

# Ocean Science Trust Study Overview

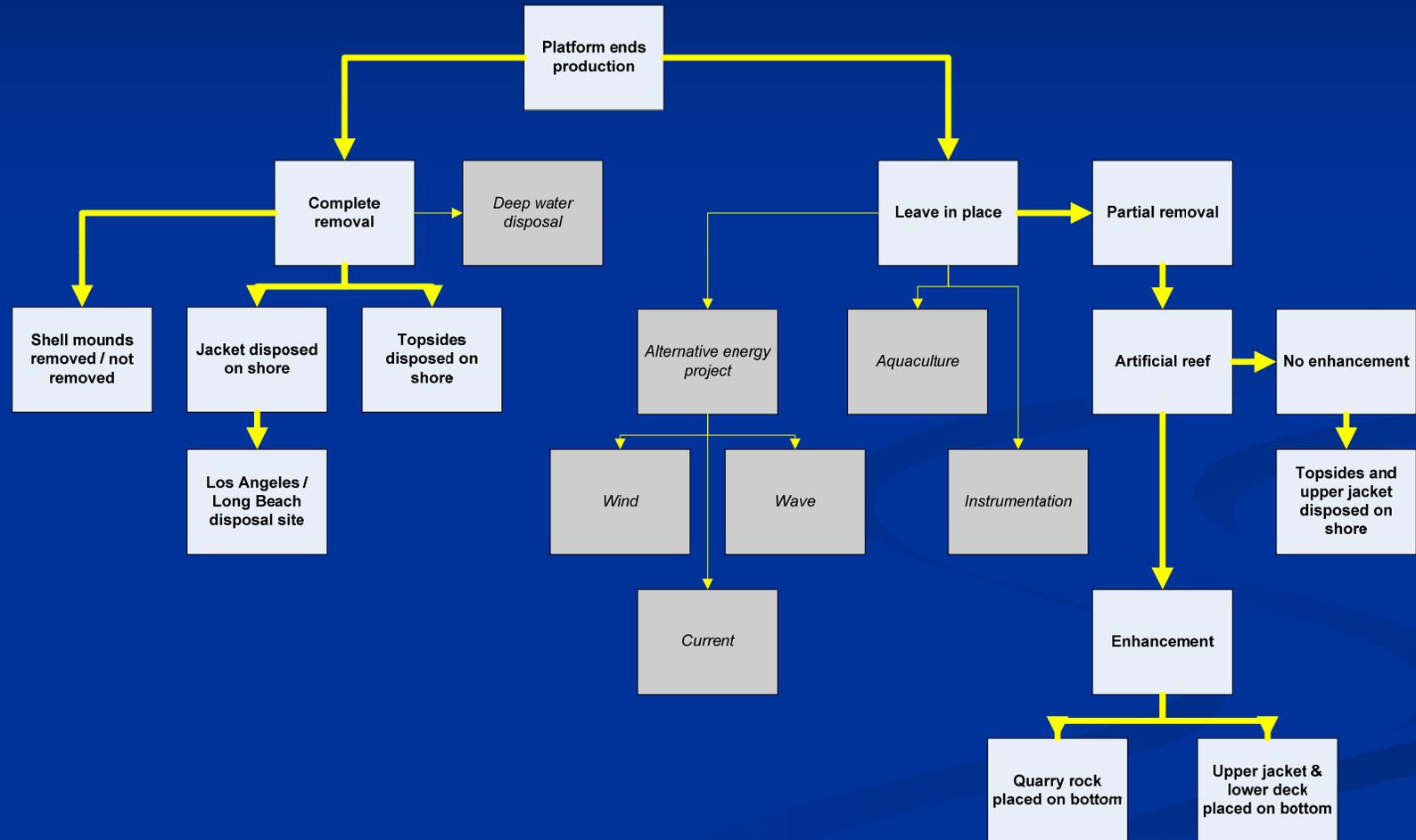
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# Project Approach

