

Columbia River Channel Improvement

A Revised Economic Analysis

Afternoon Goals

- Review Components of the Analysis
- Elicit Boredom

Three Components of the Analysis

- Benefits = Commodity Projections
⊕ Fleet Projections

Commodity Projections

- Based on Lower Columbia River Marine Cargo Forecasts
- Prepared by BST in association with DRI/WEFA
- With Adjustments for NED Compliance

Fleet Projections

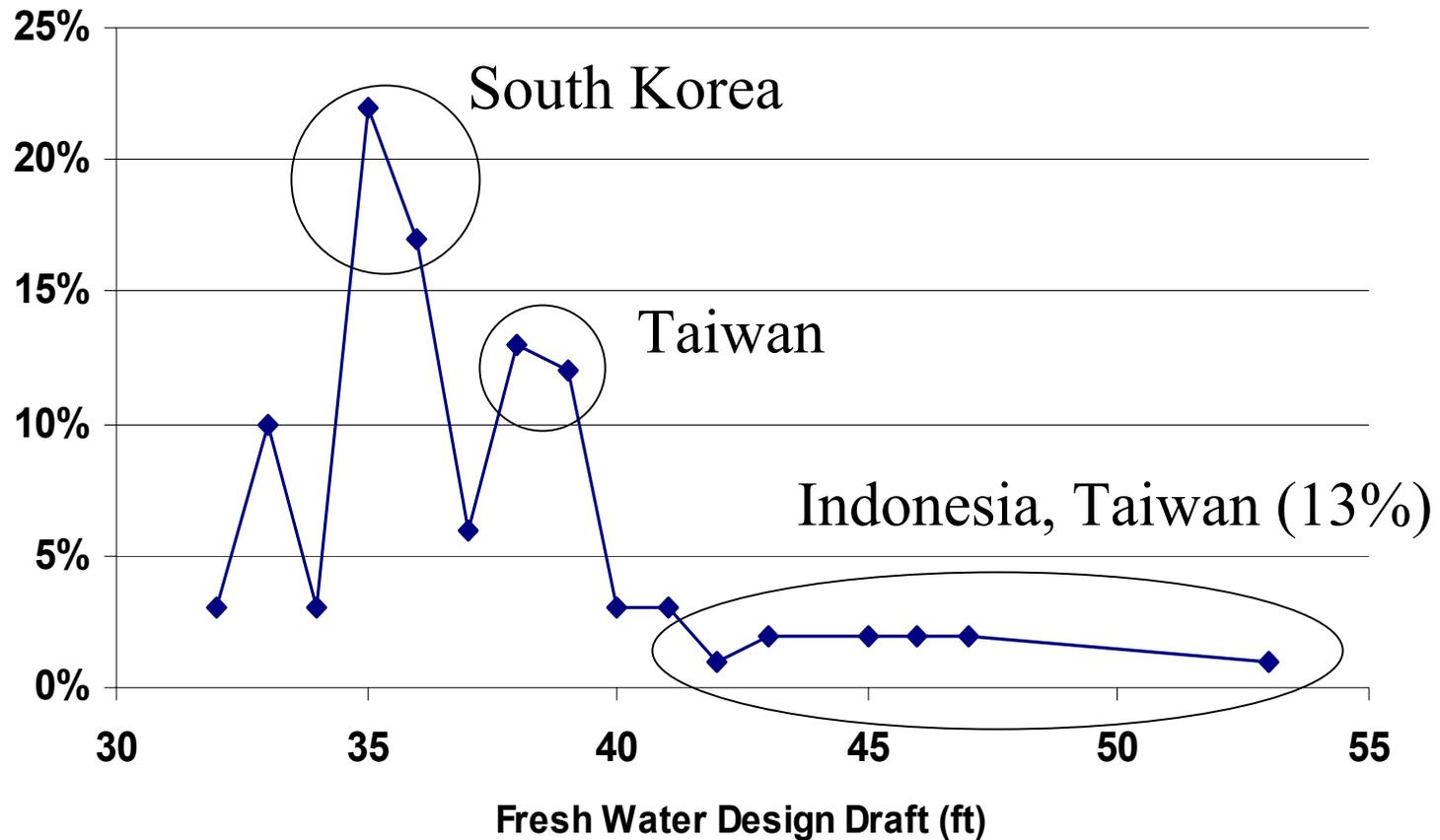
- Distribution of Tonnage by Fresh Water Design Draft
- Based on Actual Recent Data

Wheat Fleet

- Four Export Regions
 - Japan, Rapidly Developing Asia, Other Asia, and Other
- Japan – 21 percent, will not benefit
- RDA – 28 percent
- Other Asia – 38 percent
- Other – 13 percent

RDA Wheat Fleet

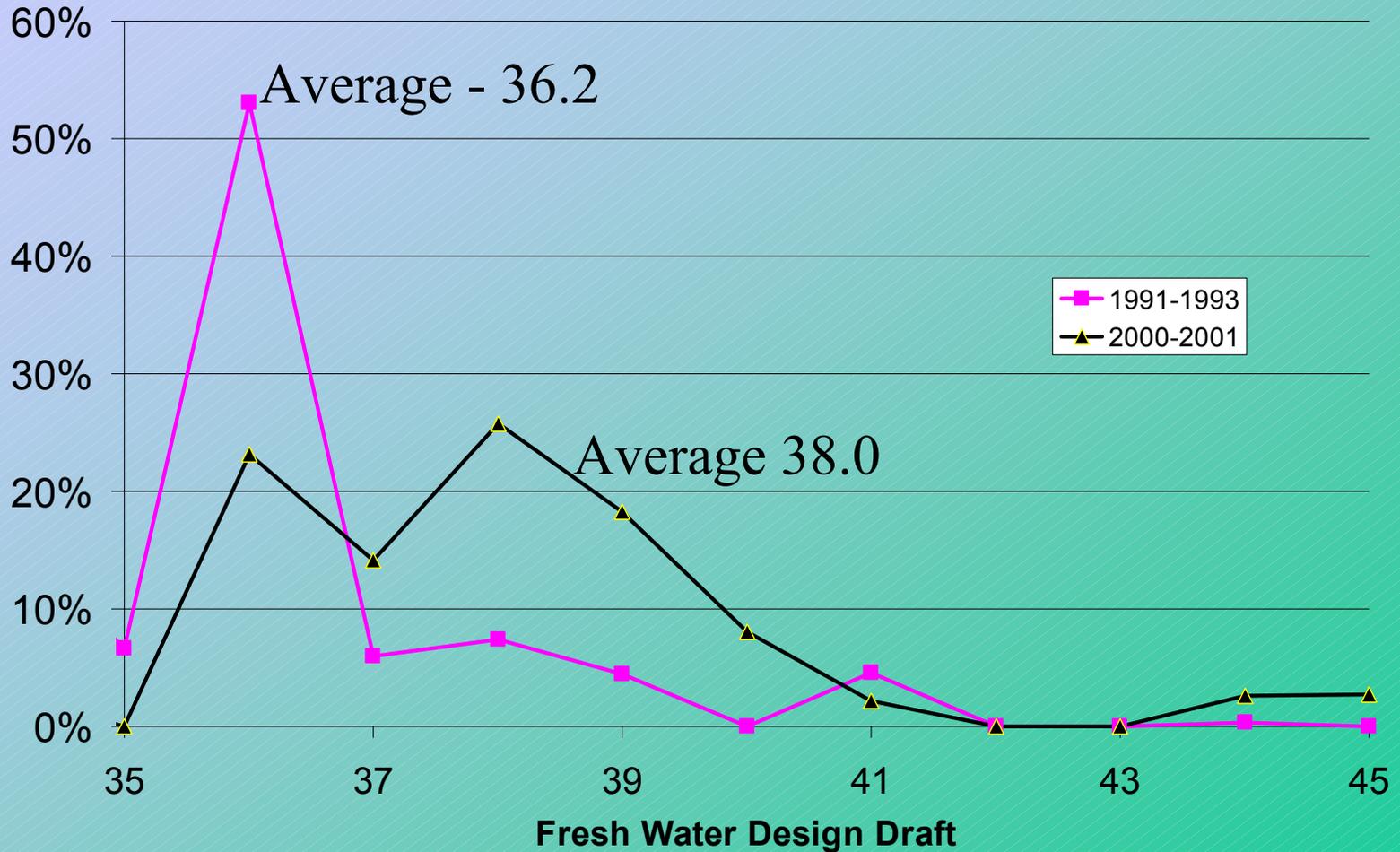
Actual Tonnage Distribution (2000-2001)



