Decision Analysis of Delta Strategies: Appendix J

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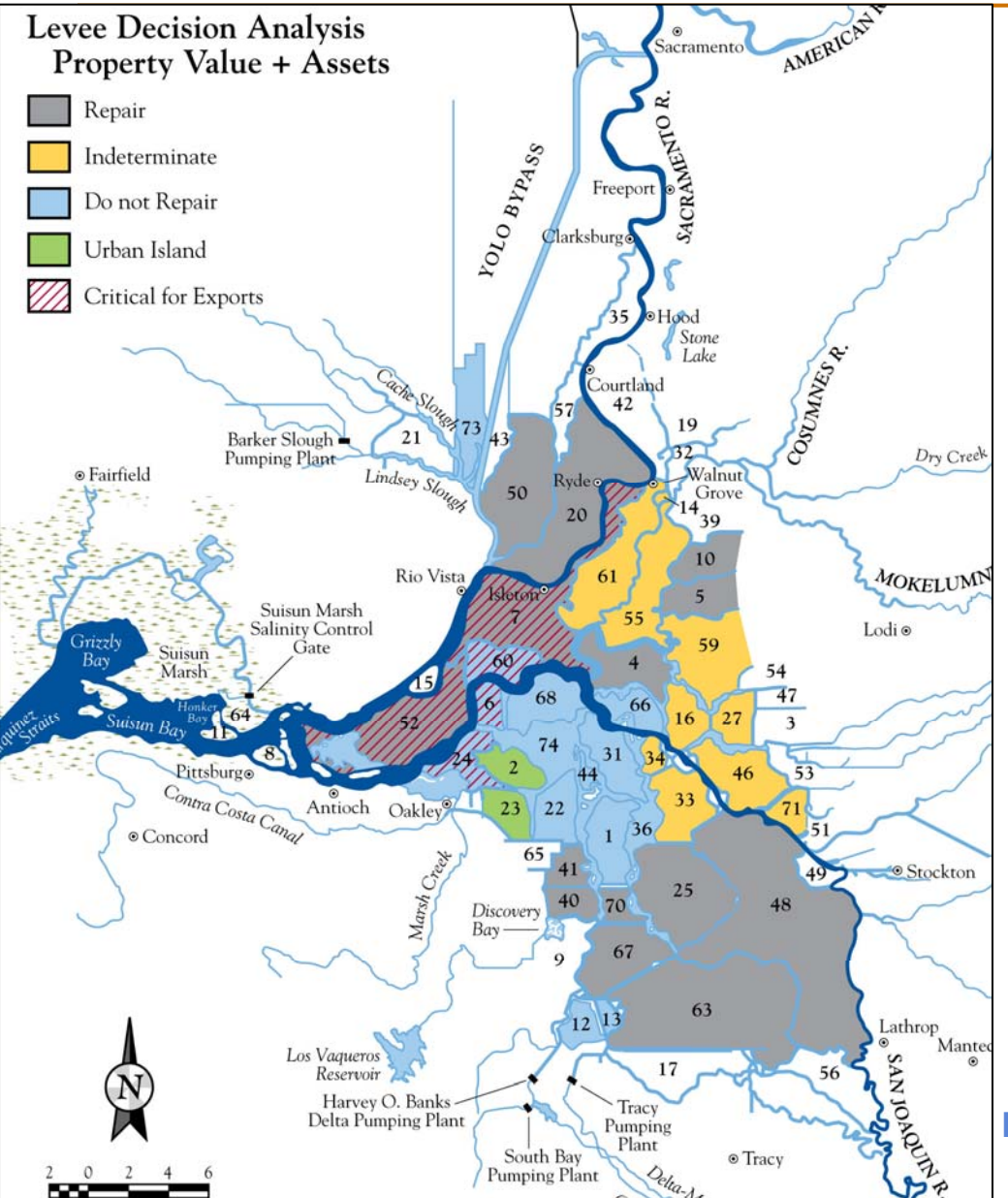
Delta of Tomorrow Will be Different

