

# Artificial Reefs

Presented by

**Dr. Brian Twomey**

(Twomeybg@gmail.com)



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# Artificial Reefs in Asia



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# Brunei Decommissioning 1: Summary

- During three decades of operating offshore, BSP have removed about **30** redundant structures.
- Between **1975 and 1984**, all the redundant structures were either brought onshore for scrapping or disposed of by deep water dumping in international waters after bringing the topsides onshore.
- With the instigation of the 'rigs to reef' policy in **August 1988**, BSP started disposing of the redundant structures as artificial reefs in an area well outside commercial shipping lanes.
- **1988:** Two redundant offshore oil platforms were placed on the seabed northwest of the original tyre reef at Two Fathom Rocks
- *This programme is the first in the Asian region where redundant oil platforms were made into intentionally built artificial rig reefs.*
- **1994:** A second "Rig Reef" made up of five redundant jackets was built at Two Fathom Rocks

## Brunei Decommissioning 2

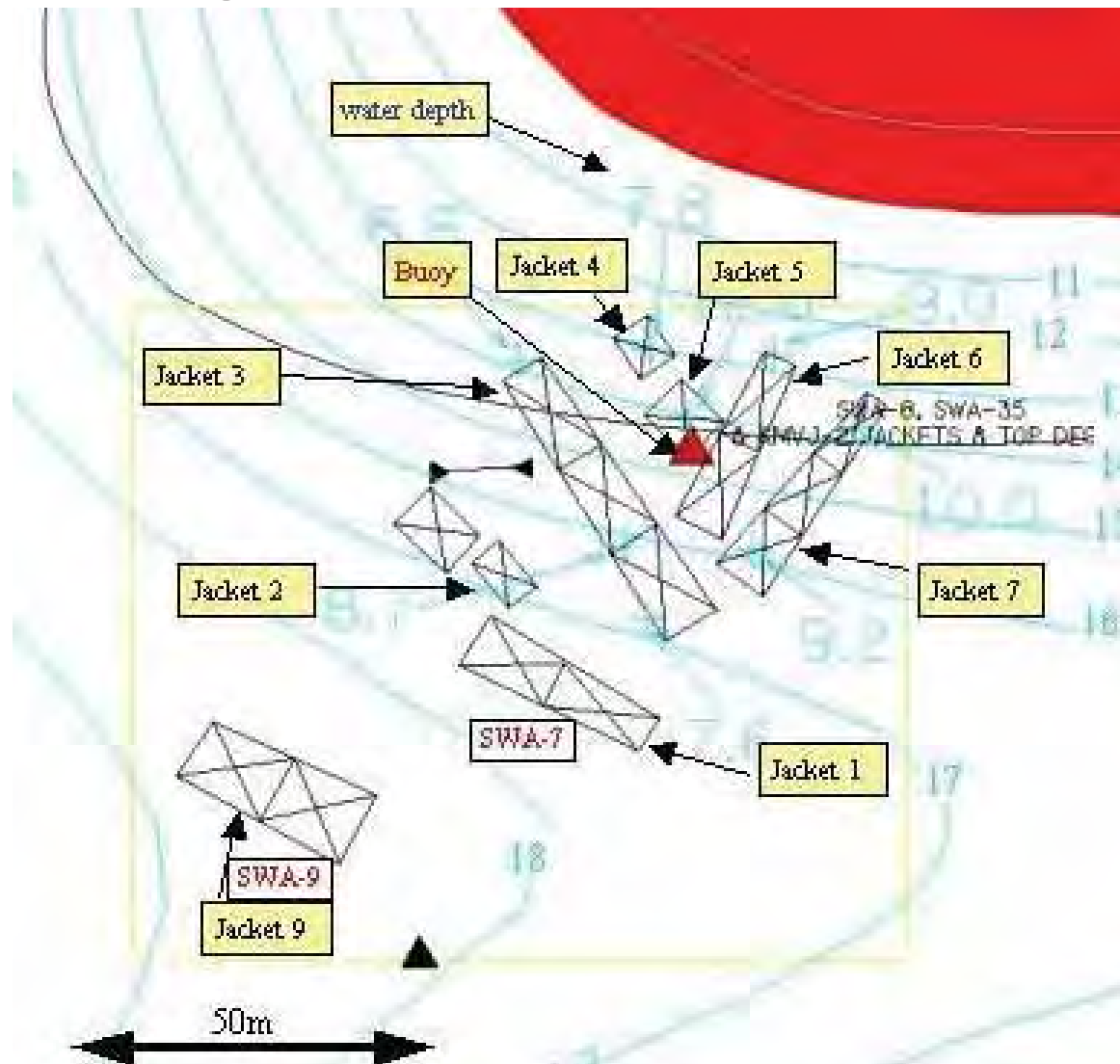
The most recent removals concern structures located in water depths ranging from **16m to 60m** and with **jackets weighing between 85 and 165 tonnes**.

These structures are:

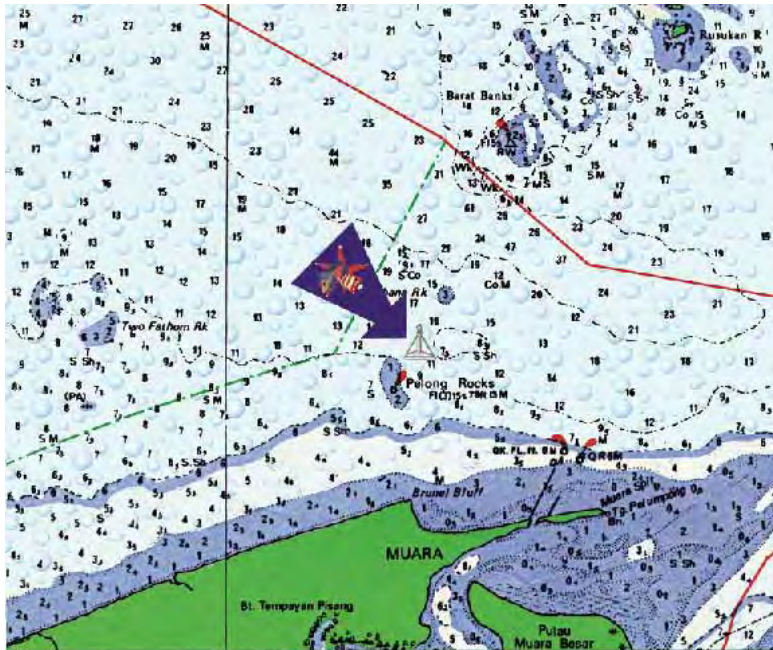
- Ampa Field: SWA-7, SWA-8, SWA-9, SWA-18, SWA-35, SWA-150, AMVJ-2, AMPP-2
- Champion Field: CPVJ-1(A), CPVJ-7/11
- Fairley Field: FAVJ-1 (0)
- In 1994, a total of five redundant structures were removed and their jackets used to extend the artificial reef located in the 'Two Fathom Rock Area'.
- Three of these installations, SWA-8, AMVJ-2 and SWA-35, were removed in April 1994.
- Two others, SWA-7 and SWA-9, were disposed of between July/August 1994.