RDA Wheat Fleet – S. Korea

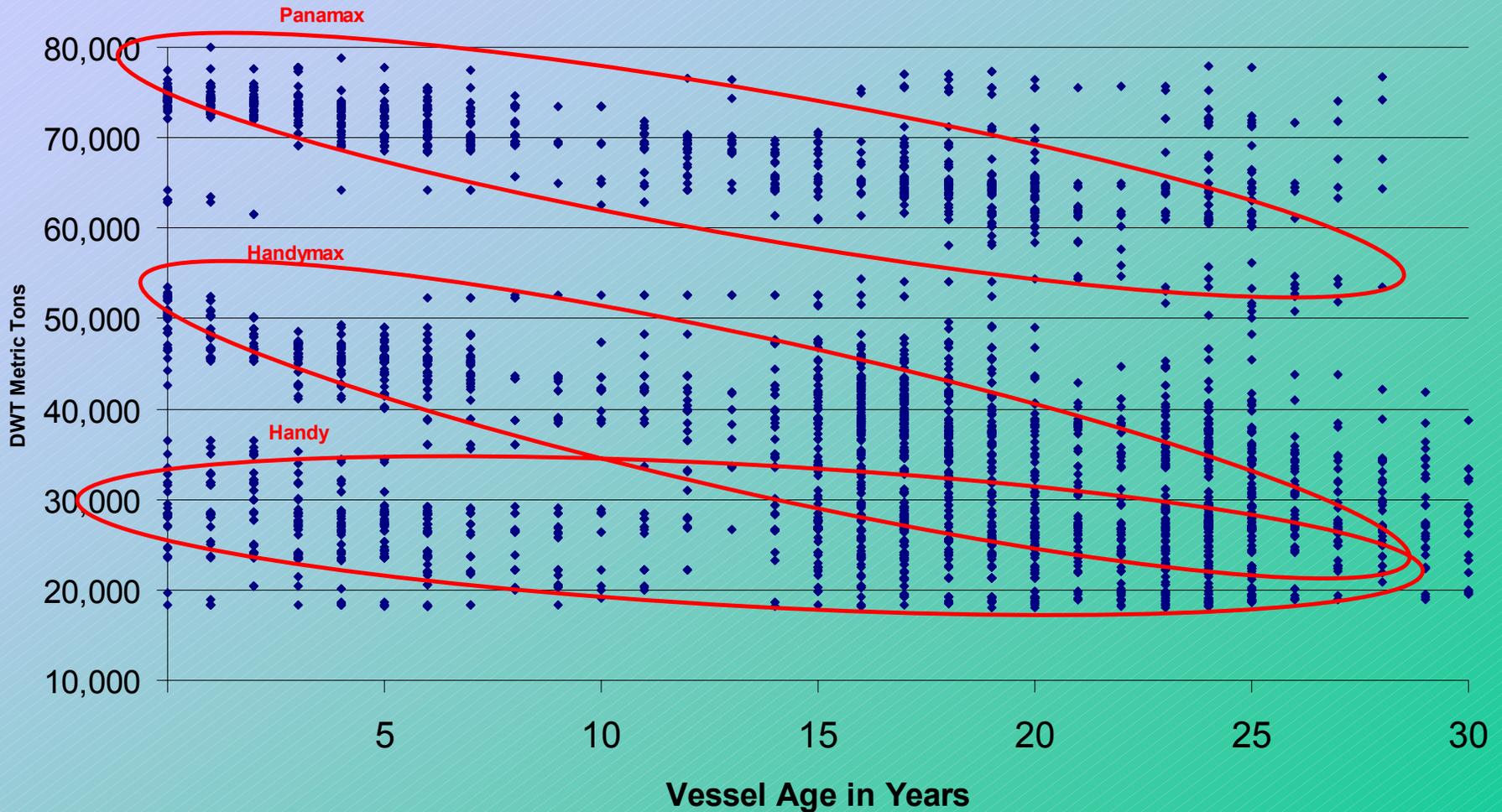
- Little change over the last decade.
- Shift to benefiting vessels unlikely to occur soon.
- 40% of RDA Tonnage will not benefit from deepening.

