SEAPORT PLAN
WATERBORNE BULK CARGO FORECAST UPDATE

December 12, 2002

Prepared for
The San Francisco Bay
Conservation and Development Commission

By
The Tioga Group, Inc.
DRI-WEFA


SOLANO
Benicia
Collinsville
San Pablo Bay
Selby
Concord Naval Weapons Station
Point San Pablo
CONTRA COSTA
Port of Richmond
Oakland Port Area
9th Avenue Terminal
China Basin
Central Basin
SAN FRANCISCO
Port of San Francisco
Hunters Point
San Francisco Bay
ALAMEDA
SAN MATEO
Port of Redwood City
SANTA CLARA
Priority Use Areas :
Port
Port/ Water- Related Industry
bcdc

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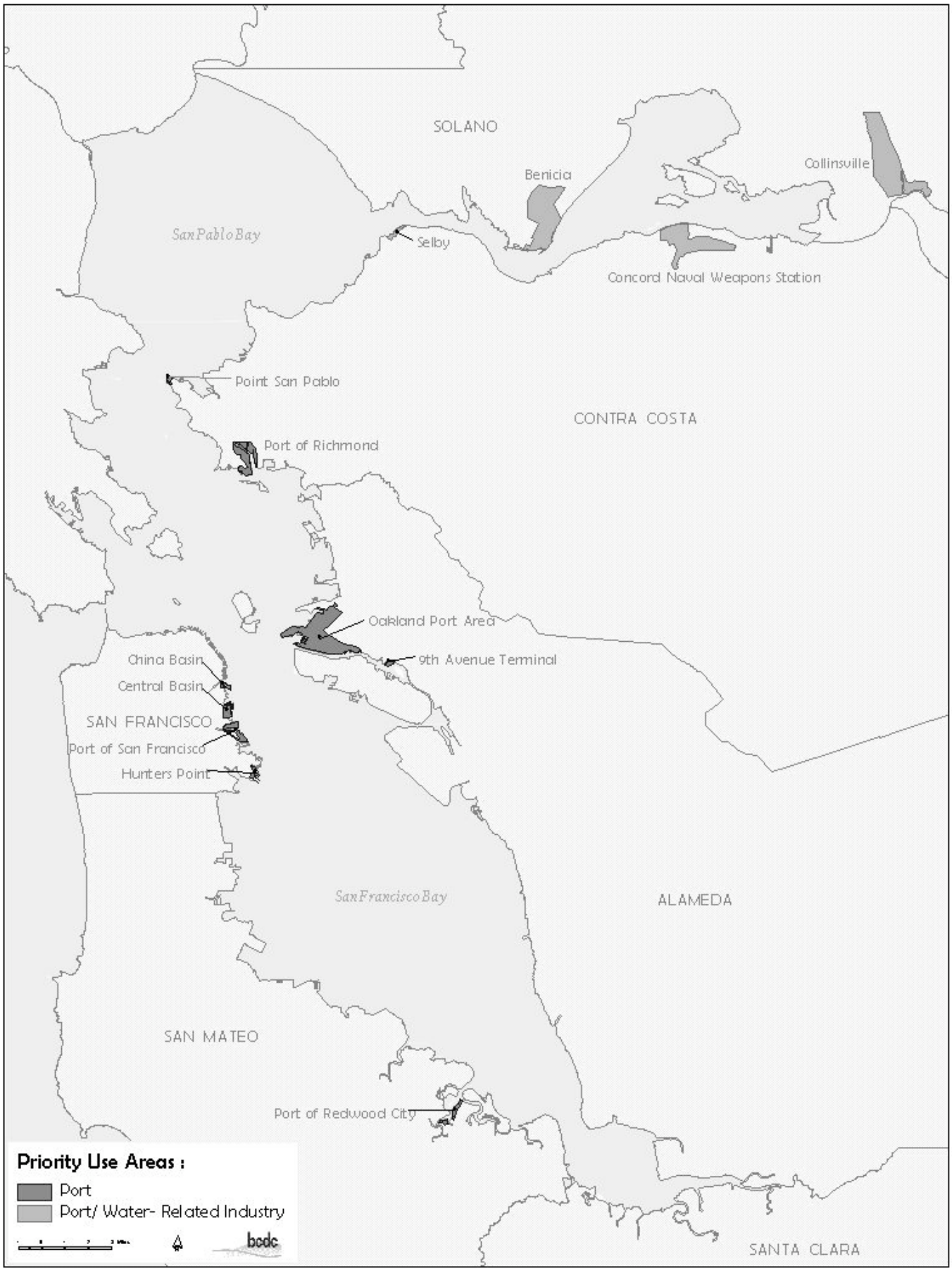
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I. Introduction

Background

To discharge its responsibilities for managing the protection and use of San Francisco Bay and its shoreline, the San Francisco Bay Conservation and Development Commission (BCDC) must compare the expected volume of waterborne commerce with the land area available at Bay Area ports to insure that sufficient space is allocated to port-priority uses. This ongoing task requires a set of comprehensive and reliable cargo forecasts. The last comprehensive forecast was prepared in 1988. BCDC staff are satisfied with the overall accuracy of the forecast for containerized cargo, but believe that the forecasts for non-containerized cargo (liquid bulk, dry bulk, break bulk, and neo-bulk) should be revisited and updated as required.

In recent decades the volume of bulk cargo moving through Bay Area ports has not kept pace with either population growth or the expansion in containerized trade. Some ports that have historically handled bulk cargoes find themselves with what they believe is excess space – space for which there is a ready market in non-Port uses.

Project Approach

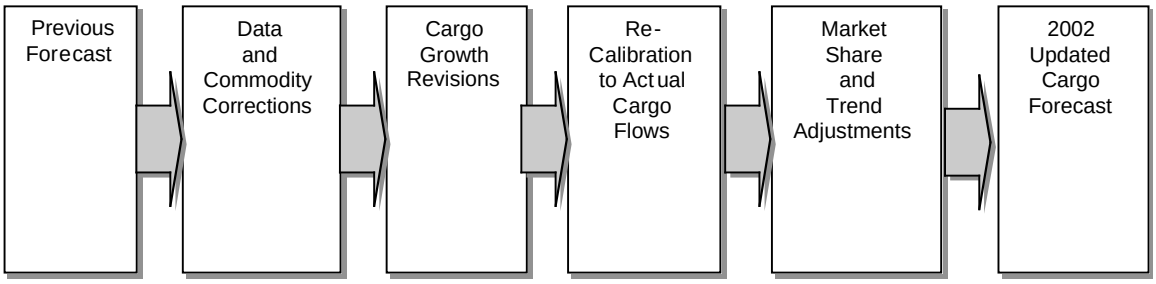
The objective of this project is to develop an updated forecast for bulk cargoes at Bay Area ports that will enable BCDC to make port-priority land-use decisions with confidence. Bulk cargo flows through the Bay Area ports are inherently difficult to predict with precision. While overall US or West Coast demand for major bulk import commodities and foreign demand for major bulk exports can be econometrically predicted with reasonable confidence, commodity flows through a specific port region such as the Bay Area depend on the buying, selling, and logistics decisions of a relatively small number of importers and exports whose behavior cannot be statistically modeled. Gypsum imports, for example, are heavily influenced by the demand for wallboard (Sheetrock) in construction. The decision to bring more or less gypsum in through Bay Area ports, however, depends on the sourcing and production choices of a very few individual companies. Similar circumstances apply to flows of sugar, grain, petroleum coke, and other bulk cargoes.

