



**From Controversy to Consensus:
California's Offshore Oil Platforms**

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Scenarios and Effective Forecasting			Value-Driven Enterprise Risk Management			

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Meet Today's Speakers



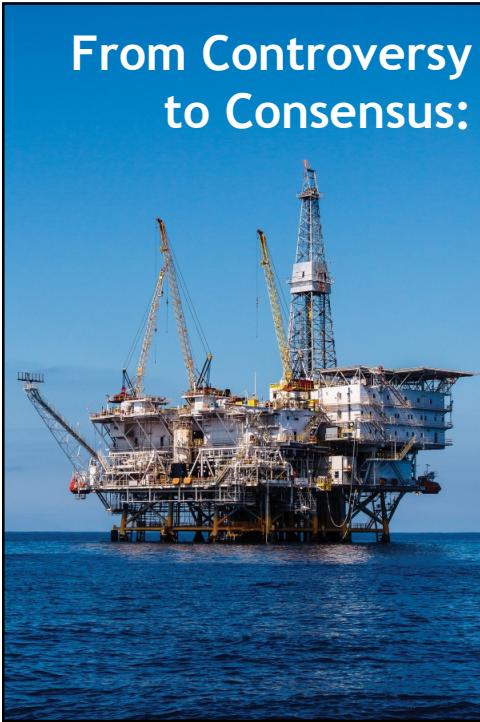
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CEO, SDG
Program Director,
Stanford SDRM

Paul Marca
Executive Director,
Stanford Center for
Professional Development

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**From Controversy
to Consensus:**

**A multi-attribute
decision analysis
for decommissioning
California's offshore
oil platforms**

Max Henrion, PhD
CEO, Lumina Decision Systems
Los Gatos, California

Stanford Center
for Professional Development
April 29, 2015

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Overview

- Challenge: Decommission offshore oil platforms
- Process: Analyze options
- Solution: Satisfy all stakeholders

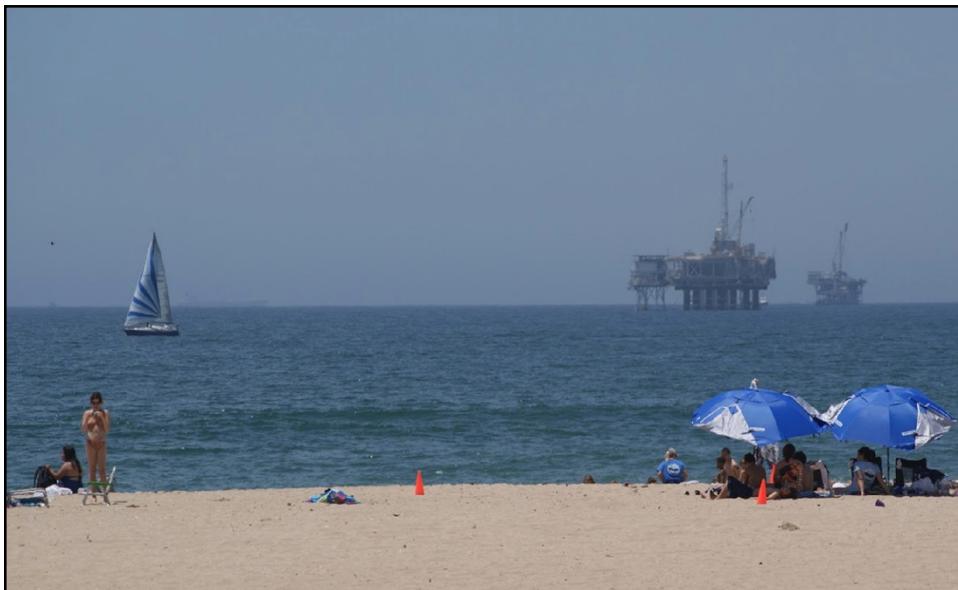
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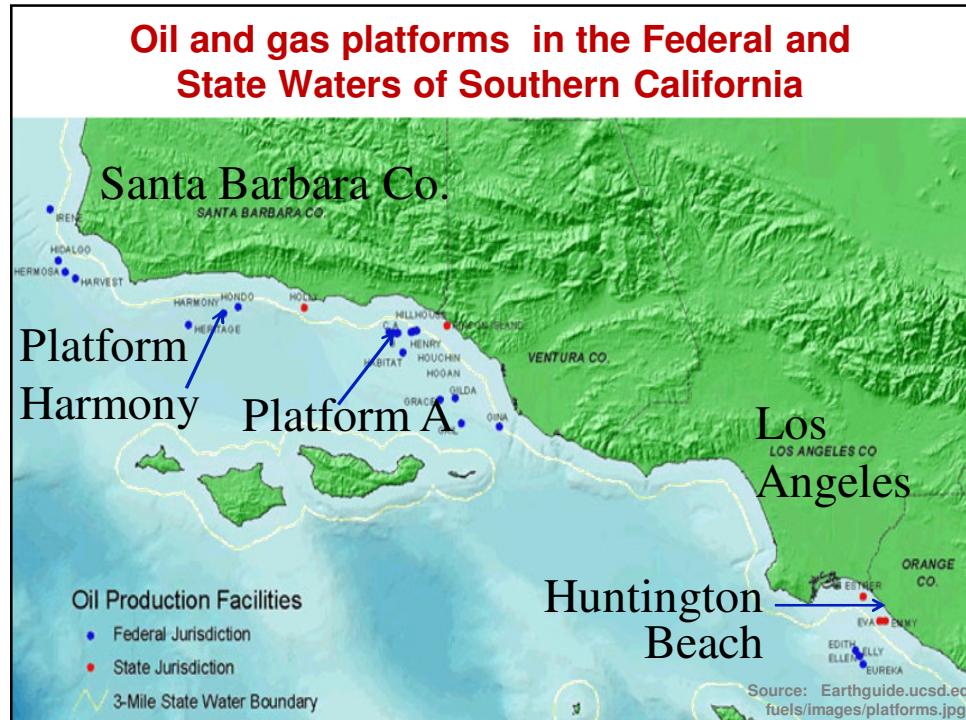


