Guiding Coordinated Bird Monitoring Decisions Through Structured Decision Making

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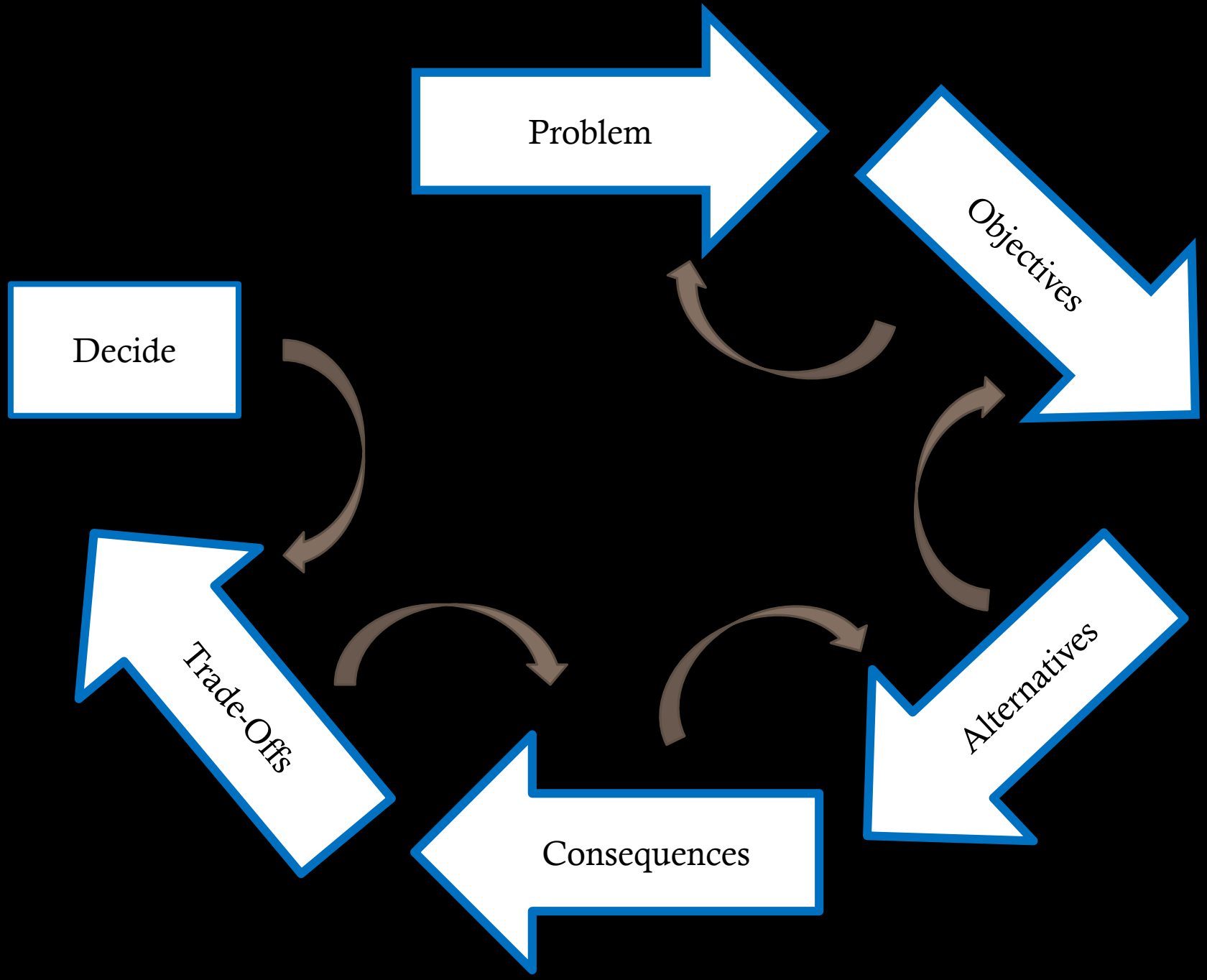
@RallidaeRule #GulfMxBirds