The diagram below illustrates the basic methodology employed in this bulk commodity forecast. As the work has progressed the conceptual steps have been re-ordered or melded together as required. Draft forecasts for all major commodities have been derived from industry sources as well as the DRI-WEFA econometric trade forecast. A key objective has been to understand the factors behind current and expected Bay Area bulk waterborne commodity flows.

Individual bulk cargo flows are inherently volatile. Each flow typically depends on a specific combination of exporter, importer, terminal operator, and economics, and if the circumstances of any one factor changes the flow pattern can be radically altered of disappear entirely.

Exhibit 1

Conceptual Forecast Update Approach



San Francisco Bay Waterborne Tonnage

Some perspective on the total waterborne tonnage moving through San Francisco Bay is useful in understanding the background flow patterns and volumes.

The U.S. Army Corps of Engineers, at its Institute for Water Resources (IWR) in New Orleans, Louisiana, documents all United States waterborne movements of commerce both domestic and international. This process involves: the Bureau of Census, which is responsible for collecting, compiling and releasing statistics related to U.S. exports, imports and the balance of U.S. trade based upon cargo data received from U.S. Customs; the U.S. Maritime Administration (MARAD), which matches cargo data received from the Bureau of Census to vessel data it collects to produce the detailed waterborne transportation data that it provides IWR; and individual domestic waterborne transportation companies who report domestic movements directly to IWR. Waterborne commerce reports are produced on a monthly, quarterly and annual basis. Since 2001 annual waterborne commerce data will not be reported until the end of 2002, Tioga used 2000 waterborne commerce data to corroborate bulk cargo movement data received from the ports.

Exhibit 2 below, drawn from year 2000 Army Corps of Engineers (USACE) data, shows the total reported tonnage moving through San Francisco Bay.

Exhibit 2

Year 2000 Waterborne Tonnage Handled (000 Metric Tons)

Flow	SF/SP Bay & Carquinez	Suisun Channel	Sacto River Sacto	SJ River Stockton	Total
Inbound Through SF Bay					
Foreign	17,680	111	227	2,269	20,286
Domestic	10,869	44	-	42	10,956
Subtotal	28,549	155	227	2,310	31,241
Share	91%	0%	1%	7%	100%
Outbound Through SF Bay					
Foreign	8,864	7	546	903	10,320
Domestic	4,923	284	-	15	5,222
Subtotal	13,787	291	546	918	15,543
Share	89%	2%	4%	6%	100%
Internal SF Bay & Delta*					
Domestic	7,747	1,271	14	179	9,211
Subtotal	7,747	1,271	14	179	9,211
Share	84%	14%	0%	2%	100%
Total Waterborne Tonnage					
Subtotal	50,083	1,718	787	3,407	55,995
Share	**89%**	**3%**	**1%**	**6%**	**100%**

Source: US Army Corps of Engineers

** Double counts tonnage as both shipments and receipts*

- As the exhibit indicates, about 89% of the total tonnage is handled at ports and private terminals within BCDC's jurisdiction in San Francisco Bay and the Carquinez Straits. Of the roughly 56 million tons shown, about 50 million are containerized flows through Oakland, petroleum and petroleum products flows through refineries, and sugar through Crockett. About 5 million tons of dry bulk, liquid bulk, break bulk, and neo-bulk traffic are covered by this forecast.

- About 3 % of the tonnage is handled at points in the Suisun Channel, beyond the

- Roughly 1% of the tonnage is handled at the Port of Sacramento and other points on the Sacramento River. Major commodities include inbound fertilizer, cement, dry chemicals, and animal feeds, and outbound woodchips and rice. For the most part, the Port of Sacramento handles different commodities and serves different markets than the Bay Area ports.

- The remaining tonnage, about 6%, is handled at the Port of Stockton and other points on the San Joaquin River. Inbound flows include fertilizer, ammonia, gypsum, cement, steel, etc. Outbound shipments include petroleum coke, scrap metal, sulfur, and rice. As with Sacramento, the markets are different.

The exhibit shows both foreign and domestic tonnage, and both inbound/outbound flows and those contained within the SF Bay and Delta. While the principal focus of the forecasts is on

inbound and outbound foreign and domestic tonnage, there is significant internal traffic that must be analyzed, particularly in dredged and barged sand and gravel.

II. Forecast Review and Cargo History

Approach

The Tioga Group reviewed the bulk cargo portions of the 1988 Manalytics Seaport Plan forecast to:

- understand how bulk commodities were classified and forecast;
- determine which competitive factors were considered and what impacts were expected; and
- develop a meaningful basis for comparison with the 2002 update.

BCDC staff report that while the forecast of containerized cargo growth remains usably accurate, other cargo volumes are well below forecast levels. Without retracing the 1988 forecast steps in too much detail, the study team compared the previous forecast to the available data on subsequent cargo flows to determine where and why the deviations have occurred.

Exhibit 3 shows the major commodity groups and forecast 1987-2020 growth rates from the Manalytics report.

Exhibit 3

1988 Cargo Forecast Growth Rates

Commodity	Import (%)	Export (%)
Containerizable	4.0	6.2
Break Bulk	3.6	5.3
Autos/trucks	0.7	4.7
Iron/steel Products	0.5	0.5
Newsprint	3.3	-1.2
Grain	2.8	4.7
Iron/steel Scrap	NA	1.3
Petroleum Coke	N/A	0.4
Sugar	2.8	6.3
Non-metallic Minerals	4.2	4.0
Other Dry Bulk	3.4	4.0
Petroleum/Products	3.6	1.2
Other Liquid Bulk	0.8	5.6

The analysis of competitive factors in the Manalytics report focused almost exclusively on containerized cargo, since that was the major issue facing the Bay Area ports at the time.

The details of the 1988 Manalytics/WEFA forecasts are contained in Table 15 of the 1988 report. Unfortunately, the available copies of Table 15 are difficult to read and the data are not available in electronic form. Exhibit 4 below displays the forecast data organized by major bulk commodity type, recognizing that some of the digits may be incorrect.

- The major dry bulk commodities analyzed were grain, scrap metal, petroleum coke, non-metallic minerals (e.g. gypsum), and a few grouped into “other dry

bulk". The situation has changed significantly, with the disappearance of grain movements and the start of substantial cement and aggregates imports.

- The amounts shown for imported autos are much higher than the totals reported by industry contacts. The 1988 report could not have anticipated the extent to which Japanese manufacturers have shifted assembly to North American plants. This trend has cut neo-bulk imports of finished autos and expanded imports of containerized parts (which are not covered in this forecast).

- At the time, there were still several major break bulk commodities of significance, such as steel and newsprint, and a substantial volume of other mixed break bulk commodities handled at Bay Area ports. Most of this traffic has been containerized, and other flows have diminished. There is now very little break bulk traffic at Bay Area ports.

