CHAPTER THREE
NEEDS AND OPPORTUNITIES

3. NEEDS AND OPPORTUNITIES

3.1. revised Introduction

This chapter has been revised in its entirety to provide revised economic information for the 43-foot channel improvement project since completion of the 1999 Final IFR/EIS. This chapter also has been revised since issuance of the Draft SEIS to incorporate responses to several issues suggested by the Technical Review Panel and other comments. Additional information also is found in Exhibit M to this Final EIS satisfying the requirement of a limited reevaluation. The benefits are based on a number of elements, and each is addressed in this update. The needs and opportunities are based on benefits accruing to the nation.

- Commodity and fleet projections have been updated. In general, a number of factors have led to depressed Columbia River exports, and updated commodity projections address the likelihood and potential timing of a recovery of those exports.
- The interest rate used to evaluate the project is now 5.875% as set by the Office of Management and Budget. The Office of Management and Budget changes this interest rate annually, and it is considered conservative.
- Vessel operating costs change annually and this update uses current vessel operating costs. Vessel operating costs have declined, which tends to decrease benefits.
- The Willamette River portion of the project is deferred, and the costs and benefits of deepening the Willamette have been excluded from this update (see Chapter 1).
- The distance used to calculate the benefits for the bulk commodities has been refined to more accurately reflect the destinations.

Waterborne commerce on the Columbia River has continued to show steady growth, along with an increase in the size of commercial vessels using the navigation channel. Average vessel size has increased due to the efficiencies gained by shippers using larger vessels to transport both bulk and containerized commodities. With the increased use of larger vessels for transporting bulk commodities such as wheat and corn, limitations posed by the existing channel dimensions occur with greater frequency. Container vessels are showing a rapid increase in size, and competition exerts pressure to fully load these vessels. Ships with design drafts approaching or greater than the 40-foot depth constraint cannot fully utilize their design drafts. This often results in reduced efficiency in the shipping process.

This analysis identifies potential efficiencies to shipping from modifying the existing channel. Such efficiencies are a function of the projected volume of commodities expected to move to and from the ports on the lower Columbia River and the projected fleet of vessels expected to call on the ports. The projected volume of commodities was matched to the projected fleet in order to evaluate transportation costs under various conditions.

The major benefit categories associated with the channel improvement would be transportation and delay savings. Transportation savings result from economies of scale that could occur when deeper draft vessels carry more tonnage per vessel. These savings would accrue up to the point where vessels would be constrained by channel depth. In a deeper channel, greater savings would accrue. Transportation benefits measure the magnitude of economies of scale savings between the without- and with-project conditions. Vessel delay costs measure the time delay and associated operating costs that deep-draft vessels could incur when approaching the maximum draft accommodated by the channel depth. Vessel delay benefits would reflect the savings in operating costs between the without- and with-project conditions.

3.2. revised Commodity Forecast

Commodity forecasts comprise one critical element of the feasibility study. The forecasts estimate the amount of tonnage that would be moved on the waterway in the future. The commodity forecasts are used in conjunction with fleet forecasts to determine transportation costs for the channel improvement project. It is assumed that existing navigation operating practices are utilized in both the without- and with-project conditions. Commodity projections were made for a 50-year project life (year 2007 to 2057) and include containers, wheat, corn, barley, alumina, and soybeans. Wheat, corn, barley, and soybeans are export commodities, alumina is an import commodity, and containers are import and export commodities (although containers are primarily exported). The projections for each commodity was estimated for each major trade route (region), and no tonnage was induced or transferred by the channel improvement project.

3.2.1. revised Containers

Container cargo represents a significant percentage of the total tonnage moved through the Columbia River. According to the Columbia River Transit Data Base provided by the Port of Portland, container exports from the Columbia River in 1993 were 1,873,020 short tons or approximately 7% of the total export tonnage. Added to this were 148,322 short tons of imported container cargoes. The only container port in the lower Columbia River is the Port of Portland. Portland is somewhat unique among the West Coast ports in that it is almost exclusively an outbound container port. Outbound movements are dominated by more resource-based, lower value-added products than are inbound movements, which is consistent with the pattern throughout the West Coast. The Port of Portland has traditionally been a last port-of-call on outbound container voyages across the Pacific Ocean. As a result, exports account for about 90% of total container throughput.

The commodities and origins/destinations handled by the Port of Portland would be very similar to those handled in Puget Sound. On the export side, much of the cargo base is composed of forest products (paper, paperboard, lumber, fiberboard, particleboard) and agricultural products (hay, animal feeds, potatoes, corn and meat), as well as wastepaper and other manufactured products (such as auto parts). On the import side, consumer goods dominate container trade and include products such as toys, tires, footwear, apparel, computer parts, consumer electronics, and furniture, as well as manufactured goods.