RDA Wheat Fleet - Taiwan



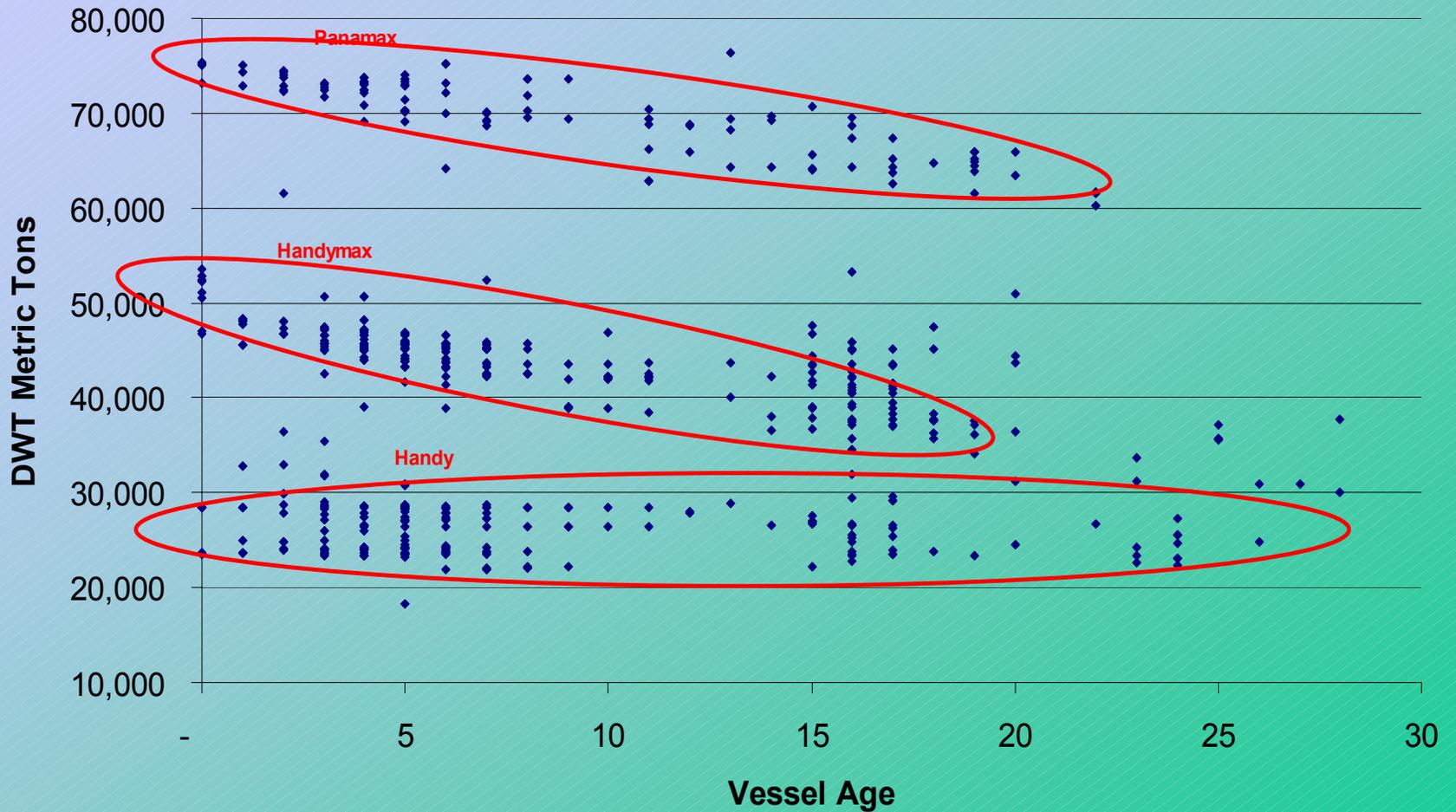
The Handymax Detour

World Dry Bulk Vessel Fleet
18,000 - 80,000 DWT tons



The Handymax Detour

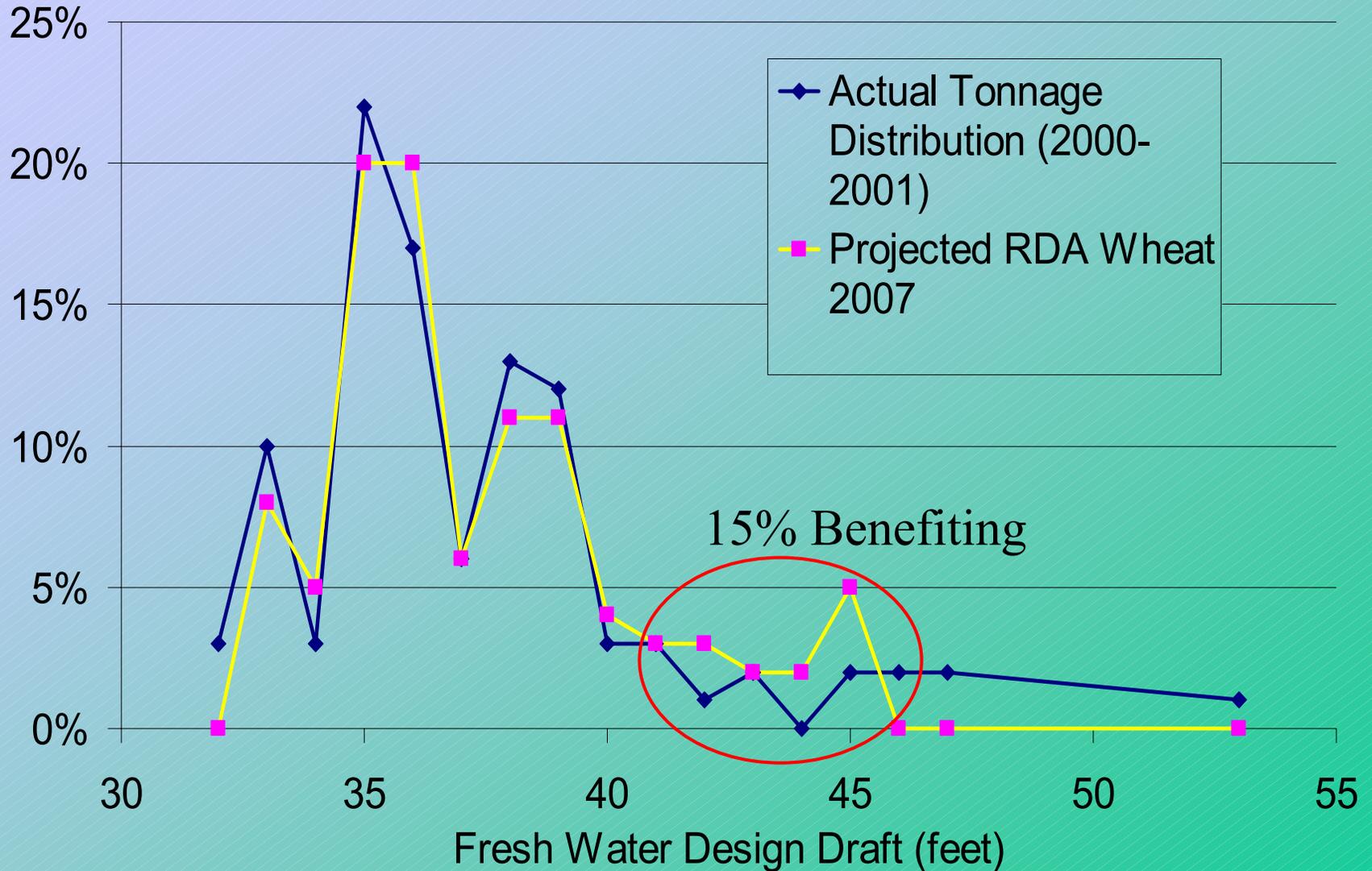
Columbia River Grain Vessels 2000-01