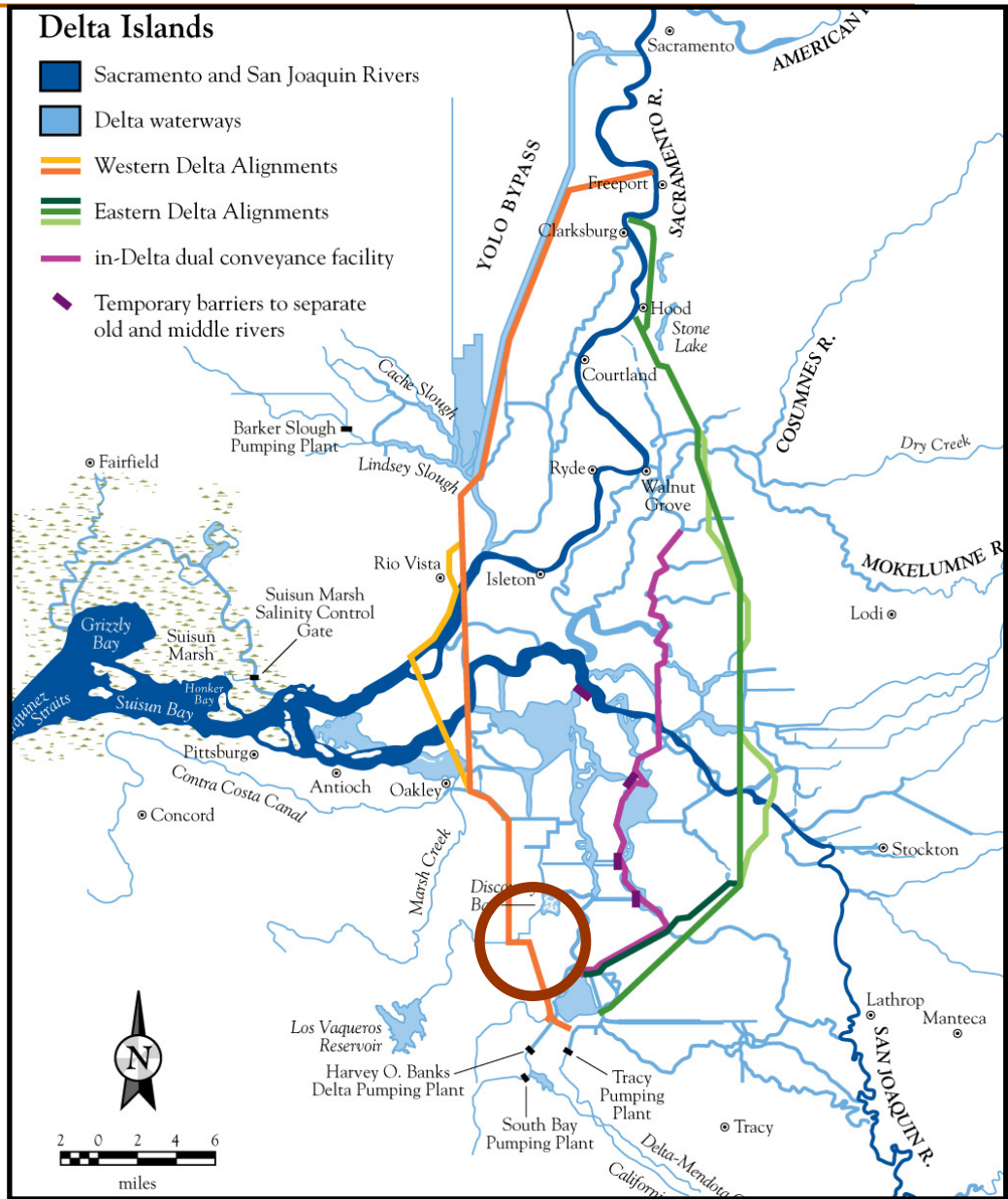


- Large bodies of open water and higher sea level
- Increased salinity, habitat variability
- Higher water quality costs – even if all islands remain intact

Based on economic value of land and assets, many islands not worth repairing after flooding (blue)

Comparing Water Export Strategies Long-Term (to Mid-Century)

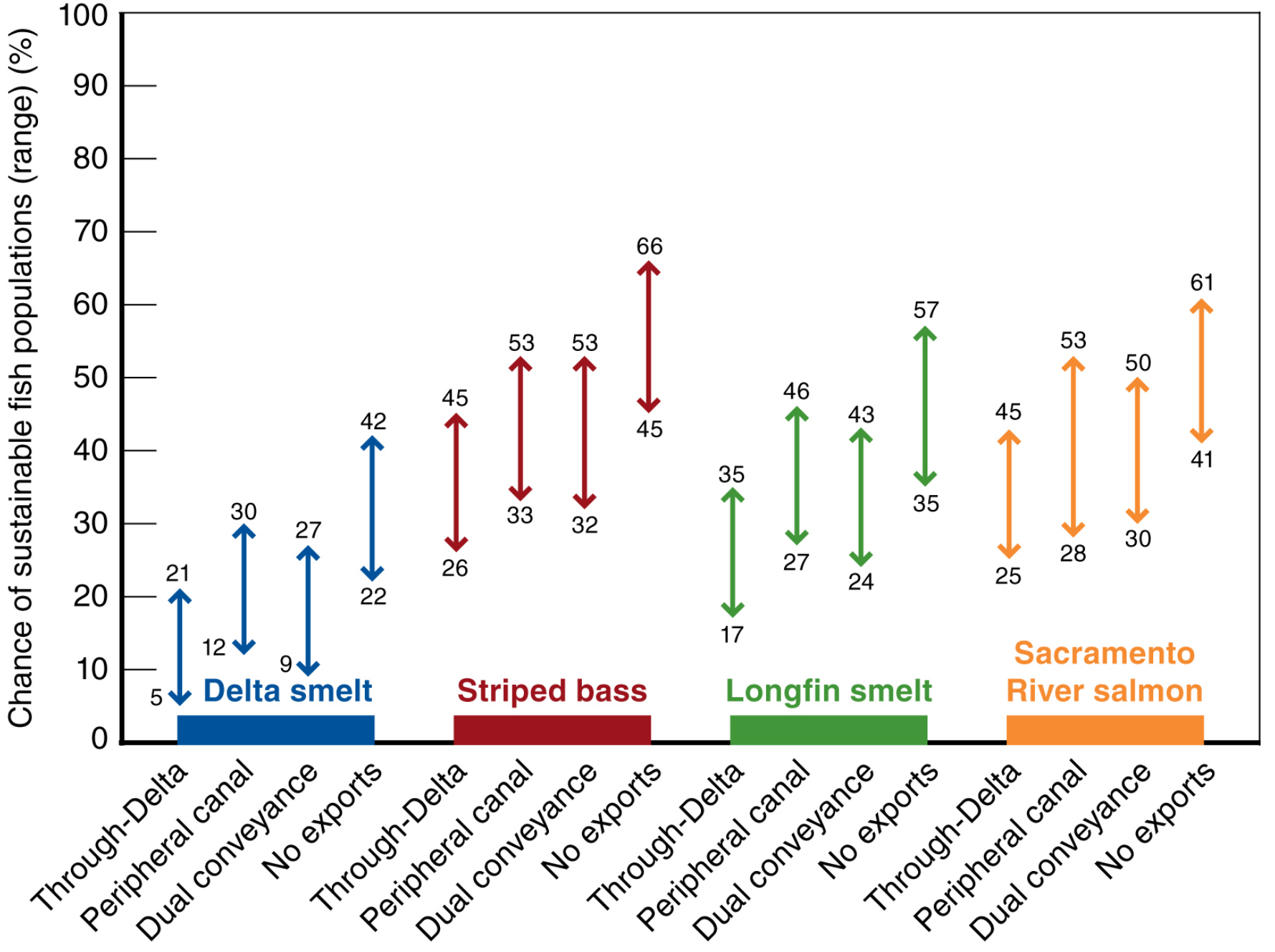
- **Current Strategy:** through the Delta
- **Peripheral Canal:** around the Delta
- **Dual Conveyance:** both through and around the Delta
- **No Exports:** use other water sources and use less



