FINAL REPORT

STUDY OF THE CONVENTIONAL BULK-REFRIGERATED (NON-CONTAINERIZED) CARGO MARKET SEGMENT CONTRACT SAA-154968

Volume II – General Cargo and Other Minor Vessel Types

PREPARED FOR:

ACP
AUTORIDAD DEL CANAL DE PANAMA

PREPARED BY:

GLOBAL INSIGHT
24 Hartwell Avenue
Lexington, MA 02421-3158

IN CONJUNCTION WITH

LauritzenCool

9 MARCH 2004

TABLE OF CONTENTS

EXECUTIVE SUMMARY ES-1

I. INTRODUCTION 1

II. OVERVIEW OF THE OTHER VESSEL TYPES 2

GROUP 1 SHIPS 2
GROUP 2 SHIPS 4

III. THE CURRENT, OTHER VESSEL FLEET – GROUP 1 8

GENERAL CARGO SHIPS 8
DRY/LIQUID BULK SHIPS (COMBO'S) 9
CONTAINER/BREAKBULK SHIPS (CONBULKERS) 10
VEHICLE/DRYBULK SHIPS 11

IV. PANAMA CANAL TRANSIT AND REVENUE MODELS FOR OTHER VESSEL TYPES 12

MODEL FOR GROUP 1 VESSELS 13
TRADE FLOW FILTERS 16
TRADE ROUTES 17
ROUTE OPERATING COSTS 19
VESSEL CHARACTERISTICS 20
CARGO TONS, PCUMS, AND TRANSITS 20
REVENUES BY SHIP CHARACTERISTICS 21
MODEL FOR GROUP 2 VESSELS 22
VESSEL CHARACTERISTICS 22
REVENUES BY SHIP CHARACTERISTICS 23

V. FORECAST OF GENERAL CARGO AND OTHER MINOR VESSEL TYPES 25

GROUP 1 SHIPS 25
GROUP 2 SHIPS 62

VI. MARKETING STRATEGY 65

APPENDIX A. REGIONAL DEFINITIONS A-1

APPENDIX B. PORT ASSIGNMENTS BY COUNTRY/REGION B-1

TABLE OF TABLES

TABLE ES-1 OTHER SHIP TYPES ES-1
TABLE ES-2 GROUP 1 SHIPS, RELATIVE IMPORTANCE ES-2
TABLE ES-3 GROUP 1 SHIPS, PERCENT OF TOTAL ES-2
TABLE ES-4 GROUP 1 SHIPS, COMPOUND ANNUAL GROWTH RATES 2000-2003 ..... ES-2
TABLE ES-5 GROUP 1 SHIPS, CARGO TONS ES-2
TABLE ES-6 GROUP 1 SHIPS. TRANSITS FORECASTS ES-3
TABLE ES-7 GROUP 1 SHIPS, TOLLS FORECAST ES-3
TABLE ES-8 GROUP 2 SHIPS, RELATIVE IMPORTANCE ES-4
TABLE ES-9 GROUP 2 SHIPS, PERCENT OF GROUP 2 TOTAL ES-5
TABLE ES-10 GROUP 2 SHIPS, COMPOUND ANNUAL GROWTH 2000-2003 ..... ES-6
TABLE ES-11 GROUP 2 SHIPS. PCUMS & DISPLACEMENT FORECAST ES-7
TABLE ES-12 GROUP 2 SHIPS, TRANSITS FORECAST ES-7
TABLE ES-13 GROUP 2 SHIPS, TOLLS FORECAST ES-8
TABLE II.1 OTHER SHIP TYPES 2
TABLE II.2 GROUP 1 SHIPS CARGO (TONS) 3
TABLE II.3 GROUP 1 SHIPS PCUMS 3
TABLE II.4 GROUP 1 SHIPS TRANSITS 4
TABLE II.5 GROUP 1 SHIPS TOLLS (U.S. DOLLARS) 4
TABLE II.6 GROUP 2 CANAL PRICING UNITS 5
TABLE II.7 GROUP 2 CANAL TRANSITS 6
TABLE II.8 GROUP 2 CANAL TOLLS 7
TABLE III.1 GENERAL CARGO FLEET, FEBRUARY 2004 9
TABLE III.2 COMBO FLEET, FEBRUARY 2004 10
TABLE III.3 CONTAINER/BREAKBULK SHIPS, FEBRUARY 2004 10
TABLE IV.1 GROUP 1 AND GROUP 2 SHIPS, CHARACTERISTIC SEGMENTS 12
TABLE IV.2 GROUP 1 AND GROUP 2 OTHER VESSEL TYPES 13
TABLE IV.3 ORIGIN & DESTINATION COUNTRIES/REGIONS 15
TABLE IV.4A TRADE ROUTES 18
TABLE IV.4B SAMPLE TRADE ROUTES (MILES) 18
TABLE IV.5 ROUTE OPERATING COSTS BETWEEN GUAYAQUIL (ECUADOR) AND ROTTERDAM (WESTERN EUROPE, NORTH) 19
TABLE V.1 GROUP 1 SHIPS, CARGO FORECAST 25
TABLE V.2 GROUP 1 SHIPS, PCUMS FORECAST 25
TABLE V.3 GROUP 1 SHIPS, TRANSITS FORECAST 25
TABLE V.4 GROUP 1 SHIPS, TOLLS FORECAST 25
TABLE V.5 GENERAL CARGO - TRANSITS 27
TABLE V.6 GENERAL CARGO - TOLLS 29
TABLE V.7 GENERAL CARGO - CARGO 31
TABLE V.8 GENERAL CARGO - PCUMS 33
TABLE V.9 DRY/LIQUID BULK CARRIERS - TRANSITS 36
TABLE V.10 DRY/LIQUID BULK CARRIERS - TOLLS 38
TABLE V.11 DRY/LIQUID BULK CARRIERS - CARGO 40
TABLE V.12 DRY/LIQUID BULK CARRIERS - PCUMS 42
TABLE V.13 CONTAINER/BREAKBULK - TRANSITS 45
TABLE V.14 CONTAINER/BREAKBULK - TOLLS 47
TABLE V.15 CONTAINER/BREAKBULK - CARGO 49

TABLE V.16 CONTAINER/BREAKBULK - PCUMS 51
TABLE V.17 VEHICLE/DRY BULK CARRIER - TRANSITS 54
TABLE V.18 VEHICLE/DRY BULK CARRIER - TOLLS 56
TABLE V.19 VEHICLE/DRY BULK CARRIER - CARGO 58
TABLE V.20 VEHICLE/DRY BULK CARRIER - PCUMS 60
TABLE V.21 TRANSITS FOR GROUP 2 SHIPS 62
TABLE V.22 TOLLS FOR GROUP 2 VESSELS 62
TABLE V.23 TOTAL PCUMS AND DISPLACEMENT – GROUP 2 VESSELS 63

TABLE OF FIGURES

FIGURE IV.1 MODEL STRUCTURE 14
FIGURE IV.2 POINT COST ESTIMATES AND THEIR PROBABILITY DISTRIBUTIONS 17

Executive Summary

The "Other minor vessels" analyzed in this report were divided into two groups for modelling and forecasting purposes. Group 1 includes the cargo ships and Group 2 includes the remaining minor vessels. The specific ship types in each of the two groups are identified in Table ES-1 along with their ship codes, as defined and used by the ACP, and pricing terms.

Table ES-1
Other Ship Types

Ship Code	*Ship Type*
	Group 1
1	**General Cargo**
5	**Dry/Liquid bulk carrier**
6	**Container/Break Bulk ship**
10	**Vehicle/Dry-Bulk carrier**
	Group 2
13	**Barge carrier**
14	**Barge not self-propelled**
15	**Barge self-propelled**
16	**Fishing vessel**
17	**Factory ship**
18	**Tug**
19	**Research vessel**
20	**Cable Ship**
21	**Yacht**
22	**Rig Tender/Supply Ship**
23	**Tank Barge not self-propelled**
24	**Tank Barge self-propelled**
25	**Barge integrated**
26	**Tank barge integrated**
27	**Woodship**
50	**Other Vessel (PC Net)**
90	**Dredge**
91	**Floating Dry dock**
93	**Warship**
94	**Submarine**
99	**Other Displacement Vessels**

Transits through the Panama Canal by Group 1 ships have declined in recent years largely because of the shift to larger cargo ships as well as out of cargo ships and into container ships. While transits declined an average 2.0% per year over the 2000-2003 period, these ships' cargo grew an average 6.1% per year, and the PCUMS units associated with the ships grew 4.5% annually. Toll increases over the period led to an even greater 8.2% annual increase in Group 1 revenues.

Tables ES-2 through ES-4 examine the FY2003 standing of the Group 1 ships.

Table ES-2
Group 1 Ships, Relative Importance

		2003			
Ship Code	*Ship Type*	*Cargo Tons*	*PCUMS*	*Transits*	*Tolls*
1	General Cargo	6,597,628	7,252,410	833	20,219,933
5	Dry/Liquid bulk carrier	1,068,536	804,660	29	2,203,275
6	Container/Break Bulk ship	12,805,706	11,271,638	576	31,622,587
10	Vehicle/Dry-Bulk carrier	32,357	194,211	6	526,219
Group 1	*Total*	*20,504,227*	19,522,919	1,444	54,572,015

Source: ACP

Table ES-3
Group 1 Ships, Percent of Total

		2003 Percent of Total			
Ship Code	*Ship Type*	*Cargo*	*PCUMS*	*Transits*	*Tolls*
1	General Cargo	32.2%	37.1%	57.7%	37.1%
5	Dry/Liquid bulk carrier	5.2%	4.1%	2.0%	4.0%
6	Container/Break Bulk ship	62.5%	57.7%	39.9%	57.9%
10	Vehicle/Dry-Bulk carrier	0.2%	1.0%	0.4%	1.0%

Source: ACP

Table ES-4
Group 1 Ships, Compound Annual Growth Rates 2000-2003

		CAGR 2000-2003 (%)			
Ship Code	*Ship Type*	*Cargo*	*PCUMS*	*Transits*	*Tolls*
1	General Cargo	-1.6	-2.8	-6.2	0.6
5	Dry/Liquid bulk carrier	-8.4	-12.3	-12.3	-9.0
6	Container/Break Bulk ship	16.7	16.3	8.9	20.1
10	Vehicle/Dry-Bulk carrier	-65.8	-38.0	-46.0	-36.8
Group 1	*Total*	6.1	4.5	-2.0	8.2

Source: ACP
CAGR = Compound Annual Growth Rate

Tables ES-5 through ES-7 display the forecasts of Group 1 ships in terms of cargo tons, transits, and tolls.

Table ES-5
Group 1 Ships, Cargo Tons

Ship Code	*Ship Type*	**2003**	**2010**	**2025**	**CAGR 2000-2003**	**CAGR 2003-2025**
1	***General Cargo***	6,597,628	5,790,813	3,756,765	-2.6	-2.5
5	***Dry/Liquid bulk carrier***	1,068,536	829,444	454,285	-8.4	-3.8
6	***Container/Break Bulk ship***	12,805,706	13,657,867	11,585,922	16.7	-0.5
10	***Vehicle/Dry-Bulk carrier***	132,357	111,281	69,570	-45.3	-2.9
Group 1	*Total*	***20,604,227***	***20,389,405***	***15,866,542***	***5.8***	***-1.2***

Source: History from ACP. Forecast based on study results

Table ES-6
Group 1 Ships. Transits Forecasts

Ship Code	Ship Type	2003	2010	2025	CAGR 2000-2003	CAGR 2003-2025
1	*General Cargo*	833	745	483	-5.6	-2.4
5	*Dry/Liquid bulk carrier*	29	23	12	-12.3	-3.8
6	*Container/Break Bulk ship*	576	590	501	8.9	-0.6
10	*Vehicle/Dry-Bulk carrier*	6	4	2	-46.0	-4.3
Group 1	*Total*	*1,444*	*1,361*	*999*	*-1.6*	*-1.7*

Source: History from ACP. Forecast based on study results

Table ES-7
Group 1 Ships, Tolls Forecast

Ship Code	Ship Type	2003	2010	2025	CAGR 2000-2003	CAGR 2003-2025
1	*General Cargo*	17,379,770	18,289,908	17,255,451	-4.3	0.0
5	*Dry/Liquid bulk carrier*	1,907,299	1,735,237	1,382,097	-12.5	-1.5
6	*Container/Break Bulk ship*	26,863,124	33,475,156	41,296,129	15.8	2.0
10	*Vehicle/Dry-Bulk carrier*	458,913	324,309	294,851	-38.3	-2.0
Group 1	*Total*	*46,609,106*	*53,824,610*	*60,228,528*	*3.6*	*1.2*

Source: History from ACP. Forecast based on study results

Transits by general cargo ships, the largest ship type in Group 1, are projected to decline through the 2025 forecast end-point, averaging –2.4% per year. Tolls revenue from this type of ship is expected to show no growth at all over the forecast period, even though the model assumes tolls that increase yearly in line with the forecast global inflation rate.

The toll elasticity for both groups is extremely small (less than 0.2) so that increases in tolls are not likely to result in shifts by ship operators/owners to bypass alternative routes. Therefore, increases in tolls should be tolerated by these vessels, based on the model results.

Table ES-8
Group 2 Ships, Relative Importance

	Unit	*PCUMS/ Displacement*	*Transits*	*Tolls*
Ship Type				
Barge carrier	PCUMS	0	0	0
Barge not self-propelled	PCUMS	403,405	71	1,096,773
Barge self-propelled	PCUMS	556	3	3,000
Fishing vessel	PCUMS	335,185	395	1,053,607
Factory ship	PCUMS	7,375	5	19,543
Tug	PCUMS	53,216	183	306,509
Research vessel	PCUMS	75,948	33	218,416
Cable Ship	PCUMS	134,156	15	343,970
Yacht	PCUMS	44,353	947	747,302
Rig Tender/Supply Ship	PCUMS	16,472	21	54,513
Tank Barge not self-propelled	PCUMS	164,328	42	437,904
Tank Barge self-propelled	PCUMS	1,245	1	2,764
Barge integrated	PCUMS	157,759	7	439,437
Tank barge integrated	PCUMS	437,183	22	1,223,678
Woodship	PCUMS	947,883	27	2,535,882
Other Vessel (PC Net)	PCUMS	385,376	157	1,101,470
Total PCUMS	***PCUMS***	***3,164,440***	***1,929***	***9,584,769***
Dredge	Displacement - tons	53,535	9	72,312
Floating Dry dock	Displacement - tons	0	0	0
Warship	Displacement - tons	298,328	133	514,746
Submarine	Displacement - tons	13,854	3	22,846
Other Vessel (Displacement)	Displacement - tons	10,638	5	15,057
Total Displacement	***Tons***	***376,355***	***150***	***624,961***
Total			***2,079***	***10,209,730***

Source: ACP

Of Group 2, yachts account for over 45% of the group's transits, but only for 3.4% of the group's tolls revenue, in view of the small PCUMS of typical wachts. This is shown in Table ES-9 below.

Table ES-9
Group 2 Ships, Percent of Group 2 Total

	PCUMS/ Displacement	*Transits*	*Tolls*
Ship Type			
Barge carrier	0.0%	0.0%	0.0%
Barge not self-propelled	12.7%	3.4%	0.0%
Barge self-propelled	0.0%	0.1%	10.7%
Fishing vessel	10.6%	19.0%	0.0%
Factory ship	0.2%	0.2%	10.3%
Tug	1.7%	8.8%	0.2%
Research vessel	2.4%	1.6%	3.0%
Cable Ship	4.2%	0.7%	2.1%
Yacht	1.4%	45.6%	3.4%
Rig Tender/Supply Ship	0.5%	1.0%	7.3%
Tank Barge not self-propelled	5.2%	2.0%	0.5%
Tank Barge self-propelled	0.0%	0.0%	4.3%
Barge integrated	5.0%	0.3%	0.0%
Tank barge integrated	13.8%	1.1%	4.3%
Woodship	30.0%	1.3%	12.0%
Other Vessel (PC Net)	12.2%	7.6%	24.8%
Total PCUMS	***100.0%***	***92.8%***	***93.9%***
Dredge	14.2%	0.4%	10.8%
Floating Dry dock	0.0%	0.0%	0.7%
Warship	79.3%	6.4%	0.0%
Submarine	3.7%	0.1%	5.0%
Other Vessel (Displacement)	2.8%	0.2%	0.2%
Total Displacement	***100.0%***	***7.2%***	***6.1%***
Total		***100.0%***	***100.0%***

Source: ACP

Table ES-10
Group 2 Ships, Compound Annual Growth 2000-2003

	PCUMS/ Displacement	*Transits*	*Tolls*
Ship Type			
Barge not self-propelled	9.8	6.6	13.6
Barge self-propelled	-14.6	-6.9	-5.0
Fishing vessel	-6.9	-4.1	-2.7
Factory ship	-17.6	-8.1	-13.9
Tug	-6.5	0.1	-1.6
Research vessel	11.9	-8.5	15.1
Cable Ship	-5.8	-11.1	-5.4
Yacht	5.8	4.6	8.9
Rig Tender/Supply Ship	10.1	15.0	17.8
Tank Barge not self-propelled	29.4	29.4	35.5
Tank Barge self-propelled	-22.4	-15.9	-23.4
Barge integrated	-10.2	-10.7	-6.6
Tank barge integrated	2.3	3.7	7.7
Woodship	-21.7	-16.3	-17.6
Other Vessel (PC Net)	-16.8	-3.9	-12.9
Total PCUMS	***-10.7***	***0.9***	***-5.6***
Dredge	-17.3	-6.9	-8.1
Warship	-7.0	-2.8	-1.2
Submarine	-11.9	0.0	-5.1
Other Vessel (Displacement)	-12.0	-11.1	-3.7
Total Displacement	***-9.1***	***-4.5***	***-2.3***
Total		***0.4***	***-5.4***

Source: ACP

Growing at 3.0% over the forecast period, the Group 2 transits will reach nearly 4,000 in the final year 2025, and yachts are forecast to represent 52% of the total Group 2 transits. This is shown in Table ES-12 below, for each of the vessel types.

The transits and revenues from military ships have been declining, and the forecast calls for a slower decline. The U.S. Navy's Atlantic and Pacific fleets have always operated under the assumption that the post-Panamax aircraft carriers can be maneuvered into position without having the benefit of an expanded Canal. The two fleets typically operate within their own theaters. If there is a call for one of the large carriers to be deployed to the other hemisphere, it uses a by-pass route due to its size. Forecasting the events (e.g. wars, regional conflicts) that might cause such ships to be redeployed and require a Canal transit is not the focus of this study.

Table ES-11
Group 2 Ships. PCUMS & Displacement Forecast

Ship Code	Ship Type	History 2003	2010	2025	CAGR 2000-2003	CAGR 2003-2025
27	Woodship	947,883	901,319	784,837	-21.7	-0.9
26	Tank barge integrated	437,183	547,451	860,901	2.3	3.1
14	Barge not self-propelled	403,405	540,223	981,218	9.8	4.1
50	Other Vessel (PC Net)	385,376	387,937	381,778	-16.8	0.0
16	Fishing vessel	335,185	400,320	627,434	-6.9	2.9
23	Tank Barge not self-propelled	164,328	257,803	657,769	29.4	6.5
25	Barge integrated	157,759	171,435	198,839	-10.2	1.1
20	Cable Ship	134,156	162,163	260,764	-5.8	3.1
19	Research vessel	75,948	103,675	196,222	11.9	4.4
18	Tug	53,216	61,545	81,595	-6.5	2.0
21	Yacht	44,353	57,328	96,499	5.8	3.6
22	Rig Tender/Supply Ship	16,472	23,279	52,249	10.1	5.4
17	Factory ship	7,375	7,351	7,083	-17.6	-0.2
24	Tank Barge self-propelled	1,245	1,174	1,003	-22.4	-1.0
15	Barge self-propelled	556	574	597	-14.6	0.3
13	Barge carrier	0	7,995	5,322	-100.0	NA
	Total PCUMS	***3,164,440***	***3,631,574***	***5,194,108***	***-10.7***	***2.3***
93	Warship	298,328	300,928	301,985	-7.0	0.1
90	Dredge	53,535	53,574	52,060	-17.3	-0.1
94	Submarine	13,854	13,196	11,711	-11.9	-0.8
99	Other Vessel (Displacement)	10,638	11,324	12,566	-12.0	0.8
91	Floating Dry dock	0	0	0	NA	NA
	Total Displacement	***376,355***	***379,022***	***378,322***	***-9.1***	***0.0***

Source: History from ACP. Forecast based on study results

Table ES-12
Group 2 Ships, Transits Forecast

Ship Code	Ship Type	History 2003	2010	2025	CAGR 2000-2003	CAGR 2003-2025
21	Yacht	947	1,224	2,060	6.1	3.6
16	Fishing vessel	395	472	739	-5.4	2.9
18	Tug	183	212	281	0.2	2.0
50	Other Vessel (PC Net)	157	158	156	-5.2	0.0
93	Warship	133	134	135	-3.7	0.1
14	Barge not self-propelled	71	95	173	8.9	4.1
23	Tank Barge not self-propelled	42	64	164	40.9	6.4
19	Research vessel	33	45	85	-11.1	4.4
27	Woodship	27	26	22	-21.1	-0.9
26	Tank barge integrated	22	28	43	5.0	3.1
22	Rig Tender/Supply Ship	21	30	67	20.5	5.4
20	Cable Ship	15	18	29	-14.5	3.1
90	Dredge	9	9	9	-9.1	-0.1
25	Barge integrated	7	8	9	-14.0	1.1
17	Factory ship	5	5	5	-10.6	-0.2
99	Other Vessel (Displacement)	5	5	6	-14.5	0.8
15	Barge self-propelled	3	3	3	-9.1	0.3
94	Submarine	3	3	3	0.0	-0.8
24	Tank Barge self-propelled	1	1	1	-20.6	-1.0
13	Barge carrier	0	2	1	-100.0	NA
91	Floating Dry dock	0	0	0	NA	NA
	Total Transits	***2,079***	***2,540***	***3,990***	***0.5***	***3.0***

Source: History from ACP. Forecast based on study results

Table ES-13
Group 2 Ships, Tolls Forecast

		History				
Ship Code	*Ship Type*	*2003*	*2010*	*2025*	*CAGR 2000-2003*	*CAGR 2003-2025*
13	**Barge carrier**	0	27,202	26,653	-100.0	NA
14	**Barge not self-propelled**	1,096,773	1,799,444	4,811,182	13.6	7.0
15	**Barge self-propelled**	3,000	3,820	5,849	-5.0	3.1
16	**Fishing vessel**	1,053,607	1,542,859	3,559,764	-2.7	5.7
17	**Factory ship**	19,543	23,866	33,848	-13.9	2.5
18	**Tug**	306,509	437,005	853,061	-1.6	4.8
19	**Research vessel**	218,416	365,359	1,017,924	15.1	7.2
20	**Cable Ship**	343,970	509,393	1,205,783	-5.4	5.9
21	**Yacht**	747,302	1,190,782	2,951,299	8.9	6.4
22	**Rig Tender/Supply Ship**	54,513	94,976	313,866	17.8	8.3
23	**Tank Barge not self-propelled**	437,904	838,794	3,150,370	35.5	9.4
24	**Tank Barge self-propelled**	2,764	3,192	4,018	-23.4	1.7
25	**Barge integrated**	439,437	585,052	998,885	-6.6	3.8
26	**Tank barge integrated**	1,223,678	1,877,329	4,345,794	7.7	5.9
27	**Woodship**	2,535,882	2,954,229	3,786,746	-17.6	1.8
50	**Other Vessel (PC Net)**	1,101,470	1,355,613	1,964,314	-12.9	2.7
90	**Dredge**	72,312	87,030	124,402	-8.1	2.5
91	**Floating Dry dock**	0	0	0	NA	NA
93	**Warship**	514,746	624,462	921,796	-1.2	2.7
94	**Submarine**	22,846	26,172	34,165	-5.1	1.8
99	**Other Vessel (Displacement)**	15,057	19,276	31,463	-3.7	3.4
	Total Tolls	***10,209,730***	***14,365,858***	***30,141,181***	***-5.4***	***5.0***

Source: History from ACP. Forecast based on study results

Conclusion

None of the Group 1 and 2 vessels currently strain the physical limits of the Canal, and the forecast of these ships is not expected to place any requirement to expand the current Canal beyond its current dimensions. Of course, the ACP should include the forecast transits in its own capacity planning, taking into account the physical dimensions of these ships.

