

# Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico

## *Executive Summary*



*“If you do not have the right problem, objectives, alternatives, list of uncertainties, and measures to indicate the degree to which the objectives are achieved, almost any analysis will be worthless” -- Ralph Keeney*



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Page 1: Dunlins and Western Sandpipers, Rob Dobbs

Page 2: Redheads, Larry Martin

Page 2: Decision Framework, Adapted from *DWH Trustees' Monitoring and Adaptive Management Procedures and Guidelines Manual*. <https://www.gulfspillrestoration.noaa.gov/monitoring-and-adaptive-management>

Page 4: Red Knots, Pat Leary

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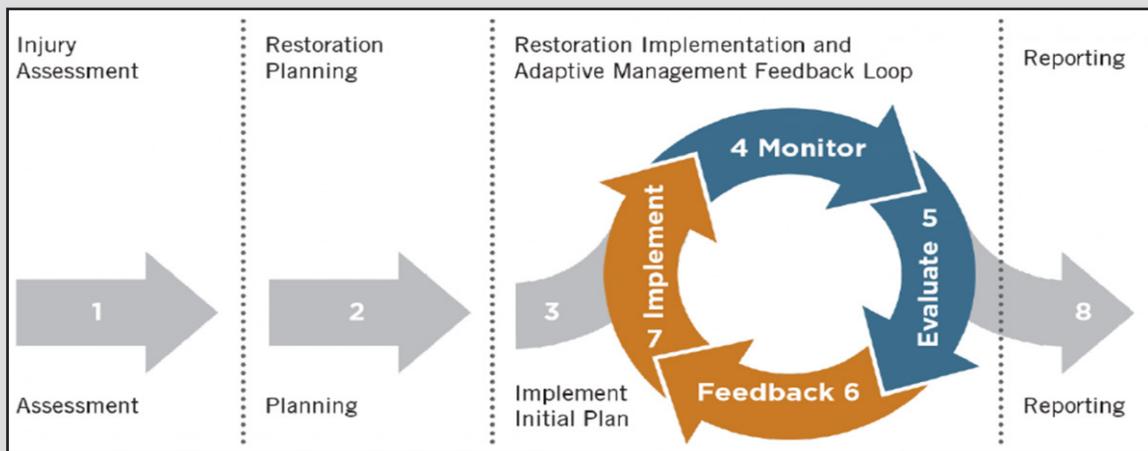


## Decision Context

The coastal habitats and offshore waters of the northern Gulf of Mexico are one of the most ecologically and socio-economically important ecosystems in the world. Unfortunately, the northern Gulf of Mexico is under increased stress due to a myriad of natural (e.g., hurricanes, thunderstorms, droughts, etc.) and anthropogenic activities (e.g., urban and commercial development, oil and gas extraction, etc.). The large-scale restoration work underway in the region as result of the 2010 Deepwater Horizon oil spill settlement presents a new set of opportunities to counter these stressors and advance bird-habitat conservation. However, decision makers will need information on bird ecology, life-history strategies, and criteria for evaluating restoration effectiveness.

## Gulf of Mexico Avian Monitoring Network

The Gulf of Mexico Avian Monitoring Network (GoMAMN; <https://gomamn.org>) was formed in 2014 to facilitate the collection and utilization of bird monitoring data to inform conservation and restoration decision making. GoMAMN is an ad-hoc, self-organized group of federal, state, academic and NGO scientists and managers representing the broader bird conservation community. Using the principles of structured decision making and facilitated workshops, GoMAMN has: (1) established a forum for communication and coordination; and (2) identified and reached consensus on a set of core values and data needs across a variety of stakeholders. Based on these discussions, the overarching goal is: maximize the utility of bird monitoring data to inform restoration and to advance bird-habitat conservation across the northern Gulf of Mexico. To that end, GoMAMN compiled and published a report entitled “Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico”. The Guidelines are advisory in nature and are intended to be a living document updated every five years to reflect our increased understanding of how bird populations respond to conservation actions and underlying ecological processes.

