

CITY OF PORTLAND BUREAU OF PLANNING AND SUSTAINABILITY

West Hayden Island Economic Foundation Study Executive Summary

FINAL

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PREPARED BY



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INTRODUCTION

The City of Portland (City) is considering annexation and development of a long-range land use plan for West Hayden Island (WHI). This process requires not only annexing and zoning the property, but also an assessment of natural resources, potential conflicting land uses, and marine industrial and recreational uses. WHI is approximately 800 acres and is the undeveloped western portion of Hayden Island, located in the Columbia River near the confluence with the Willamette River. WHI is owned by the Port of Portland, and was added to the region's urban growth boundary in 1983 for marine industrial purposes. It is both a potentially important economic resource and an important natural resource, containing undeveloped open space in a location with habitat value. WHI is designated as Marine Industrial Land on METRO's 2040 Growth Functional Plan. WHI is also identified by METRO as a high value riparian area and a Habitat of Concern in the regional inventory, and as a Moderate Habitat Conservation Area in Title 13.

The WHI Economic Foundation Study will serve as a foundation study for the zoning and annexation of WHI and is intended to provide background information for the current planning process and future WHI studies. The objective of the study is to identify likely marine-related economic development opportunities and corresponding land needs over a planning period of the next 30 years. The land demand analysis will also inform the Economic Social, Environmental and Energy (ESEE) Analysis to be completed as part of the City land use plan for WHI.

This Economic Foundation Study provides information about marine-related industrial land needs relative to WHI and its surroundings over the next 30 years. A companion study, the Environmental Foundation Study, provides a detailed understanding of the condition, function, and value of WHI natural resources. A third recreation study describes recreation participation, development potential, and value on and around WHI. Together these studies provide information on the importance and potential contribution of WHI in three different land uses: habitat, marine-industrial use, and recreation. The studies also provide information on potential compatibility and conflicts with multiple land uses on WHI.

Broadly, the scope of this work is to 1) assess the opportunities for marine-related economic growth in Portland Harbor, 2) estimate the land acreage and site characteristics necessary to accommodate this growth, 3) compare the available land supply to the land demand to identify marine industrial land shortages, and 4) identify the potential role of WHI and other sites in meeting projected land shortages. The scope of the analysis is marine-related uses, which includes both marine cargo and marine industrial uses. Marine cargo refers to activity and facilities related to the movement of waterborne cargo while marine industrial refers to industrial activity and facilities requiring waterborne transportation. Marine industrial activities may include manufacturing, vessel repair and construction, and rail yards at marine terminal sites.

In terms of geographic scope, the analysis is focused on Portland Harbor, with a limited review of the availability and relative suitability of alternative marine industrial land sites in the Lower Columbia River. The planning timeframe for the analysis is a 30-year horizon through 2040. Due to time and resource constraints, the scope of the analysis is based on existing data and readily available information.

HISTORY AND ECONOMIC ROLES OF PORTLAND HARBOR

The purpose of this section is to provide planning and policy context for the WHI decision process by describing the economic history and regional role of marine-related activities and land needs in Portland Harbor and surrounding areas. Furthermore, the section describes the economic contribution of marine-related uses to the regional economy. This section is intended to portray the broader economic context of marine-related uses and their regional importance.

For over 140 years, Portland has been a successful port city and continues today in this role due to its location at the nexus of excellent rail infrastructure, including the Olympic oil pipeline, two interstate freeways, the Columbia River deepwater shipping channel, and the Upper Columbia/Snake Rivers barge system. Marine cargo terminals handle and transport freight that is vital to numerous other industries located throughout Oregon, Southwest Washington, and beyond. Cargo movement through the Portland Harbor has grown steadily over the past century, and recent trends indicate continued future growth. A wide web of industries rely on waterborne transportation, including wholesalers and retailers who import consumer products, manufacturers that import raw and intermediate goods, and manufacturers and natural resource industries that export products.

Portland Harbor serves as an economic engine for the metro regional economy. The Portland Harbor is home not only to transportation and distribution activities linked to marine terminals, but also manufacturing facilities that rely on marine transportation. These marine-related industries are linked to other industries located in Portland Harbor and elsewhere in the metro area, including wholesale trade, local and regional transportation firms, manufacturing firms, and retail firms. These businesses depend on the transportation hub at Portland Harbor either for transport of their products to international or regional markets, or for the provision of inputs of the wide variety of freight materials imported through Portland Harbor, whether petroleum, consumer apparel, automobiles, or raw materials.

These water-dependent industries are then linked to other industries in the harbor and elsewhere throughout the metro region. Past studies indicate that cargo and manufacturing activities dependent on waterborne transportation contribute significantly to the metro region's economy. These studies indicate that marine-related economic activity generates approximately 20,000 jobs and \$1.4 billion in income, while economic activity in the overall harbor area may support approximately 100,000 jobs and \$3.5 billion in regional income.