In view of the low elasticity of demand for both groups of vessels, the ACP should be able to raise toll levels for these ships quite substantially with little or no effect on the number of transits.

I. Introduction

Global Insight (USA), Inc. was hired by the Autoridad del Canal de Panama to carry out a study of the future of the conventional (non-containerized) reefer ship market segment. The contract, SAA-154968, was initiated in Panama with an effective date of July 1, 2003, and a supplemental task, to analyze the reefer container shipping mode for perishable commodities, was added to the project in November, 2003.

Global Insight assembled a team of modeling specialists to develop a simulation model of the conventional reefer segment. Additionally, other specialists were brought into the working team as needed, including consultants who had worked with the Panama Canal on previous studies.

The working team from Global Insight consisted of the following individuals:

Name	Title	Position in Project
Robert West	Managing Director	Project Director
Joyce Brinner	Senior Principal	Project Manager, model development
Dan Westenberger	Consultant	Technical Advisor, user interfaces
Frederic Avierinos	Managing Director	European Advisor
Elizabeth Gomez	Associate	Trade Data & Forecast Manager
Ben Hackett	Executive Managing Director	Industry Overview, Ship Characteristics
Junya Tanizaki	Consultant	Database Development
Maria Kulikova	Consultant	Database Development
Eddie Tapiero	Consultant	Advisor, West Coast South America

Annika Sandstrom represented LauritzenCool, from the company headquarters in Sweden.

The focus of this study is the conventional reefer ships that transit the Canal, and the trends for this segment over the next 25 years under expanded and unexpanded scenarios.

This Volume II contains forecasts of vessel transits and revenues, broken down by specific ACP-specified categories, for general cargo and other minor vessel types.

II. Overview of the Other Vessel Types

The "Other" ships analyzed in this report were divided into two groups for modelling and forecasting purposes. Group 1 includes the cargo ships and Group 2 includes the remaining minor vessels. The specific ship types in each of the two groups are identified in Table II.1 along with their ship codes and pricing terms.

Table II.1
Other Ship Types

Ship Code	*Ship Type*	*Pricing Unit*
	Group 1	
1	**General Cargo**	PCUMS
5	**Dry/Liquid bulk carrier**	PCUMS
6	**Container/Break Bulk ship**	PCUMS
10	**Vehicle/Dry-Bulk carrier**	PCUMS
	Group 2	
13	**Barge carrier**	Length/PCUMS
14	**Barge not self-propelled**	Length/PCUMS
15	**Barge self-propelled**	Length
16	**Fishing vessel**	Length/PCUMS
17	**Factory ship**	Length/PCUMS
18	**Tug**	Length/PCUMS
19	**Research vessel**	Length/PCUMS
20	**Cable Ship**	Length/PCUMS
21	**Yacht**	Length/PCUMS
22	**Rig Tender/Supply Ship**	PCUMS
23	**Tank Barge not self-propelled**	Length/PCUMS
24	**Tank Barge self-propelled**	Length/PCUMS
25	**Barge integrated**	Length/PCUMS
26	**Tank barge integrated**	Length/PCUMS
27	**Woodship**	Length/PCUMS
50	**Other Vessel (PC Net)**	PCUMS
90	**Dredge**	Displacement
91	**Floating Dry dock**	Displacement
93	**Warship**	Displacement
94	**Submarine**	Displacement
99	**Other Vessel (Displacement)**	Displacement

Group 1 Ships

Container/break bulk ships and general cargo ships accounted for over 90% of Group 1 cargo tons, PCUMS, transits and tolls in 2003. Container/break bulk ships is clearly the largest ship segment with nearly twice the cargo tons and 50% more PCUMS and tolls than general cargo ships (Tables 2 and 3). It is also the only ship type in Group 1 that posted any significant growth in any of the categories over the 2000-2003 period. Total Group 1 transits through the Panama Canal by Group 1 ships declined in recent years (in spite of nearly a 9% increase in container/break bulk transits) largely because of the shift to larger cargo ships as well as out of cargo ships and into container ships. While transits declined an average 2.0% per year over the 2000-2003 period, the cargo in

these ships grew an average 6.1% annually, and the PCUMS units associated with the ships grew 4.5% annually. Toll increases over the period led to an even greater 8.2% annual increase in Group 1 revenues. In total, Group 1 ships contributed $54.6 million in revenues to the Canal in 2003.

Table II.2
Group 1 Ships Cargo (tons)

Ship Code	Ship Type	2000	2001	2002	2003	CAGR 2000-2003 (%)
				Metric Tons		
1	General Cargo	6,921,224	7,423,620	7,130,374	6,597,628	-1.6
5	Dry/Liquid bulk carrier	1,388,781	1,599,143	2,190,512	1,068,536	-8.4
6	Container/Break Bulk ship	8,066,455	7,776,631	8,024,265	12,805,706	16.7
10	Vehicle/Dry-Bulk carrier	810,148	807,386	134,416	32,357	-65.8
Group 1	Total	17,186,608	17,606,780	17,479,567	20,504,227	6.1
				Percent of Total		
1	General Cargo	40.3%	42.2%	40.8%	32.2%	
5	Dry/Liquid bulk carrier	8.1%	9.1%	12.5%	5.2%	
6	Container/Break Bulk ship	46.9%	44.2%	45.9%	62.5%	
10	Vehicle/Dry-Bulk carrier	4.7%	4.6%	0.8%	0.2%	

Table II.3
Group 1 Ships PCUMS

Ship Code	Ship Type	2000	2001	2002	2003	CAGR 2000-2003 (%)
1	General Cargo	7,902,694	8,548,752	8,324,869	7,252,410	-2.8
5	Dry/Liquid bulk carrier	1,193,098	1,205,989	2,260,368	804,660	-12.3
6	Container/Break Bulk ship	7,173,314	6,946,005	7,816,535	11,271,638	16.3
10	Vehicle/Dry-Bulk carrier	815,712	806,331	184,722	194,211	-38.0
Group 1	Total	17,084,818	17,507,077	18,586,494	19,522,919	4.5
				Percent of Total		
1	General Cargo	46.3%	48.8%	44.8%	37.1%	
5	Dry/Liquid bulk carrier	7.0%	6.9%	12.2%	4.1%	
6	Container/Break Bulk ship	42.0%	39.7%	42.1%	57.7%	
10	Vehicle/Dry-Bulk carrier	4.8%	4.6%	1.0%	1.0%	

Table II.4
Group 1 Ships Transits

Ship Code	Ship Type	2000	2001	2002	2003	CAGR 2000-2003 (%)
1	General Cargo	1,008	1,119	989	833	-6.2
5	Dry/Liquid bulk carrier	43	44	72	29	-12.3
6	Container/Break Bulk ship	446	407	433	576	8.9
10	Vehicle/Dry-Bulk carrier	38	34	8	6	-46.0
Group 1	Total	1,535	1,604	1,502	1,444	-2.0
				Percent of Total		
1	General Cargo	65.7%	69.8%	65.8%	57.7%	
5	Dry/Liquid bulk carrier	2.8%	2.7%	4.8%	2.0%	
6	Container/Break Bulk ship	29.1%	25.4%	28.8%	39.9%	
10	Vehicle/Dry-Bulk carrier	2.5%	2.1%	0.5%	0.4%	

Source: ACP

Table II.5
Group 1 Ships Tolls (U.S. dollars)

Ship Code	Ship Type	2000	2001	2002	2003	CAGR 2000-2003 (%)
1	General Cargo	19,852,442	21,641,184	21,102,431	20,219,933	0.6
5	Dry/Liquid bulk carrier	2,920,082	3,014,689	5,372,175	2,203,275	-9.0
6	Container/Break Bulk ship	18,246,921	17,772,855	19,947,518	31,622,587	20.1
10	Vehicle/Dry-Bulk carrier	2,084,135	2,041,677	474,736	526,219	-36.8
Group 1	Total	43,103,579	44,470,406	46,896,859	54,572,015	8.2
				Percent of Total		
1	General Cargo	46.1%	48.7%	45.0%	37.1%	
5	Dry/Liquid bulk carrier	6.8%	6.8%	11.5%	4.0%	
6	Container/Break Bulk ship	42.3%	40.0%	42.5%	57.9%	
10	Vehicle/Dry-Bulk carrier	4.8%	4.6%	1.0%	1.0%	

Source: ACP

The Group 1 ship cargo tons, PCUMS, transits and tolls are projected based upon Global Insight's outlook for their associated cargos. The modeling methodology for the Group 1 ships is similar to that for the reefer ships, incorporating the cargo projections, and the feasibility and cost competitiveness of the Panama Canal route.

Group 2 Ships

The second group of small vessel types includes a variety of ship types from yachts to warships. Within this group, most ships do not carry commercial cargo; however, woodships and integrated tank barges carried about 1.4 million tons of cargo in 2003.

Ships in Group 2 are priced on the basis of PCUMS, length (meters), or displacement (tons). In the table below, the pricing unit is shown with the annual total of the unit for all transits from 2000 through 2003. Canal transits by the first 16 ship types, or those priced according to PCUMS or length (ships with PCUMS less than 583), had PCUMS units totaling 3.1 million in 2003, down 4.1 million in 2000 (-10.7%). Transits by the five

remaining ship types, or those priced according to their displacement tons, had displacement tons of 376,000 tons in 2003, down from 501,000 tons in 2000 (-9.1%). All displacement vessels posted a decline, while PCUMS vessels were mixed.

Table II.6
Group 2 Canal Pricing Units

Ship Code	*Ship Type*	*Pricing Unit*	*2000*	*2001*	*2002*	*2003*	*CAGR 2000-2003*
13	**Barge carrier**	Length/PCUMS	34,072	35,380	4,923	0	
14	**Barge not self-propelled**	Length/PCUMS	304,995	355,864	288,894	403,405	9.77
15	**Barge self-propelled**	Length/PCUMS	892	0	0	556	-14.59
16	**Fishing vessel**	Length/PCUMS	415,215	405,065	348,309	335,185	-6.89
17	**Factory ship**	Length/PCUMS	13,204	12,762	10,052	7,375	-17.65
18	**Tug**	Length/PCUMS	65,176	40,945	71,298	53,216	-6.53
19	**Research vessel**	Length/PCUMS	54,182	68,428	63,580	75,948	11.91
20	**Cable Ship**	Length/PCUMS	160,651	76,411	99,836	134,156	-5.83
21	**Yacht**	Length/PCUMS	37,428	21,869	33,786	44,353	5.82
22	**Rig Tender/Supply Ship**	PCUMS	12,349	10,647	16,050	16,472	10.08
23	**Tank Barge not self-propelled**	Length/PCUMS	75,893	51,520	154,534	164,328	29.37
24	**Tank Barge self-propelled**	Length/PCUMS	2,664	10,656	0	1,245	-22.40
25	**Barge integrated**	Length/PCUMS	217,842	45,074	53,017	157,759	-10.20
26	**Tank barge integrated**	Length/PCUMS	408,259	238,260	411,540	437,183	2.31
27	**Woodship**	Length/PCUMS	1,972,220	4,299,011	1,579,154	947,883	-21.67
50	**Other Vessel (PC Net)**	PCUMS	669,113	544,138	388,986	385,376	-16.80
	Total PCUMS	***PCUMS***	***4,444,155***	***6,216,030***	***3,523,959***	***3,164,440***	***-10.70***
90	**Dredge**	Displacment - tons	94,666	73,931	0	53,535	-17.30
91	**Floating Dry dock**	Displacment - tons	0	0	0	0	
93	**Warship**	Displacment - tons	370,802	398,319	302,158	298,328	-6.99
94	**Submarine**	Displacment - tons	20,254	0	6,927	13,854	-11.89
99	**Other Vessel (Displacement)**	Displacment - tons	15,602	10,487	0	10,638	-11.98
	Total Displacement	***Tons***	***501,324***	***482,737***	***309,085***	***376,355***	***-9.11***

Source: ACP

Transits by Group 2 vessels totaled to 2,079 in FY2003. Several of the vessel types have little or not transits. Warships, including submarines amounted to just 133 transits in FY2003, while yachts, most of which are comparatively small vessels, generated 947 transits. The growth in transits by Group 2 vessels in recent years has been very slow, averaging only 0.35% over the 2000-2003 period.

Table II.7
Group 2 Canal Transits

Ship Code	Ship Type	2000	2001	2002	2003	CAGR 2000-2003
13	Barge carrier	2	4	5	0	
14	Barge not self-propelled	55	49	50	71	6.59
15	Barge self-propelled	4	0	0	3	-6.94
16	Fishing vessel	467	485	428	395	-4.10
17	Factory ship	7	4	6	5	-8.07
18	Tug	182	150	175	183	0.14
19	Research vessel	47	44	35	33	-8.46
20	Cable Ship	24	13	12	15	-11.09
21	Yacht	792	811	879	947	4.57
22	Rig Tender/Supply Ship	12	12	22	21	15.02
23	Tank Barge not self-propelled	15	17	32	42	29.36
24	Tank Barge self-propelled	2	8	0	1	-15.91
25	Barge integrated	11	2	3	7	-10.68
26	Tank barge integrated	19	11	19	22	3.73
27	Woodship	55	119	46	27	-16.30
50	Other Vessel (PC Net)	184	154	142	157	-3.89
90	Dredge	12	8	12	9	-6.94
91	Floating Dry dock	0	1	0	0	NA
93	Warship	149	89	111	133	-2.80
94	Submarine	3	0	1	3	0.00
99	Other Vessel (Displacement)	8	0	0	5	-11.09
Group 2	*Total*	2,050	1,981	1,978	2,079	0.35
			Percent of Total			
13	Barge carrier	0.1%	0.2%	0.3%	0.0%	
14	Barge not self-propelled	2.7%	2.5%	2.5%	3.4%	
15	Barge self-propelled	0.2%	0.0%	0.0%	0.1%	
16	Fishing vessel	22.8%	24.5%	21.6%	19.0%	
17	Factory ship	0.3%	0.2%	0.3%	0.2%	
18	Tug	8.9%	7.6%	8.8%	8.8%	
19	Research vessel	2.3%	2.2%	1.8%	1.6%	
20	Cable Ship	1.2%	0.7%	0.6%	0.7%	
21	Yacht	38.6%	40.9%	44.4%	45.6%	
22	Rig Tender/Supply Ship	0.6%	0.6%	1.1%	1.0%	
23	Tank Barge not self-propelled	0.7%	0.9%	1.6%	2.0%	
24	Tank Barge self-propelled	0.1%	0.4%	0.0%	0.0%	
25	Barge integrated	0.5%	0.1%	0.2%	0.3%	
26	Tank barge integrated	0.9%	0.6%	1.0%	1.1%	
27	Woodship	2.7%	6.0%	2.3%	1.3%	
50	Other Vessel (PC Net)	9.0%	7.8%	7.2%	7.6%	
90	Dredge	0.6%	0.4%	0.6%	0.4%	
91	Floating Dry dock	0.0%	0.1%	0.0%	0.0%	
93	Warship	7.3%	4.5%	5.6%	6.4%	
94	Submarine	0.1%	0.0%	0.1%	0.1%	
99	Other Vessel (Displacement)	0.4%	0.0%	0.0%	0.2%	

Source: ACP

The tolls generated by Group 2 ships amounted to $10.2 million in FY2003. Tolls from Group 2 vessels were down from $12.1 million in 2000 and $16.2 million in 2002. This revenue decline represents an average annual decline of 5.4% over the 2000-2003 period. While yachts constitute the largest share of this group in terms of transits, they account for only 3.3% of the group's total tolls revenue last year. Other Vessels (PC Net) contributed 25% of the total tolls, with woodships in second place with 12% of the total revenues. Revenues from self-propelled barges, factory ships, and dredges were also significant sources of toll revenues, with each vessel type contributing 10-11% of 2003 tolls generated by Group 2 vessels. In total, these 5 vessel types accounted for two-thirds of Group 2 vessel tolls.

Table II.8
Group 2 Canal Tolls

Ship Code	Ship Type	2000	2001	2002	2003	CAGR 2000-2003
13	Barge carrier	87,565	90,927	15,652	0	
14	Barge not self-propelled	749,004	871,529	732,457	1,096,773	13.56
15	Barge self-propelled	3,500	0	0	3,000	-5.01
16	Fishing vessel	1,143,292	1,165,902	1,006,050	1,053,607	-2.69
17	Factory ship	30,593	29,499	22,548	19,543	-13.88
18	Tug	321,336	246,599	343,252	306,509	-1.56
19	Research vessel	143,142	174,898	163,489	218,416	15.13
20	Cable Ship	406,554	194,757	243,592	343,970	-5.42
21	Yacht	577,962	603,539	674,840	747,302	8.94
22	Rig Tender/Supply Ship	33,321	34,145	46,336	54,513	17.83
23	Tank Barge not self-propelled	176,191	122,545	381,831	437,904	35.46
24	Tank Barge self-propelled	6,141	24,562	0	2,764	-23.36
25	Barge integrated	539,832	115,840	136,254	439,437	-6.63
26	Tank barge integrated	980,347	577,889	1,034,698	1,223,678	7.67
27	Woodship	4,527,518	10,074,398	3,764,027	2,535,882	-17.57
50	Other Vessel (PC Net)	1,667,113	1,401,926	1,009,168	1,101,470	-12.90
90	Dredge	93,123	68,781	73,350	72,312	-8.09
91	Floating Dry dock	0	16,638	0	0	#DIV/0!
93	Warship	534,089	396,982	445,975	514,746	-1.22
94	Submarine	26,770	0	6,956	22,846	-5.15
99	Other Vessel (Displacement)	16,839	0	0	15,057	-3.66
Group 2	*Total*	12,064,231	16,211,355	10,100,476	10,209,730	-5.41
			Percent of Total			
13	Barge carrier	0.0%	0.0%	0.0%	0.0%	
14	Barge not self-propelled	0.7%	0.6%	0.2%	0.0%	
15	Barge self-propelled	6.2%	5.4%	7.3%	10.7%	
16	Fishing vessel	0.0%	0.0%	0.0%	0.0%	
17	Factory ship	9.5%	7.2%	10.0%	10.3%	
18	Tug	0.3%	0.2%	0.2%	0.2%	
19	Research vessel	2.7%	1.5%	3.4%	3.0%	
20	Cable Ship	1.2%	1.1%	1.6%	2.1%	
21	Yacht	3.4%	1.2%	2.4%	3.4%	
22	Rig Tender/Supply Ship	4.8%	3.7%	6.7%	7.3%	
23	Tank Barge not self-propelled	0.3%	0.2%	0.5%	0.5%	
24	Tank Barge self-propelled	1.5%	0.8%	3.8%	4.3%	
25	Barge integrated	0.1%	0.2%	0.0%	0.0%	
26	Tank barge integrated	4.5%	0.7%	1.3%	4.3%	
27	Woodship	8.1%	3.6%	10.2%	12.0%	
50	Other Vessel (PC Net)	37.5%	62.1%	37.3%	24.8%	
90	Dredge	13.8%	8.6%	10.0%	10.8%	
91	Floating Dry dock	0.8%	0.4%	0.7%	0.7%	
93	Warship	0.0%	0.1%	0.0%	0.0%	
94	Submarine	4.4%	2.4%	4.4%	5.0%	
99	Other Vessel (Displacement)	0.2%	0.0%	0.1%	0.2%	

Source: ACP

III. The Current, Other Vessel Fleet – Group 1

General Cargo Ships

General cargo ships currently number 3,390 in the world (Clarkson Research Studies, as of November 2003), with an average DWT of 9,687. There is some container-carrying capacity on these vessels, and the average TEUs per ship is 375.

