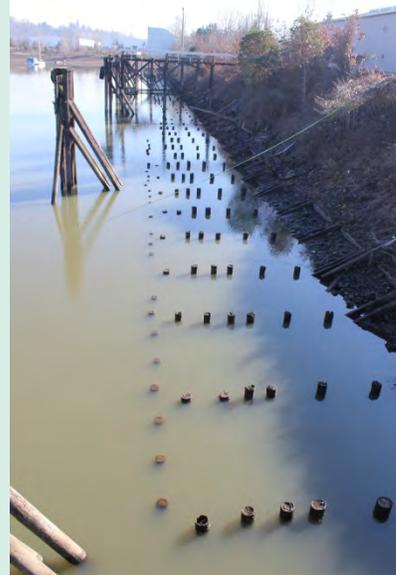


HABITAT TYPE MAPPING ◦ APRIL 11, 2014

# Habitat Type Inputs for National Marine Fisheries Service Habitat Equivalency Analysis



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## 1 INTRODUCTION

Vigor Industrial (Vigor) is proposing to operate a new drydock, identified as drydock 6 (DD6) in the current location of drydock 3 (DD3) at their facility at the western end of Swan Island, Portland, Multnomah County, Oregon (Figure 1). DD6 is a 950-ft long by 227-ft wide floating steel drydock and is replacing the 750-ft long by 139-ft wide DD3. The larger size of DD6 results in an additional 111,400 square feet (2.56 acres) of floating area. National Marine Fisheries Service (NMFS) has reviewed a biological assessment (BA) of the proposed drydock moorage and has requested conservation measures in the form of habitat upgrades equivalent to the 2.56 acres of floating area as determined by a Habitat Equivalency Analysis (HEA).

Vigor is proposing to improve salmonid habitat in the Swan Island Basin on the north side of their facility (Figure 1 – “mitigation area”) to mitigate for the additional affected habitat beneath the new drydock. The proposed mitigation method is piling removal and removal of large timber tie beams to improve shallow water salmonid habitat.

## 2 METHODS

NMFS provided Vigor Industrial and Stillwater Sciences with the HEA calculation spreadsheet they (NMFS) will be using to calculate the discounted service acre years (DSAYs) of the additional shaded habitat at DD6 vs the DSAYs in the mitigation area before and after the habitat improvement actions (pile removal and removal of large timbers). Calculating DSAYs involves identifying and measuring (in acres) habitat units at the impact and mitigation locations before and after the proposed action (drydock moorage and habitat improvement respectively), and entering those acreages in the HEA spreadsheet.

Habitat types are predefined in the spreadsheet and are included in Appendix A. Stillwater Sciences visited the proposed mitigation site on March 7 and 14, 2014 and identified the habitat types present. Acreages were determined based on field measurements and GIS mapping. GIS mapping was initially used to block out various habitat types and these distances were then field-verified and adjusted as needed.

Map files delineating the ordinary high water (OHW) line and bathymetric contours were obtained from the City of Portland (City of Portland 2014). OHW has been defined by the U.S. Army Corps of Engineers for Willamette River Mile 8 as 16.6 feet NGVD (USACE 2004), which translates to 13 feet NAVD88. For the Portland Harbor Superfund Site cleanup, Ordinary Low Water (OLW) has been defined as 5.1 feet NAVD88 (Anchor QEA 2012), 7.9 feet below OHW. The area between OHW and OLW is defined as the Active Channel Margin (ACM). The active channel margin was delineated based solely on the City of Portland OHW mapping and bathymetric surveys using ArcView. Because the available contours were in two foot increments, OLW was set at -8 feet elevation below OHW, very near the -7.9 feet used for the Portland Harbor Superfund cleanup. Because of high water conditions during the site visit, the physical condition of the ACM was determined based on previous photographs (see Appendix B). Sediment types were obtained from sampling done for the Portland Harbor Superfund site (Integral 2007). All samples collected for that effort in and around the mitigation area were gravel and finer sediments.

