datum** used for this survey is the North American Datum of 1983, 2011 realization, EPOCH:2010.00 (NAD83 [2011]) projected to the State Plane Coordinate System (SPCS) – Oregon North Zone, with units in International Feet.

— River Miles  
 - - - River Edge  
 ■ Docks and Structures  
 — Bathymetric Contours (20 Ft Interval)  
 - - - Navigation Channel  
 — Bathymetric Contours (2 Ft Interval)

Feet  
 500 1,000 2,000 3,000 4,000  
 Meters  
 0 250 500 1,000  
 1 inch = 1,000 feet





This aerial map displays the Willamette River and its surrounding urban environment in Portland, Oregon. The river is shown flowing through the city, with various landmarks and areas labeled. Key locations include the North District, Albina, Clack, Pearl, and North District. The map also shows Mack's Canal Property and Overlook. A semi-transparent blue and white pattern is overlaid on the map, likely representing a flood risk or water level projection. The map is oriented with North at the top.