Assessing the Importance of Wetlands on DoD Installations for the Persistence of Wetland-Dependent Birds in North America

Background:

Wetlands are among the most imperiled ecosystems in the U.S. As a result, many wetland-dependent bird species have suffered population declines and are considered priority species for management at state, regional, and national levels. To ensure the long-term persistence of these species, we must identify and manage the wetlands on which they depend.

The Department of Defense (DoD) should play a key role in managing wetland-dependent bird habitat in the continental U.S. Wetland complexes on DoD installations tend to be healthier than those on non-DoD lands due to restrictions on DoD land use. Hence, the DoD may manage a disproportionate amount of the remaining quality habitat for wetland-dependent birds in the U.S. The DoD already manages much of the remaining habitat for the federally endangered light-footed Ridgway's rail (*Rallus obsoletus levipes*) in California. DoD installations may be expected to shoulder the administrative burden if more species become federally listed as threatened or endangered. We need to identify the DoD installations that provide optimal remaining habitat to ensure that these issues do not curtail the military mission and reduce military readiness, and to enable the DoD to better manage wetland-dependent bird habitat.

Ridgway's rail (*Rallus obsoletus)*

Objective:

Our objectives were to: 1) develop habitat suitability models for each of 11 priority species of wetland-dependent birds (both on and off DoD installations) throughout the continental U.S.; 2) use the models to rank each of the over 350 DoD installations in the continental U.S. on their relative value to each of the 11 focal wetland-dependent species, and; 3) produce a map of the relative value of each DoD installation to wetland-dependent birds in the continental U.S.

Summary of Approach:

We integrated survey data collected with the North American Marsh Bird Monitoring Protocol between 1999 and 2012 with spatial data from the National Wetland Inventory (NWI) and Gap Analysis Program (GAP) to examine the influence of wetland characteristics (i.e., water regime and vegetative community) and anthropogenic disturbance on the occupancy of 11 species of wetland-dependent birds (Ridgway's rail, clapper rail, king rail, Virginia rail, sora, common moorhen, purple gallinule, American coot, least bittern, American bittern, and pied-billed grebe) at 3 spatial scales (100 m, 225 m, and 500 m radii buffers around survey points) at over 9,400 survey points across the U.S. With these data we developed habitat suitability models that quantify occupancy of each species across the continental U.S. and allow us to rank each DoD installation based on the quantity and quality of the habitat they provide.

Benefit:

This project will improve military readiness, improve range sustainment, and reduce the conflict between military needs and the needs of rare and endangered wetland-dependent birds on DoD lands.

Accomplishments:

We have completed occupancy analyses with 4 species (Ridgway's rail, clapper rail, king rail, and American bittern) which have identified important wetland and anthropogenic landscape features for each species, while allowing us to develop an effective hierarchical modeling approach that accounts for imperfect species detection. These models have been validated and have high predictive performance (AUC >0.8). We have identified a suite of key indicators of occupancy for each species. For example, intertidal estuarine wetlands and regularly flooded water regimes are positive predictors of clapper rail occupancy; DoD installations with greater quantities of these features will be ranked favorably for clapper rail. We are using the features specified from our models to project occupancy and rank DoD installations.

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