

# Towards a Gulf-wide Bird Monitoring Network; Identifying Objectives to Prioritize Actions



Randy Wilson - *U.S. Fish and Wildlife Service - Migratory Bird Program*  
John Tirpak - *U.S. Fish and Wildlife Service – Gulf Restoration Program*  
Melanie Driscoll – *National Audubon Society*

# Partners in Gulf of Mexico Bird Monitoring Working Group



## Monitoring Issue:

- ✓ Lack coordinated, objective-driven framework to guide monitoring efforts at large spatial scales across the Gulf of Mexico

Bjorndal et al. (2011). *Better Science Needed for Restoration in the Gulf of Mexico*. Science. Vol. 331, No. 6017, pp. 537-538.

- *“Achieving mandated recovery goals depends on understanding both population trends and the demographic processes that drive those trends.”*
- *“The United States needs strategic national research plans for key marine species and ecosystems based on evaluation of cause and effect and on integrated monitoring of abundance and demographic traits.”*

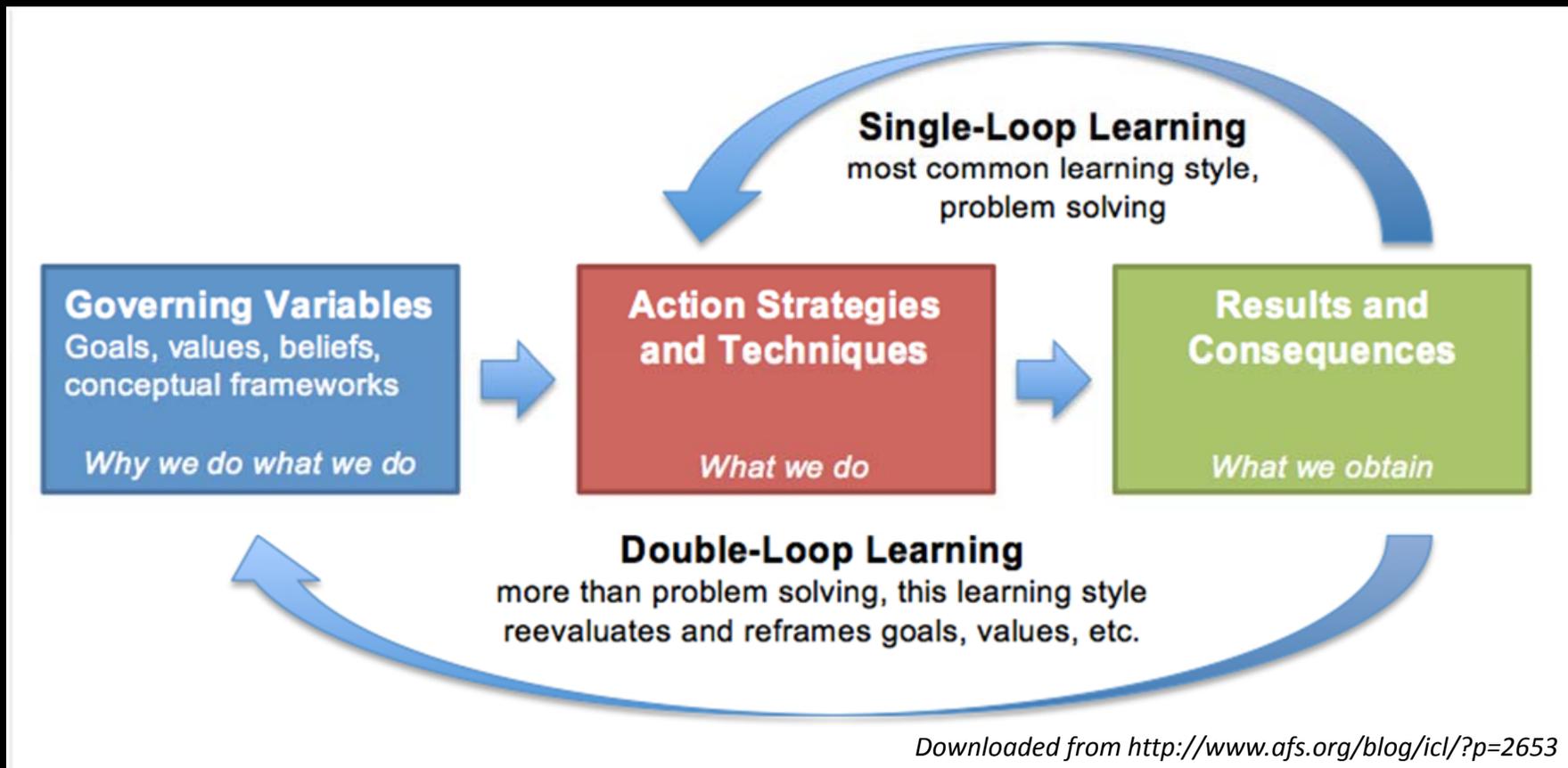
## Monitoring Issue:

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

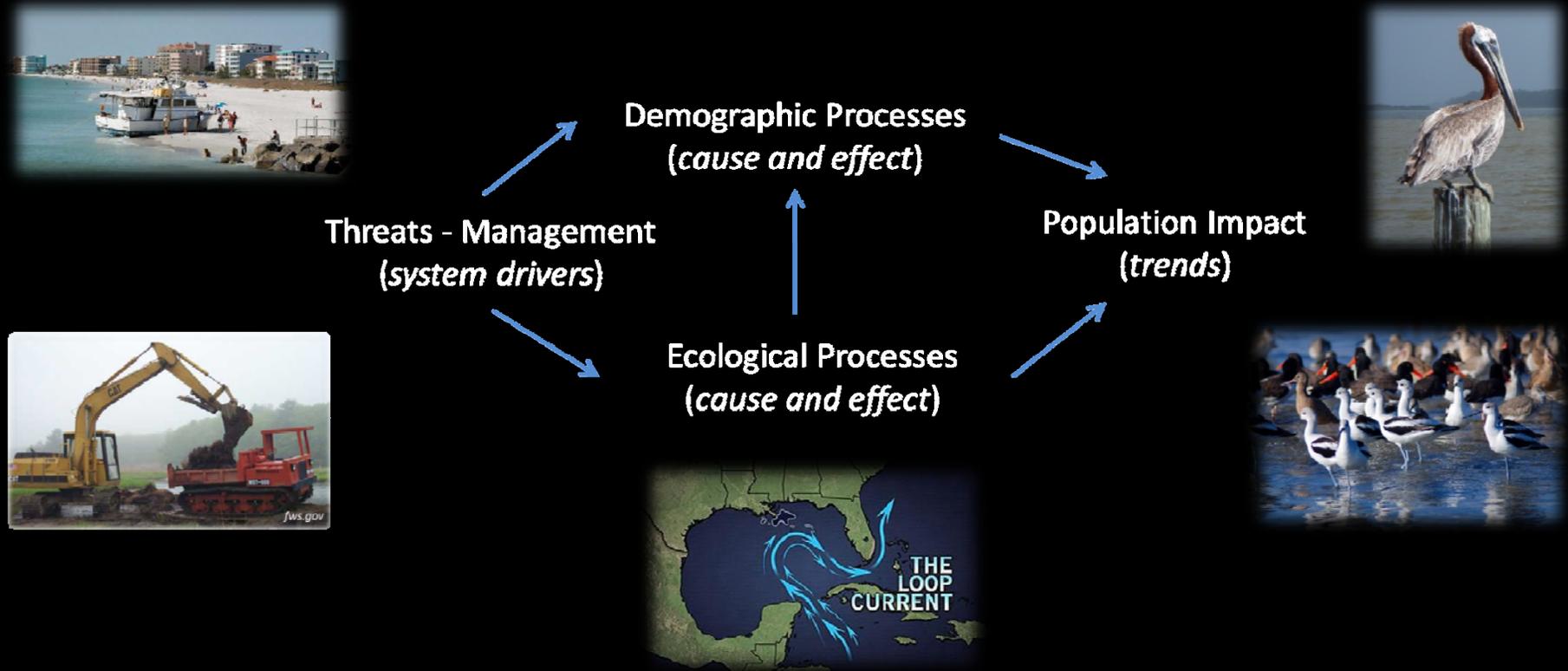


## Fundamental Issue:

- ✓ Lack clearly defined and agreed upon goals and values for an avian monitoring program.



# 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?



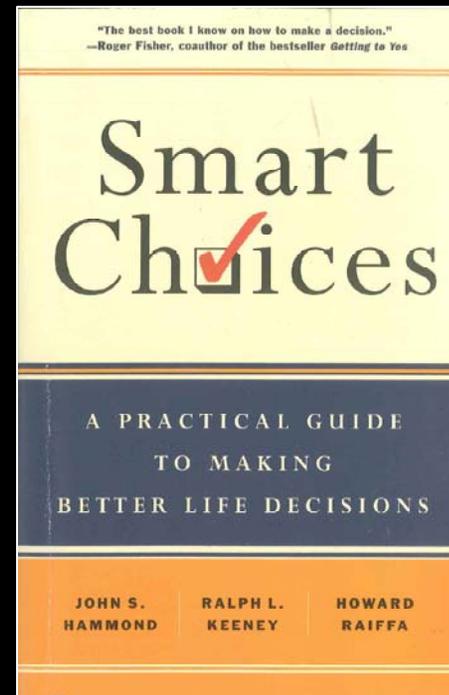
## What do we value?

- 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 Process

## PrOACT

- ◎ Problem framing
- ◎ Objectives
- ◎ Actions
- ◎ Consequences
- ◎ Trade-offs



Hammond, J. S., R. L. Keeney, and H. Raiffa. 1999. *Smart Choices: A Practical Guide to Making Better Life Decisions*. Broadway Books, New York, N.Y.





**Vison:** An integrated, coordinated and sustained monitoring and analysis system that advances bird conservation in the Northern Gulf of Mexico.



# Problem Framing

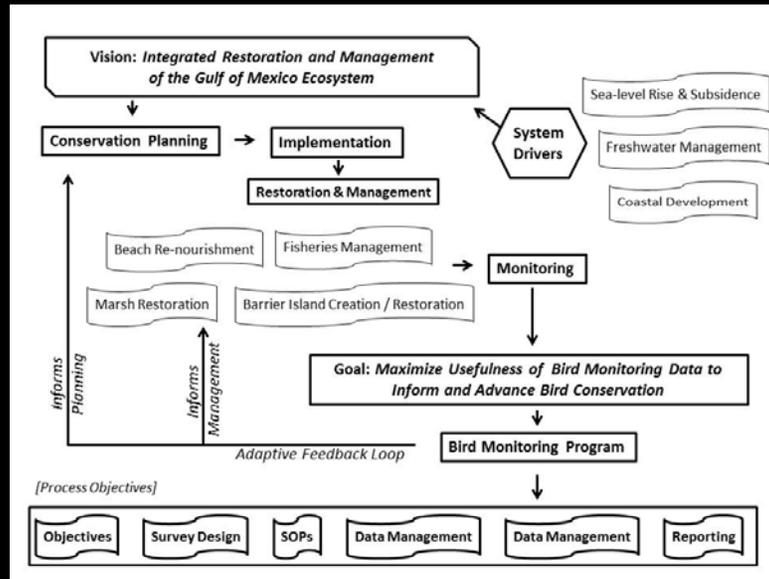
## Problem Statement:

*How do we develop a cost-effective bird monitoring strategy for the Gulf of Mexico that evaluates ongoing, chronic, and acute threats and conservation activities, maximizes learning, and is flexible and holistic enough to detect novel ecological threats with respect to management triggers and to evaluate new and emerging conservation activities?*

**Decision Maker** = SDM Group + suite of additional partners

**Decision** = What suite of monitoring projects to include in the Gulf of Mexico Bird Monitoring Strategy to inform and facilitate bird conservation?

# Development of Bird Monitoring Objectives



Context

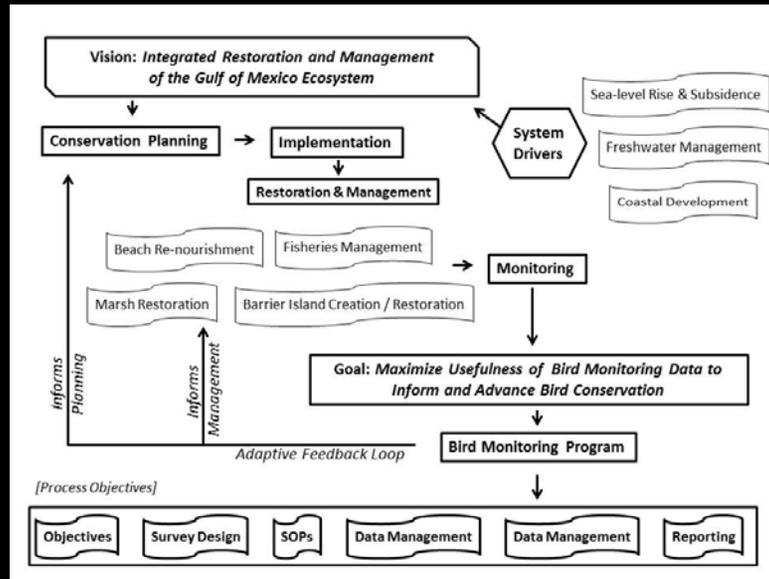


Content



- What is your objective?
- What do you value?
- Do the objectives represent your values?