PrOACT

Problem
Objectives
Alternatives
Consequences
Tradeoffs

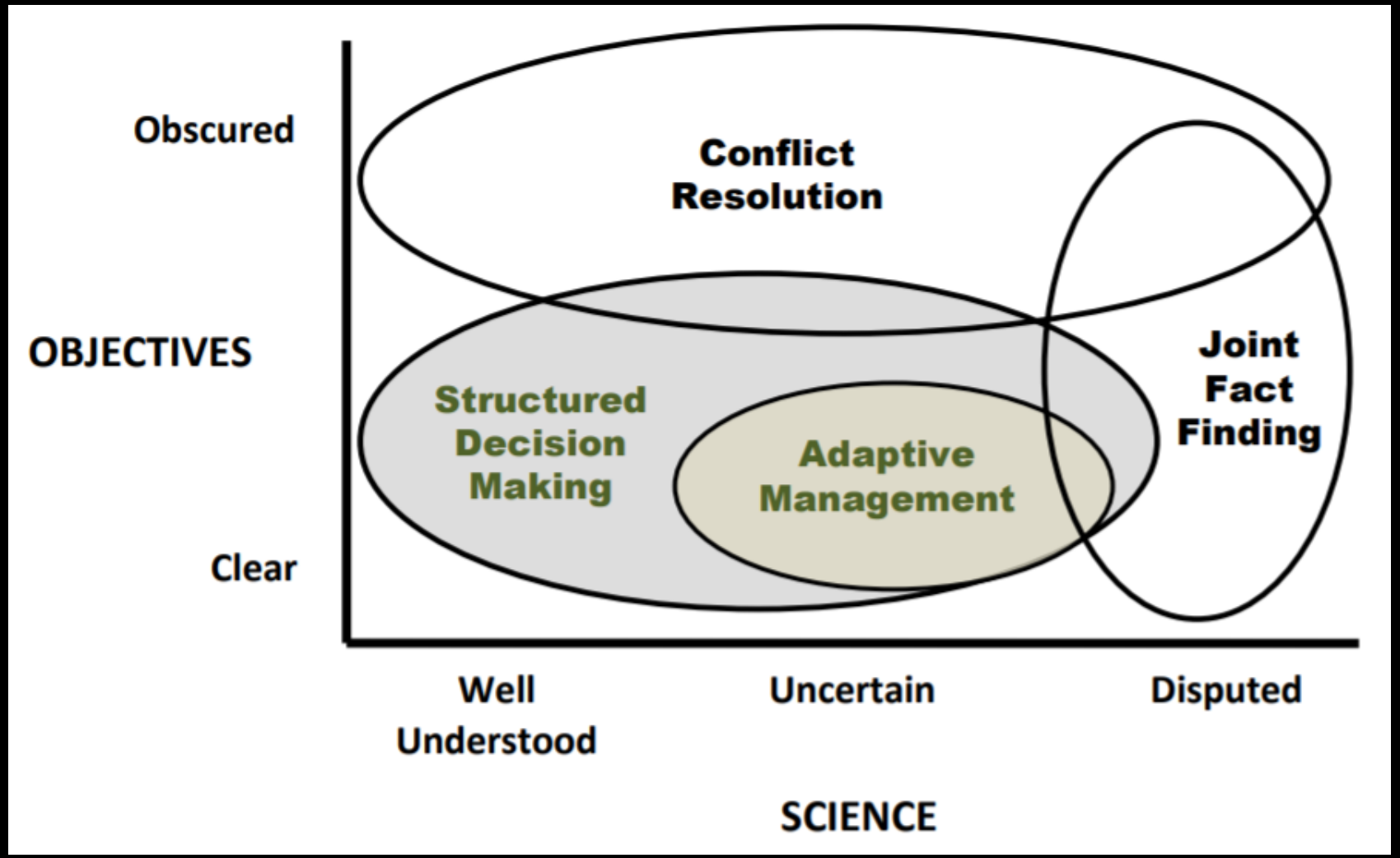


What is Decision Science?

Eliminates Mental Shortcuts

Allows for a variety of values

Unites stakeholders around a common objective



PrOACT - Problem

A disjointed and inefficient bird monitoring system that fails to address many complexities and interactions