- The liquid bulk forecasts in the 1988 study reflect the operations of two or more tank farms as well as a few non-refinery specialty terminals. These two tank farms are now idle, and only the specialty terminals remain to handle tallow and vegetable oils.

Exhibit 4

1988 Seaport Plan Forecast

Metric Tons

IMPORTS	2000	2002	2005	2010	2015	2020	2000 - 2020 Growth Rate
Total Bulk	**2,982,228**	**3,151,283**	**3,505,027**	**4,038,779**	**4,647,426**	**5,306,800**	**2.9%**
Dry Bulk	1,243,549	1,335,331	1,535,792	1,828,538	2,159,777	2,534,676	3.6%
Grain	111,825	116,131	124,939	137,164	149,696	163,164	1.9%
Scrap Metal	16	17	20	25	30	37	4.3%
Pet Coke	-	-	-	-	-	-	na
Non-Met Minerals	858,919	935,047	1,095,359	1,361,015	1,663,912	2,008,010	4.3%
Other Dry Bulk	272,789	280,731	315,474	330,334	346,139	363,465	1.4%
Neo-Bulk	337,070	347,258	363,119	391,105	421,415	453,983	1.5%
Autos	337,070	347,258	363,119	391,105	421,415	453,983	1.5%
Break Bulk	982,209	1,048,930	1,184,918	1,398,386	1,635,852	1,895,084	3.3%
Newsprint	390,629	420,255	502,883	605,170	710,515	811,423	3.7%
Steel	430,464	451,487	482,242	542,509	612,373	693,465	2.4%
Other Break Bulk	161,116	176,016	199,793	250,707	312,964	390,196	4.5%
Liquid Bulk	419,400	419,764	421,198	420,750	430,382	423,057	0.0%
Other Liq. Bulk	419,400	419,764	421,198	420,750	430,382	423,057	0.0%

EXPORTS	2000	2002	2005	2010	2015	2020	2000 - 2020 Growth Rate
Total Bulk	**3,498,494**	**3,563,626**	**3,912,647**	**4,275,893**	**3,912,966**	**4,387,938**	**1.1%**
Dry Bulk	2,908,053	2,923,973	3,160,771	3,371,173	2,821,415	3,071,228	0.3%
Grain	270,641	282,694	326,352	354,235	385,152	418,437	2.2%
Scrap Metal	794,821	805,968	836,286	862,326	88,810	913,600	0.7%
Pet Coke	695,883	686,417	604,611	598,446	606,914	606,811	-0.7%
Non-Met Minerals	1,114,601	1,110,080	1,354,701	1,514,397	1,688,023	1,070,211	-0.2%
Other Dry Bulk	32,107	34,300	38,821	41,769	52,516	62,169	3.4%
Neo-Bulk	10,170	11,050	13,052	15,639	19,240	23,317	4.2%
Autos	10,170	11,050	13,052	15,639	19,240	23,317	4.2%
Break Bulk	345,734	372,771	435,797	518,058	616,984	734,073	3.8%
Newsprint	1,041	1,034	1,039	1,007	986	973	-0.3%
Steel	26,312	27,449	29,101	31,730	35,549	40,167	2.1%
Other Break Bulk	318,381	344,129	405,657	485,321	580,449	692,933	4.0%
Liquid Bulk	234,537	255,833	303,027	371,023	455,327	559,320	4.4%
Other Liq. Bulk	234,537	255,833	303,027	371,023	455,327	559,320	4.4%

Imports & Exports	2000	2002	2005	2010	2015	2020	2000 - 2020 Growth Rate
Total Bulk	**6,480,722**	**6,739,555**	**7,417,674**	**8,314,672**	**8,560,392**	**9,694,738**	**2.0%**
Dry Bulk	4,151,602	4,278,177	4,696,563	5,199,711	4,981,192	5,605,904	1.5%
Grain	382,466	398,825	451,291	491,399	534,848	581,601	2.1%
Scrap Metal	794,837	805,986	836,306	862,351	88,840	913,637	0.7%
Pet Coke	695,883	686,417	604,611	598,446	606,914	606,811	-0.7%
Non-Met Minerals	1,973,520	2,045,128	2,450,060	2,875,412	3,351,935	3,078,221	2.2%
Other Dry Bulk	304,896	315,031	354,295	372,103	398,655	425,634	1.7%
Neo-Bulk	347,240	358,464	376,171	406,744	440,655	477,300	1.6%
Autos	347,240	358,308	376,171	406,744	440,655	477,300	1.6%
Break Bulk	1,327,943	1,421,815	1,620,715	1,916,444	2,252,836	2,629,157	3.5%
Newsprint	391,670	421,289	503,922	606,177	711,501	812,396	3.7%
Steel	456,776	478,936	511,343	574,239	647,922	733,632	2.4%
Other Break Bulk	479,497	520,146	605,450	736,028	893,413	1,083,129	4.2%
Liquid Bulk	653,937	681,099	724,225	791,773	885,709	982,377	2.1%
Other Liq. Bulk	653,937	675,597	724,225	791,773	885,709	982,377	2.1%

Cargo History

Exhibit 5 below presents the cargo tonnage reported to BCDC since 1994.

Exhibit 5

Seaport Bulk Tonnage Reported to BCDC - Metric Tons

Cargo Type	1994	1995	1996	1997	1998	1999	2000	2001	2002 est.
Break Bulk	48,577	45,674	30,908	35,961	77,801	76,753	78,541	21,027	40,127
Neo-Bulk*	1,280,060	1,032,053	840,922	759,012	945,299	576,281	559,045	591,961	381,973
Dry Bulk	1,190,360	1,488,256	2,083,713	2,222,153	2,293,782	2,041,251	2,551,717	2,643,818	3,323,506
Liquid Bulk	443,742	463,733	471,584	530,526	444,771	653,566	492,727	335,499	331,045
Total Bulk	2,964,733	3,031,711	3,429,123	3,549,649	3,763,651	3,349,850	3,684,030	3,594,306	4,076,651

*BCDC data classify newsprint and steel as neo-bulk as well as autos

As the figures indicate, some of the cargo types have seen considerable fluctuation.

Exhibit 6 shows the volatility of the break bulk cargo. Rather than a broad trend, the chart reflects individual cargo flows starting, growing or shrinking, and stopping.