General cargo vessels are normally grouped into three sectors:

Multi-purpose ships
General Cargo Tramp (in tramp service)
General Cargo Liner (in advertised, liner schedules)

The 3,390 general cargo ships in operation span all three sectors.

Below is a discussion of the trends in each of the above three sectors.

The **multi-purpose** fleet (highly container friendly though, on liner trades, very often carrying containers on one directional leg only), continues to grow, though not at anything like the breakneck pace of the container fleet (see volume I). The fleet is predominantly committed by Contracts of Afreightment (CoAs) to trades that are not liner operations, and for which we have no data (i.e. it is thus hard to estimate Canal transits), but there is a solid core committed to liner trades, predominantly for the carriage of forest products. There has been a switch of sourcing away from North America and Northern Europe to Brazil, which should beef up demand for such ships given the longer distance from Brazil to major consumer zones. There has also been a trend to up-size the container capacity of these ships; Hoegh started it with their 1,800TEU multi-purpose fleet, which has now been acquired by CNCo who will continue to operate them round the world. MACS also operate big, powerful 1,900 TEU multi-purpose ships between Europe and South Africa, not a Canal route.

Over two-thirds of the existing fleet of multi-purpose general cargo vessels are less than 10,000 DWT in size. Of those that have container-carrying capacity, the largest are 4 ships that can carry 1,800 TEUs.

The **general cargo tramp** fleet is also growing. Ships here tend to be less container friendly and are often small, for what are generally brown water trades. Some may operate in liner services for very small, often third world government shipping companies but the majority are in deployed in CoA operations. Over half of the 597 general cargo tramp vessels are in the 5,000-10,000 DWT range.

The third sector is composed of the aging fleet of moderately high-speed **general cargo liners** built by carriers hoping, in the 1970s, to resist the inexorable march of containerization. These ships generally have a better container capability than the general cargo tramps. Much traded on the second-hand market, ships like these are reaching their sell-by date in some numbers and being scrapped. Almost *no new ships of this type are being built any longer*. One was built for a Turkish line in 2002, but it was the first since the early 1990s.

The majority of the general cargo liners, of which there are currently 433 in operation, are in the 10,000-20,000 DWT range.

Table III.1
General Cargo Fleet, February 2004

Multi-purpose						
	No. ships	**size range (dwt)**		**ave TEU**		**ave YOB**
	837	<5000		208		1990
	826	>4999,<10000		365		1988
	219	>9999,<15000		534		1985
	261	>14999,<20000		633		1985
	166	>19999,<25000		884		1987
	26	\>24999,<30000		1112		1988
	21	>29999,<40000		1806		2000
	4	>3999		1800		1984
	2360	**TOTAL**		**415**		1988
General Cargo tramps						
	58	<5000		99		1984
	390	>4999,<10000		102		1989
	60	>999,<15000		141		1981
	89	>14999		212		1978
	597	**TOTAL**		**145**		1986
General Cargo Liners						
	96	<10000		149		1978
	143	>9999,<15000		190		1975
	165	>14999,<20000		229		1977
	29	>19999,<25000		401		1976
	433	**TOTAL**		**222**		1976

Source: Clarkson Research Studies

The orderbook contains 139 MPPs, predominantly below 1000TEU and 60 general cargo tramps, of which 52 are less than 10,000DWT.

Dry/Liquid Bulk Ships (combo's)

The 116-ship combo fleet is in terminal decline. Of all the ship types monitored by Clarkson Research, this is the only one that has a zero orderbook today. In fact, at the moment the dry cargo market is so hungry for tonnage that the world's combos are all working exclusively bulk trades. The biggest ship, 310,700 DWT, was built in 1987. Two 121,000 DWT ships were built last year (2003), 4 ships of around 110,000 DWT were built in 1999, and 3 similar in 1997. Those ships were all that were built in the last 7 years.

The structure of the current fleet is shown below:

Table III.2
Combo Fleet, February 2004

DWT		No ships	ave dwt	ave YOB
>199999		6	291514	1985
>119999, <200000		20	151149	1988
>79999,<120,000		34	97765	1991
>59000,<80000		36	74501	1984
>9999,<60000		20	45131	1984
TOTAL		**116**	**100696**	**1987**

Container/Breakbulk Ships (Conbulkers)

This 385-ship sector usually falls between two markets, the containerized cargo market and the bulk shipping market. When the container market is strong, and the bulk market weak, some container charters may turn to these vessels for additional capacity. When the reverse holds true and the bulk market is strong, the ships may do well on the bulk side. When both are weak the conbulker is generally not utilized though there are specialist trades in which such ships are successful. The biggest problem with these ships is that they are generally too slow, and too heavy for container trades, all other things being equal. At the moment, with an extraordinarily healthy bulk market – and in spite of the strength of demand in container trades – these ships are trading as bulkers because bulk rates are so strong.

The average speed of the conbulker fleet is 13.96 knots, and this contrasts sharply with the container fleet at a size around the average conbulker TEU capacity of 18.1 knots[1]. The conbulker fleet's configuration appears in the table below:

Table III.3
Container/Breakbulk Ships, February 2004

DWT		No ships	ave dwt	ave TEU	ave YOB
<20000		63	16695	478	1982
>19999,<30000		97	25528	874	1985
>29999,<40000		83	35348	1178	1984
>39999,<50000		133	43965	1494	1988
>49999,<60000		9	52037	1839	1994
TOTAL		**385**	**33189**	**1112**	**1985**

The smallest conbulker container capability is 260TEU (11,860 DWT) and 53 of these ships have TEU capacity of less than 500TEU, which suggests that such ships at least (14% of the fleet) are unlikely to be taken seriously nowadays as alternative containerships. The biggest container capacity is 2,247 TEU, and a total of 92 of the ships can carry over 1,500 TEU. There have been several ships built recently (7 in 2003, including a 40000DWT ship for Westwood and 2 ships for Star (all likely to be

[1] Clarkson Research Studies, London

oriented towards forest products), 7 in 2002, 2 in 2001 and 1 in 2000) and the orderbook contains 2 ships of less than 25,000 DWT, and 10 of over 25,000 DWT. The most notable operators of these ships are probably Star Bulk, Gear bulk and Egon Oldendorff.

Vehicle/Drybulk Ships

This ship type refers to the carriage of vehicles on portable car decks in dry bulkers, a practice that used to be popular in the ‘70s and early ‘80s when grain cargoes between the U.S. Gulf and Japan, for example, would be complemented by cars on the return leg. In essence, this sort of operation no longer exists – today cars are often moved in conventional reefer ships on return legs, but not, generally speaking, in bulkers, though there may be occasional instances of this.

IV. Panama Canal Transit and Revenue Models for Other Vessel Types

Global Insight developed two models for projecting transits and revenues for "other" vessel types. The first model analyses transits for the Group 1 vessels: general cargo ships, dry/liquid-bulk carriers, container breakbulk ships, and vehicle/dry-bulk ships. This model uses a more detailed approach based upon global trade flows and the cost competitiveness of the Panama Canal route. The model determines cargo, PCUMS, transits, and tolls within beam, PCUMS, deadweight ton, draft, length, and cubic capacity segments.

The second model analyses transits for the Group 2 ships (all remaining other vessels types). A simplified approach based upon economic and transit trends is used to project total PCUMS, lengths, or displacements going through the Canal. The model projects PCUMS, transits, and tolls for Group 2A ships, PCUMS, lengths, transits and tolls for Group 2B ships, and displacements, transits and tolls for Group 2C ships. Each of these concepts is allocated across beam, PCUMS, deadweight ton, draft, length, and cubic capacity segments. Segment detail is identified in Table IV.1. Group 1 and Group 2 vessels are identified in Table IV.2.

Table IV.1
Group 1 and Group 2 Ships, Characteristic Segments

Beam - Meters					***Cubic Capacity - Cubic Feet***					***Dead Weight Tons - Tons***				
Beam_1			<	24.3	CuCap_1			<	100,000	Dwt_1			<	10,000
Beam_2	>=	24.3	<	25.9	CuCap_2	>=	100,000	<	200,000	Dwt_2	>=	10,000	<	15,000
Beam_3	>=	25.9	<	27.7	CuCap_3	>=	200,000	<	300,000	Dwt_3	>=	15,000	<	20,000
Beam_4	>=	27.7	<	29.0	CuCap_4	>=	300,000	<	400,000	Dwt_4	>=	20,000	<	25,000
Beam_5	>=	29.0	<	30.4	CuCap_5	>=	400,000	<	450,000	Dwt_5	>=	25,000	<	30,000
Beam_6	>=	30.4	<	32.3	CuCap_6	>=	450,000	<	550,000	Dwt_6	>=	30,000	<	40,000
Beam_7	>=	32.3	<	33.5	CuCap_7	>=	550,000			Dwt_7	>=	40,000	<	50,000
Beam_8	>=	33.5	<	36.6						Dwt_8	>=	50,000	<	60,000
Beam_9	>=	36.6	<	39.6						Dwt_9	>=	60,000	<	70,000
Beam_10	>=	39.6	<	42.7						Dwt_10	>=	70,000	<	80,000
Beam_11	>=	42.7	<	45.7						Dwt_11	>=	80,000	<	90,000
Beam_12	>=	45.7	<	48.8						Dwt_12	>=	90,000	<	100,000
Beam_13	>=	48.8	<	51.8						Dwt_13	>=	100,000	<	110,000
Beam_14	>=	51.8	<	54.9						Dwt_14	>=	110,000	<	120,000
Beam_15	>=	54.9								Dwt_15	>=	120,000	<	150,000
										Dwt_16	>=	150,000	<	200,000
										Dwt_17	>=	200,000		
Draft - Meters					***Length - Meters***					***PCUMS***				
Draft_1			<	10.0	Length_1*				15.24	PcUms_1			<	10,000
Draft_2	>=	10.0	<	10.5	Length_2*	>=	15.24	<	24.38	PcUms_2	>=	10,000	<	15,000
Draft_3	>=	10.5	<	11.0	Length_3*	>=	24.38	<	30.48	PcUms_3	>=	15,000	<	20,000
Draft_4	>=	11.0	<	11.5	Length_4	>=	30.48	<	200.00	PcUms_4	>=	20,000	<	25,000
Draft_5	>=	11.5	<	12.0	Length_5	>=	200.00	<	230.90	PcUms_5	>=	25,000	<	30,000
Draft_6	>=	12.0	<	12.5	Length_6	>=	230.90	<	286.60	PcUms_6	>=	30,000	<	40,000
Draft_7	>=	12.5	<	13.0	Length_7	>=	286.60	<	294.10	PcUms_7	>=	40,000	<	50,000
Draft_8	>=	13.0	<	13.5	Length_8	>=	294.10	<	330.90	PcUms_8	>=	50,000	<	60,000
Draft_9	>=	13.5	<	14.0	Length_9	>=	330.90	<	360.90	PcUms_9	>=	60,000	<	70,000
Draft_10	>=	14.0	<	14.5	Length_10	>=	360.90	<	385.60	PcUms_10	>=	70,000	<	80,000
Draft_11	>=	14.5	<	15.2	Length_11	>=	385.60	<	399.90	PcUms_11	>=	80,000	<	90,000
Draft_12	>=	15.2	<	17.5	Length_12	>=	399.90			PcUms_12	>=	90,000	<	100,000
Draft_13	>=	17.5	<	20.0						PcUms_13	>=	100,000	<	110,000
Draft_14	>=	20.0								PcUms_14	>=	110,000	<	120,000
										PcUms_15	>=	120,000	<	150,000
										PcUms_16	>=	150,000	<	200,000
										PcUms_17	>=	200,000		

* Length segments added for pricing of small Group 2 vessels with PCUMS < 583.

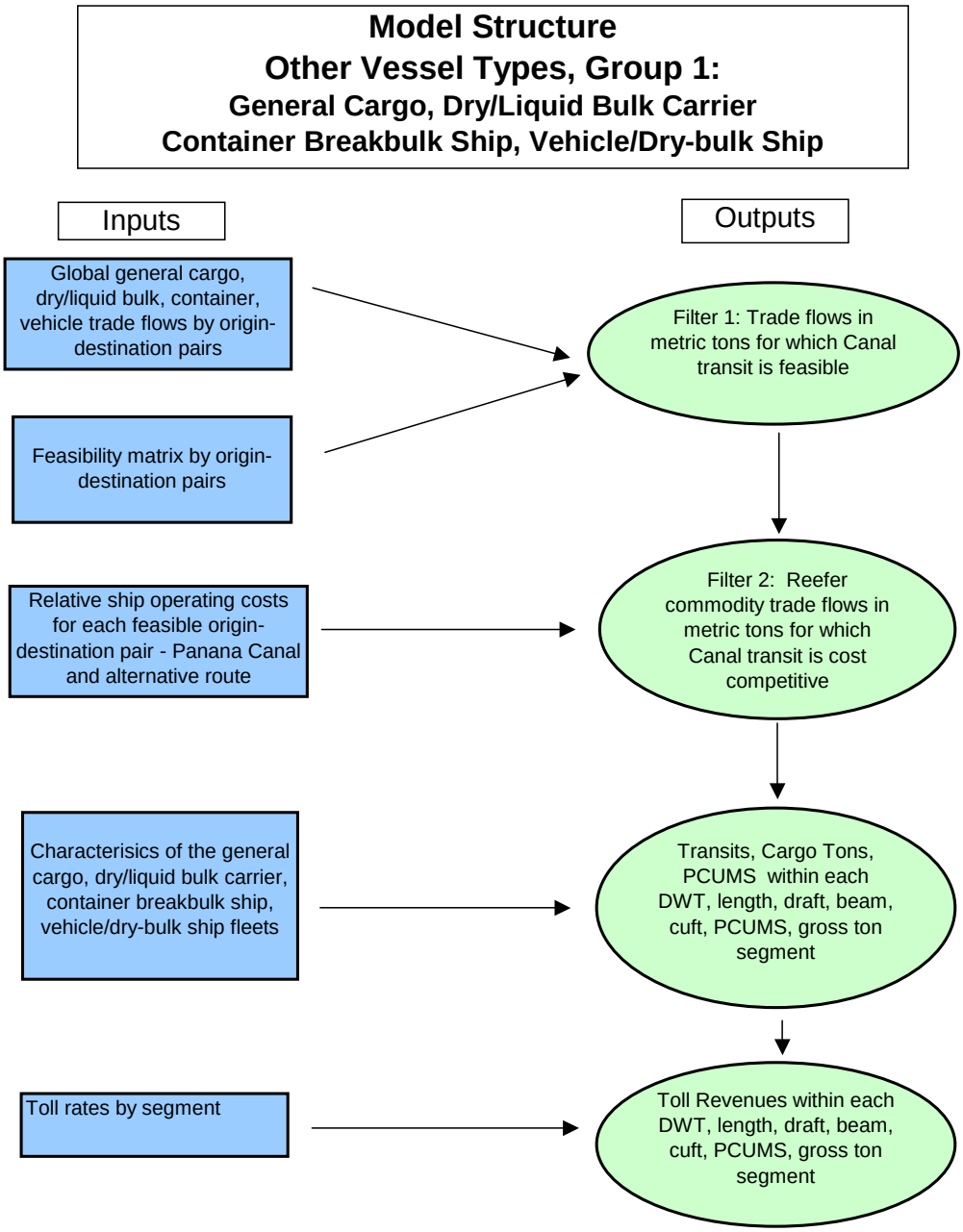
Table IV.2
Group 1 and Group 2 Other Vessel Types

Model Group	*Vessel Type Code*	*Description*
Group 1		
	1	General Cargo
	5	Dry/Liquid Bulk Carrier
	6	Container breakbulk ships
	10	Vehicle/Dry-bulk Ships
Group 2A		
	22	Rig Tender/Supply Ships
	50	Other Vessels (PC Net)
Group 2B		
	13	Barge Carriers
	14	Barge not self-propelled
	15	Barge Self-Propelled
	16	Fishing Vessels
	17	Factor Ships
	18	Tugs
	19	Research Vessels
	20	Cable Ships
	21	Yachts
	23	Tank Barges Not Self-Propelled
	24	Tank Barges Self-Propelled
Group 2C		
	25	Barges Integrated
	26	Tank Barges Integrated
	27	Woodships
	90	Dredgers
	91	Floating dry-docks
	93	Warships
	94	Submarines

Model for Group 1 Vessels

The model for the Group 1 vessels, general cargo ships, dry/liquid-bulk carriers, container breakbulk ships, and vehicle/dry-bulk ships, is based upon global trade flows and the cost competitiveness of the Panama Canal route. The model determines cargo, PCUMS, transits, and tolls within beam, PCUMS, deadweight ton, draft, length, and cubic capacity segments. Figure IV.1 illustrates the structure of the model for the Group 1 ships.

Figure IV.1
Model Structure



The primary inputs to the Group 1 model are global sea borne trade flows between origin-destination pairs, distances along trade routes, ship operating costs, and toll rates. Total sea borne trade flows are in metric tons and identify global general cargo, container, dry and liquid bulk, and motor vehicles trade going from each origin O to each destination D. These totals include cargo coming from countries whose trade routes to the destination country could potentially involve the Panama Canal, as well as from countries whose trade routes would never involve the Canal. Including all cargo

inflows to each destination allows the model user to alter the source of cargo inflows under alternative simulations. See Table IV.3 for a list of origins and destinations.

CI_O_D = Cargo I, I = 1,...4 (metric tons)
O = 1,…37 origins
D = 1,…37 destinations

$$(1)\ CI_D = \sum_{O=1}^{37} CI_O_D$$

Where:
CI_D = total seaborne flow of Cargo I to destination D

Note: CI_O_D is an exogenous model input that can be changed by the model user in alternative simulations.

Table IV.3
Origin & Destination Countries/Regions

1	**Argentina (ARG)**	20	**Mexico East (MXE)**
2	**Australia (AUS)**	21	**Mexico West (MXW)**
3	**Brazil (BRA)**	22	**New Zealand (NZL)**
4	**Canada East Coast (CNE)**	23	**Northern Africa (NAF)**
5	**Canada West Coast (CNW)**	24	**Peru (PER)**
6	**Caribbean Basin (CRB)**	25	**Russia (RUS)**
7	**Central America East (CAE)**	26	**South East Asia (SEA)**
8	**Central America West (CAW)**	27	**Southern Africa (SAF)**
9	**Chile (CHL)**	28	**United States East Coast (USE)**
10	**China Region (CH)**	29	**United States West Coast (USW)**
11	**Colombia East (COE)**	30	**Venezuela (VEN)**
12	**Colombia West (COW)**	31	**Western Africa (WAF)**
13	**Confederation of Independent States (CIS)**	32	**Western Europe North (WEN)**
14	**East Africa (OEA)**	33	**Western Europe South (SWE)**
15	**Eastern Europe (EE)**	34	**Other East Coast of South America (OEL)**
16	**Ecuador (EB)**	35	**Other Mediterranean (OMED)**
17	**Indian Subcontinent (IND)**	36	**Other Middle East (MIDE)**
18	**Israel (ISR)**	37	**Other Region (OWW)**
19	**Japan (JPN)**		

Trade Flow Filters

Cargo trade flows between each origin-destination pair are subjected to a number of filters to determine the metric tons of cargo that can feasibly (filter 1) and economically (filter 2) transit the Panama Canal. It was not necessary to consider a final filter based upon the size of the ships (filter 3), since these vessels are small in size relative to the Panama Canal.

Filter 1

Only the CI_O_D flows that can be feasibly served by the Canal are carried forward in the analysis. Each CI_O_D flow is multiplied by a feasibility scalar. The feasibility scalar equals 1 if transit through the Canal is feasible, or 0 if transit through the Canal is not feasible. Feasibility scalars are defined for each origin-destination pair and are not subject to change by the model user. See Appendix A in Volume I for a list of origin-destination pairs and their associated feasibility scalars.

(3) F1_CI_O_D = FPC_O_D * CI_O_D

Where:
F1_CI_O_D = cargo I from origin O to destination D that can feasibly transit the Panama Canal (Filter 1).
FPC_O_D = 0 or 1 scalar based upon the feasibility of a Panama Canal transit between origin O and destination D.

Filter 2

Feasible trade flows are subjected to a second filter based upon the operating costs associated with a Panama Canal route relative to the costs of alternative trade routes.