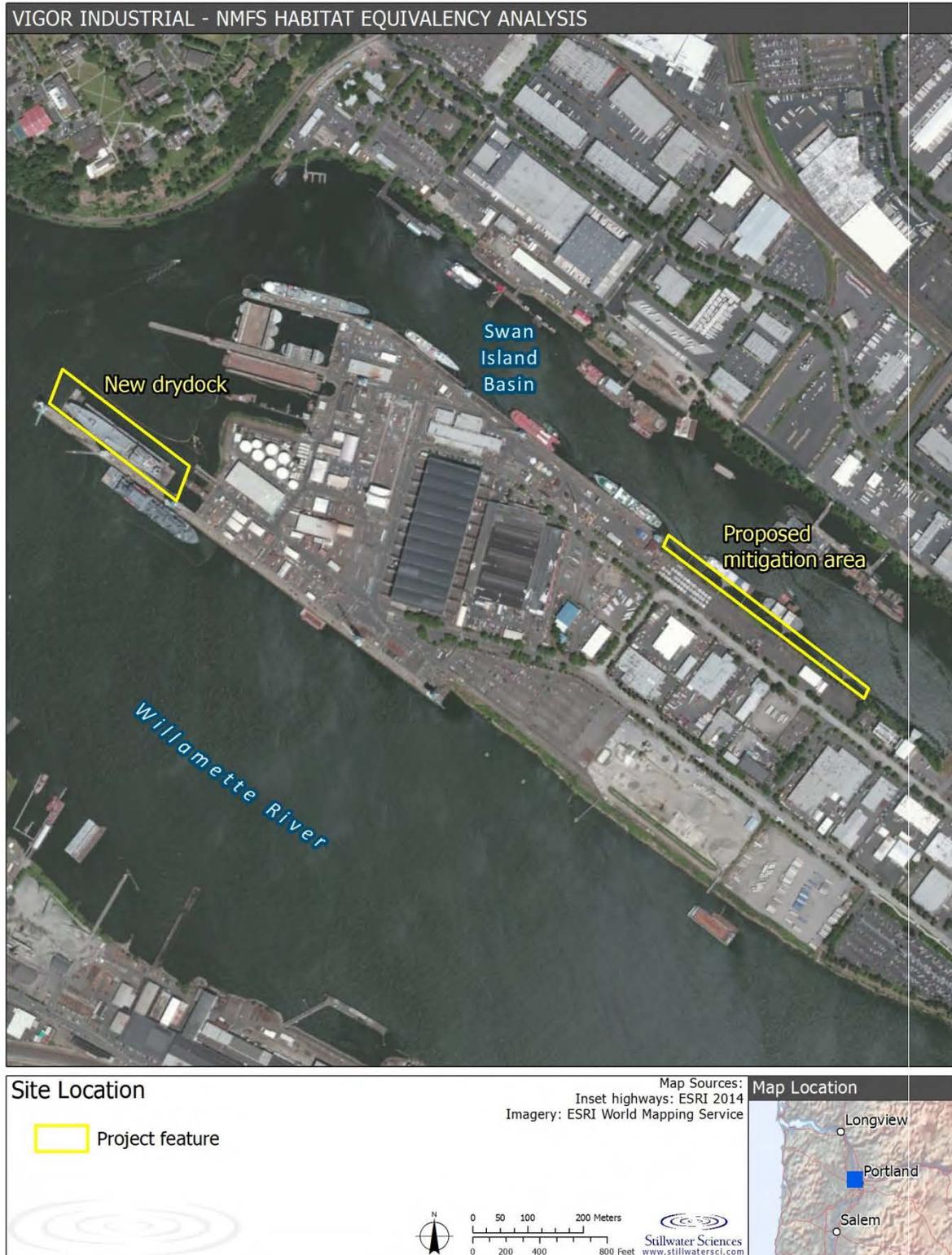


Figure 1. Project location

### 3 RESULTS

Habitat types present at the drydock moorage and mitigation area pre and post project implementation are provided on Table 1, and illustrated on Figures 2-4. The habitat values were provided by NMFS, and differ from those previously provided (Appendix A).

Table 1. Habitat types, their current acreages, and their projected acreages post-project.