Exhibit 6

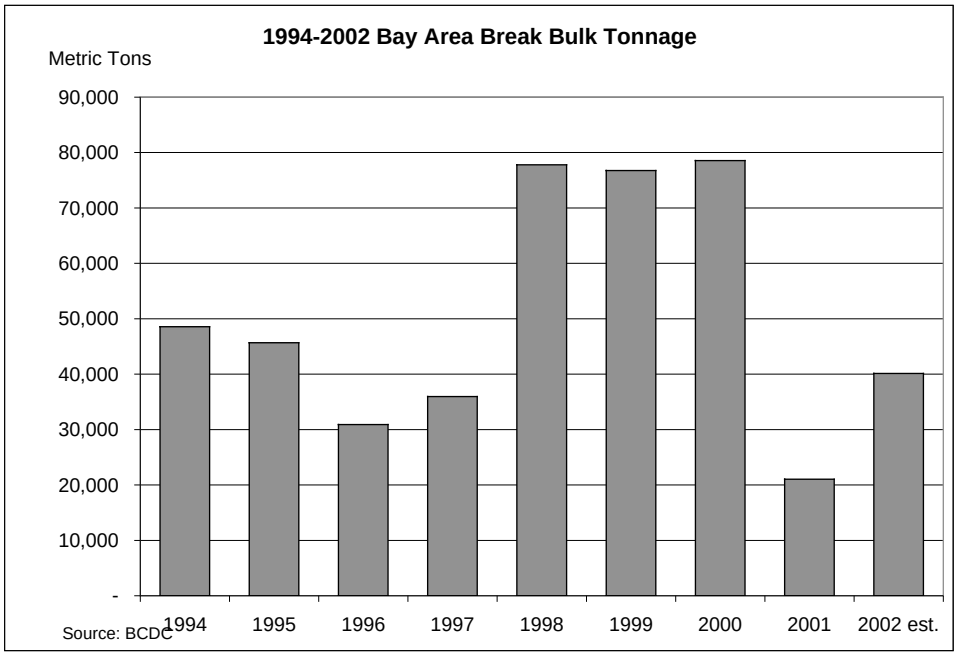
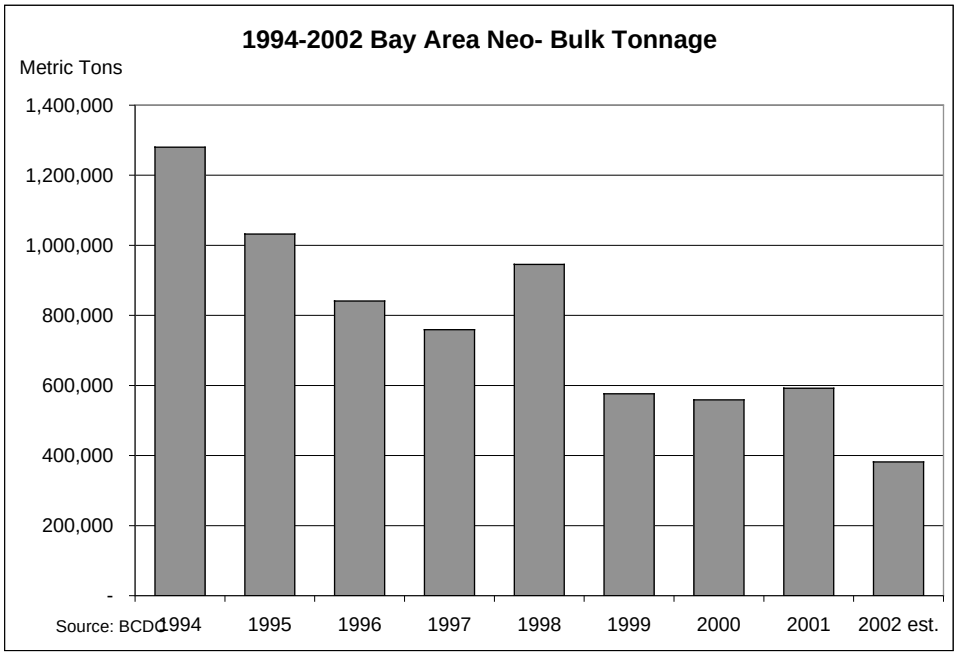


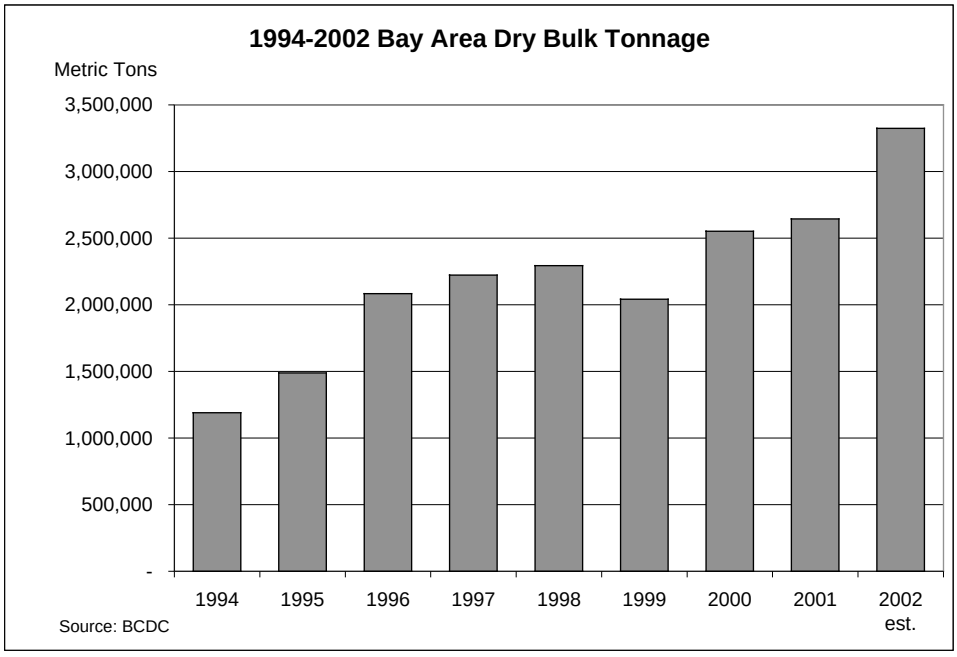
Exhibit 7shows the neo-bulk tonnage, which for BCDC reporting purposes includes newsprint and steel (treated elsewhere in the report as break bulk, in accordance with current industry terminology). The decline in neo-bulk tonnage appears to be traceable to the gradual substitution of containerized parts flows to new U.S. factories for auto brands formerly imported as finished vehicles. The drop between 2001 and 2002 is due primarily to the decline in steel imports after tariffs were tightened.

Exhibit 7



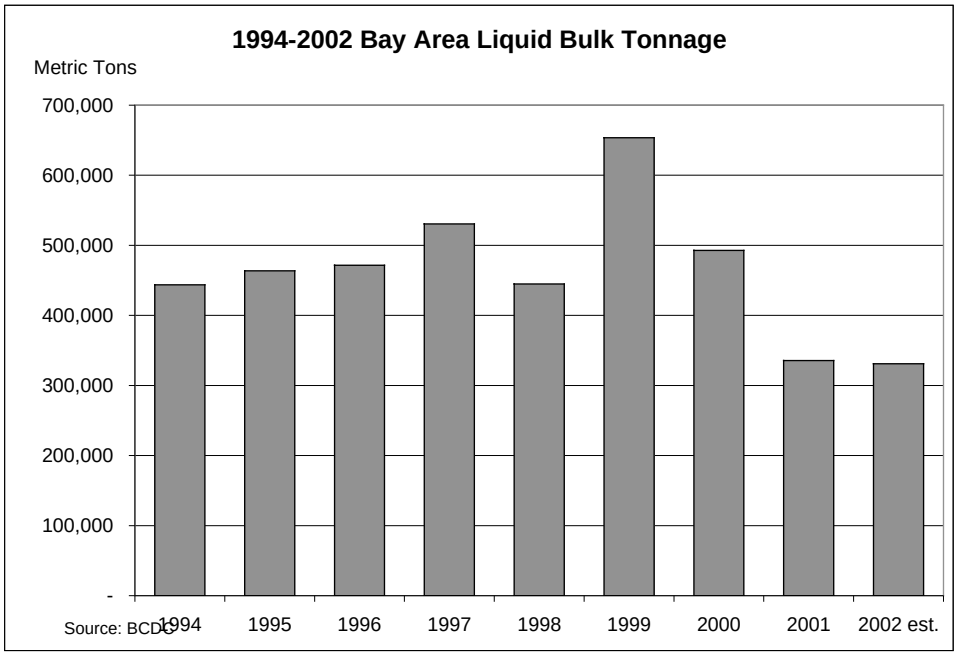
The dry bulk tonnage in Exhibit 8 has grown with Bay Area construction activity. The noticeable jump in 2002 is due to import substitution for declining local production of sand and gravel.