(4) F2_CI_O_D = f(F1_CI_O_D, OCPC_O_D/OCALT_O_D)

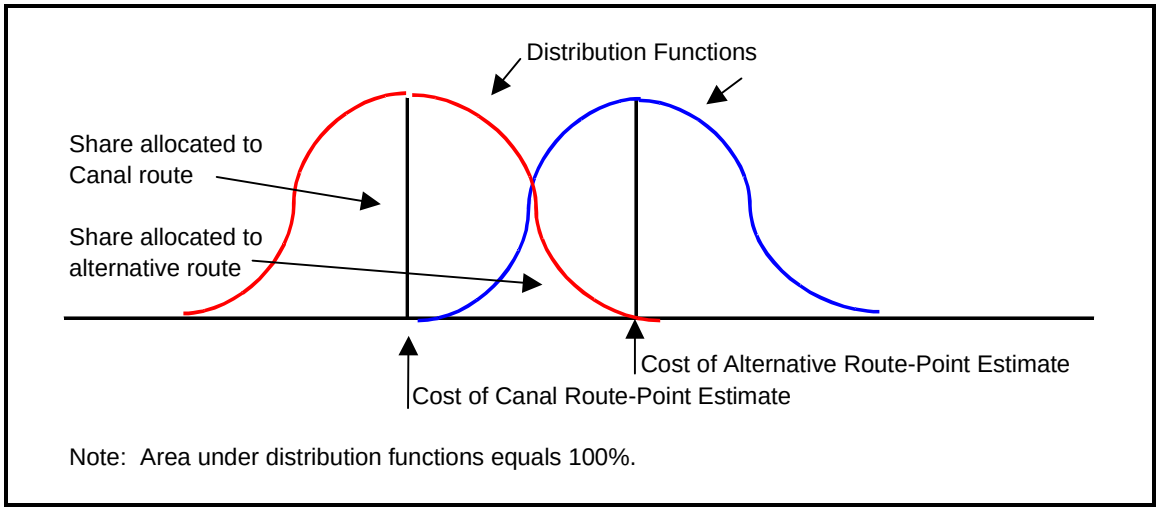
Where:
F2_CI_O_D = cost effective metric tons of cargo I from origin O to destination D through the Panama Canal (Filter 2).
OCPC_O_D = operating costs from origin O to destination D via a Panama Canal route.
OCALT_O_D = operating costs from origin O to destination D via alternative routes.

The major trade routes between origin-destination pairs are summarized in the following section, “Trade Routes.” The calculations defining the transit costs between origin-destination pairs for both the Panama Canal routes and alternative competing routes are summarized in the following section “Route Operating Costs.”

The route operating costs are point estimates. The model acknowledges that actual costs vary around these point estimates. Probability distributions are therefore defined around the cost point estimates for the Panama Canal Route and the minimum cost alternative route using a Weibull distribution. Given the distribution around the costs,

one of the trade routes can be minimum cost over part of the distribution and one can be minimum cost over another part. Trade flows between the origin-destination pairs are allocated between the trade routes based upon the minimum cost distribution shares. The distribution cost analysis is illustrated in the below diagram.

Figure IV.2
Point Cost Estimates and Their Probability Distributions



Filter 3

Transit through the Canal by these other vessels is not limited by the width and depth of the current Panama Canal. Consequently, it was not necessary to add a third filter to account for Canal limitations.

Totals

The metric tons of cargo I transported from origin O to destination D through the Panama Canal on Group 1 vessels in each year between 2004 and 2025 are summed across all origin destination pairs to determine the total metric tons of cargo I transiting the Canal.

$$CI_MT_t = \sum_O \sum_D CI_O_D_t$$

Where:
CI_MT_t = total metric tons of cargo I transported through the Panama Canal on all ships.

Trade Routes

Cargo can be shipped via the Panama Canal or six alternative trade routes. These routes include travel around Cape Horn and Cape of Good Hope, through the Straits of Magellan, the Suez Canal, and the Straits of Gibraltar, and finally a variety of direct ocean routes between two ports that do not pass by or through any of the above trade routes. Each origin-destination pair in the model is associated with an exporting and

importing port. Distances are specified between the ports and used to calculate operating costs. Table IV.4A below summarizes the routes, and Table IV.4B provides distances for illustrative origin-destination pairs and alternative trade routes. The operating cost calculations are summarized in the following section.

Table IV.4A
Trade Routes

1	Cape Horn
2	Cape Hope
3	Magellan
4	Panama Canal
5	Suez
6	Gibraltar
7	Direct (Ocean)

Table IV.4B
Sample Trade Routes (miles)

Wellington, New Zealand to New York, USA	
Cape Horn	11530
Cape Hope	14332
Magellan	11469
Panama	8481
Suez	14258
Wellington, New Zealand to Cannes, France	
Cape Horn	11726
Cape Hope	13388
Magellan	11667
Panama	11586
Suez	10596
Wellington, New Zealand to Hamburg, Germany	
Cape Horn	12283
Cape Hope	13960
Magellan	12222
Panama	11563
Suez	12666

Route Operating Costs

Route operating costs are computed for each origin-destination pair via a Panama Canal trade route and an alternative route based upon the miles along the trade routes, the price of bunker and middle diesel fuel, and the non-fuel operating costs of the four ship types.

Sample route operating cost calculations for general cargo ships, as examples, are provided below for travel between Guayaquil, Ecuador and Rotterdam (Western Europe, North) via the Panama Canal and the alternative route through the Straits of Magellan. Operating cost inputs for each of the vessel types were obtained from the Army Corps of Engineers.

Table IV.5
Route Operating Costs Between Guayaquil (Ecuador) and Rotterdam (Western Europe, North)

Model Inputs		
Ship Characteristics		
Deadweight tons	14,000	
Cubic Feet	637,000	
PCUMS	10,878	
Speed (knots)	16	
Cost Assumptions		
Heavy Fuel Oil		
Consumption (tons per day)	25	
Cost per ton	$170	
Middle Diesel		
Consumption (tons per day)	1.5	
Cost per ton	$256	
Non-fuel Operating Cost per Day	$9,179	
Cargo-to-DWT ratio	$ 0.70	
Cargo Tonnage	$ 9,800	
Cargo Value per Metric Ton	$300	
Cargo Value	$2,940,000	
Finance Rate	4.123%	
Routes	***Panama***	***Magellan***
Miles	5,594	10,688

Model Outputs	**Panama**	**Magellan**
Tolls*	$32,199	$0
Days At Sea	14.57	27.83
Operating Costs		
Fuel Costs	$67,507	$128,980
Non-fuel Operating Costs	$133,717	$255,482
Tolls	$32,199	$0
Total Operating Costs	$233,423	$384,462

Where:
Cubic Feet = 45.5 * Deadweight Tons
PCUMS = .777 * Deadweight Tons
Cargo Value = Cargo Value per PCUMS * PCUMS
Tolls = $2.96 * PCUMS
Days = Miles / Knots / 24 Hours
Fuel Costs = Days * Tons per Day * Heavy Fuel Oil Cost per Ton +
Days * Tons per Day * Distillate Oil Cost per Ton
Non-fuel Operating Costs = Days * Non-fuel Operating Cost per Day
Total Operating Costs = Fuel Costs + Non-fuel Operating Costs + Tolls

Vessel Characteristics

The relative segment characteristics of the general cargo, dry/liquid bulk carrier, container breakbulk ships, and vehicle/dry-bulk carrier fleet transiting the Canal are assumed to remain relatively constant over the forecast period. That is, the percent of cargo within deadweight ton segments, cubic feet segments, etc, are not expected to change significantly over the forecast period. However, the model user can alter assumptions regarding the segment characteristics of these other minor vessels transiting the Canal.

Cargo Tons, PCUMS, and Transits

Cargo tons in each of the Group 1 vessel types are grown with the rate of change in metric tons of the above calculated cargo transiting the Canal, subject to any user-specified adjustments. Without user specified adjustments, for example, cargo in general cargo ships would maintain their share of general cargo shipments; dry/liquid bulk carriers would maintain their share of dry and liquid bulk cargo shipments. The user can specify either a level adjustment to the cargo transiting the Canal in Group 1 shipments, or specify a differential between the Group 1 cargo growth rates and the total cargo growth rates. Cargo tons are converted to PCUMS using typical conversion factors for each of the cargo types.

Cargo tons and PCUMS for each Group 1 vessel type are allocated to each characteristic segment (deadweight tons, cubic feet, PCUMS, cargo, draft, length, and beam) based upon exogenously-specified segment shares that reflect the characteristics of the fleet currently transiting the Canal. PCUMS within each category are then translated into transits by dividing PCUMS by typical or average “PCUMS per transit” scalars. These scalars are computed based upon historical relationships when available, and as the mid-point of the range when not.

$$CARGO_TOT_VI_t = CARGO_TOT_{t-1} * CI_MT_t / CI_MT_{t-1}$$

$$CARGO_n_VI_t = CARGO_TOT_VI_t * SHPC_CARGO_n_VI_t$$

$$PCUMS_TOT_VI_t = PCUMS_PER_CARGO_VI * CARGO_TOT_VI_t$$

$PCUMS_n_VI_t = PCUMS_TOT_VI_t * SHPC_PCUMS_n_VI_t$

$T_ PCUMS_n_VI_t = PCUMS_n_VI_t / MID_PCUMS_n_VI_t$

$T_TOT_VI_t = \sum_n T_ PCUMS_n_VI_t$

Where:
$CARGO_TOT_VI_t$ = cargo tons of vessel I required to transport cargo through the Panama Canal
$SHPC_CARGO_n_VI_t$ = share of DWT within DWT segment n = 1,…..N
$MID_PCUMS_n_VI_t$ = PCUMS for mid-point ship if vessel I within segment n
$T_ PCUMS_n_VI_t$ = transits within PCUMS segment n = 1,...N for vessel I
$T_TOT_VI_t$ = total transits through the Panama Canal by vessel I

Revenues by Ship Characteristics

Revenues are computed by multiplying toll rates associated with each PCUMS segment times the PCUMS in the segments. PCUMS in each of the segments are first split between ballast and laden so that ballast and laden toll rates can be applied. Revenues are totaled across the PCUMS segments and then allocated to other characteristic segments (beam, DWT, cubic feet, draft, and length) using the share factors discussed above.

$Rev_PCUMS_n_VI_t = SH_BALLAST_VI_t * PCUMS_n_VI_t * TOLL_BALLAST_PCUMS_n_VI_t + (1 - SH_BALLAST_VI_t) * PCUMS_n_VI_t * TOLL_LADEN_PCUMS_ n_VI_t$

$REV_TOT_VI_t = \sum_n REV_ PCUMS_n_VI_t$

$REV_type_n_VI_t = REV_TOT_VI_t * SHPC_TOLL_type_n_VI_t$

Where:
$REV_PCUMS_n_VI_t$ = revenues associated with vessel I PCUMS segment m = 1,…17
$SH_BALLAST_VI_t$ = share of PCUMS associated with vessel I ballast ships
$PCUMS_m_VI_t$ = PCUMS within each PCUMS segment n = 1,…17 for vessel I through the Panama Canal
$TOLL_BALLAST_PCUMS_m_VI_t$ = toll rate for ballast ships in segment n = 1,…17
$TOLL_BALLAST_PCUMS_m_VI_t$ = toll rate for ballast ships in segment n = 1,….17
$REV_TOT_VI_t$ = total Panama Canal revenues from vessel I transits
$REV_type_n_VI_t$ = revenue by type = beam, DWT, cubic feet, draft, and length for segments n = 1,…N for vessel I
$SHPC_TOLL_type_n_VI_t$ = share of TOLL within type = beam, DWT, cubic feet, draft, and length; for segments n = 1,…N for vessel I

Model for Group 2 Vessels

The Group 2 Model projects PCUMS, transits, and tolls for Group 2A ships, PCUMS, lengths, transits and tolls for Group 2B ships, and displacements, transits and tolls for Group 2C ships (see Table IV.2). Growth in total PCUMS, length, or displacement for each of the Group 2 vessel types is modeled as a function of the growth in world or regional economic growth, toll rates, and specified trend adjustment rates. Total PCUMS (or length or displacement) is then allocated across beam, PCUMS, deadweight ton, draft, length, and cubic capacity segments. The average PCUMS (or length, or displacement) for ships within each segment (mid-point ship) is then used to translate PCUMS by segment into transits by segment.

$$PCUMS_TOT_VI_t = PCUMS_TOT_{t-1} * (1 + \alpha*(GDPR_t / GDPR_{t-1}-1) + \beta*(TOLLRATE_t / TOLLRATE_{t-1}-1) + TRENDRATE_VI$$

$$PCUMS_n_VI_t = PCUMS_TOT_VI_t * SHPC_PCUMS_n_VI_t$$

$$T_ PCUMS_n_VI_t = PCUMS_n_VI_t / MID_PCUMS_n_VI_t$$

$$T_TOT_VI_t = \sum_n T_ PCUMS_n_VI_t$$

Where:
$PCUMS_TOT_VI_t$ = PCUMS of vessel I transiting the Panama Canal
$SHPC_PCUMS_n_VI_t$ = share of PCUMS within PCUMS segment n = 1,…..N
$MID_PCUMS_n_VI_t$ = PCUMS for mid-point ship if vessel I within segment n
$T_ PCUMS_n_VI_t$ = transits within PCUMS segment n = 1,...N for vessel I
$T_TOT_VI_t$ = total transits through the Panama Canal by vessel I

The calculations are analogous for length and displacement in total and by segment. Ship types 22 and 50 use PCUMS for pricing, ship types 13-21 and 23-27 use length and/or PCUMS for pricing, and ship types 90, 91, 93, 94, and 99 use displacement for pricing.

Vessel Characteristics

As noted in Table IV.1 above, the ACP segment breakdowns for length were expanded because the first category (<200 meters) was not adequate for computing tolls associated with small vessels. Transits by small ships in ship types 13-21, and 23-27 are charged differently for vessels 1) less than 50 feet, 2) 50-80 feet, 3) 80-100 feet, and 4) greater than 100 feet.

The relative segment characteristics of the Group 2 ships are assumed to remain the relatively constant over the forecast period. That is, the percent of PCUMS within deadweight ton segments, cubic feet segments, etc, are not expected to change significantly over the forecast period. However, the model user can alter assumptions regarding the segment characteristics of the other vessels transiting the Canal.

Revenues by Ship Characteristics

Ship types 13-50 are priced according to PCUMS if large enough, and by length if not. Revenues from the smallest PCUMS category (less than 583 PCUMS) are computed by multiplying toll rates within 4 length breakdowns times the transits in the segments.

$$REV_LENGTH_m_VI_t = TRANSITS_m_VI_t * TOLL_LENGTH_ m_VI_t$$
$$REV_PCUMS_0_VI_t = \sum_m REV_ LENGTH_m_VI_t$$

Where:
$REV_LENGTH_m_VI_t$ = revenues associated with vessel I lenght segment m = 1,…4
$REV_PCUMS_0_VI_t$ = revenues associated with vessel I in the smallest PCUMS segment 0.

Revenues for the remaining PCUMS segments for each ship type are computed by multiplying toll rates associated with each PCUMS segment times the PCUMS in the segments. PCUMS in each of the segments are first split between ballast and laden so that ballast and laden toll rates can be applied. Revenues are totaled across the PCUMS segments and then allocated to other characteristic segments (beam, DWT, cubic feet, draft, and length) using the share factors discussed above.

$$Rev_PCUMS_n_VI_t = SH_BALLAST_VI_t * PCUMS_n_VI_t * TOLL_BALLAST_PCUMS_n_VI_t + (1 - SH_BALLAST_VI_t) * PCUMS_n_VI_t * TOLL_LADEN_PCUMS_ n_VI_t$$

$$REV_TOT_VI_t = \sum_n REV_ PCUMS_n_VI_t$$

$$REV_type_n_VI_t = REV_TOT_VI_t * SHPC_TOLL_type_n_VI_t$$

Where:
$REV_PCUMS_m_VI_t$ = revenues associated with vessel I PCUMS segment n = 1,…17
$SH_BALLAST_VI_t$ = share of PCUMS associated with vessel I ballast ships
$PCUMS_m_VI_t$ = PCUMS within each PCUMS segment n = 1,…17 for vessel I through the Panama Canal
$TOLL_BALLAST_PCUMS_m_VI_t$ = toll rate for ballast ships segment n = 1,…17
$TOLL_BALLAST_PCUMS_m_VI_t$ = toll rate for ballast ships segment n = 1,….17
$REV_TOT_VI_t$ = total Panama Canal revenues from vessel I transits
$REV_type_n_VI_t$ = revenue by type = beam, DWT, cubic feet, draft, and length for segments n = 1,…N for vessel I
$SHPC_TOLL_type_n_VI_t$ = share of TOLL within type = beam, DWT, cubic feet, draft, and length; for segments n = 1,…N for vessel I

Ship types 90-99 are priced according to their displacement. Revenues for each of the displacement ship types are computed by multiplying the displacement toll rate times the displacement tons in each of the PCUMS segments. Revenues are totaled across

the PCUMS segments and then allocated to other characteristic segments (beam, DWT, cubic feet, draft, and length) using the share factors discussed above.

$Rev_PCUMS_n_VI_t$ = * $DISP_PCUMS_n_VI_t$ * $DISPTOLLRATE_t$

$$REV_TOT_VI_t = \sum_n REV_PCUMS_n_VI_t$$

$REV_type_n_VI_t = REV_TOT_VI_t * SHPC_TOLL_type_n_VI_t$

Where:
$REV_PCUMS_n_VI_t$ = revenues associated with vessel I PCUMS segment n = 1,…17
$DISP_PCUMS_n_VI_t$ = displacement tons within each PCUMS segment n = 1,…17 for vessel I through the Panama Canal
$DISPTOLLRATE_t$ = ton rate per displacement ton.
$REV_TOT_VI_t$ = total Panama Canal revenues from vessel I transits
$REV_type_n_VI_t$ = revenue by type = beam, DWT, cubic feet, draft, and length for segments n = 1,…N for vessel I
$SHPC_TOLL_type_n_VI_t$ = share of TOLL within type = beam, DWT, cubic feet, draft, and length; for segments n = 1,…N for vessel I

V. Forecast of General Cargo and Other Minor Vessel Types

The forecast of transits and tolls revenue by each of the contract-required breakdowns is shown below.

Group 1 Ships

Table V.1
Group 1 Ships, Cargo Forecast

Ship Code	Ship Type	2003	2004	2005	2010	2015	2020	2025	CAGR 2000-2003	CAGR 2003-2025
1	*General Cargo*	6,597,628	6,587,813	6,491,661	5,790,813	5,128,018	4,426,733	3,756,765	-2.6	-2.5
5	*Dry/Liquid bulk carrier*	1,068,536	1,042,395	1,013,819	829,444	685,578	560,171	454,285	-8.4	-3.8
6	*Container/Break Bulk ship*	12,805,706	13,322,192	13,510,500	13,657,867	13,448,184	12,657,454	11,585,922	16.7	-0.5
10	*Vehicle/Dry-Bulk carrier*	132,357	131,237	128,260	111,281	97,298	82,905	69,570	-45.3	-2.9
Group 1	*Total*	20,604,227	21,083,636	21,144,239	20,389,405	19,359,077	17,727,263	15,866,542	5.8	-1.2

Table V.2
Group 1 Ships, PCUMS Forecast

Ship Code	Ship Type	2003	2004	2005	2010	2015	2020	2025	CAGR 2000-2003	CAGR 2003-2025
1	*General Cargo*	7,252,410	7,378,350	7,270,660	6,485,711	5,743,380	4,957,941	4,207,577	-4.5	-2.4
5	*Dry/Liquid bulk carrier*	804,660	784,923	763,405	624,572	516,240	421,809	342,077	-12.3	-3.8
6	*Container/Break Bulk ship*	11,271,638	11,723,529	11,889,240	12,018,923	11,834,402	11,138,559	10,195,611	16.3	-0.5
10	*Vehicle/Dry-Bulk carrier*	194,211	137,798	134,673	116,845	102,163	87,051	73,049	-38.0	-4.3
Group 1	*Total*	19,522,919	20,024,601	20,057,978	19,246,050	18,196,185	16,605,360	14,818,313	3.7	-1.2

Table V.3
Group 1 Ships, Transits Forecast

Ship Code	Ship Type	2003	2004	2005	2010	2015	2020	2025	CAGR 2000-2003	CAGR 2003-2025
1	*General Cargo*	833	847	835	745	660	569	483	-5.6	-2.4
5	*Dry/Liquid bulk carrier*	29	28	28	23	19	15	12	-12.3	-3.8
6	*Container/Break Bulk ship*	576	576	584	590	581	547	501	8.9	-0.6
10	*Vehicle/Dry-Bulk carrier*	6	4	4	4	3	3	2	-46.0	-4.3
Group 1	*Total*	1,444	1,456	1,451	1,361	1,263	1,134	999	-1.6	-1.7

Table V.4
Group 1 Ships, Tolls Forecast

Ship Code	Ship Type	2003	2004	2005	2010	2015	2020	2025	CAGR 2000-2003	CAGR 2003-2025
1	*General Cargo*	17,413,400	17,755,866	17,379,770	18,289,908	18,474,461	17,988,445	17,255,451	-4.3	0.0
5	*Dry/Liquid bulk carrier*	1,907,299	1,864,727	1,801,481	1,735,237	1,635,970	1,507,752	1,382,097	-12.5	-1.5
6	*Container/Break Bulk ship*	26,863,124	27,981,177	28,186,979	33,475,156	37,596,786	39,913,847	41,296,129	15.8	2.0
10	*Vehicle/Dry-Bulk carrier*	458,913	326,349	316,813	324,309	323,436	310,855	294,851	-38.3	-2.0
Group 1	*Total*	46,642,736	47,928,118	47,685,042	53,824,610	58,030,652	59,720,899	60,228,528	3.6	1.2

Transits by **general cargo** ships are projected to decline through the 2025 forecast end-point, averaging –2.4% per year. Such a decline is consistent with the outlook for the fleet and with the continued move to the containerization of general cargo. Tolls revenue from this type of ship is expected to show no growth at all over the forecast period, even though the model assumes tolls that increase yearly in line with overall global inflation (world GDP deflator). In effect, the reduction in the number of vessels offsets the increase in tolls. Should tolls increase above the global deflator rate, then

revenue would also increase from general cargo vessels, since the toll elasticity of demand is very small.

The details of the forecast, by year and by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables, by ship type. The tables appear in the following order:

- Transits
- Tolls
- Cargo
- PCUMS

for each ship type.

