A Real Time Assessment of the Columbia-Snake River Extended Lock Outage: Process and Impacts

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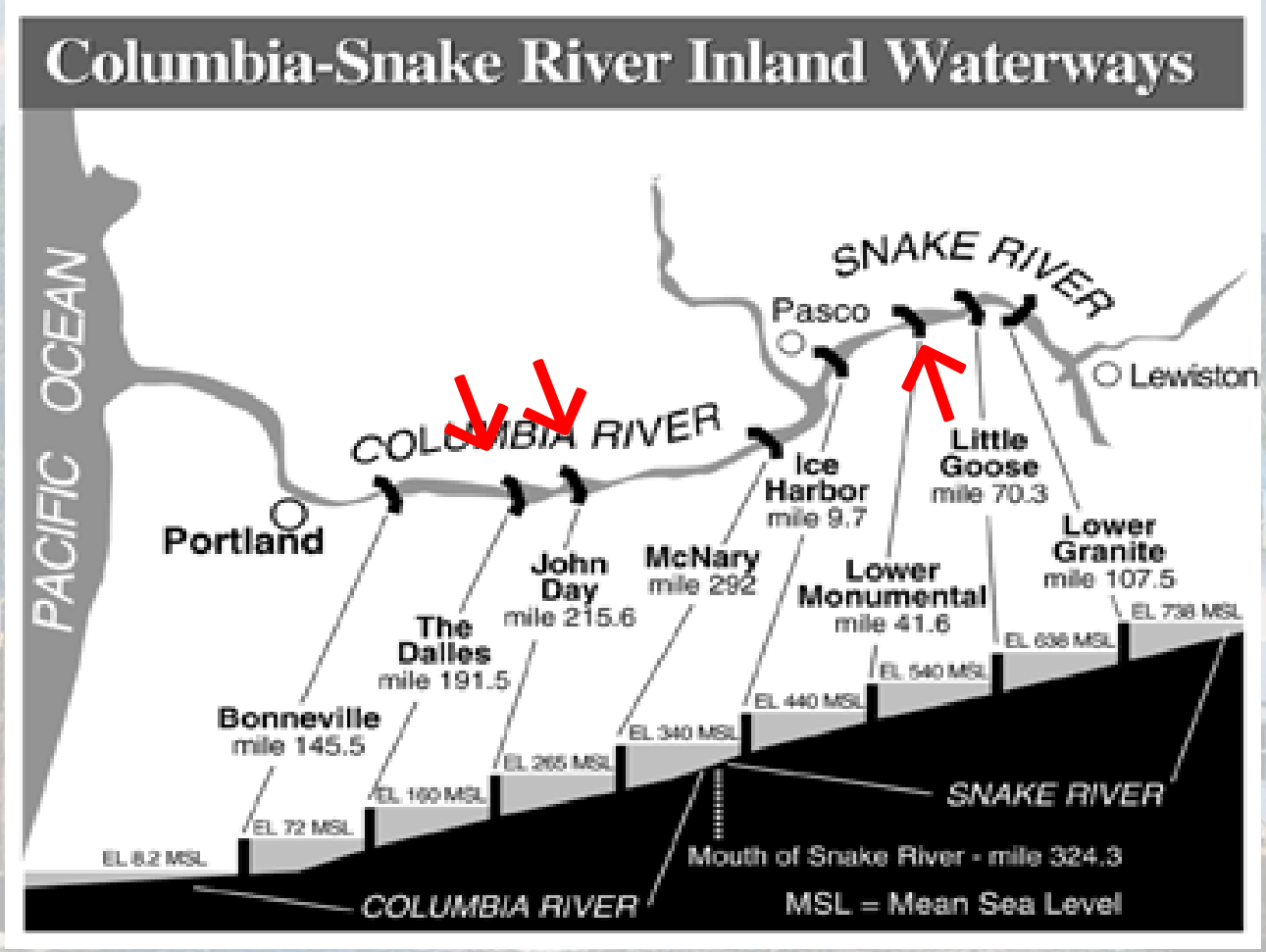
The Issue