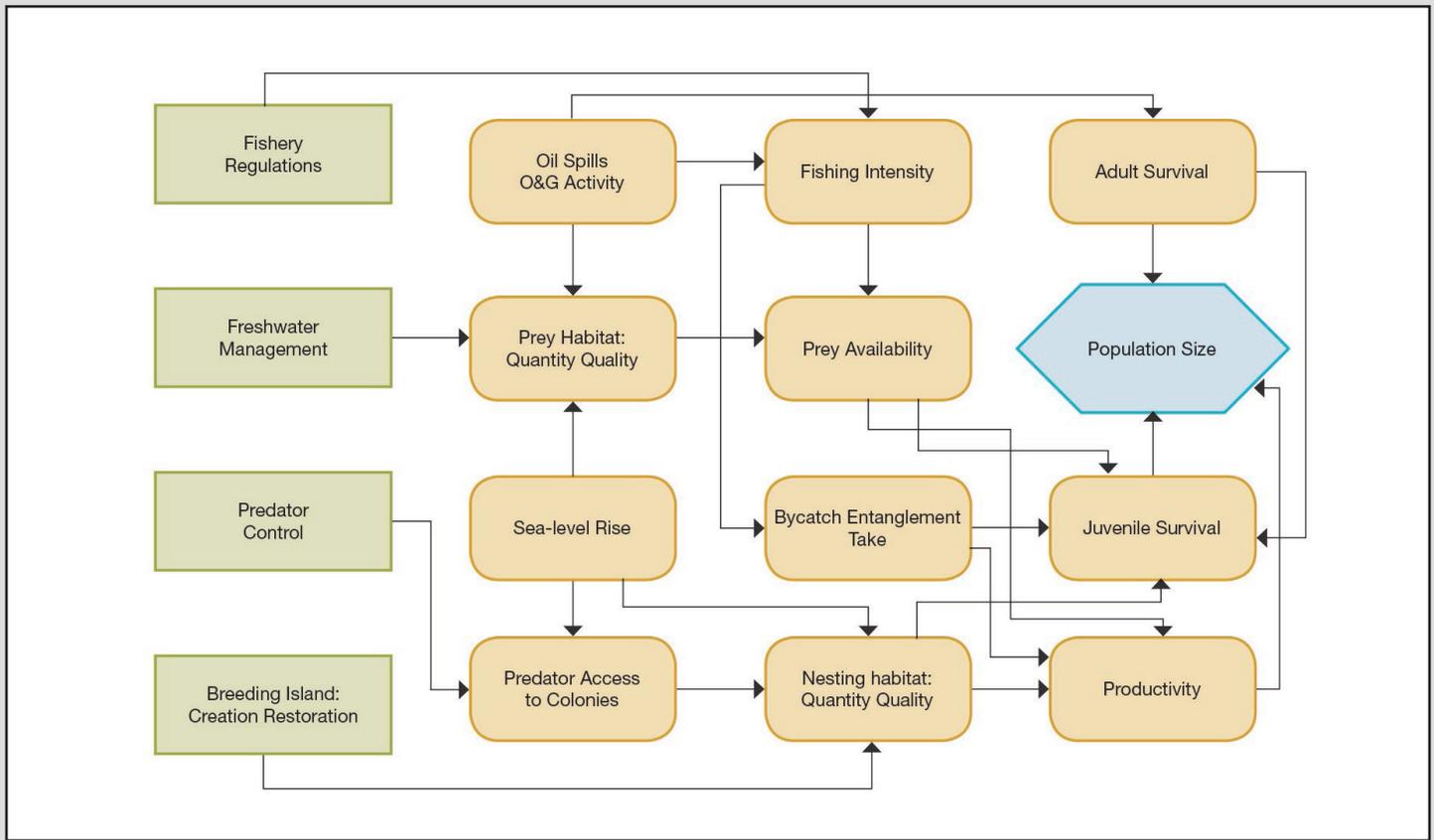


*Decision framework guiding restoration in the northern Gulf of Mexico*

## Strategic Bird Monitoring Guidelines

To maximize the utility of bird monitoring data, stakeholders agreed that bird monitoring projects must embrace three fundamental objectives: (1) maximize the relevance of monitoring data, (2) maximize the scientific rigor of monitoring projects, and (3) maximize the integration of monitoring projects. More specifically, relevance is defined as: (a) establishing status and trend assessments for birds of conservation concern and their habitats, (b) reducing uncertainty related to management effectiveness; and (c) reducing uncertainty related to ecological processes and their respective impacts on bird-habitat conservation.

Using these fundamental objectives as a foundation, members of GoMAMN developed a suite of conceptual models for 68 birds of conservation concern (see example below for the Brown Pelican). These models identified: (1) key uncertainties in the drivers of bird populations; (2) key performance metrics to guide implementation; and (3) recommendations for advancing bird monitoring efforts to facilitate learning. The key uncertainties and associated performance metrics are summarized by management actions and ecological processes within each of seven taxa-based chapters. In addition, a chapter on avian health puts forth a conceptual model with physiological endpoints and recommendations to advance avian health monitoring activities. Collectively, these objectives, conceptual models, and associated recommendations serve as a strategic framework to foster targeted, collaborative monitoring efforts to facilitate decision-making, and ultimately bird-habitat conservation across the northern Gulf of Mexico.