Table V.5
General Cargo - Transits

General Cargo - Transits

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	1,008	1,119	989	833	847	835	745	660	569	483

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	837	980	827	686	698	688	613	543	469	398
<25.9	95	64	68	46	47	46	41	36	31	27
<27.7	61	38	45	19	19	19	17	15	13	11
<29	2	9	9	41	42	41	37	32	28	24
<30.4	5	3	1	8	8	8	7	6	5	5
<=32.3	8	25	39	27	27	27	24	21	18	16
<33.5	0	0	0	6	6	6	5	5	4	3
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	495	604	486	408	415	409	365	323	279	237
<15000	88	73	71	65	66	65	58	51	44	38
<20000	197	232	207	152	155	152	136	120	104	88
<25000	165	154	148	105	107	105	94	83	72	61
<30000	43	15	20	21	21	21	19	17	14	12
<40000	16	31	39	55	56	55	49	44	38	32
<50000	1	3	14	24	24	24	21	19	16	14
<60000	3	5	4	3	3	3	3	2	2	2
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	2	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	653	730	584	512	521	513	458	405	350	297
<15000	281	324	315	211	215	212	189	167	144	122
<20000	60	42	53	34	35	34	30	27	23	20
<25000	8	8	15	58	59	58	52	46	40	34
<30000	4	10	16	15	15	15	13	12	10	9
<40000	2	5	6	3	3	3	3	2	2	2
<50000	0	0	0	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	0	0	1	0	0	0	0	0	0	0
<24.38	2	3	1	2	2	2	2	2	1	1
<30.48	1	1	0	1	1	1	1	1	1	1
<200	1,001	1,112	985	827	841	829	740	655	565	480
<230.9	4	3	2	3	3	3	3	2	2	2
<286.6	0	0	0	0	0	0	0	0	0	0
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	765	928	799	675	687	677	604	535	461	392
<10.5	179	134	123	63	64	63	56	50	43	37
<11	28	15	12	6	6	6	5	5	4	3
<11.5	14	5	4	41	42	41	37	32	28	24
<=12	15	19	27	24	24	24	21	19	16	14
<12.5	5	12	20	15	15	15	13	12	10	9
<13	2	4	4	9	9	9	8	7	6	5
<13.5	0	0	0	0	0	0	0	0	0	0
<14	0	2	0	0	0	0	0	0	0	0
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	104	81	50	23	23	23	21	18	16	13
<100,000	117	149	118	135	137	135	121	107	92	78
<200,000	289	280	198	133	135	133	119	105	91	77
<585000	154	138	97	69	70	69	62	55	47	40
<685000	16	23	35	38	39	38	34	30	26	22
<885000	54	67	63	53	54	53	47	42	36	31
>885000	274	381	428	382	389	383	342	303	261	222

Table V.6
General Cargo - Tolls

General Cargo - Tolls

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	$19,169,741	$20,564,433	$19,851,260	$17,413,400	$17,755,866	$17,379,770	$18,289,908	$18,474,461	$17,988,445	$17,255,451

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	$12,810,229	$15,005,599	$13,268,090	$10,717,397	$10,928,174	$10,696,699	$11,256,860	$11,370,446	$11,071,319	$10,620,184
<25.9	$3,167,270	$2,070,383	$2,160,295	$1,479,169	$1,508,260	$1,476,313	$1,553,624	$1,569,300	$1,528,016	$1,465,752
<27.7	$2,328,519	$1,388,704	$1,644,182	$714,574	$728,628	$713,194	$750,542	$758,116	$738,172	$708,093
<29	$95,423	$430,754	$430,437	$2,031,661	$2,071,617	$2,027,737	$2,133,925	$2,155,457	$2,098,752	$2,013,232
<30.4	$252,302	$152,490	$45,903	$434,679	$443,228	$433,839	$456,559	$461,165	$449,033	$430,736
<=32.3	$515,997	$1,516,503	$2,302,353	$1,607,203	$1,638,811	$1,604,099	$1,688,102	$1,705,136	$1,660,278	$1,592,625
<33.5	$0	$0	$0	$428,717	$437,149	$427,889	$450,297	$454,840	$442,875	$424,828
<36.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<39.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<42.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<45.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<48.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<51.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	$4,407,098	$5,611,727	$4,612,401	$3,629,043	$3,700,415	$3,622,034	$3,811,712	$3,850,174	$3,748,885	$3,596,126
<15000	$1,698,794	$1,379,380	$1,374,773	$1,166,934	$1,189,884	$1,164,681	$1,225,672	$1,238,040	$1,205,470	$1,156,350
<20000	$5,023,651	$5,933,515	$5,378,367	$3,955,612	$4,033,407	$3,947,973	$4,154,719	$4,196,642	$4,086,239	$3,919,733
<25000	$5,303,521	$4,847,682	$4,649,605	$3,371,557	$3,437,865	$3,365,046	$3,541,265	$3,576,998	$3,482,896	$3,340,975
<30000	$1,646,391	$501,304	$700,936	$797,021	$812,696	$795,482	$837,140	$845,587	$823,342	$789,792
<40000	$827,601	$1,621,633	$2,005,176	$2,787,987	$2,842,817	$2,782,602	$2,928,321	$2,957,869	$2,880,055	$2,762,698
<50000	$55,275	$171,275	$853,312	$1,487,242	$1,516,491	$1,484,369	$1,562,102	$1,577,865	$1,536,355	$1,473,752
<60000	$207,409	$339,382	$276,689	$218,003	$222,291	$217,582	$228,977	$231,287	$225,202	$216,026
<70000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<80000	$0	$158,535	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	$7,573,757	$8,085,285	$6,527,362	$5,652,432	$5,763,597	$5,641,516	$5,936,949	$5,996,855	$5,839,093	$5,601,161
<15000	$8,373,571	$9,280,585	$8,962,512	$6,179,820	$6,301,358	$6,167,885	$6,490,883	$6,556,379	$6,383,897	$6,123,766
<20000	$2,395,270	$1,764,729	$2,147,528	$1,360,908	$1,387,673	$1,358,280	$1,429,410	$1,443,833	$1,405,849	$1,348,564
<25000	$426,204	$424,767	$786,065	$3,022,977	$3,082,430	$3,017,139	$3,175,140	$3,207,178	$3,122,805	$2,995,557
<30000	$253,313	$631,163	$992,965	$979,259	$998,518	$977,367	$1,028,550	$1,038,928	$1,011,597	$970,376
<40000	$147,625	$377,904	$434,829	$218,003	$222,291	$217,582	$228,977	$231,287	$225,202	$216,026
<50000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<60000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<70000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<80000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<24.38	$209	$0	$0	$206	$211	$206	$217	$219	$213	$205
<30.48	$0	$260	$0	$0	$0	$0	$0	$0	$0	$0
<200	$18,962,856	$20,350,861	$19,768,258	$17,250,693	$17,589,959	$17,217,377	$18,119,011	$18,301,839	$17,820,364	$17,094,219
<230.9	$206,676	$213,312	$83,002	$162,501	$165,697	$162,187	$170,680	$172,402	$167,867	$161,027
<286.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<294.1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<330.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<360.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<385.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	$10,720,419	$13,576,080	$12,606,502	$10,338,773	$10,542,104	$10,318,806	$10,859,178	$10,968,751	$10,680,191	$10,244,995
<10.5	$5,792,773	$4,159,212	$3,762,971	$2,072,932	$2,113,700	$2,068,929	$2,177,274	$2,199,243	$2,141,387	$2,054,130
<11	$1,023,262	$573,668	$477,487	$227,396	$231,868	$226,957	$238,842	$241,252	$234,906	$225,334
<11.5	$551,039	$207,899	$162,852	$2,021,014	$2,060,761	$2,017,111	$2,122,743	$2,144,162	$2,087,754	$2,002,683
<=12	$621,526	$867,087	$1,303,105	$1,215,111	$1,239,009	$1,212,765	$1,276,274	$1,289,153	$1,255,238	$1,204,090
<12.5	$313,098	$736,728	$1,256,002	$891,452	$908,984	$889,731	$936,324	$945,772	$920,891	$883,366
<13	$147,625	$285,223	$282,341	$646,720	$659,439	$645,471	$679,273	$686,127	$668,077	$640,854
<13.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<14	$0	$158,535	$0	$0	$0	$0	$0	$0	$0	$0
<14.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=15.2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<17.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>=20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	$581,336	$369,112	$253,313	$59,971	$61,150	$59,855	$62,990	$63,625	$61,951	$59,427
<100,000	$1,038,488	$1,097,916	$748,742	$770,238	$785,386	$768,750	$809,008	$817,171	$795,673	$763,251
<200,000	$4,027,871	$3,496,666	$2,447,524	$1,329,970	$1,356,127	$1,327,402	$1,396,915	$1,411,010	$1,373,890	$1,317,907
<585000	$3,624,771	$2,416,433	$1,437,290	$857,744	$874,613	$856,087	$900,919	$910,009	$886,069	$849,964
<685000	$260,911	$408,948	$489,105	$539,141	$549,745	$538,100	$566,279	$571,993	$556,946	$534,251
<885000	$1,246,947	$1,146,564	$1,005,181	$852,903	$869,677	$851,256	$895,835	$904,874	$881,069	$845,167
>885000	$8,389,416	$11,628,794	$13,470,106	$13,003,432	$13,259,168	$12,978,319	$13,657,963	$13,795,778	$13,432,846	$12,885,484

Table V.7
General Cargo - Cargo

General Cargo - Cargo

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	6,921,224	7,423,620	7,130,374	6,597,628	6,587,813	6,491,661	5,790,813	5,128,018	4,426,733	3,756,765

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	4,561,375	5,205,034	4,252,163	3,801,418	3,795,763	3,740,362	3,336,548	2,954,659	2,550,593	2,164,571
<25.9	1,037,786	849,343	922,285	633,652	632,709	623,475	556,164	492,507	425,154	360,809
<27.7	908,670	424,274	556,644	338,078	337,575	332,648	296,735	262,772	226,836	192,505
<29	29,398	157,002	193,665	711,339	710,281	699,914	624,350	552,889	477,279	405,045
<30.4	104,391	36,726	12,606	248,382	248,012	244,393	218,008	193,055	166,654	141,432
<=32.3	279,604	751,241	1,193,011	717,922	716,854	706,391	630,128	558,006	481,696	408,793
<33.5	0	0	0	146,837	146,619	144,479	128,881	114,129	98,521	83,611
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	1,476,388	1,700,630	1,343,802	1,170,860	1,169,118	1,152,054	1,027,677	910,053	785,598	666,701
<15000	494,828	460,949	464,828	430,417	429,777	423,504	377,782	334,542	288,792	245,084
<20000	1,831,051	2,070,617	1,685,690	1,396,439	1,394,362	1,374,010	1,225,670	1,085,385	936,952	795,148
<25000	1,890,963	1,950,604	1,770,750	1,304,336	1,302,396	1,283,387	1,144,831	1,013,797	875,155	742,704
<30000	718,777	251,812	371,223	445,845	445,182	438,684	391,323	346,534	299,143	253,869
<40000	366,181	659,551	891,536	1,139,689	1,137,994	1,121,384	1,000,318	885,825	764,684	648,952
<50000	38,568	89,909	474,062	609,108	608,202	599,325	534,621	473,430	408,686	346,833
<60000	104,468	180,200	128,483	100,934	100,784	99,313	88,591	78,451	67,722	57,473
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	59,348	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	2,627,897	2,678,528	2,128,331	2,017,706	2,014,704	1,985,299	1,770,964	1,568,266	1,353,796	1,148,905
<15000	2,937,597	3,426,962	2,998,237	2,219,530	2,216,228	2,183,881	1,948,107	1,725,134	1,489,212	1,263,826
<20000	991,231	617,982	845,903	671,646	670,647	660,858	589,511	522,038	450,646	382,443
<25000	167,840	167,029	421,161	1,175,144	1,173,396	1,156,270	1,031,437	913,383	788,473	669,140
<30000	136,568	351,717	534,659	412,668	412,054	406,040	362,203	320,747	276,883	234,978
<40000	60,091	181,402	202,083	100,934	100,784	99,313	88,591	78,451	67,722	57,473
<50000	0	0	0	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	1	1	1	1	1	1	1
<30.48	0	2	0	0	0	0	0	0	0	0
<200	6,860,819	7,359,059	7,107,620	6,520,859	6,511,158	6,416,125	5,723,432	5,068,349	4,375,224	3,713,052
<230.9	60,405	64,559	22,754	76,768	76,654	75,535	67,380	59,668	51,508	43,713
<286.6	0	0	0	0	0	0	0	0	0	0
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	3,808,551	4,696,143	4,112,169	3,659,913	3,654,468	3,601,130	3,212,347	2,844,674	2,455,649	2,083,996
<10.5	2,148,714	1,555,433	1,447,720	940,599	939,200	925,492	825,574	731,082	631,103	535,588
<11	359,618	211,253	147,698	68,488	68,386	67,388	60,113	53,232	45,953	38,998
<11.5	135,388	38,441	60,074	727,250	726,168	715,569	638,316	565,256	487,954	414,104
<=12	227,917	313,236	584,543	560,431	559,597	551,430	491,897	435,596	376,026	319,116
<12.5	180,945	391,083	668,224	393,176	392,591	386,861	345,095	305,597	263,805	223,879
<13	60,091	158,683	109,946	247,771	247,402	243,791	217,471	192,580	166,244	141,084
<13.5	0	0	0	0	0	0	0	0	0	0
<14	0	59,348	0	0	0	0	0	0	0	0
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	303,181	106,864	85,737	11,255	11,238	11,074	9,879	8,748	7,552	6,409
<100,000	343,280	352,962	251,778	286,593	286,167	281,990	251,546	222,755	192,292	163,189
<200,000	1,390,174	1,275,755	768,010	542,703	541,896	533,986	476,337	421,817	364,131	309,021
<585000	1,276,189	901,218	462,217	261,072	260,684	256,879	229,146	202,919	175,168	148,657
<685000	98,899	150,826	136,143	114,356	114,186	112,519	100,372	88,883	76,728	65,116
<885000	421,047	307,975	212,925	285,093	284,669	280,514	250,229	221,589	191,285	162,335
>885000	3,088,454	4,328,020	5,213,564	5,096,556	5,088,974	5,014,698	4,473,305	3,961,307	3,419,576	2,902,037

Table V.8
General Cargo - PCUMS

General Cargo - PCUMS

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	7,902,694	8,548,752	8,324,869	7,252,410	7,378,350	7,270,660	6,485,711	5,743,380	4,957,941	4,207,577

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	5,280,996	6,237,913	5,564,136	4,463,629	4,541,141	4,474,861	3,991,750	3,534,869	3,051,456	2,589,630
<25.9	1,305,702	860,670	905,946	616,051	626,749	617,601	550,924	487,867	421,149	357,410
<27.7	959,928	577,292	689,508	297,609	302,777	298,358	266,147	235,685	203,453	172,662
<29	39,338	179,067	180,509	846,155	860,849	848,284	756,702	670,093	578,454	490,907
<30.4	104,011	63,391	19,250	181,037	184,181	181,493	161,898	143,368	123,762	105,031
<=32.3	212,719	630,419	965,520	669,375	680,999	671,059	598,611	530,096	457,603	388,346
<33.5	0	0	0	178,554	181,655	179,003	159,678	141,402	122,064	103,590
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	1,816,819	2,332,827	1,934,267	1,511,440	1,537,687	1,515,243	1,351,656	1,196,950	1,033,261	876,881
<15000	700,325	573,416	576,528	486,010	494,450	487,233	434,631	384,884	332,249	281,965
<20000	2,070,992	2,466,596	2,255,484	1,647,451	1,676,060	1,651,597	1,473,288	1,304,661	1,126,241	955,789
<25000	2,186,368	2,015,209	1,949,869	1,404,201	1,428,585	1,407,735	1,255,754	1,112,025	959,949	814,665
<30000	678,722	208,395	293,946	331,947	337,711	332,782	296,855	262,878	226,928	192,583
<40000	341,177	674,122	840,895	1,161,153	1,181,317	1,164,075	1,038,400	919,549	793,795	673,657
<50000	22,787	71,200	357,847	619,413	630,169	620,972	553,931	490,530	423,447	359,360
<60000	85,504	141,083	116,033	90,795	92,372	91,023	81,196	71,903	62,070	52,676
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	65,904	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	3,122,269	3,361,099	2,737,329	2,354,150	2,395,031	2,360,074	2,105,278	1,864,315	1,609,360	1,365,790
<15000	3,451,991	3,857,992	3,758,539	2,573,799	2,618,494	2,580,276	2,301,706	2,038,261	1,759,518	1,493,222
<20000	987,446	733,608	900,592	566,797	576,640	568,223	506,877	448,862	387,478	328,834
<25000	175,702	176,578	329,646	1,259,023	1,280,886	1,262,191	1,125,924	997,054	860,702	730,438
<30000	104,428	262,378	416,412	407,846	414,928	408,872	364,730	322,984	278,814	236,617
<40000	60,858	157,097	182,351	90,795	92,372	91,023	81,196	71,903	62,070	52,676
<50000	0	0	0	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	86	0	0	86	87	86	77	68	59	50
<30.48	0	108	0	0	0	0	0	0	0	0
<200	7,817,406	8,459,969	8,290,061	7,184,645	7,309,409	7,202,725	6,425,110	5,689,715	4,911,615	4,168,262
<230.9	85,202	88,675	34,808	67,679	68,854	67,849	60,524	53,597	46,267	39,265
<286.6	0	0	0	0	0	0	0	0	0	0
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	4,419,475	5,643,654	5,286,691	4,305,938	4,380,712	4,316,774	3,850,729	3,409,989	2,943,654	2,498,144
<10.5	2,388,061	1,729,008	1,578,048	863,344	878,336	865,517	772,074	683,706	590,205	500,880
<11	421,838	238,477	200,240	94,707	96,352	94,945	84,695	75,001	64,744	54,945
<11.5	227,165	86,425	68,294	841,721	856,338	843,839	752,737	666,582	575,423	488,335
<=12	256,223	360,453	546,473	506,075	514,863	507,349	452,575	400,775	345,966	293,606
<12.5	129,074	306,262	526,720	371,276	377,723	372,210	332,026	294,024	253,814	215,400
<13	60,858	118,569	118,403	269,349	274,026	270,027	240,874	213,305	184,134	156,266
<13.5	0	0	0	0	0	0	0	0	0	0
<14	0	65,904	0	0	0	0	0	0	0	0
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	239,655	153,442	106,230	24,977	25,411	25,040	22,337	19,780	17,075	14,491
<100,000	428,115	456,410	313,994	320,792	326,363	321,599	286,879	254,044	219,302	186,112
<200,000	1,660,483	1,453,584	1,026,399	553,912	563,531	555,306	495,354	438,658	378,669	321,359
<585000	1,494,306	1,004,525	602,745	357,237	363,441	358,136	319,471	282,906	244,217	207,256
<685000	107,560	170,002	205,112	224,544	228,443	225,109	200,806	177,822	153,504	130,272
<885000	514,052	476,633	421,535	355,221	361,390	356,115	317,668	281,309	242,839	206,086
>885000	3,458,523	4,834,156	5,648,854	5,415,727	5,509,773	5,429,355	4,843,195	4,288,861	3,702,335	3,142,002

The outlook for **dry/liquid bulk carriers** calls for transits to decline over time and ships become more specialized and dual-use ships do not keep pace with overall growth in international cargo demand. The average annual decline is forecast to be 3.8% through 2025, which reduces the 29 transits in 2003 to 12 in the final year of the forecast.

Revenue from this vessel type will also decline, by 1.5% per year, with less than $1.4 million in revenue generated in the last forecast year.

The tables showing the details of this vessel type forecast, by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables.

The details of the forecast, by year and by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables, by ship type. The tables appear in the following order:

- Transits
- Tolls
- Cargo
- PCUMS

for each ship type.