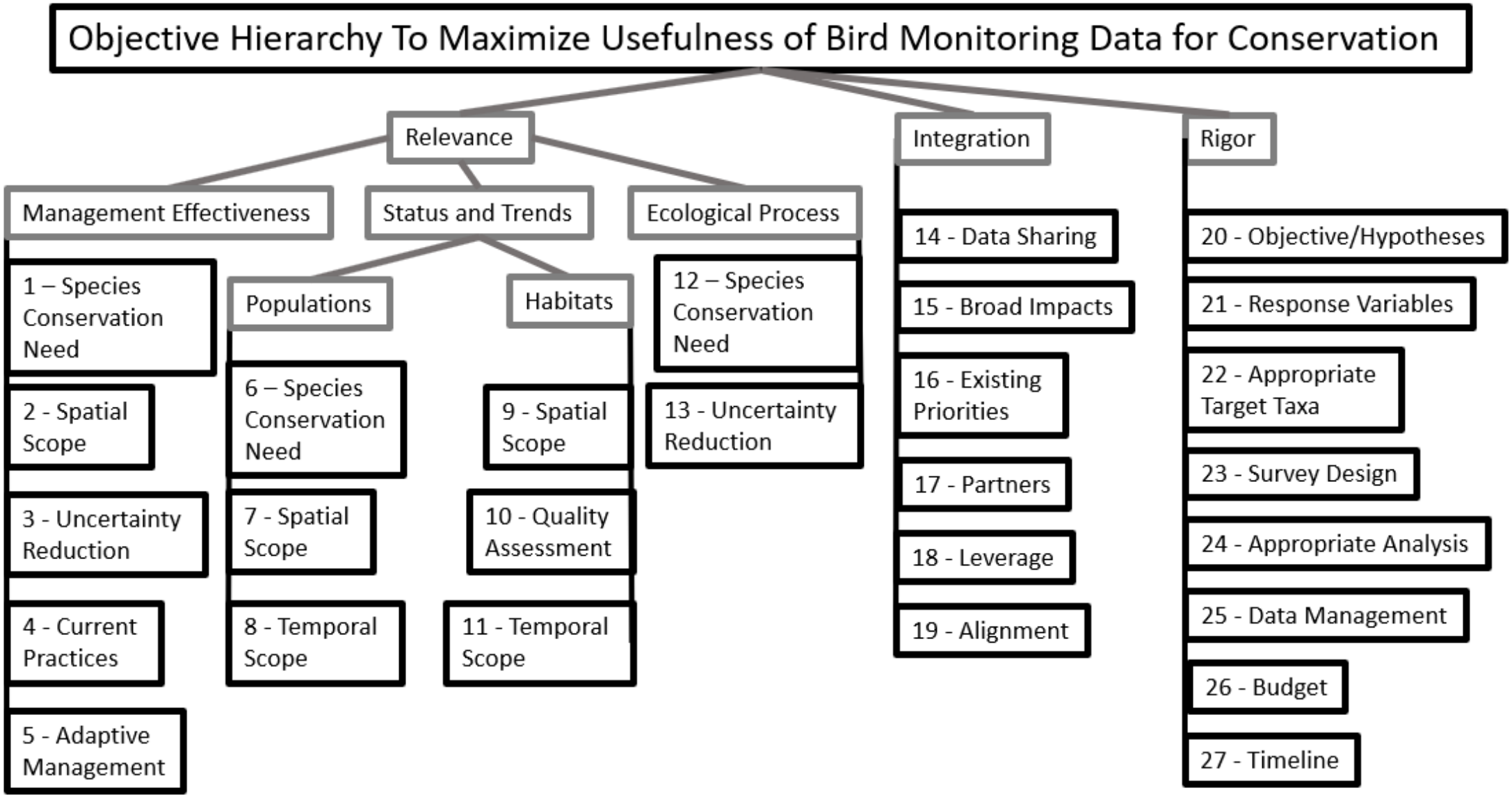
>500 species of birds

Multiple
Stressors

Multiple Complementary
Restoration Opportunities

NRDAR
Trustees

& Others


Objective Hierarchy To Maximize Usefulness of Bird Monitoring Data for Conservation
Relevance
Integration
Rigor
Management Effectiveness
Status and Trends
Ecological Process
1 – Species Conservation Need
2 - Spatial Scope
3 - Uncertainty Reduction
4 - Current Practices
5 - Adaptive Management
Populations
Habitats
6 – Species Conservation Need
7 - Spatial Scope
8 - Temporal Scope
9 - Spatial Scope
10 - Quality Assessment
11 - Temporal Scope
12 – Species Conservation Need
13 - Uncertainty Reduction
14 - Data Sharing
15 - Broad Impacts
16 - Existing Priorities
17 - Partners
18 - Leverage
19 - Alignment
20 - Objective/Hypotheses
21 - Response Variables
22 - Appropriate Target Taxa
23 - Survey Design
24 - Appropriate Analysis
25 - Data Management
26 - Budget
27 - Timeline

