Application of Structured Decision Making to Developing a Gulf-wide Avian Monitoring Network

Why focus on birds?

- ✓ People care about birds
  - ✓ Easily visible
  - ✓ Colorful
  - ✓ Capture our imagination

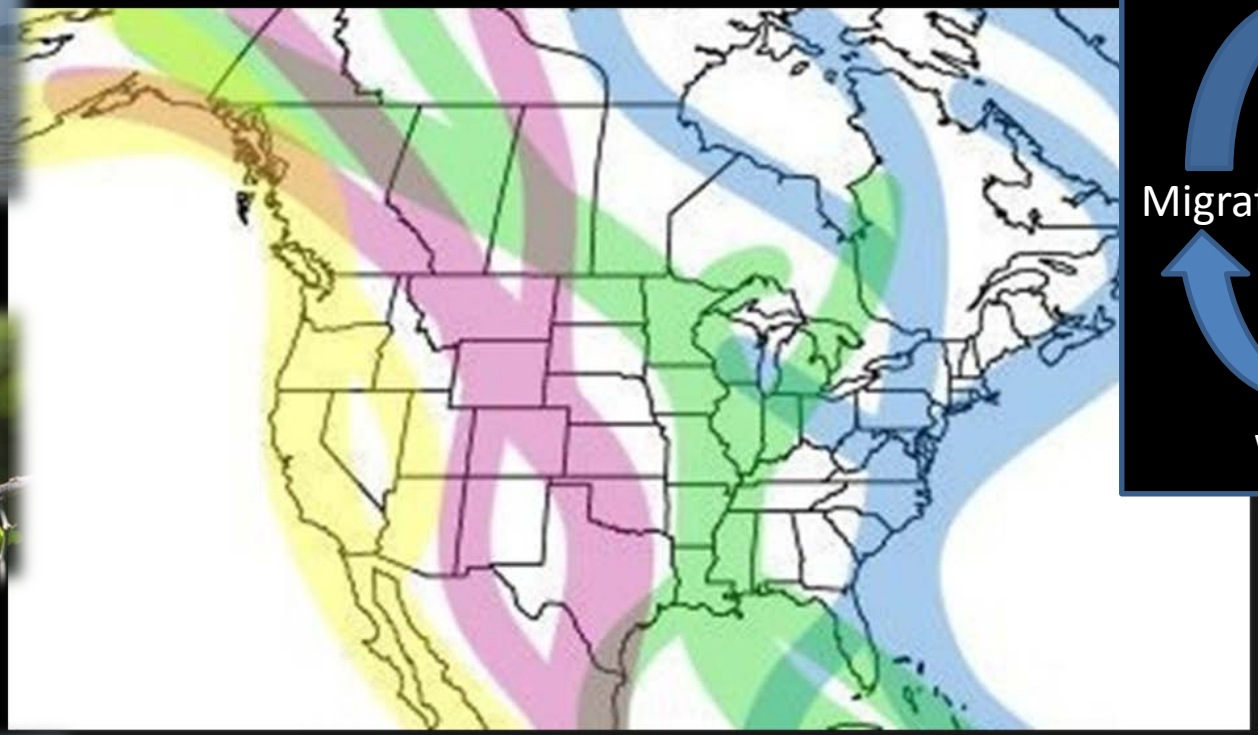
Why focus on birds?

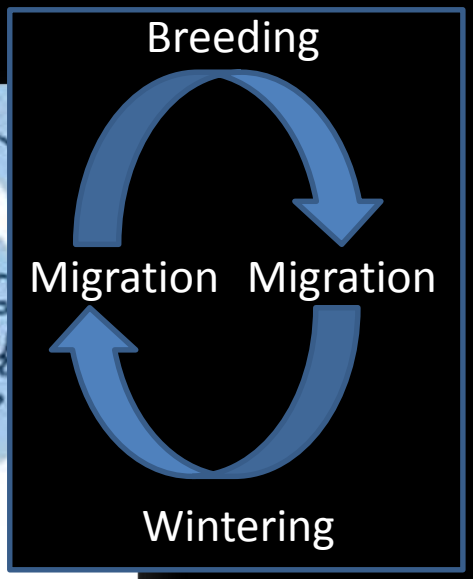
- ✓ People care about birds

  Some of the most indelible images of the oil spill

Why focus on birds?