Location	Habitat	Characteristics	Habitat value	Acres pre-project	Acres post-project
Moorage	Main Channel	Deepwater Natural Substrates	0.05	2.56	
		Covered-Floating	0.0		2.56
Mitigation area	Active Channel Margin	Sloped, >11°, unarmored, unvegetated (tie beams present)	0.025	0.13	0.00
		Sloped, >11°, unarmored, unvegetated (tie beams removed)	0.05	0.00	0.13
	Main Channel	Shallow water, gravel and finer substrates (pilings removed)	0.5	0.0	0.50

The following are brief narrative descriptions of the habitat types currently present, and their proposed post-project conditions. Photographs of all habitat types are included in Attachment 2.

1. Active Channel Margin. The active channel margin is currently steeply sloped and unvegetated. Some derelict piles (approximately 30, based on a review of site and aerial photographs taken during low water, and observations during the site visits) are currently located within the active channel margin. In addition, 98 wood tie beams consisting of two 4-inch by 12-inch timbers, 12-feet in length, which connect to the pilings and run perpendicular to the bank, extend onto the ACM (see the detail photo in Appendix B). These tie beams are functionally similar to pilings in that they provide refuge to predators, obstruct near shore habitat, and interfere with water circulation. Approximately half the length of the tie beams extend over the ACM. However, the tie beams affect the entire ACM by harboring ambush predators that can easily traverse the spaces between them. Thus the entire 0.39 acres of the ACM is available for mitigation, and the ACM with pilings will be converted to ACM, sloped >11°, unarmored, unvegetated. In order to achieve mitigation equal to the effect, 0.13 acres of active channel margin will have the pilings and tie-beams removed, along with piling removal from 0.5 acres of shallow water (see below). A total of 32 tie beam pairs will be removed from the 0.13 acres of ACM to be mitigated.

Figure 2. Habitat units in the mitigation area



2. Main Channel. The main channel habitat type is found in both the Moorage and Mitigation areas. In the Moorage area, it includes water approximately 65 feet deep (following dredging and depending on river and tidal stage), with fine substrates; 2.56 additional acres of which will be covered by the drydock. In the mitigation area, there is 1.4 acres of shallow water containing 853 pilings available for mitigation. The area of effect from a piling extends 10 feet around the piling, thus, the mitigation area extends from the OLW line out into the channel ten feet beyond the deepest pilings. This area was calculated using ArcView based on georeferenced aerial photos and channel contours obtained from the City of Portland (2014). A total of 0.5 acres of piling removal will be required to achieve a net of 4.4 DSAYs; the amount of DSAYs “converted” beneath Drydock 6. Three separate Google Earth aerial photos as well as site photographs taken during low water conditions were reviewed to determine the number of pilings to be removed. Each photograph (dated 7/2008, 7/2009 and 9/2009) showed a slightly different angle and shadow pattern. Based on this evidence, the area of piling removal contains approximately 220 piles. As part of the mitigation Vigor Industrial will remove a minimum of 220 piles from a 0.5 acre footprint of shallow water. Following mitigation the 0.5 acres of “shallow water with pilings” will be converted to “shallow water, less than 20 feet deep, with gravel and finer substrates.”

The pilings will be removed using a barge-mounted crane. A cable loop will be slipped over the pilings and lowered as close to the mudline as possible. The crane will then extract the pilings with a smooth lifting action. Care will be taken to not break the piles. A vibratory pile driver/extractor will also be available on-site should the pilings prove difficult to extract by pulling alone. The pilings will be stockpiled either at the top of bank or on one of the piers and disposed of in an approved upland landfill (the Hillsboro Landfill). No water or sediment clinging to the piles will be allowed to discharge back to the Swan Island Lagoon from the stockpile area.