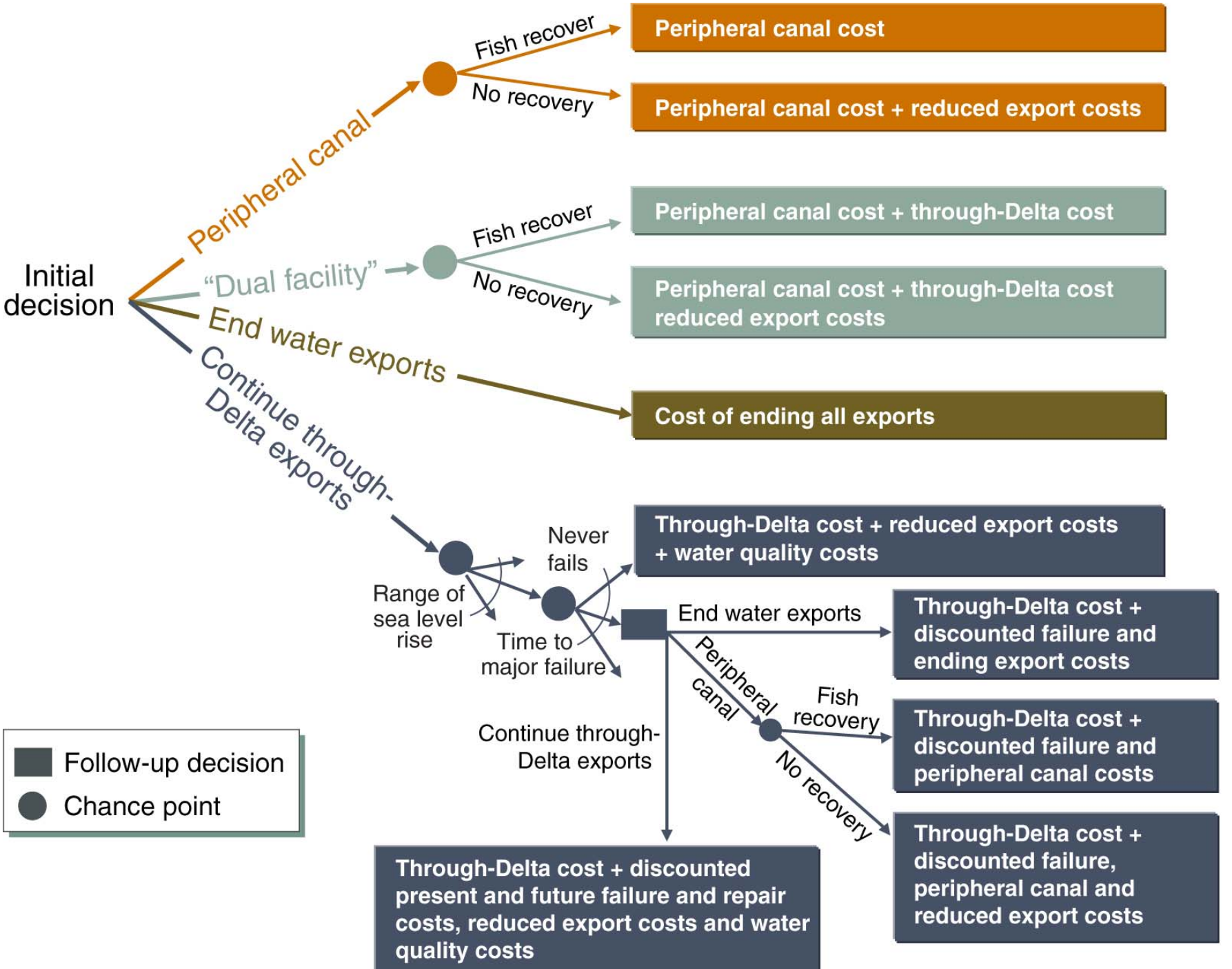
Evaluation Criteria: “Co-Equal” Goals

- Delta ecosystem
  - Delta Vision: “sustainable environment”
  - Our report: viability of native fish populations
  - Expert judgment
- Water supply
  - Delta Vision: “reliable water supply”
  - Our report: statewide economic costs
  - Construction & operations, water quality, supply cutbacks
- Use ranges to capture uncertainty