Exhibit 8



The liquid bulk tonnage pattern in Exhibit 9 appears to be caused by reductions in the shipment volume of petroleum products through non-refinery terminals. By 2001 the liquid bulk categories consisted solely of vegetable oils and liquid tallow.

Exhibit 9


1994-2002 Bay Area Liquid Bulk Tonnage
Metric Tons
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
1994
1995
1996
1997
1998
1999
2000
2001
2002 est.
Source: BCDC

III. Major Forecast Commodities

Overview Major Commodities

Tioga contacted all the Bay Area ports and also spoke with a number of terminal operators and major shippers/consignees. Cooperation was excellent, and contacts provided not only current volumes but also informal projections and critical insights into the factors behind the trade flows.

Of the roughly 5 million metric tons of bulk and neobulk/break-bulk cargoes reportedly moving through San Francisco Bay seaports, including private terminals in Benicia, Oakland, and Richmond, there are several major commodities that make up nearly all the non-refinery imports, exports, and domestic moves, as described in Exhibit 10. Large volumes of crude petroleum and refined petroleum, which move primarily through private terminals adjacent to oil refineries, are not in the forecast scope. Likewise, movements of raw sugar to the Crockett refinery are not included. Volumes of sand harvested (dredged) from the Bay are included where they are handled through the major harbors of San Francisco, Oakland, and Richmond (smaller volumes handled through private terminals near Martinez are not included).

Exhibit 10

Major SF Bay Bulk Commodities, 2002

SF Bay Bulk Commodities, 2002

Type	Bulk Commodities	Reported Annual Metric Tons	Share of Total
Dry Bulk	Aggregates (Imports)	800,000	15%
Dry Bulk	Aggregates (Domestic)	1,212,894	23%
	Aggregates Subtotal	2,012,894	38%
Dry Bulk	Bauxite (Imports)	120,000	2%
Dry Bulk	Cement (Imports)	290,000	5%
Dry Bulk	Cottonseed (Imports)	120,000	2%
Dry Bulk	Gypsum (Imports)	395,506	7%
Dry Bulk	Metallurgical Coke (Imports)	25,000	0%
Dry Bulk	Petroleum Coke (Exports)	475,000	9%
Dry Bulk	Salt (Exports)	0	0%
Dry Bulk	Scrap Metal (Exports)	1,040,000	20%
Break Bulk	Steel, Forest Prod., Newsprint, Project (Imports)	227,100	4%
Break Bulk	Rice (Exports)	58,000	1%
Neo-Bulk	Automobiles (Imports & Domestic)	195,000	4%
Liquid Bulk	Oils & Petro. Prods. (Imports & Exports)	331,045	6%
Total		**5,289,545**	**100%**

This commodity mix has a number of characteristics that affect the forecast.

- Bay Area bulk cargoes are almost exclusively raw materials or intermediate industrial inputs tied to economic fundamentals rather than fluctuating consumer demand. The exceptions are the auto imports.

- The commodities are produced or consumed locally or, at most regionally. Most are low-value commodities whose selling price cannot support significant inland transportation costs. The exception, again, are the auto imports.

- As is immediately apparent, about half of the bulk commodity total – including aggregates, cement, steel, and gypsum – is tied to local and regional construction activity.

- The major flows are tied to specific industries or even specific firms, including the mixed break bulk commodities handled at terminals in San Francisco Richmond. The volumes, therefore, depend on the fortunes of individual firms and even the logistics choices of individual decision makers.

- Of all the major commodities, only imported autos initially appear to be significantly affected by port competition (in this case from Port Hueneme). The other commodities are for local consumption (e.g. aggregates, cement, gypsum) or are produced locally (e.g. pet coke, scrap metal).

Aggregates (Imports and domestic)

Current Volume and Share: 2,012,894 metric tons and 38%

Aggregates (sand, gravel, and rock) are the largest single bulk commodity flow moving through the SF Bay seaports and this volume is expected to grow significantly in 2002-2020. There are two major components to the aggregates volume: imported, high-grade aggregates (primarily crushed rock and gravel) for manufacture of concrete and asphalt; and domestic sand and gravel harvested from San Francisco Bay sand deposits. The imports come from British Columbia and Mexico in self-sustaining Panamax-size ships, limited to about 50,000 to 52,000 tons due to draft constraints in some of the ports. The domestic sand and gravel moves exclusively to SF Bay ports and private terminals by barges.

The key factor in the growth of aggregate imports is the decline of domestic supplies of aggregates as Bay Area quarries are depleted. The overall current market for aggregates in the greater Bay Area is estimated to be about 36 million tons per year, [i] depending on the volume of building and infrastructure construction. Local aggregate companies – because the low-value commodity cannot afford domestic transport costs on distances greater than 35-40 miles – do not consider hinterlands beyond the greater Bay Area as part of their market. There is another 16 million tons of demand in the Northern Sacramento Valley, for example, but this demand is filled from other aggregate resources such as quarries in the Marysville area or a proposed new quarry new Oakville.

Growth of sand and gravel harvesting from sand deposits in SF Bay (sand mining) is difficult to forecast because of the lack of definitive knowledge about its continuing environmental viability. Studies are underway to develop better understanding of sediment dynamics, the amount of sediment resources (sand and gravel) and the effect of sand mining on these resources and their

[i] From industry sources, including local aggregate firms, for the five Bay Area Counties of Alameda, Contra Costa, Marin, San Francisco and Santa Clara.

dynamics. Until these studies are completed, it is difficult to predict any change in the volume of domestic sand and gravel that will be harvested from the bay. Thus, for the purposes of this forecast, it was assumed that sand mining volumes would not increase, and the shortfall between aggregate demand and domestic production would be covered by imports.

As their quarries become depleted during the period 2002-2020, aggregate companies will turn increasingly to imports to fill the construction needs for aggregates throughout the greater Bay Area.