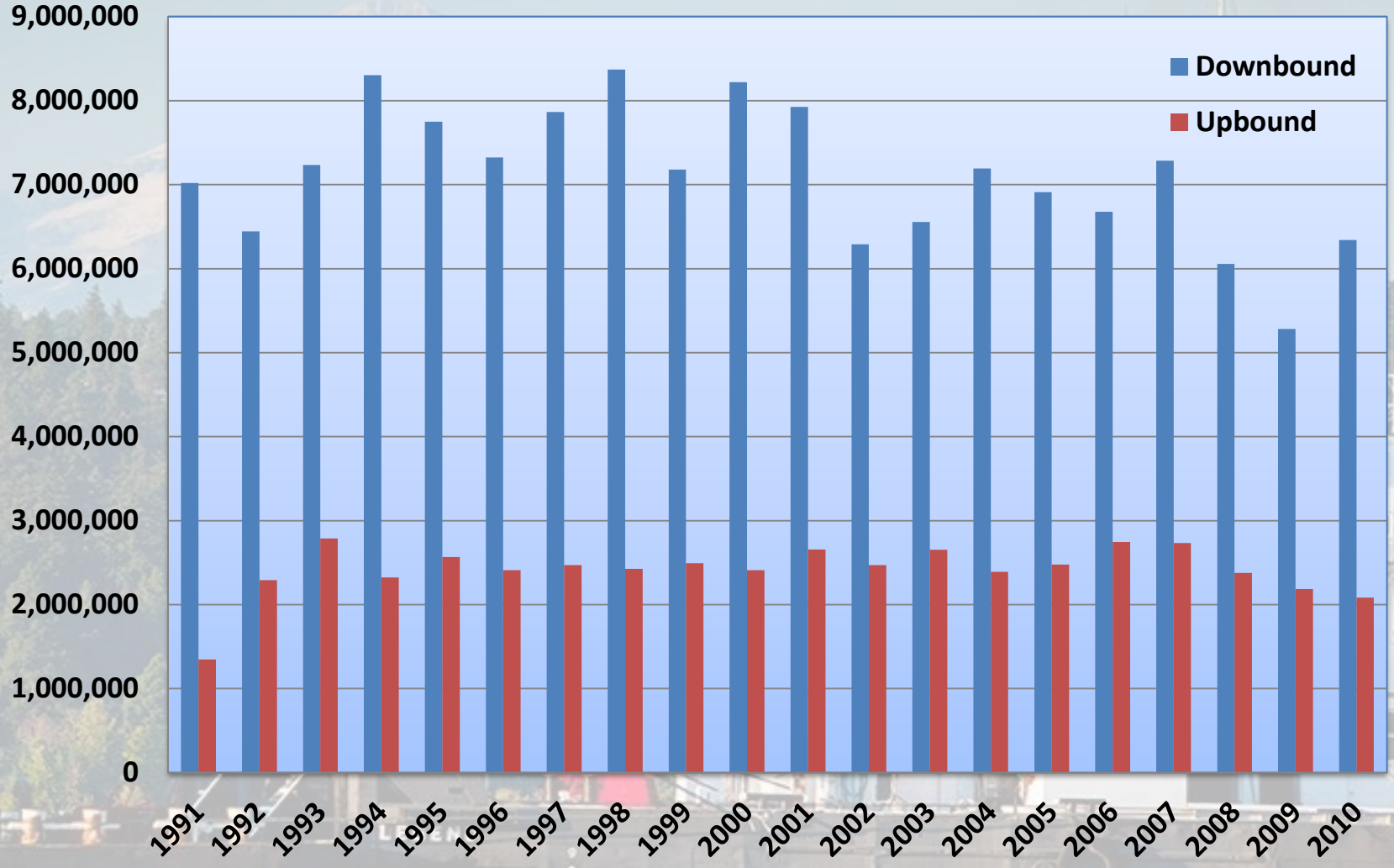
- 15 weeks
- December 2010 to March 2011
- Replace and rehabilitate an aging infrastructure
- Replaced downstream gates for three locks