Table S3-1 displays updated projections for Columbia River container exports for the period of analysis (2007 to 2057). From 1991 to 2000, outbound (full) container traffic increased from 114,000 to 175,000 containers. In 1995, container exports peaked at over 210,000, while in 1997 and 1998 figures reflect the economic problems in Asia and exports dipped to 157,700 containers in 1998. The analysis projects an annual growth rate of 2.7% for the first decade of the analysis (2007 to 2017), declining to 1.9% in the second decade. From 2007 to 2057, the annual growth rate would be 1.03%.

Table S3-1. Export Projections for Containers

Year	Outbound TEUs*
2007	221,000
2017	279,000
2027	339,000
2037	358,000
2047	358,000
2057	358,000

* Twenty-foot Equivalent Units, full.

3.2.2. revised Wheat

Table S3-2 displays more recent information on historic wheat shipments from Columbia River ports. Wheat is the leading commodity, in terms of tonnage, moved by the deep-water ports of Portland, Vancouver and Kalama on the Columbia River.

Table S3-2. Historic Wheat Exports

Year	Tons Exported*
1991	12.1
1992	12.5
1993	12.2
1994	15.3
1995	14.9
1996	13.9
1997	12.4
1998	12.2
1999	11.6
2000	11.3

*millions of short tons

Table S3-3 displays updated export projections for wheat for the period of analysis (2007 to 2057). Wheat exports are projected to remain relatively flat over the period of analysis. In 2007, exports are expected to be 11.5 million short tons. Although this is much lower than export levels in the 1990s, it is close to what was exported in the most recent years. Wheat

exports would be projected to grow at an average annual rate of 0.7% for the first decade of the analysis, would drop to 0.6% over the second decade, and would level off at 2030. About 12% of the wheat would be exported to countries outside of the Rapidly Developing Asia and Other Asia regions. These exports to countries in Africa, Latin America, and the Middle East are expected to remain at a steady share of total exports from the Columbia River.

Table S3-3. Export Projections for Wheat (short tons)

Year	Tons Exported*
2007	11,529,000
2017	12,395,000
2027	13,215,000
2037	13,230,000
2047	13,230,000
2057	13,230,000

*short tons

There are three major trade routes used in the wheat export projection. The 'Rapidly Developing Asia' region includes South Korea, Taiwan, Singapore, Malaysia, Indonesia, and Thailand. This region is expected to see a rapidly rising demand for wheat until 2035 when it should level off. In the near term, this is driven largely by strong economic growth, rising incomes, rapid industrialization and urbanization, and limited ability to produce wheat domestically. The economic growth, which has been fueled largely by exports, provides the foreign exchange necessary to expand wheat imports.

In the 'Southeast Asia' region, wheat use has increased by nearly 50% in the 1990s, growing at a rate of almost 10% per year from 1990 to 1994. Rising disposable income has resulted in a more diverse diet with the substitution of Japanese-style noodles for rice. Many regional experts believe that the per capita wheat use ceiling for the region would likely be similar to Japan. However, Malaysia is already at this level with one-tenth the per capita income. Indonesia could experience the most rapid growth in import demand since the country's largest flour miller and noodle processor has started a large expansion program. If fully utilized, processing capacity would require nearly 7.0 million tons of wheat, more than doubling the 3.25 million tons imported in 1994 to 1995.

Although the 'Other Asia' region contains more than thirty countries in Asia, the Philippines, Pakistan, and Sri Lanka are the three major destination countries. These countries currently receive more than 30% of Columbia River wheat exports. Wheat export growth to the Philippines would be expected to remain strong. The Philippines imports its total supply of wheat, and most comes from the United States (91.2% market share in 1993-1994). Growth in Philippine wheat consumption is steady and high. Population growth is strong (2.2% from 1990-1995) and would likely continue to be among the highest in Asia until slowing to 1.4% in 2010 to 2015 (Faucett 1996). Per capita consumption has also

grown steadily, up 50% over the last 10 years to about 26 kilograms (about 57 pounds). Although this trend could continue through the end of this century, it should experience some slowing as consumption rates exceed that of the Japanese.

3.2.3. revised Corn

Table S3-4 displays updated export projections for corn for the period of analysis (2007 to 2057). After wheat, corn represents the second largest grain tonnage commodity shipped through the Columbia River ports. According to the Portland Merchants Exchange, Columbia Snake River Marketing Group, in 1993 corn accounted for 12.9% of total export tonnage from the ports, which was a relatively weak year for corn exports. Exporting of corn through the ports is a relatively recent phenomenon. The first year of significant corn exports was 1984, with the opening of the Peavey grain elevator at the Port of Kalama.

