



# Restoration as a Means of Compensating for Damages to Natural Resources

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# Oil Spill Liability

A silhouette of an offshore oil rig is centered in the background of the slide. The rig features a central derrick with multiple levels and a long, angled structure extending to the right. The entire scene is set against a solid blue background.

- Responsible Party Liable for Damages to Publically-Owned Natural Resource
- Restoration Primary Means of Compensating
- Costs not “Grossly Disproportionate to Value”

# Damages Include:

- Lost Use Values, such as ...



# Use Values for Commercial Species



# Recreational Use



# Recreational Use



# Recreational Fishing

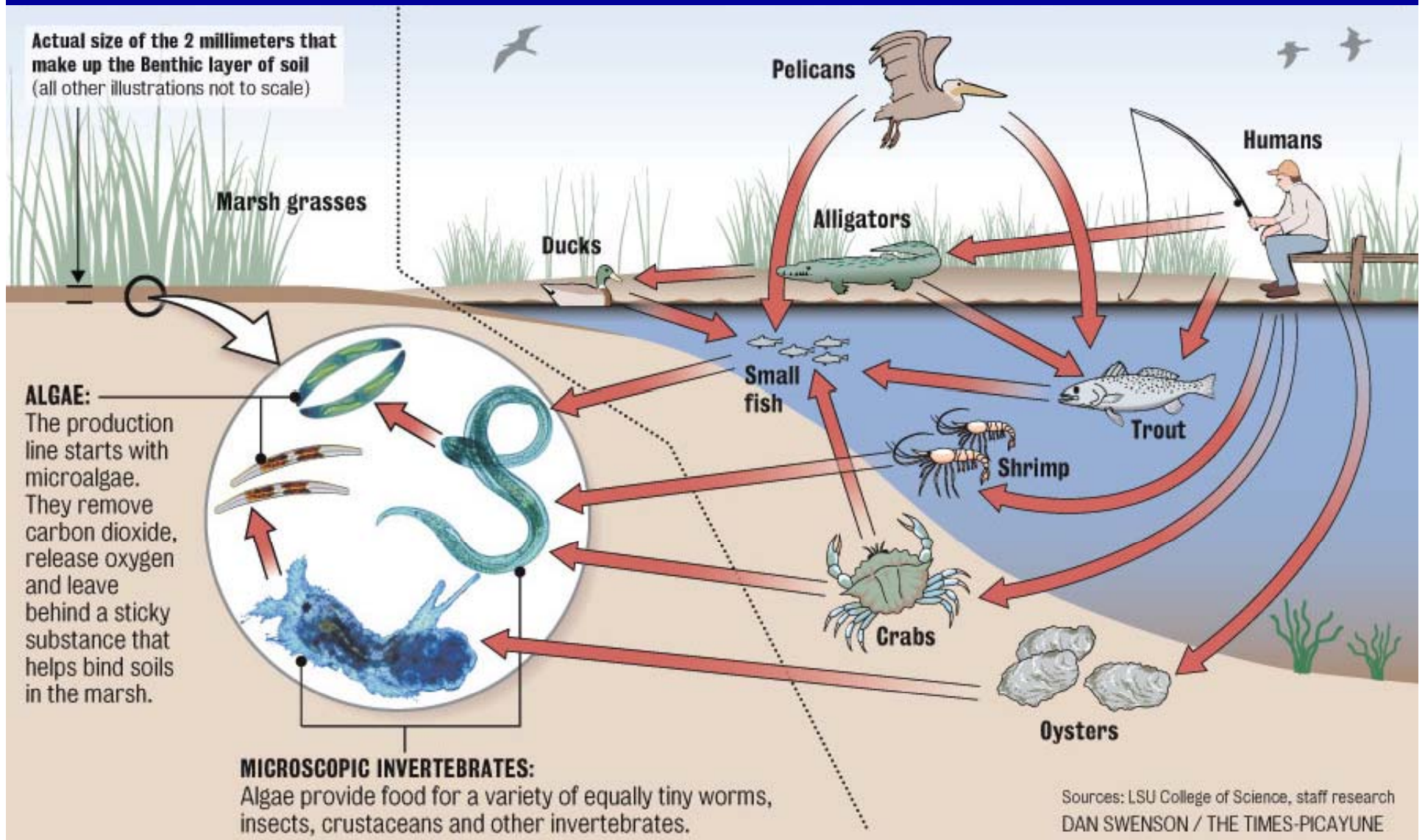


# Damages Include:

- Lost Use Values (e.g., Commercial Recreational Use)
- Indirect Use Values (e.g., Ecological Effects)