Transportation Study and Approach

- Purpose and Phases
  - Determine
    - Historical use of the river system (Phase I)
    - Preparations of shippers, industries and governments (Phase II)
    - Impacts of the outage (Phase III)
    - Return of traffic to the river system (Phase IV)
  - Evaluate the economic and environmental impacts (Phase V)

Phase I



Total Annual Downriver and Upriver Tonnage, 1991-2010

Source: U.S. Army Corps of Engineers Monthly Lock Tonnage Reports

Major Commodities, 1991 – 2010

Downriver Commodities

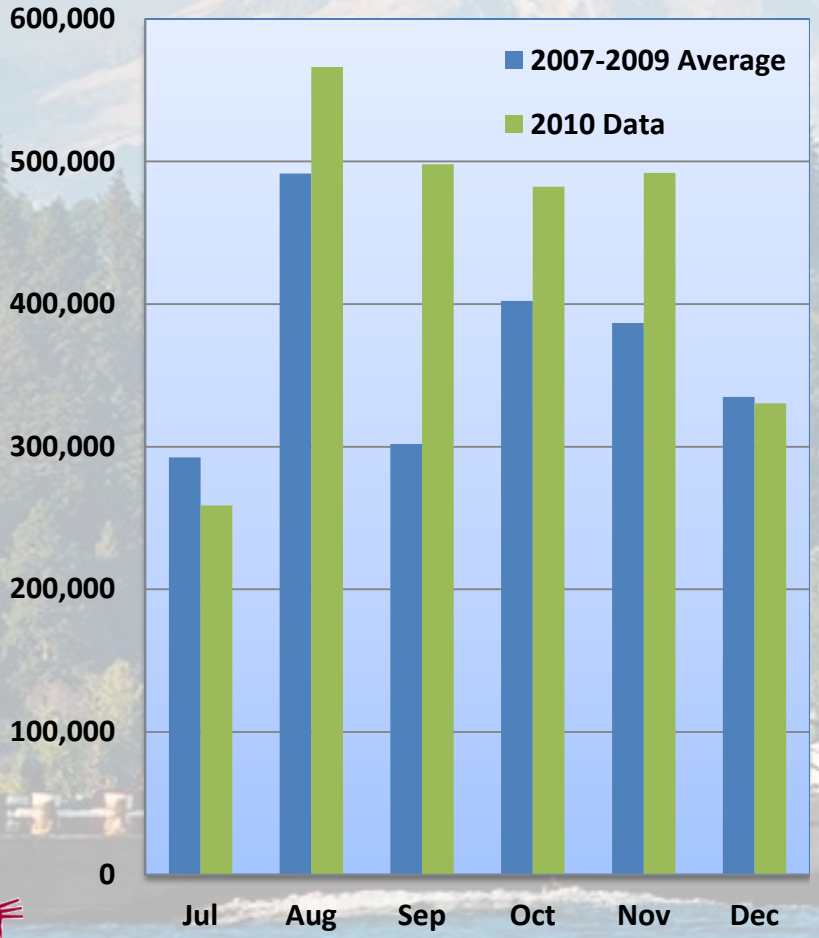
- Wheat
- Sand, gravel and stone
- Forest products
- Iron ore products
- Agricultural products
- Corn, rye, barley, rice, sorghum and oats