# TWO FATHOM ROCK

Brunei Shell Rigs to Reefs



## Brunei Decommissioning 3 : Two Fathom Rock (Rig Reef) -1988



Based on a mutual agreement between the department and Brunei Shell Petroleum Co. Sdn. Bhd. (BSP), two redundant offshore oil platforms were placed on the seabed northwest of the original tyre reef at Two Fathom Rocks



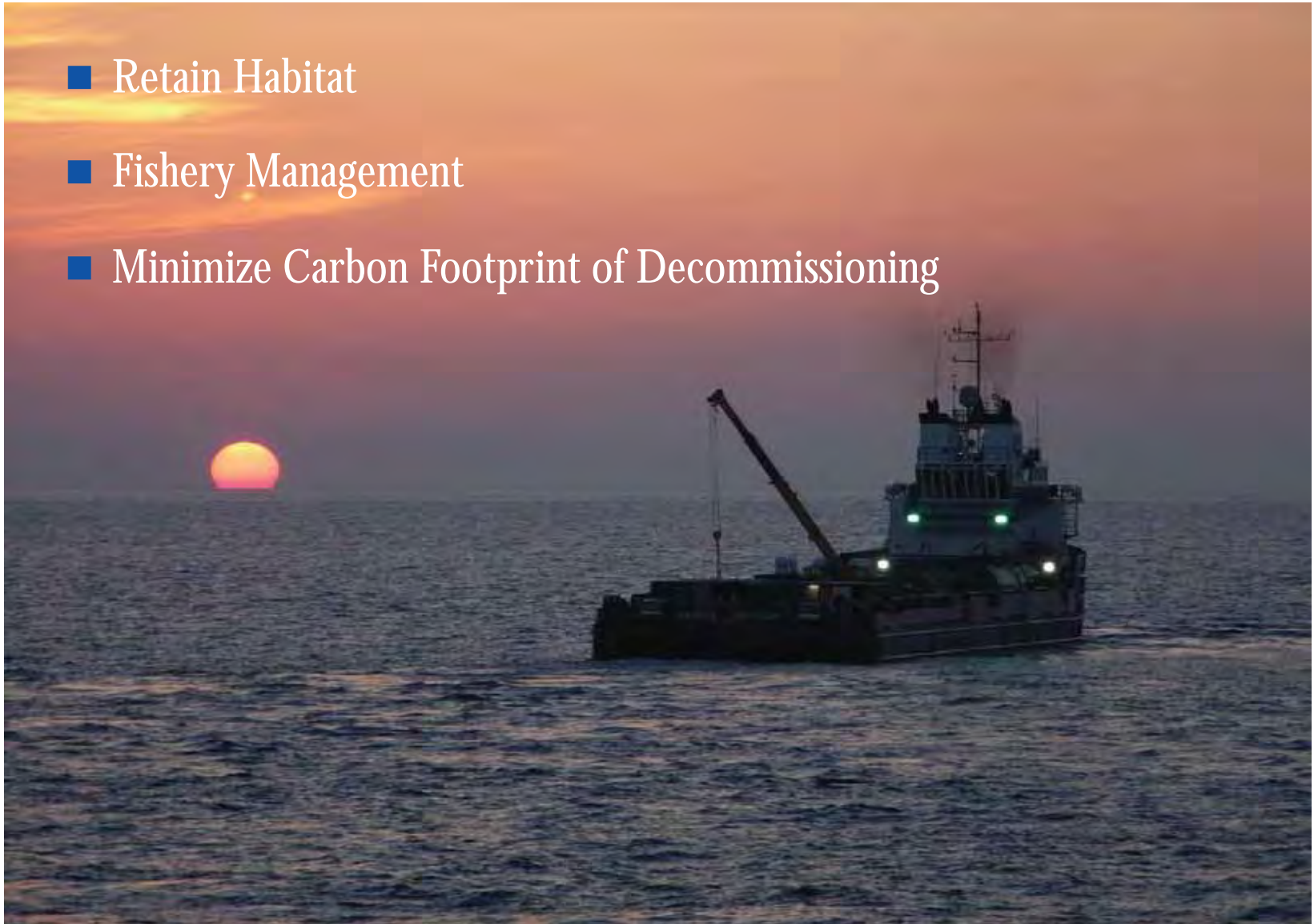
# TWO FATHOM ROCK

Brunei Shell Rigs to Reefs



# FUTURE OF REEFING?

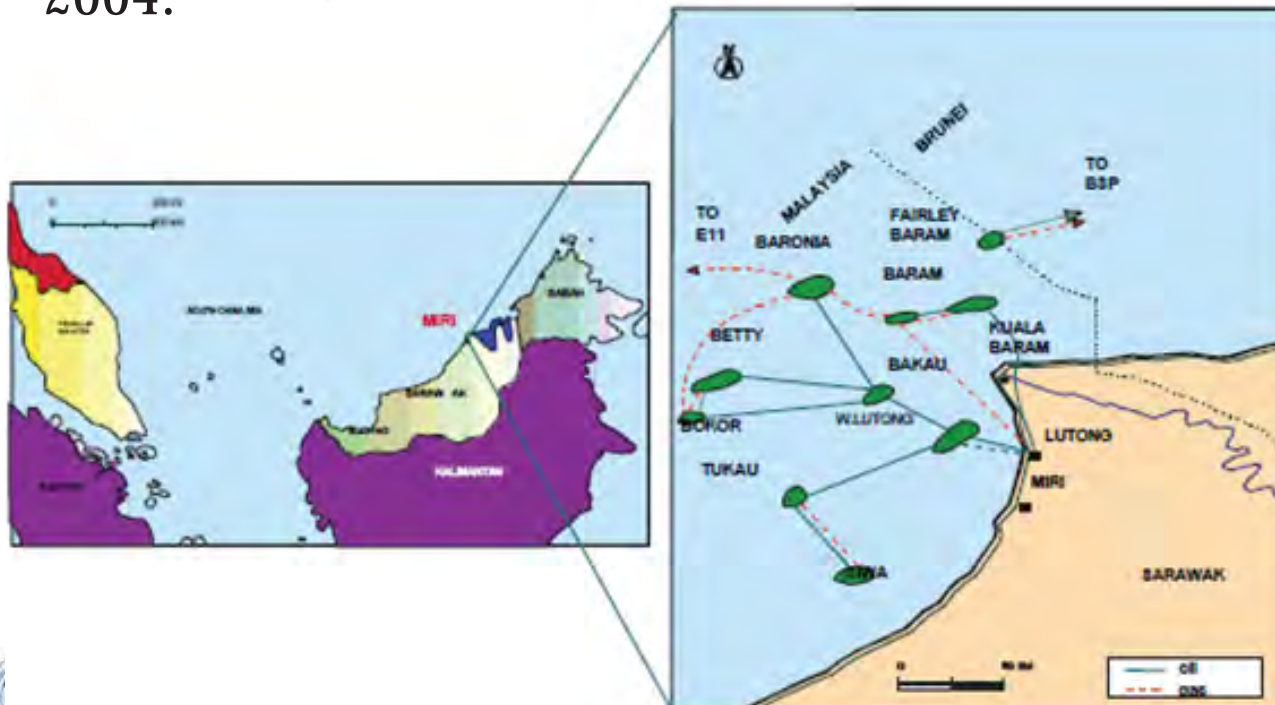
- Retain Habitat
- Fishery Management
- Minimize Carbon Footprint of Decommissioning