Table S3-4. Export Projections for Corn

Year	Tons Exported
2007	3,833,000
2017	4,536,000
2027	4,842,000
2037	5,017,000
2047	5,017,000
2057	5,017,000

Growth in corn exports from the Columbia River is tied to the high growth in feed grain consumption in the Rapidly Developing Asia region and Japan. Corn exports from the Columbia River are very concentrated, with Japan, Korea, and Taiwan accounting for all but a very small percentage. Japan's share of Columbia River corn exports would eventually drop to 15%, while rapidly developing Asian countries would eventually receive approximately 85% of the total.

Although China could become a net corn importer at some point in the future, it has been assumed for this analysis that Columbia River corn exports would continue follow current trade patterns. In the Rapidly Developing Asia region, Taiwan, South Korea, and Malaysia would be expected to experience economic growth, leading to increased meat consumption and increased demand for feed grains. Many of these countries also are improving infrastructure to allow efficient use of large grain carrying vessels, which may increase the competitive status of United States exports.

3.2.4. revised Barley

Barley represents the fourth largest tonnage commodity shipped through the Columbia River ports of Portland, Vancouver and Kalama. As shown in Table S3-5, exports of barley from the Columbia River can be highly volatile. Typically, barley exports were between 450,000 and 950,000 short tons per year. This volatility mirrored United States barley export behavior during the same period. Barley is used primarily as an alternate feed grain in the

world market as well as for malting. Typically, barley represents a relatively small fraction of total United States coarse grain production (5% to 10%). Destinations and volume vary from year to year. Table S3-6 displays updated export projections for barley, which represent a flat growth rate over the period of analysis (2007 to 2057).

Table S3-5. Historic Barley Exports

Year	Tons Exported
1985	350,000
1986	911,000
1987	1,872,000
1988	871,000
1989	664,000
1990	722,000
1991	603,000
1992	332,000
1993	461,000
1994	225,000

Table S3-6. Export Projections for Barley

Year	Tons Exported*
2007	550,000
2017	550,000
2027	550,000
2037	550,000
2047	550,000
2057	550,000

*short tons

3.2.5. Alumina

No updating of the existing information in this subsection for alumina is necessary for the Final SEIS (see the Final IFR/EIS, August 1999).

3.2.6. [new] Soybeans

Soybeans are a new commodity in the benefit analysis, and were not included in the original analysis in the Final IFR/EIS (1999). In 2001, exports of soybeans exceeded one million short tons, and 2002 shows a similar trend. Table S3-7 displays export projections for soybeans. Columbia River soybean exports are projected to range between 880,000 short tons and 2.3 million short tons 2030, or at average annual rates of growth of 2.3% (low) and 6.6% (high) between 2000 and 2030. The initial range of exports is projected to be between 514,000 short tons and 846,000 short tons in 2007. Over the first 30 years of the analysis, the expected average annual growth rate is 2.9%.

Table S3-7. Export Projections for Soybeans

Year	Short Tons
2007	680,230
2017	1,088,770
2027	1,450,065
2037	1,598,677
2047	1,598,677
2057	1,598,677

3.3. revised Fleet Forecast

The fleet forecast attempts to determine the extent that vessels calling at the Columbia River ports will make use of the channel improvement. The fleet forecast reflects the trade-route specific analysis performed for the commodity projections. For each commodity, each major trade route has been examined to determine what forces would dictate the size of vessels calling on the ports.

3.3.1. revised Container Vessel Fleet

Container vessels calling at the Columbia River ports typically would be vessels on a liner trade, stopping first in Los Angeles or the Puget Sound before heading to Portland to load export cargo destined for Japan and Southeast Asia. The size of these vessels is being dictated by world market forces, which are rapidly pressing the world container fleet into larger vessels with increasing capacity and drafts.

Currently there are three transpacific carriers that use Portland as a last port of call on the west coast. These carriers are primarily using vessels that are 41 feet, 44 feet, and 46 feet in freshwater design draft. This represents a significant shift in vessel size over the last decade. Container vessels serving Portland would continue trafficking predominantly the transpacific routes. Currently, 94% of Portland container traffic is transpacific. The major transpacific trade routes would not be expected to change significantly over time.

The Port of Portland would continue to be primarily for export and would continue to be a last port-of-call for 78% of cargo loaded. The remaining 22% would move on middle port-of-call vessels. These vessels have historically departed at shallower depths and would likely continue this practice in the future. These vessels typically call Puget Sound (+49 feet depth) as their last port-of-call, and are not currently approaching Columbia River draft constraints. There could be some small benefit for this group of vessels in the future, particularly if they shift to larger Panamax class vessels. However, for the purposes of this analysis, it has been assumed that mid-port vessels would not benefit from channel deepening.