Conceptual model depicting the relationship between management actions (green boxes), intermediate processes (gold boxes) and population size (blue hexagon) for the Brown Pelican within the northern Gulf of Mexico.

# Gulf of Mexico Avian Monitoring Network

## Birds of Conservation Concern

Common Name	PIF-Status	DWH Injured Resource	Common Name	PIF-Status	DWH Injured Resource
Mottled Duck	Watchlist - Red	X	Masked Booby		X
Northern Pintail			Northern Gannet		X
Lesser Scaup		X	Brown Pelican		X
Northern Bobwhite	Steep Decline		American Bittern		
Common Ground Dove			Least Bittern		X
Chuck-will's-widow	Steep Decline		Snowy Egret		X
Yellow Rail	Watchlist - Yellow		Little Blue Heron		X
Black Rail	Watchlist - Red		Tricolored Heron		X
King Rail	Watchlist - Yellow		Reddish Egret	Watchlist - Yellow	X
FL Sandhill Crane <sup>FL (state listed)</sup>	Watchlist - Yellow		Osprey		X
MS Sandhill Crane <sup>T&amp;E</sup>	Watchlist - Yellow		Swallow-tailed Kite		
Whooping Crane <sup>T&amp;E</sup>	Watchlist - Yellow		Bald Eagle		
American Oystercatcher	Watchlist - Yellow	X	Short-eared Owl	Steep Decline	
Piping Plover <sup>T&amp;E</sup>	Watchlist - Red	X	Red-headed Woodpecker	Watchlist - Yellow	
Wilson's Plover	Watchlist - Yellow	X	Red-cockaded Woodpecker <sup>T&amp;E</sup>	Watchlist - Red	
Snowy Plover	Watchlist - Yellow	X	SE American Kestrel <sup>FL (state listed)</sup>	Watchlist - Yellow	
Long-billed Curlew			Peregrine Falcon		
Marbled Godwit	Watchlist - Yellow		Loggerhead Shrike	Steep Decline	
Red Knot <sup>T&amp;E</sup>	Watchlist - Yellow		Brown-headed Nuthatch		
Dunlin		X	Sedge Wren		
Buff-breasted Sandpiper	Watchlist - Yellow		Marsh Wren		
Western Sandpiper		X	Wood Thrush	Watchlist - Yellow	
Sooty Tern		X	Bachman's Sparrow	Watchlist - Red	
Least Tern	Watchlist - Yellow	X	Grasshopper Sparrow	Steep Decline	
Gull-billed Tern		X	LeConte's Sparrow	Watchlist - Yellow	
Royal Tern		X	Seaside Sparrow	Watchlist - Yellow	X
Sandwich Tern		X	Nelson's Sparrow		
Black Skimmer	Watchlist - Yellow	X	Henslow's Sparrow	Watchlist - Yellow	
Common Loon		X	Rusty Blackbird	Steep Decline	
Band-rumped Storm-Petrel	Watchlist - Red	X	Louisiana Waterthrush		
Black-capped Petrel <sup>T&amp;E</sup>	Watchlist - Red		Prothonotary Warbler	Watchlist - Yellow	
Audubon's Shearwater	Watchlist - Yellow	X	Swainson's Warbler		
Wood Stork <sup>T&amp;E</sup>			Yellow-throated Warbler		
Magnificent Frigatebird	Watchlist - Yellow	X	Painted Bunting		

Table includes Partners in Flight (PIF) continental concern status and injured resource status as noted within the 2016 Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan (PDARP). FL State Listed = Species of special concern in Florida; T&E = Federally listed as either Threatened or Endangered species.



## Presentation of the Guidelines

To facilitate application, information is organized and presented in a series of topical, stand-alone chapters including: stakeholder values, landbirds, marsh birds, raptors, seabirds, shorebirds, wading birds, waterfowl, avian health, and data integration. Each chapter provides an overview of threats, challenges, and uncertainties underpinning conservation and management of birds in the northern Gulf of Mexico, as well as recommendations to focus and guide the implementation of monitoring activities. However, the Guidelines do not provide specific recommendations per survey design nor sampling protocols. Given the volume of data needs across a variety of bird species and landcover types, the development and presentation of species-specific survey designs and sampling protocols is beyond the scope of this report. Instead, the goal is to identify key uncertainties and data needs that will facilitate increased communication and collaboration, not only within the bird community, but also across other resource groups. For more information on survey design and protocols, please contact the chapter author(s).