# Development of Bird Monitoring Objectives



**Context**



**Content**

**Assess Core Values:**

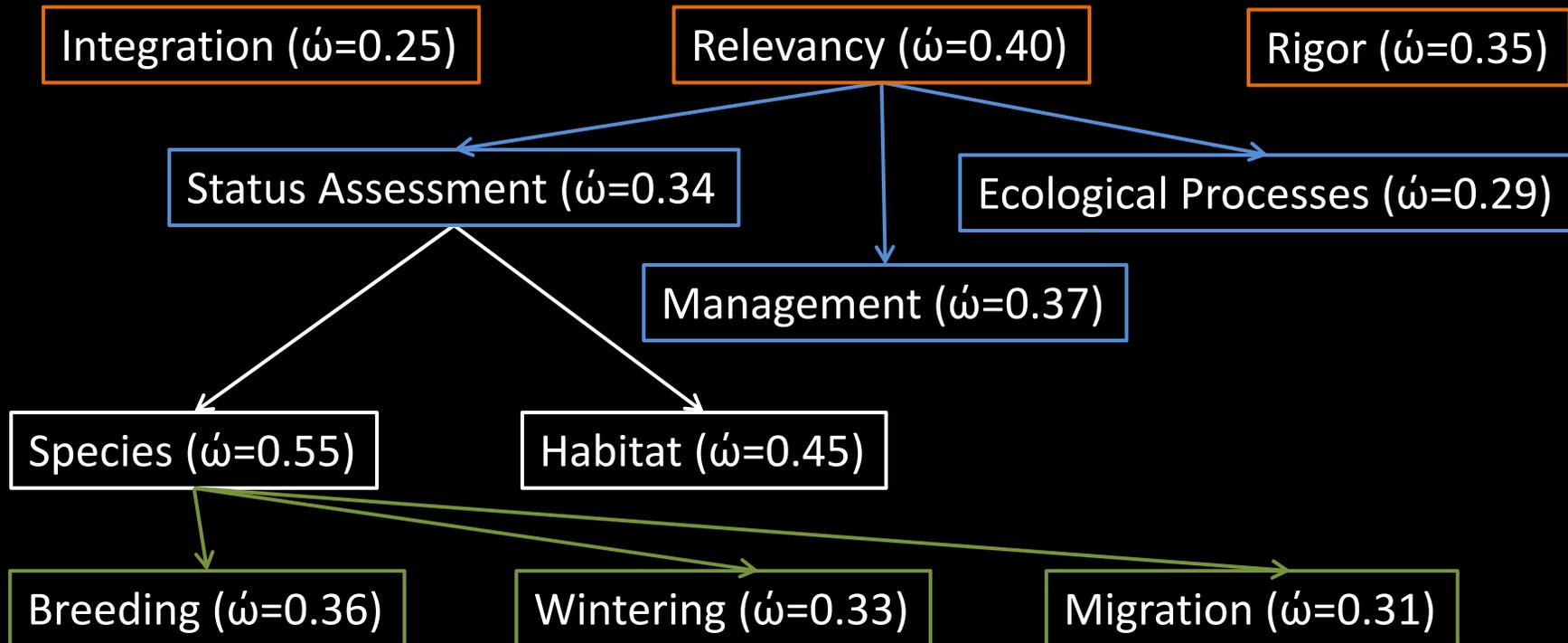
- |                |                |
|----------------|----------------|
| Rigor          | Relevancy      |
| Integration    | Partnership    |
| Baseline       | Management     |
| Sustainability | Cause & Effect |

# Bird Monitoring Objectives for the Gulf of Mexico

- ❖ **Fundamental Objective:** *Maximize Integration of Monitoring Projects*
- ❖ **Fundamental Objective:** *Maximize 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*

## Objectives Hierarchy and Weights for Bird Monitoring

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



**Assignment of objective weights is a means of setting priorities**

*Note: Weights depicted here are preliminary and not final.*

## Development of Performance Measures for each of the Objectives

Identification of attributes to measure performance of each objective (i.e., what do you value about the objective?)