# Malaysian Artificial Reef : BARAM 8

- BARAM- 8 consisted of tripod jacket, one well head and a simple deck.
- BARAM- 8 damaged in a storm & collapsed on sea bed in 1975
- BARAM- 8 was a salvage operation
- The BARAM- 8 jacket was made into Malaysia's first artificial reef in 2004.



## Malaysian Decommissioning 6: BARAM 8



**"Baram 8" was scheduled for a Rigs 2 Reef trial in Miri, Sarawak. The rig became a reef on November 8 2004.**

These photographs was taken in September 2007,

© Ian G. Jones 2007 - Rigs 2 Reefs -  
Kenyalang reef (Baram 8 platform) - Miri  
Sarawak

# Artificial Reefs in GOM

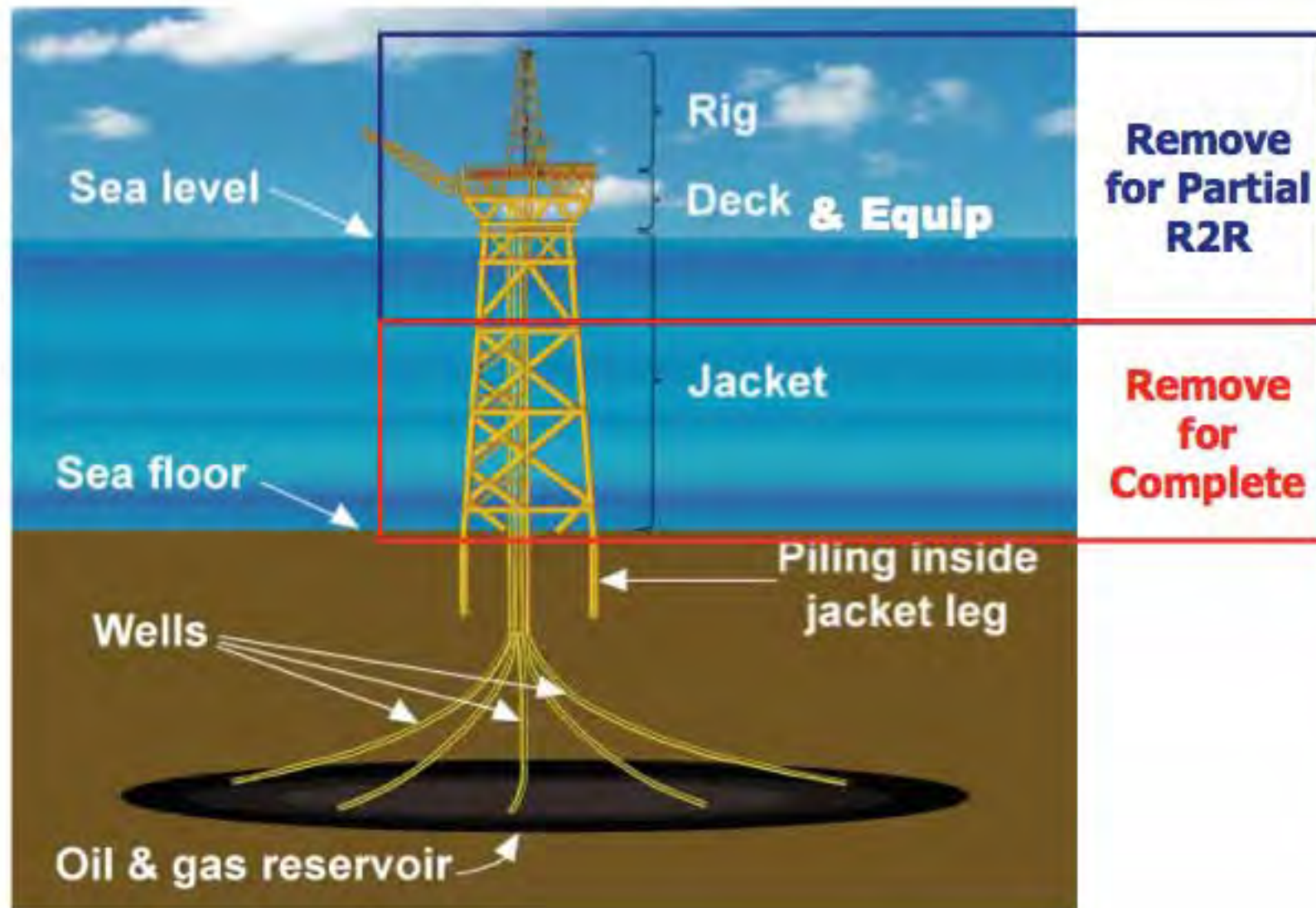


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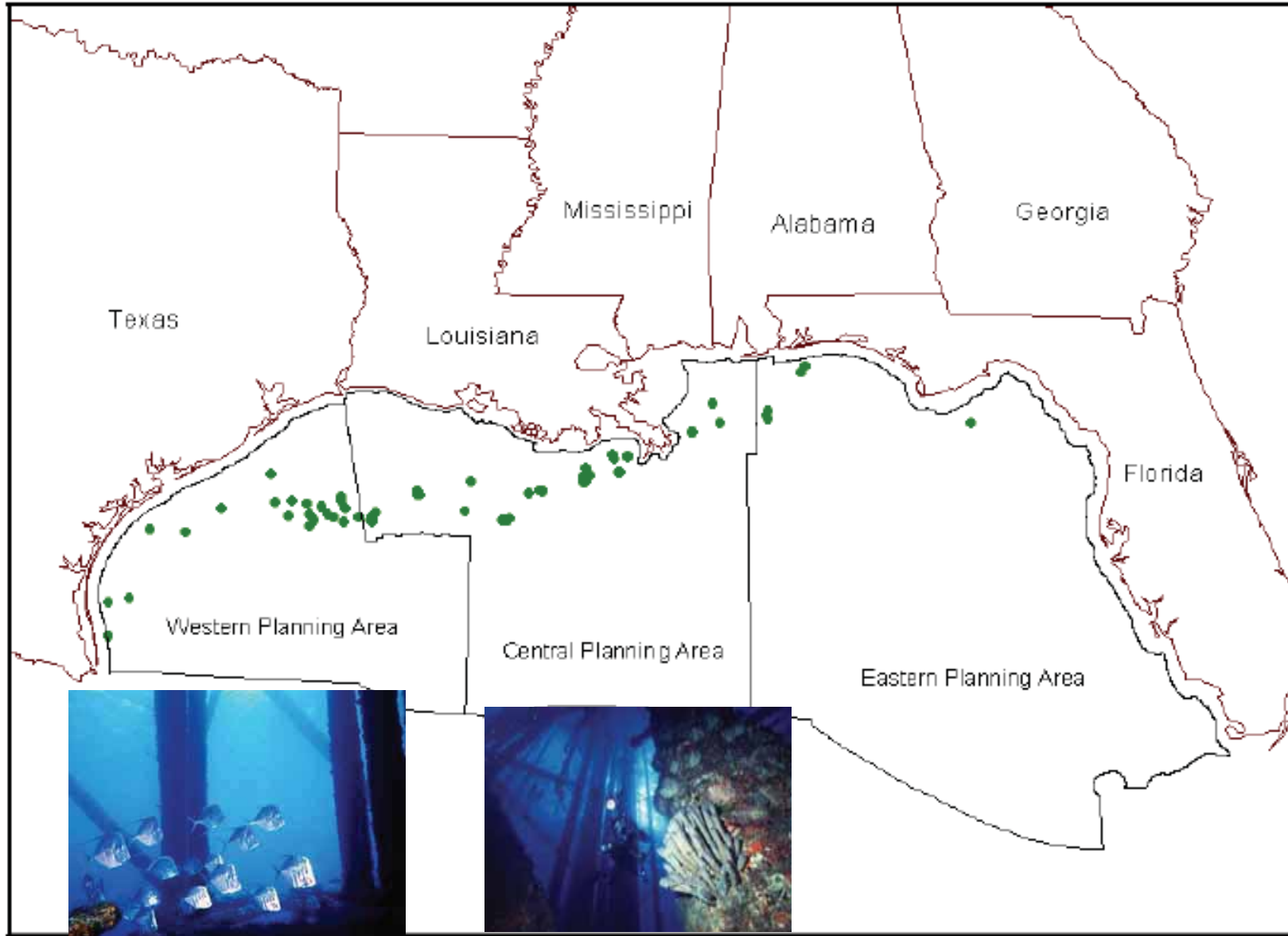


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# PLATFORM COMPONENTS



# RIGS TO REEFS Habitat Retention



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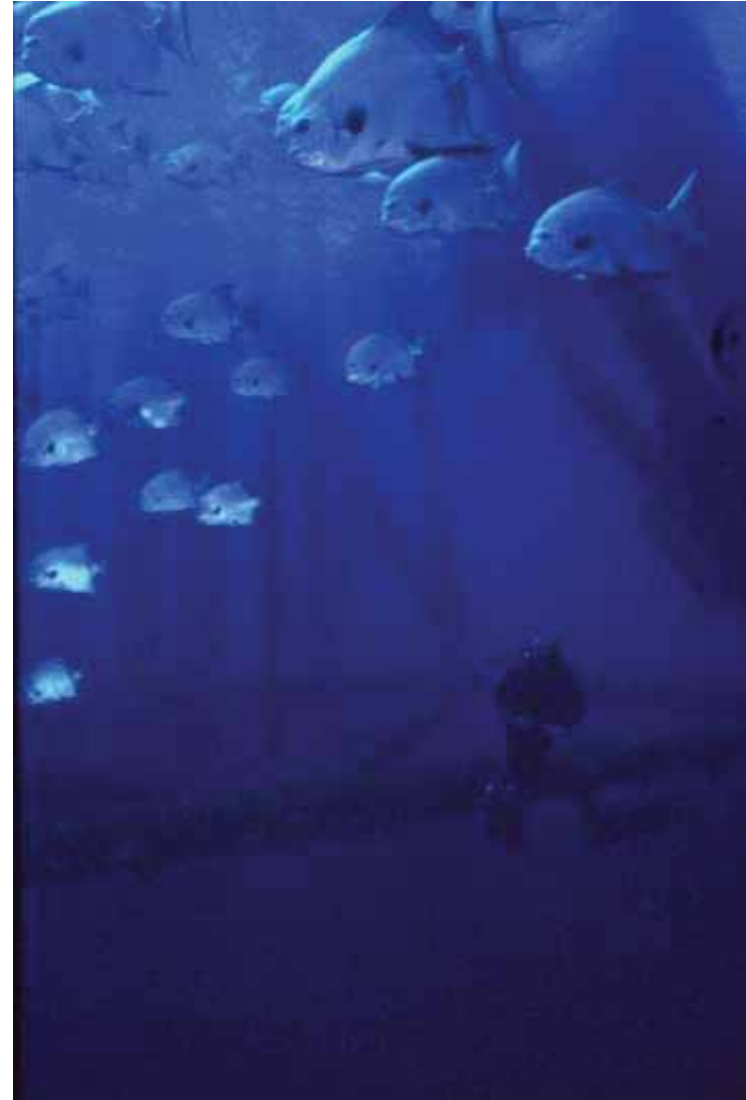


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# IS IT REALLY HABITAT?

The area or type of environment in which an organism or biological population normally lives or occurs. The place where a person or thing is most likely to be found.