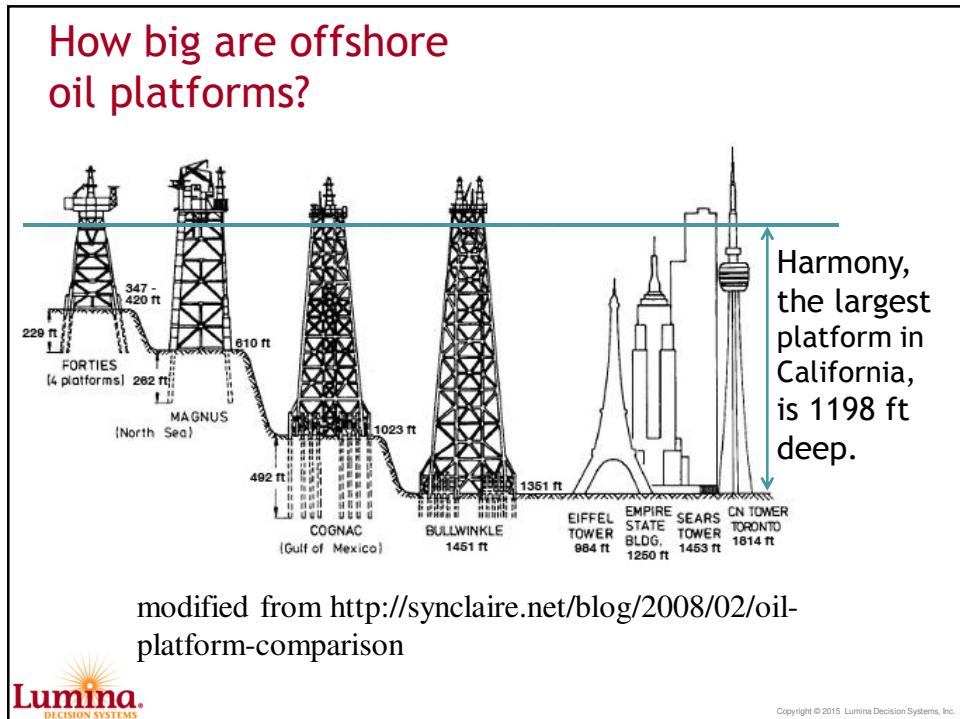
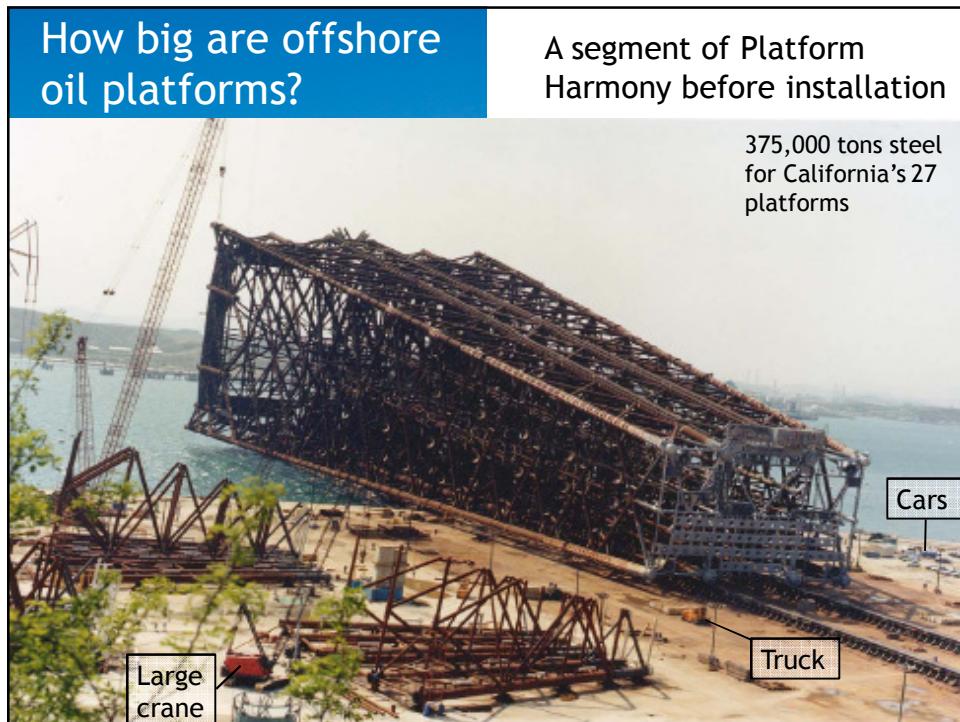
Huntington Beach, 1926

Source: Orange County Archives - Flickr: Huntington Beach, 1926. Licensed under CC BY 2.0 via Wikimedia Commons - http://commons.wikimedia.org/wiki/File:Huntington_Beach,_1926.jpg#/media/File:Huntington_Beach,_1926.jpg



Huntington Beach, 2015







Life under the platforms

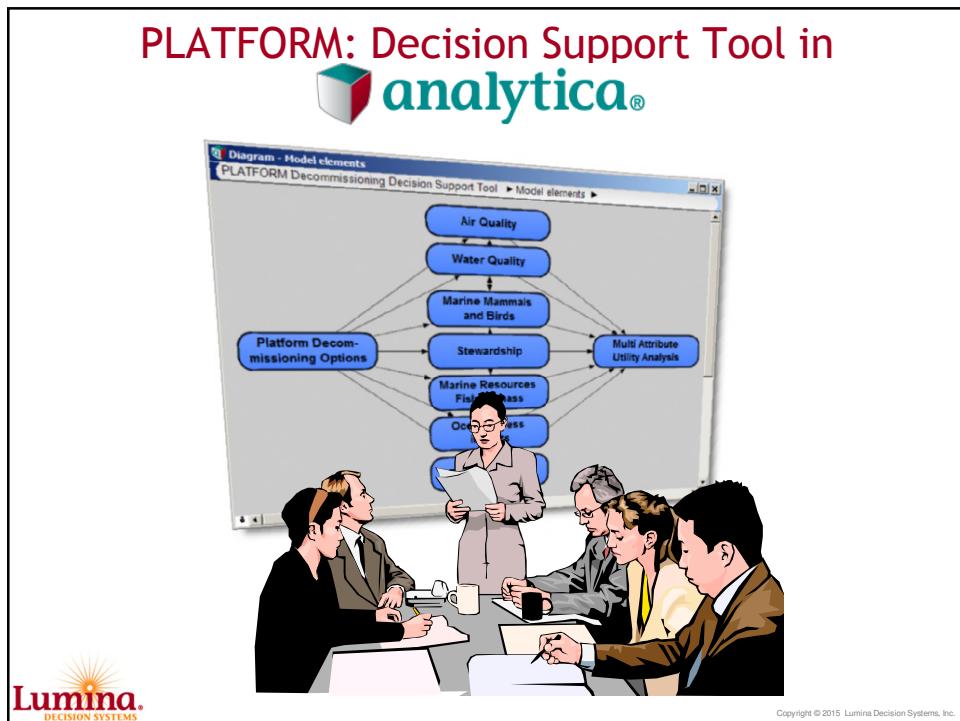


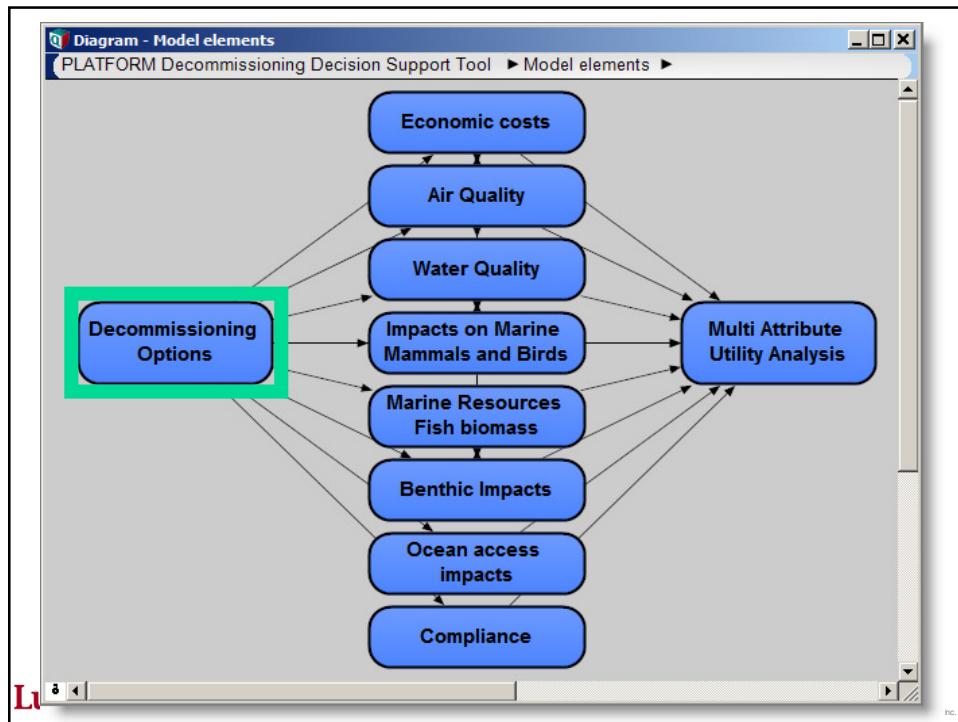
Selected stakeholder organizations			
Federal and California gov.	 	Owner operators of oil platforms	
 		Commercial and sport fishing	 
		Recreational divers	 
Environmental groups	 		