Like all container movements in general and more specifically transpacific movements, competition between ports and lines would continue to be intense. Rationalization among carriers should continue and expand in scope. Lines calling Portland would change ports, order of calls, and routing patterns in an attempt to increase profits. Carriers would seek to utilize economies of scale by moving to faster vessels with more carrying capacity. In 1993, average vessel capacity was 2,700 TEUs. Today, the smallest vessels are 3,500 TEU vessels, and larger 4,000 and 4,400 TEU vessels are moving on the river.

Most container vessels would continue to depart at drafts less than the design draft because of cargo capacity constraints, depth constraints, and the availability of cargo. A decade ago, container lines calling Portland used 4 to 5 feet of underkeel clearance. Today, two of the three existing carriers commonly use 2 feet of underkeel clearance. It is assumed that 2 feet of underkeel clearance will become the standard in the future. Although this assumption reduces benefits, it reflects the competitive nature of the container business.

In the without-project condition, vessels strive to have a departure draft of 38 feet. Most departure drafts would not increase beyond 38 feet in the without-project condition, as few container lines are willing to wait to ride the tides. With a 43-foot channel, few vessels would be expected to depart significantly beyond 41 feet for the same reason. The time dependency of container traffic would not lend itself to delays in operations caused by tides in the without- and with-project conditions.

Container ships operate on demanding schedules that usually require them to arrive at a particular port at a specific time on a specific day of the week. Any delay could have a negative effect on the coordinated rail and truck transportation of cargoes. A ship delay could have a domino effect delaying other ships scheduled to call at this and other berths. Also, delays could cause unacceptable congestion in the marine terminal. Because of the severe impacts of delays, container ship operators strive to avoid them at the expense of loading the ship less deeply to ensure an unrestricted transit.

3.3.2. [revised] Bulk Carrier Fleet

In projecting a future bulk carrier fleet for the Columbia River, the world bulk fleet, draft constraints, and other operating constraints would need to be considered. Trends in the world fleet would generally be followed for the Columbia River, as allowed by various draft constraints, institutional constraints, and other market forces. For the purposes of this analysis, two major industry expert sources were used to project the trends for the Columbia bulk fleet (DRI/McGraw Hill 1996; Drewry 1996). Also, for each commodity and each major destination for that commodity, a fleet forecast was constructed that reflects the trends of the world fleet and the particular characteristics of the trade route.

Of particular interest to the Columbia River fleet projection is the category of bulk carrier termed panamax. These vessels are typically 50,000 tons to 80,000 tons, and represent approximately 25% of the world dry bulk fleet. In the grain trades, the use of panamax vessels would likely grow to dominate world markets. While the Japanese wheat trade is

institutionally restricted, most other markets would be expected to develop for use of panamax carriers. In discussing the future of bulk vessels, Drewry Shipping Consultants mentions some of the emerging markets, which would be particularly important to the Columbia River fleet.

> For the panamax sector of the shipping market, a good deal of attention needs to be taken of the "emerging markets" for grain as many of these have geared themselves up (or intend to do so) in terms of port facilities, cargo handling capabilities, and storage/silo capacities to accept shipments of around 50-55,000 cargo tonnes. In this respect, attention needs to focus on North Africa, the Asian Middle East, Pakistan and South Asia.

Table S3-8 displays a projection of outbound vessel movements from the Pacific Northwest by vessel size. Much of the cargo continues to move in vessels of the 40,000 to 80,000 deadweight tonnage (dwt) sizes, and there is a slight shift from vessels in the 20,000- to 40,000-dwt size to the 80,000- to 100,000-dwt size.

Table S3-8. U.S. Northwest Routes, 1990-2044 Outbound Cargo Projections

1,000s dwt	1990	1991	1992	1993	1994	1995	2000	2004	2010-2044
20 - 40	51%	51%	52%	51%	50%	48%	43%	39%	33%
40 - 80	49%	49%	48%	48%	49%	49%	51%	51%	50%
80 - 100	0	0	0	1%	1%	2%	6%	8%	11%
100 – 175	0	0	0	0	0	0	1%	3%	5%
>175	0	0	0	0	0	0	0	0	1%
Totals	100%	100%	100%	100%	100%	100%	100%	100%	100%