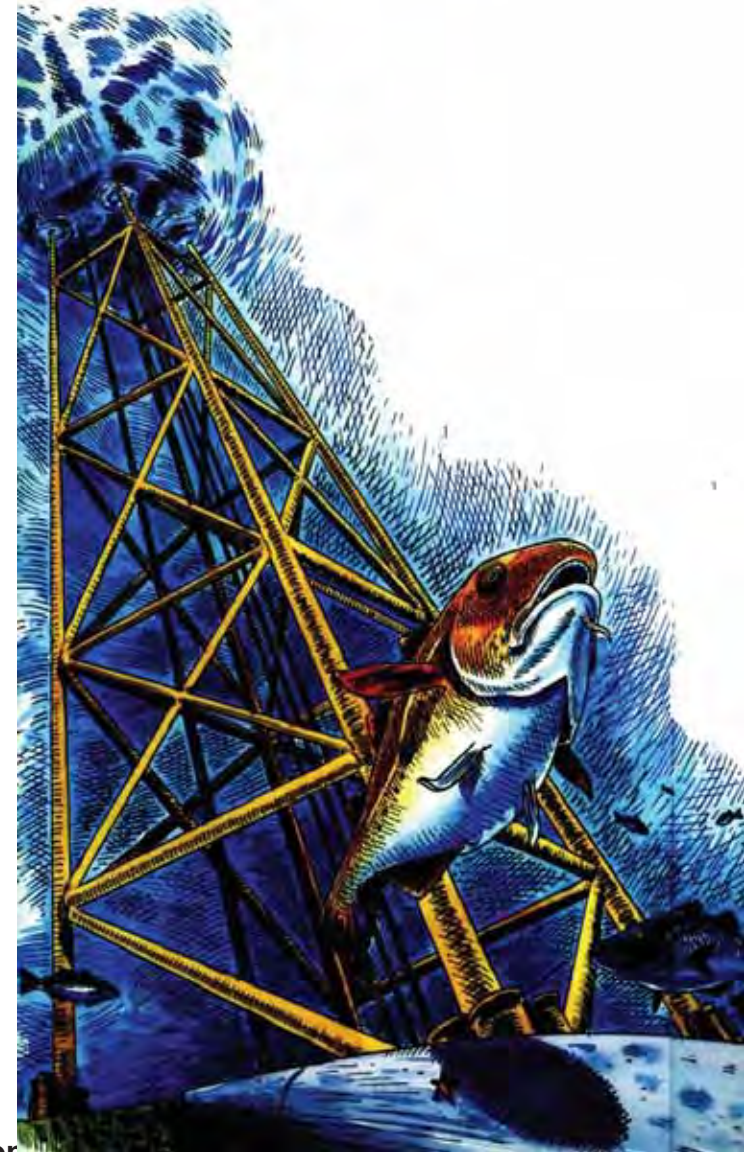
# HOW GOOD IS THE HABITAT?

- 70% of offshore saltwater fishing trips in Louisiana EEZ are destined for one or more offshore platforms
- Offshore platforms represent 25% of the available hard bottom substrate in the Gulf of Mexico
- Monthly average density around platform of 12,000 fishes, ranging in size from 2.4 cm to 1.1 m



# WHEN DID IT START?

- In 1947 - Kerr McGee installing SS 32 in 18' ?
- In 1980 - Exxon SPS offshore Florida?
- In 1985 - when the US Congress recognized value of artificial reefs?
- In 1987 - when OXY placed the 1st platform in the Louisiana program?





# WHO STARTED IT?

Stakeholders!!!

- Fishermen
- Divers
- Fisheries Management
- Oil Industry



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# WHAT CAN BE A REEF?

## Materials of Opportunity

- Concrete Rubble
- Quarry Rock
- Bridge and Tunnels Sections
- Barges and Ships
- Military Equipment
- Automobiles
- Offshore Platforms (Rigs-to-Reefs)
- Other Materials of Opportunity