- ✓ Millions of birds representing many taxa use the Northern Gulf of Mexico for some or all of their life cycle

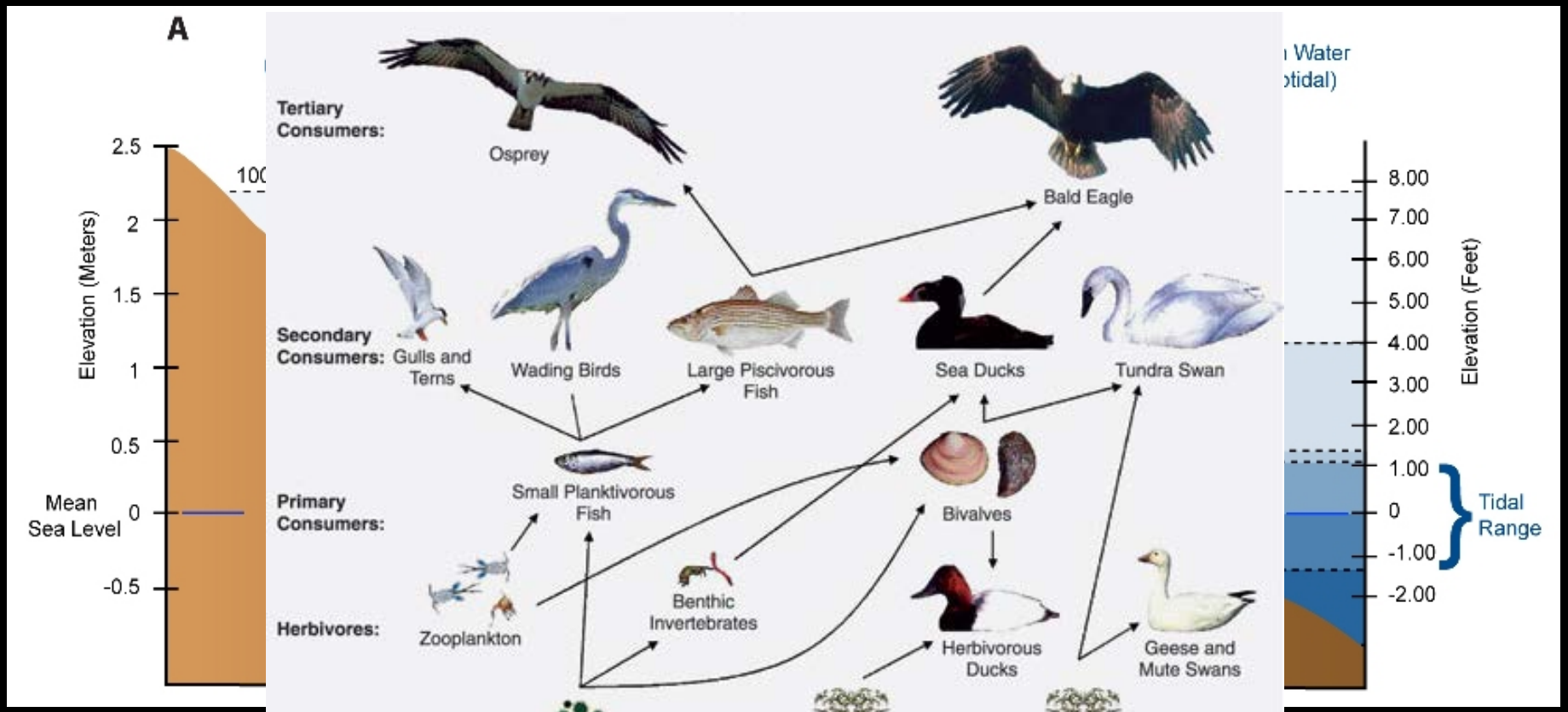




Why focus on birds?

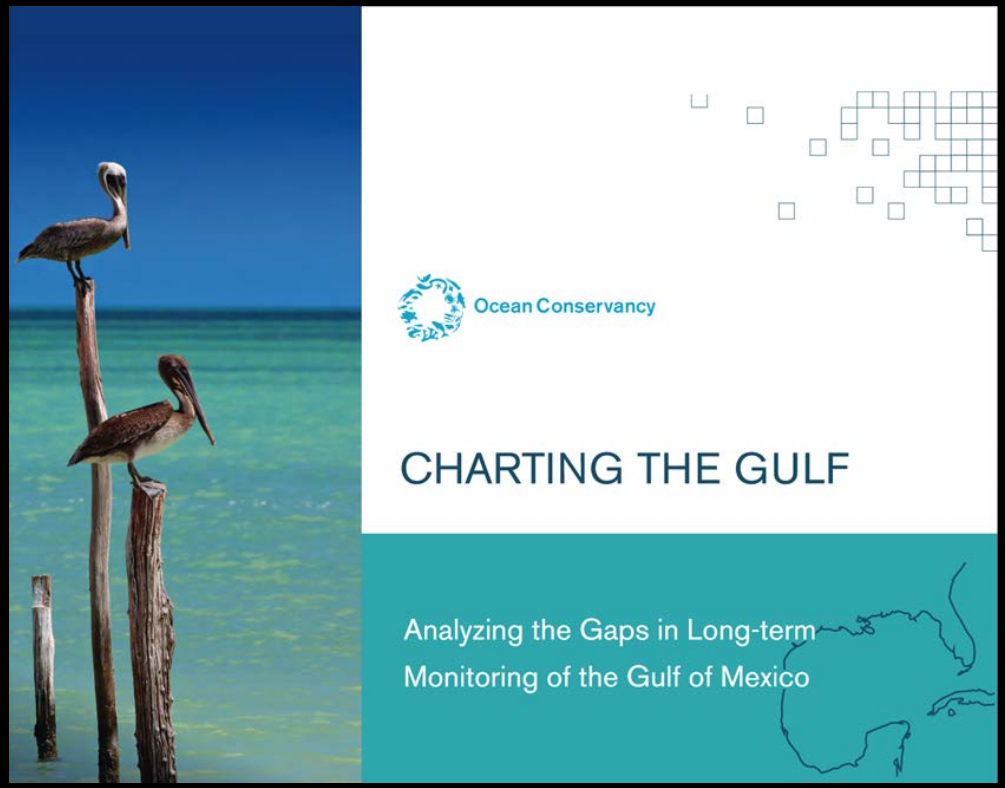
- ✓ Birds occupy multiple habitat types
- ✓ Birds occupy multiple trophic levels

