



Gulf of Mexico Long-term Monitoring: Assessment of Marine Vertebrate Programs

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Ocean Conservancy



Conceptual Gulf Ecosystem Model

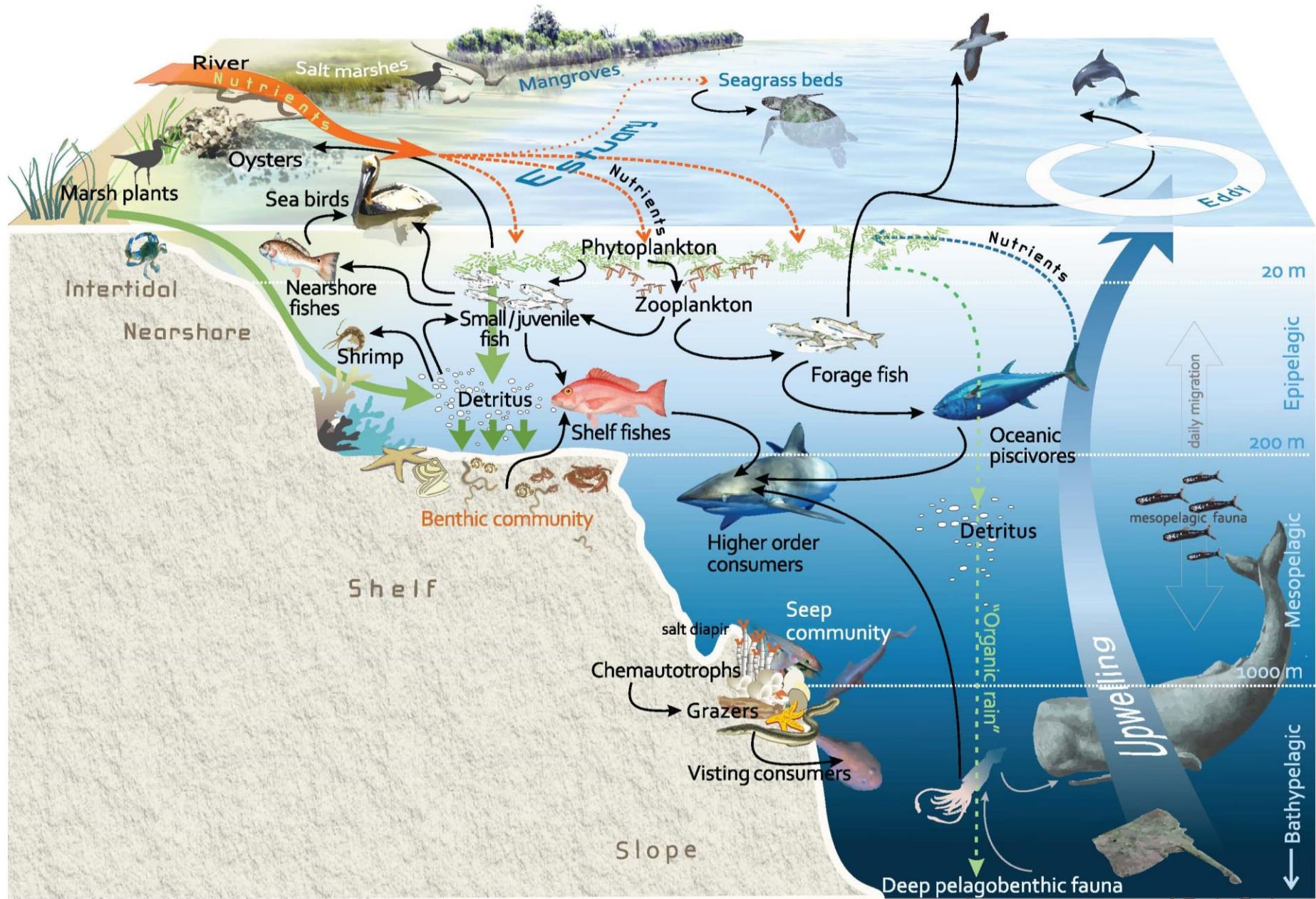
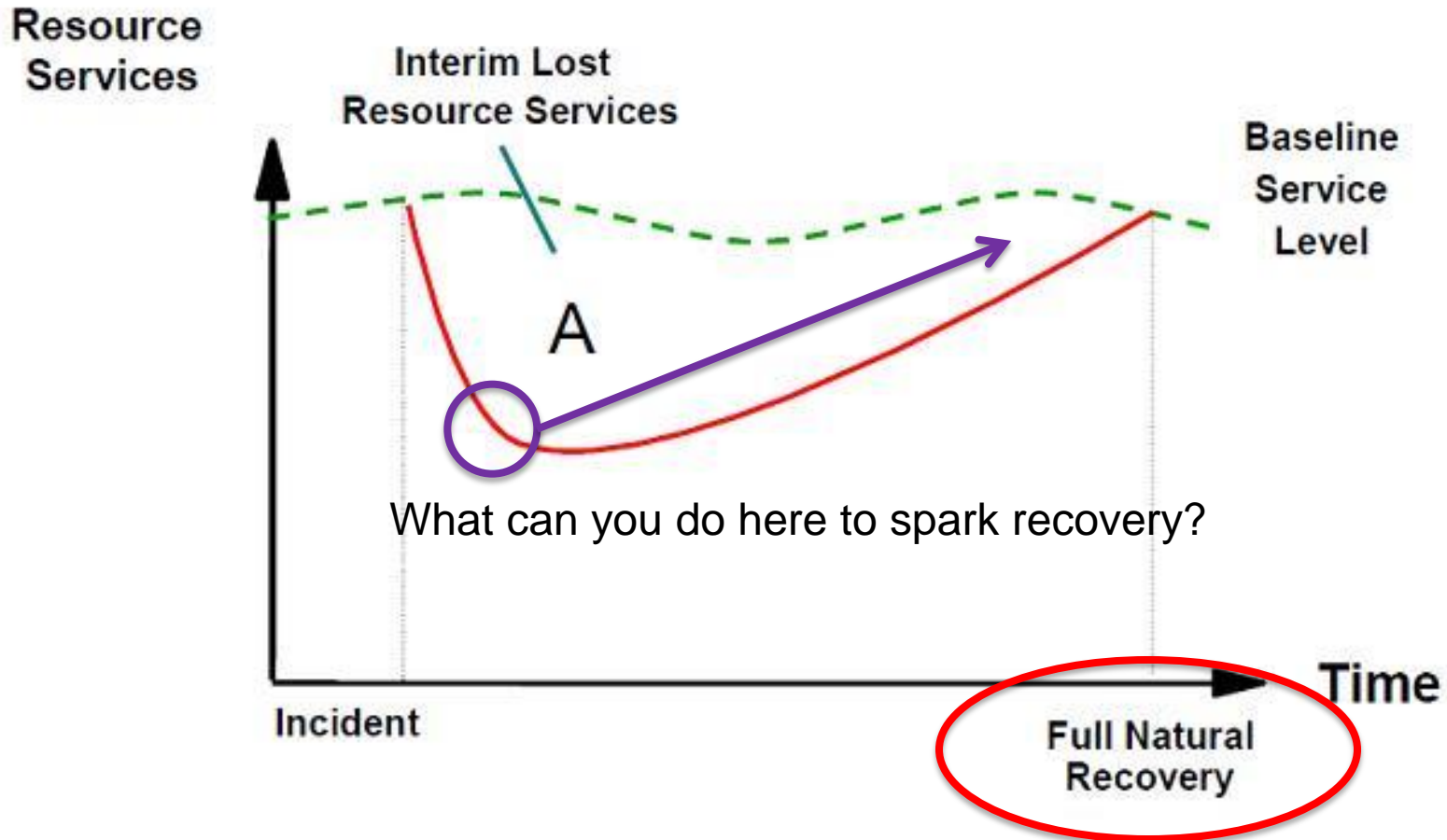