*Number of Species*

*Temporal Scope*

*Hypotheses*

*Survey Design*

*Spatial Scope*

*Ecological Processes*

*Data Management*

*System Drivers*

*Number of Partners*

*% Uncertainty*

*Adaptive Management*

*Power Analysis*

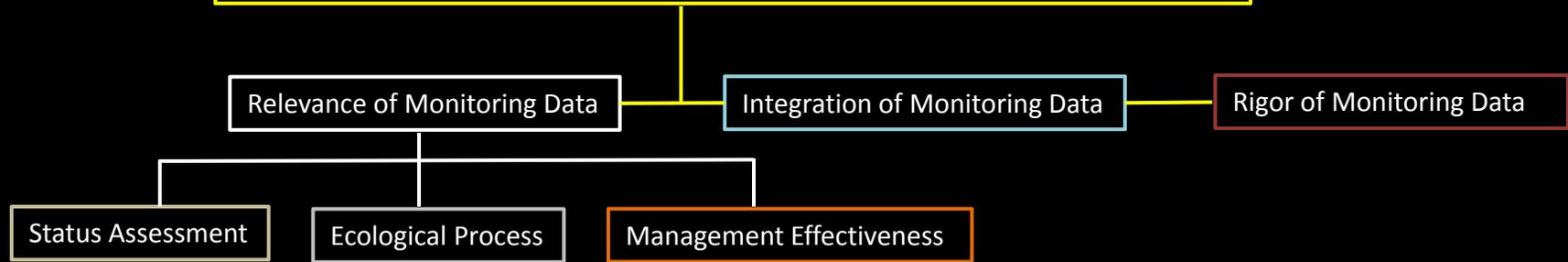
*Management Actions*

*Address Existing Priority*

*Broader Impacts*

*Leverage Resources*

# Maximize Usefulness of Bird Monitoring Data for Conservation



# Maximize Usefulness of Bird Monitoring Data for Conservation

Relevance of Monitoring Data

Integration of Monitoring Data

Rigor of Monitoring Data

Status Assessment

Populations

1. Priority Species

2. Spatial Scope

3. Temporal Scope

# Maximize Usefulness of Bird Monitoring Data for Conservation

Relevance of Monitoring Data

Integration of Monitoring Data

Rigor of Monitoring Data