- Evaluate range of potential options
- Describe overall regulatory and legal context
- Select options for in-depth analysis
- Conduct in-depth analysis
  - Focus on choice between options
  - Describe and evaluate major sources of impact
  - Develop decision model for more detailed examination
- Investigate legal and liability issues
- Interact with EAC at key points in the process

# Overview of Options Considered



# Criteria for Selecting Options

- Viability within ten-year timeframe
- Existing legal framework for implementation
- Technical feasibility
- Economic viability
- Degree of acceptance by managers
- Degree of interest from proponents
- Relevance to the majority of S CA platforms

# Features of the Analysis

- Many aspects identical (well abandonment, topsides removal)
- Use available data / information
  - Published literature, reports, monitoring data
  - Mix of quantitative and qualitative information
  - Many data gaps
- New information for
  - Fish production on platforms
  - Worst-case air emissions
  - Minor costs (dredging, reef enhancement, cathodic protection)



# Factors Excluded From Analysis (cont.)

Reason excluded	Likely effect on analysis
<i>Data poor, hard to quantify, small</i>	
<ul style="list-style-type: none"><li>■ Employment</li><li>■ Broader regional, state economy</li><li>■ Tax consequences</li> <li>■ Mitigation costs or credits</li> <li>■ Non-MMS permitting costs</li></ul>	<ul style="list-style-type: none"><li>■ Very small</li><li>■ Very small</li><li>■ Small to moderate depending on magnitude and policy implications</li><li>■ Small based on lack of legal basis and precedent for artificial habitats</li><li>■ Small because permitting requirements likely to be similar for both options</li></ul>

# Key Findings

- Impacts not equally likely or significant
- Localized and short-term
  - Benthic communities
  - Birds
  - Marine mammals
  - Water quality
  - But larger chance of impact under complete removal
- Mix of potentially positive and negative
  - Socioeconomic due to changes in ocean access
  - Fishing, nonconsumptive, shipping

# Key Findings (cont.)

- Potentially larger impacts
  - Air emissions (Harmony alone)
    - NO<sub>x</sub>: 600 tons vs. 89 tons
    - CO<sub>2</sub>: 29,400 tons vs. 4,400 tons
    - PM<sub>10</sub>: 21 tons vs. 3 tons
  - Biological communities
    - Standing stock
    - Recruitment and production
  - Costs
    - \$1.09 billion for complete removal
    - \$478 million for partial removal