## 4 REFERENCES

- Anchor QEA. 2012. Portland Harbor RI/FS. Attachment 1. Draft Mitigation Framework Development. Draft Feasibility Study.
- City of Portland. 2013. Bathymetric and OHW shapefiles obtained from Kevin Martin, Tech Services Manager. Meta data available at [http://www.portlandmaps.com/metadata/viewer/display.cfm?Meta\\_layer\\_id=53397&Db\\_type=sde&City\\_Only=True](http://www.portlandmaps.com/metadata/viewer/display.cfm?Meta_layer_id=53397&Db_type=sde&City_Only=True) and [http://www.portlandmaps.com/metadata/viewer/display.cfm?Meta\\_layer\\_id=53396&Db\\_type=sde&City\\_Only=True#dist](http://www.portlandmaps.com/metadata/viewer/display.cfm?Meta_layer_id=53396&Db_type=sde&City_Only=True#dist)
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- USACE (U.S. Army Corps of Engineers). 2004. Portland-Vancouver Harbor Information Package Second Edition. Reservoir Regulation and Water Quality Section. November 2004.

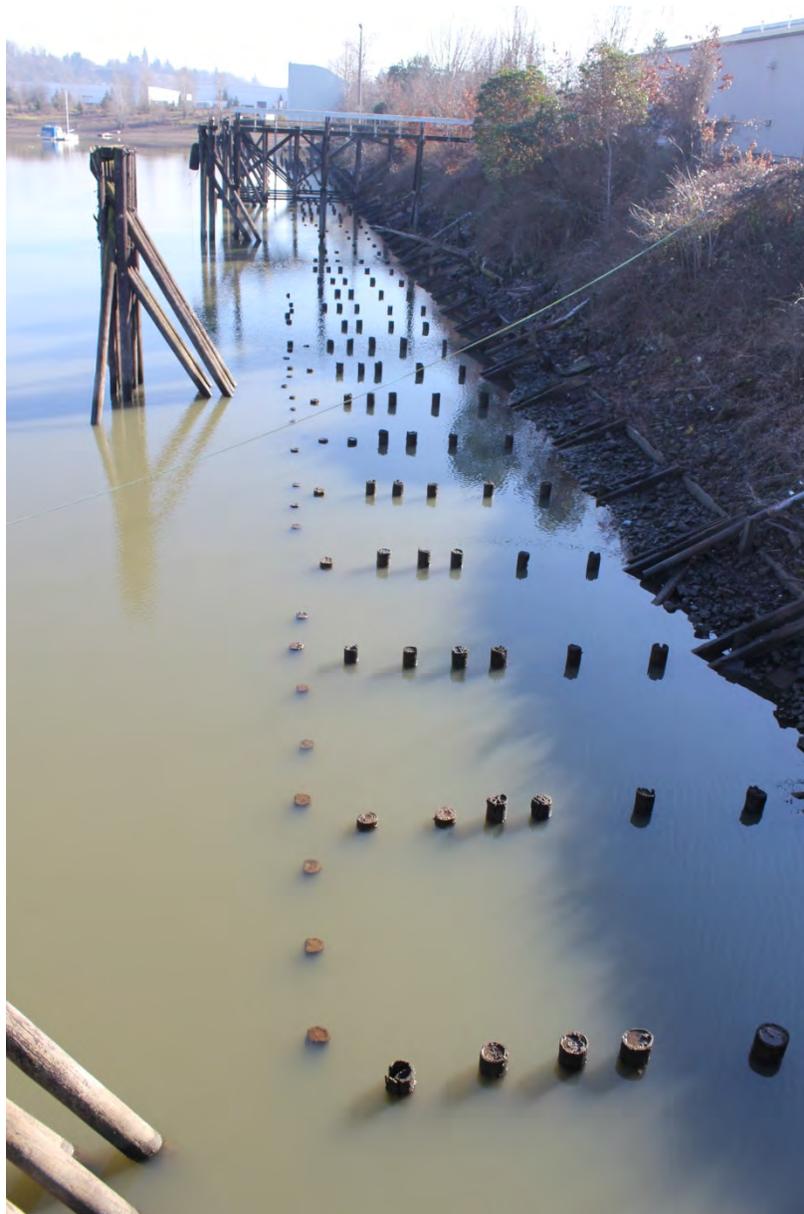


Figure B-2. Pilings and tie-beams to be removed. Note the gravel substrate in the exposed ACM (photo courtesy of Gene Caudill, Vigor Industrial, photo taken January 18, 2014).