Scrap Metal Exports

Current Volume and Share: 1,040,000 metric tons and 20%

Ferrous scrap metal exports (almost exclusively steel) move primarily as dry bulk due to the low value per ton. Non-ferrous exports (e.g., brass, copper, etc.) tend to move as container commodities since their value can support the incremental liner/container transport cost. Ferrous scrap metal is exported through three SF Bay terminals, two of which are private: Schnitzer Steel in Oakland and Levin Richmond Terminal Corporation (LRTC) of Richmond. The third scrap-metal export terminal is Wharf 3 at the Port of Redwood City. Two companies share the ferrous scrap metal export business: Schnitzer Steel, which owns a 35-acre site on the Oakland Estuary between the Howard and APL Limited terminals, and SimsMetals America, who owns and operates a 35-acre processing facility adjacent to LRTC in Richmond and leases a 14-acre terminal from the Port of Redwood City. Schnitzer Steel's Oakland facility has two wharves and extensive metal-shredding processing capabilities. SimsMetal's facility in Redwood City also has a metal shredder. SimsMetal's Richmond operation handles bulkier scrap steel and other metal exports that are too large for shredding. This commodity is "melting steel scrap." The total Bay Area export volume is approximately 1,040,000 metric tons per year, according to industry sources.

The growing demand for steel scrap in Asia is the key driver in forecasting steel scrap exports. There is a growing supply of "raw materials" as Northern Californians continue to buy new cars and appliances creating an abundance of abandoned or junked vehicles or steel appliances for shredding and export.

Industry representatives expect the demand for shredded steel exports to grow between 3.5 to 5 percent annually. They expect the demand for melting steel scrap exports to grow about 5 percent per year through 2004, as the Asian economies continue to come out of recession, and then settle down to a similar growth pattern as shredded steel exports. Industry contacts expect Bay Area scrap steel exports to reach 1.9 million metric tons by 2020.

Petroleum Coke Exports

Current Volume and Share: 475,000 metric tons and 9%

Petroleum coke (pet coke) exports move through two SF Bay terminals within the broad reach of the Seaport Plan: LRTC in Richmond (approximately 200,000 tons per year), and the Amport

private terminal in Benicia (approximately 275,000 tons per year). Petroleum coke is also exported through facilities on Suisun Channel near Pittsburg, but those locations are outside the Seaport Plan.

There are five major refineries in the greater Bay Area. The refineries, their locations, the residual petroleum products they produce and, if they produce pet coke, the export ports and terminals are listed below.

Exhibit 11

Refinery	Location	Product	Export Port (Terminal)
SF Bay (Seaport Plan)			
Chevron	Richmond	Asphalt	N/A
Valero	Benicia	Pet Coke	Benicia (Amport)
Conoco Phillips	Rodeo	Pet Coke	Richmond (LRTC)
Suisun Channel (non Seaport Plan)			
Shell	Martinez	Pet Coke	Pittsburg (Koch Industries)
Tesoro "Golden Eagle"	Avon	Pet Coke	Pittsburg (Tesoro)

Petroleum coke is a product of the crude oil refining process where, at the very end of the refining process, residual crude oil is made into either petroleum coke or asphalt. The choice is up to the refinery. Whether the refineries choose to use residual crude oil for pet coke or asphalt, the end product must be moved out of the refinery or it will slow or stop the refining process. Thus, the export of pet coke is dictated less by overseas demand for the product than by the requirement to keep the refineries operating smoothly. Foreign aluminum smelters and power producers are large consumers of exported pet coke.

The production of pet coke is a function of the total production of petroleum products at refineries in the SF Bay. Today, refineries are reportedly operating at roughly 90 percent of capacity. Assuming that the SF Bay Area refineries are not appreciably expanded in the foreseeable future (a likely scenario), and also assuming that the refineries do not change their decisions on whether to produce asphalt or pet coke, it seems that the total current San Francisco Bay exports of pet coke (475,000 tons) cannot grow to much more than a total of 500,000 tons in the future (i.e. when refineries are at full capacity.) This correlates with conversations with terminal operators who predict small growth for pet coke exports.

Tioga verified the overall petroleum refining outlook for the Bay Area to confirm the low-growth outlook for pet coke. The chief resource used was the U.S. Department of Energy Annual Energy Outlook, 2002.

- Petroleum consumption, and thus refinery output, is a function of economic activity and growth. Despite the recent economic slowdown, petroleum consumption has been rising for a number of years. At the same time, domestic petroleum production in the "lower 48" states is on a slow decline from about 4.9 million barrels per day in 2000 to a forecast of 4.5 million barrels per day in 2020. Alaskan crude production has also been declining, although it will rebound somewhat with expected production from the National Petroleum Reserve –

Alaska. The net result is a widening gap between production and consumption that is being filled by imports (although the petroleum imports themselves are not in the forecast scope).

- U.S. refinery capacity declined in the 1980s before an upturn in 1995-2001. The Department of Energy expects no new refineries to be built in the foreseeable future due to high financial and environmental barriers. Additions to capacity and improvements to production are expected, but not in the Bay Area:

  > " Almost all the capacity additions are projected to be on the Gulf Coast. Existing refineries are expected to continue to be utilized intensively throughout the forecast, in a range of 90 to 94 percent of design capacity." Annual Energy Outlook

- DOE therefore expects just 1.1% annual growth in residual petroleum products, which include petroleum coke. By implication, most of this growth will accompany the capacity increase in the Gulf. The DOE projections are thus consistent with the very low growth rates anticipated for Bay Area pet coke exports.

Gypsum Imports

Current Volume and Share: 395,506 metric tons and 7%

Imported gypsum used for manufacture of wallboard and other building materials as well as an agent in the manufacture of cement is an important commodity to the SF Bay seaports. The three import gypsum destinations in the Greater Bay Area are Redwood City (Wharf 3 & 4); Richmond (Terminal 15, the National Gypsum private terminal and wallboard manufacturing plant); and Antioch (the Georgia-Pacific wallboard manufacturing plant). Antioch is beyond BCDC's jurisdiction.

The Redwood City terminal is jointly shared by Pabco Gypsum, which imports gypsum for wallboard manufacturing at its Newark, California plant, and Oxbow Carbon & Minerals, which imports gypsum that it sells to the two Bay Area cement plants in Cupertino and Davenport for use as a cement additive. The Redwood City total is about 220,000 metric tons annually.

The National Gypsum plant in Richmond (Terminal 15) imports approximately 175,500 tons per year, although it was down to 150,225 tons in 2001 reflecting the falloff of construction in Northern California. A return to former throughput should occur as construction recovers from the 2001/2002 recession.

The growth of gypsum imports is tied to the growth of the building industry. An informal industry forecast would yield 400,000 annual metric tons by 2020.

Portland cement imports

Current Volume and Share: 290,000 metric tons and 5%

According to the Portland Cement Association, the demand for cement in Northern California is about 4,626,000 metric tons per year and is expected to grow at an annual rate of 2.5 to 3.0 percent per year once Northern California's economy recovers from its recent malaise. Cement manufacturing capacity is only 2,812,000 metric tons per year so there is an annual demand shortfall of 1,814,000 metric tons. This demand must be met by importing either domestic cement (by rail) or foreign cement by ocean. Ocean transport costs, on a per ton basis and assuming railroad transport greater than 200 miles, are reportedly about ten percent of the rail costs. This key economic factor will continue to drive imports to fill the local supply shortfall.