# Desired Option

- No way to make an objective choice
- Depends heavily on preferences

## Complete

Ecosystem integrity

Strict compliance

Clear ocean access

Potential liability

## Partial

Air emissions

Biological production

Cost / funding

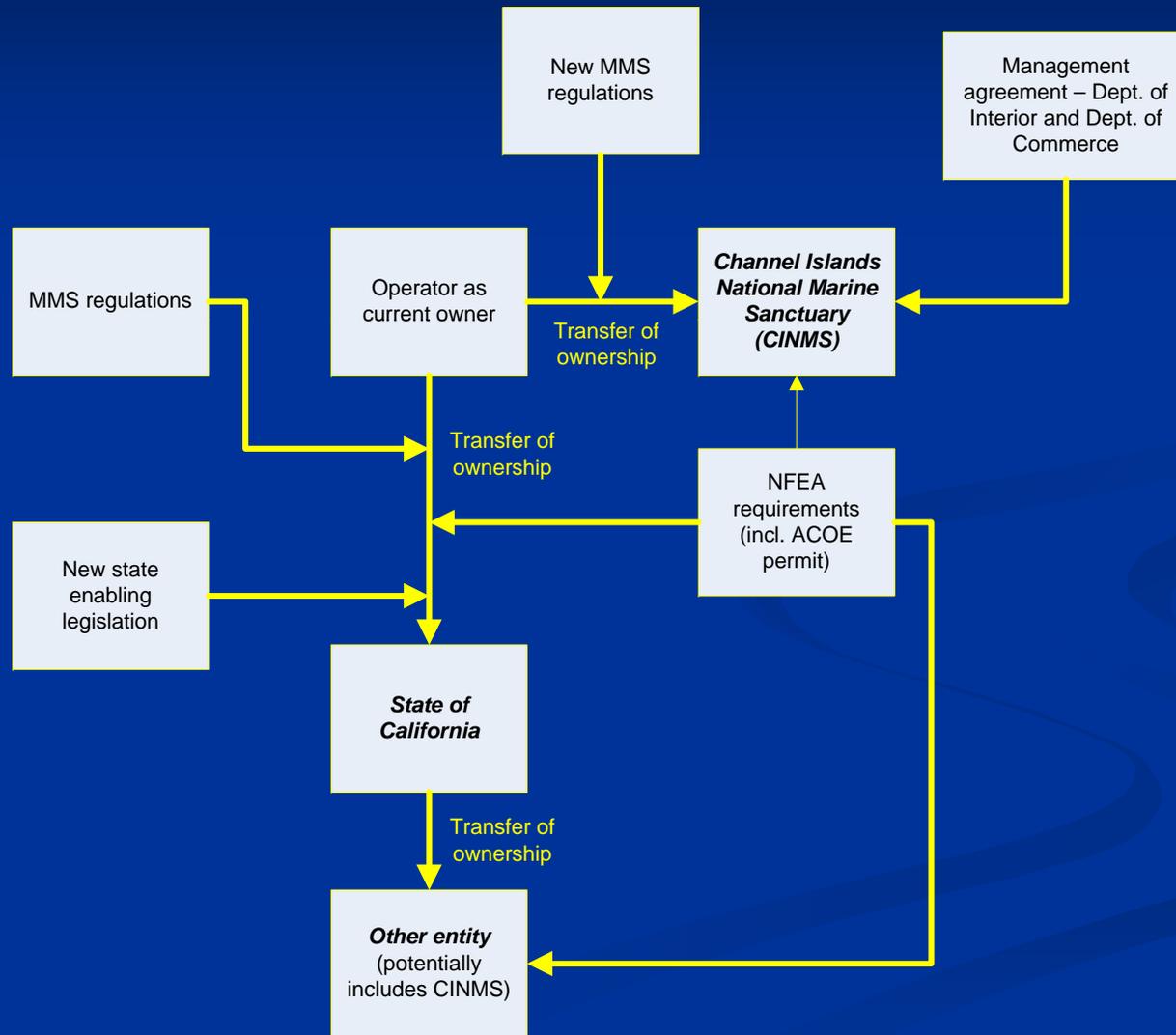
Recreational fishing

Water quality

# Partial Removal: Legal and Liability

- Well-defined pathways for ownership transfer
- Well-developed mechanisms for managing liability
- Funds available from avoided costs
- CA would require new legislation
  - Acceptance of ownership of reefs in OCS
  - Expanded artificial reef program
  - Acceptance / management of avoided costs
  - Liability containment

# Ownership Transfer Pathways



# Modeling the Options

- Many alternative options and preferences
- Difficult to analyze exhaustively
- Important to enable stakeholders to examine implications of assumptions and values
- Decision model loaded with all data and assessments used for the analysis
- Integrates quantitative and qualitative aspects

# Model User Interface

Diagram - PLATFORM Decommissioning Decision Support Tool

PLATFORM Decommissioning Decision Support Tool

## PLATFORM - OST Oil & Gas Platform Decommissioning Decision Support Tool

Platform Decommissioning Options	
Select scenarios to consider	<b>Edit Table</b>
Define selected scenarios	<b>Sub Table</b>
Reef enhancements for partial removal	<b>Sub Table</b>
Shell mound removal option by platform	<b>Sub Table</b>
Use explosives on jacket piles for selected platforms	<b>Sub Table</b>
HLV required for project (tons)	<b>Calc</b> mid
Decommissioning options by selected platforms	<b>Result</b> mid