System-level integrators and indicators



Bird Monitoring Issue:

- ✓ Lack baseline data for many bird species
- ✓ Lack ability to assess effect of system drivers and management on birds at large (spatial & temporal) scales



Overarching themes:

1. Many existing monitoring efforts….building upon these will improve consistency, efficiency and coordination;

2. There are gaps in monitoring;

3. As a group, offshore species and habitats are monitored to a lesser degree.

4. Addressing the currently disjointed monitoring system and moving towards a Gulf-wide ecosystem monitoring network will provide a more efficient, integrated and accessible tool for ecosystem information.

Partners in Gulf of Mexico Avian Monitoring Network (outdated slide)

Question: How do we identify the goals and values and key data needs per bird monitoring given the interactions and complexities of the Northern Gulf of Mexico Ecosystem?

Demographic Processes
(*cause and effect*)

Threats - Management
(*system drivers*)

Population Impact
(*trends*)

Ecological Processes
(*cause and effect*)

What do we value?

- What bird(s)?
- What habitat(s)?
- What season (B, W, M)?

- What management strategy?
- What habitat(s)?
- What season (B, W, M)?

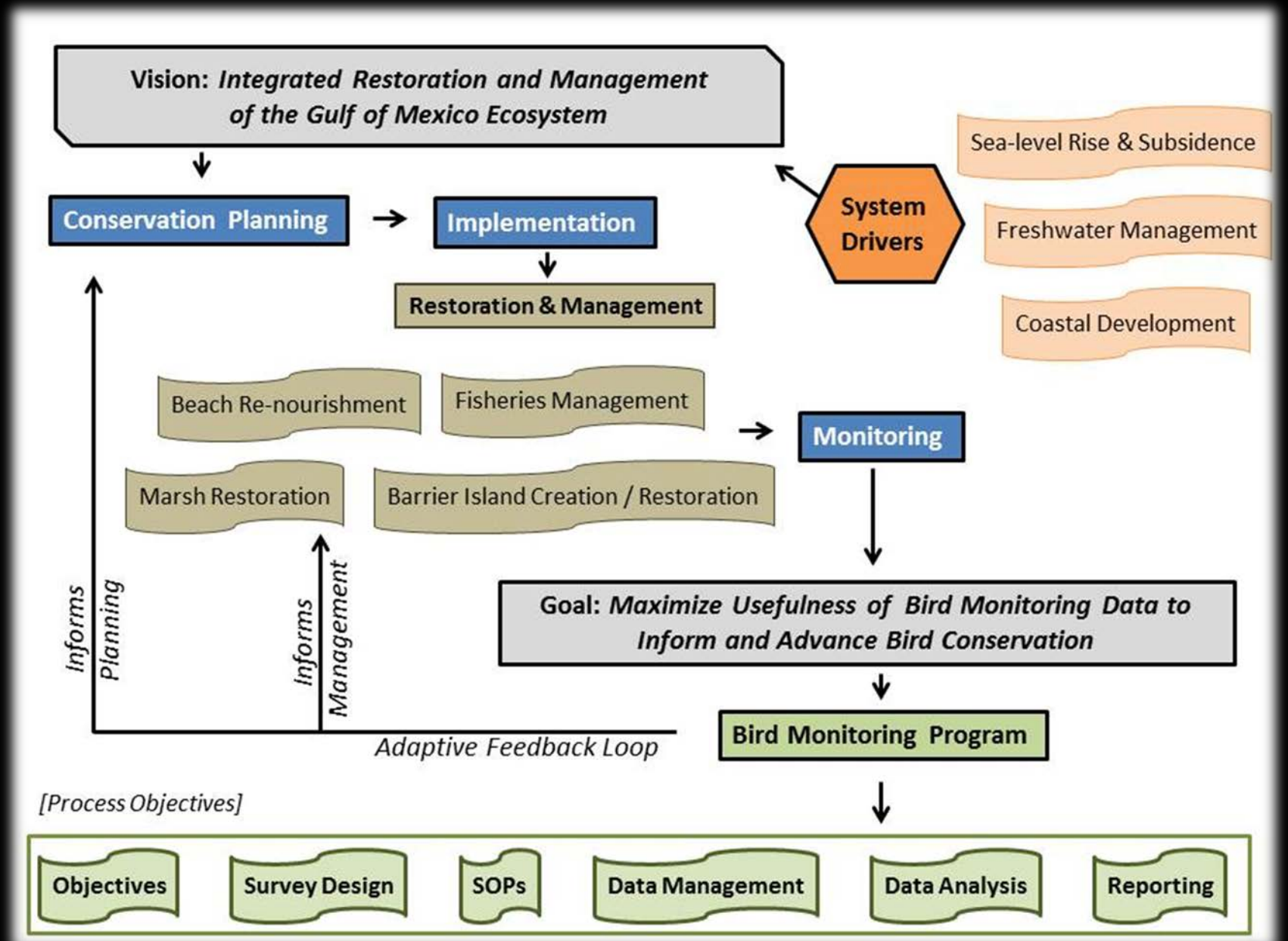
- What ecological process?
- What habitat(s)?
- What season (B, W, M)?