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*The Guidelines include stakeholder values, management and restoration uncertainties for seven avian taxa groups, and implications for understanding avian health and integrating data.*

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## Cross-taxa Recommendations

A number of thematic issues were identified as having cross-taxa impacts. For additional information on these cross-cutting thematic issues as well as other species-specific issues, please see the respective chapters within the Strategic Bird Monitoring Guidelines (<https://gomamn.org/strategic-bird-monitoring-guidelines>).

- \* Reduce uncertainty related to the impacts of changing climatic events (e.g., storm severity, sea-level rise, drought, etc.) on habitat structure and composition, as well as on associated food resources.
- \* Reduce uncertainty related to the impacts of altered freshwater flow regimes and subsequent changes to salinity, which drive food resource composition and availability.
- \* Reduce uncertainty related to the impacts of fisheries management (e.g. shrimp, menhaden, etc.) and subsequent food resource composition and availability.
- \* Reduce uncertainty related to the impacts of prescribed fire on plant structure and composition within coastal marshes.
- \* Reduce uncertainty related to the impacts of changing agricultural and silvicultural practices on habitat structure and food resources therein.
- \* Reduce uncertainty related to the impacts of beach re-nourishment / island creation on plant structure and composition, as well as invertebrate composition.
- \* Increase awareness and amount of available information on avian health metrics and linkage to reproductive success and survival.
- \* Standardize data collection metrics and protocols, to the degree possible.
- \* Increase collaborative and integrated Gulf-wide, status assessments and monitoring strategies.

## Intended Applications

The Strategic Bird Monitoring Guidelines identify many data gaps and uncertainties in our current state of knowledge of bird-habitat conservation along the northern Gulf of Mexico. It is critical that we fill these gaps and increase our understanding of the role that different intrinsic (e.g., fitness, productivity) and extrinsic (e.g., habitat, food resources) factors play in the conservation of >500 species of birds that utilize the region for all or part of their annual life cycle. Further, due to the multitude of restoration and management activities and inter-relationships of ecological and climatic events presumed to drive bird populations, an agreement on large-scale data gaps and *a priori* hypotheses is an essential first step. Recognition and acceptance of the data gaps and uncertainties presented within these Guidelines not only provides a strong foundation to further communication and collaboration across agencies and organizations implementing bird monitoring projects, but also provides a basis to enable collaboration and integration across resource groups (e.g., fisheries, water quality, etc.).

The uncertainties identified within these Guidelines clarify key targets for monitoring and research. GoMAMN envisions that these uncertainties will provide valuable insight to the programs and projects funded under Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act (e.g., RESTORE Science Program, RESTORE Centers of Excellence), and the National Academy of Science's Gulf Research Program, as they develop federal funding opportunities and requests for proposals; the Guidelines could help these programs and others increase collaborative monitoring that addresses the cross-taxa, thematic issues underpinning bird-habitat conservation. Similarly, the Guidelines provide a valuable reference to project managers who need to consider the array of potential uncertainties that could affect project outcomes as they develop monitoring and adaptive management plans under the RESTORE Act, National Fish and Wildlife Foundation's Gulf Environmental Benefit Fund, Natural Resource Damage Assessment (NRDA) or State Wildlife Action Plans. We are encouraged by the early adoption of key uncertainties and metrics identified in these Guidelines by the cross-trustee Monitoring and Adaptive Management Working Group, as they considered how best to address issues articulated within the Strategic Framework for Bird Restoration under NRDA. We anticipate similar adoption and use by the Council Monitoring and Assessment Working Group affiliated with the RESTORE Council. Beyond the library of uncertainties, the information contained within this report provides a basis to standardize monitoring objectives and metrics, as previously done for other resource groups (e.g., oysters, sea grass) to inform project level monitoring, as well as to facilitate programmatic assessments at multiple spatial scales. Hence, GoMAMN anticipates the various conservation partners working in the northern Gulf of Mexico will use information presented within the Guidelines to focus their respective work to address key data gaps and uncertainties underpinning bird-habitat conservation in the northern Gulf of Mexico.

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*The uncertainties and data needs articulated within these Guidelines serve as a foundational roadmap to facilitate decision making and implementation of future bird monitoring efforts.*

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# Gulf of Mexico Avian Monitoring Network

The Gulf of Mexico Avian Monitoring Network is a self-directed, non-regulatory network of conservation professionals. Partners within the Network share information and expertise to facilitate and coordinate development of monitoring plans that address contemporary and future needs of bird populations and their habitats across the northern Gulf of Mexico region.



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