# WHAT DIDN'T WE KNOW?

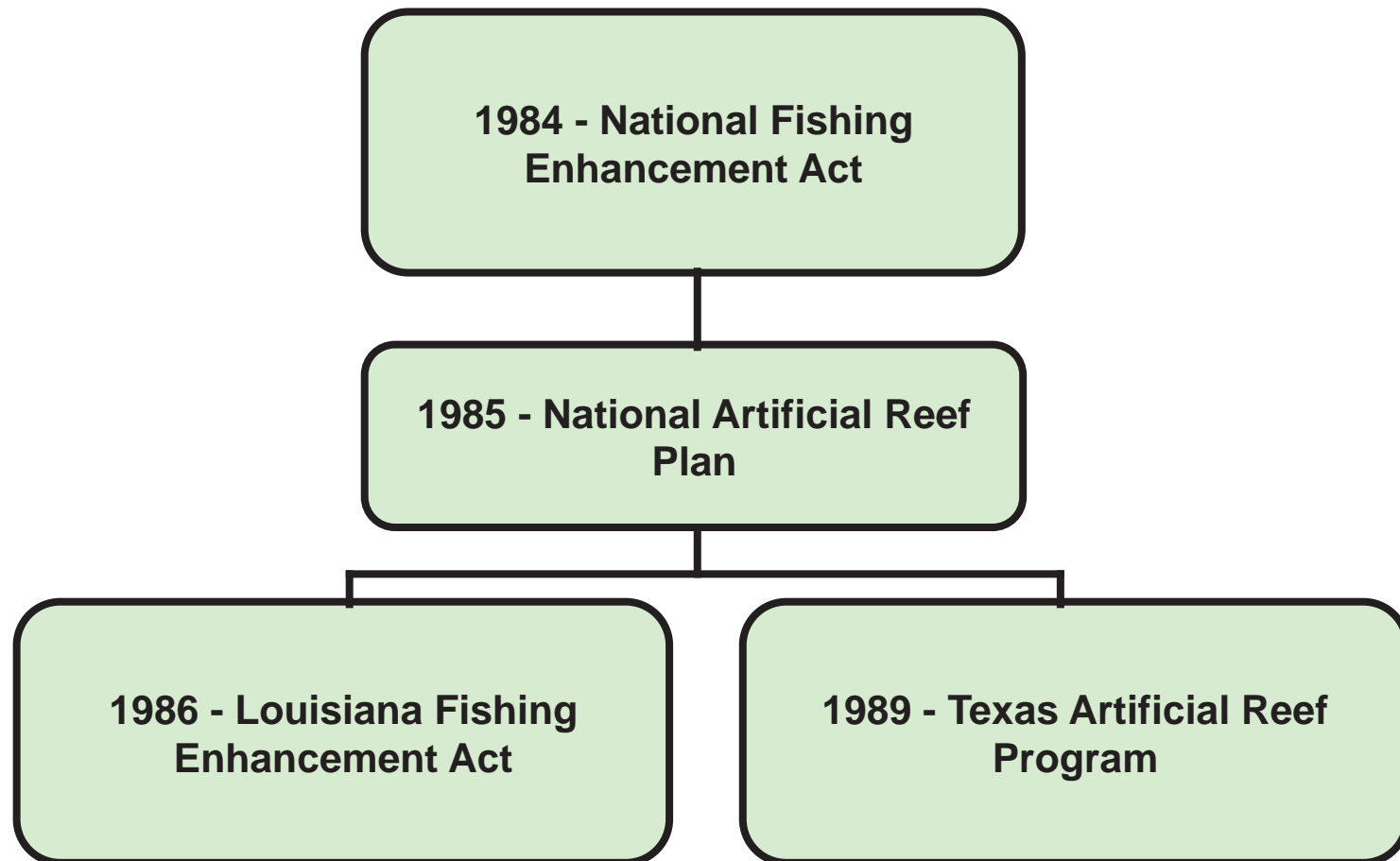
## Starting an Artificial Reef Program

- Who Owns It?
- Where Should It Be?
- How Many Should There Be?
- What Should It Look Like?
- Who Operates and Maintains It?
- Who Pays for It?
- Who is Responsible for It?



# REGULATORY PROCESS

Ownership, Funding & Liability Transfer



# FLORIDA REEF SITES

## Ad Hoc Materials of Opportunity

### 1. Exxon Reef (1979)

Depth: 105 feet

Distance Offshore: 35 miles

Sponsor: Florida Dept. of Environmental Protection

### 2. Pensacola-Tenneco Reef (1982)

Depth: 175 feet

Distance Offshore: 22 miles

Sponsor: Florida Dept. of Environmental Protection

### 3. Tenneco Reef (1985)

Depth: 105 feet and 190 feet

Distance Offshore: 1.5 miles

Sponsor: Broward & Dade Counties

### 4. Chevron Reef (1993)

Depth: 150 feet

Distance Offshore: 22 miles

Sponsor: Escambia County

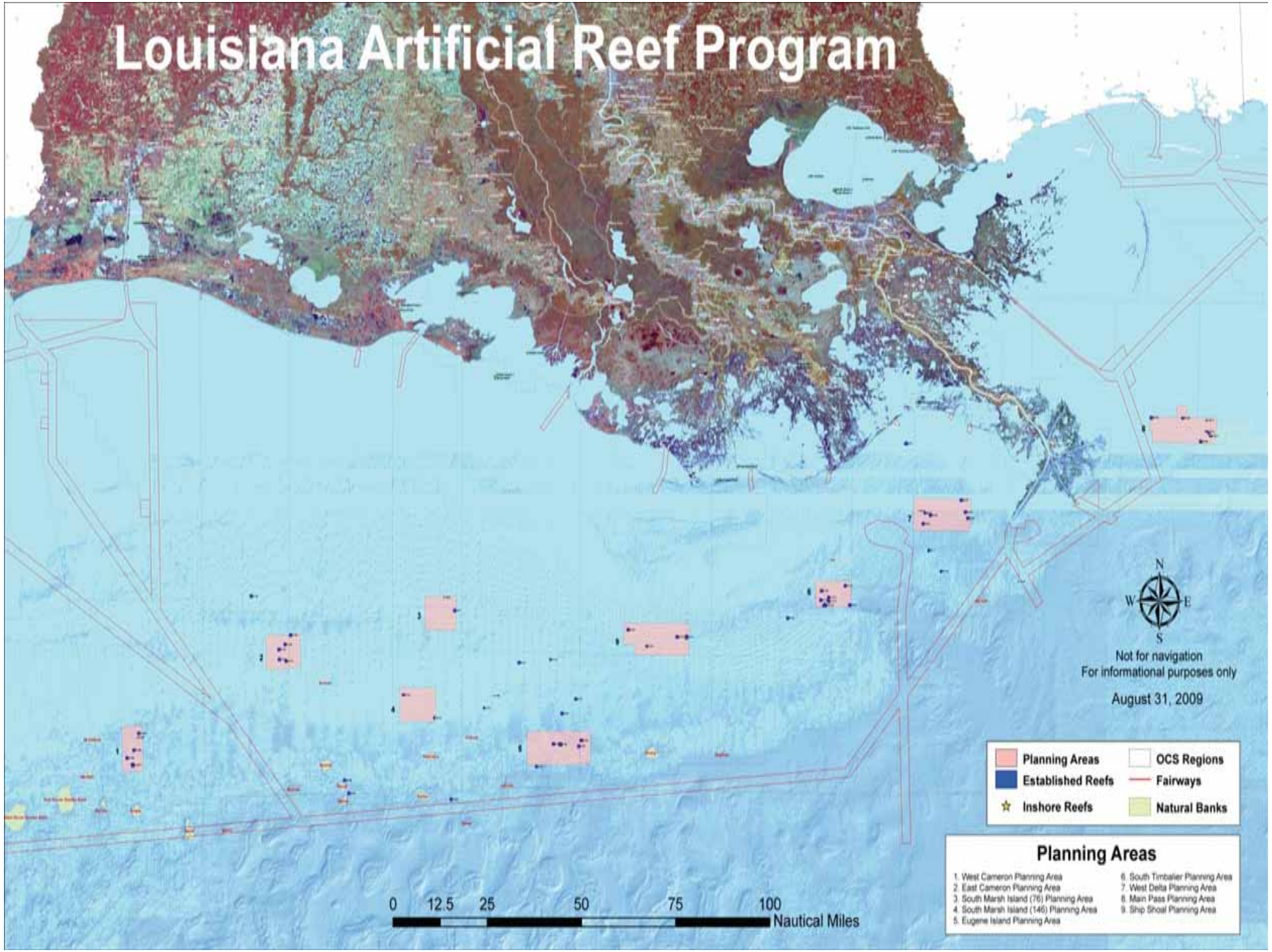


# **LOUISIANA REEF SITES**

## Developing Selection Criteria

- Exclusion Mapping
- Establish Artificial Reef Planning Areas
- Database Compilation
- Assessment & Interpretation of Database
- Mapping of Geological and Technological Features within Each Proposed Reef Site
- Site Selection