Structured Decision Making

- ✓ Is a formal method for analyzing a decision, by breaking it into components
- ✓ Helps identify where the impediments to a decision are, to focus effort on the right piece
- ✓ Provides a wide array of analytical tools for dealing with particular impediments

"A formalization of common sense for decision problems that are too complex for informal use of common sense" **– Ralph Keeney**

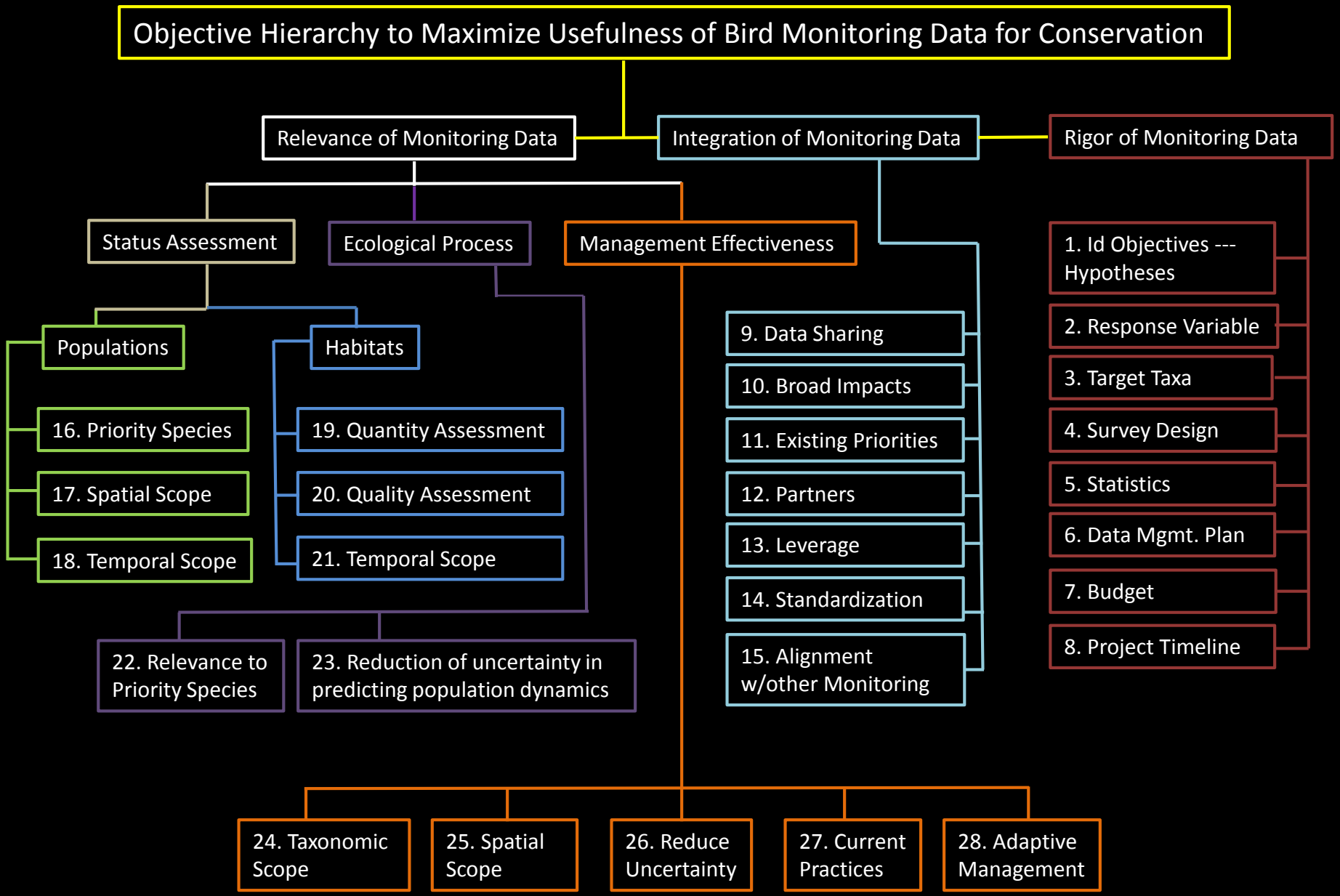
Frame the Role of Monitoring within Gulf of Mexico