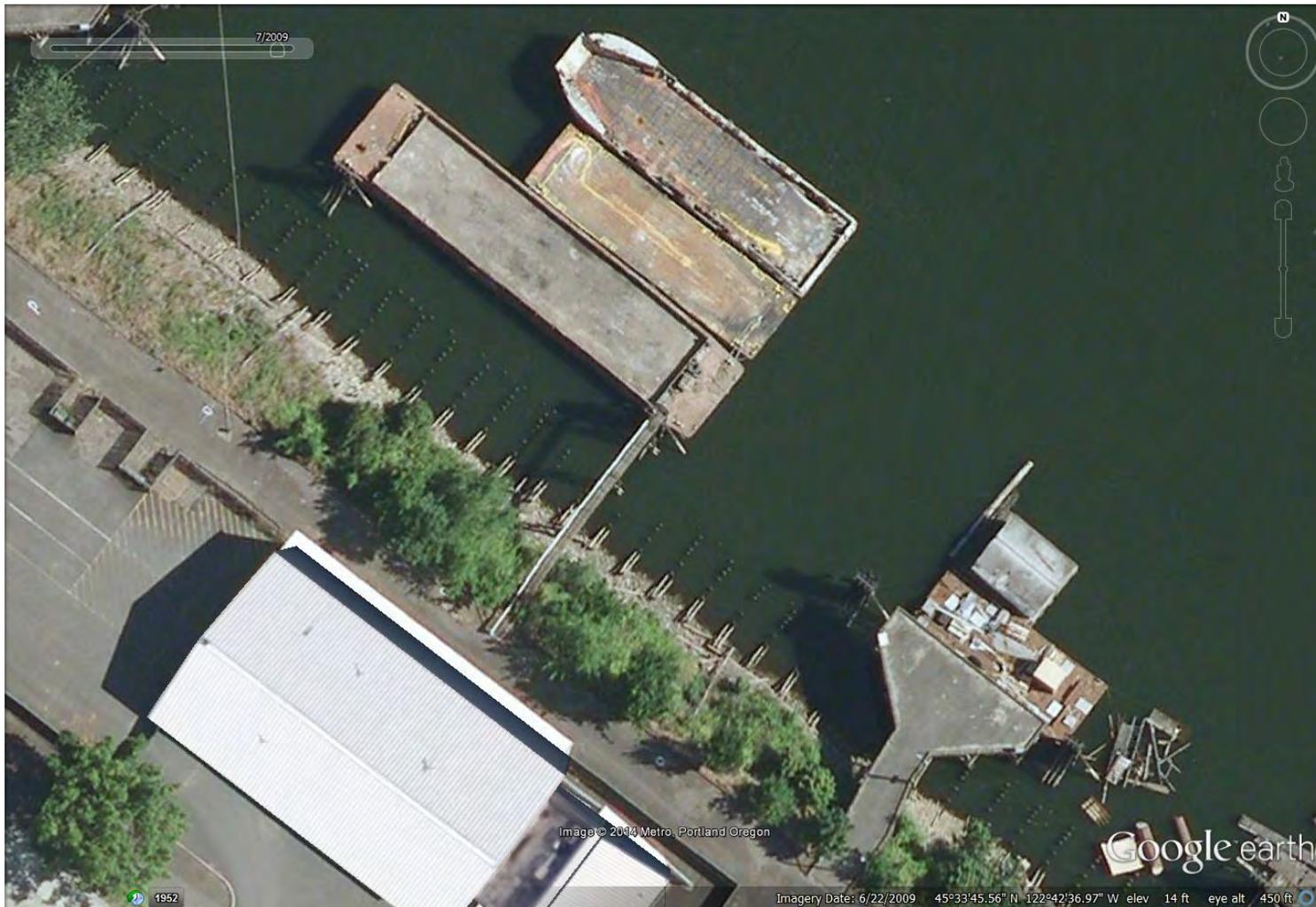


Figure B-1. A portion of the mitigation area shown in an aerial photograph taken 06/22/2006 showing pilings to be removed from shallow water, and tie beams to be removed from the ACM (from Google Earth).