Fish Population Viability Estimates



Decision Tree for Economic Cost



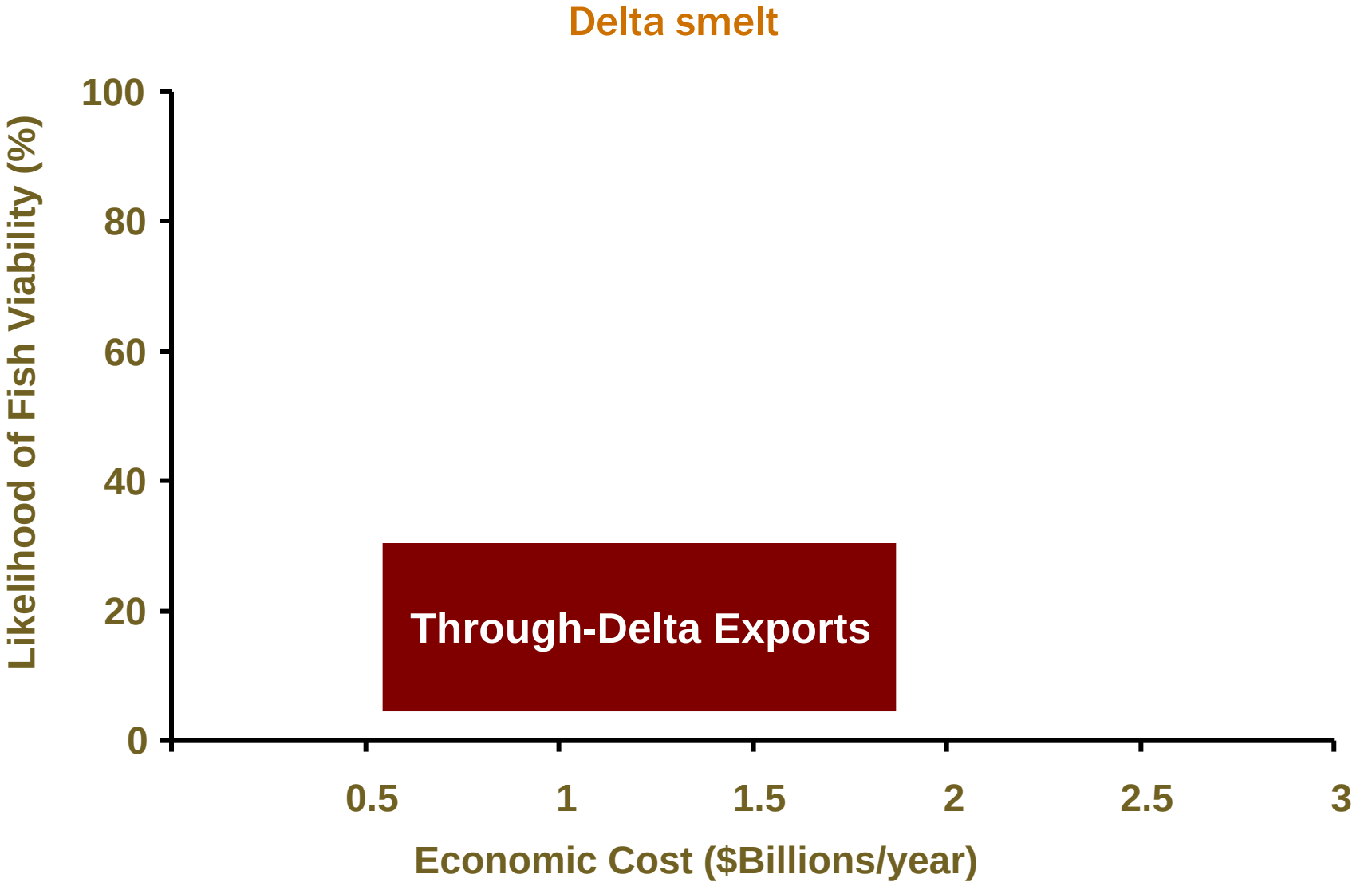
16 Questions with 32 Answers

Question	Low	High
Sea level rise (ft)		
1) How much will sea level rise by 2050?	0.5	1.5
Probability of extensive Delta failure (annual failure probability in parentheses) (%)		
2) With the minimum sea level rise?	34 (1)	88 (5)
3) With the maximum sea level rise?	57 (2)	95 (7)
Population viability in 2050 for delta smelt (Chinook salmon in parentheses) (%)		
4) Probability of viable fish pop. with continued through-Delta exports?	5 (10)	30 (30)
5) Probability of viable fish populations with no Delta exports?	30 (40)	60 (80)
6) Probability of viable fish populations with a peripheral canal?	10 (20)	40 (50)
7) Probability of viable fish populations with dual conveyance?	10 (20)	40 (50)
8) % exports reduced with continued through-Delta pumping?	25	40
9) % reduction in PC exports if fish continue to decline?	25	40
Economic and financial costs ($ billion)		
10) What is the construction cost of a peripheral canal?	4.75	9.75
11) Additional water quality cost from using Delta water?	0.3/year	1.0/year
12) What is the annualized cost of ending Delta exports?	1.5/year	2.5/year
13) Annualized cost to maintain continued through-Delta pumping?	0.15/year	0.4/year
14) Cost to water users of a sudden extensive failure of Delta levees?	7.8	15.7
15) Average cost to repair an extensive Delta levee failure?	0.2	2.5
16) What exponent relates export reduction to economic cost?*	2	3

