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Strategic Bird Monitoring Guidelines for the Northern Gulf of Mexico

CONCLUDING REMARKS

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Lesser Scaup (*Aythya affinis*) with snail. Photo credit: Ron Bielefeld

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Chapter 12

CONCLUDING REMARKS

Following the Deepwater Horizon oil spill in 2010 (DHNRDAT 2016), early efforts to determine pre-spill baseline conditions for birds highlighted the lack of adequate data to inform decision-making, as well as, the lack of any comprehensive, integrated approach that would permit the evaluation of future on-the-ground restoration efforts (see Bjorndal et al. 2011). Using this lack of coordination and inadequate data as an impetus, the bird conservation community organized themselves (e.g., Gulf of Mexico Avian Monitoring Network [GoMAMN]) to facilitate discussions and monitoring in a more coordinated and structured approach to better understand bird-habitat relationships and inform conservation decision-making across the northern Gulf of Mexico (GoM). These collective experiences and discussions led to the creation of these Strategic Bird Monitoring Guidelines.

Not surprisingly, there are many data gaps and uncertainties in our current knowledge of bird-habitat conservation along the northern GoM (Brasher et al. 2012, Love et al. 2015, Vermillion and Wilson 2018). Furthermore, the bird conservation community has historically struggled to integrate monitoring into large-scale management questions nor addressed underlying assumptions due to a myriad of challenges (e.g., lack of agreed upon goals and/or objectives, differing agency and organization mandates and data needs) as outlined by the U.S. North American Bird Conservation Initiative Monitoring Subcommittee (NABCI 2007). Yet meeting these challenges and understanding the many intrinsic (e.g., fitness, productivity) and extrinsic (e.g., habitat, food resources) factors governing bird populations is critical for the conservation of >500 species of birds that utilize the northern GoM for all or part of their annual life cycle (Burger 2017, 2018).

A review of large-scale bird monitoring efforts by Bart (2005) suggested that most monitoring efforts focused on bird abundance (population-level metric) with relatively few efforts incorporating measures of fitness (individual-level metric) as a means to understand changes in bird populations. Accordingly, we need to understand the mechanistic factors affecting individuals (e.g., physiological stressors; see chapter 10) to interpret population-level responses. For example, Lamb et al. (2016) found Brown Pelican (*Pelecanus occidentalis*) chicks with lower body condition and higher corticosterone levels were less likely to fledge; with reproductive success and nestling corticosterone levels strongly related to nutritional condition. Given the potential for immigration and emigration of individuals between and among sites, the decoupling of individual fitness from a population-level response has the potential to lead to erroneous conclusions when monitoring habitat restoration projects at different spatial and temporal scales (Frederick et al. 2009 and references therein). Hence, it is important for the conservation community to embrace a set of agreed upon objectives that reflects both individual-level and population-level metrics in the context of reducing uncertainty surrounding large-scale restoration efforts (Doren et al. 2009, NASEM 2017, Baldera et al. 2018).

This document represents a thoughtful and long-term response to the problem of monitoring birds across the northern GoM. As suggested by Lyons et al. (2008), monitoring data are most valuable when collected in a cost-effective and scientifically robust fashion that facilitates learning and is relevant to stakeholder needs and values. To that end, it is important to recognize the distinct roles monitoring can play within a decision context: 1) provide information related to changes in dependent variables, 2) evaluation of restoration effectiveness, and 3) facilitate improved management through learning by

Brown Pelican (*Pelecanus occidentalis*) with chicks. Photo credit: Juliet Lamb

evaluation of key uncertainties and assumptions (Nichols and Williams 2006, Lyons et al. 2008). Within these Strategic Bird Monitoring Guidelines, the chapter authors utilized stakeholder values (see chapter 2) and fundamental objectives articulated by Fournier et al. (In Press), in concert with the above referenced roles of monitoring (Lyons et al. 2008) to articulate a vision for bird monitoring across the northern GoM. Specifically, the authors have: 1) identified a suite of key data gaps and associated uncertainties underpinning bird-habitat conservation, and 2) proposed recommendations to advance our collective ability to monitor bird-habitat relationships using a coordinated and structured approach to facilitate the implementation and evaluation of restoration actions in an adaptive management context (DHNRDAT 2017).

The information presented herein provides a means to design avian monitoring programs that address key uncertainties and assumptions that are relevant to multiple stakeholders at large spatial-scales. Due to the myriad of potential ecological interactions and inter-relationships of ecological and climatic events presumed to drive bird populations, this agreement on large-scale data gaps and *a priori* hypotheses is an essential tool for the evaluation of restoration actions across the northern GoM (see NASEM 2017). Recognition and acceptance of the key data gaps and uncertainties presented here, not only provides a strong foundation to further collaboration and integration of monitoring efforts across agencies and organizations implementing avian monitoring projects, but also provides a basis to enable collaboration and integration across resource groups (e.g., fisheries, water quality, etc.). For example, a review of data gaps underpinning restoration and management issues across avian taxa groups (Chapters 3-9) suggests that a large degree of uncertainty exists across taxa about the effects of coastal development (e.g., habitat loss/fragmentation), climatic processes (e.g., storms, sea-level rise), and altered freshwater flow regimes (e.g., changes in salinity). All of these system stressors disrupt a variety of ecological processes and are beyond the avian Community of Practice's ability to track or assess without assistance from the larger conservation community. Thus, it will be imperative that the conservation community work in a collaborative and integrated manner across the various monitoring Community of Practices (e.g., water quality, habitat mapping, fisheries, etc.) to evaluate system stressors and ecological processes that span resource groups in a manner that reduces uncertainty and improves decision making (see chapter 11). To that end, the identification of values and priorities within and across other resource groups (e.g., fisheries, marine mammals, sea turtles, water quality, habitat, etc.) is an important first step.

From the onset, GoMAMN has endeavored to create a forum by which the conservation community can identify and agree upon a set of core values and monitoring needs as a means to maximize the usefulness of bird monitoring data to inform decision making and advance bird conservation across the northern GoM. The publication of these Strategic Bird Monitoring Guidelines represent the collective views of more than 100 scientists, land managers, and program managers (i.e., stakeholders in both bird conservation and restoration outcomes). It is with this same partnership mindset that GoMAMN anticipates the implementation of a coordinated and collaborative avian monitoring program and future refinements to the strategies outlined herein as new data and knowledge become available. To that end, these Strategic Bird Monitoring Guidelines represent significant progress towards: 1) the identification and agreement of key data gaps and assumptions underpinning bird conservation across the northern GoM, and 2) providing a platform to integrate monitoring into conservation decision-making across a diverse group of stakeholders. Both of which address obstacles that have historically hindered large-scale, coordinated bird monitoring, especially at scales as large as the GoM. The challenge now lies within the realm of acceptance and implementation. To address this new challenge, GoMAMN anticipates the various conservation partners (e.g., trustee implementation groups, restoration program managers, bird conservation groups, non-bird conservation groups, academia, etc.) will utilize information presented here to guide and focus their respective work to address key data gaps and assumptions underpinning bird-habitat conservation. Furthermore, acceptance of the values and priorities outlined herein will foster increased collaboration and integration not only within the bird monitoring Community of Practice, but also across other monitoring Community of Practices and stakeholders, such that we (collectively) work to reduce uncertainty and advance bird-habitat conservation in an efficient and effective manner across the northern GoM.

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