Status Assessment

Populations

Habitats

1. Priority Species

4. Quantity Assessment

2. Spatial Scope

5. Quality Assessment

3. Temporal Scope

6. Temporal Scope

# Maximize Usefulness of Bird Monitoring Data for Conservation

Relevance of Monitoring Data

Integration of Monitoring Data

Rigor of Monitoring Data

Status Assessment

Management Effectiveness

Populations

Habitats

1. Priority Species

2. Spatial Scope

3. Temporal Scope

4. Quantity Assessment

5. Quality Assessment

6. Temporal Scope

7. Taxonomic Scope

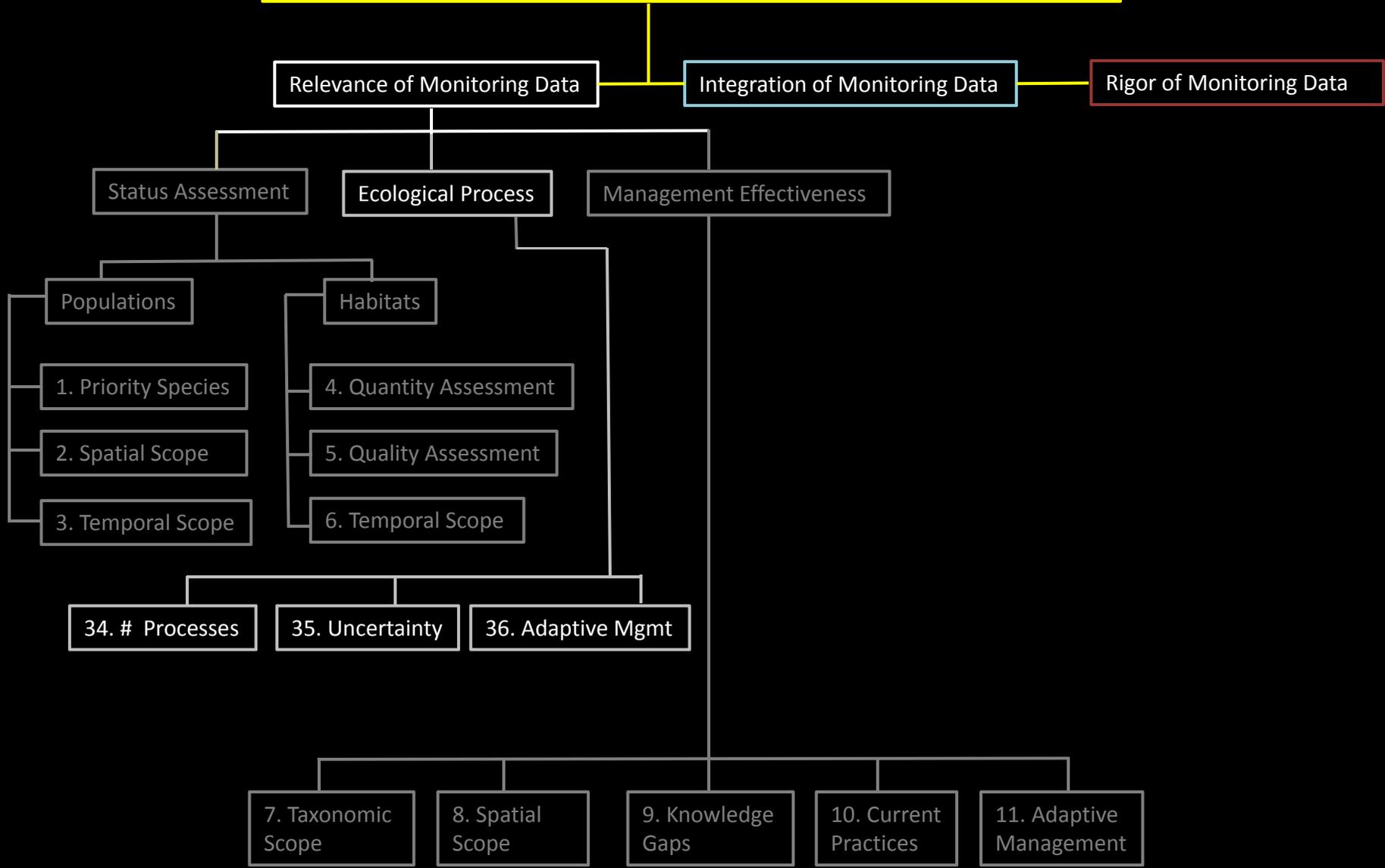
8. Spatial Scope

9. Knowledge Gaps

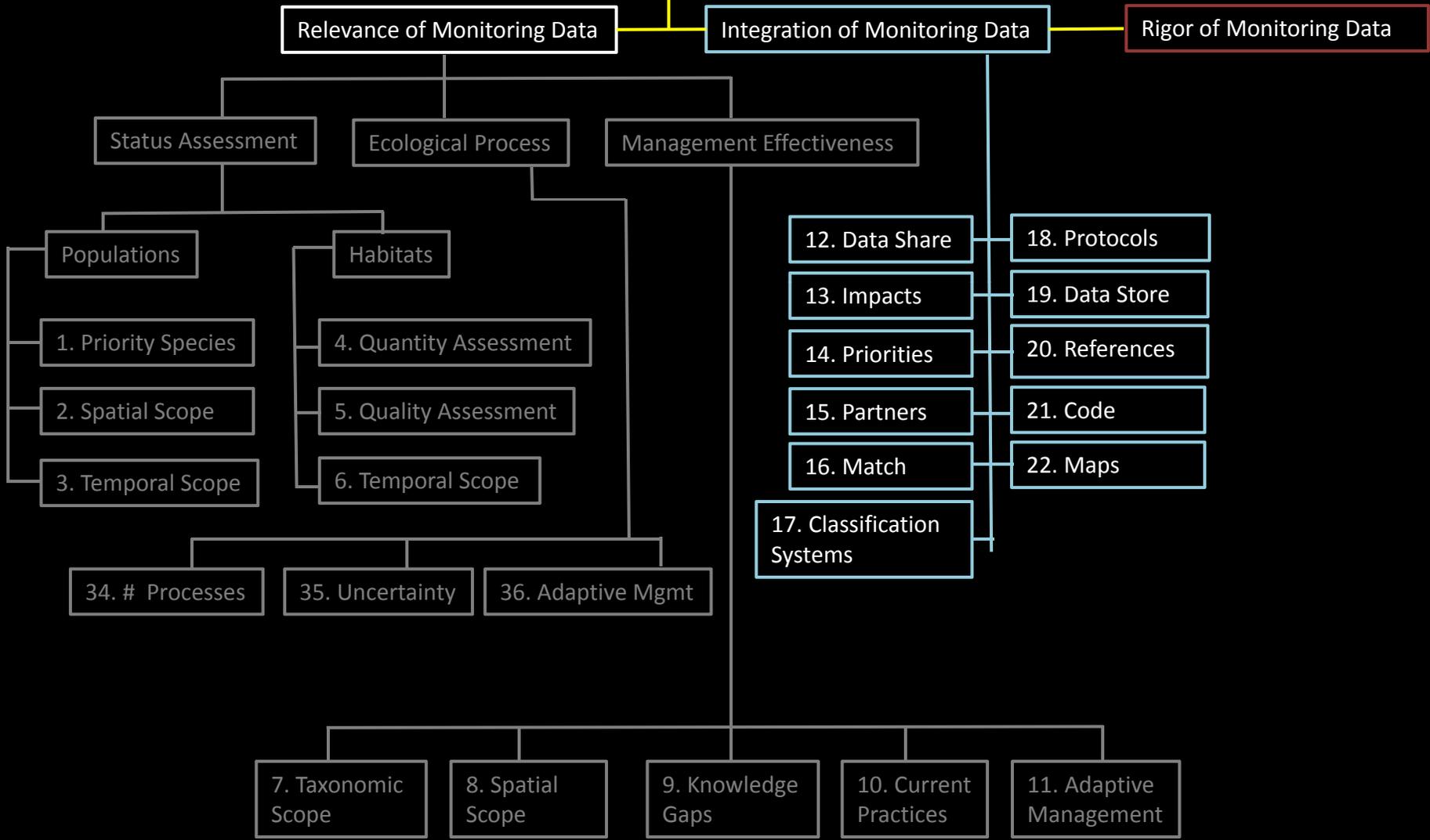
10. Current Practices

11. Adaptive Management

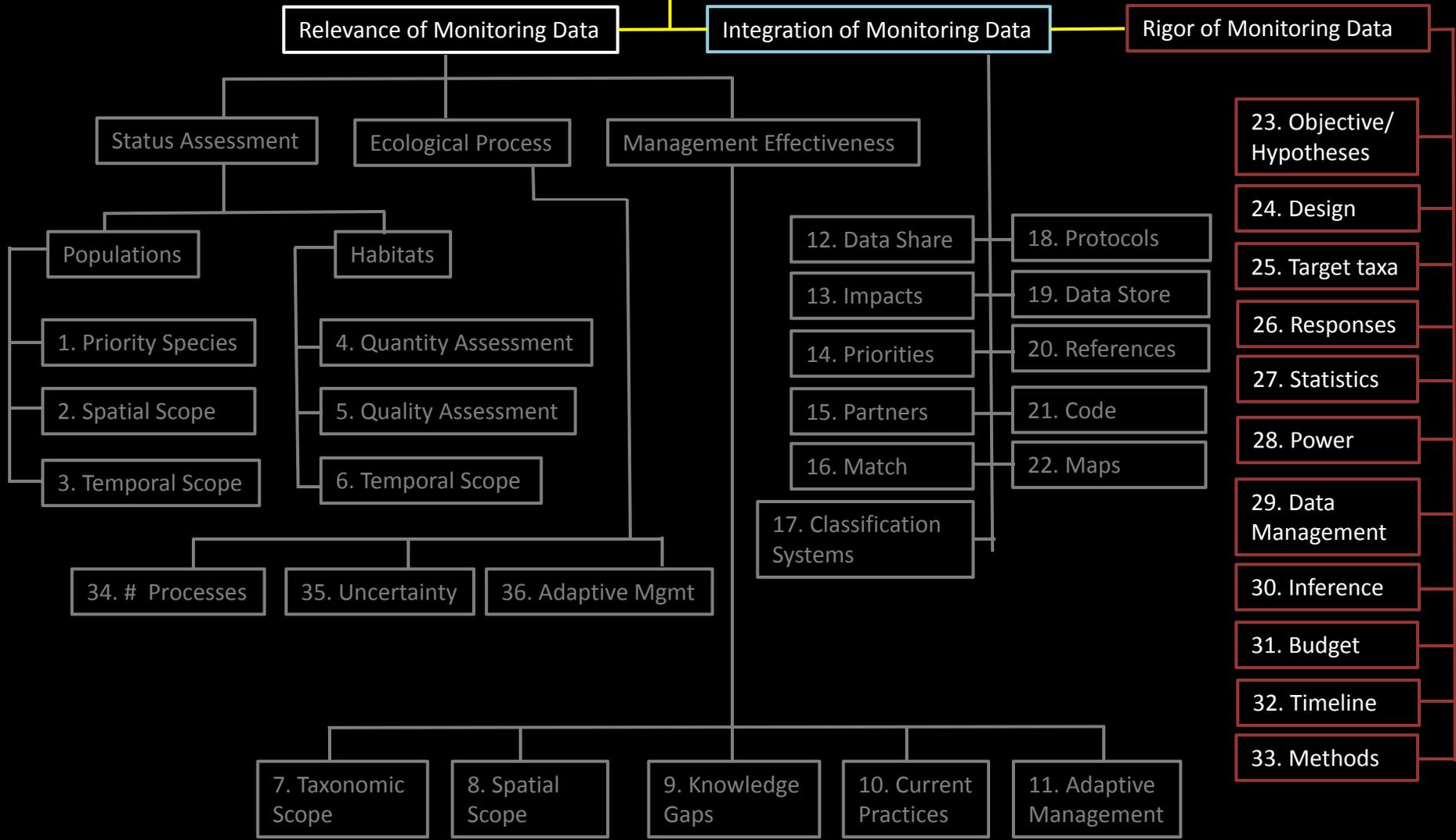
# Maximize Usefulness of Bird Monitoring Data for Conservation