Project client:  CALIFORNIA
Ocean Science Trust

Skyli McAfee, Executive Director

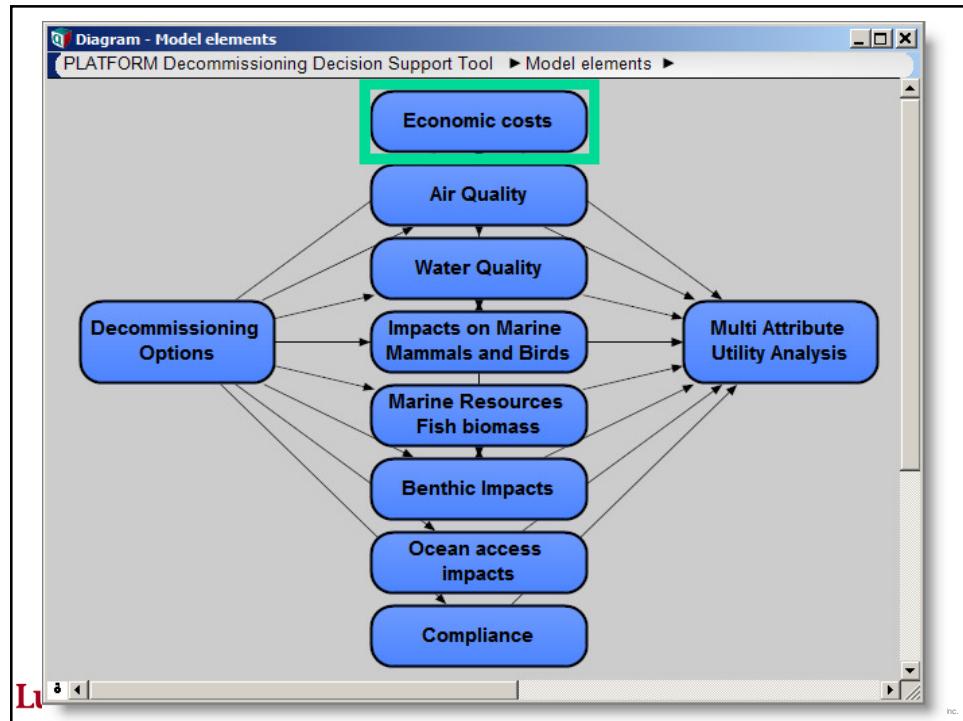
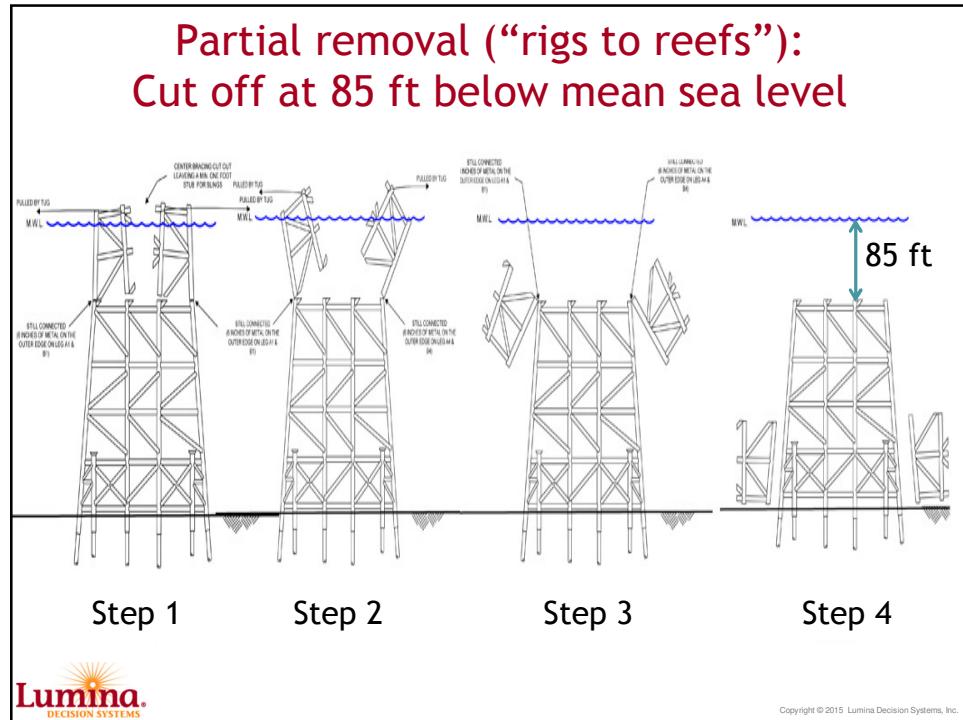
Multidisciplinary Team			Advisory Committee	
Brock Bernstein, PhD		Team lead, Project manager	Todd Anderson	San Diego State University
Max Henrion, PhD	Lumina	Decision analyst	Doug Anthony	Santa Barbara County
Surya Swamy	Lumina	Model developer	Ann Bull	Federal Minerals Management Service
Daniel Pondella, PhD	Occidental College	Marine ecology, fisheries	Robert Byrd	Proserv Offshore
Sarah Kruse, PhD	Ecotrust	Economist	Alison Dettmer	California Coastal Commission
John de Witt	Bowdoin College	Policy analysis	Dominic Gregorio	Calif. State Water Resources Control Board
Astrid Scholz, PhD	Ecotrust	Economist	Linda Fernandez	University of California Riverside
Andy Bressler	Texaco (ret.)	Offshore engineering	Grigg Gitschlag	National Ocean and Atmospheric Admin
Peter Cantle	Bioresources	Air quality and emissions	Alan Hager	California Dept. of Fish and Wildlife
Tim Setnicka	Superintendent Channel Islands National Park (ret.)	Federal policy, coastal management	Sean Hecht	UCLA
Laurel Fink	Researcher	Marine ecology	Sonke Mastrup	California Dept. of Fish and Wildlife
Bridget McCann	Researcher	Legal and management	Michael McGinnis	University of California Santa Barbara
			Mark Meier	State Lands Commission
			Mark Page	University of California Santa Barbara
			Alan Winer	University of Southern California
				Air emissions