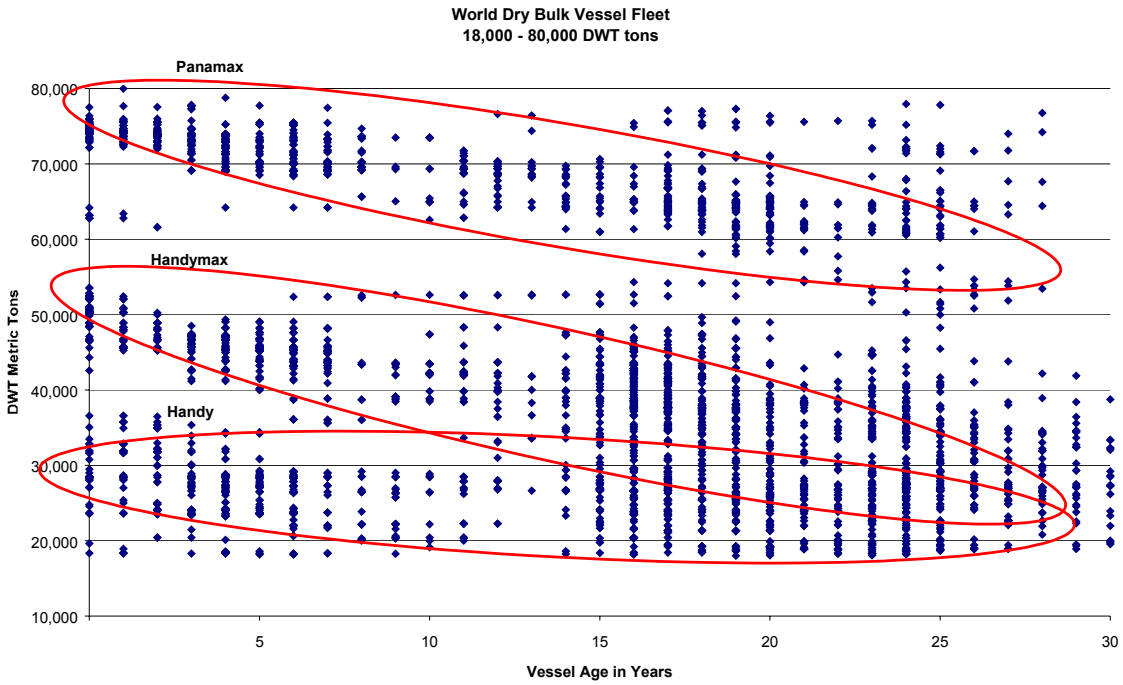
Source: DRI/McGraw Hill 1996; numbers do not add because of rounding.

In the 40,000- to 80,000-dwt ranges, there would be a variety of vessels in terms of size, draft, and grain carrying capacity. Of interest is whether the vessels calling on Columbia River ports in the future would be of a deep enough draft to benefit from channel improvement. The Drewry report discusses the increasing size of panamax vessels.

> Also evident is the progressive increase in the size of the 'representative' panamax dry bulk carrier. Initially, development centered around 50-55,000 tonners, which were essentially ore carrier derivatives. By the mid-1970s, the typical unit was moving around 60,000 dwt. However, the new building boom seen during the first half of the 1980s took the expectations of the typical panamax unit to 64-65,000 dwt. The late 1980s saw this figure edge toward 68-69,000 dwt while current ideas now centre around 72,000 dwt.

Figure S3-1 displays panamax-class builds by year and deadweight tonnage. The database clearly displays the tendency in recent years toward the 72,000- to 78,000-dwt range. Vessels of this size typically have design drafts ranging from 44 to 47 feet. In 1993, more than 5.5 million short tons of grain left the Columbia on vessels greater than 65,000 dwt.

Figure S3-1. Dry Bulk Builds by Year and Deadweight Tonnage



The following sections provide a general description of the vessels projected to move on each trade route by commodity. For most grain trade routes, existing traffic includes vessels with design drafts greater than the current channel depth. This practice would be expected to continue in the future.

3.3.2.1. revised Wheat

Table S3-9 displays 1993 wheat vessel movements by departure draft and destination. The three major destinations were Japan, South Korea, and the Philippines. Historically, the Japanese have purchased wheat in relatively small lot sizes (approximately 22,000 short tons). The Japanese wheat market is highly regulated, and, while there is significant pressure to change the current system, it has been assumed the Japanese system does not change throughout the period of analysis.

The Rapidly Developing Asia region would have increasing importance in Columbia River exports. Unlike Japan, these countries do not impose institutional constraints on lot sizes. This region is expected to increase total net imports from 9.7 million metric tons in 2000 to 13.6 million metric tons in 2010. As these countries experience economic growth, the consumption of wheat also would be expected to grow. Economic forces would push towards utilization of larger and more efficient grain handling facilities serviced by vessels drafting 41 to 44 feet. In the Other Asia region, a deep-draft grain facility in Mariveles, Bataan (Philippines) has the capacity to handle panamax vessels. In 2000 and 2001, the

Philippines received over 3.5 million short tons of wheat, primarily in vessels with 38- and 39-foot design drafts. As milling capacity consolidates and expands, it is likely that these vessels would eventually increase in size beyond the current channel constraint.