Table V.9
Dry/Liquid Bulk Carriers - Transits

Dry/Liquid Bulk Carriers - Transits

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	43	44	72	29	28	28	23	19	15	12

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	0	0	3	0	0	0	0	0	0	0
<25.9	0	0	0	0	0	0	0	0	0	0
<27.7	1	1	0	0	0	0	0	0	0	0
<29	0	0	0	0	0	0	0	0	0	0
<30.4	0	0	0	0	0	0	0	0	0	0
<=32.3	39	43	69	28	27	27	22	18	15	12
<33.5	3	0	0	1	1	1	1	1	1	0
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	0	0	0	0	0	0	0	0	0	0
<15000	0	0	0	0	0	0	0	0	0	0
<20000	0	0	0	0	0	0	0	0	0	0
<25000	0	0	0	0	0	0	0	0	0	0
<30000	1	1	3	0	0	0	0	0	0	0
<40000	6	5	3	0	0	0	0	0	0	0
<50000	12	15	10	18	18	17	14	12	9	8
<60000	4	2	6	0	0	0	0	0	0	0
<70000	8	6	8	1	1	1	1	1	1	0
<80000	8	15	31	8	8	8	6	5	4	3
<90000	4	0	11	2	2	2	2	1	1	1
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	0	0	0	0	0	0	0	0	0	0
<15000	1	1	3	0	0	0	0	0	0	0
<20000	4	5	0	0	0	0	0	0	0	0
<25000	13	14	8	10	10	9	8	6	5	4
<30000	7	3	11	8	8	8	6	5	4	3
<40000	15	21	40	11	11	10	9	7	6	5
<50000	3	0	10	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	19	21	12	13	13	12	10	8	7	6
<230.9	12	8	19	8	8	8	6	5	4	3
<286.6	12	15	41	8	8	8	6	5	4	3
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	1	1	0	0	0	0	0	0	0	0
<10.5	0	0	0	0	0	0	0	0	0	0
<11	0	0	3	0	0	0	0	0	0	0
<11.5	0	0	4	5	5	5	4	3	3	2
<=12	1	1	3	5	5	5	4	3	3	2
<12.5	6	5	3	0	0	0	0	0	0	0
<13	4	3	6	2	2	2	2	1	1	1
<13.5	19	16	11	7	7	7	5	4	4	3
<14	7	10	20	6	6	6	5	4	3	3
<14.5	1	8	21	2	2	2	2	1	1	1
<=15.2	4	0	1	2	2	2	2	1	1	1
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	0	0	0	0	0	0	0	0	0	0
<100,000	0	0	0	0	0	0	0	0	0	0
<200,000	0	0	0	0	0	0	0	0	0	0
<585000	0	0	0	0	0	0	0	0	0	0
<685000	0	0	0	0	0	0	0	0	0	0
<885000	0	0	0	0	0	0	0	0	0	0
>885000	43	44	72	29	28	28	23	19	15	12

Table V.10
Dry/Liquid Bulk Carriers - Tolls

Dry/Liquid Bulk Carriers - Tolls

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	$2,851,109	$2,858,932	$5,300,726	$1,907,299	$1,864,727	$1,801,481	$1,735,237	$1,635,970	$1,507,752	$1,382,097

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	$0	$0	$92,661	$0	$0	$0	$0	$0	$0	$0
<25.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<27.7	$34,246	$33,973	$0	$0	$0	$0	$0	$0	$0	$0
<29	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<30.4	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=32.3	$2,513,341	$2,824,958	$5,208,065	$1,831,069	$1,790,199	$1,729,481	$1,665,884	$1,570,585	$1,447,491	$1,326,859
<33.5	$303,521	$0	$0	$76,229	$74,528	$72,000	$69,353	$65,385	$60,261	$55,239
<36.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<39.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<42.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<45.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<48.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<51.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<15000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<20000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<25000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<30000	$34,246	$33,973	$92,661	$0	$0	$0	$0	$0	$0	$0
<40000	$287,248	$237,464	$140,944	$0	$0	$0	$0	$0	$0	$0
<50000	$611,516	$770,513	$573,494	$1,007,211	$984,730	$951,331	$916,348	$863,927	$796,218	$729,862
<60000	$254,242	$124,573	$370,603	$0	$0	$0	$0	$0	$0	$0
<70000	$624,846	$488,512	$637,381	$80,399	$78,604	$75,938	$73,146	$68,961	$63,557	$58,260
<80000	$645,576	$1,203,896	$2,442,092	$641,318	$627,003	$605,737	$583,463	$550,085	$506,972	$464,722
<90000	$393,435	$0	$1,043,550	$178,371	$174,390	$168,475	$162,280	$152,996	$141,005	$129,254
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<15000	$34,246	$33,973	$92,661	$0	$0	$0	$0	$0	$0	$0
<20000	$190,825	$236,653	$0	$0	$0	$0	$0	$0	$0	$0
<25000	$645,459	$709,342	$399,879	$501,282	$490,093	$473,470	$456,060	$429,970	$396,272	$363,247
<30000	$454,706	$186,555	$685,162	$505,930	$494,637	$477,861	$460,289	$433,957	$399,946	$366,615
<40000	$1,222,351	$1,692,408	$3,164,264	$900,087	$879,997	$850,150	$818,888	$772,042	$711,534	$652,236
<50000	$303,521	$0	$958,759	$0	$0	$0	$0	$0	$0	$0
<60000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<70000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<80000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<24.38	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<30.48	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200	$933,010	$1,041,950	$553,854	$687,204	$671,866	$649,078	$625,210	$589,444	$543,247	$497,973
<230.9	$879,087	$606,765	$1,338,738	$554,979	$542,591	$524,188	$504,913	$476,028	$438,720	$402,158
<286.6	$1,039,011	$1,210,216	$3,408,133	$665,116	$650,270	$628,215	$605,114	$570,497	$525,785	$481,967
<294.1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<330.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<360.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<385.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	$34,246	$33,973	$0	$0	$0	$0	$0	$0	$0	$0
<10.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<11	$0	$0	$92,661	$0	$0	$0	$0	$0	$0	$0
<11.5	$0	$0	$253,244	$320,007	$312,864	$302,253	$291,138	$274,483	$252,971	$231,889
<=12	$48,778	$48,289	$143,603	$241,914	$236,515	$228,493	$220,091	$207,500	$191,237	$175,300
<12.5	$287,248	$237,464	$140,944	$0	$0	$0	$0	$0	$0	$0
<13	$254,242	$186,555	$370,603	$123,949	$121,182	$117,072	$112,767	$106,316	$97,983	$89,818
<13.5	$1,187,584	$901,731	$814,028	$401,740	$392,773	$379,451	$365,498	$344,589	$317,582	$291,115
<14	$558,709	$802,094	$1,566,578	$480,070	$469,354	$453,435	$436,761	$411,776	$379,503	$347,876
<14.5	$86,867	$648,825	$1,834,273	$161,248	$157,649	$152,302	$146,701	$138,309	$127,469	$116,846
<=15.2	$393,435	$0	$84,791	$178,371	$174,390	$168,475	$162,280	$152,996	$141,005	$129,254
<17.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>=20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<585000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<685000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<885000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>885000	$2,851,109	$2,858,932	$5,300,726	$1,907,299	$1,864,727	$1,801,481	$1,735,237	$1,635,970	$1,507,752	$1,382,097

Table V.11
Dry/Liquid Bulk Carriers - Cargo

Dry/Liquid Bulk Carriers - Cargo

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	1,388,781	1,599,143	2,190,512	1,068,536	1,042,395	1,013,819	829,444	685,578	560,171	454,285

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	0	0	46,573	0	0	0	0	0	0	0
<25.9	0	0	0	0	0	0	0	0	0	0
<27.7	24,285	23,384	0	0	0	0	0	0	0	0
<29	0	0	0	0	0	0	0	0	0	0
<30.4	0	0	0	0	0	0	0	0	0	0
<=32.3	1,193,801	1,575,759	2,143,939	1,013,146	988,360	961,265	786,448	650,040	531,134	430,736
<33.5	170,695	0	0	55,390	54,035	52,554	42,996	35,539	29,038	23,549
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	0	0	0	0	0	0	0	0	0	0
<15000	0	0	0	0	0	0	0	0	0	0
<20000	0	0	0	0	0	0	0	0	0	0
<25000	0	0	0	0	0	0	0	0	0	0
<30000	24,285	23,384	46,573	0	0	0	0	0	0	0
<40000	104,902	103,904	80,358	0	0	0	0	0	0	0
<50000	284,732	325,771	349,531	554,180	540,622	525,802	430,179	355,565	290,524	235,608
<60000	118,824	80,619	110,676	0	0	0	0	0	0	0
<70000	309,605	304,726	295,841	30,959	30,202	29,374	24,032	19,863	16,230	13,162
<80000	319,409	760,739	970,103	430,295	419,768	408,261	334,014	276,079	225,579	182,939
<90000	227,024	0	337,430	53,102	51,803	50,383	41,220	34,071	27,838	22,576
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	0	0	0	0	0	0	0	0	0	0
<15000	24,285	23,384	46,573	0	0	0	0	0	0	0
<20000	69,327	63,939	0	0	0	0	0	0	0	0
<25000	282,907	365,736	221,431	267,677	261,128	253,970	207,783	171,743	140,328	113,802
<30000	204,890	80,619	319,134	286,503	279,494	271,832	222,396	183,822	150,197	121,806
<40000	636,677	1,065,465	1,324,720	514,356	501,772	488,017	399,266	330,013	269,647	218,677
<50000	170,695	0	278,654	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	413,919	453,059	300,091	334,230	326,053	317,115	259,444	214,444	175,217	142,097
<230.9	428,429	391,789	634,588	362,259	353,396	343,708	281,201	232,427	189,911	154,013
<286.6	546,433	754,295	1,255,833	372,047	362,945	352,995	288,799	238,707	195,043	158,175
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	24,285	23,384	0	0	0	0	0	0	0	0
<10.5	0	0	0	0	0	0	0	0	0	0
<11	0	0	46,573	0	0	0	0	0	0	0
<11.5	0	0	176,371	219,950	214,569	208,687	170,735	141,121	115,307	93,511
<=12	33,944	34,517	72,865	131,316	128,103	124,592	101,933	84,253	68,841	55,829
<12.5	104,902	103,904	80,358	0	0	0	0	0	0	0
<13	118,824	80,619	110,676	29,124	28,411	27,633	22,607	18,686	15,268	12,382
<13.5	560,393	441,030	396,136	204,749	199,740	194,264	158,935	131,368	107,338	87,048
<14	265,807	534,024	699,267	319,457	311,642	303,098	247,976	204,965	167,473	135,816
<14.5	53,602	381,665	549,490	110,838	108,126	105,162	86,037	71,114	58,106	47,122
<=15.2	227,024	0	58,776	53,102	51,803	50,383	41,220	34,071	27,838	22,576
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	0	0	0	0	0	0	0	0	0	0
<100,000	0	0	0	0	0	0	0	0	0	0
<200,000	0	0	0	0	0	0	0	0	0	0
<585000	0	0	0	0	0	0	0	0	0	0
<685000	0	0	0	0	0	0	0	0	0	0
<885000	0	0	0	0	0	0	0	0	0	0
>885000	1,388,781	1,599,143	2,190,512	1,068,536	1,042,395	1,013,819	829,444	685,578	560,171	454,285

Table V.12
Dry/Liquid Bulk Carriers - PCUMS

Dry/Liquid Bulk Carriers - PCUMS

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	1,193,098	1,205,989	2,260,368	804,660	784,923	763,405	624,572	516,240	421,809	342,077

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=24.3	0	0	39,513	0	0	0	0	0	0	0
<25.9	0	0	0	0	0	0	0	0	0	0
<27.7	14,331	14,331	0	0	0	0	0	0	0	0
<29	0	0	0	0	0	0	0	0	0	0
<30.4	0	0	0	0	0	0	0	0	0	0
<=32.3	1,051,753	1,191,658	2,220,855	772,500	753,552	732,894	599,609	495,608	404,951	328,405
<33.5	127,014	0	0	32,160	31,371	30,511	24,962	20,633	16,859	13,672
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	0	0	0	0	0	0	0	0	0	0
<15000	0	0	0	0	0	0	0	0	0	0
<20000	0	0	0	0	0	0	0	0	0	0
<25000	0	0	0	0	0	0	0	0	0	0
<30000	14,331	14,331	39,513	0	0	0	0	0	0	0
<40000	120,204	100,170	60,102	0	0	0	0	0	0	0
<50000	255,900	325,027	244,553	424,927	414,504	403,141	329,825	272,618	222,750	180,645
<60000	106,392	52,549	158,035	0	0	0	0	0	0	0
<70000	261,478	206,070	271,796	33,919	33,087	32,180	26,328	21,761	17,781	14,420
<80000	270,153	507,842	1,041,372	270,562	263,926	256,690	210,008	173,583	141,831	115,021
<90000	164,640	0	444,997	75,252	73,406	71,394	58,410	48,279	39,448	31,991
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	0	0	0	0	0	0	0	0	0	0
<15000	14,331	14,331	39,513	0	0	0	0	0	0	0
<20000	79,854	99,828	0	0	0	0	0	0	0	0
<25000	270,104	299,223	170,519	211,483	206,296	200,640	164,152	135,680	110,861	89,906
<30000	190,280	78,695	292,171	213,444	208,209	202,501	165,674	136,938	111,889	90,739
<40000	511,515	713,912	1,349,325	379,733	370,419	360,264	294,746	243,623	199,059	161,432
<50000	127,014	0	408,840	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	390,435	439,528	236,178	289,921	282,810	275,057	225,035	186,003	151,979	123,251
<230.9	367,870	255,953	570,873	234,137	228,394	222,133	181,736	150,214	122,736	99,536
<286.6	434,793	510,508	1,453,317	280,602	273,719	266,216	217,801	180,024	147,094	119,289
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	14,331	14,331	0	0	0	0	0	0	0	0
<10.5	0	0	0	0	0	0	0	0	0	0
<11	0	0	39,513	0	0	0	0	0	0	0
<11.5	0	0	107,990	135,006	131,695	128,084	104,791	86,615	70,771	57,394
<=12	20,412	20,370	61,236	102,060	99,557	96,827	79,218	65,478	53,501	43,388
<12.5	120,204	100,170	60,102	0	0	0	0	0	0	0
<13	106,392	78,695	158,035	52,292	51,009	49,611	40,589	33,549	27,412	22,230
<13.5	496,966	380,379	347,123	169,488	165,331	160,798	131,555	108,737	88,847	72,053
<14	233,802	338,349	668,030	202,534	197,566	192,150	157,205	129,938	106,170	86,101
<14.5	36,351	273,695	782,182	68,028	66,359	64,540	52,803	43,644	35,661	28,920
<=15.2	164,640	0	36,157	75,252	73,406	71,394	58,410	48,279	39,448	31,991
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<34000	0	0	0	0	0	0	0	0	0	0
<100,000	0	0	0	0	0	0	0	0	0	0
<200,000	0	0	0	0	0	0	0	0	0	0
<585000	0	0	0	0	0	0	0	0	0	0
<685000	0	0	0	0	0	0	0	0	0	0
<885000	0	0	0	0	0	0	0	0	0	0
>885000	1,193,098	1,205,989	2,260,368	804,660	784,923	763,405	624,572	516,240	421,809	342,077

Transits through the Canal by **container breakbulk ships** are also projected to decline slightly, in line with continued containerization of cargo, from 576 in 2033 to 501 in the final year of the forecast, 2025. This yields an average decline of 0.6% per year.

While transits will decline, this vessel type is forecast to increase revenues, averaging 2% per year, and producing $41.3 million in the last year of the forecast, up from $26.9 in FY2003.

The tables showing the details of this vessel type forecast, by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables.

The details of the forecast, by year and by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables, by ship type. The tables appear in the following order:

- Transits
- Tolls
- Cargo
- PCUMS

for each ship type.

Table V.13
Container/Breakbulk - Transits

Container/Breakbulk - Transits

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	446	407	433	576	576	584	590	581	547	501

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	160	125	137	112	112	114	115	113	106	97
<25.9	24	19	19	21	21	21	22	21	20	18
<27.7	76	74	61	84	84	85	86	85	80	73
<29	22	14	12	26	26	26	27	26	25	23
<30.4	34	33	47	90	90	91	92	91	85	78
<=32.3	127	140	148	232	232	235	238	234	220	202
<33.5	3	2	9	11	11	11	11	11	10	10
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	57	32	23	38	38	39	39	38	36	33
<15000	17	18	4	6	6	6	6	6	6	5
<20000	71	54	64	21	21	21	22	21	20	18
<25000	34	38	68	47	47	48	48	47	45	41
<30000	56	56	37	53	53	54	54	53	50	46
<40000	72	66	69	138	138	140	141	139	131	120
<50000	137	142	163	266	266	270	273	268	253	231
<60000	0	0	2	4	4	4	4	4	4	3
<70000	1	1	3	3	3	3	3	3	3	3
<80000	1	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	132	85	53	58	58	59	59	59	55	50
<15000	62	65	112	74	74	75	76	75	70	64
<20000	90	89	75	125	125	127	128	126	119	109
<25000	135	139	133	214	214	217	219	216	203	186
<30000	22	22	54	86	86	87	88	87	82	75
<40000	5	7	3	15	15	15	15	15	14	13
<50000	0	0	3	4	4	4	4	4	4	3
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	436	392	400	502	502	509	514	506	477	436
<230.9	9	14	30	65	65	66	67	66	62	56
<286.6	1	1	1	9	9	9	9	9	9	8
<294.1	0	0	2	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	169	112	121	92	92	93	94	93	87	80
<10.5	71	96	68	85	85	86	87	86	81	74
<11	18	12	26	44	44	45	45	44	42	38
<11.5	40	34	25	49	49	50	50	49	47	43
<=12	52	59	74	141	141	143	144	142	134	123
<12.5	93	93	114	158	158	160	162	159	150	137
<13	1	0	2	4	4	4	4	4	4	3
<13.5	2	1	1	3	3	3	3	3	3	3
<14	0	0	2	0	0	0	0	0	0	0
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	5	8	4	15	15	15	15	15	14	13
<100,000	19	22	6	16	16	16	16	16	15	14
<200,000	41	25	15	3	3	3	3	3	3	3
<585000	51	31	16	0	0	0	0	0	0	0
<685000	6	3	2	5	5	5	5	5	5	4
<885000	10	22	6	10	10	10	10	10	9	9
>885000	314	296	384	527	527	534	540	532	500	458

Table V.14
Container/Breakbulk - Tolls

Container/Breakbulk - Tolls

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	$17,281,427	$16,584,844	$18,502,156	$26,863,124	$27,981,177	$28,186,979	$33,475,156	$37,596,786	$39,913,847	$41,296,129

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	$3,135,407	$2,532,503	$3,207,956	$2,376,014	$2,474,904	$2,493,107	$2,960,841	$3,325,394	$3,530,336	$3,652,597
<25.9	$839,677	$636,138	$674,376	$745,550	$776,580	$782,291	$929,057	$1,043,448	$1,107,755	$1,146,118
<27.7	$2,913,153	$2,829,395	$2,299,531	$3,257,606	$3,393,189	$3,418,146	$4,059,427	$4,559,244	$4,840,226	$5,007,851
<29	$1,015,151	$632,984	$539,366	$1,220,815	$1,271,625	$1,280,978	$1,521,303	$1,708,614	$1,813,915	$1,876,733
<30.4	$1,733,220	$1,699,430	$2,412,160	$4,551,468	$4,740,901	$4,775,771	$5,671,756	$6,370,091	$6,762,675	$6,996,878
<=32.3	$7,479,483	$8,146,118	$8,766,763	$13,907,454	$14,486,287	$14,592,834	$17,330,605	$19,464,436	$20,664,015	$21,379,644
<33.5	$165,336	$108,277	$602,003	$804,218	$837,690	$843,851	$1,002,166	$1,125,558	$1,194,926	$1,236,308
<36.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<39.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<42.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<45.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<48.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<51.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	$719,021	$343,874	$214,379	$286,536	$298,461	$300,657	$357,063	$401,026	$425,741	$440,485
<15000	$333,218	$320,128	$86,584	$122,666	$127,771	$128,711	$152,859	$171,679	$182,260	$188,572
<20000	$1,644,974	$1,263,114	$1,583,945	$492,155	$512,639	$516,409	$613,293	$688,805	$731,256	$756,580
<25000	$1,068,429	$1,159,162	$2,086,356	$1,428,036	$1,487,471	$1,498,412	$1,779,530	$1,998,634	$2,121,809	$2,195,290
<30000	$2,102,009	$2,135,762	$1,354,899	$1,959,806	$2,041,373	$2,056,388	$2,442,188	$2,742,882	$2,911,924	$3,012,769
<40000	$3,353,696	$3,061,845	$3,181,620	$6,288,535	$6,550,266	$6,598,443	$7,836,381	$8,801,236	$9,343,649	$9,667,235
<50000	$7,907,491	$8,228,558	$9,530,046	$15,682,829	$16,335,554	$16,455,703	$19,542,968	$21,949,196	$23,301,908	$24,108,892
<60000	$0	$0	$172,473	$386,515	$402,602	$405,563	$481,651	$540,955	$574,293	$594,182
<70000	$73,052	$72,402	$291,853	$216,046	$225,038	$226,693	$269,224	$302,372	$321,007	$332,124
<80000	$79,537	$0	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	$2,352,660	$1,438,096	$873,102	$715,459	$745,236	$750,717	$891,560	$1,001,333	$1,063,045	$1,099,860
<15000	$1,893,656	$1,908,385	$3,268,221	$2,276,241	$2,370,979	$2,388,418	$2,836,511	$3,185,756	$3,382,092	$3,499,219
<20000	$3,722,384	$3,594,226	$3,078,699	$5,171,310	$5,386,542	$5,426,160	$6,444,166	$7,237,604	$7,683,652	$7,949,749
<25000	$7,473,147	$7,685,484	$7,312,614	$11,707,631	$12,194,907	$12,284,601	$14,589,323	$16,385,634	$17,395,468	$17,997,901
<30000	$1,463,087	$1,439,387	$3,433,186	$5,504,705	$5,733,813	$5,775,986	$6,859,622	$7,704,213	$8,179,018	$8,462,271
<40000	$376,494	$519,266	$215,104	$1,101,261	$1,147,096	$1,155,533	$1,372,324	$1,541,291	$1,636,279	$1,692,947
<50000	$0	$0	$321,230	$386,515	$402,602	$405,563	$481,651	$540,955	$574,293	$594,182
<60000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<70000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<80000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<24.38	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<30.48	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200	$16,614,954	$15,642,644	$16,465,375	$22,317,741	$23,246,613	$23,417,592	$27,810,982	$31,235,210	$33,160,212	$34,308,605
<230.9	$586,936	$865,188	$1,715,550	$3,792,348	$3,950,187	$3,979,241	$4,725,788	$5,307,651	$5,634,758	$5,829,899
<286.6	$79,537	$77,012	$100,668	$753,035	$784,377	$790,146	$938,386	$1,053,925	$1,118,877	$1,157,626
<294.1	$0	$0	$220,562	$0	$0	$0	$0	$0	$0	$0
<330.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<360.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<385.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	$3,580,021	$2,294,127	$2,848,978	$1,749,655	$1,822,477	$1,835,881	$2,180,312	$2,448,763	$2,599,678	$2,689,709
<10.5	$2,491,915	$3,316,460	$2,244,239	$3,072,554	$3,200,435	$3,223,974	$3,828,826	$4,300,250	$4,565,272	$4,723,374
<11	$747,771	$494,365	$1,035,742	$1,864,590	$1,942,195	$1,956,480	$2,323,536	$2,609,622	$2,770,451	$2,866,396
<11.5	$2,027,030	$1,778,932	$1,304,616	$2,509,423	$2,613,866	$2,633,091	$3,127,087	$3,512,110	$3,728,559	$3,857,685
<=12	$2,643,391	$3,061,855	$3,754,916	$7,324,173	$7,629,008	$7,685,120	$9,126,930	$10,250,683	$10,882,425	$11,259,301
<12.5	$5,572,193	$5,566,704	$6,849,339	$9,740,166	$10,145,555	$10,220,176	$12,137,590	$13,632,031	$14,472,163	$14,973,357
<13	$66,516	$0	$172,473	$386,515	$402,602	$405,563	$481,651	$540,955	$574,293	$594,182
<13.5	$152,589	$72,402	$71,291	$216,046	$225,038	$226,693	$269,224	$302,372	$321,007	$332,124
<14	$0	$0	$220,562	$0	$0	$0	$0	$0	$0	$0
<14.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=15.2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<17.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>=20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	$23,041	$54,573	$18,283	$120,707	$125,731	$126,655	$150,417	$168,937	$179,349	$185,560
<100,000	$271,150	$319,780	$36,105	$77,420	$80,642	$81,235	$96,476	$108,354	$115,032	$119,016
<200,000	$921,751	$511,281	$289,060	$28,256	$29,432	$29,648	$35,211	$39,546	$41,983	$43,437
<585000	$883,386	$711,732	$343,994	$0	$0	$0	$0	$0	$0	$0
<685000	$133,061	$64,520	$26,255	$99,710	$103,860	$104,624	$124,253	$139,552	$148,152	$153,283
<885000	$430,762	$811,363	$223,575	$343,908	$358,221	$360,856	$428,556	$481,322	$510,986	$528,682
>885000	$14,618,276	$14,111,596	$17,564,883	$26,193,123	$27,283,291	$27,483,960	$32,640,243	$36,659,074	$38,918,345	$40,266,151