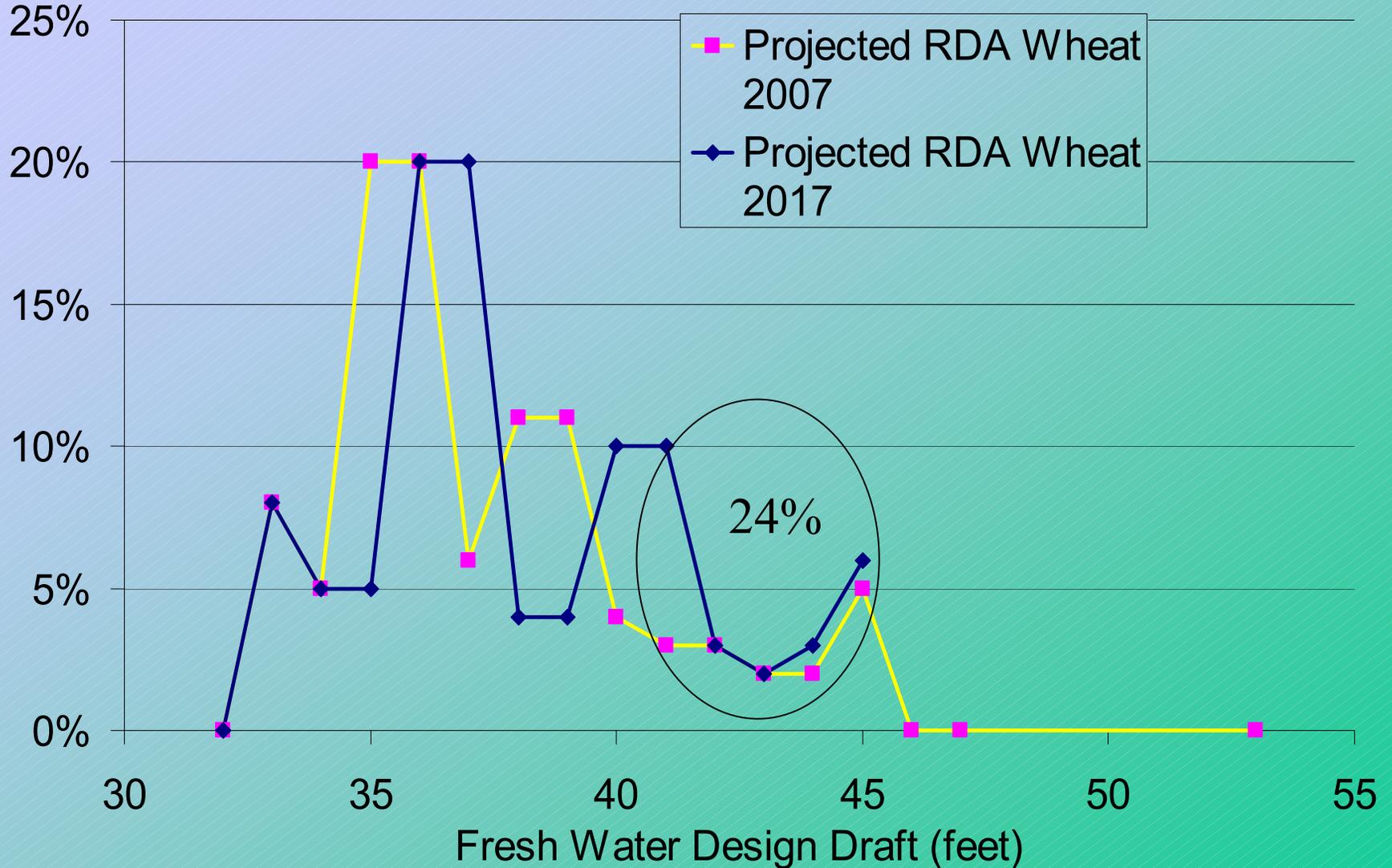
Handymax Assumptions

- Tomorrow will be like Today.
- Larger Handymax will become increasingly common.
- Trade Routes dominated by 38 to 39-foot vessels will be using 40 to 41-foot vessels by 2017.
- Held constant after 2017.