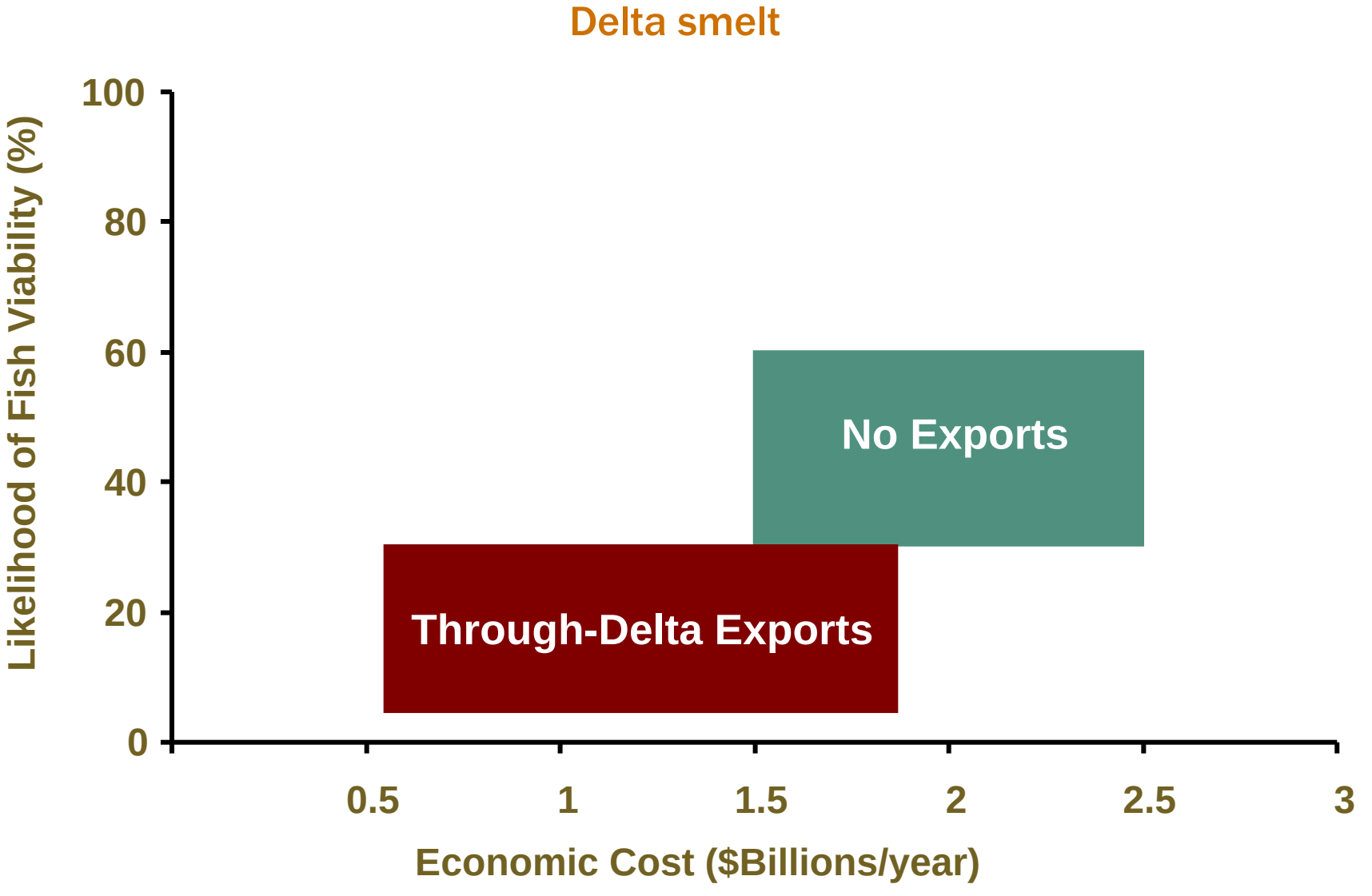
What informed our answers?

Question		Low	High
Sea level rise (ft)			
1) How much will sea level rise by 2050?	B	0.5	1.5
Probability of extensive Delta failure (annual failure probability in parentheses) (%)			
2) With the minimum sea level rise?		34 (1)	88 (5)
3) With the maximum sea level rise?		57 (2)	95 (7)
Population viability in 2050 for delta smelt (Chinook salmon in parentheses) (%)			
4) Probability of viable fish pop. with continued through-Delta exports?	D, E	5 (10)	30 (30)
5) Probability of viable fish populations with no Delta exports?	D, E	30 (40)	60 (80)
6) Probability of viable fish populations with a peripheral canal?	D, E	10 (20)	40 (50)
7) Probability of viable fish populations with dual conveyance?	D, E	10 (20)	40 (50)
8) % exports reduced with continued through-Delta pumping?		25	40
9) % reduction in PC exports if fish continue to decline?		25	40
Economic and financial costs ($ billion)			
10) What is the construction cost of a peripheral canal?	DWR, DV	4.75	9.75
11) Additional water quality cost from using Delta water?	H, I	0.3/year	1.0/year
12) What is the annualized cost of ending Delta exports?	F	1.5/year	2.5/year
13) Annualized cost to maintain continued through-Delta pumping?	B	0.15/year	0.4/year
14) Cost to water users of a sudden extensive failure of Delta levees?	DRMS	7.8	15.7
15) Average cost to repair an extensive Delta levee failure?	DRMS	0.2	2.5
16) What exponent relates export reduction to economic cost?*	F	2	3