Image courtesy of Bob Spies

Knowledge is Important for Restoration of Marine Species and Habitats



Courtesy of Damage Assessment, Remediation, and Restoration Program (DARRP)

So What Do We Know?



And Where Are The Gaps?

ENTER: OC Monitoring Inventory And Gap Analysis



Photo: Ron Wooten/NMFS

Inventory

- Identify existing or past monitoring programs
- Focus on long-term (>5 year) time series
- Based on what we currently know of injury
- Provide the basic framework for an integrated monitoring program under NRDA +

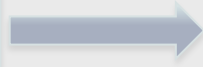


NRDA



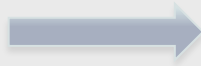
Injury Recovery Monitoring

**Restore
Science 1604**



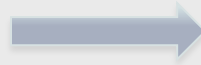
Research, Observation & Monitoring

**Restore
Council**



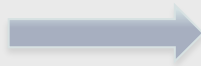
**Coordination & Interoperability of
Ecosystem Monitoring Programs**

GOMRI



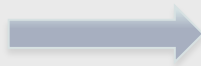
Investigate Impacts

**NAS Gulf
Program**



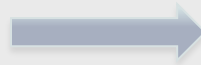
Long-term Observation & Monitoring

**NFWF Gulf
Benefit Fund**



Improve data & expand SRMMSN

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Research & Monitoring

Long-term Monitoring Assessment

- Long-term = minimum 5 year data record
- Data must be publically accessible
- Relevant to NRDA resource injury categories
- Identify gaps: spatial, temporal, taxonomic/habitat



Monitoring Programs and Priorities

- Subject matter expert interviews
- Published Literature
- Program reports
- To date correspondence with >100 subject matter experts



NRDA Resource Injury Categories

- 1) Deepwater Communities
- 2) Water Column and Invertebrates
- 3) Marine Fish
- 4) Marine Mammals**
- 5) Sea Turtles**
- 6) Nearshore Sediment and Resources
- 7) Submerged Aquatic Vegetation
- 8) Oysters
- 9) Shallow Water Coral
- 10) Shorelines
- 11) Birds
- 12) Human Use
- 13) Terrestrial Species

General Priorities

Marine Mammals

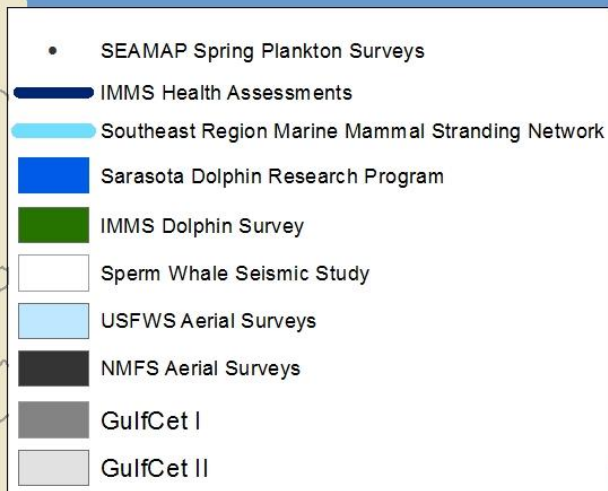
- Observe/assess stranded mammals
- Abundance/distribution coastal stocks
- Abundance/distribution offshore stocks
- Determine stock structure
- Demographics and reproductive rates
- Assess habitat use

Sea Turtles

- Continue/expand evaluation efforts at nesting beaches
- Monitor neophyte (first-time) nesters
- Assess potential exposure and effects of oil on reproduction
- Important foraging, breeding, inter-nesting and migratory habitats
- Monitor incidental take from U.S. and Mexico fisheries

Marine Mammal Surveys (1979 - 2010)

1979 – 1981 USFWS Aerial Surveys (Fritt's Surveys)
1992 – 1994 GulfCet I
1996 – 1997 GulfCet II
2000 – 2005 Sperm Whale Acoustic Monitoring Program



Priorities for Marine Mammals

- Observe and assess stranded mammals
- Nearshore abundance and distribution of marine mammal stocks
- Offshore abundance and distribution of marine mammal stocks
- Determine stock structure
- Population demographics and reproductive rates
- Habitat use

Marine Mammal Long-term Monitoring

Spring Plankton Cruises, 1991-2001 – broadest and most consistent dataset
Further surveys that expand entire oceanic northern Gulf needed
Stranding network – not traditional monitoring
Use of SRMMSN for investigation current UME - unusual mortality even

• SEAMAP Spring Plankton Surveys

IMMS Health Assessments

Southeast Region Marine Mammal Stranding Network

Sarasota Dolphin Research Program

IMMS Dolphin Survey

Priorities for Marine Mammals

- Observe and assess stranded mammals
- Nearshore abundance and distribution of marine mammal stocks
- Offshore abundance and distribution of marine mammal stocks
- Determine stock structure
- Population demographics and reproductive rates
- Habitat use


Sea Turtle Surveys

TX - 12 monitoring programs

AL - 1 monitoring program

MS - 1 monitoring program

FL ~ 75 monitoring programs

 Nesting Surveys

Priorities for Sea Turtles

Continue or expand efforts at nesting beaches to collect data

- number of nests
- clutch size
- length of incubation
- emergence success
- nesting success
- hatchling sex ratios