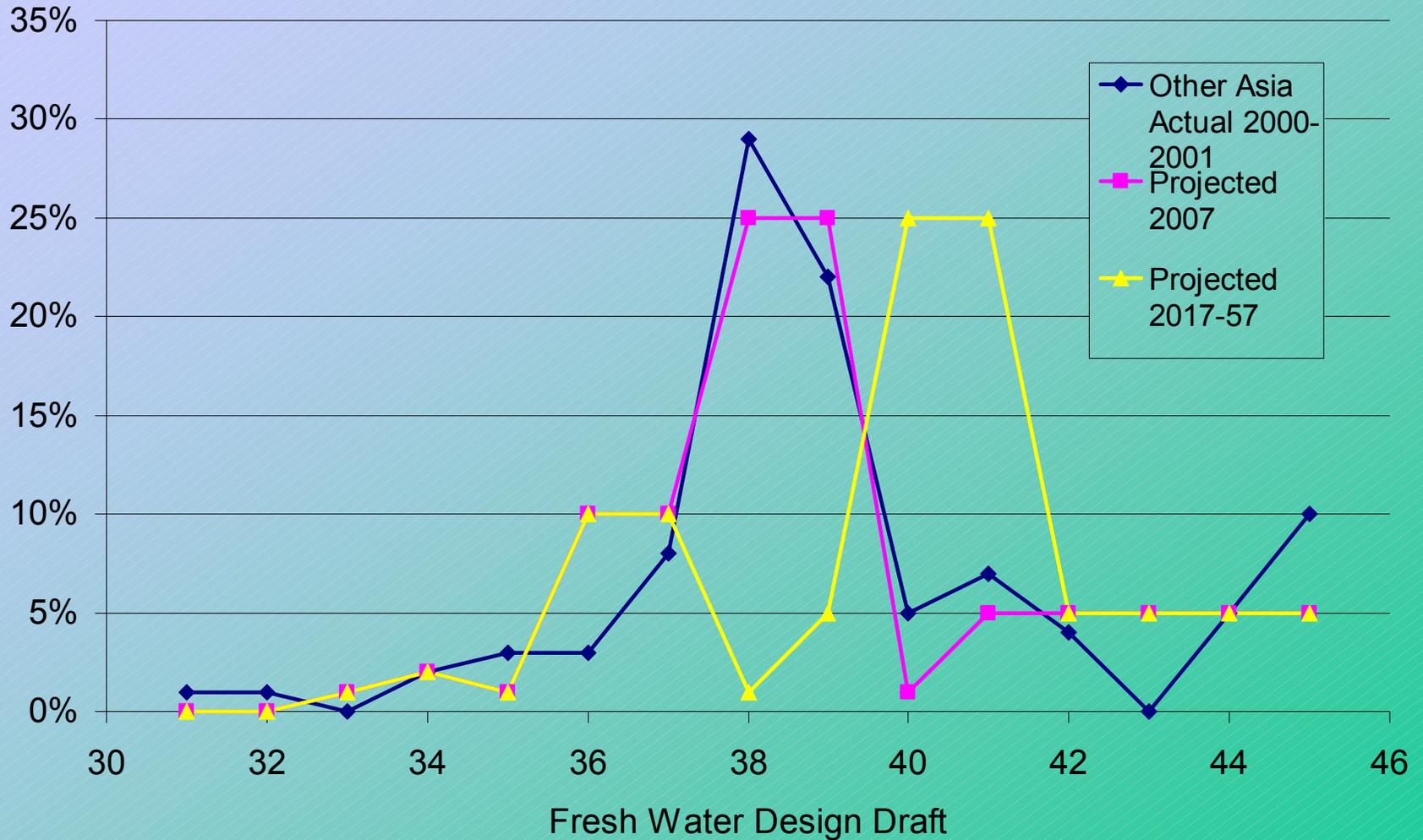
Back to RDA Wheat



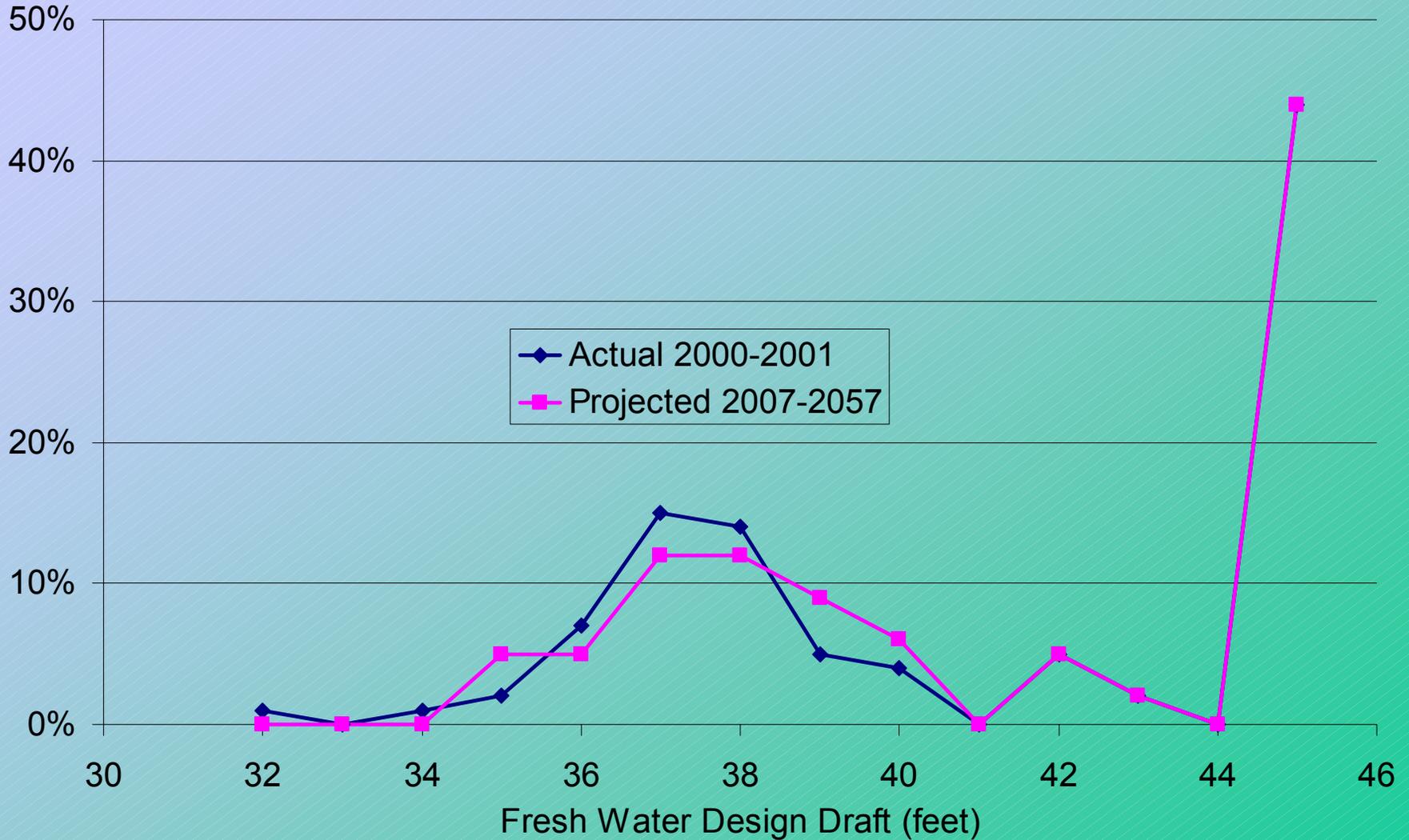
RDA Wheat



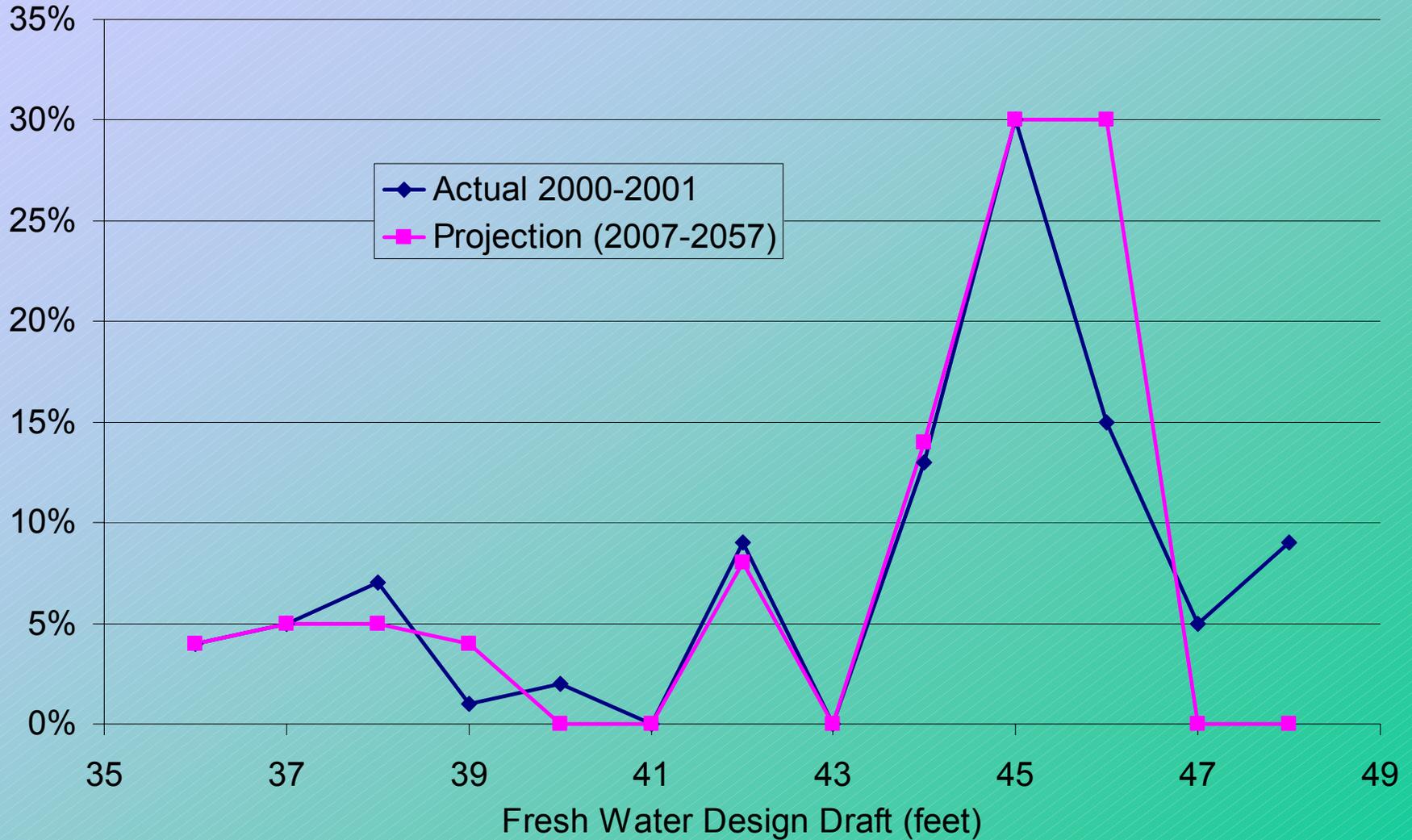
Other Asia Wheat



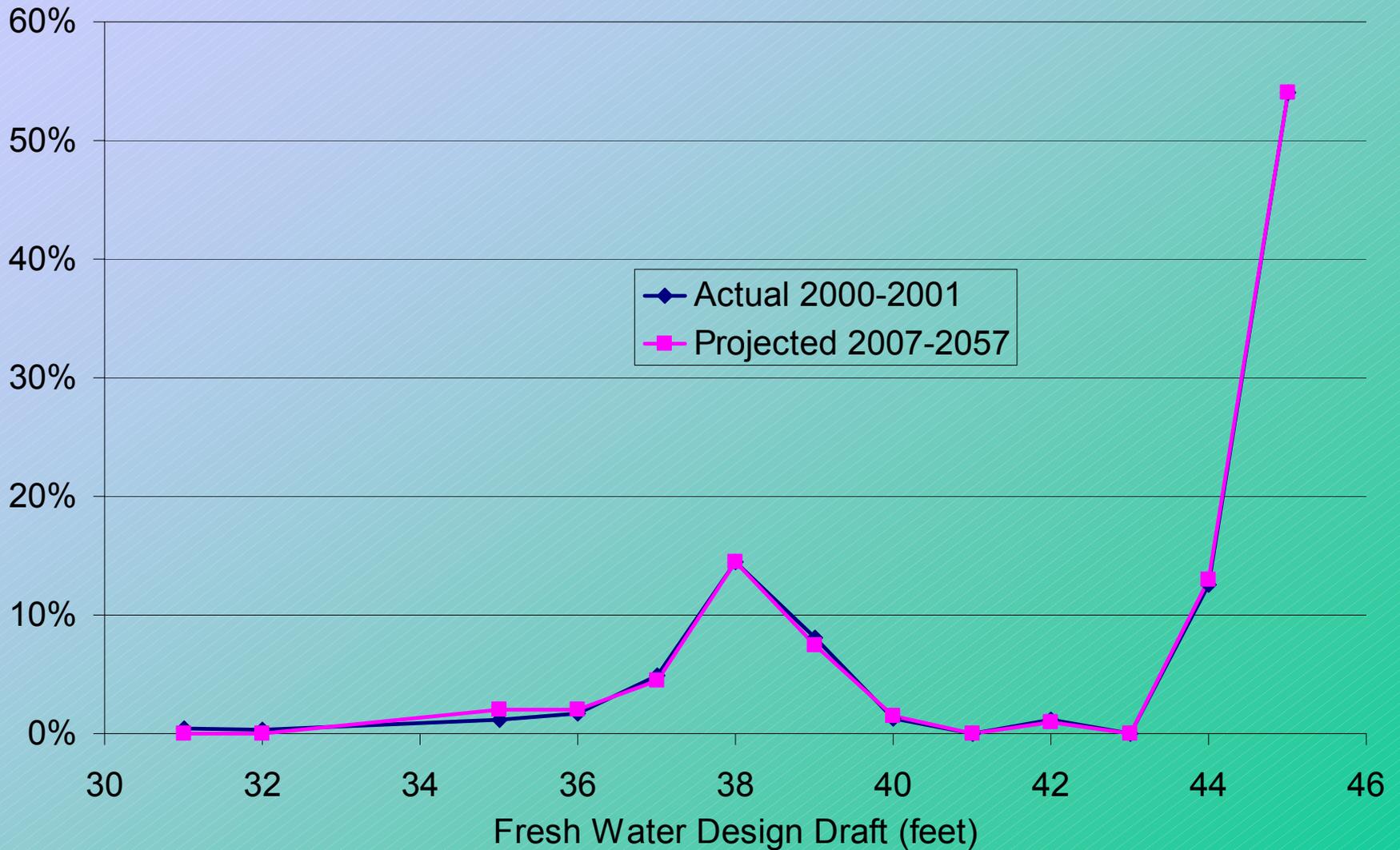
Other Wheat



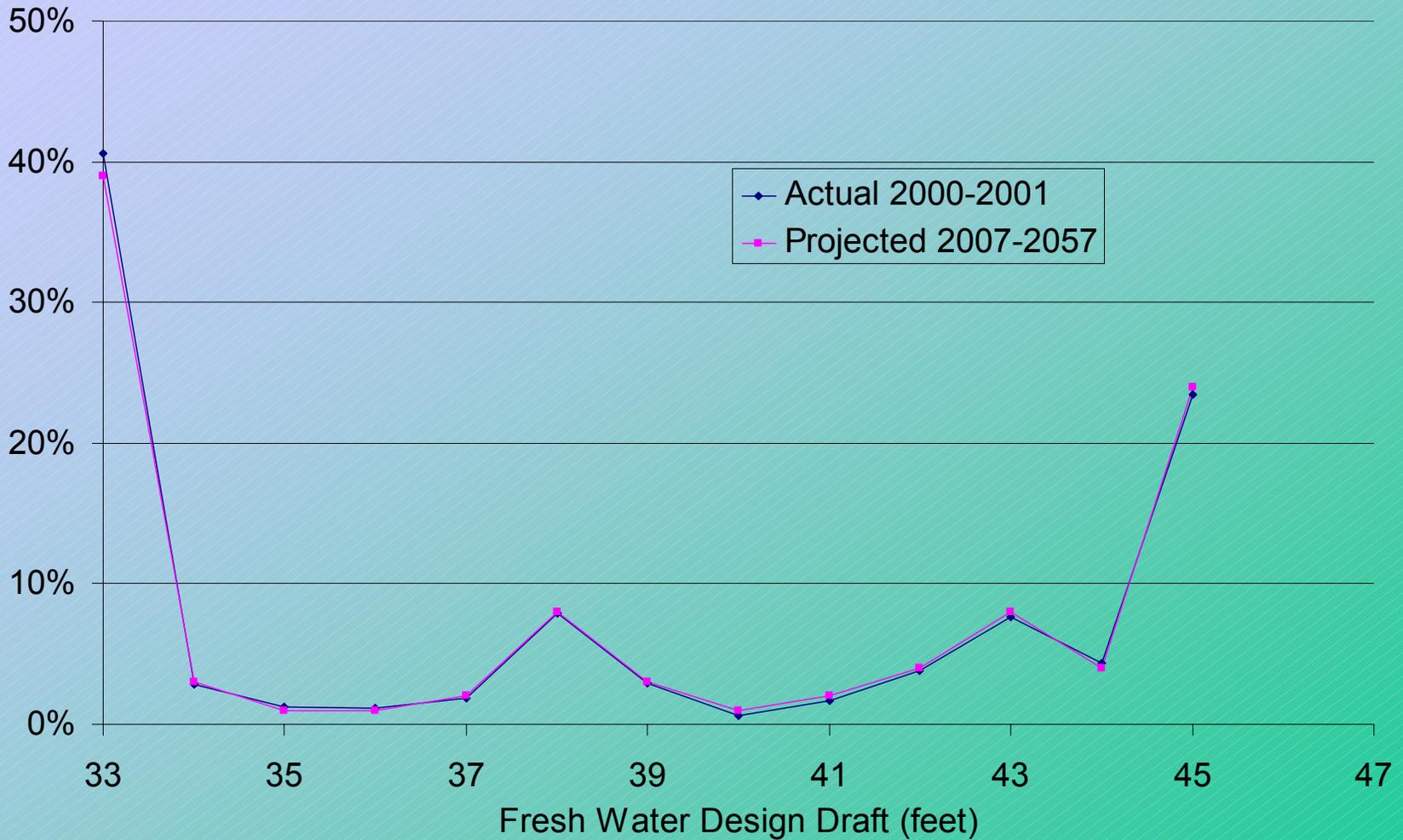
RDA Corn



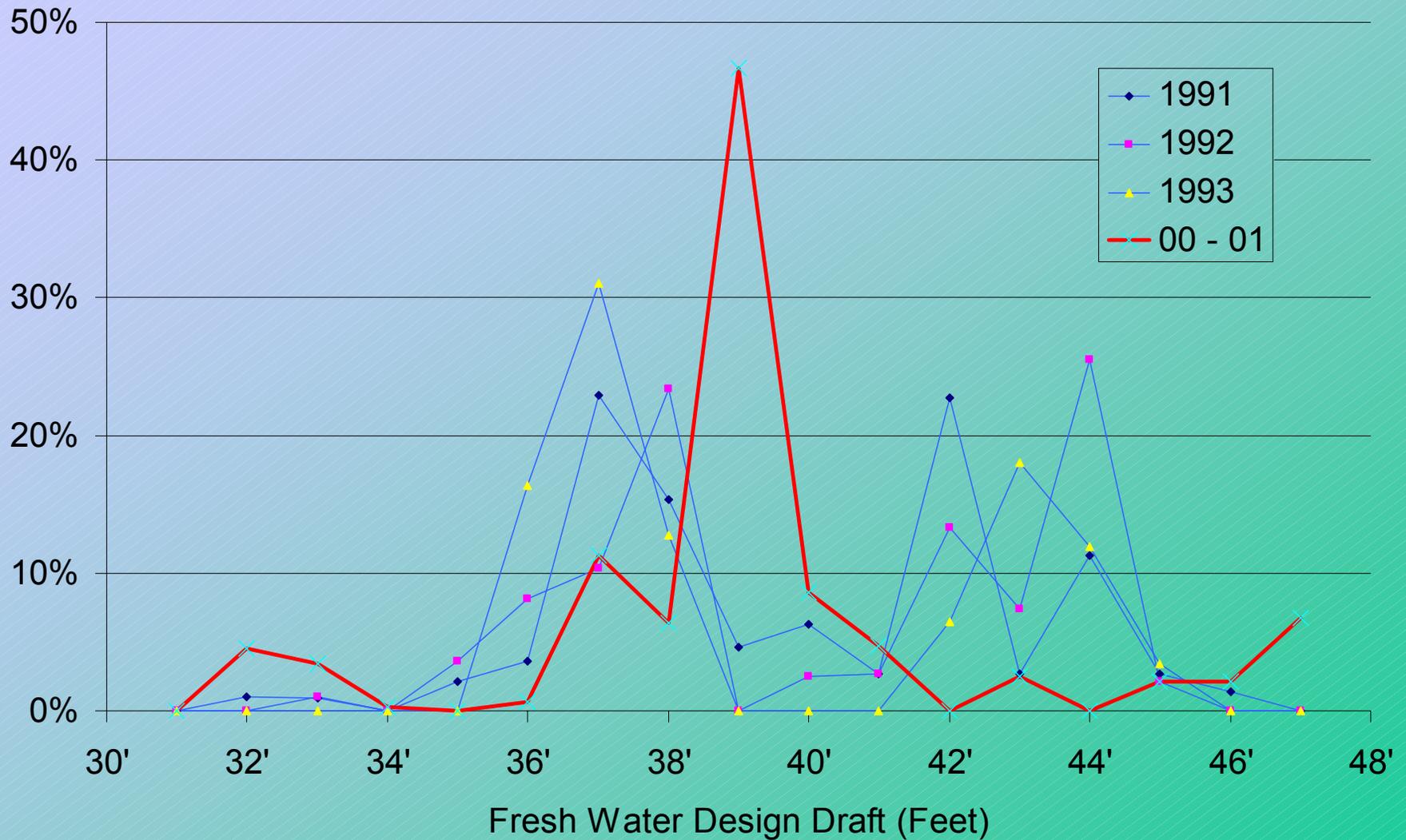
Soybeans



Barley



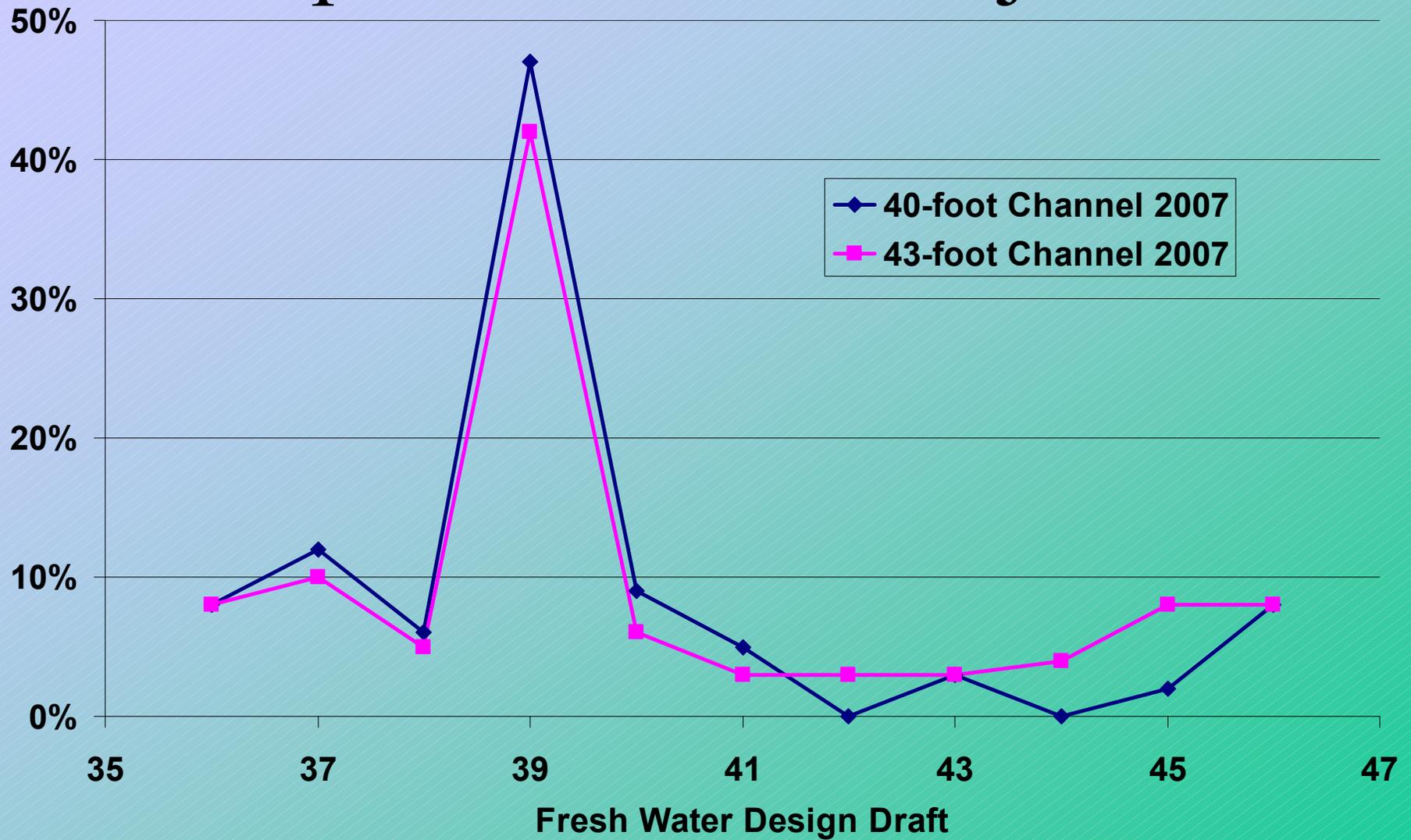
Corn Exports to Japan



Blending with the Puget Sound

- Same commodity
- Same origins
- Same destinations
- Puget Sound – 36% 41ft+ vs. CR 18%
- Combined average is 29%

Japan Corn Fleet Projection



Bulk Fleet

- Mirrors current bulk fleet
 - Japan corn exception
- 40-41 ft handymax will be common on the Columbia River by 2017.
- Virtually no transition from handymax to panamax.

Bulk Benefit Calculation

- Vessel Characteristics (cargo capacity and immersion factors)
- Vessel Operating Costs
- Days at Sea and Days in Port

Bulk Detail

- Wheat Other Asia
- 45-foot vessel (fresh water)
- 5% of total Other Asia Wheat (115,000 short tons)

Bulk Detail

Design Draft (saltwater)	Metric dwt	Short dwt
44	70,000	77,200
	Metric	Short
Immersion Factor (tpi)	169	186