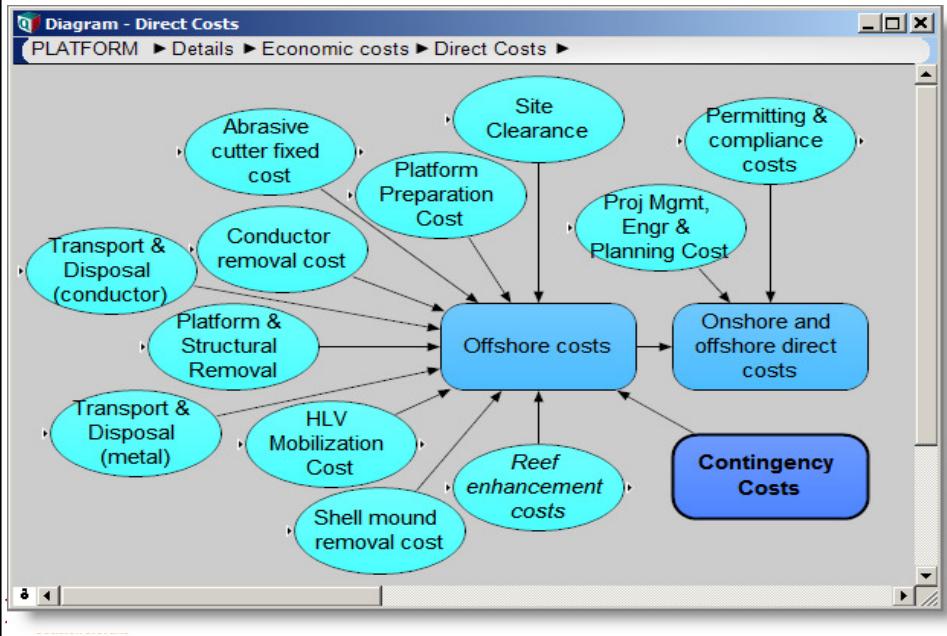


Decommissioning Options: A Decision Tree

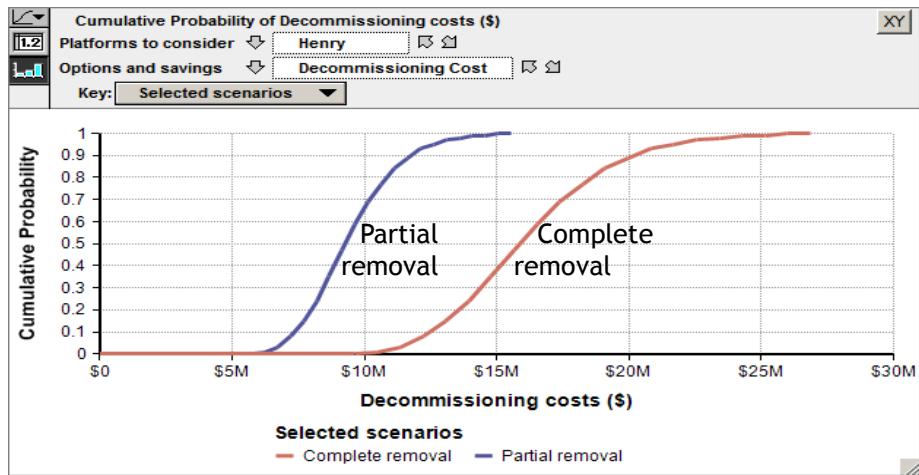




Economic costs of decommissioning



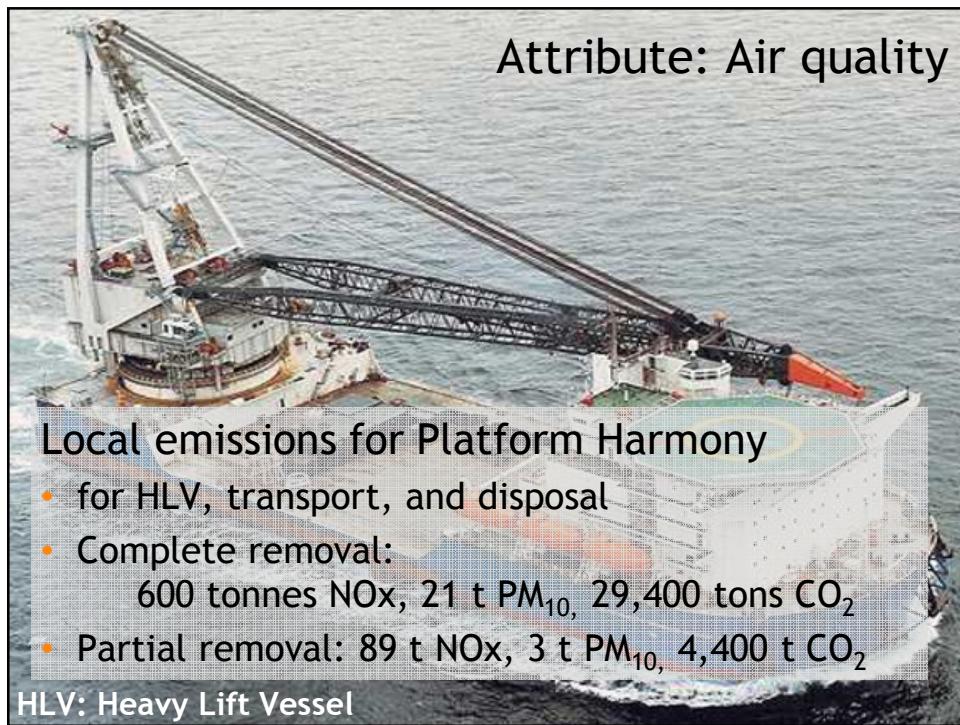
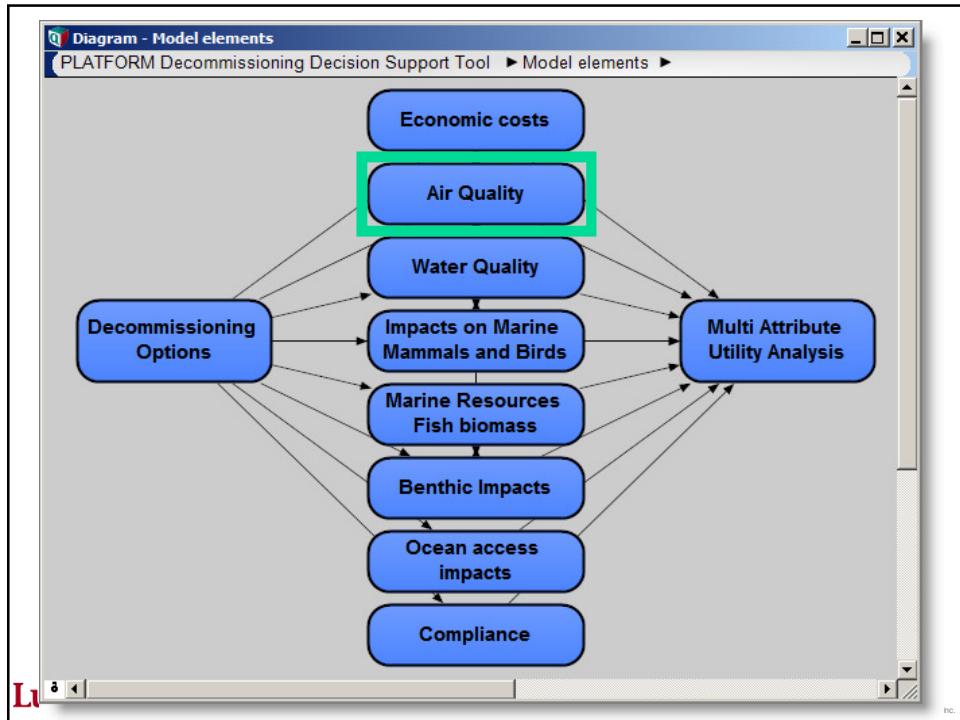
Probability distributions over decommissioning costs

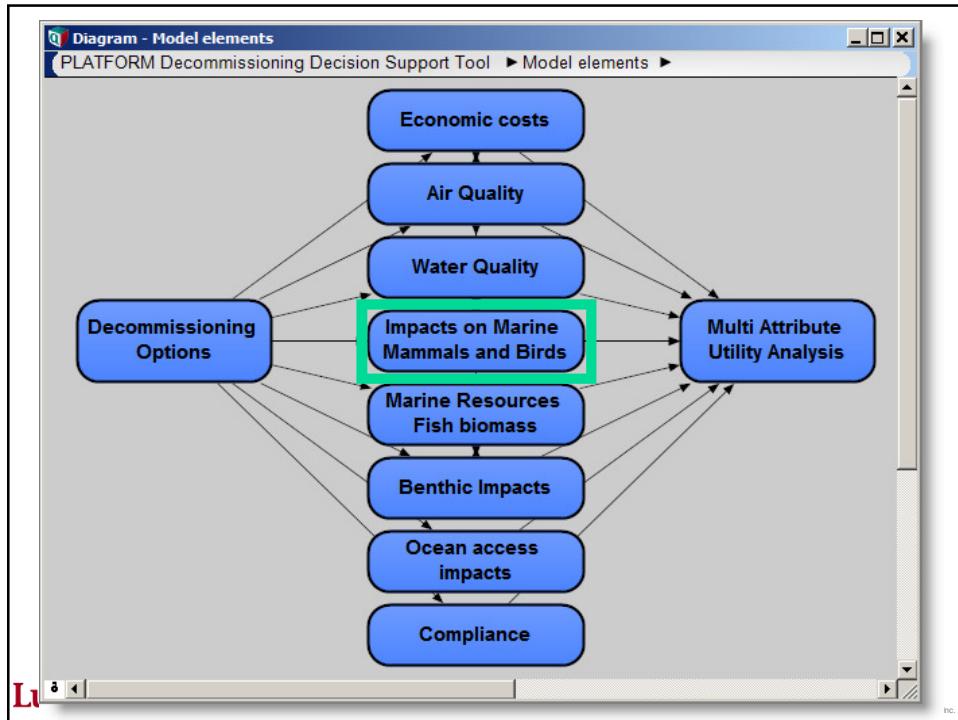


Uncertainty about cost of complete and partial removal:
Distributions calibrated to estimation errors in 120 past
estimates from 40 decommissioning projects (Byrd, et al.).