The Bay Area cement industry imports cement from China to fill the demand for concrete in Northern California. The cement is imported to silos at the Port of Redwood City (Wharves 1 & 2) for storage and distribution in Northern California. Thus, imported cement will continue to be an important bulk cargo import through Redwood City and other SF Bay bulk terminals in the future.

The current import volume is 290,000 metric tons per year, but is expected to grow to 550,000 tons as demand increases due to increased construction of residences, industrial buildings and the area's infrastructure.

Metallurgical Coke Imports

Current Volume and Share: 25,000 metric tons and <1%

Metallurgical coke (met coke) is a coal product used in steel manufacturing, and petroleum coke and metallurgical coke are not substitutes. It is imported via the private LRTC terminal (Terminal 9) in Richmond.[ii] The 2001 volume was approximately 240,000 tons; current volume is roughly 25,000 annual tons. The small present volume is trucked from LRTC to a Bay Area foundry, and is not expected to grow past 30,000 annual tons.

Any substantial growth in met coke is problematical because the only significant customer for Bay Area met coke imports, Geneva Steel near Vineyard, Utah, is in bankruptcy. On January 28, 2002, Geneva filed a voluntary petition under Chapter 11 of the United States Bankruptcy Code, a little over a year after it had emerged from bankruptcy in January of 2001. In late October 2002, Geneva announced that its financing arrangements had fallen through and liquidation was expected.

Should the Geneva Steel Mill reopen it would increase met coke imports through LRTC significantly. Operating one blast furnace requires about 500,000 tons of met coke annually. Geneva has two blast furnaces and it is conceivable that met coke imports could grow to one

[ii] The Levin-RTC terminal is unique on the West Coast in that it can handle bulk exports and imports. This attribute is critical as there needs to be multi-use, multi-commodity bulk and break bulk terminals in SF Bay to handle all types on non-containerized cargoes in the future.

million tons annually if both were operated and all met coke was imported through the Bay Area. It is possible, however, that Geneva could import all or part of its met coke needs through Gulf ports or other routes.

Accordingly, the future volumes of met coke flows could vary widely. A high-growth forecast would be 530,000 tons per year by 2020, corresponding to one Geneva blast furnace in operation and importing through the Bay Area and 30,000 tons imported for Bay Area use.

Steel, Forest Products, Newsprint, and Project Cargo Imports
Rice Exports

Current Volume and Share: 285,100 metric tons and 5%

Break bulk and project cargoes are imported through the Port of Richmond's Terminal 3, operated by Stevedoring Services of America (SSA), through the Port of San Francisco's Pier 80, operated by Marine Terminals Corporation.

- Most steel imported through San Francisco Bay moves past Richmond to the POSCO Steel Plant in Pittsburg, beyond the scope of the Seaport Plan. Asia steel imports have been slowed by U.S. tariff actions, but some steel does move through Richmond and San Francisco. Current steel imports are mostly low-grade steel for use in construction (e.g. reinforcing bar). Recently, Caltrans issued a waiver allowing the use of some imported steel in highway and bridge construction, which is likely to boost near-term steel import volumes.

- Newsprint is imported both in containers (through Oakland) and as individual or grouped rolls handled with specialized lift equipment. The choice between containerized and break-bulk modes for newsprint may vary over the years with the relative rates, the sources, and the destinations.

- Forest product imports include small amounts of lumber reportedly handled at Richmond and a new and growing flow of Brazilian forest products (e.g. MDF – medium density fiberboard) at San Francisco's Pier 80.

- "Project cargoes" include a wide range of shipments typically tied to specific industrial developments or construction projects. Typical shipments include specialized building materials, fabricated steel structures, transportation equipment, and industrial machinery. These shipments usually move in general cargo vessels or roll-on-roll-off (Ro-Ro) vessels. A recent example was the movement of unfinished rail passenger car shells through Richmond.

Break bulk exports, most recently bagged rice, are handled at the Port of Benicia. The rice movement has been completed, and Benicia is looking for new break bulk cargos.

This category can be highly variable as individual flows change with the fortunes and logistics strategies of individual firms. A large portion of this traffic, particularly in steel, was formerly handled at the Burma Road terminal at the Port of Oakland. When the Burma Road terminal was

closed, much of the steel traffic declined due to the tightening of steel tariffs while other portions of the traffic were shifted to SF Pier 80. The other major steel traffic was coil steel for the Pinole Point Steel Co, handled through Richmond until Pinole Pont Steel closed.

Automobile Imports & Domestic Flows

Current Volume and Share: 195,000 metric tons and 4%

Automobile imports tend to be cyclical according to country of manufacture and manufacturer. As imports increase, the manufacturers typically reach a point where it is more economical to build an automobile plant and import components than to import the completed cars themselves. The current situation in the SF Bay Area is a microcosm of this phenomenon: the Korean manufacturer, KIA, currently imports 75,000 units per year through Amport in Benicia, while Toyota manufactures vehicles in Fremont and imports containerized parts through Oakland. There are approximately 90,000 tons per year of completed vehicles[iii] moving through Benicia. Army Corps of Engineers data show that 267,500 metric tons (after conversion) of imported automobile parts moved through the Port of Oakland in containers bound for Fremont or other Japanese manufacturing plants in the hinterlands of the Port of Oakland.

Amport expects that its automobile imports could grow to 360,000 metric tons (300,000 units) from Korea. PASHA has a proposal to expand its current domestic auto handling facility in Richmond to receive imported autos as well, and believes this traffic could grow to 240,000 annual metric tons (200,000 units). The difficult question is: Where will the next wave of automobile imports come from? China, Indonesia, Thailand, Mexico and other countries have all been mentioned as the next sources of imported vehicles.

Matson Navigation currently moves autos and other vehicles to and from Hawaii in ro-ro (neo-bulk) service from Oakland. For 2000, USACE data show a total of approximately 105,000 metric tons of autos and parts in this trade, most of which are apparently set-up autos or other vehicles. This trade has been held constant in the forecasts, as growth, if any, is containerized.

Bulk liquid imports and exports

Current Volume and Share: 331,045 metric tons and 6%

Vegetable oil imports (e.g. coconut oil, palm oil, etc.) and exports (e.g. corn oil, safflower oil, walnut oil, etc.) are the major liquid bulk cargoes covered by this forecast. There is also a small flow of liquid tallow exported from San Francisco. Crude oil and other petroleum liquid bulk cargoes that are normally handled at proprietary marine terminals, usually adjacent to refineries, are not included.

There were three terminals handling liquid bulk vegetable oils in the SF Bay region in 2000 all at the Port of Richmond: Terminal 2, California Oils (a division of Mitsubishi Trading); Terminal

[iii] By comparing Army Corps weight data for year 2000 with Amport unit data for year 2000, the approximate weight of a KIA automobile was determined to be 1.2 metric tonnes on average.

4, PakTank Corporation; and Terminal 13, GATX now Kinder Morgan Co. In 2001, only California Oils and Kinder Morgan continued to handle vegetable oils and Terminal 4 is no longer in operation (but has three storage tanks that could be reactivated). There was a total of 318,995 metric tons of imports and exports during 2001. Participants in vegetable oil trading project static growth over the foreseeable future as the market demand has dropped and been static for a number of years.