Although there are several other ports in the Lower Columbia River, including the ports of Kalama, Longview, St. Helens, and Vancouver, Portland is distinguished in the level of its transportation connections and its location in a large metropolitan area. The metro area provides a larger population of skilled labor and a larger local industrial base that can generate cluster benefits and additional opportunity for marine-related businesses. As part of the Portland metropolitan area, Vancouver also has this advantage over other Lower Columbia River ports. However, Portland is differentiated from Vancouver and all other Lower Columbia Ports because it is the only port that handles large volumes of all cargo types (specifically, it is the only port that generally handles containers). While some marine industrial uses could be suitable at any Lower Columbia River port, for certain land uses that rely on all types of transportation connections and a large population or industrial base, marine industrial land in the Portland metropolitan area (in Vancouver or Portland) may not be as easily substituted for lands elsewhere in the Lower Columbia. While locating in Portland may be more desirable for some marine-related uses, other ports appear to be less land constrained (and have larger contiguous, shovel-ready sites), and may have less contamination.

Key findings from this section are summarized below:

• **Long-Term Leading Port.** From the late 19th century, Portland has been a leading West Coast port due to its position on the confluence of the Willamette and Columbia Rivers, its multi-modal transportation

infrastructure, and its proximity to areas producing substantial natural resources (primarily timber and grain) and associated finished products.

- Continued Land Absorption for Marine-Related Activities. Marine-related activities have experienced continued growth in Portland, with particular growth occurring during the world wars and continuing today. From 1960 to 1997, an annual average of 21 acres has been developed for river-dependent industrial uses in the Portland and Vancouver harbor area.
- Marine-Related Activities Contribute Significantly to City's Economy. Past studies indicate that cargo and manufacturing activities dependent on waterborne transportation contribute significantly to the region's economy. These studies indicate that river-dependent economic activity generates approximately 20,000 jobs and \$1.4 billion in income, while economic activity in the overall harbor area may support approximately 100,000 jobs and \$3.5 billion in income.
- **Regional Reliance on Marine-Cargo Activities.** A wide web of industries rely on waterborne transportation, including wholesalers and retailers who import consumer products, manufacturers that import raw and intermediate goods, and manufacturers and natural resource industries that export products.
- Substitutability of Marine-Related Lands in Portland vs. Other Ports. Portland is differentiated from other Lower Columbia Ports because it accommodates all cargo types (it is the only port that handles container cargo) and is closer to the population centers that utilize consumer goods that are shipped by marine freight. Additionally, as a metropolitan area Portland has a larger population of skilled labor and a larger local industrial base that can generate cluster benefits and additional opportunity for marine-related businesses; this advantage is also shared by the Port of Vancouver. Other ports, however, appear to be less land constrained (and have larger contiguous, shovel-ready sites), and may have less contamination. In general, Lower Columbia ports are distinguished by having access to two competing rail lines, which ensures more competitive rail rates.

GENERAL ECONOMIC AND MARINE INDUSTRIAL TRENDS

The purpose of this section is to identify the level of marine industrial economic activity likely to occur within Portland Harbor. The analysis consists of a 30-year (to the year 2040) forecast of job and cargo growth associated with marine industrial development opportunities. A review of economic and demographic trends is first provided, followed by a discussion of employment and land use trends more specific to marine industrial opportunities in Portland Harbor. These subsections rely on data from interviews as well as published data to provide historical and current context to the marine cargo and employment growth forecasts. A final subsection provides the marine cargo and job-growth forecast. The forecasts are based on different assumptions about the types of marine industrial development that could occur over the planning horizon, resulting in a low, medium, and high estimate of job growth. The three scenarios reflect uncertainty regarding overall economic growth, business location decisions, magnitude of cargo movement, and the Portland Harbor cargo market share.

Prior to the current recession, economic and population growth in the Portland metro region outpaced growth elsewhere in the nation. Economic activity is expected to begin recovering in 2010, with employment and population growth expected to average 1.4 percent and 1.5 percent, respectively, through 2030. A primary source of past economic growth in Portland has been marine-related economic activity, including marine industrial and marine cargo uses. These uses are projected to continue to grow over the next 30-years, with particular growth forecasted in the marine cargo and related transportation, warehousing, utility, and wholesale trade sectors.

The forecasts for cargo and employment have low, most likely, and high estimates, and yet still exclude the significant uncertainty represented by future markets development. New markets are perhaps the most

uncertain area since a new market can develop rapidly as a result of global economic forces, new technologies, and policy developments. Interviews with planners, industry representatives, and commodity forecasters, indicates that new markets are the most difficult to predict factors for both cargo and marine industrial growth, and the most important.

Growth in marine cargo over the 30 year planning horizon to 2040 is expected to vary by cargo type, but is projected to grow on a most likely average annual rate of between 0.2 percent for breakbulk to 3.3 percent for automobiles. Together, the marine cargo types measured in tonnage (dry bulks, grain, liquid bulks, and breakbulk) are expected to grow at a most likely average annual rate of 0.6 percent (average annual growth rate weighted by current tonnage), while containers are expected to increase at an annual rate of 2.4 percent for containers, and automobiles at a rate of 3.3 percent annually.