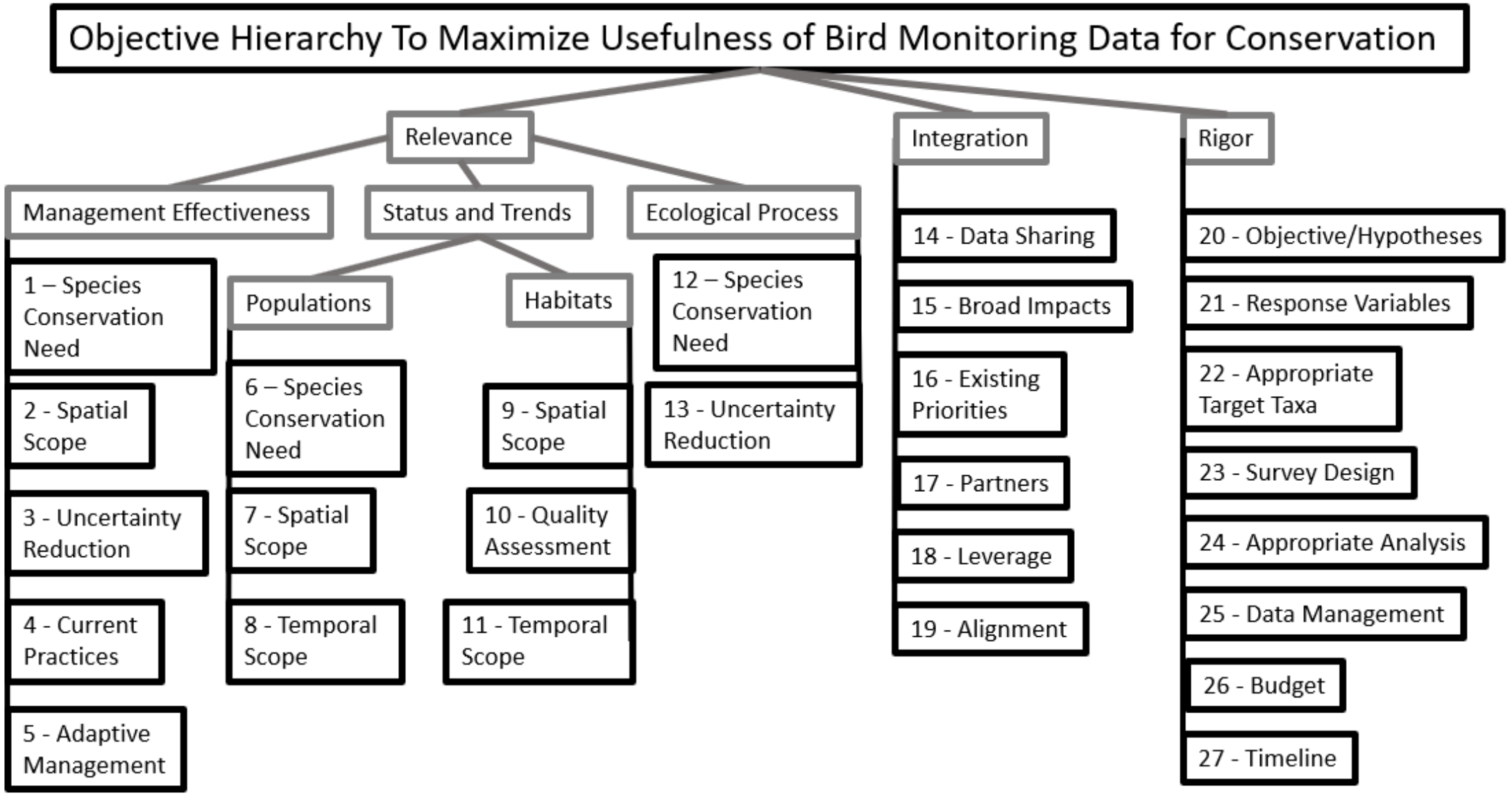
Two Applications of Decision Science

Portfolio Selection Tool

Funding Decision Maker choosing among alternative proposals/projects

Monitoring Plan

Choosing among priorities for the next 5 years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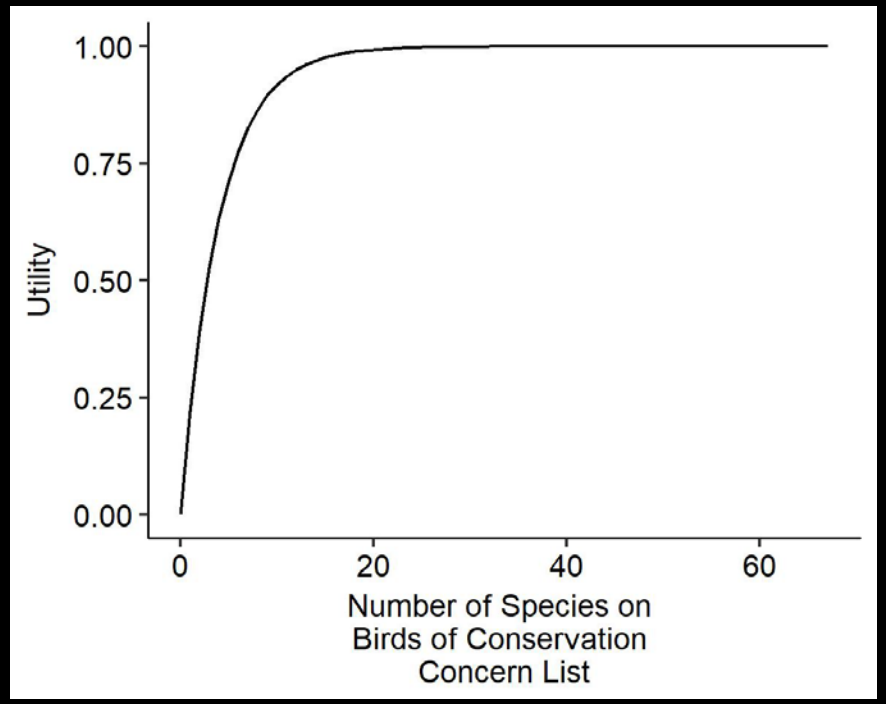
How we measure what we value