The Pasha Group, operators of Richmond Terminal 5, see potential for 120,000 annual metric tons of imported petroleum products through that facility, although there is no liquid bulk cargo at present.

Tallow (rendered animal fat/oil) is exported in small quantities from San Francisco and vegetable oils (e.g. cottonseed oil, corn oil, canola oil, etc.) are both imported and exported through Richmond. These are the only remaining non-refinery liquid bulk movements of significance, as the two major liquid bulk terminals in Redwood City and Richmond are idle. Industry contacts expect very modest growth.

Summary of Port/Industry Findings

The commodity tonnage and outlook information provided by the port and industry contacts is summarized in Exhibit 12.

Exhibit 12

Long-term Industry Growth Expectations for Bulk Commodities - Metric Tons

Type	Bulk Commodities	2002 Est. Throughput	Long-Term Potential (e.g. 2020)	Implied Average Growth Rate
Dry Bulk	Aggregates (Imports)	800,000	2,500,000	6.5%
Dry Bulk	Aggregates (Bay Sand Harvest)	1,212,894	1,212,894	0.0%
	Aggregates Subtotal	2,012,894	3,712,894	3.5%
Dry Bulk	Bauxite (Imports)	120,000	180,000	2.3%
Dry Bulk	Cement (Imports)	290,000	550,000	3.6%
Dry Bulk	Cottonseed (Imports)	120,000	171,390	2.0%
Dry Bulk	Gypsum (Imports)	395,506	400,000	0.1%
Dry Bulk	Metallurgical Coke (Imports)	25,000	530,000	18.5%
Dry Bulk	Petroleum Coke (Exports)	475,000	500,000	0.3%
Dry Bulk	Salt (Exports)	0	90,000	na
Dry Bulk	Scrap Metal (Exports)	1,040,000	1,900,000	3.4%
Dry Bulk	Subtotal	4,478,400	8,034,284	3.3%
Dry Bulk	Oceanborne (Ex sand harvesting)	3,265,506	6,821,390	4.2%
Break Bulk	Steel, Forest Prod., Newsprint, Project (Imports)	227,100	298,000	1.5%
Break Bulk	Rice (Exports)	58,000	60,000	0.2%
Neo-Bulk	Automobiles (Imports & domestic)	195,000	705,000	7.4%
Liquid Bulk	Oils & Petro. Prods. (Imports & Exports)	331,045	492,700	2.2%
Total		**5,289,545**	**9,589,984**	**3.4%**

IV. Updated Bulk Cargo Forecast

DRI-WEFA West Coast Bulk Cargo Forecast

DRI-WEFA prepared forecasts of dry bulk, liquid bulk, and general/neo-bulk cargoes for the U.S. west coast, the smallest region for which econometric forecasting is ordinarily valid. Detailed forecasts tables are presented in Appendix A.

Exhibit 13 summarizes the forecast and growth rates for the four major commodity types. The tonnages shown are for the West Coast as a whole and serve only as a check on the Bay Area volumes. The major items of interest in the table are the projected growth rates.

Exhibit 13: DRI-WEFA West Coast Bulk Cargo Forecast

US West Coast - Metric Tons							Growth Rates		
Commodity Group	1995	2000	2005	2010	2015	2020	1995-2000	2000-2005	2000-2020
Dry Bulk (all)	62,946,085	59,627,034	62,272,888	70,162,408	78,873,286	88,536,547	-1.1%	0.9%	2.0%
Imports	12,909,612	21,676,096	23,472,604	28,084,964	34,169,242	41,858,799	10.9%	1.6%	3.3%
Exports	50,036,474	37,950,938	38,800,285	42,077,443	44,704,044	46,677,748	-5.4%	0.4%	1.0%
Break Bulk (ex Autos)	26,893,865	26,409,576	28,771,082	32,312,202	36,487,081	41,110,221	-0.4%	1.7%	2.2%
Imports	12,211,476	15,166,741	16,703,830	19,517,199	22,839,915	26,575,346	4.4%	1.9%	2.8%
Exports	14,682,389	11,242,835	12,067,252	12,795,003	13,647,166	14,534,875	-5.2%	1.4%	1.3%
Neo - Bulk (Autos)	1,354,354	2,216,900	2,511,686	3,031,227	3,613,852	4,228,666	10.4%	2.5%	3.3%
Imports	1,354,354	2,216,900	2,511,686	3,031,227	3,613,852	4,228,666	10.4%	2.5%	3.3%
Exports	-	-	-	-	-	-	na	na	na
Liquid Bulk (Veg.Oils)	513,814	436,473	513,781	590,906	659,321	715,769	-3.2%	3.3%	2.5%
Imports	170,228	173,867	200,162	229,268	258,630	285,829	0.4%	2.9%	2.5%
Exports	343,585	262,606	313,620	361,639	400,691	429,940	-5.2%	3.6%	2.5%

Dry Bulk. The Dry Bulk growth rates are for all dry bulk cargoes, except petroleum coke. The DRI-WEFA forecast calls for very slow growth in the near term followed by modest long-term growth.

Petroleum coke appears in the liquid bulk tonnage in Appendix A. Because of its origin as a petroleum refining by-product, the petroleum coke is grouped with other petroleum products into liquid bulk, even though the petroleum coke tonnage is actually carried in dry bulk vessels. The growth rate of residual petroleum refining products in liquid bulk is very nearly zero, corresponding closely to the industry scenario presented in the previous section. The growth is very slow in this category, as DRI-WEFA expects no new refining capacity to be constructed on the west coast and the only increases in throughput will come from technical efficiency improvements over time combined with slightly increased utilization. The petroleum coke tonnage is a supply driven, not demand driven trade.

Break Bulk. The Break Bulk forecast shown above is for all break bulk/general cargo categories except autos, where were treated separately as neo-bulk. The growth rates for break bulk are modest in both near-term and long-term. Cement shows up in the data as break bulk. The growth

rates for the non-metallic products category, which includes cement, are appropriate given expected growth rates for the west coast.

Neo Bulk. Autos are the only neo-bulk commodity shown above. Import growth is expected to be moderate and exports are virtually non-existent.

Liquid Bulk. The forecast shown above for liquid bulk is the DRI-WEFA forecast for animal and vegetable oils, which are the non-refinery commodities currently moving in the Bay Area. Appendix A shows, refined petroleum products – a candidate growth commodity for Richmond – have similar forecasts growth rates.

Details of the DRI-WEFA forecast methodology are given in Appendix B. Appendix C gives DRI-WEFA's most recent world trade outlook.

Forecast Comparisons

The table on the next page, Exhibit 14, displays four forecasts, grouped by vessel/handling cargo type:

- The 1988 Manalytics/WEFA forecast from Exhibit 4
- The industry expectations discussed above from Exhibit 12
- A composite forecast using US Army Corps of Engineers data where available for year 2000 volumes and the DRI-WEFA West Coast forecast growth rates by type to 2020.
- A base case forecast for the Seaport Plan Update.

A separate table is provided for Dry Bulk including dredged sand.

Following the summary exhibit are individual discussions and charts for the major cargo types.