Growth in marine-industrial employment is expected to roughly mirror economic growth trends in the region, as some elements are expected to grow less slowly (manufacturing), while others are expected to grow more rapidly (transportation and warehousing). Growth rates in marine industrial employment are projected to vary from between 0.7 percent to 1.7 percent, with total employment estimated to increase by 2,100 jobs to 6,000 jobs.

As identified in the 2006 trade capacity analysis, availability of marine industrial land and adequate freight handling and transportation system infrastructure are critical to the growth of marine-related employment. Development of additional lands and facilities will likely be necessary to meet the projected growth in these sectors. If so, land availability for marine industrial development on West Hayden Island may be able to play a critical role in providing the infrastructure and lands necessary to take advantage of growth in these industries. These issues will be addressed in subsequent sections of this study.

Key findings from the general trend assessment are summarized below:

- General Global Economic Outlook. The current recession has caused a short-term decline on local cargo and employment, but this trend is expected to be reversed in 2010, with annual growth forecasted to be positive through 2040.
- **Population Growth.** Population growth in the Portland metro area has outpaced state and national growth, averaging 2.5 percent annually from 1980 to 2007. Annual growth from 2000 to 2060 is forecasted to average 1.2 percent, with growth to 2030 forecasted at the higher annual rate of 1.5 percent.
- General Employment Growth. Since 1981, Oregon has experienced average employment growth of 2 percent annually (compared to 1.7 percent nationally). Portland metro area employment is expected to nearly mirror population growth rate. Employment is forecasted to grow at an annual average rate of 1.2 percent from 2000 to 2060, with a higher annual growth rate of 1.4 percent expected through 2030. METRO forecasts employment growth of approximately 23,600 jobs in the Columbia Harbor area from 2010 to 2035.

Key findings from the cargo and employment forecasts are summarized below:

• **Cargo Forecasts.** Three cargo forecasts completed for the region were assessed: one for the Puget Sound and Columbia River system completed in 2009 for the Washington Public Ports Association, and two for Portland Harbor completed in 2009 (one by the Oregon Department of Transportation and one for the Port of Portland). Of these, the forecast completed for Portland Harbor (done for the Port of Portland) was utilized as it is the most recent, the most conservative, and utilized sound methodology. This forecast estimates growth in each cargo type in Portland Harbor through 2040, with estimated growth rates from 2007 to 2040 varying from 0.2 percent for breakbulk to 3.7 percent for automobiles. A recent trade capacity analysis for the Portland/Vancouver area indicates that this forecasted growth is feasible given the infrastructure in the region, since it is less than the doubling of freight volumes that the study suggested was possible (though challenging) for the region.

• Marine and Rail-Dependent Industrial Job Forecast. Data collected by the City of Portland indicates that in Portland Harbor there are 212 firms employing approximately 8,400 workers. Based on general population and employment growth trends in the region, these jobs are forecast to grow at an average annual rate of 1.2 percent a year. Barring constraints to growth such as land availability, this suggests that total employment in the Harbor area dependent on the multi-model transport system may increase to 12,000 jobs by 2040.

MARINE-RELATED SITE SUITABILITY

The purpose of this section is to provide an understanding of site suitability and constraints for marinerelated uses, including both marine cargo and marine industrial uses. Site suitability is assessed for six marine cargo types: automobiles, liquid bulk, grain dry bulk, other dry bulk, containers, and breakbulk. Site suitability is also assessed for two marine industrial types: vessel related services and marine-dependent manufacturing.¹ Requirements for a given marine-related use vary depending on site and use-specific needs. This section is intended to provide a general sense of the site size, water access, and intermodal infrastructure requirements for each of these marine-related uses. Where available, information on trends in these requirements is presented. A brief discussion is also provided on site constraints for marine-related use related to natural resources and environmental contamination. The information presented in this section is used in later sections to assess the suitability of vacant, waterfront lands in Portland to meet the requirements for marine-related uses, and to assess the suitability of West Hayden Island (WHI) and other lands in the Lower Columbia River.

Marine-related uses share similar site requirements, including 1) zoning (industrial), 2) flat and contiguous lands with shoreline access of 400 feet or more, and 3) proximity to multimodal infrastructure (water, truck, and rail). Differences arise in acreage and water depth requirements, with marine cargo uses typically requiring more acreage and deeper water. Specifically, marine cargo facilities are usually sized at 50 acres or more (with the exception of local/regional dry bulk and liquid facilities that can be as small as five acres) and require a minimum draft depth of 35 feet. Marine industrial uses vary considerably in their site size requirements, but are typically at least five acres in size and can be as large as several hundred acres. A draft depth of 20 to 30 feet is required for most marine industrial uses.

Regarding site limitations, marine cargo and marine industrial uses alike face constraints related to sensitive natural resources and brownfield contamination. The presence of either can limit site usage or increase site acreage requirements for mitigation, and increase site development costs.

Table ES-1 summarizes the site characteristics of each marine-related use described above. **ES-1** is not an exhaustive analysis of specific businesses that fall into marine cargo and marine industrial classifications. Rather, the intended purpose of **Table ES-1** is to summarize general characteristics and potential requirements of marine cargo and marine industrial sites, based upon representative businesses in Portland Harbor as well as in other west coast ports.