Bird Monitoring Objectives for the Gulf of Mexico

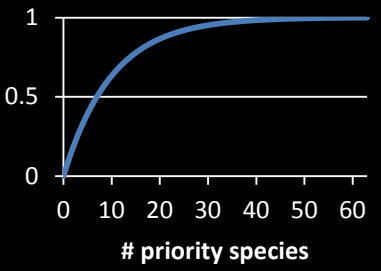
Goal: *Maximize Usefulness of Bird Monitoring Data to Inform Bird Conservation in the Northern Gulf of Mexico*

- **Fundamental Objective:** *Maximize Integration of Monitoring Projects*
- **Fundamental Objective:** *Maximize Scientific Rigor of Monitoring Projects*
- **Fundamental Objective**: *Maximize Relevance of Monitoring Projects*
  - ✓ **Objective**: *Maximize Understanding of Population and Habitat Status Assessments (i.e., baseline information)*
  - ✓ **Objective:** *Maximize Understanding of Management Actions and their Respective Impacts on Avian Populations and their Habitat*
  - ✓ **Objective**: *Maximize Understanding of Ecological Processes and their Respective Impacts on Avian Populations and their Habitat*

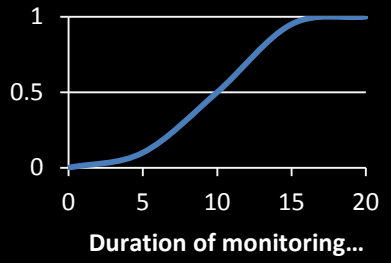

Objective Hierarchy to Maximize Usefulness of Bird Monitoring Data for Conservation
Relevance of Monitoring Data
Integration of Monitoring Data
Rigor of Monitoring Data
Status Assessment
Ecological Process
Management Effectiveness
Populations
Habitats
16. Priority Species
17. Spatial Scope
18. Temporal Scope
19. Quantity Assessment
20. Quality Assessment
21. Temporal Scope
22. Relevance to Priority Species
23. Reduction of uncertainty in predicting population dynamics
9. Data Sharing
10. Broad Impacts
11. Existing Priorities
12. Partners
13. Leverage
14. Standardization
15. Alignment w/other Monitoring
1. Id Objectives --- Hypotheses
2. Response Variable
3. Target Taxa
4. Survey Design
5. Statistics
6. Data Mgmt. Plan
7. Budget
8. Project Timeline
24. Taxonomic Scope
25. Spatial Scope
26. Reduce Uncertainty
27. Current Practices
28. Adaptive Management

Objective Hierarchy to Maximize Usefulness of Bird Monitoring Data for Conservation

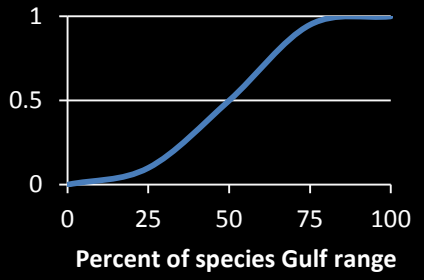
- Relevance of Monitoring Data
  - Status Assessment
    - Populations
      - 16. Priority Species → Maximize number of priority species surveyed (ώ=.38)



      - 17. Spatial Scope → Maximize the spatial scope of surveys (ώ=.30)