Table S3-9. 2000-2001 Wheat Vessel Movements by Design Draft Region

Design Draft (freshwater feet)	Japan	Other	Other Asia	Rapidly Developing Asia	Grand Total
31	1.19%	---	0.13%	---	1.32%
32	13.76%	0.13%	0.23%	0.86%	14.99%
33	12.71%	---	0.11%	3.15%	15.97%
34	1.32%	0.15%	0.45%	1.08%	3.01%
35	0.15%	0.24%	0.59%	7.19%	8.17%
36	0.16%	0.89%	0.70%	5.49%	7.23%
37	0.63%	1.80%	1.83%	1.84%	6.10%
38	0.43%	1.71%	6.71%	4.24%	13.09%
39	0.01%	0.60%	5.12%	3.91%	9.64%
40	---	0.49%	1.14%	0.86%	2.49%
41	0.58%	---	1.52%	1.14%	3.24%
42	0.11%	0.62%	0.87%	0.50%	2.09%
43	0.43%	0.30%	---	0.58%	1.30%
44	---	---	1.24%	---	1.24%
45	---	2.23%	0.26%	0.58%	3.07%
46	---	0.89%	0.26%	0.61%	1.76%
47	0.13%	2.10%	0.28%	0.61%	3.13%
53	---	0.13%	1.32%	0.34%	1.79%
59	---	---	0.13%	---	0.13%
(blank)	---	---	---	0.24%	0.24%
Grand Total	31.61%	12.28%	22.88%	33.22%	100.00%

Sources: Port of Portland, PIERS (Port Import Export Reporting Service), and Lloyd's Registry

The Philippines accounted for almost 75% of the Columbia River wheat exports in 2000 and 2001, and the remaining share has primarily gone to Pakistan, Bangladesh, and North Korea. About half of this tonnage has moved in vessels with design drafts in excess of 40 feet, which would be expected to continue in the future.

About 10% to 15% of wheat tonnage would go to countries in Africa and the Middle East, including Egypt, South Africa, Sudan, Ethiopia, Jordan, Kuwait, Saudi Arabia, and Yemen. In 2000 and 2001, about half of this tonnage moved in vessels with design drafts of 41 feet or greater. Egypt and Yemen accounted for approximately 90% of this tonnage. Exports to Egypt move on panamax-size vessels in about 62,000 ton lot sizes, with design drafts of 42 to 47 feet and dead weight tonnage in the 65,000 to 76,000 ranges. Exports to Yemen move primarily in handymax vessels, with the majority of the tonnage moving in vessels of 36 to 39 feet in design draft.

In the without-project condition, there would likely be little change in these movements other than the expected growth in the size of handymax vessels. Many vessels are already of greater capacity than the current channel can fully utilize. Panamax vessels are expected to take full advantage of the additional 3 feet in channel depth, and the larger handymax vessels would take advantage of the increased depth to some extent as well.

3.3.2.2. revised Corn

Corn is a low-value feed grain and economic forces would always be strong to minimize transportation and processing costs. There is strong pressure to move corn in large quantities in order to take advantage of economies of scale. However, factors such as existing facilities and infrastructure could limit the size of shipments. The majority of increases in corn exports over the period of analysis would likely result from increases in demand from countries such as Taiwan, Korea, Malaysia, Indonesia, and Thailand (Rapidly Developing Asia region). Japan is currently a major importer, but is expected to decline in share over time, partly due to growth in other regions, but also due to a declining livestock sector.

Exports to Taiwan and South Korea move primarily in Panamax vessels, departing at the channel constraint. In 2000 and 2001, more than 80% of the tonnage to these two countries moved in vessels that were constrained by the channel depth (Table S3-10). This is expected to continue in the future.

Japan has historically utilized the existing channel depth with a fair degree of efficiency. From 2000 to 2001, almost three-quarters of the Columbia River corn exports to Japan moved in vessels with design drafts of 39 feet or deeper. While it is expected that there will always be some portion of this tonnage that will move in smaller handymax vessels, it is also expected that a large portion of this tonnage will be moving in either panamax vessels or the largest handymax vessels.