Bulk Detail

DWT (short tons)	77,178
Cargo Capacity Factor	0.92
Fully Loaded Capacity	71,003

	Reduction	Net Capacity
40-foot Capacity	11,180	59,824 (60*imm. factor)
43-foot Capacity	4,472	66,531 (24*imm. factor)
	<hr/> 6,708	

Bulk Detail

	At Sea	In Port
Daily Operating Costs	\$ 17,180	\$ 13,277
Days	45.6	8
Voyage Costs	\$ 782,673	\$ 106,217
Total Voyage Costs		\$ 888,889

Bulk Detail

	Capacity	Cost Per Ton	Total Tons	Transportation Cost
40-foot Channel	59,824	\$ 14.86	114,504	\$ 1,701,354
43-foot Channel	66,531	\$ 13.36	114,504	\$ 1,529,820
Benefit		\$ 1.50		\$ 171,534

The Willamette

- Reduces Wheat and Barley Tonnage and Benefits by 50%.

Total Wheat Forecast	11,528,504
Reduced for Willamette (52%)	5,994,822
Share to Other Asia	38%
Total to Other Asia	2,290,074
45-Foot Share	5%
Total Tonnage, Other Asia, 45' Vessel	114,504

That is all I have to say about
bulk benefits.

Container Benefits

- Three weekly services using Portland as a last port of call.
- 77.5% of the containerized cargo.
- 3,500 – 4,500 teu capacity.
- Design drafts of 41 to 46 feet.

Target Drafts

- Current target draft is 38 feet. With a deeper channel, target will be 41 feet.