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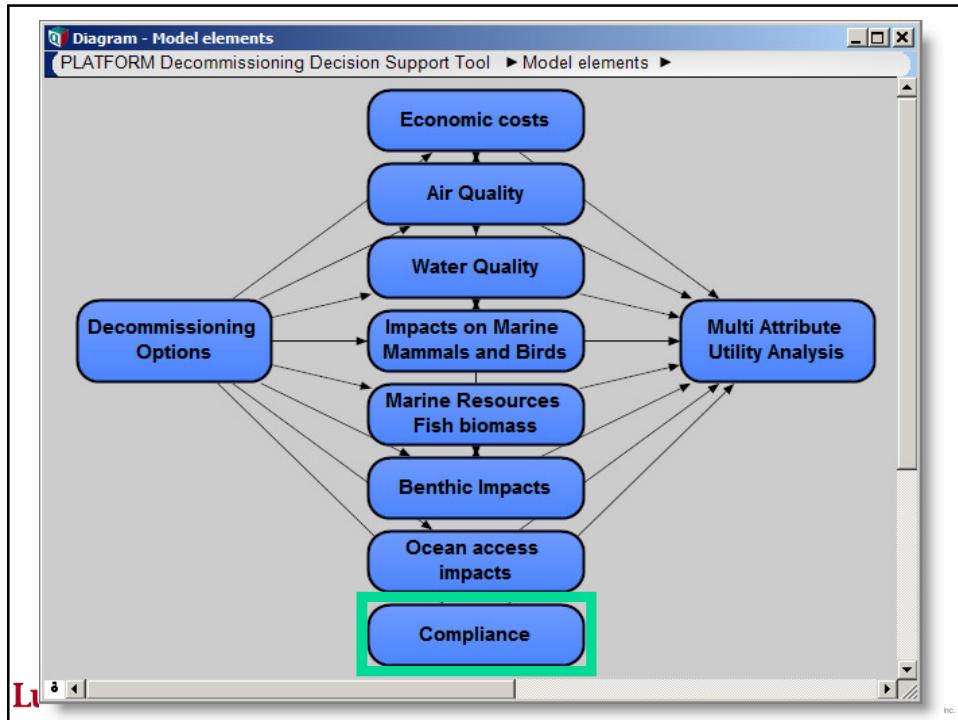




Defining and scoring an attribute: Impacts on Marine Mammals

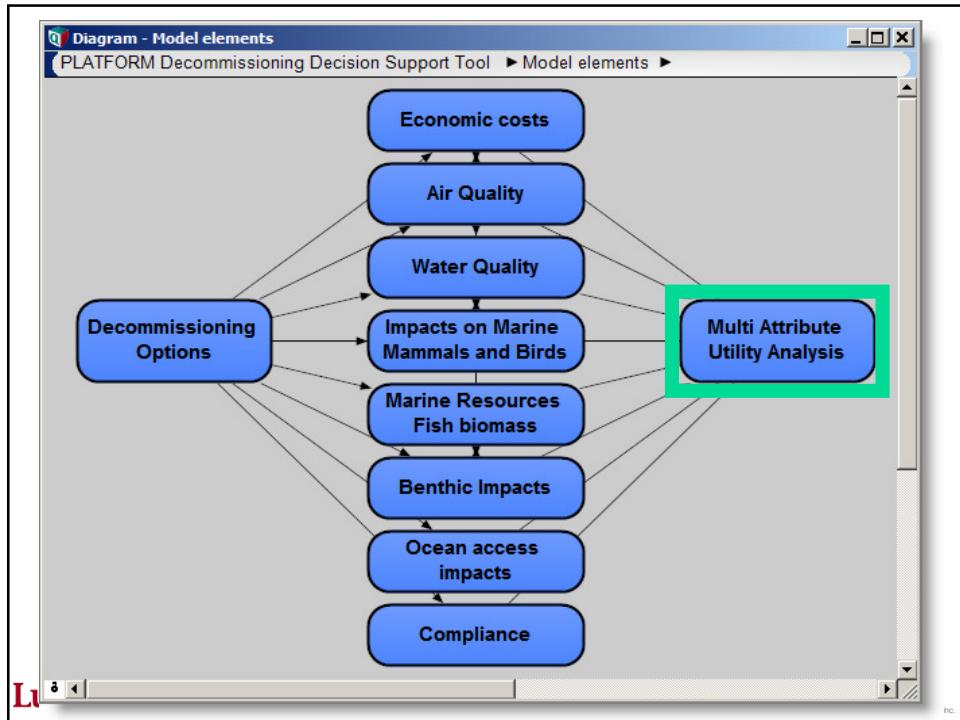
Attribute: Impacts on Marine Mammals	
Level	Description
Best	Status quo, no effect
Good	
Medium	Slight effect son movement or migration of marine mammals
Poor	Some disturbance or disorientation
Worst	Disturbance, disorientation, and possible mortality





Attribute: Strict compliance with platform leases requiring complete removal

Attribute: Strict compliance			
Level	Description	Decision options	Score
Best	Platform is completely removed and sea bed restored, compliant with lease	Complete removal including shell mounds	100
Medium	Jacket up to 85 feet below MWL and shell mounds left in place, non-compliant with lease.	Partial removal of platform	0%
Worst	Entire platform left in place, non-compliant with lease.	Reuse of platform in place	0



Assessing Swing Weights by Attribute

Assessing swing weights by attribute				
Attributes	Type	Best outcome	Worst outcome	Swing weight
Costs	Quantitative	Status quo: \$0	Complete removal: \$250 million	100 ▼
Air quality	Qualitative	Status quo: Zero emissions.	Complete removal: Emissions from 4400 ton HLV onsite for 113 service days for complete removal.	40 ▼
Water quality	Qualitative	Status quo: No impact	Complete removal: Accidental discharge of contaminated material at surface, or shell mound removal with toxic sediment contaminates water column.	15 ▼
Marine mammals	Qualitative	Status quo: No impact	Complete removal: Explosive severing for complete removal causes disturbance, disorientation, and some mortality to marine mammals.	20 ▼
Birds	Qualitative	Deck removal: Reduced mortality from flight collisions. Loss of offshore roosting replaced by new	Deck removal: Loss of offshore roosting reduces fitness and survival, which outweighs reduced flight collisions.	10 ▼
Benthic impacts	Qualitative	Status quo: No impact	Complete removal: Anchoring or shell mound removal leads to widespread impact and spreading contaminants.	10 ▼
Fish production	Quantitative	Status quo: 10,000 Kg/y	Complete removal: Zero fish production	25 ▼
Ocean access	Quantitative	Removal: Adds 2 Sq N Mi	Status quo: Limits access	20 ▼
Strict compliance	Qualitative	Complete removal complies with lease	Partial or no removal violates lease.	50 ▼

SMARTS: Simple Multi-Attribute Rating Tool with Swing weights (Edwards & Barron, 1994)

- Rate by swing - i.e. importance of change from worst to best outcome
- Select attribute with largest swing weight (100) and order attributes from largest to smallest
- Select weight for each attribute

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Poll 2

Poll: I would put the following weight on “Strict Compliance”:

0% (not at all important)