In general, the table indicates that cargo facilities require sites that are typically 50 acres or larger, with the exception of local/regional dry bulk and liquid bulk facilities that may be much smaller. It is important to note that while many existing grain facilities are relatively small, industry trends show that newer facilities are larger to accommodate larger vessels and longer unit trains (to ensure competitive railroad rates). Many of the acreage sizes indicated in **Table ES-1** indicate the core terminal operation footprint, which excludes the rail infrastructure and ancillary structures and operations. Furthermore, the site sizes in **Table ES-1** do not include any acreage required for onsite mitigation or environmental protection. Total acreage, including

¹ Marine or vessel related services include barging, cargo handling services, and naval/coast guard services. Marine dependent manufactures are those firms that require marine facilities for the transport of raw and finished product.

rail infrastructure and support operations, for new marine cargo facilities handling containers, automobiles, national/international dry bulks, and grain are typically 100 acres or more.

All cargo facilities require minimum draft depths of 35 feet, with a deeper draft more suitable for many cargo types. Berth lengths of most cargo facilities are at least 550 feet, with many larger than 1,000 feet. As noted above, these lengths do not include dolphins, which extend the shoreline length for mooring vessels. This emphasizes the need for sites with at least 400 feet of shoreline length.

Marine industrial sites vary significantly in their requirements, both in terms of acreage, berth length, and channel depth. However with the exception of some vessel-related services, most marine industrial sites require at least a 20-foot draft and a five acre site. Nearly all marine industrial uses require a site with at least 400 feet of riverfront to accommodate a berth, and nearly all require access to rail and truck routes.

Table ES-1 Summary of Site Characteristics for Marine-Related Land Uses							
	Acreage A	Approximation	Water Frontage Approximation		Berth Depth	Rail Infrastructure	
Site Type	Portland Harbor	Other West Coast Harbors	Portland Harbor	West Coast Ports	Requirement within 150' of Shore ²	Requirements	
Cargo							
Automobile	75 - 120	95 - 168	414′ - 1,000	1,040' – 1,300'	35' or greater	Rail Ramp & Nearsite Rail Yard (5+ acres)	
Container	193	50 - 385	Total of 2,850' (3 berths)	1,100′ – 6,380′	40' or greater	Intermodal Yard (Onsite or Nearby Rail Yard) & Mainline Access	
Breakbulk	20 - 50	15 - 75	2005' (2 berths)	600 [,] – 1,750	35' or greater	Nearby Rail Yard & Mainline Access	
Grain	40 – 100	40 - 100	327' – 928'	715′	40' or greater	Spur/loop & Nearby Rail Yard & Mainline Access	
Dry bulk National/International	25 – 120	34 – 136	740'- 900+'	550 [,] – 1,900	40' or greater	Spur/loop & Nearby Rail Yard & Mainline Access	
Dry Bulk	5 – 27	5 – 23	N/A	550' – 1900'	40' or greater	Spur	
Local/Regional							
Liquid bulk	5 – 45	10 - 20	700′	700' – 1,980'	35' or greater	Spur	
Industrial							
Vessel Related Services	5 - 60		175' – 3,900'	150 1,400'	20' or greater	Spur / None	
Marine dependent manufacturing	10 - 170 acres		994′ – 1,800′	500' – 875'	20' or greater	Spur	

Key findings from the suit suitability assessment are summarized below:

General Site Requirements. Sites for marine industrial use must be zoned for industrial use, and be located on the waterfront with access to adequate channel depth—at least 20 feet for marine industrial sites and at least 35 feet water depth for marine cargo sites. Most marine-related uses require this draft depth for a length of 400 feet within 150 feet of shore, with depth close to shore most desirable. Marine cargo and marine industrial sites also both require easy access to rail and truck transportation routes.

² This distance from shore is based upon PHILS study, City of Portland, Portland Harbor Industrial Lands Study, February 2003, Prepared by E.D. Hovee & Company.

- **General Acreage Requirements.** Acreage is required not only for the footprint of the marine terminal or marine industrial operations, but also for infrastructure such as access roads and rail lines. Acreage requirements differ by use, but in general, marine terminals require more acreage due to the large rail facilities required for many cargo facilities and associated warehousing and distribution facilities. Existing marine cargo terminals generally range in size from 20 acres to over 100 acres, while marine industrial sites typically range between 5 acres and 100 acres.
- Variation in Specific Site Requirements. Site size and configuration vary significantly based on specific use, operational requirements, site constraints, and local market conditions. An examination of just one use, such as container cargo terminals, will reveal very different site sizes and configurations at different ports and even at the same port.
- Trends in Marine Cargo Facilities. Ship size is increasing for most cargo types, resulting in larger desired berth lengths and deeper river depth. The trend towards unit trains for grain and international/national dry bulk cargoes means that larger sites (100+ acres) that can accommodate multiple unit trains are expected to be necessary for future competitiveness. Trends in Asia and other land-constrained areas are to minimize terminal footprint through a variety of methods; in general, these methods are costly, respond to specific local market conditions, and have not been implemented at Lower Columbia ports. The tradeoffs between cost and site efficiency, and the resulting impact on competitiveness and economic viability is not addressed in this analysis.
- Natural Resources Site Constraints. Waterfront areas often have sensitive natural resources. Local, state, and national regulations protect sensitive resources, and often require mitigation and avoidance of impact for development in areas with these resources. In addition to requiring lands to be set aside for environmental purposes, developing in areas with sensitive resources may increase site development cost and limit suitability.
- **Contamination Site Constraints.** By raising site development costs and raising long-term liability concerns, contamination in waterfront areas can reduce the market feasibility of a site for marine industrial use.