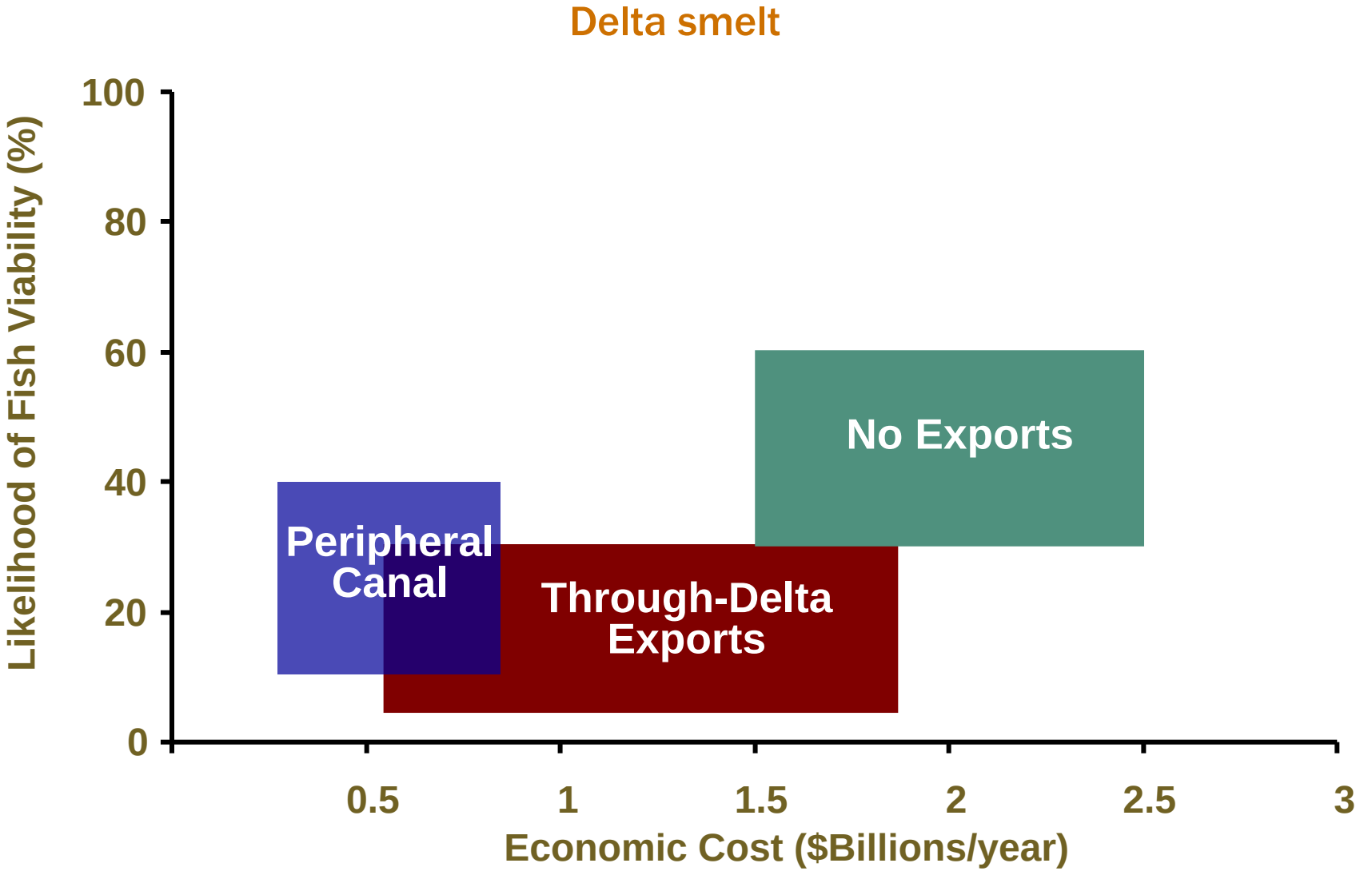
Through-Delta Pumping: Low Chance of Restoring Fish, High Costs