# Food Web Effects



# Habitat Effects



# Damages Include:

- Lost Use Values (e.g., Commercial Recreational Use)
- Indirect Use Values (e.g., Ecological Effects)
- Non-Use Values (Passive Use) ...

# Nonuse Values for Turtles



# Nonuse Value for Birds



# Nonuse Values for Other Marine Communities

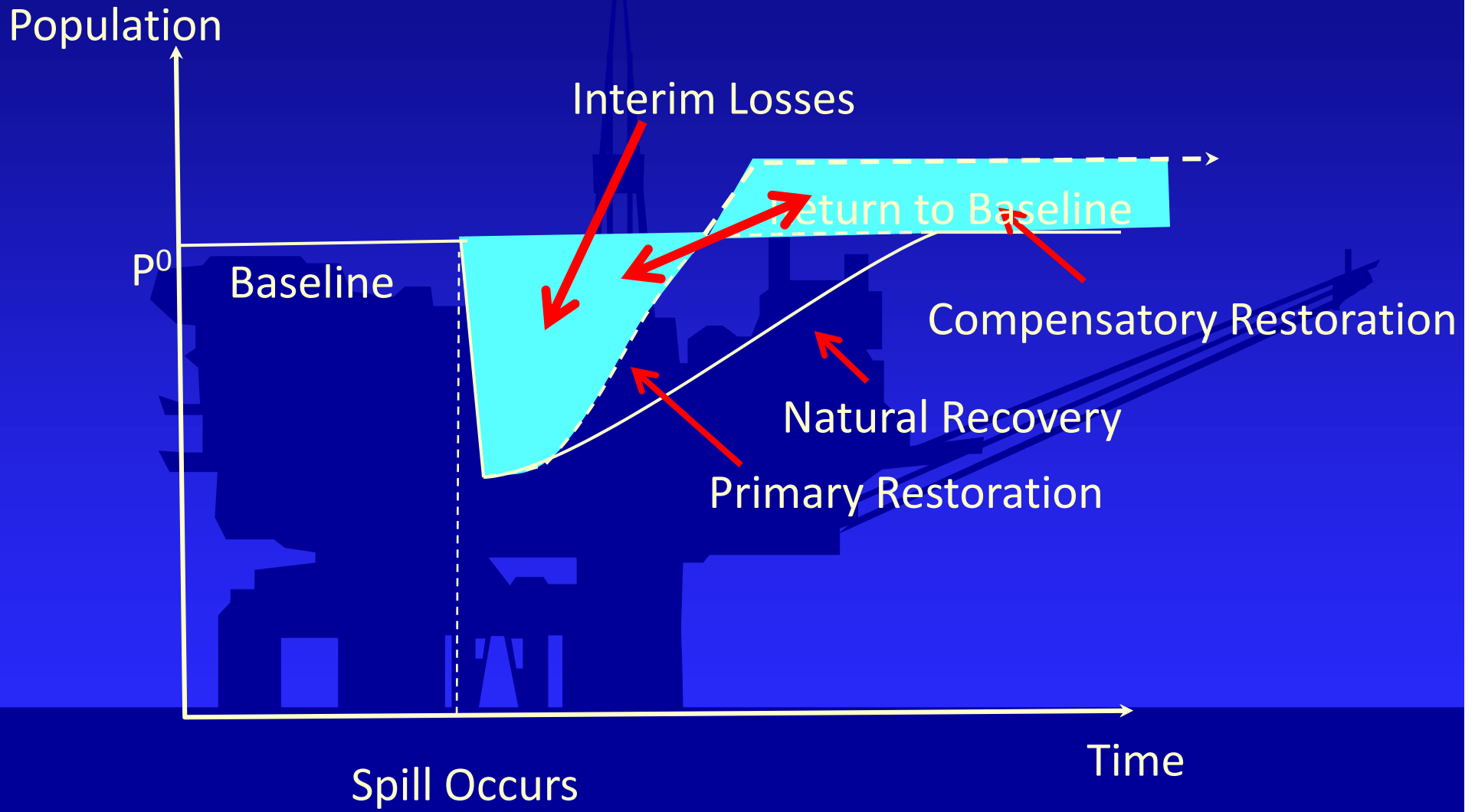


By Tom Mackenzie, US Fish and Wildlife Service

# Restoration Concepts

- Primary Restoration:
  - Bring Resource to Baseline Conditions
- Compensatory Restoration:
  - Compensate for Interim Losses

# Primary & Compensatory Restoration





# Restoration Scaling



- How Much to Restore?
- How to Compare Spill-Related Loss to Restoration?

# Key Questions

The background of the slide features a dark blue gradient with a faint, semi-transparent silhouette of an offshore oil rig. The rig's derrick and various structural elements are visible against the lighter blue background.

## Injury

- What Was Extent of Injury?
- How Quickly System Will Recover?

## Restoration

- What is Provided by Restoration?
- How Long will Restoration Project Persist?

# Resource-to-Resource

A dark blue silhouette of an offshore oil rig is centered in the background. The rig features a complex structure with a tall derrick, various platforms, and a long horizontal beam extending to the right. The background is a gradient of blue, transitioning from a lighter shade at the top to a darker shade at the bottom.

- Balance Lost Resource Against Restored Resource
- How to Restore?

# Habitat Equivalency

- Restoration Program Restores Habitat
- Calculate Amount of Habitat Required to Restore Resource

# Example: North Cape Oil Spill

January 1996



# North Cape Oil Spill

A silhouette of an oil rig is centered in the background. The rig features a tall derrick with a crane arm extending to the right. The background is a blue gradient, and the entire slide has a dark blue border.