Table S3-10. 2000-2001 Corn Exports by Design Draft to Taiwan and South Korea

Design Draft (freshwater feet)	Taiwan	South Korea	Grand Total
36	3.82%	---	3.82%
37	3.33%	---	4.55%
38	7.14%	---	7.14%
39	1.09%	---	1.09%
40	1.51%	---	1.51%
42	---	9.50%	9.50%
44	---	12.55%	12.55%
45	23.83%	6.36%	30.19%
46	11.82%	3.18%	15.00%
47	5.45%	---	5.45%
48	2.86%	6.36%	9.22%
Grand Total	60.84%	37.94%	100.00%

Sources: Port of Portland, PIERS, and Lloyd's Registry

3.3.2.3. revised Barley

In terms of volume, barley represents a lesser export commodity for the Columbia River. Over 2000 and 2001, exports averaged a little over 700,000 short tons per year. About 40% of that tonnage moved in vessels that were constrained by the channel depth (Table S3-11). This trend is expected to continue in the future.

Table S3-11. 2000-2001 Barley Exports by Design Draft and Country

Design Draft (freshwater, feet)	Taiwan	Japan	Jordan	Morocco	S. Arabia	Grand Total
31	---	5.59%	---	---	---	5.59%
32	---	17.11%	---	---	---	17.11%
33	---	19.64%	---	---	---	19.64%
34	1.84%	1.10%	---	---	---	2.93%
35	---	1.30%	---	---	---	1.30%
36	---	1.19%	---	---	---	1.19%
37	---	1.96%	---	---	---	1.96%
38	2.56%	5.69%	---	---	---	8.24%
39	---	3.07%	---	---	---	3.07%
40	---	0.61%	---	---	---	0.61%
41	---	1.77%	---	---	---	1.77%
42	---	---	---	3.94%	---	3.94%
43	---	---	---	---	7.98%	7.98%
44	---	---	---	---	4.50%	4.50%
45	---	---	3.80%	---	8.32%	12.12%
46	---	---	---	---	8.02%	8.02%
Grand Total	4.39%	59.04%	3.80%	3.94%	28.82%	100.00%

Sources: Port of Portland, PIERS, and Lloyd's Registry

3.3.2.4. revised Alumina

Alumina represents an import commodity to the Columbia River for Pacific Northwest smelters. Alumina is generally imported from Australia in lot sizes from 30,000 to 40,000 short tons. Industry sources have stated that the Columbia River channel depth would not be a constraint to their operations. Currently, off-loading and storage facilities limit useful vessel size. In this case, unlike the grain bulk commodities, local infrastructure would need to change in order for alumina vessels to make use of a deeper channel.

Forecasts from the Bonneville Power Administration and the Northwest Power Planning Council predict that Pacific Northwest smelters would operate at approximately 85% to 90% of their current capacity throughout the next 30 years. While some plant modernization would occur to meet environmental regulations and to become more competitive internationally, this forecast assumes no expansion of local capacity. It is anticipated that channel improvement would not affect alumina imports.

3.3.2.5. [new] Soybeans

In 2000 and 2001, 67% of the soybeans exported moved in vessels that could have benefited from a deeper channel. The fleet projections for soybeans have been modeled to reflect that data. Currently, China, Taiwan and the Philippines are the three biggest markets for Columbia River soybean exports, combining for 85% of the exports in 2000 and 2001, and would continue to be so in the future.

3.4. [revised] Future Port Development

For the Final SEIS, the following updated information is being added to this section. The 1999 Final IFR/EIS described a number of potential port development projects that were either planned or underway. Since issuance of the 1999 Final IFR/EIS, several of these projects have been completed, one has been withdrawn, and others have been planned.

Through the ESA consultation process, the Corps received updated information from the sponsor ports regarding potential future development, including new information about the projects discussed in the 1999 Final IFR/EIS, as well as information about some new potential projects. This information indicates that, aside from the berth deepening analyzed in the 1999 Final IFR/EIS, the BA, the Biological Opinions, and in this report, such development will be caused by regional market factors such as commodity demand and not by channel improvements, and will occur independent of channel improvement. Therefore, such development is not an action connected with, or an indirect effect of channel improvement (see Exhibit H, *ESA Consultation Documents*, available on the Corps' website).

Projects that were described in the 1999 Final IFR/EIS and that have since been completed include the Port of Portland's Terminal 6 improvements, the Port of St. Helens' sheetrock wallboard plant (now owned by US Gypsum), and the Port of Longview's bulk import facility improvements and its industrial park development. In addition, the Port of Longview has completed construction of a new log unloading area and the Port of Kalama has completed development of the Kalama River Industrial Park.

One of the potential development projects described in the 1999 Final IFR/EIS has since been withdrawn. At the end of 2000, in response to updated market analyses and concerns raised by some members of the public, the Port of Portland withdrew its development plans and permit applications for its proposed West Hayden Island development. The Port is now simply holding its West Hayden Island property in long-term strategic reserve capacity.