Upriver Commodities

- Gasoline
- Diesel
- Fertilizer
- Waste materials

Phase II

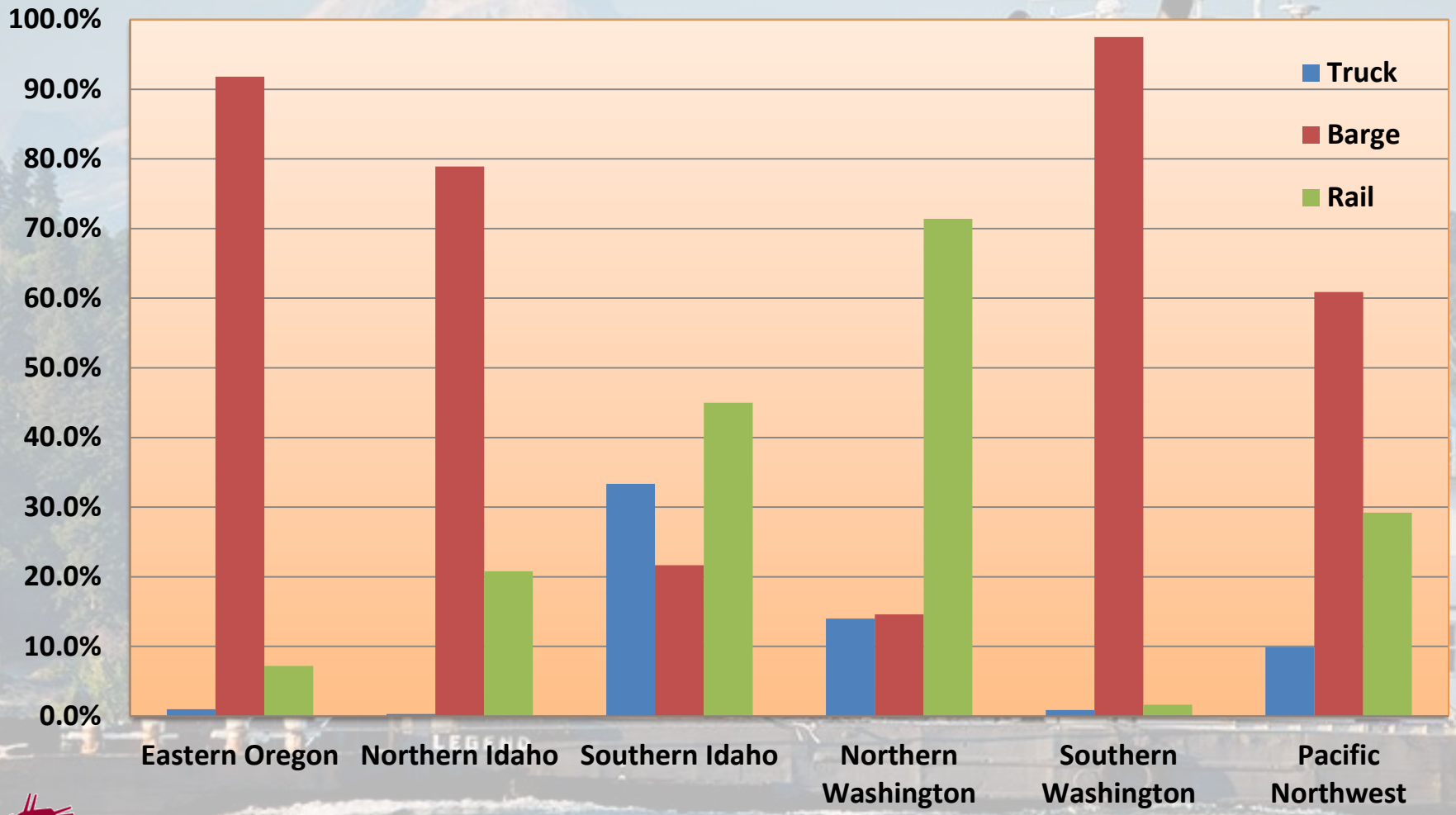
Above Average Downriver Wheat Shipments, July – Dec 2010



- **Above average months: August – November**
  - **Increased wheat production**
- **To preposition and fill early international orders**
- **Historic wheat prices and surge in international demand**
  - **Russian drought and export ban on wheat**

Note: December 2010 data only includes the first nine days of the month.