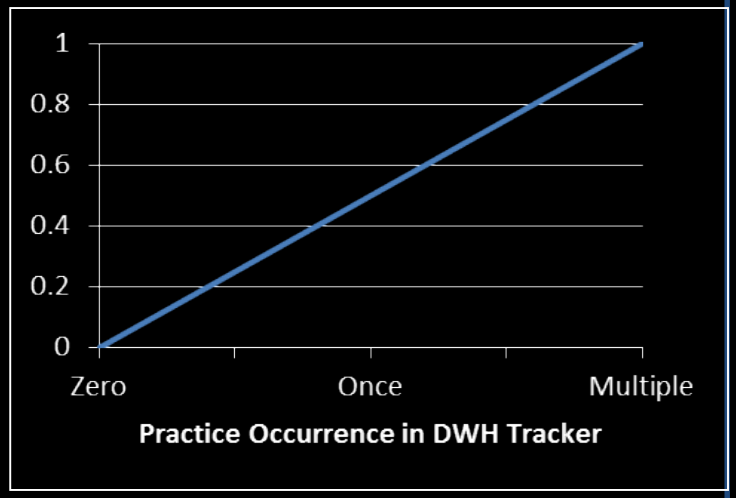
      - 18. Temporal Scope → Maximize survey duration (longevity of data collection) (ώ=.32)



Objective Hierarchy to Maximize Usefulness of Bird Monitoring Data for Conservation

- Relevance of Monitoring Data
- Integration of Monitoring Data
- Rigor of Monitoring Data
- Management Effectiveness

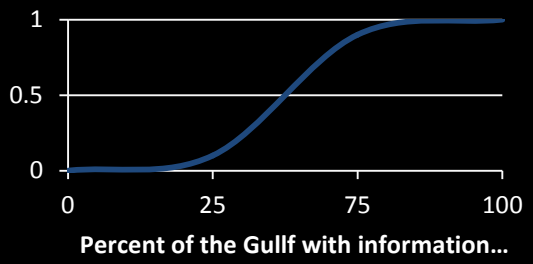
"Maximize understanding of high priority management practices"	
Score	Description
Zero	Management practice has zero occurrences in the Deepwater Horizon Project Tracking database (DWHPT); not currently being funded in the GOM region.
One	Management practice has one occurrence in the DWHPT database; currently being funded at a low level in the GOM region.
Multiple	Management practice has multiple occurrences in the DWHPT database; currently being funded in the GOM region.

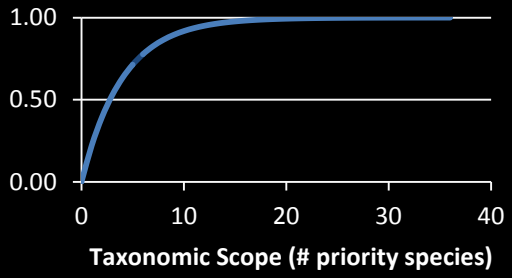


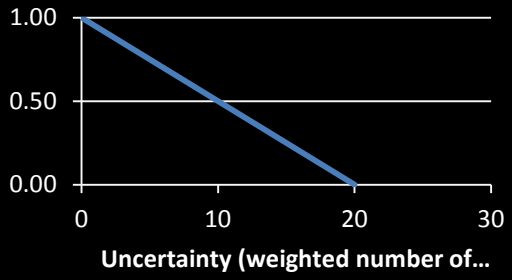
- 24. Taxonomic Scope
- 25. Spatial Scope
- 26. Reduce Uncertainty
- 27. Current Practices
- 28. Adaptive Management

Decision Support Tool:

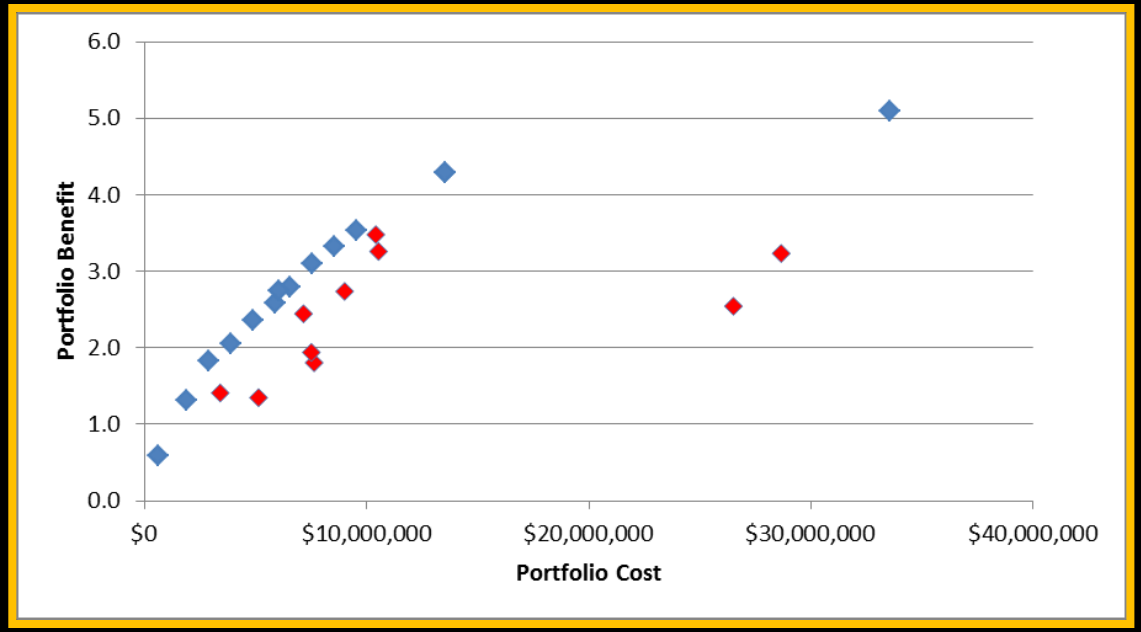
Use of Value Models to Conduct Trade-off Analysis – *which survey or group of surveys yield the greatest contribution to the stated values – constrained by some factor (e.g., cost)?*