- The analysis assumes the vessel operators will be equally efficient with/without deepening.

Container Departure Draft Projections

Departure Draft	Actual 2000-2002 Q1	Actual 2001-2002 Q1	40-foot Channel 2007	43-foot Channel 2008
33	8%	3%	0%	0%
34	8%	7%	7%	0%
35	16%	15%	10%	0%
36	18%	16%	10%	0%
37	20%	23%	33%	7%
38	20%	26%	33%	10%
39	7%	8%	7%	10%
40	1%	2%	0%	33%
41	0%	0%	0%	33%
42	0%	0%	0%	7%
Total	100%	100%	100%	100%
Average Draft	35.8	36.7	37.0	40.0

Why?

- Design draft constraints? No.
- Cargo availability? Yes.
- Incentive to utilize additional capacity?
Yes.

Fleet Projection – Design Drafts

Design Draft (fresh water, feet)	2007	2017	2027- 2057
40	0%	0%	0%
41	0%	0%	0%
42	30%	0%	0%
43	0%	0%	0%
44	35%	50%	50%
45	0%	0%	0%
46	35%	50%	50%

Benefit Calculation

- Based on one-way ocean transportation cost reductions.
- Total tonnage on-board must be included.

1 Number of Full Export Teu's (2007)	214,333
2 Conversion to Short Tons (12.4 short tons per teu)	2,657,733
3 Last Port Portion (77.5 percent)	2,059,743
4 Additional Tons on Board (U.S. Only) (0.6208)	1,278,689
5 Total Benefiting Tons	3,338,000

Other Factors