Table V.15
Container/Breakbulk - Cargo

Container/Breakbulk - Cargo

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	8,066,455	7,776,631	8,024,265	12,805,706	13,322,192	13,510,500	13,657,867	13,448,184	12,657,454	11,585,922

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	1,195,706	1,129,797	1,236,500	1,176,478	1,223,928	1,241,228	1,254,767	1,235,503	1,162,858	1,064,415
<25.9	326,261	269,838	238,566	332,819	346,242	351,137	354,967	349,517	328,966	301,117
<27.7	1,286,448	1,320,559	1,134,947	1,853,765	1,928,532	1,955,792	1,977,125	1,946,771	1,832,304	1,677,188
<29	522,840	322,091	205,448	537,546	559,227	567,131	573,317	564,515	531,323	486,343
<30.4	1,026,977	902,933	1,233,176	2,395,406	2,492,019	2,527,243	2,554,809	2,515,586	2,367,674	2,167,236
<=32.3	3,628,842	3,775,638	3,692,433	6,107,800	6,354,143	6,443,958	6,514,246	6,414,236	6,037,090	5,526,013
<33.5	79,381	55,775	283,195	401,892	418,101	424,011	428,636	422,055	397,239	363,611
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	152,405	80,784	58,446	121,490	126,390	128,177	129,575	127,585	120,084	109,918
<15000	101,111	113,376	8,050	12,906	13,427	13,616	13,765	13,554	12,757	11,677
<20000	672,405	605,969	579,552	204,765	213,024	216,035	218,391	215,038	202,394	185,260
<25000	500,265	556,864	798,108	634,776	660,378	669,713	677,017	666,623	627,427	574,312
<30000	914,988	1,010,261	720,493	1,131,778	1,177,425	1,194,068	1,207,093	1,188,561	1,118,675	1,023,973
<40000	1,525,367	1,270,109	1,333,620	3,145,882	3,272,763	3,319,024	3,355,226	3,303,715	3,109,462	2,846,227
<50000	4,092,813	4,088,442	4,404,072	7,373,062	7,670,436	7,778,857	7,863,705	7,742,977	7,287,704	6,670,754
<60000	0	0	62,120	129,317	134,533	136,434	137,922	135,805	127,820	116,999
<70000	52,970	50,826	59,804	51,730	53,816	54,577	55,172	54,325	51,131	46,803
<80000	54,131	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	829,163	578,495	391,676	266,326	277,068	280,984	284,049	279,688	263,243	240,958
<15000	841,970	1,025,004	1,261,094	1,160,671	1,207,484	1,224,551	1,237,908	1,218,903	1,147,234	1,050,113
<20000	1,712,179	1,543,096	1,372,685	3,076,892	3,200,991	3,246,237	3,281,645	3,231,263	3,041,271	2,783,808
<25000	3,688,029	3,612,475	3,354,215	5,655,076	5,883,159	5,966,317	6,031,395	5,938,798	5,589,607	5,116,412
<30000	793,333	811,867	1,522,671	2,184,385	2,272,487	2,304,608	2,329,746	2,293,978	2,159,096	1,976,315
<40000	201,781	205,694	38,165	333,039	346,471	351,369	355,201	349,748	329,183	301,316
<50000	0	0	83,759	129,317	134,533	136,434	137,922	135,805	127,820	116,999
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	7,714,266	7,301,522	7,193,797	11,163,428	11,613,677	11,777,835	11,906,303	11,723,511	11,034,189	10,100,076
<230.9	298,058	461,533	746,709	1,452,424	1,511,004	1,532,362	1,549,076	1,525,294	1,435,609	1,314,076
<286.6	54,131	13,576	23,955	189,854	197,511	200,303	202,488	199,379	187,656	171,770
<294.1	0	0	59,804	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	1,324,477	1,048,431	1,198,580	782,355	813,909	825,414	834,417	821,607	773,298	707,833
<10.5	1,180,120	1,499,676	854,820	1,689,670	1,757,819	1,782,665	1,802,110	1,774,443	1,670,109	1,528,724
<11	321,676	253,805	581,742	1,169,933	1,217,119	1,234,323	1,247,787	1,228,630	1,156,389	1,058,493
<11.5	972,051	770,819	509,472	1,086,582	1,130,407	1,146,385	1,158,889	1,141,097	1,074,003	983,082
<=12	1,480,253	1,542,652	1,847,524	3,895,356	4,052,466	4,109,747	4,154,574	4,090,791	3,850,259	3,524,311
<12.5	2,680,777	2,610,422	2,910,203	4,000,763	4,162,124	4,220,955	4,266,995	4,201,486	3,954,446	3,619,678
<13	0	0	62,120	129,317	134,533	136,434	137,922	135,805	127,820	116,999
<13.5	107,101	50,826	0	51,730	53,816	54,577	55,172	54,325	51,131	46,803
<14	0	0	59,804	0	0	0	0	0	0	0
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	5,683	13,383	5,942	59,351	61,745	62,618	63,301	62,329	58,664	53,698
<100,000	103,918	114,146	9,642	33,756	35,117	35,614	36,002	35,450	33,365	30,541
<200,000	357,018	209,424	92,949	8,973	9,335	9,467	9,570	9,423	8,869	8,118
<585000	238,907	355,670	118,968	0	0	0	0	0	0	0
<685000	63,714	26,960	12,815	47,281	49,188	49,883	50,427	49,653	46,734	42,777
<885000	182,146	381,845	126,444	178,328	185,520	188,143	190,195	187,275	176,263	161,342
>885000	7,115,069	6,675,203	7,657,505	12,478,017	12,981,287	13,164,776	13,308,372	13,104,054	12,333,559	11,289,446

Table V.16
Container/Breakbulk - PCUMS

Container/Breakbulk - PCUMS

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	7,173,314	6,946,005	7,816,535	11,271,638	11,723,529	11,889,240	12,018,923	11,834,402	11,138,559	10,195,611

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	1,301,470	1,060,654	1,355,253	996,964	1,036,933	1,051,590	1,063,061	1,046,740	985,193	901,791
<25.9	348,540	266,425	284,901	312,829	325,371	329,970	333,569	328,448	309,136	282,965
<27.7	1,209,215	1,184,997	971,474	1,366,876	1,421,675	1,441,771	1,457,497	1,435,121	1,350,738	1,236,390
<29	421,377	265,104	227,864	512,248	532,785	540,315	546,209	537,823	506,200	463,347
<30.4	719,439	711,749	1,019,056	1,909,774	1,986,339	2,014,415	2,036,388	2,005,124	1,887,226	1,727,461
<=32.3	3,104,644	3,411,728	3,703,661	5,835,501	6,069,452	6,155,243	6,222,382	6,126,852	5,766,604	5,278,425
<33.5	68,629	45,348	254,326	337,446	350,975	355,936	359,818	354,294	333,462	305,232
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	298,457	144,020	90,568	120,229	125,049	126,817	128,200	126,232	118,810	108,752
<15000	138,315	134,075	36,579	51,470	53,533	54,290	54,882	54,040	50,862	46,557
<20000	682,809	529,013	669,163	206,506	214,785	217,821	220,197	216,816	204,068	186,792
<25000	443,492	485,476	881,415	599,197	623,219	632,029	638,922	629,113	592,123	541,996
<30000	872,519	894,492	572,399	822,325	855,293	867,382	876,843	863,382	812,616	743,823
<40000	1,392,079	1,282,351	1,344,127	2,638,639	2,744,425	2,783,217	2,813,575	2,770,379	2,607,486	2,386,746
<50000	3,282,305	3,446,255	4,026,122	6,580,440	6,844,256	6,940,999	7,016,709	6,908,984	6,502,748	5,952,250
<60000	0	0	72,864	162,180	168,682	171,066	172,932	170,277	160,265	146,698
<70000	30,323	30,323	123,298	90,652	94,286	95,619	96,662	95,178	89,582	81,998
<80000	33,015	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<10000	976,561	602,298	368,856	300,203	312,238	316,652	320,106	315,191	296,659	271,545
<15000	786,034	799,263	1,380,713	955,100	993,391	1,007,432	1,018,421	1,002,786	943,824	863,923
<20000	1,545,117	1,505,321	1,300,646	2,169,857	2,256,849	2,288,749	2,313,714	2,278,192	2,144,239	1,962,715
<25000	3,102,014	3,218,807	3,089,332	4,912,466	5,109,412	5,181,633	5,238,152	5,157,733	4,854,467	4,443,506
<30000	607,310	602,839	1,450,405	2,309,748	2,402,348	2,436,305	2,462,879	2,425,068	2,282,478	2,089,252
<40000	156,278	217,477	90,874	462,084	480,609	487,403	492,719	485,155	456,628	417,972
<50000	0	0	135,709	162,180	168,682	171,066	172,932	170,277	160,265	146,698
<60000	0	0	0	0	0	0	0	0	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	6,896,669	6,551,396	6,956,064	9,364,417	9,739,846	9,877,518	9,985,257	9,831,958	9,253,856	8,470,459
<230.9	243,630	362,355	724,762	1,591,251	1,655,046	1,678,440	1,696,747	1,670,698	1,572,464	1,439,345
<286.6	33,015	32,254	42,529	315,970	328,638	333,283	336,918	331,746	312,240	285,806
<294.1	0	0	93,180	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025.000
<=10	1,486,024	960,818	1,203,597	734,147	763,580	774,373	782,819	770,801	725,479	664,063
<10.5	1,034,364	1,388,988	948,115	1,289,229	1,340,915	1,359,869	1,374,702	1,353,597	1,274,008	1,166,155
<11	310,391	207,048	437,566	782,373	813,739	825,241	834,243	821,435	773,136	707,685
<11.5	841,396	745,046	551,156	1,052,942	1,095,156	1,110,635	1,122,750	1,105,513	1,040,510	952,425
<=12	1,097,240	1,282,355	1,586,325	3,073,188	3,196,395	3,241,576	3,276,934	3,226,624	3,036,904	2,779,812
<12.5	2,312,951	2,331,427	2,893,614	4,086,927	4,250,776	4,310,860	4,357,881	4,290,977	4,038,675	3,696,776
<13	27,610	0	72,864	162,180	168,682	171,066	172,932	170,277	160,265	146,698
<13.5	63,338	30,323	30,118	90,652	94,286	95,619	96,662	95,178	89,582	81,998
<14	0	0	93,180	0	0	0	0	0	0	0
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	9,564	22,856	7,724	50,648	52,679	53,423	54,006	53,177	50,050	45,813
<100,000	112,551	133,929	15,253	32,485	33,787	34,265	34,639	34,107	32,101	29,384
<200,000	382,608	214,133	122,118	11,856	12,331	12,506	12,642	12,448	11,716	10,724
<585000	366,683	298,085	145,326	0	0	0	0	0	0	0
<685000	55,232	27,022	11,092	41,838	43,515	44,130	44,612	43,927	41,344	37,844
<885000	178,804	339,812	94,453	144,302	150,087	152,209	153,869	151,507	142,598	130,526
>885000	6,067,872	5,910,168	7,420,569	10,990,509	11,431,130	11,592,708	11,719,156	11,539,237	10,860,750	9,941,319

Vehicle/dry bulk carriers are dry bulk ships that may offer platforms for carrying automobiles and other roll-on vehicles, typically used during dead return legs of a roundtrip voyage.

The transits for Vehicle/dry bulk carriers are forecast to decline through 2025 by 4.3% per year, falling to only 2 transits in the final year of the forecast, down from this year's 6 transits (2003).

Revenues will also decline, by 2% per year, to less than $300,000, from this year's $460,000 in revenue.

The tables showing the details of this vessel type forecast, by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables.

The details of the forecast, by year and by beam, DWT, PCUMS, length, draft and cubic capacity are shown in the following pages of tables, by ship type. The tables appear in the following order:

- Transits
- Tolls
- Cargo
- PCUMS

for each ship type.

Table V.17
Vehicle/Dry Bulk Carrier - Transits

Vehicle/Dry Bulk Carrier - Transits

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	38	34	8	6	4	4	4	3	3	2

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	4	2	0	0	0	0	0	0	0	0
<25.9	1	1	0	0	0	0	0	0	0	0
<27.7	10	9	4	0	0	0	0	0	0	0
<29	18	14	3	3	2	2	2	2	1	1
<30.4	0	0	0	0	0	0	0	0	0	0
<=32.3	5	8	1	3	2	2	2	2	1	1
<33.5	0	0	0	0	0	0	0	0	0	0
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	0	0	0	0	0	0	0	0	0	0
<15000	0	0	0	0	0	0	0	0	0	0
<20000	0	2	0	0	0	0	0	0	0	0
<25000	6	3	1	1	1	1	1	1	0	0
<30000	1	1	2	0	0	0	0	0	0	0
<40000	25	23	5	3	2	2	2	2	1	1
<50000	3	0	0	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	3	5	0	2	1	1	1	1	1	1
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	0	2	0	0	0	0	0	0	0	0
<15000	5	1	2	0	0	0	0	0	0	0
<20000	25	22	5	3	2	2	2	2	1	1
<25000	3	1	0	0	0	0	0	0	0	0
<30000	0	1	0	0	0	0	0	0	0	0
<40000	3	4	0	2	1	1	1	1	1	1
<50000	0	0	0	0	0	0	0	0	0	0
<60000	2	3	1	1	1	1	1	1	0	0
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	35	29	8	4	3	3	2	2	2	2
<230.9	3	5	0	2	1	1	1	1	1	1
<286.6	0	0	0	0	0	0	0	0	0	0
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=10	0	3	1	0	0	0	0	0	0	0
<10.5	7	3	2	1	1	1	1	1	0	0
<11	15	12	3	3	2	2	2	2	1	1
<11.5	2	3	0	0	0	0	0	0	0	0
<=12	6	6	0	0	0	0	0	0	0	0
<12.5	5	2	2	0	0	0	0	0	0	0
<13	0	0	0	0	0	0	0	0	0	0
<13.5	0	0	0	0	0	0	0	0	0	0
<14	3	5	0	2	1	1	1	1	1	1
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	0	0	0	0	0	0	0	0	0	0
<100,000	0	0	0	0	0	0	0	0	0	0
<200,000	0	2	0	0	0	0	0	0	0	0
<585000	4	0	0	0	0	0	0	0	0	0
<685000	1	3	0	0	0	0	0	0	0	0
<885000	8	9	1	0	0	0	0	0	0	0
>885000	25	20	7	6	4	4	4	3	3	2

Table V.18
Vehicle/Dry Bulk Carrier - Tolls

Vehicle/Dry Bulk Carrier - Tolls

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	$1,958,000	$1,914,583	$435,621	$458,913	$326,349	$316,813	$324,309	$323,436	$310,855	$294,851

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	$110,916	$40,598	$0	$0	$0	$0	$0	$0	$0	$0
<25.9	$36,949	$36,550	$0	$0	$0	$0	$0	$0	$0	$0
<27.7	$438,209	$361,128	$158,807	$0	$0	$0	$0	$0	$0	$0
<29	$817,876	$630,012	$140,689	$140,885	$100,188	$97,260	$99,561	$99,293	$95,431	$90,518
<30.4	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=32.3	$554,050	$846,295	$136,125	$318,029	$226,161	$219,553	$224,747	$224,142	$215,424	$204,333
<33.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<36.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<39.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<42.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<45.7	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<48.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<51.8	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>54.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<15000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<20000	$0	$40,598	$0	$0	$0	$0	$0	$0	$0	$0
<25000	$388,027	$411,179	$136,125	$136,397	$96,997	$94,162	$96,390	$96,131	$92,392	$87,635
<30000	$34,131	$34,054	$67,354	$0	$0	$0	$0	$0	$0	$0
<40000	$1,107,537	$993,636	$232,142	$140,885	$100,188	$97,260	$99,561	$99,293	$95,431	$90,518
<50000	$151,367	$0	$0	$0	$0	$0	$0	$0	$0	$0
<60000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<70000	$276,939	$435,116	$0	$181,631	$129,164	$125,390	$128,357	$128,011	$123,032	$116,698
<80000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	$0	$40,598	$0	$0	$0	$0	$0	$0	$0	$0
<15000	$145,046	$34,054	$67,354	$0	$0	$0	$0	$0	$0	$0
<20000	$1,107,537	$939,532	$232,142	$140,885	$100,188	$97,260	$99,561	$99,293	$95,431	$90,518
<25000	$151,367	$54,104	$0	$0	$0	$0	$0	$0	$0	$0
<30000	$0	$69,851	$0	$0	$0	$0	$0	$0	$0	$0
<40000	$276,939	$365,264	$0	$181,631	$129,164	$125,390	$128,357	$128,011	$123,032	$116,698
<50000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<60000	$277,112	$411,179	$136,125	$136,397	$96,997	$94,162	$96,390	$96,131	$92,392	$87,635
<70000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<80000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<90000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<110000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<120000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<150000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>200000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<24.38	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<30.48	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200	$1,681,061	$1,479,467	$435,621	$277,282	$197,184	$191,423	$195,952	$195,424	$187,823	$178,153
<230.9	$276,939	$435,116	$0	$181,631	$129,164	$125,390	$128,357	$128,011	$123,032	$116,698
<286.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<294.1	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<330.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<360.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<385.6	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>399.9	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=10	$0	$74,652	$33,822	$0	$0	$0	$0	$0	$0	$0
<10.5	$422,158	$411,179	$169,657	$136,397	$96,997	$94,162	$96,390	$96,131	$92,392	$87,635
<11	$701,514	$537,539	$140,689	$140,885	$100,188	$97,260	$99,561	$99,293	$95,431	$90,518
<11.5	$79,411	$115,970	$0	$0	$0	$0	$0	$0	$0	$0
<=12	$233,526	$248,046	$0	$0	$0	$0	$0	$0	$0	$0
<12.5	$244,452	$92,081	$91,453	$0	$0	$0	$0	$0	$0	$0
<13	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<13.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<14	$276,939	$435,116	$0	$181,631	$129,164	$125,390	$128,357	$128,011	$123,032	$116,698
<14.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<=15.2	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<17.5	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
>=20	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<100,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
<200,000	$0	$40,598	$0	$0	$0	$0	$0	$0	$0	$0
<585000	$110,916	$0	$0	$0	$0	$0	$0	$0	$0	$0
<685000	$36,949	$115,965	$0	$0	$0	$0	$0	$0	$0	$0
<885000	$310,119	$353,813	$33,532	$0	$0	$0	$0	$0	$0	$0
>885000	$1,500,017	$1,404,207	$402,089	$458,913	$326,349	$316,813	$324,309	$323,436	$310,855	$294,851

Table V.19
Vehicle/Dry Bulk Carrier - Cargo

Vehicle/Dry Bulk Carrier - Cargo

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	810,148	807,386	134,416	132,357	131,237	128,260	111,281	97,298	82,905	69,570