Sea Turtle Surveys

TAMU, Galveston Island

Padre Island National Seashore

IMMS, Mississippi Sound

UF, St Joe Bay

FWC, Epipelagic

Conservancy of Southwest Florida

Dry Tortugas National Park

Florida Keys NWR

FFWCC, Florida Bay



Tracking/Habitat Use Surveys

**Not Shown - SEFSC Stokes & Epperly

Priorities for Sea Turtles

Identify foraging, breeding, and inter-nesting habitats and migratory pathways

- tracking
- habitat use

Marine Mammals Gap Analysis Results

Monitoring/Research Priority	General Gaps - Priority Species*	General Gaps - Geography	General Gaps - Time
Observe and assess stranded mammals	Pelagic species. This is a shore-based volunteer response network for stranded wildlife and carcasses of any species that wash ashore	South Texas, West Louisiana, Big Bend of Florida, Southeast Florida	Volunteer response effort, so responsiveness depends on availability of resources and trained staff
Monitor abundance and distribution of marine mammal stocks in nearshore waters (<200m), i.e., coastal and bay/sound/estuary	Low effort and lack of repeated monitoring of Atlantic spotted dolphins in majority of region outside of Mississippi Sound and Sarasota Bay. Bryde's whales	From N extent of SEFSC aerial surveys to S extent of Sarasota Bay program. From N extent of Sarasota Bay program to E edge of Mississippi Sound. From LA/MS border to Brownsville, TX.	Entire category is a gap. No status and trends possible due to lack of sustained monitoring in coastal areas outside Mississippi Sound and Sarasota Bay, except 1992 - 2001 in SE FL.
Monitor abundance and distribution of marine mammal stocks in offshore waters (>200m)	None, there has been equal effort among species during short term surveys.	All areas a gap. No status and trends possible without sustained monitoring, especially in oceanic waters and outside the US EEZ	Entire category a gap. There is no sustained monitoring programs in offshore waters
Determine stock structure of marine mammal populations	Gap across all priority species. No status and trends possible without sustained monitoring in coastal areas outside Mississippi Sound and Sarasota Bay	All areas a gap. Only short-term studies have been done, there are no status and trends possible without sustained monitoring in coastal areas outside Mississippi Sound and Sarasota Bay	Entire category a gap. Only short-term studies have been done, there are no status and trends possible without sustained monitoring in coastal areas outside Mississippi Sound and Sarasota Bay
Assess population demographics and reproductive rates	Gap across all priority species. No sustained monitoring beyond Mississippi Sound and Sarasota Bay.	All areas a gap. No sustained monitoring beyond Mississippi Sound and Sarasota Bay.	Entire category is a gap. No sustained monitoring beyond Mississippi Sound and Sarasota Bay.
Assess habitat use	Gap across all priority species. No sustained monitoring beyond Mississippi Sound and Sarasota Bay.	All areas a gap. No sustained monitoring beyond Mississippi Sound and Sarasota Bay.	Entire category is a gap. No sustained monitoring beyond Mississippi Sound and Sarasota Bay.

*Priority species identified for marine mammals: Atlantic spotted bottlenose dolphins, Bryde's whale, sperm whale, and pelagic delphinids

NRDA



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Research & Monitoring



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Love, M., Baldera, A., Robbins, C. and R.B. Spies. An Inventory of Gulf of Mexico Ecosystem Long-term Monitoring Programs: Priorities and Gaps for Resources Impacted by the Deepwater Horizon Oil disaster. Ocean Conservancy, New Orleans, Louisiana (Forthcoming).



Extra Slides If Needed

Program/Effort Metadata

Injury Category	Start	Spatial Data
Name	Frequency	Data Location
Program	End	Data Available
Website	Duration	Data Format
What	Discontinuities	Database
Method	Project Timeframe	Data Acquired
Where	Funding	Contact
Who	Funding Future	Email



Marine Fish Monitoring Priorities

- Samples fish eggs, larvae and adults for toxicity testing for PAH metabolites
- Migratory behavior , fish condition, growth rates, survivorship, and reproductive impairment
- Composition, abundance, distribution and densities (all life stages) for population dynamics, community structure, migration and trophic effects of the spill.



Bird Monitoring Priorities

- Spatial use of habitat types
- Identify species-specific stressors and develop measures of health
- Monitoring abundance, density, and distribution
- Identify and monitor key ecosystem variables and respective impacts