- Voyage Distance – 10 days (1 day in port).
- Tare weight – excluded from benefits, capacity and immersion factors adjusted by 80.8%.

Container Detail (Optional)

Design Draft (sw)

41

Metric dwt

49,000

Short dwt

54,024

Immersion Factor (tpi)

Metric

171

Short

189

Tare Adjustment

80.8%

152

Container Detail

DWT (short tons)	54,024
Cargo Capacity Factor	90%
Fully Loaded Capacity	48,622
Tare Adjustment	80.8%
Operational Cargo Capacity	39,286

Container Detail

	Reduction	Capacity	
37' Departure Draft Capacity	9,140	30,146	(60*imm. factor)
40' Departure Draft Capacity	3,656	35,630	(24*imm. factor)
	5,484		

Container Detail

	At Sea	In Port
Daily Operating Costs	\$ 34,718	\$ 23,716
Days	10.0	1
Voyage Costs	\$ 347,182	\$ 23,716
Total Voyage Costs		<hr/> <u>\$ 370,898</u>

Container Detail

	Capacity	Cost Per Ton	Total Tons	Transportation Cost
37' Departure Draft	30,146	\$ 12.30	330,462	\$ 4,065,757
40' Departure Draft	35,630	\$ 10.41	330,462	\$ 3,439,975
Benefit		\$ 1.89		\$ 625,783

Moving On

Risk and Uncertainty

- Commodity forecasts
- Bulk fleets
- Container fleet/efficiency
- Container transit times
- Container Benefit Calculation (multiport)