Typical Percentage of Wheat Shipped via Various Modes



Phase III

Rail and Truck Movements During Lock Outage

- Most products were transported by truck or a combination of truck and rail

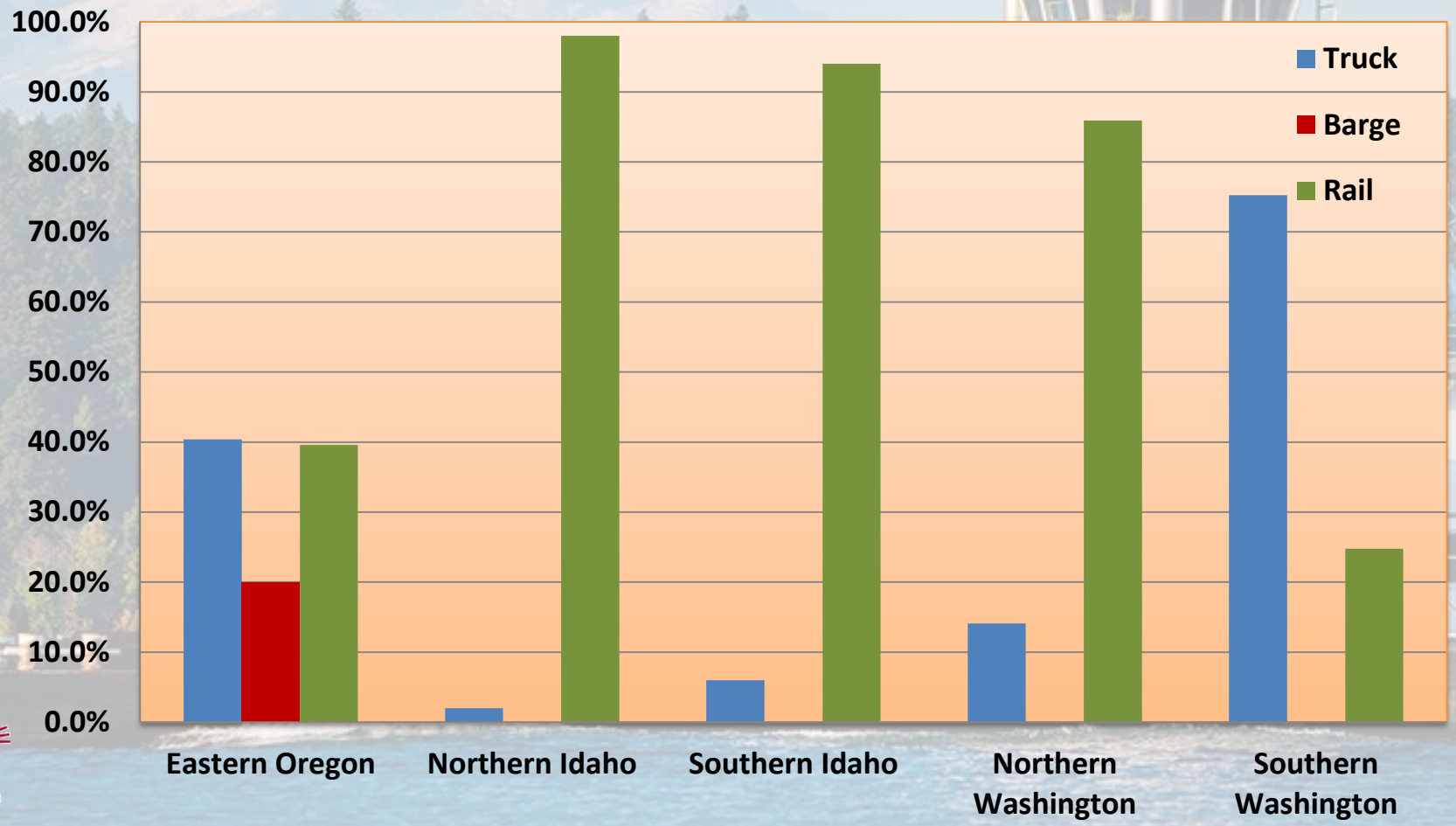
  - Most industries planned to only use rail
    - Inexpensive and can transport large volumes
  - Short distances and small loads
  - Industries chose to send their goods to alternative markets