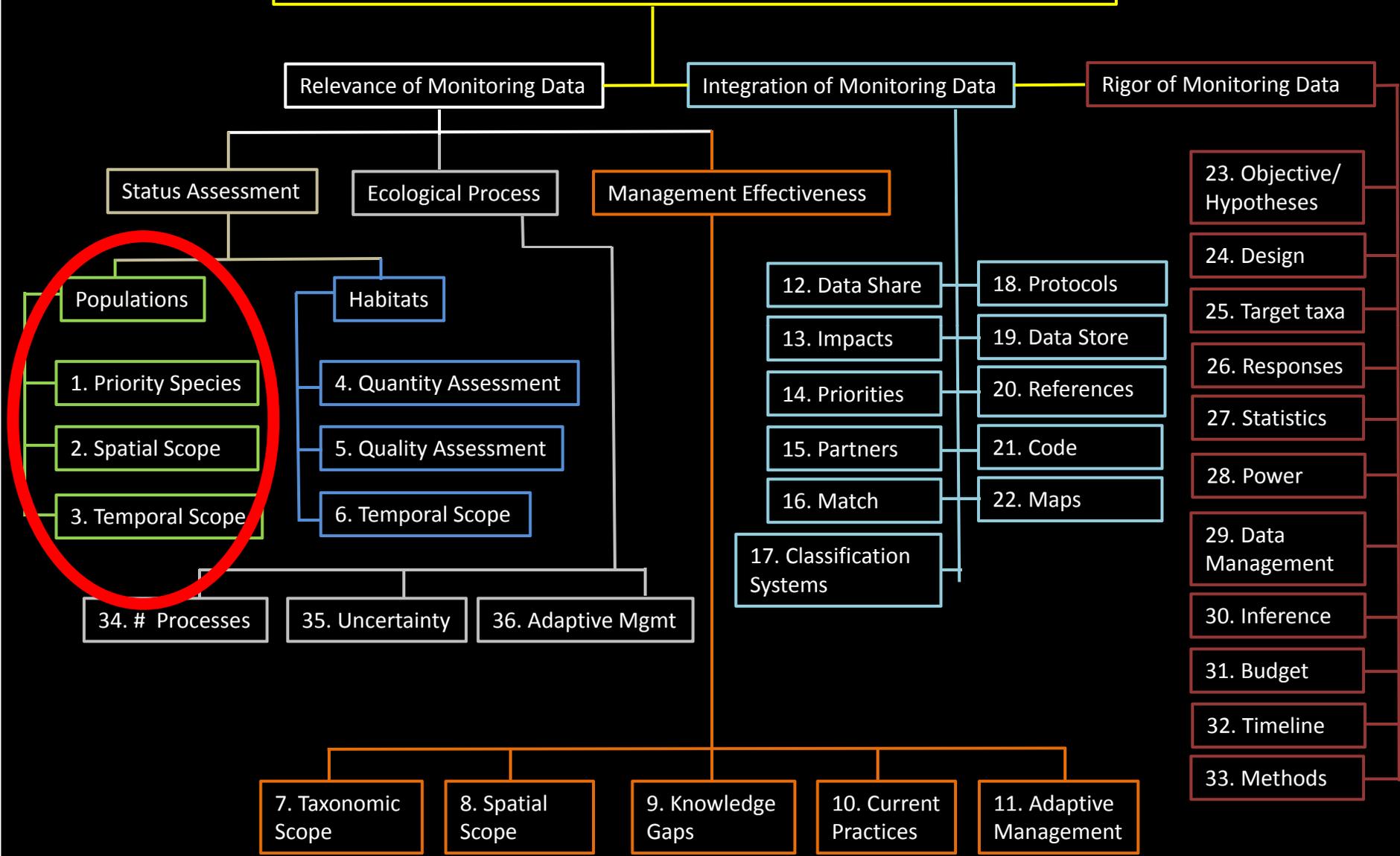
# Maximize Usefulness of Bird Monitoring Data for Conservation



# Maximize Usefulness of Bird Monitoring Data for Conservation



# Maximize Usefulness of Bird Monitoring Data for Conservation



# Development of Value Models for each Objective

Example: Objective = Status Assessment – Populations (Breeding)

Sub-Objective

Maximize number of priority species surveyed ( $\omega=.38$ )

Maximize survey duration (longevity of data collection) ( $\omega=.32$ )

Maximize the spatial scope of surveys ( $\omega=.30$ )

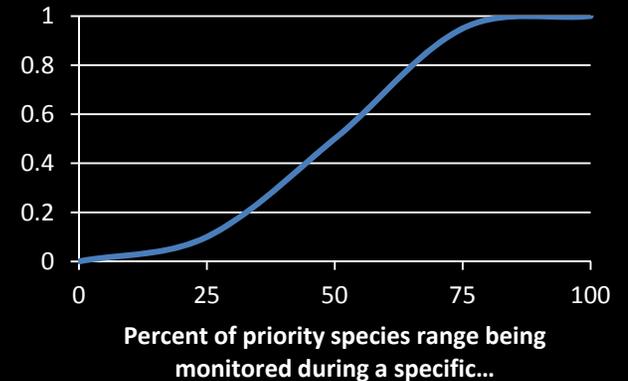
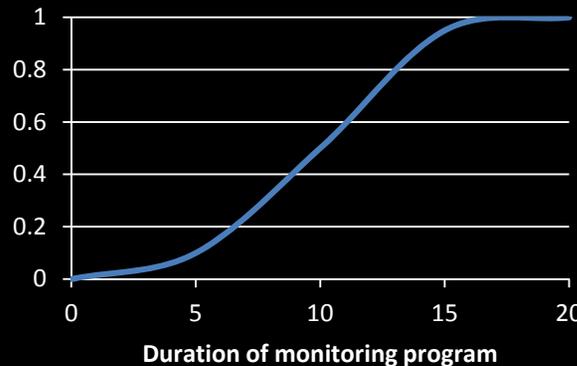
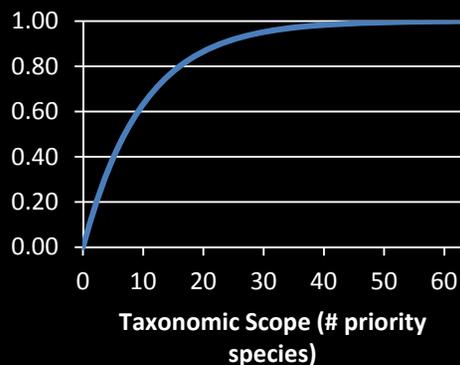
Performance Metric

0 = No priority species  
 1 = 1 priority species  
 2 = 2 priority species  
 .....  
 63 = 63 priority species

1= 1 to 4 years  
 2= 5 to 10 years  
 3 = 11 to 15 years  
 4 = 16 to 20 years  
 5 = 20+ years