Current information on reasonably foreseeable future port development is as follows:

Port of Kalama. The Port of Kalama is planning to expand its marine facilities at North Port by adding another deep draft berth. The Port is currently conducting environmental review of the potential new berth but has not yet begun any permitting. The Port will seek permits for the project, but does not intend to construct it until securing an appropriate client. At this time, the Port is not in discussions with any potential clients.

Port of Longview. The Port of Longview has begun permitting a potential new auto import facility at property the Port recently acquired from International Paper. The Port submitted a permit application (Joint Aquatic Resources Permit Application or JARPA) for the marine aspects of the auto terminal project in 2000 and ESA consultation for the project is currently underway. Actual development of the proposed auto import terminal is entirely dependent upon the Port securing a tenant for the property. The Port does not intend to develop the project without a tenant, and none has been identified to date. The precise form and timing of project development is therefore not certain at this time.

The Port also has two berths in need of some repairs (berths 1 and 4). However, the Port does not intend to make repairs until tenants are secured for the facilities. The only other activity the Port is engaged in that is related to marine development is maintenance dredging of its berths. The Port conducts maintenance dredging on an as-needed basis. Any such dredging is reviewed and conducted under the Corps' nationwide permits and the associated programmatic BA. At this point, the Port does not foresee the need to deepen any of its berths or access channels after completion of the channel improvement project.

Finally, the Port is currently undertaking some non-marine infrastructure development. The project is a rail corridor improvement project that is located over 0.5-mile from the Columbia River and is unrelated to channel improvement.

Port of Portland. The Port of Portland is obtaining permits for planned improvements to its existing auto import facility at Terminal 4 on the Willamette River. These improvements are scheduled for construction in the summer of 2003. The improvements are currently in the process of review under the Corps' nationwide permits and associated programmatic BA. The Port also regularly engages in routine maintenance of its marine terminals (such as fender pile replacement), much of which is reviewed and conducted under the Corps' nationwide permits and the associated programmatic BA.

While other future changes to or redevelopment of the Port's marine terminals is possible, the scope and timing of any such improvements cannot be predicted at this time. The Port is in the midst of a master planning process for all of its marine terminals that will take approximately 4 months to complete. After the master planning process is complete, actual implementation of any major capital improvements is typically dependent on the needs of identified tenants for the facilities, which is in turn dependent on regional and national economic and market factors.

Port of St. Helens. Several potential development projects are proposed for the Port of St. Helens' Port Westward property. These projects are either permitted or currently going through the Oregon Energy Facility Siting Council permitting process. These projects consist of a grain loop track under development by the Port for a grain/ethanol facility being developed privately, and two gas-fired generating projects also under private development. The grain project does not involve any significant changes to or development of wharves or berths. The proposed power projects are not marine uses.

Port of Vancouver. The Port of Vancouver has several maintenance and development projects that are planned or underway. The first is expansion of the dock at Terminal 2, which has been permitted, including ESA consultation, and should be completed early in 2003. The second is maintenance work at Terminal 3, which consists mostly of asphalt, rail and warehouse repairs and upgrades, and for which permitting has just begun. Finally, the Port has recently prepared properties on Parcel 1A, which is more than 0.25 mile from the Columbia River, for lease as industrial property. Any further improvements to these properties will depend on securing appropriate tenants.

The Port of Vancouver also is continuing work on its development plans for the Columbia Gateway project. Information received from the Port demonstrates that their development plans are independent of the Corps' channel improvement project and will, depending on regional market conditions, proceed regardless of whether channel improvement occurs. The Port's Gateway property is among only a handful of large industrial parcels (over 100 acres) in the region, and is the largest industrial property under one ownership in the Portland metropolitan area. As such, the Gateway property represents a scarce regional resource that, regardless of channel improvement, the Port is committed to developing consistent with good environmental stewardship. Detailed information on the Port's proposed development can be found in the *Port of Vancouver Columbia Gateway Subarea Plan Draft Environmental Impact Statement (DEIS)* (City of Vancouver, August 2002).

Information provided by the Port during reconsultation regarding fill requirements and available sources of fill for the Gateway development project further demonstrates the independence of Gateway development and channel improvement. The Gateway development does not depend upon channel improvement dredge material as a source of fill and can readily proceed without it. While channel dredge material represents one potential source of cost-effective fill for implementing Gateway development, it is by no means the only source. Other sources of fill are available in sufficient quantities and at acceptable costs to accomplish the Port's development objectives.

Port of Woodland. The Port of Woodland currently has no specific development plans for its marine properties.

Other Potential Future Port Development. Other marine and industrial development is likely at Columbia River ports over time in response to regional and national economic trends and in response to regional commodity demand. However, the timing, nature, and extent of such development are not reasonably foreseeable at this time.