Pacific Northwest Wheat Survey

Wheat Tonnage Shipped, Dec 2010 - Mar 2011			
Region	**Tonnage Shipped in Bushels**	**Typical Total Tonnage Shipped**	**Lock Outage Total Tonnage Shipped**
Eastern Oregon	9,681,700	12.68%	**27.29%**
Northern Idaho	2,428,000	15.69%	6.84%
Southern Idaho	1,620,000	2.90%	4.57%
Northern Washington	20,315,826	**33.98%**	**57.26%**
Southern Washington	1,433,200	**34.75%**	4.04%
Pacific Northwest	35,478,726	100.0%	100.0%

Phase III

Percentage of Wheat Shipped via Various Modes, Dec 2010 – Mar 2011



Shipping Rates for Wheat by Survey Respondents, Dec 2010 – Mar 2011

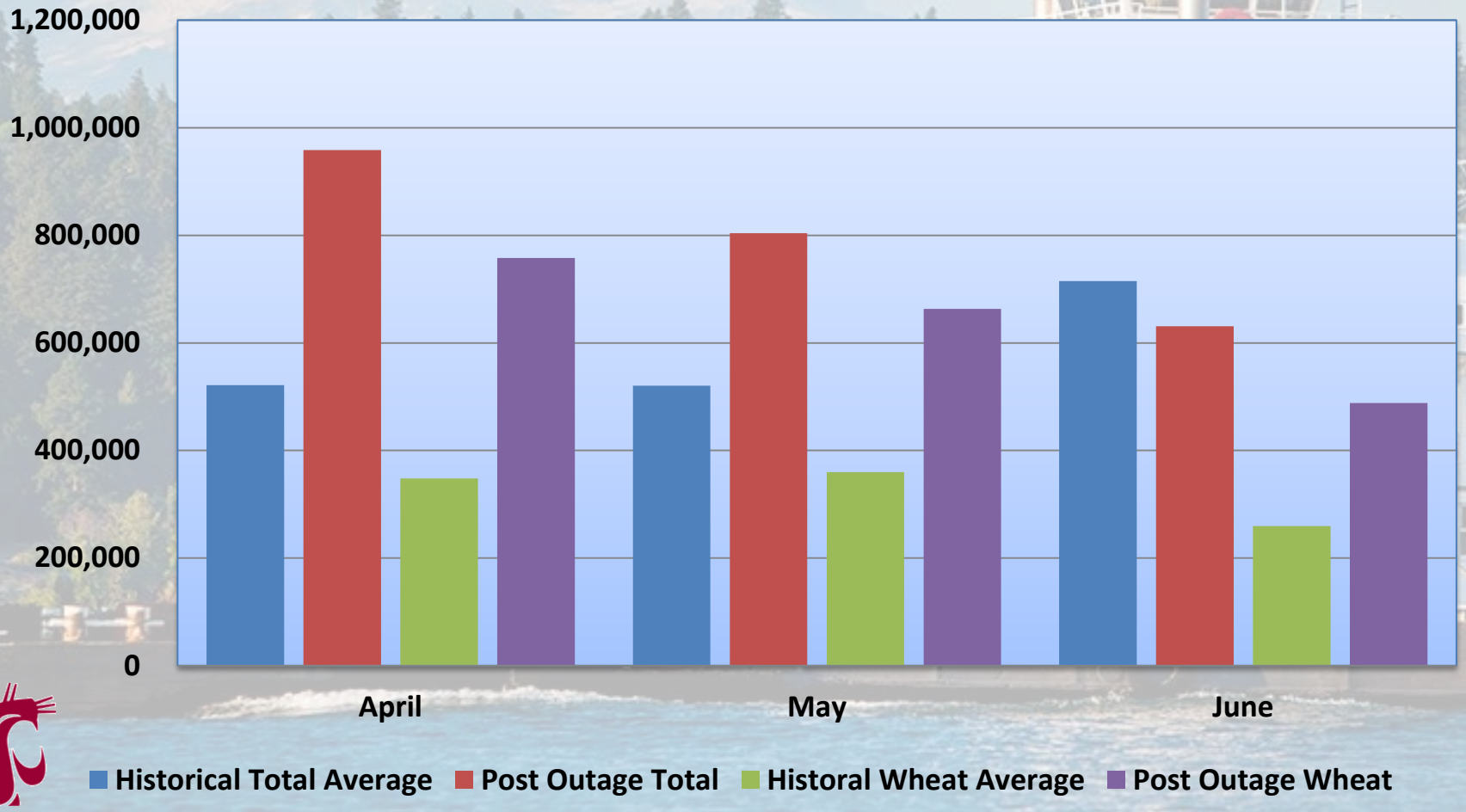
Region	Number of Firms	Average Rate in Cents per Bushel (to Portland)		
		Direct Truck to Final Market	Truck-Barge	Rail
Eastern Oregon	5	$0.56	$0.30	$0.54
Northern Idaho	5	$1.50	-	$0.74
Southern Idaho	3	$0.76	-	$0.90
Northern Washington	5	$0.45	-	$0.55
Southern Washington	8	$1.34	-	$0.58
Pacific Northwest	26	$0.92	$0.30	$0.66