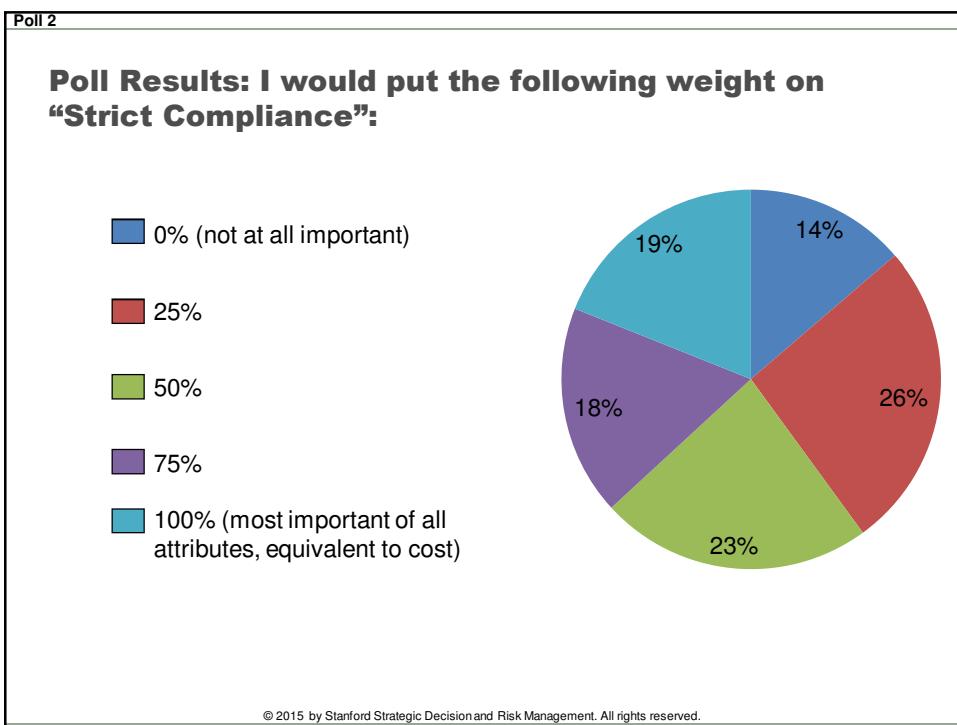
25%

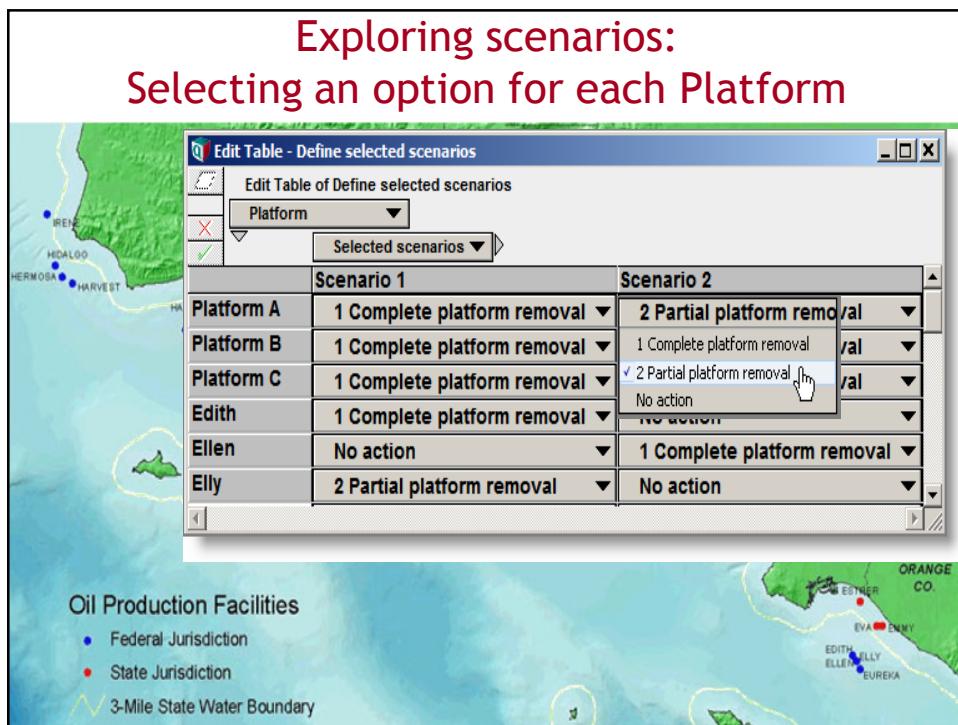
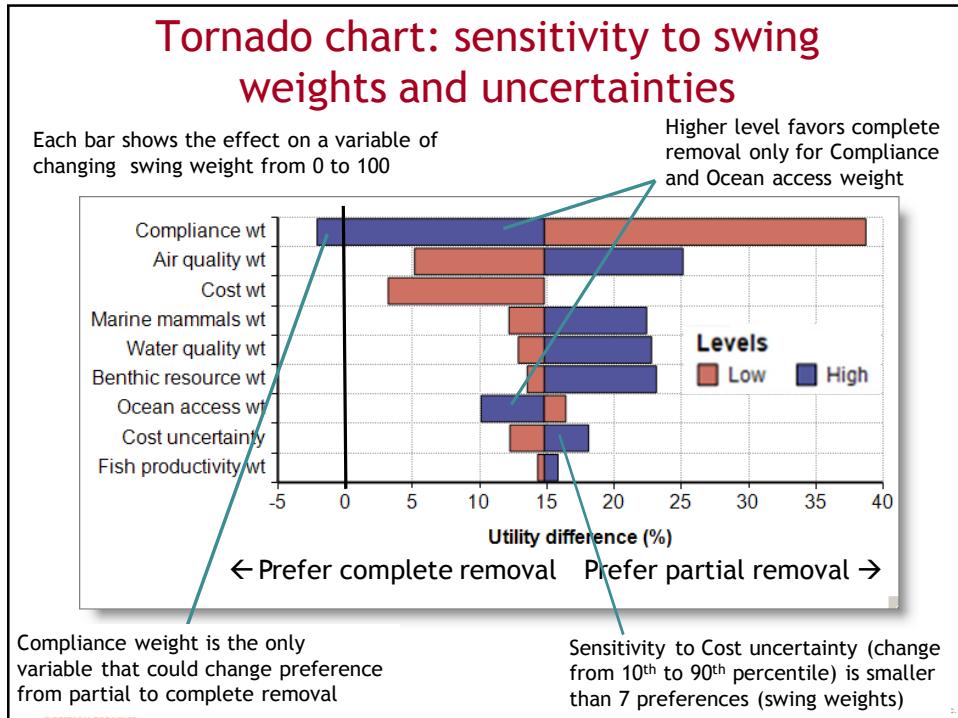
50%