# Louisiana Artificial Reef Program





# LOUISIANA REEF PROGRAM

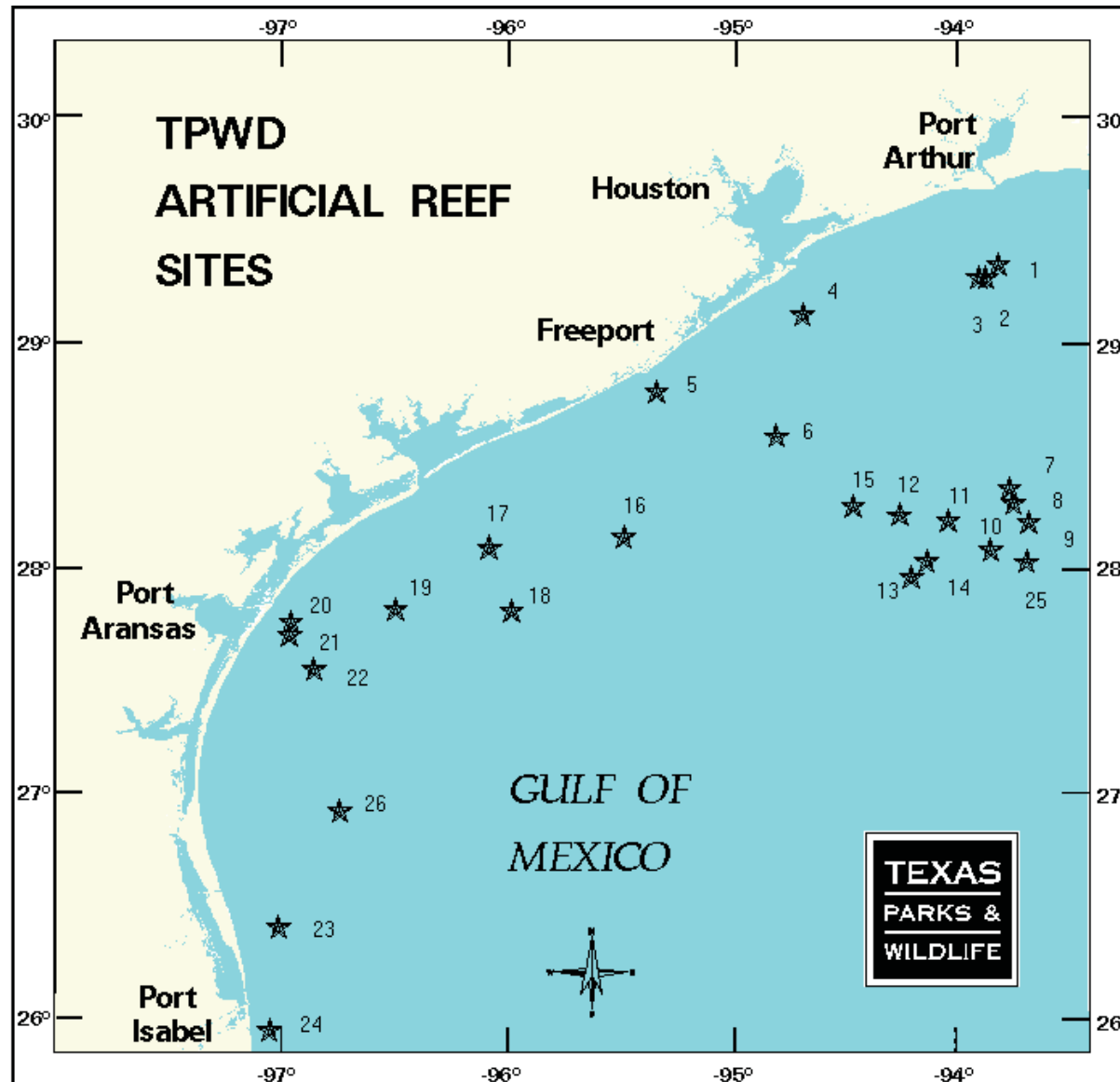
- **63 Artificial Reef Sites**
  - 43 Planning Area Reefs
  - 15 Special Artificial Reef Sites
  - 5 Deepwater Reefs
- **Structures Converted**
  - 245 platform jackets reefed
  - 24 jackets reefed in 2009

# **TEXAS REEF SITES**

Stakeholder Advisory Committee

- Salt Water Sports Fishing
- Offshore Oil and Gas
- Texas Tourist Industry
- General Land Office
- Shrimping Organization
- Texas Diving Club
- Attorney General's Office
- A Texas University
- Environmental Group

# TEXAS REEF SITES



# CALIFORNIA RIGS TO REEFS

Implementation Details to be Developed

## ➤ Legislation Outline

- Bill was introduced by John Perez, Speaker of the California State Assembly.
- Passed the nearly unanimously by state legislators in September, 2010.
- Strong support from politicians, recreational fishermen, Audubon California, California League of Conservation Voters, the Monterey Bay Aquarium, Ocean Conservancy, Oceana, and The Nature Conservancy.
- Opposition from some commercial fishing groups, Santa Barbara County environmental groups including EDC and GOO.
- Bill was signed by the Governor on September 30, 2010.

# EXAMPLE - COST SAVINGS

In 1987 an 8-pile drilling and production platform in 238' of water was toppled in-place in SMI 146 by OXY. The savings resulted in a donation of \$250,000 to the program.

<u>ITEM</u>	<u>TRADITIONAL</u>	<u>RIGS-TO-REEFS</u>	<u>SAVINGS</u>
CARGO BARGES & TUGS	\$250,000	\$115,000	\$135,000
DERRICK BARGE & TUGS	\$1,350,000	\$1,025,000	\$325,000
DIVERS / SURVEYING	\$200,000	\$130,000	\$70,000
ENGINEERING	\$10,000	\$40,000	(\$30,000)
INSPECTION	\$25,000	\$25,000	\$0
WELDING CREW	\$100,000	\$100,000	\$0
WORKBOAT / HELICOPTER	\$25,000	\$25,000	\$0
WEATHER	\$100,000	\$100,000	\$0
MISCELLANEOUS	\$40,000	\$40,000	\$0
<b>TOTALS</b>	<b>\$2,100,000</b>	<b>\$1,600,000</b>	<b>\$500,000</b>



# HOW TO MAKE A REEF

- **Create In Place**
  - Partial Abandonment
  - Topple
- **Cluster at Remote Location**
  - Tow and topple