Rates before the lock outage: Truck - $0.89 (4% ↑)

and Rail - $0.65 (2% ↑)

Phase IV

Monthly Tonnage Shipped Downriver Post Lock Outage



Phase V

Economic Impacts – Wheat

- Wheat industry shipped an unusually above average amount of grain during the year of the lock outage
  - Russian drought and ban on wheat exports
  - Wheat prices reached historic highs
  - Extensive planning for the lock outage

Year	Time Period			Total Annual Bushels
	Aug - Nov	Dec - Mar	Apr - Jul	
Typical August - July	171,352,480	132,586,318	85,787,202	389,726,000
August 2010 - July 2011	208,906,375	161,644,157	104,588,468	475,139,000
Percentage Difference	**21.92%**	**21.92%**	**21.92%**	**21.92%**

Phase V

Economic Impacts – Wheat

Total Shipping Costs (in Millions)					
Year	Time Period			Total Cost	Cents per Bushel
	Aug - Nov	Dec - Mar	Apr - Jul		
Typical August - July	$82.6	$63.2	$40.5	$186.3	**$0.48**
August 2010 - July 2011	$100.7	$105.8	$49.3	$255.9	**$0.54**
Difference	$18.1	$42.6	$8.9	$69.6	**$0.06**
Percentage Difference	**21.95%**	**67.38%**	**21.92%**	**37.36%**	**12.67%**

Environmental Impacts – Energy Consumed

Mode	Btu's Consumed (Typical Year)	Btu's Consumed (Lock Outage Year)	Change in Btu's	Change in Btu's per Ton
Truck	46,515,557,320	196,840,743,081	**323.17%**	**265.96%**
Rail	225,502,685,519	396,433,424,239	**75.80%**	**52.03%**
Barge	1,221,391,779,927	1,051,249,387,056	**-13.93%**	**-25.57%**

Environmental Impacts – Emissions Produced

Emissions Component	Emissions in Pounds (Typical Year)	Emissions in Pounds (Lock Outage Year)	Percent Change in Emissions
HC	271,634	503,039	**85.19%**
CO	599,956	627,415	**4.58%**
NOx	4,646,348	4,964,671	**6.85%**
PM	107,663	131,145	**21.81%**
SOx	714,131	672,842	**-5.78%**
Total	6,339,732	6,899,114	**8.82%**
Emissions per Ton	**0.43**	**0.41**	**-5.89%**

Conclusions

- Stakeholders were well prepared
- Prior to outage, commodities moved in large and above average quantities
- Rail lines prepared for possible increases in carloads and advertized to barge customers
- During the outage, wheat producers shipped wheat heavily by truck even though rates increased
- Traffic returned to barge in above average levels

Thank you!

Questions?

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