INVENTORY OF SUITABILITY MARINE-RELATED SITES

Following a brief overview of current land use in Portland Harbor, this section provides an inventory of vacant, waterfront lands in the industrial districts in Portland. The lands inventoried for this study are located along the Willamette River downstream of the Fremont Bridge and eastward along the Columbia River to Interstate 5. The purpose of the section is to provide an understanding of the available supply of industrial waterfront land in Portland Harbor, and the characteristics of the land supply relative to the site suitability requirements for marine-related uses outlined above. The section concludes with a comparison of site characteristics required for marine-related uses versus the characteristics of the available waterfront lands in Portland. The focus is an inventory of lands in Portland Harbor; the next section includes an overview assessment of the availability of industrial lands suitable for marine-related uses in other ports on the Lower Columbia River.

The site suitability analysis discussed above identified the desired or required site characteristics for each type of marine industrial use. As noted in that section, most marine cargo uses require channel depth of 35 feet or more and sites that are 60 to over 100 acres in size. There are no sites that meet these requirements currently vacant in Portland Harbor. Assuming that future dredging enables deep draft access to all sites, there are still no sites that are large enough to accommodate a new, modern marine cargo facility. The possible exceptions are liquid bulk and local/regional dry bulk facilities that may require a smaller site.

Marine industrial uses and their site size requirements are quite varied. However, it is expected that most marine industrial uses desire sites of at least five acres, draft of 20 feet within 150 feet of shore, and a

shoreline length of at least 400 feet. As indicated above, however, many marine industrial uses require large sites of over 100 acres. There are 11 sites in Portland Harbor that are five acres or more with shoreline length of 400 feet, of which nine have depth of 20 feet or more within 150 feet of shore. All but one of these sites are constrained as suspected brownfields. **Table ES-2** summarizes the number of available sites that may be potentially suitable for each type of marine-related use.

Waterfront vacant land suitable for marine cargo and marine industrial use is limited by site size and configuration, natural resource constraints, and contamination. There are 31 sites with 300 acres of vacant, waterfront industrial lands, of which 20 sites are smaller than five acres in size. No vacant sites are larger than 60 acres in size, which precludes development of many marine cargo uses and some marine industrial uses. There are, however, 11 sites larger than five acres that with channel deepening could become appropriate for local/regional market dry bulk or liquid bulk cargo or for marine industrial uses. All but one of these sites is a suspected brownfield, however, which constrains its suitability. Suitability of these sites for each use will depend on use-specific site requirements as well as the tolerance of the user for the potentially large liability associated with the Superfund site and upland brownfield contamination.

Marine-Related Use	Number of Available, Potentially Suitable Sites	Notes		
Cargo				
Automobile	0	No vacant sites large enough to accommodate new automobile terminal and associated infrastructure.		
Container	0	No vacant sites large enough to accommodate new container terminal and associated infrastructure.		
Breakbulk	0	No vacant sites large enough to accommodate new breakbulk terminal and associated infrastructure.		
Dry Bulk (National/International)	0	No vacant sites are large enough to accommodate a new grain or international dry bulk commodity terminal and associated infrastructure.		
Liquid Bulk	0-6	There are six sites that are larger than ten acres that are located in the Northwest industrial district proximate to the Olympic pipeline. All of these sites have suspected upland contamination. Only one of these sites (it is 13.5 acres in size and is owned by Northwest Natural Gas) currently has a draft of 35 feet.		
Dry Bulk (Regional/Local)	1-11	There are 11 sites in Portland Harbor that are larger than five acres and have shoreline access of 400 feet. Only one of these sites does not have suspected upland contamination, and is owned by the Port of Portland. Only one other site (it is 13.5 acres in size and is owned by Northwest Natural Gas) currently has a draft of 35 feet.		
Industrial				
Vessel Related Services	1-11	There are eleven vacant sites larger than five acres in size with adequate riverfront access, of which nine sites have draft depth of 20 feet or more. Only one site does not have potential upland contamination, and is owned by the Port of Portland.		
Manufacturing	0 – 11	There are eleven vacant sites larger than five acres in size, and only two sites larger than 50 acres in size. Of these sites, nine sites have draft depth of 20 feet or more. There are no vacant riverfront sites larger than 60 acres in size. All sites larger than 15 acres are affected by upland contamination.		