0= No part of the priority species range  
 1 = <25 % of the priority species range  
 2 = 25 to 49% of the priority species range  
 3 = 50 to 75% of the priority species range  
 4 = >75% of the priority species range

Value Function



# Development of Value Models and Performance Metrics



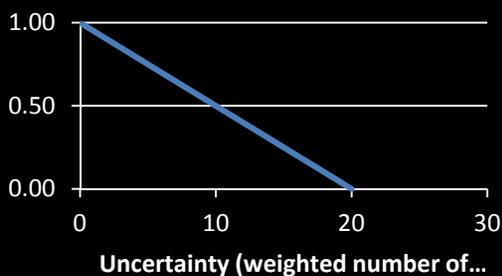
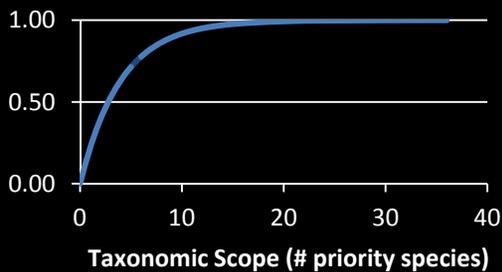
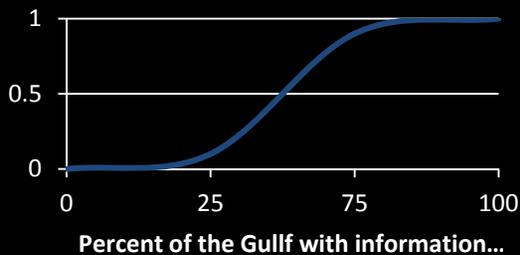
## OBJECTIVES:

- Status Assessment
- Ecological Processes
- Management
- Rigor
- Integration

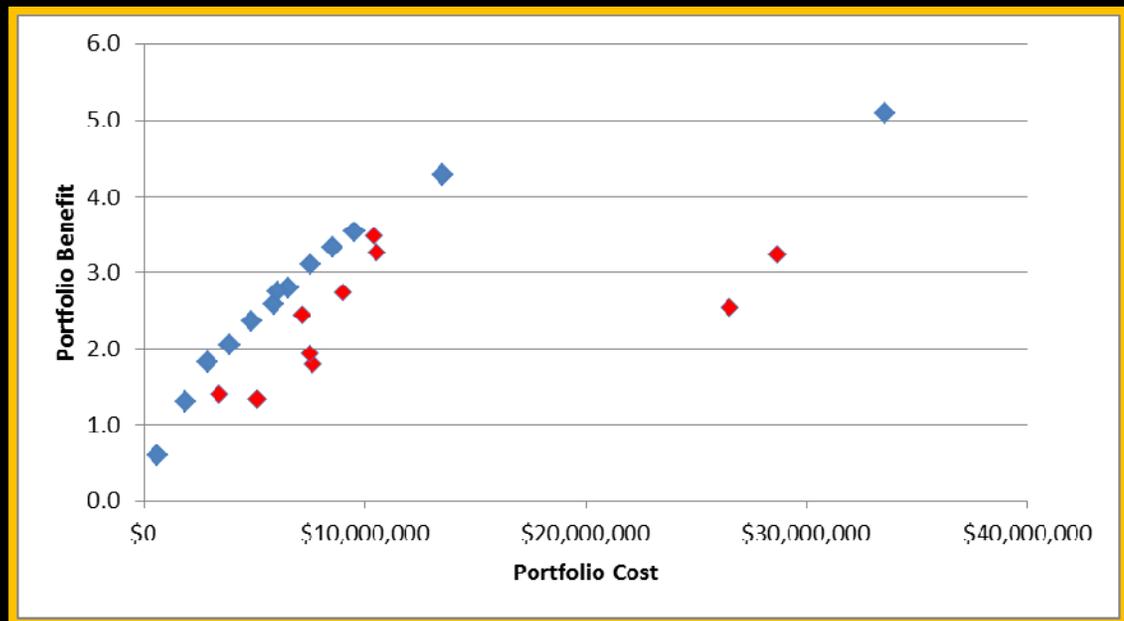
Value models and performance metrics have been developed for all objectives and are currently under review by the working group.

# 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)?*



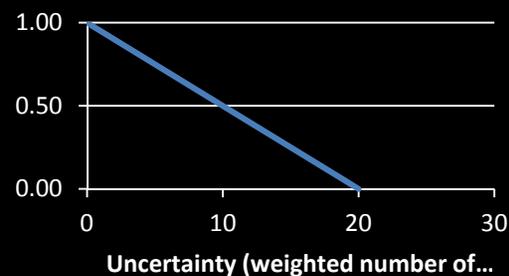
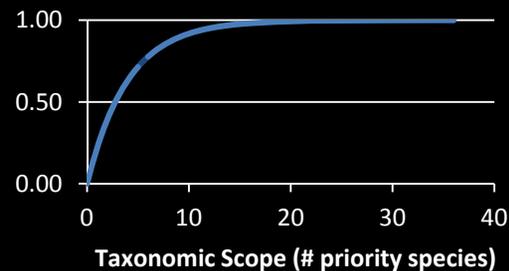
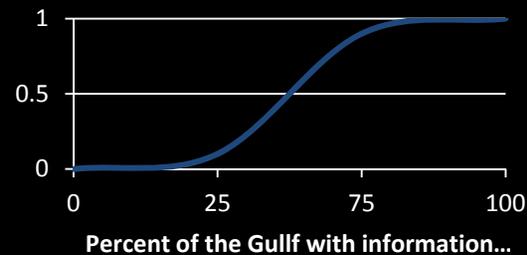
## Hypothetical Example: Analysis of 10 Potential Surveys



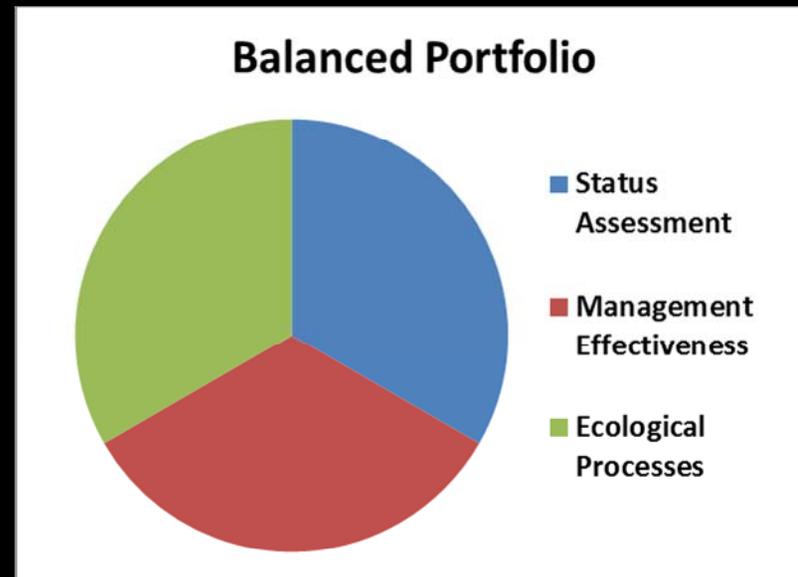
Blue represents survey selection based on value models  
Red represents random selection of surveys