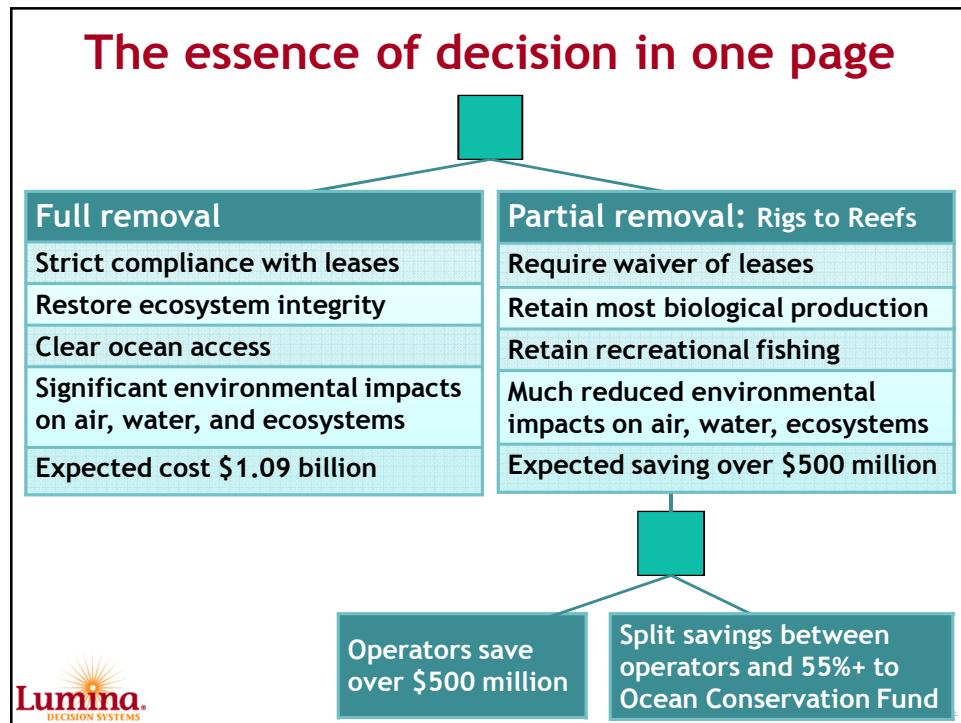
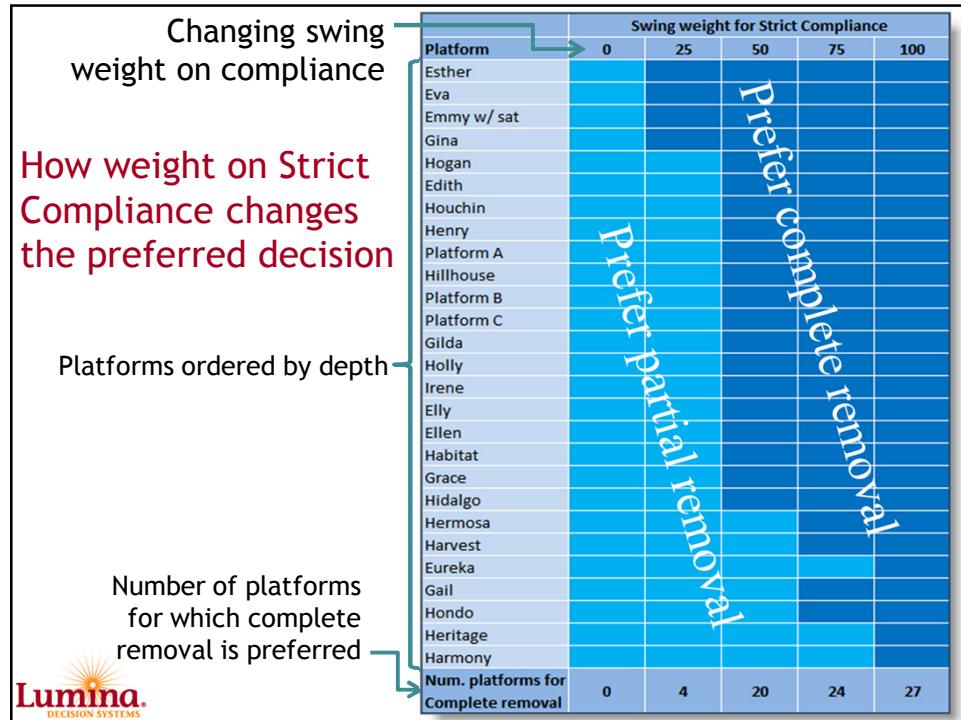
75%

100% (most important of all attributes, equivalent to cost)

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Outcomes

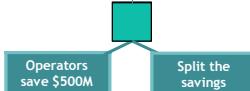
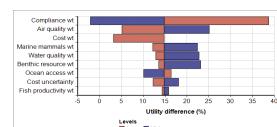
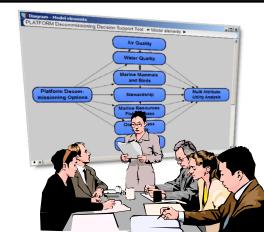
- Waive “strict compliance”
- Split the savings
- “Rigs-to-Reefs” bill AB 2503 passed by California State House with near consensus



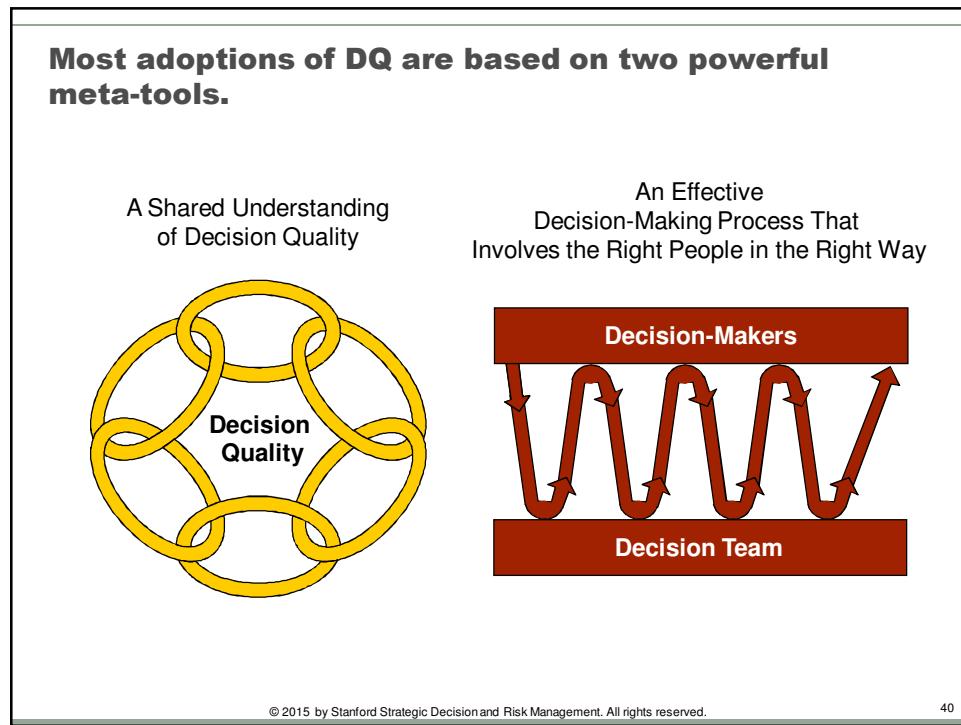
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Lessons learned

- Stakeholders gain confidence and insights by exploring an interactive decision model
- Sensitivity analysis lets us work with approx numbers
- Ingenuity can generate a better decision option
- DA can help illuminate decisions even when perspectives conflict



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Decision quality requires six elements.

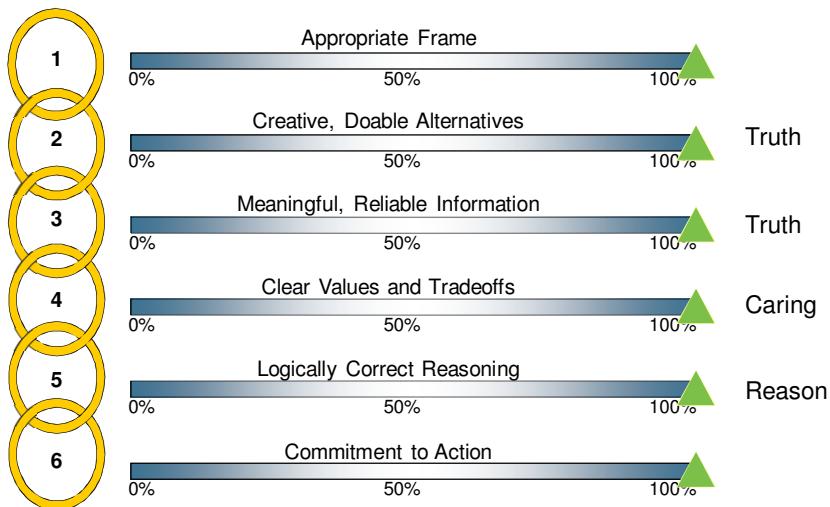


The DQ Chain: Because a decision is no better than its weakest link.