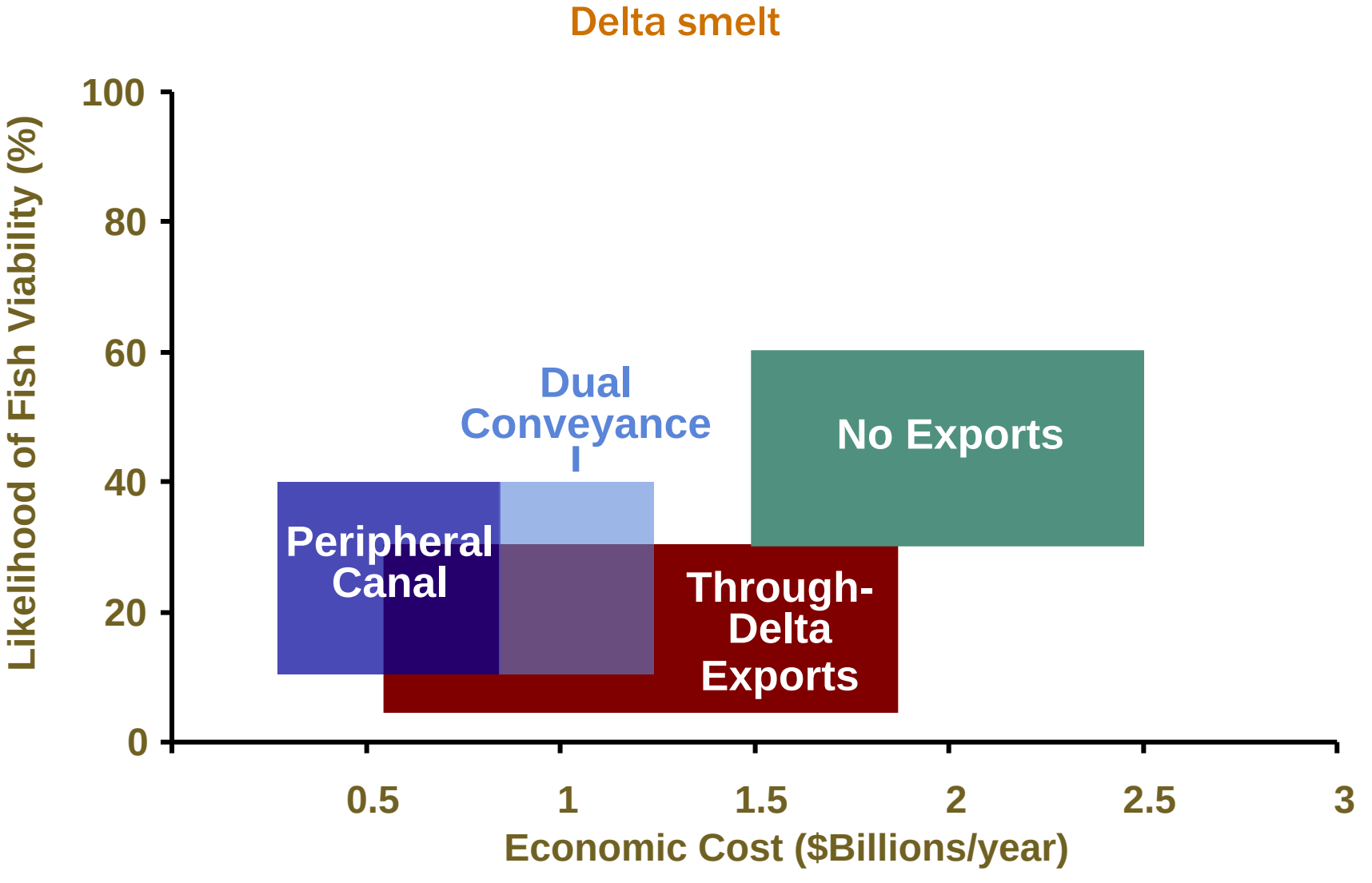
Ending Exports: Better for Fish, But Even More Costly



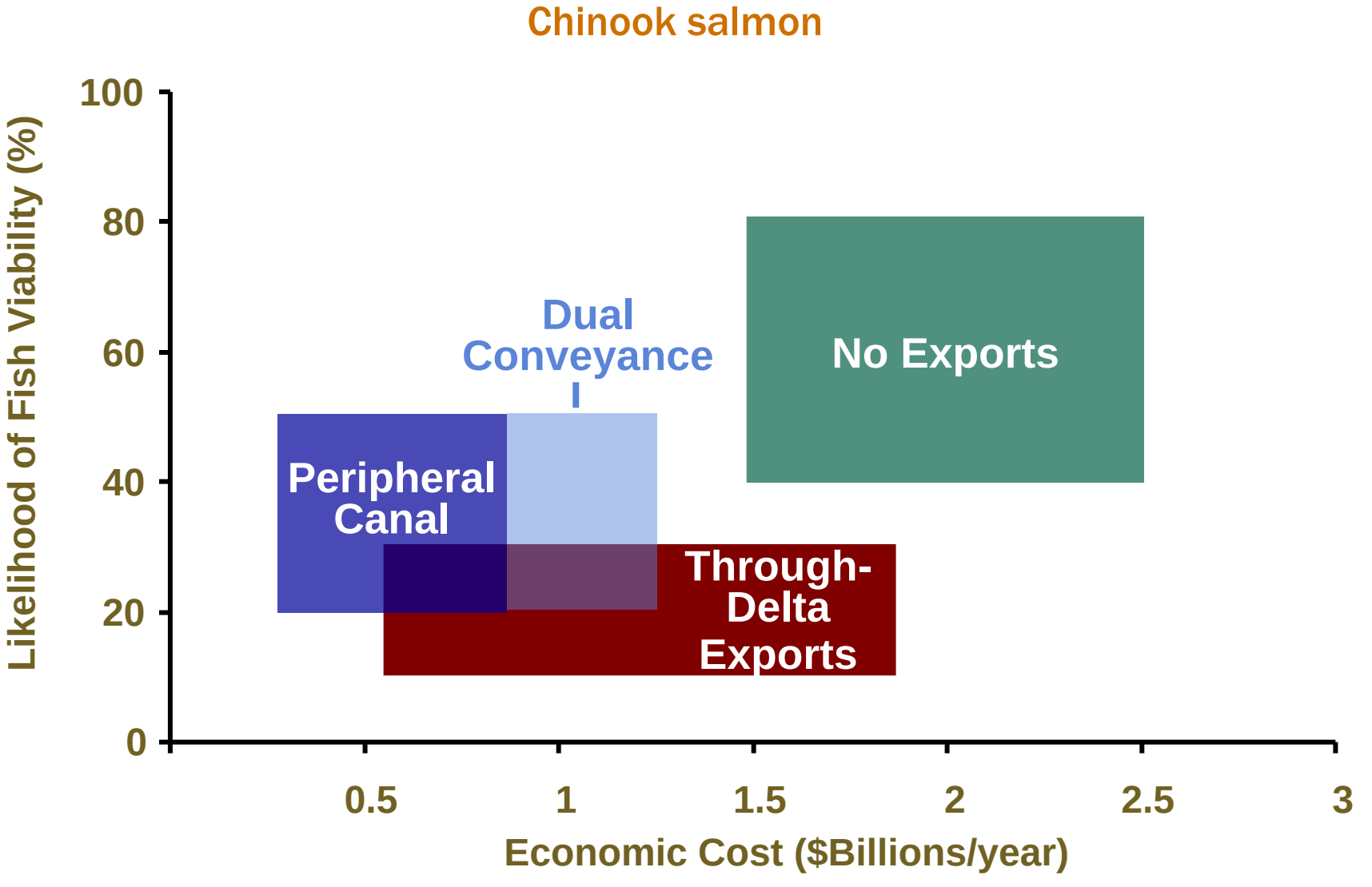
Peripheral Canal: Mid-range for Fish Viability, Least Costly