Table ES-2 Available, Potentially Suitable Sites by Marine-Related Use

Key points from this site inventory include:

- **Marine cargo.** The industrial districts in Portland Harbor downstream of the Steel Bridge cover 5,932 acres of land in taxlots.³ This land encompasses river-dependent marine industrial and marine cargo activities and facilities, as well as rail-dependent uses that are not directly dependent on water access but that utilize the intermodal transportation facilities available in the Harbor area.
- Available, Vacant Lands. In 2009, the Economic Opportunity Analysis (EOA) completed for the City of Portland inventoried the industrial lands available for development throughout the City. This study estimated the vacant industrial land supply at approximately 3,000 acres, of which approximately 1,900 acres are located in the Columbia Harbor area (which includes lands along the Willamette River downstream of the Fremont Bridge and eastward along the Columbia River to 82nd Street). Of all vacant industrial lands (as classified by the 2009 Economic Opportunities Analysis or EOA), only 33 sites in the Columbia Harbor geography are adjacent to the waterfront. Nearly all of these sites are located in Portland Harbor, but nine are located in the Rivergate industrial district with access to the Columbia River. Redevelopment of non-vacant lands was not examined in this analysis.
- Size of Available Land. There are a total of 300 acres on the 33 sites, with the average site size approximately 10 acres. Over 65 percent of sites are less than 5 acres in size, less than the minimum typically required for marine-related uses. Ten sites are larger than 10 acres, and three sites are larger than 30 acres. Adjacent parcels (including upland parcels) with the same landowner have been grouped into one 'site', as have been parcels with different land owners that may be feasible to aggregate. This aggregation results in 31 sites being analyzed (rather than 33 sites).
- Waterfront Characteristics. Twenty-five sites have the minimum waterfront access (400 feet) required by most marine-related uses, with 11 sites having minimum waterfront access that are larger than 5 acres. Only one site larger than 5 acres has access to deep draft channel depth of 35 feet, but access to deep draft waters will be increased once dredging resumes again on the Willamette River (currently dredging is suspended pending the outcome of the Portland Harbor Superfund cleanup).
- Natural Resource Constraints. All vacant waterfront sites are affected by at least one natural resource constraint. Of the 300 acres of vacant, waterfront lands, over half (170 acres) are affected by some level of natural resource constraint based on City of Portland overlay zoning. These constraints can affect the costs and required acreage for development, but do not prohibit development. It is expected that all waterfront lands suitable for marine industrial use will be affected by natural resource constraints, whether located in Portland Harbor or elsewhere.
- **Contamination.** The Willamette River in Portland Harbor has been identified by the Environmental Protection Agency as a Superfund site. This designation affects all waterfront acreage from Columbia Slough to the Fremont Bridge, and presents a challenge to the transfer and lease of property in the harbor. As assessed by Oregon Department of Environmental Quality (DEQ), nearly one-half of the 31 vacant, waterfront properties in Portland Harbor have potential upland contamination. This contamination can present costly clean up requirements and may limit the lease or sale of these properties.
- **Overall Summary**. There are no sites currently vacant on the waterfront that are suitable for marine cargo development, with the exception of liquid or small dry bulk facilities. There are 11 vacant sites larger than 5 acres with appropriate shoreline access, there are no sites available larger than 60 acres.

³ Portland Bureau of Planning, 2003, Portland Harbor Industrial Lands Study Part One: Inventories, Trends and Geographic Context.

LAND ABSORPTION AND NEEDS FORECAST

This section concludes the economic foundation study, and provides a forecast of land absorption demand by marine-related uses in Portland Harbor together with a discussion of the potential role of WHI. The section draws from all preceding economic sections to evaluate the demand for additional lands for marine uses, and the potential role of WHI to meet this demand. The first two subsections forecast the land need for marine-related uses in Portland Harbor, including marine cargo and marine industrial uses. The forecast for marine cargo lands is based on an assessment of current capacity compared to forecast cargo volume. The forecast for marine industrial lands is based on past land absorption trends of marine industrial land combined with an existing forecast of land absorption in the Portland Harbor area. The final subsections focus on the availability of existing lands in Portland Harbor to meet demand compared to the suitability of WHI land and lands available at other Ports.

Provided there is adequate terminal infrastructure and land, marine cargo volume is projected to grow over the next 30 years in Portland, as is marine industrial land use. However, projected growth will not be realized if suitable lands are not available. In particular, lack of available, large developable sites suitable for marine industrial development constrains growth opportunities for marine cargo or large marine industrial manufacturers. As noted in METRO's 2009 urban growth report, the region must decide how it will accommodate forecasted population and employment growth and what investments we are willing and able make in transportation corridors and employment areas to support long-term employment growth.⁴

Forecasted demand for marine-related land uses (both marine cargo and marine industrial) ranges from 220 acres in the low forecast to 980 acres in the high forecast. Of this acreage, up to 130 acres may be accommodated on smaller parcels in the harbor area (potentially 55 acres of regional/local dry bulk terminal and liquid bulk terminal and up to 75 acres of marine industrial). This figure is based on the available lands in the harbor area and the proportion of brownfield sites that may be available for development.