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The 100% point for a given situation is where additional work is not worth the effort.



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Poll 3

Poll: I am highly frustrated with the extreme and polarized adversarial advocacy decision process in important societal decisions and want transparency based on Truth – Reason – Caring instead.

Strongly disagree

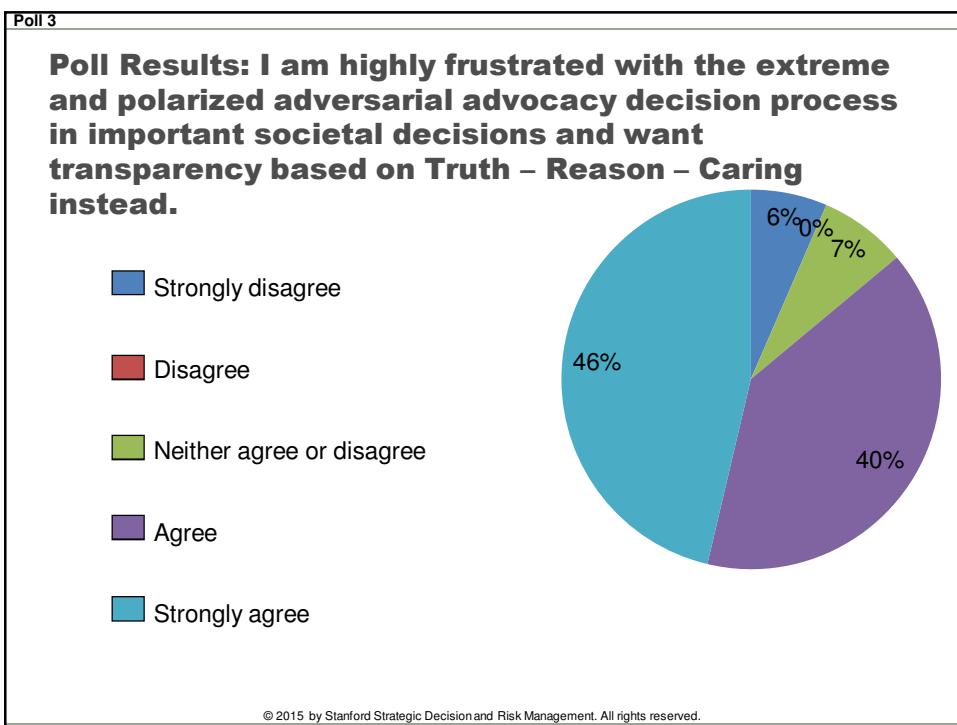
Disagree

Neither agree or disagree

Agree

Strongly agree

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Poll 4

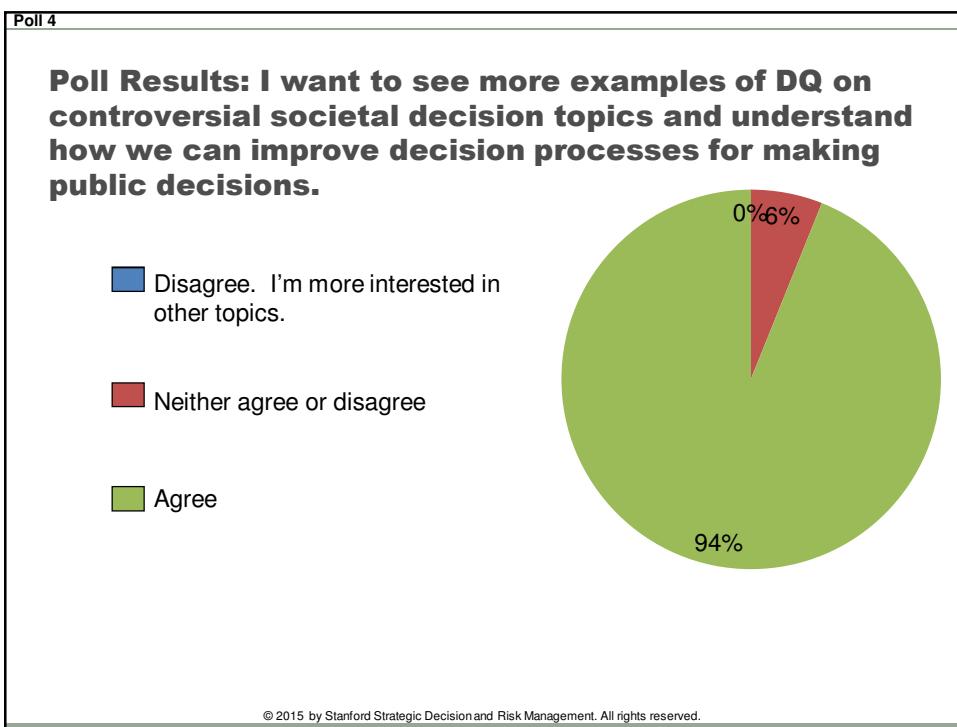
Poll: I want to see more examples of DQ on controversial societal decision topics and understand how we can improve decision processes for making public decisions.

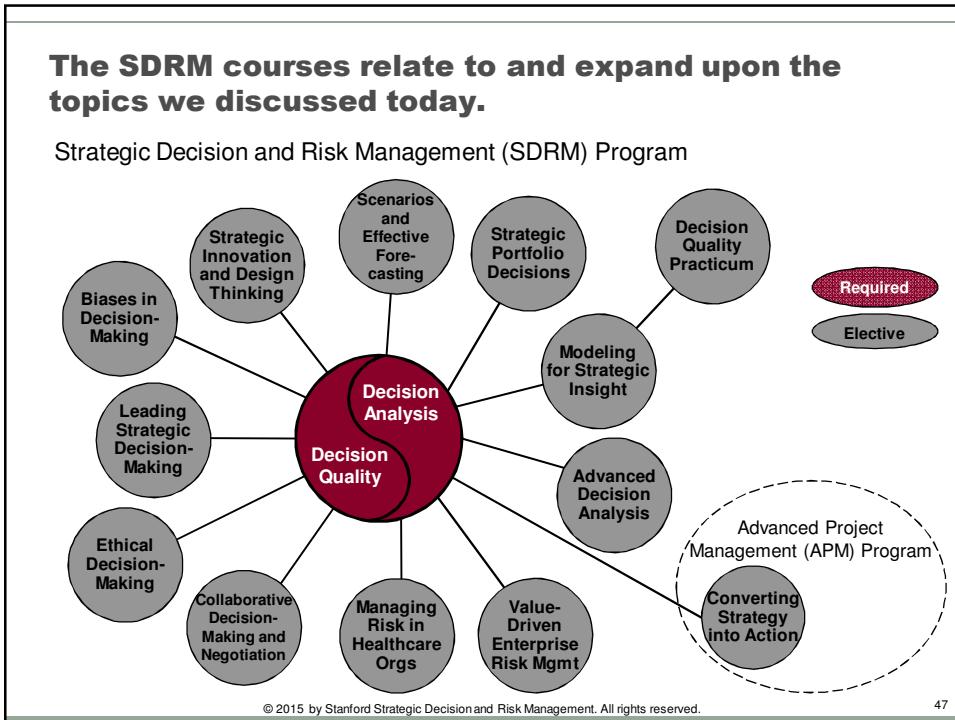
Disagree. I'm more interested in other topics.

Neither agree or disagree

Agree

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Scenarios and Effective Forecasting			Value-Driven Enterprise Risk Management			

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Patty Harris and Kristen Simonds +1.650.307.6973

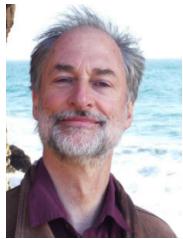
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