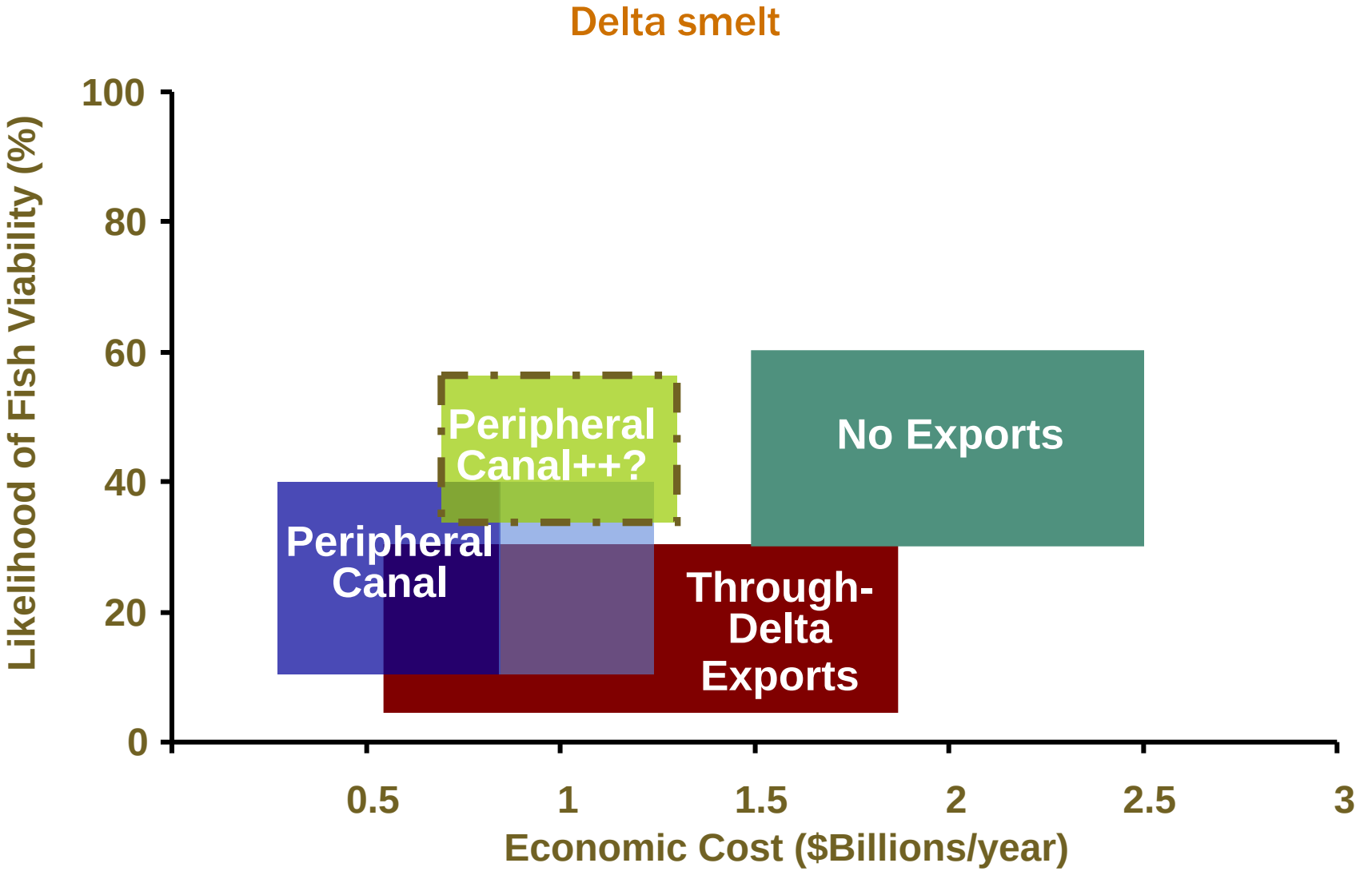
Dual Conveyance: Similar to PC for Fish, Probably More Costly



Similar Ranking for Chinook Salmon



Is there a better tradeoff?



The spreadsheet

Show spreadsheet here