## 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)?*



**Can also constrain by Objectives, Taxa, Habitats, etc**



# Pathway for Moving the Conceptual Model to Reality

## SDM Value Models:

Frames Bird Monitoring Issues  
and Provides Context;

Provides Insight per Values,  
Needs, and Priorities;

Provides Basis for Development  
of Decision Support Tool



## Develop Monitoring Framework

*Written Report that Documents  
Underlying Decisions,  
Assumptions, Objectives, Values,  
and Priorities for Bird Monitoring*



Long-term

Basis for Establishment of  
GoM Bird Monitoring Program



Short-term

Inform and Influence  
(Coordination across Agencies)

Develop and Implement New  
Bird Monitoring Surveys

**Vision: A coordinated and sustained monitoring and analysis system that advances bird conservation in support of integrated restoration and management of the Gulf of Mexico ecosystem.**

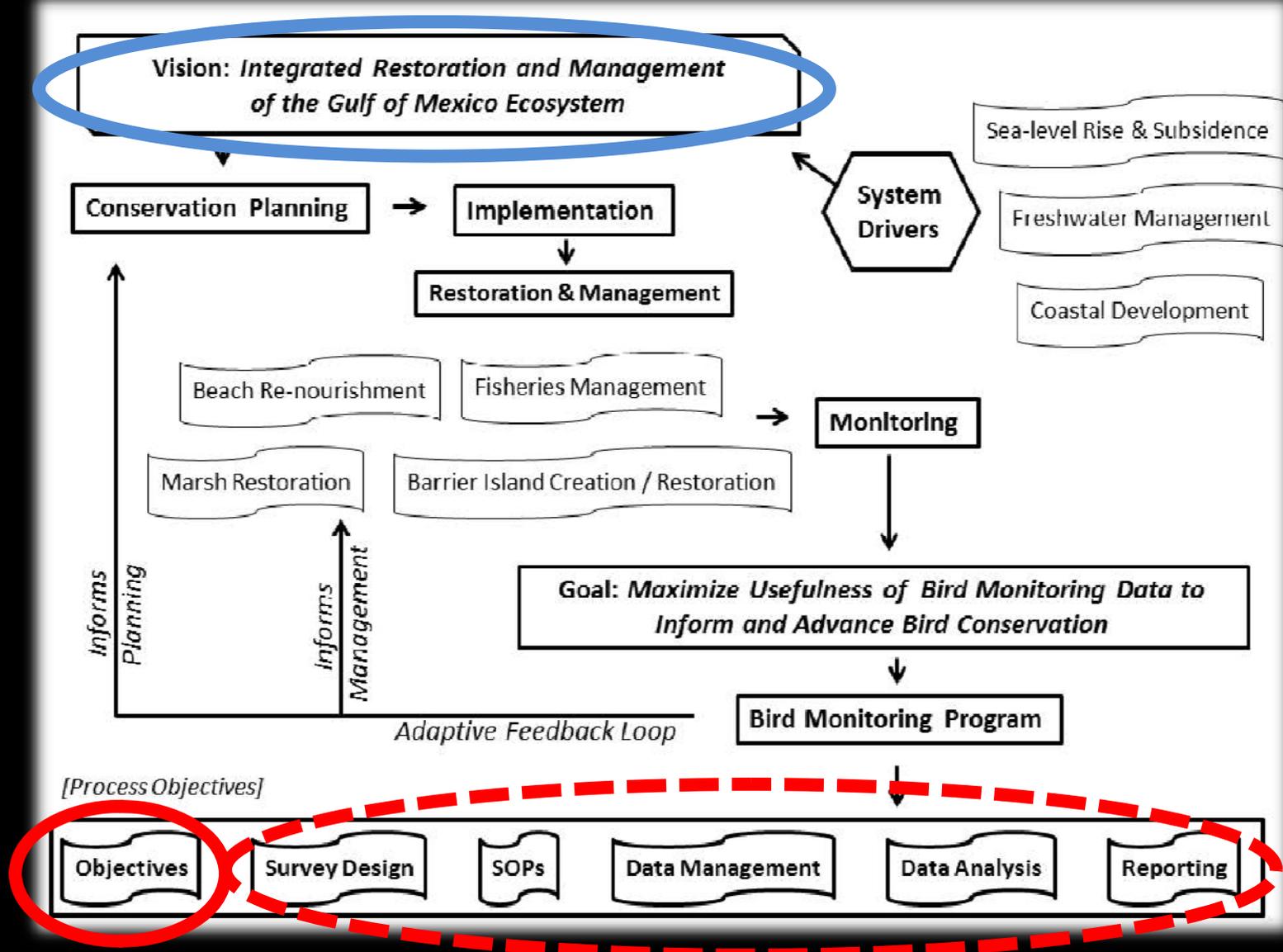
The SDM Process yields:

- ✓ Structure and insight into key components (aka. Process Objectives) of a region-wide avian monitoring program;
- ✓ Structure and transparency to objectives, values, and priorities underpinning a region-wide avian monitoring program;
- ✓ Decision support tool to facilitate trade-off analysis (e.g., cost:benefit of individual and/or a portfolio of surveys)
- ✓ Structure to coordinate and cross-walk with other biotic and abiotic monitoring efforts within the Gulf of Mexico.

## Opportunities in Coordinated Bird Monitoring

- ✓ Increasing effectiveness of restoration expenditures
- ✓ Identifying areas for organizations to pool/leverage resources
- ✓ Raising new money to implement key surveys
  - Foundations, non-traditional sectors, etc.
- ✓ Guiding infrastructure development
  - Highways, energy development, etc.
- ✓ Bringing a landscape perspective to local adaptation
  - How do I fit in? How important is this regionally?

# Moving Towards a Region-wide Avian Monitoring Framework for the Northern Gulf of Mexico





Thanks for your time and attention!

Questions?