- 828,000 Gallons of Heating Oil Spilled
- 402 Common Loons Killed

# North Cape Loon Restoration

- Alternatives:
  - Create Artificial Islands for Breeding Habitat on Lakes in Maine

# North Cape Loon Restoration





# North Cape Loon Restoration

- Alternatives:
  - Create Artificial Islands for Breeding Habitat on Lakes in Maine
  - Purchase Threatened Lake Habitat
- Protect Loon Nesting Habitat  
Maine

# Restoration Scaling

3,749 Loon-Yrs Lost

- Fledge Success Higher in Undeveloped Lakes
- Life Expectancy 6 Yrs. Per Fledge
- Benefits Calculated for 100 Yrs.
- 33 Nests Equate Lost Loon-Yrs to Discounted Restored Loon-Yrs.

# Service-to-Service

- Replace Lost Services w/ Restored Services
  - Recreational Uses
  - Wetlands **Functions & Services**
- Challenges: Must Quantify Services

# Value-to-Value

- Lost Value to the Public is Replace by “Equally Valued” Resources



# Challenges: Injury

The background of the slide features a dark blue gradient. In the center, there is a white silhouette of an offshore oil rig. The rig has a central derrick and several horizontal beams extending outwards. The overall aesthetic is clean and professional, with a focus on the text and the central graphic.

- Quantifying Injury to Natural Resource
- Establishing Baseline
- Forecasting Natural Recovery
- Double Counting?

# Challenges: Restoration



- Identifying Successful Restoration Actions
- Link Restoration to Actions
- Forecasting Restoration Recovery to Baseline

# Challenges: Restoration

The background of the slide features a dark blue gradient with a faint, semi-transparent silhouette of a construction site. A large crane is visible in the center, and the skeletal frame of a building is on the left. The overall aesthetic is professional and technical.

- Quantifying Restoration of Resources, Services, and Values
- Identifying “Grossly Disproportionate”
- Collateral Benefits?

# Major Challenge

- Advocacy, Not Science