WHI is the only parcel suitable in Portland Harbor for new uses that require 100 acres or more. Development of WHI for marine terminal use would likely allow Portland to capture the forecasted potential cargo opportunities, and associated jobs and income. Forecasted acreage demand that can not likely be satisfied in the harbor area ranges from 150 acres in the low scenario to 850 acres in the high scenario. Development on WHI for marine cargo purposes may also lead to more available lands in Portland Harbor for other industrial uses, if some existing cargo operations such as grain are consolidated at larger marine terminals. Growth in these marine-related industries is a major engine for the local economy, and has implications across a variety of sectors.

Key points in this section related to marine cargo land needs include:

- **Cargo Forecast**. Cargo is forecasted to increase in all cargo categories, but is concentrated in the automobile (growth of 280 percent by 2040) and container (growth of 212 percent by 2040) cargoes. Tonnage of all other cargoes is expected to grow by 22 percent by 2040 under the most likely scenario.
- **Cargo Forecast vs. Existing Capacity.** Capacity of existing Portland cargo facilities is shown in Table 1, as determined by the Port of Portland. As highlighted in grey in **Table ES-3**, in the most likely forecast scenario there is not adequate existing capacity for automobile, and there may not be adequate future capacity for grain cargo.

⁴ METRO. 2009. 20 and 50 year Regional population and employment range forecasts. accessed online at: http://library.oregonmetro.gov/files/appendix_12_forecast.pdf.

				,	5	
			Cargo			
Cargo	Units	Current Practical Maximum Capacity	Low	Most Likely	High	Potential Capacity Shortfall
Automobiles	Units	675,000	925,000	1,145,000	1,364,000	350,000 - 700,000
Containers	TEU	700,000	379,000	585,000	744,000	0 - 50,000
Breakbulk	MT	2,100,000	1,010,000	1,181,000	1,295,000	0
Grain	MT	4,100,000 - 7,100,000	5,647,000	6,477,000	7,059,000	0 - 3,000,000
Dry Bulk National/international	MT	8,200,000	4,650,000	6,054,000	9,733,000	0 – 1,500,000
Dry Bulk Local / Regional	MT	2,500,000	2,089,000	2,471,000	2,852,000	0 – 500,000

Table ES-3 Forecast Cargo Volume versus Annual Cargo Capacity of Existing Terminals in Portland Harbor

Source: BST Associates, 2009 and 2010, Port of Portland Marine Terminal Master Plan, Personal communication with the Port of Portland and BST Associates.

- Land Needs for Cargo Growth. An important assumption is that future marine-related development in Portland will be similar in size and site requirements to new marine-related developments at other west coast and Lower Columbia ports. Also, to meet growing demand, ports throughout the United States have typically increased throughput capacity by building new terminals requiring new land for development. Ports around the world have also worked to increase efficiency and increase throughput at existing facilities by changing operating standards and implementing such practices as off-site storage and more efficient cargo management systems. While reducing acreage requirements in marine areas, these practices can substantially increase operating costs and reduce competitiveness of a port. There are thus tradeoffs associated with cost competitiveness and land use efficiency.
- Marine Cargo Land Absorption Forecast. Based on the size trends of new terminals being constructed on the west coast, the forecasted land need through 2040 for the Port of Portland to retain and attract potential cargo clients ranges from approximately 150 acres (low forecast for only automobiles) to approximately 680 acres (high forecast), with a most likely land need of approximately 425 acres. These forecasts indicate that this land would be required to build modern, operationally-efficient terminals to accommodate all projected cargo growth, but does not signify that these terminals would be operating at capacity.
- Land Needs compared to Vacant Inventory. Marine cargo land need is forecast to range from 150 acres to 680 acres, primarily in parcels larger than 100 acres. It is anticipated that up to 55 acres in the high forecast and 25 acres in the most likely forecast could be met by vacant lands available in the Portland Harbor. The remaining land need for marine cargo (150 acres in the low scenario, 400 acres in the most likely scenario, and 625 in the high scenario), is expected to be for parcels larger than 100 acres to accommodate rail access and ensure competitiveness. As discussed above, there are no vacant parcels of this size available in Portland Harbor. To accommodate these new marine terminals in Portland given the currently available land supply, it is expected that the Port of Portland would need to develop land on WHI.

Key points related to land need for marine industrial growth:

• Existing River-Dependent Land Use and Employment. River dependent uses were classified by the City, and were further divided for this study into marine cargo and marine industrial uses based ownership and existing use of the site. There are 47 parcels in Portland Harbor identified by the City as river-dependent, with a total of 1,790 acres. Of the 47 river-dependent parcels, there are 29 with available employment data. Data for these parcels indicate 2,780 employees in river-dependent uses, of whom approximately 77 percent (2,140 employees) are employed in marine industrial uses with the remaining 23 percent (640 employees) employed in marine cargo uses.

• Marine Industrial Land Absorption. Based on the City of Portland Economic Opportunities Analysis (EOA) job forecasts and proportion of land in marine industrial uses, a range of 70 to 300 acres is the forecasted land need for marine industrial uses.