Hypothetical Example: Analysis of 10 Potential Surveys
-- Selection of Optimized Portfolio of Surveys --



Blue represents survey selection based on value models

Red represents random selection of surveys

Gulf of Mexico Avian Monitoring Network

Gulf of Mexico Avian Monitoring Network

A forum to facilitate integrated and complementary data collection for avian populations and their habitats

The Gulf of Mexico Avian Monitoring Network is a group of avian scientists and land managers working collectively to develop a coordinated and comprehensive approach to avian monitoring that will provide solutions to contemporary and long-term conservation needs within the Gulf of Mexico.

Background

The Deepwater Horizon oil spill directly impacted birds and their habitats at an unprecedented scale within the Gulf of Mexico. Early efforts to determine pre-spill baseline conditions for avian resources highlighted the lack of adequate data to inform decision-makers, as well as the lack of any comprehensive, integrated approach that would permit evaluation of realized damages or response to future on-the-ground restoration efforts. However, this environmental disaster has also resulted in an equally unprecedented focus on the Gulf ecosystem and resources to support its restoration and recovery. Designing a coordinated, integrated, and collaborative avian monitoring program for this system has many challenges: (1) the scope and scale of the Gulf ecosystem, (2) the number of partners, stakeholders, and required expertise; and (3) the amount of funding required to successfully design and implement a Gulf-wide avian monitoring program. Yet meeting this challenge is imperative to understanding population trends and cause and effect relationships that underscore demographic processes that drive trends; as well as providing a basis for judging success of Gulf restoration efforts.

American Oystercatcher, Walker Golder

Gulf of Mexico Birds & Habitats

Birds are a remarkable natural resource within the Gulf of Mexico. They occur across a variety of habitats and ecological niches across this region. Barrier islands, beaches, marshes, coastal forests, and the open ocean support hundreds of species and millions of individuals. Colonial-nesting waterbirds feed near the top of the food chain in shallow water, whereas overwintering shorebirds forage on mudflats and beaches, and secretive marshbirds forage in marsh vegetation at the interface of open water and land. Twice a year, coastal habitats provide essential stopover sites for millions of Neotropical migrant songbirds, and this area serves as one of the most important areas for

Reddish Egret, Clay Green

wintering waterfowl on the continent. Yet, coastal habitats are increasingly stressed by a variety of anthropogenic activities and natural events that are often at odds with birds and their use of these habitats. Stressors such as land development, oil and gas activities, hurricanes, sea-level rise, degraded water quality, and pollution can fragment and reduce quality and quantity of habitats in sensitive coastal ecosystems. Quantifying the magnitude of these impacts as well as evaluating contemporary restoration and management actions is a critical, but complex and challenging task given the scope, scale and inter-connectedness of the Gulf ecosystem.

The geographic extent is bounded on the Gulf side by the southern edge of the Marine Bird Conservation Region with the inland extent defined by the RESTORE Act boundary, except in Florida where it is defined by Water Management Districts.

Approach

Over the last two years, an ad-hoc working group of conservation partners representing >20 agencies and organizations have been utilizing a Structured Decision Making framework to identify and agree upon a set of core values and fundamental objectives that underpin avian monitoring needs within the Gulf of Mexico. Through a series of facilitated workshops, the working group agreed that any on-going or proposed avian monitoring efforts should:

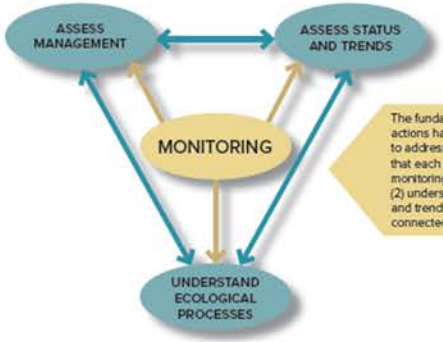
(1) maximize the relevance of monitoring data by:
- (a) establishing reliable estimates of population size and trends;
- (b) evaluating management effectiveness on these avian populations; and
- (c) providing a means to understand how ecological processes affect birds and their habitats;

(2) maximize the scientific rigor underpinning all surveys; and

(3) maximize the integration of surveys across agencies and organizations.