# TOPPLED IN PLACE

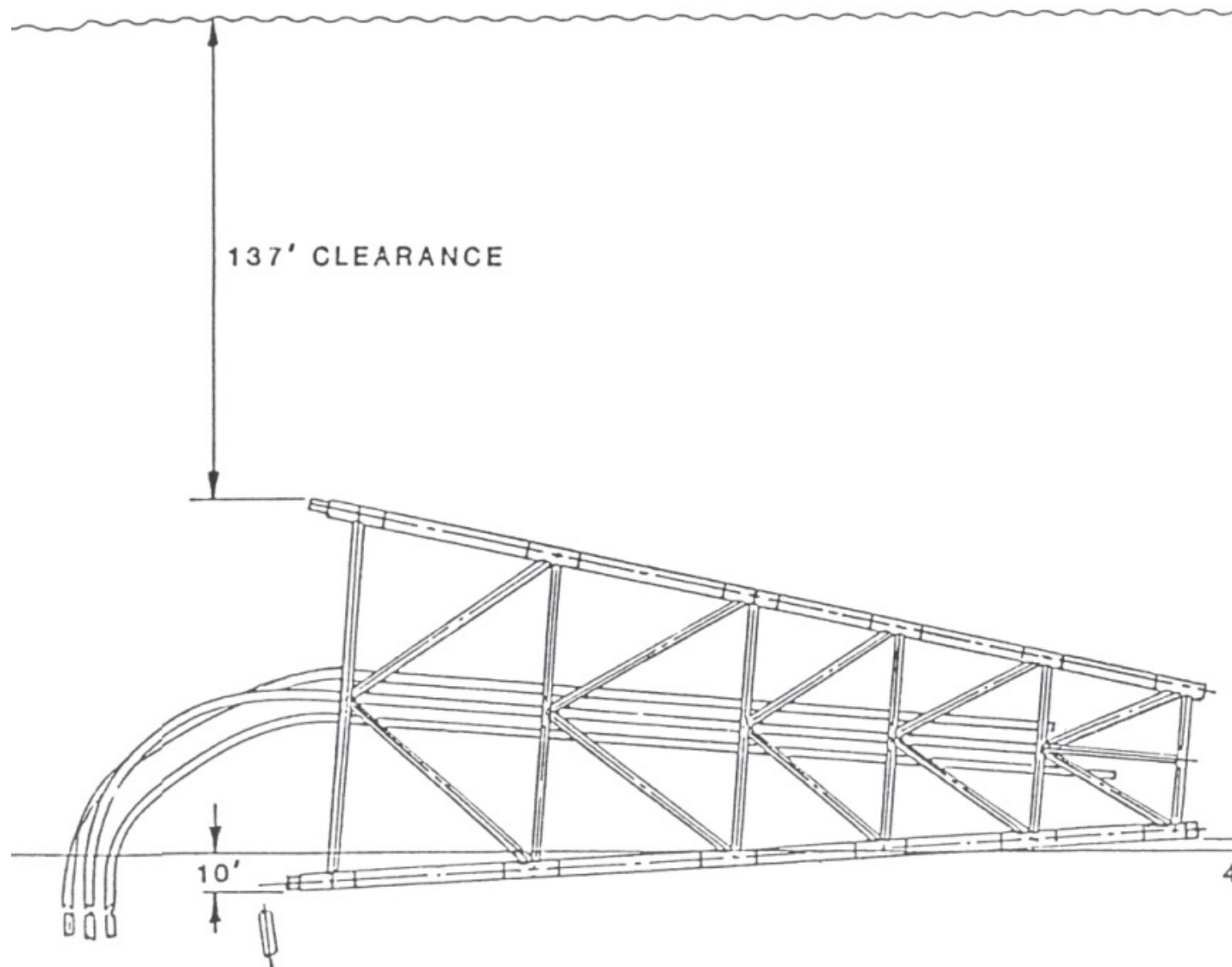
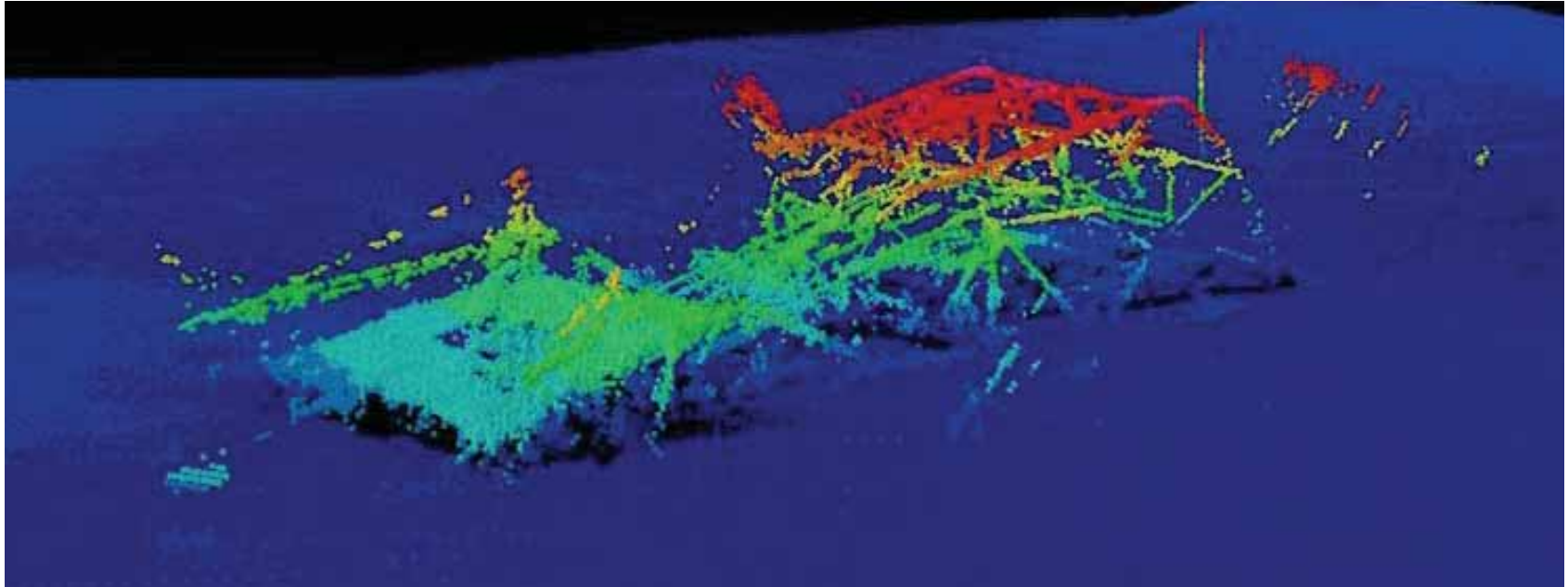


Fig. 4 - View of toppled jacket

# HURRICANE TOPPLED PLATFORM



# DECKS MAKE GOOD HABITAT TOO





# TOPPLE DECK & JACKET INPLACE





**Thank you for your attention**

**Any Questions ?**



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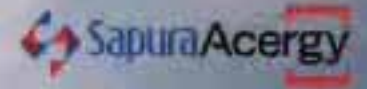
Chop saw - Grout Line & Vent Line Cutting  
Iwaki Decommissioning – Jacket Subsea Operation



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Pile Removal  
Iwaki Decommissioning - Topside Removal



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