Project Cost Analysis	
Percent of avoided costs for beneficial use (%)	50% ▾
Decommissioning and Avoided Costs (\$)	<b>Calc</b> mid
Avoided costs for beneficial use (\$)	<b>Calc</b> mid
Range percentage (as % of inputs) (%)	<b>Edit Table</b>
Cost tornado sensitivity (\$)	<b>Calc</b> mid

Multi Attribute Utility Analysis	
<b>Range weights by attribute</b>	
Attribute ratings by level	<b>Edit Table</b>
Weights by attribute	<b>Edit table</b>
Attribute rating by option	<b>Calc</b> mid
Multi-attribute score	<b>Calc</b> mid
<b>Equivalent cost weights by attribute</b>	
Cost weights by attribute (\$M)	<b>Edit table</b>
Equivalent cost by attribute (\$M)	<b>Calc</b> mid
Total equivalent cost (\$M)	<b>Calc</b> mid
Equivalent cost breakeven (\$M)	<b>Calc</b> mid
<b>Model Details</b>	
<b>Multi Attribute Utility Analysis</b>	<b>Model elements</b>

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# Defining Decommissioning Scenarios

 Edit Table - Define selected scenarios

Edit Table of Define selected scenarios

Platform

Selected scenarios

	Scenario 1	Scenario 2
Platform A	1 Complete platform removal ▼	2 Partial platform removal ▼
Platform B	1 Complete platform removal ▼	2 Partial platform removal ▼
Platform C	No action ▼	No action ▼
Edith	No action ▼	No action ▼
Ellen	No action ▼	No action ▼
Elly	No action ▼	No action ▼
Eureka	No action ▼	No action ▼
Gail	No action ▼	No action ▼
Gilda	No action ▼	No action ▼
Gina	No action ▼	No action ▼
Grace	No action ▼	No action ▼
Habitat	No action ▼	No action ▼
Harmony	No action ▼	No action ▼

# Defining Specific Impacts

The screenshot shows a software window titled "Diagram - Ocean access impacts". The breadcrumb trail is "PLATFORM Decom...cision Support Tool > Model elements > Ocean access impacts".

**Module Inputs**

- Use type by selected platforms **SubTable**
- Use distance limit (nautical miles) **11**
- Ocean access data (various) **Edit Table**
- Access Impacts by Removal Option, ... (Sq. nautical miles) **Edit Table**

**Module Outputs**

- Access type by selected platforms **Calc** mid
- Access impacts for selected platforms (sq. nautical miles) **Calc** mid
- Access impacts (% of State Fed waters) (%) **Calc** mid

**Ocean Access Impacts Module Details**

# Embedded Data

Q Edit Table - Input Decommissioning Costs

Edit Table of Input Decommissioning Costs (\$)

Decommissioning Cost Categories ▼

Platform ▼

	Platform A	Platform B	Platform C	Edith
Proj mgmt & Engr & Planning	0	0	0	0
Permitting & Regulatory Compliance	0	0	0	0
Platform Preparation	957.71K	957.71K	957.71K	1.163564M
Conductors	4.157409M	4.329792M	3.316694M	1.650362M
HLV Mobilization & Demobilization	0	0	0	0
Abrasive Cut Spread Mob/Demob	0	0	0	0
Deck - removal	1.759372M	1.759372M	1.759372M	2.45146M
contingency portion	1.46502M	1.46502M	1.46502M	2.11302M
Pile - removal	1.515498M	1.515498M	1.584834M	4.095035M
Jacket - removal	558.932K	558.932K	558.932K	2.804512M
contingency portion	280.54K	280.54K	280.54K	1.801392M
Transportation & Disposal (metal)	1.327488M	1.327488M	1.327488M	3.086592M
Transportation & Disposal (conductor)	363.358K	379.381K	288.32K	136.641K
Site Clearance	709K	709K	709K	709K
Shell Mound Removal	0	0	0	0
Reef Enhancement	0	0	0	0



# Uncertainty Analysis