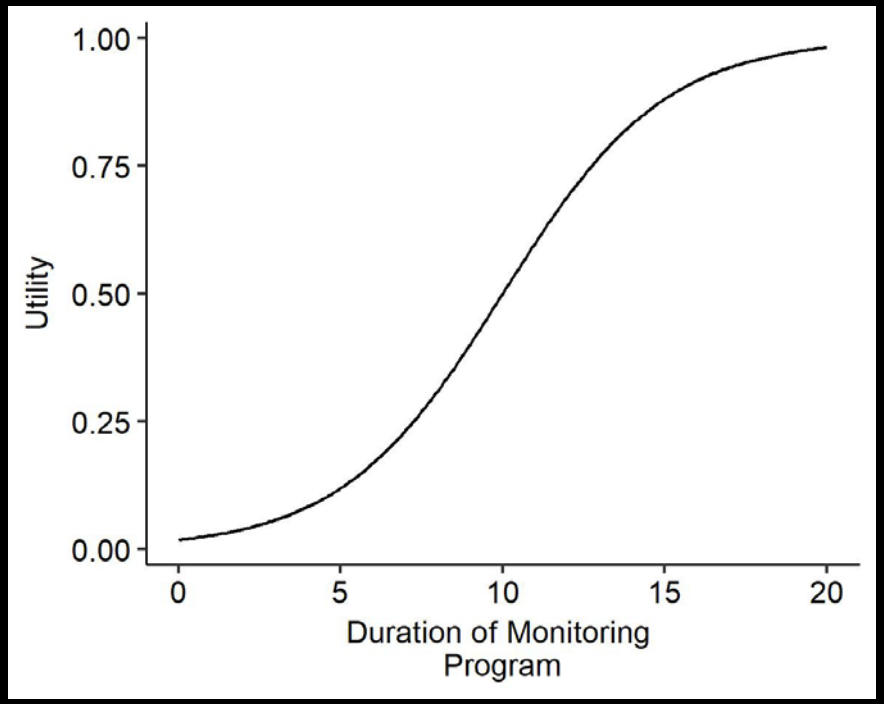
Populations

6 - Conservation Need

7 - Spatial Scope

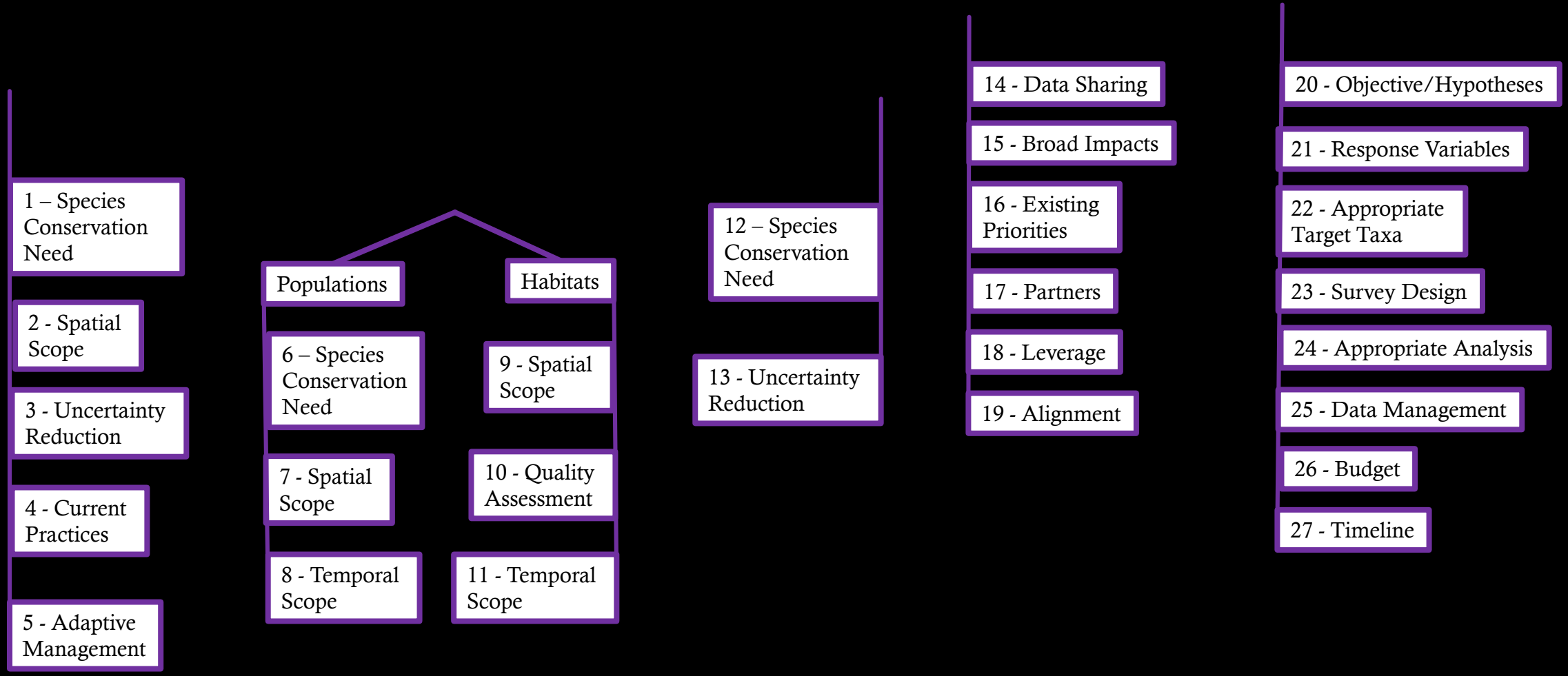
8 - Temporal Scope





PrOACT - Consequences

$$\sum [\text{Utility Score} \times \text{weight}] = \text{Conservation Benefit Score}$$
$$(0\text{-}1) \qquad (0\text{-}1) \qquad (0\text{-}1)$$



PrOACT – Tradeoffs

A randomly generated proposals (rows)

Each proposal has a cost and a benefit score

COST	Benefit Score	Gulf Coast States				
150000	0.28	0	1	0	0	0
220000	0.32	0	0	1	0	1
110000	0.18	1	1	0	0	0
1000000	0.50	1	1	1	1	1
5000000	0.50	0	0	0	1	0
25000	0.40	1	1	1	1	1
900000	0.32	1	0	0	0	0
1500000	0.39	1	1	1	1	1
100000	0.30	0	1	0	0	0
10000	0.27	0	0	0	0	0
250000	0.22	0	0	0	1	1
500000	0.37	0	0	1	1	0
800000	0.42	1	1	1	1	1
2000000	0.43	1	1	1	1	1
500000	0.34	0	0	1	1	0
300000	0.33	1	1	1	1	1
750000	0.32	1	1	1	1	1
1500000	0.44	1	1	1	1	1
900000	0.34	1	1	1	1	1
750000	0.33	1	1	1	1	1
1000000	0.30	1	1	1	1	1
150000	0.34	1	1	1	1	1
250000	0.44	1	1	1	0	0
500000	0.37	0	0	1	1	1
1200000	0.26	1	1	1	1	1
500000	0.39	0	1	0	0	0
2000000	0.41	1	1	1	1	1
250000	0.27	0	1	0	0	0
650000	0.28	1	1	1	0	0
200000	0.42	0	0	0	1	1
400000	0.36	1	1	1	1	1
900000	0.37	1	1	1	1	1