Prothonotary Warbler, Bao Nguyen

Clapper Rail, Mike Gray



The fundamental objective to maximize relevance of data to inform conservation actions has three sub-objectives (depicted above). Monitoring is central and critical to addressing these sub-objectives; double-headed arrows (in blue) demonstrate that each sub-objective often informs the others. Without a scientifically rigorous monitoring program, one cannot (1) gauge effectiveness of our management efforts; (2) understand ecological processes that affect birds; or (3) assess the status and trends of avian populations, much less recognize and untangle the inter-connectedness among the sub-objectives.

Recognizing the need to incorporate additional stakeholders, partners, expertise, and a more formalized means of coordinating and integrating avian monitoring activities across the Gulf of Mexico, the initial working group has evolved into the Gulf of Mexico Avian Monitoring Network. The Network aims to provide a forum by which conservation partners can collaborate and implement a coordinated monitoring system that recognizes and builds upon established monitoring programs to connect, leverage, and integrate existing efforts into a comprehensive Gulf-wide avian monitoring program to address contemporary and long-term conservation needs of avian populations and their habitats within the Gulf of Mexico.

Outcome

An integrated and coordinated network of scientists and land managers provides a much needed forum to collaborate, share information and provide overall support for the implementation of bird monitoring efforts in a unified fashion, as well as, to provide a venue to ensure the most up-to-date science is integrated into conservation strategies and disseminated to decision-makers, managers, landowners, and the general public about the invaluable natural resources of the Gulf of Mexico. The Gulf of Mexico Avian Monitoring Network will provide such a forum and allow conservation partners to more efficiently and effectively monitor birds and their habitats as an indicator of Gulf restoration.

For more information, contact Randy Wilson (randy_wilson@fws.gov) or Jeff Gleason (jeffrey_gleason@fws.gov).

Collaborators: Alabama Cooperative Fish and Wildlife Research Unit, Alabama Department of Conservation and Natural Resources, American Bird Conservancy, Audubon Mississippi, Barataria Terrebonne National Estuary Program, Biodiversity Research Institute, Connecting Conservation, East Gulf Coastal Plain Joint Venture, Florida Fish and Wildlife Conservation Commission, Grand Bay NERR, Gulf Coast Bird Observatory, Gulf Coast Joint Venture, Gulf Coastal Plains & Ozarks Landscape Conservation Cooperative, Gulf Coast Prairie Landscape Conservation Cooperative, Louisiana Department of Wildlife and Fisheries, Manomet Center for Conservation Sciences, Mississippi Department of Environmental Quality, Mississippi Department of Wildlife, Fisheries, and Parks, Mississippi State University, National Audubon Society, National Fish and Wildlife Foundation, National Park Service, North Carolina State University, Ocean Conservancy, Southeast Climate Science Center, Smithsonian Institution, Texas Parks and Wildlife Department, The Nature Conservancy, Tulane University, University of Florida, University of Georgia, University of West Florida, U.S. Fish and Wildlife Service, U.S. Geological Survey

Community of Practice

Federal Agencies
- USFWS
- USGS
- USPS
- BOEM

State Agencies
- FWC
- ALDNR
- MDWFP
- LDWF
- TXPW
- MS-DEQ

Non-Governmental
- Audubon
- TNC
- Ocean Conservancy
- GCBO
- Smithsonian
- Biodiversity Research Institute

Partnerships
- GCJV
- EGCPJV
- GCPO-LCC
- GC-LCC

Universities
- UF
- UGA
- MSU
- NC State
- LSU
- Tulane
- Univ. W. FL

Gulf of Mexico Avian Monitoring Network

Coordination Committee

- Marshbird Working Group
- Landbird Working Group
- Wading Bird Working Group
- Raptor Working Group
- Shorebird Working Group
- Seabird Working Group
- Waterfowl Working Group
- SDM Working Group

Next Steps:

- ✓ GoM Avian Monitoring Network: *Continue to socialize and grow the network to facilitate coordination & integration & sharing of information based on a community of practice approach*

- ✓ SDM Working Group: *Finalize SDM models & technical report to document and articulate fundamental objectives & core values underpinning bird monitoring within the Gulf region*

- ✓ Hire Post-doctoral Researcher: *Finalize SDM models and construct decision support tool to facilitate trade-off analyses*

- ✓ Taxa Working Groups: *Articulate suite of surveys, SOPs & "minimum standards" for each bird group using SDM models.*




Thanks for your time and attention!

Questions?