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	36,250	29,121	0	0	0	0	0	0	0	0
<25.9	28,251	31,287	0	0	0	0	0	0	0	0
<27.7	280,527	257,377	99,932	0	0	0	0	0	0	0
<29	394,311	325,318	27,110	47,361	46,960	45,895	39,819	34,816	29,666	24,894
<30.4	0	0	0	0	0	0	0	0	0	0
<=32.3	70,809	164,283	7,374	84,996	84,277	82,365	71,461	62,482	53,239	44,676
<33.5	0	0	0	0	0	0	0	0	0	0
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	0	0	0	0	0	0	0	0	0	0
<15000	0	0	0	0	0	0	0	0	0	0
<20000	0	29,121	0	0	0	0	0	0	0	0
<25000	51,791	13,913	7,374	37,192	36,877	36,041	31,270	27,340	23,296	19,549
<30000	24,605	25,311	40,586	0	0	0	0	0	0	0
<40000	581,128	588,671	86,456	47,361	46,960	45,895	39,819	34,816	29,666	24,894
<50000	97,356	0	0	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	55,268	150,370	0	47,804	47,399	46,324	40,192	35,141	29,943	25,127
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	0	29,121	0	0	0	0	0	0	0	0
<15000	60,855	25,311	40,586	0	0	0	0	0	0	0
<20000	581,128	556,195	86,456	47,361	46,960	45,895	39,819	34,816	29,666	24,894
<25000	97,356	32,476	0	0	0	0	0	0	0	0
<30000	0	49,181	0	0	0	0	0	0	0	0
<40000	55,268	101,189	0	47,804	47,399	46,324	40,192	35,141	29,943	25,127
<50000	0	0	0	0	0	0	0	0	0	0
<60000	15,541	13,913	7,374	37,192	36,877	36,041	31,270	27,340	23,296	19,549
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	754,880	657,016	134,416	84,553	83,837	81,935	71,089	62,156	52,962	44,443
<230.9	55,268	150,370	0	47,804	47,399	46,324	40,192	35,141	29,943	25,127
<286.6	0	0	0	0	0	0	0	0	0	0
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=10	0	54,432	19,210	0	0	0	0	0	0	0
<10.5	76,396	13,913	28,750	37,192	36,877	36,041	31,270	27,340	23,296	19,549
<11	307,286	261,864	27,110	47,361	46,960	45,895	39,819	34,816	29,666	24,894
<11.5	59,674	84,612	0	0	0	0	0	0	0	0
<=12	170,595	169,406	0	0	0	0	0	0	0	0
<12.5	140,929	72,789	59,346	0	0	0	0	0	0	0
<13	0	0	0	0	0	0	0	0	0	0
<13.5	0	0	0	0	0	0	0	0	0	0
<14	55,268	150,370	0	47,804	47,399	46,324	40,192	35,141	29,943	25,127
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	0	0	0	0	0	0	0	0	0	0
<100,000	0	0	0	0	0	0	0	0	0	0
<200,000	0	29,121	0	0	0	0	0	0	0	0
<585000	36,250	0	0	0	0	0	0	0	0	0
<685000	28,251	90,307	0	0	0	0	0	0	0	0
<885000	226,623	253,803	21,376	0	0	0	0	0	0	0
>885000	519,024	434,155	113,040	132,357	131,237	128,260	111,281	97,298	82,905	69,570

Table V.20
Vehicle/Dry Bulk Carrier - PCUMS

Vehicle/Dry Bulk Carrier - PCUMS

	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
TOTAL	815,712	806,331	184,722	194,211	137,798	134,673	116,845	102,163	87,051	73,049

Beam	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=24.3	46,208	17,098	0	0	0	0	0	0	0	0
<25.9	15,393	15,393	0	0	0	0	0	0	0	0
<27.7	182,560	152,090	67,341	0	0	0	0	0	0	0
<29	340,731	265,331	59,658	59,622	42,304	41,344	35,871	31,363	26,724	22,426
<30.4	0	0	0	0	0	0	0	0	0	0
<=32.3	230,820	356,419	57,723	134,589	95,495	93,329	80,974	70,799	60,326	50,623
<33.5	0	0	0	0	0	0	0	0	0	0
<36.6	0	0	0	0	0	0	0	0	0	0
<39.6	0	0	0	0	0	0	0	0	0	0
<42.7	0	0	0	0	0	0	0	0	0	0
<45.7	0	0	0	0	0	0	0	0	0	0
<48.8	0	0	0	0	0	0	0	0	0	0
<51.8	0	0	0	0	0	0	0	0	0	0
<=54.9	0	0	0	0	0	0	0	0	0	0
>54.9	0	0	0	0	0	0	0	0	0	0

DWT	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	0	0	0	0	0	0	0	0	0	0
<15000	0	0	0	0	0	0	0	0	0	0
<20000	0	17,098	0	0	0	0	0	0	0	0
<25000	161,654	173,169	57,723	57,723	40,956	40,027	34,728	30,365	25,873	21,711
<30000	14,219	14,342	28,561	0	0	0	0	0	0	0
<40000	461,405	418,472	98,438	59,622	42,304	41,344	35,871	31,363	26,724	22,426
<50000	63,060	0	0	0	0	0	0	0	0	0
<60000	0	0	0	0	0	0	0	0	0	0
<70000	115,374	183,250	0	76,866	54,539	53,302	46,245	40,435	34,453	28,912
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

PcUms	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<10000	0	17,098	0	0	0	0	0	0	0	0
<15000	60,427	14,342	28,561	0	0	0	0	0	0	0
<20000	461,405	395,686	98,438	59,622	42,304	41,344	35,871	31,363	26,724	22,426
<25000	63,060	22,786	0	0	0	0	0	0	0	0
<30000	0	29,418	0	0	0	0	0	0	0	0
<40000	115,374	153,832	0	76,866	54,539	53,302	46,245	40,435	34,453	28,912
<50000	0	0	0	0	0	0	0	0	0	0
<60000	115,446	173,169	57,723	57,723	40,956	40,027	34,728	30,365	25,873	21,711
<70000	0	0	0	0	0	0	0	0	0	0
<80000	0	0	0	0	0	0	0	0	0	0
<90000	0	0	0	0	0	0	0	0	0	0
<100000	0	0	0	0	0	0	0	0	0	0
<110000	0	0	0	0	0	0	0	0	0	0
<120000	0	0	0	0	0	0	0	0	0	0
<150000	0	0	0	0	0	0	0	0	0	0
<200000	0	0	0	0	0	0	0	0	0	0
>200000	0	0	0	0	0	0	0	0	0	0

Length	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<15.24	0	0	0	0	0	0	0	0	0	0
<24.38	0	0	0	0	0	0	0	0	0	0
<30.48	0	0	0	0	0	0	0	0	0	0
<200	700,338	623,081	184,722	117,345	83,260	81,371	70,599	61,728	52,597	44,137
<230.9	115,374	183,250	0	76,866	54,539	53,302	46,245	40,435	34,453	28,912
<286.6	0	0	0	0	0	0	0	0	0	0
<294.1	0	0	0	0	0	0	0	0	0	0
<330.9	0	0	0	0	0	0	0	0	0	0
<360.9	0	0	0	0	0	0	0	0	0	0
<385.6	0	0	0	0	0	0	0	0	0	0
<399.9	0	0	0	0	0	0	0	0	0	0
>399.9	0	0	0	0	0	0	0	0	0	0

Draft	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<=10	0	31,440	14,342	0	0	0	0	0	0	0
<10.5	175,873	173,169	71,942	57,723	40,956	40,027	34,728	30,365	25,873	21,711
<11	292,254	226,386	59,658	59,622	42,304	41,344	35,871	31,363	26,724	22,426
<11.5	33,083	48,841	0	0	0	0	0	0	0	0
<=12	97,288	104,465	0	0	0	0	0	0	0	0
<12.5	101,840	38,780	38,780	0	0	0	0	0	0	0
<13	0	0	0	0	0	0	0	0	0	0
<13.5	0	0	0	0	0	0	0	0	0	0
<14	115,374	183,250	0	76,866	54,539	53,302	46,245	40,435	34,453	28,912
<14.5	0	0	0	0	0	0	0	0	0	0
<=15.2	0	0	0	0	0	0	0	0	0	0
<17.5	0	0	0	0	0	0	0	0	0	0
<20	0	0	0	0	0	0	0	0	0	0
>=20	0	0	0	0	0	0	0	0	0	0

CuCap	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
<34000	0	0	0	0	0	0	0	0	0	0
<100,000	0	0	0	0	0	0	0	0	0	0
<200,000	0	17,098	0	0	0	0	0	0	0	0
<585000	46,208	0	0	0	0	0	0	0	0	0
<685000	15,393	48,839	0	0	0	0	0	0	0	0
<885000	129,197	149,009	14,219	0	0	0	0	0	0	0
>885000	624,914	591,385	170,503	194,211	137,798	134,673	116,845	102,163	87,051	73,049

Group 2 Ships

The outlook for the ships in Group 2 is shown in Table V.21 below in terms of PCUMS units, displacement tons, transits, and tolls. The 2,079 transits in FY2003 are expected to grow by 3% over the 2003-2025 forecast period, reaching 3,990. Yachts are expected to grow at 3.7% per year, making this ship type the largest of the Group 2 vessels in terms of transits, a position already held in the initial FY2003.

Table V.21
Transits for Group 2 Ships

		History			Forecast					
Ship Code	*Ship Type*	*2003*	*2004*	*2005*	*2010*	*2015*	*2020*	*2025*	*CAGR 2000-2003*	*CAGR 2003-2025*
13	Barge carrier	0	2	2	2	1	1	1	-100.0	NA
14	Barge not self-propelled	71	74	77	95	117	142	173	8.9	4.1
15	Barge self-propelled	3	3	3	3	3	3	3	-9.1	0.3
16	Fishing vessel	395	403	412	472	545	631	739	-5.4	2.9
17	Factory ship	5	5	5	5	5	5	5	-10.6	-0.2
18	Tug	183	187	191	212	234	256	281	0.2	2.0
19	Research vessel	33	35	36	45	56	69	85	-11.1	4.4
20	Cable Ship	15	15	16	18	21	25	29	-14.5	3.1
21	Yacht	947	983	1,021	1,224	1,463	1,738	2,060	6.1	3.6
22	Rig Tender/Supply Ship	21	22	23	30	39	50	67	20.5	5.4
23	Tank Barge not self-propelled	42	44	47	64	88	121	164	40.9	6.4
24	Tank Barge self-propelled	1	1	1	1	1	1	1	-20.6	-1.0
25	Barge integrated	7	7	7	8	8	8	9	-14.0	1.1
26	Tank barge integrated	22	23	23	28	32	37	43	5.0	3.1
27	Woodship	27	27	27	26	25	23	22	-21.1	-0.9
50	Other Vessel (PC Net)	157	157	158	158	158	157	156	-5.2	0.0
90	Dredge	9	9	9	9	9	9	9	-9.1	-0.1
91	Floating Dry dock	0	0	0	0	0	0	0	NA	NA
93	Warship	133	133	133	134	135	135	135	-3.7	0.1
94	Submarine	3	3	3	3	3	3	3	0.0	-0.8
99	Other Vessel (Displacement)	5	5	5	5	6	6	6	-14.5	0.8
	Total Transits	*2,079*	*2,137*	*2,199*	*2,540*	*2,947*	*3,421*	*3,990*	*0.5*	*3.0*

This growth in transits will generate a growth in tolls revenue as well, assuming that the current pricing structure is maintained. The expected tolls from Group 2 vessels is shown in Table V.22 below.

Table V.22
Tolls for Group 2 Vessels

		History			Forecast					
Ship Code	*Ship Type*	*2003*	*2004*	*2005*	*2010*	*2015*	*2020*	*2025*	*CAGR 2000-2003*	*CAGR 2003-2025*
13	Barge carrier	0	26,619	26,925	27,202	27,083	26,923	26,653	-100.0	NA
14	Barge not self-propelled	1,096,773	1,179,444	1,275,310	1,799,444	2,502,761	3,476,953	4,811,182	13.6	7.0
15	Barge self-propelled	3,000	3,141	3,266	3,820	4,414	5,092	5,849	-5.0	3.1
16	Fishing vessel	1,053,607	1,108,738	1,174,982	1,542,859	2,021,456	2,670,177	3,559,764	-2.7	5.7
17	Factory ship	19,543	20,149	20,887	23,866	26,876	30,223	33,848	-13.9	2.5
18	Tug	306,509	326,088	344,662	437,005	547,494	684,853	853,061	-1.6	4.8
19	Research vessel	218,416	235,600	255,433	365,359	515,181	725,606	1,017,924	15.1	7.2
20	Cable Ship	343,970	362,136	384,521	509,393	673,114	896,757	1,205,783	-5.4	5.9
21	Yacht	747,302	807,765	867,427	1,190,782	1,615,309	2,187,985	2,951,299	8.9	6.4
22	Rig Tender/Supply Ship	54,513	59,297	64,269	94,976	140,321	208,942	313,866	17.8	8.3
23	Tank Barge not self-propelled	437,904	480,027	530,901	838,794	1,306,440	2,032,720	3,150,370	35.5	9.4
24	Tank Barge self-propelled	2,764	2,827	2,907	3,192	3,455	3,733	4,018	-23.4	1.7
25	Barge integrated	439,437	458,674	481,390	585,052	700,818	838,376	998,885	-6.6	3.8
26	Tank barge integrated	1,223,678	1,303,368	1,395,874	1,877,329	2,488,737	3,295,279	4,345,794	7.7	5.9
27	Woodship	2,535,882	2,596,905	2,674,096	2,954,229	3,216,580	3,497,184	3,786,746	-17.6	1.8
50	Other Vessel (PC Net)	1,101,470	1,139,336	1,180,620	1,355,613	1,537,905	1,741,801	1,964,314	-12.9	2.7
90	Dredge	72,312	72,347	75,463	87,030	98,187	110,711	124,402	-8.1	2.5
91	Floating Dry dock	0	0	0	0	0	0	0	NA	NA
93	Warship	514,746	515,484	537,948	624,462	710,412	810,147	921,796	-1.2	2.7
94	Submarine	22,846	22,693	23,489	26,172	28,580	31,283	34,165	-5.1	1.8
99	Other Vessel (Displacement)	15,057	15,197	15,992	19,276	22,730	26,788	31,463	-3.7	3.4
	Total Tolls	*10,209,730*	*10,735,835*	*11,336,362*	*14,365,858*	*18,187,850*	*23,301,532*	*30,141,181*	*-5.4*	*5.0*

The 4-year decline in tolls revenue is projected to show an increase over the forecast period, from $10.2 million in 2003 to $30,1 million in 2025, in line with the growth in transits and the assumption that tolls rates will adjust in line with the global inflation rate.

Additionally, the Global Insight model forecasts each of these Group 2 vessel types in terms of PCUMS and displacement, the two units of measurement that serve as the basis for the current pricing scheme. The total PCUMS and total displacement, by year, for each of the vessel types is shown in the following composite Table V.23.

Table V.23
Total PCUMS and Displacement – Group 2 Vessels

		History			Forecast					
Ship Code	*Ship Type*	*2003*	*2004*	*2005*	*2010*	*2015*	*2020*	*2025*	*CAGR 2000-2003*	*CAGR 2003-2025*
13	Barge carrier	0	9,297	9,079	7,995	7,015	6,118	5,322	-100.0	NA
14	Barge not self-propelled	403,405	420,747	439,217	540,223	662,146	806,969	981,218	9.8	4.1
15	Barge self-propelled	556	559	562	574	584	591	597	-14.6	0.3
16	Fishing vessel	335,185	341,668	349,643	400,320	462,197	535,579	627,434	-6.9	2.9
17	Factory ship	7,375	7,374	7,381	7,351	7,295	7,197	7,083	-17.6	-0.2
18	Tug	53,216	54,354	55,565	61,545	67,927	74,535	81,595	-6.5	2.0
19	Research vessel	75,948	79,430	83,144	103,675	128,828	159,175	196,222	11.9	4.4
20	Cable Ship	134,156	136,987	140,426	162,163	188,837	220,698	260,764	-5.8	3.1
21	Yacht	44,353	46,026	47,804	57,328	68,509	81,402	96,499	5.8	3.6
22	Rig Tender/Supply Ship	16,472	17,202	18,033	23,279	30,299	39,576	52,249	10.1	5.4
23	Tank Barge not self-propelled	164,328	175,311	187,187	257,803	353,853	482,986	657,769	29.4	6.5
24	Tank Barge self-propelled	1,245	1,235	1,226	1,174	1,119	1,061	1,003	-22.4	-1.0
25	Barge integrated	157,759	159,705	161,820	171,435	180,972	189,919	198,839	-10.2	1.1
26	Tank barge integrated	437,183	451,628	466,959	547,451	639,564	742,883	860,901	2.3	3.1
27	Woodship	947,883	941,453	935,921	901,319	864,825	824,853	784,837	-21.7	-0.9
50	Other Vessel (PC Net)	385,376	385,890	386,755	387,937	387,713	385,193	381,778	-16.8	0.0
	Total PCUMS	***3,164,440***	***3,228,865***	***3,290,720***	***3,631,574***	***4,051,683***	***4,558,734***	***5,194,108***	***-10.7***	***2.3***
90	Dredge	53,535	53,561	53,636	53,574	53,318	52,748	52,060	-17.3	-0.1
91	Floating Dry dock	0	0	0	0	0	0	0	NA	NA
93	Warship	298,328	298,756	299,320	300,928	301,996	302,170	301,985	-7.0	0.1
94	Submarine	13,854	13,761	13,674	13,196	12,712	12,208	11,711	-11.9	-0.8
99	Other Vessel (Displacement)	10,638	10,738	10,848	11,324	11,779	12,180	12,566	-12.0	0.8
	Total Displacement	***376,355***	***376,815***	***377,478***	***379,022***	***379,805***	***379,308***	***378,322***	***-9.1***	***0.0***

Global Insight has provided the ACP with additional output tables in electronic format. The tables for the 21 vessel types are best examined through Excel. The tables include the history (2000-2003) and forecast (2004-2025) of :

- Length by beam, cubic foot capacity, draft, DWT, length and PCUMS for 14 vessel types;
- PCUMS by beam, cubic foot capacity, draft, DWT, length and PCUMS for 16 vessel types;
- Displacement tons by beam, cubic foot capacity, draft, DWT, length and PCUMS for the remaining 5 vessel types;
- Transits by beam, cubic foot capacity, draft, DWT, length and PCUMS for the 21 vessel types;
- Tolls by beam, cubic foot capacity, draft, DWT, length and PCUMS for the 21 vessel types.

Also included are annual totals of length, PCUMS, displacement, transits, and tolls. In total there are tables for 21 (vessel types) by 3-4 major concepts (length and PCUMS or PCUMS or displacement, transits and tolls) by 6 category divisions (beam, cubic foot capacity, draft, DWT, length and PCUMS). All 500+ tables can be viewed and examined within the Global Insight models. Because of the large number of tables, they are not printed in this Volume II report.

In summary, total PCUMS is projected to increase slightly over the forecast period, and total displacement should show almost no growth at all.

All of the Group 2 vessels currently do not strain the physical limits of the Canal, and the forecast of these ships is not expected to place any requirement to expand the current Canal. The ACP should clearly include the forecast transits in its own capacity planning, taking into account the physical dimensions of these ships.

VI. Marketing Strategy

The vessel types in Group1, which carry some form of cargo, have a toll elasticity that is very small (-.2%) in view of the small size of the ships themselves, which does not afford them many by-pass route options, and the comparatively small percentage of total operating costs represented by the Canal tolls. Therefore, the ACP can be assured that a substantial increase in the current Canal tolls should be accepted by these ship types.

While the number of transits expected in 2025 from the Group 2 vessels reaches 2,022, this is only about 5 ships per day, or roughly 14% of today's Canal throughput capacity. As transits by other ships also increase, not studied in this contract, there will certainly be growing constraints on the overall throughput capacity of the Canal. While the other minor vessel types studied in this Volume II of the Conventional Reefer Study may not be a source of major revenue to support the Canal's expansion efforts, the fact that the toll elasticity is comparatively small may support the need to raise tolls on this segment, or to restructure the methodology used to calculate their tolls, especially in the face of tightening capacity constraints.

Appendices

Appendix A. Regional Definitions

Table A1. Regional Definitions

China Region
China
Hong Kong
Taiwan
Confederation of Independent States
CIS Southeast
CIS West
Eastern Europe
Baltics
Bulgaria
Czech Republic
Hungary
Poland
Romania
Slovak Republic
Indian Subcontinent
India
Other Indian Subcontinent
Pakistan
Other Middle East
Saudi Arabia
United Arab Emirates
Other Persian Gulf
Northern Africa
Egypt
Other Northern Africa
Western Europe North
Belgium
Denmark
Finland
France
Germany
Ireland
Netherlands
Norway
Other Western Europe

Sweden
Switzerland
United Kingdom
Austria
Western Europe South
Greece
Italy
Portugal
Spain
East Africa
Kenya
Other East Africa
Other Mediterranean
Other Mediterranean
Turkey
Southern Africa
South Africa
Other Southern Africa
South East Asia
Malaysia
Philippines
Singapore
South Korea
Thailand
Vietnam
Indonesia

Appendix B. Port Assignments by Country/Region

In order to calculate distances and then shipping costs between countries/regions, Global Insight selected a port to represent the origin or destination within each country/region. The selection was based upon each port's reefer volumes or general cargo importance. The same set of ports was used for reefer ships and other vessel types.

Table B1. Port Assignments by Country/Region

Country	Code	Port
Argentina	ARG	Buenos Aires
Australia	AUS	Sydney
Brazil	BRA	Santos
Canada	CNE	Vancouver
Canada	CNW	Montreal
Caribbean Basin	CRB	Kingsgton, Jamaica
Central America East	CAE	Limon (East Coast)
Central America West	CAW	Balboa, Panama
Chile	CHL	Valparaiso
China Region	CH	Shanghai
Colombia	COE	Santa Marta
	COW	Buenaventura
CIS	CIS	Odessa
East Africa	OEA	Mombasa
Eastern Europe	EE	Hamburg
Ecuador & Bolivia	EB	Guayaquil, Ecuador
Indian Subcontinent	IND	Colombo
Israel	ISR	Ashdod
Japan	JPN	Yokohama
Mexico	MXE	Veracruz
	MXW	Manzanillo
New Zealand	NZL	Wellington
Northern Africa	NAF	Tunis
Other East Coast of S. America	OEL	Montevideo, Uruguay
Other Mediterranean	OMED	Dubrovnik
Other Middle East	MIDE	Bandar Abbas
Other Region	OWW	
Peru	PER	Callao
Russia	RUS	St. Petersburg
South East Asia	SEA	Pusan, South Korea
Southern Africa	SAF	Durban, South Africa
United States	USE	New York

United States	USW	Los Angeles
Venezuela	VEN	La Guiara
Western Africa	WAF	Lagos
Western Europe North	WEN	Rotterdam
Western Europe South	SWE	Marseille