900000	0.36	1	1	1	1	1

Set Constraints

- Cost
- Balance of habitats
- X projects on private land
- Includes capacity building of Y skill set
- Z endangered species

COST	Benefit Score	Gulf Coast States				
150000	0.28	0	1	0	0	0
220000	0.32	0	0	1	0	1
110000	0.18	1	1	0	0	0
1000000	0.50	1	1	1	1	1
5000000	0.50	0	0	0	1	0
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But how is the decision made?

- Set budget (1.45 million)
- Set state constraints (3 in each state)
- Run Optimization

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150000	0.28	0	1	0	0	0
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Portfolio Decision Support Tool Application

This does not tie funding decision maker's hands, but helps them compare a large number of alternatives without taking mental shortcuts

Available in USGS Open File Report by end of 2018
(check gomamn.org)

Monitoring Plan – Setting Priorities

Use the community's values to set priorities for seven taxonomic groups

- Seabirds
- Shorebirds
- Marshbirds
- Landbirds
- Raptors
- Waterfowl
- Wadingbirds

PrO

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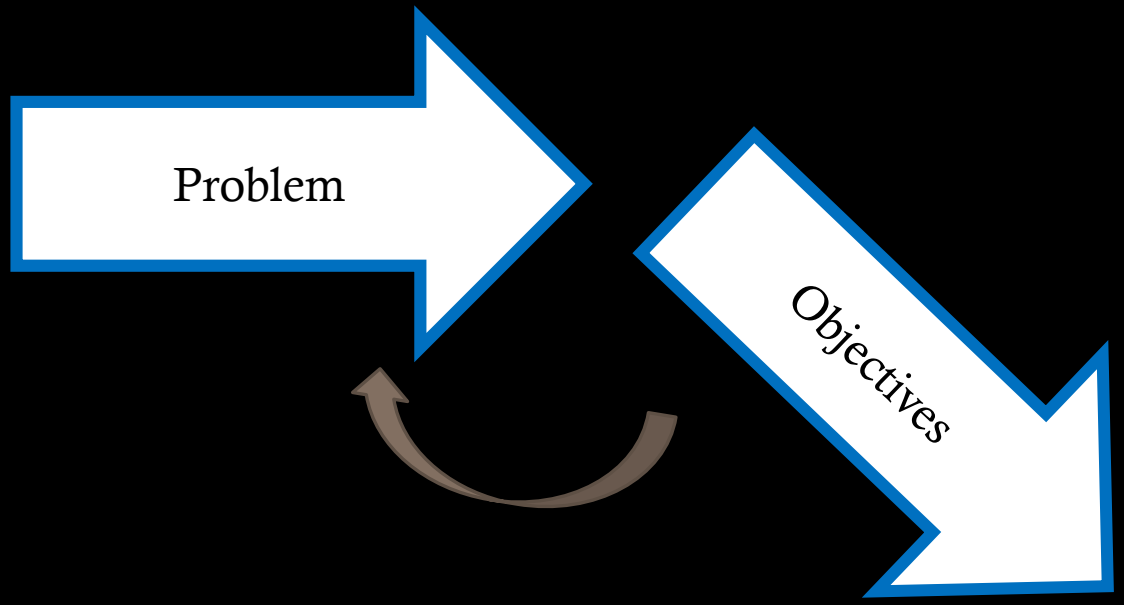