Key points related to marine-related land need and vacant land supply:

- Land Needs compared to Vacant Inventory. Vacant parcels are available in Portland Harbor for marine industrial uses requiring less than 60 acres. There are 11 parcels (263 acres) of vacant lands in Portland Harbor that are larger than five acres and have adequate shoreline length. However, only one of the 11 potential sites (19 acres) does not have potential upland contamination, the presence of which carries significant costs and risks. Thus, while Portland Harbor has available brownfield sites for redevelopment that will accommodate smaller-sized marine industrial uses, it lacks sites for large river-dependent manufacturers and has limited opportunities for uses requiring uncontaminated sites on the river.
- Suitability of WHI. WHI has the land size, deepwater access, and proximity to rail and interstate infrastructure necessary for a marine terminal location. If marine terminal development were to take place on the island it is expected that a bridge for vehicular access would be constructed connecting WHI with Marine Drive in Portland. It is also expected that rail access would be developed by integrating with the existing BNSF rail bridge on the eastern limits of the WHI. The primary constraint to WHI development is expected to be impact to natural resources.
- **Concept Designs.** A recent study conducted for the Port of Portland provides some general design guidelines for potential marine terminal development of WHI.⁵ This preliminary study analyzed terminals for automobiles (75 to 140 acres), dry bulk (110 to 175 acres), liquid bulk (125 to 155 acres), and container cargo (95 to 140 acres). Conceptual designs, include rail infrastructure, were generated for these terminals. Berths for each terminal type were described, and vary from floating platforms to splitlevel fixed berths to a traveling loader system. All berths would be located on the north side of the island.
- Alternative Rail Layouts. Two general design concepts were developed, one with a long track traversing east-west along the island parallel to the shoreline, and one with the tracks approximately extending only as far west as the power line corridor. Limiting the rail footprint to the east side the BPA power line corridor increases the amount of time for trains to enter or exit the mainline tracks by approximately 25 percent due to increased curvature in the track configuration. Other operational constraints would result from this configuration, including increased labor for train handling and maneuvering, and providing only one loop track of the desired 8,000 to 10,000 feet length which would require increased coordination between terminals.
- Available Lands at Other Lower Columbia Ports. At the Port of Vancouver there are 718 acres available, of which 218 acres are in the planned Terminal 5, and 350 to 400 acres are in the planned Columbia Gateway. At the Port of Longview, the only available parcels for additional marine terminal development are privately owned, but include approximately 730 acres.

CONCLUSIONS

Portland Harbor has been a leading west coast port for over 100 years, transporting and handling marine cargo products that sustain businesses and economic activity in the metro area and the greater region extending through Oregon, Southwest Washington, and into Idaho and beyond. Marine industrial activity in the Portland Harbor has also been an important component of the Portland economy, and includes businesses

⁵ HDR Engineering, Inc. 2009. West Hayden Island Terminal Site and Operation Requirements and Addendum 1. Prepared for Port of Portland. Accessed at <u>http://www.portlandonline.com/bps/index.cfm?a=279953&c=51508</u>.

highly interdependent on each other and on the cargo handled at marine terminals in the area. As the Portland Harbor has continued to develop over the last century, land use needs have expanded with approximately 21 acres being developed every year from 1960 to 1997. Future growth is anticipated, particularly in the marine cargo sectors and the transportation, logistics, and distribution industries.

While there is uncertainty associated with the magnitude of marine cargo and marine industrial growth over the 30-year planning horizon, the current market position of Portland and historical and recent trends indicate significant growth opportunities. Based on the marine cargo and employment growth rates forecasted to 2040, marine-related land needs to accommodate growth are expected to exceed land supply in Portland Harbor. Land needs are forecasted to range from a low of 220 acres to a high of 980 acres, reflecting uncertainty in new market opportunities and rates of overall economic growth.

As in numerous past studies (Portland Harbor Industrial Lands Study, Trade Capacity Assessment, Economic Opportunities Analysis), this study finds that marine industrial land is limited in the region, particularly for large sites of 60 acres or more needed for marine terminals and large marine industrial operations. Furthermore, marine industrial redevelopment opportunities on the available land are constrained by both the Portland Harbor Superfund Site and the upland contamination present on many sites. Liability concerns and redevelopment costs affect the marketability of these sites to prospective buyers or new tenants.

In summary, to capture economic growth opportunities in marine-industrial land uses, Portland will need to provide large parcels for marine industrial growth. Barring considerable redevelopment and reconfiguration of existing sites in Portland Harbor, Portland will need to look to new sites such as WHI to ensure large site availability for significant growth opportunities. If WHI is not developed, it appears that the existing and planned terminals at ports located on the Washington side of the Lower Columbia River may be able to meet the forecasted cargo demand for the Lower Columbia. Under this scenario, however, it is expected that Portland would lose opportunities to expand marine-related economic activity and would forfeit the associated jobs and income. Additionally, if WHI is not developed, it is expected that fewer lands will be available for marine industrial uses in Portland Harbor, potentially resulting in less job growth in marine-related manufacturing and other sectors dependent on marine cargo activities.