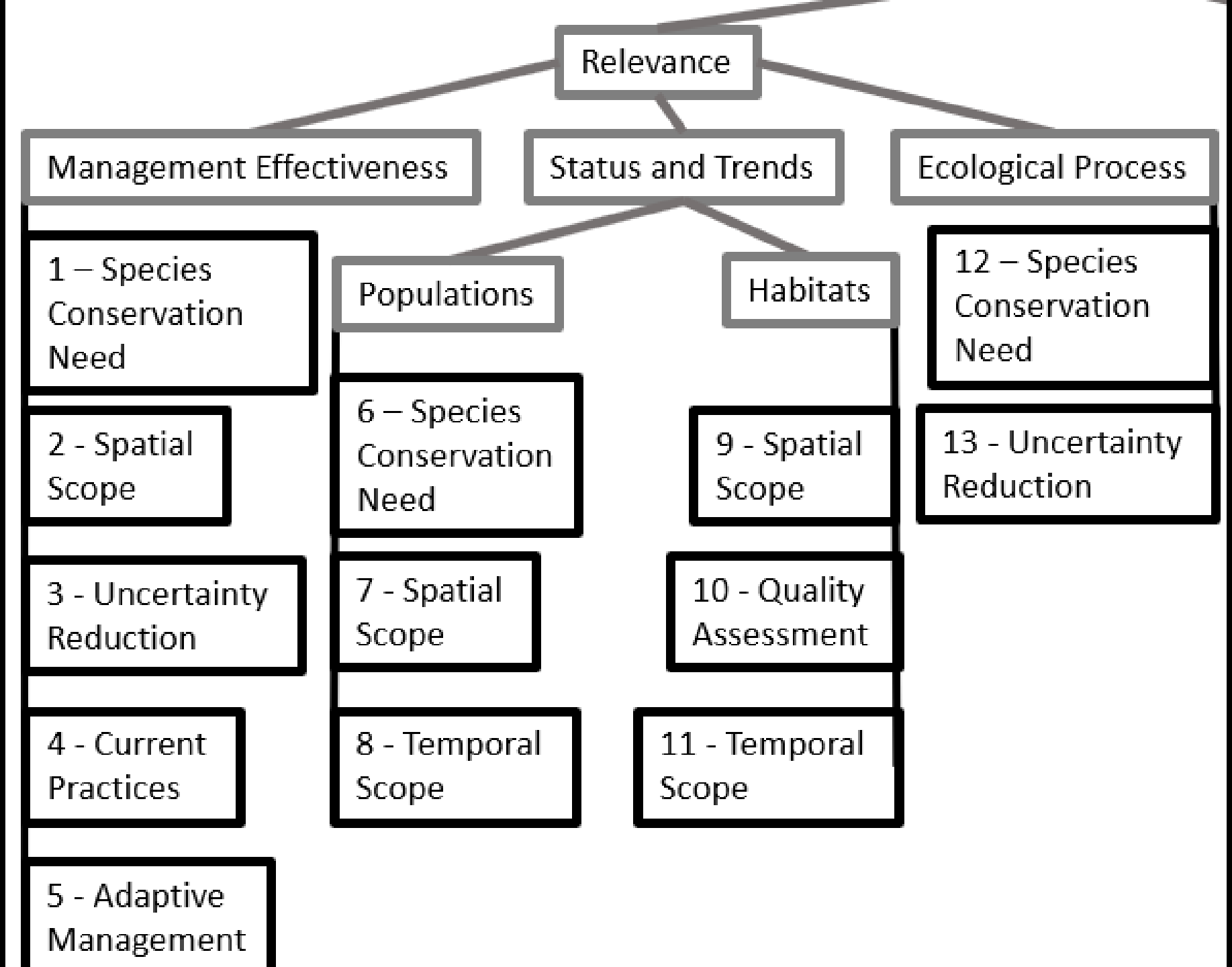
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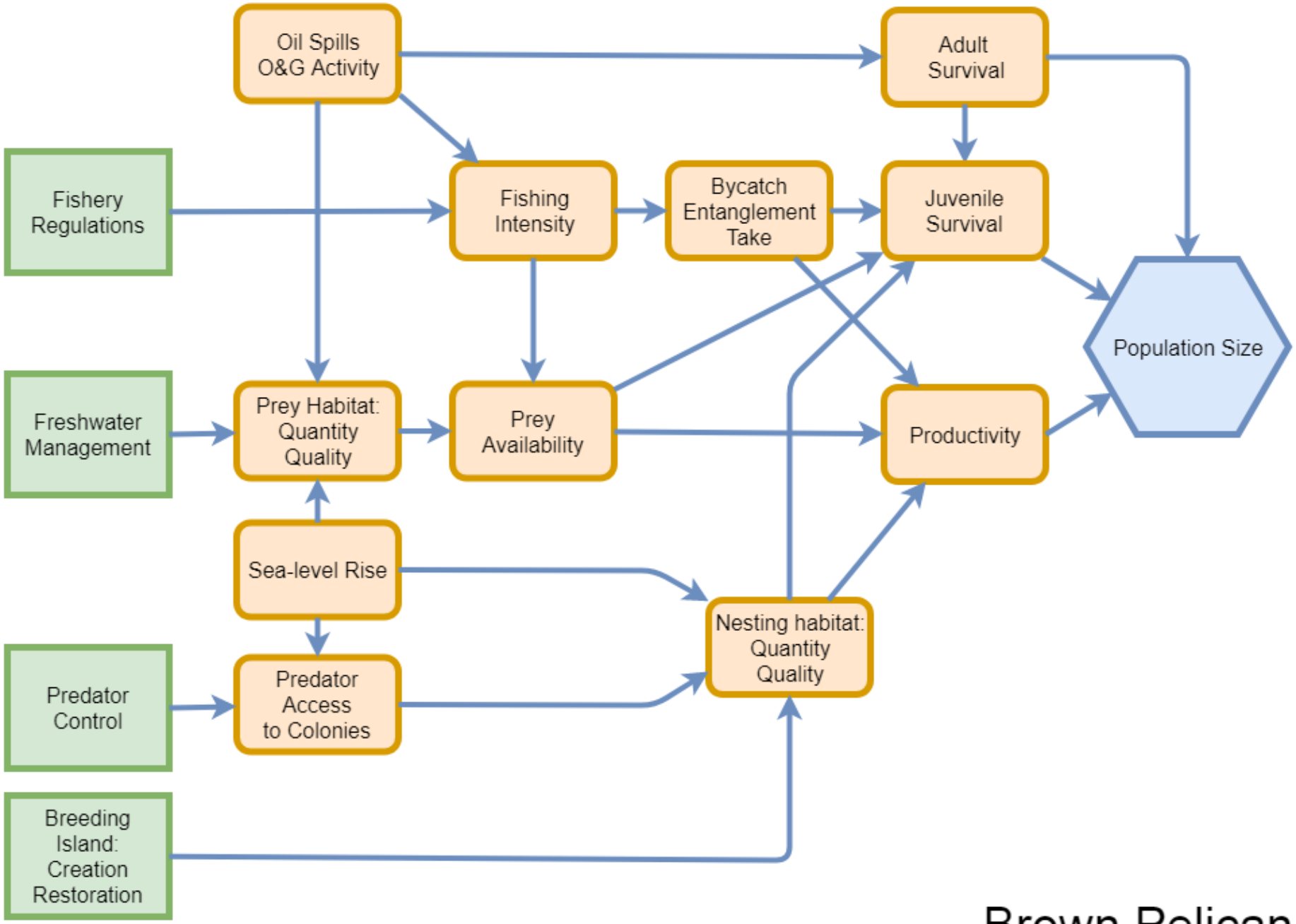
Oil Spills
O&G Activity
Adult
Survival
Fishery
Regulations
Fishing
Intensity
Bycatch
Entanglement
Take
Juvenile
Survival
Population Size
Freshwater
Management
Prey Habitat:
Quantity
Quality
Prey
Availability
Productivity
Sea-level Rise
Nesting habitat:
Quantity
Quality
Predator
Control
Predator
Access
to Colonies
Breeding
Island:
Creation
Restoration
Brown Pelican

How to Prioritize

		Effect Size		
		Low	High	Unknown
Uncertainty	Low	5	3	2
	High	4	1	2

Gulf of Mexico Avian Monitoring Plan

Setting Priorities For Each Taxonomic Group

- Management Actions
- Ecological Process
- Status and Trends

Connecting these with metrics

- Avian Covariates
- Non-Avian Covariates

Guidelines for Collaboration & Integration

Gulf of Mexico Avian Monitoring Plan

Available Early 2019

Updated Every 5 Years

As we learn more, our priorities can shift, and our values will continue to inform those priorities

Decision Science Can Be Used Two Ways To Coordinated and Integrate Regional Monitoring Efforts

- Select Among Projects
- Setting Priorities

Thanks!!

National Fish and Wildlife Foundation

GoMAMN Community of Practice

Questions?

GoMAMN.org

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@RallidaeRule #GulfMxBirds

Sensitivity Analysis