Department of Defense
Legacy Resource Management Program

5-245

Migratory Bird Monitoring using Automated Acoustic and Internet Technologies

Dr. Kenneth Rosenberg
Cornell Lab of Ornithology
Ithaca, NY

April 2007

Acknowledgments

Department of Defense Legacy Program provided funding and support for project 05-245, covering the first year's and two additional years' research. Pedro Morales, Jane Mallory, and Chris Eberly assisted with the logistics of the funding and the details of the report submission process. Special thanks to the Bioacoustics Research Program at the Cornell Laboratory of Ornithology for hardware and software development and application; additionally, special thanks to all of the base resource managers for all of the Department of Defense deployment sites employing our recording units: Kyle Rambo at Patuxent River, James Beemer at US Military Academy, John Joyce at Lakehurst Naval Air Station, Chris Dobony at Ft. Drum, Rayanne Benner at Dover AFB, and John Van DeVenter at Picatinny Arsenal.

Development of DoD-customized eBird Application

To facilitate the year-round inventory of bird populations, both on and surrounding DoD facilities, we developed a DoD-specific version of the eBird application, customized to accommodate the data management and security needs of DoD resource managers. Cornell Lab of Ornithology and its partners have developed eBird (http://www.ebird.org), an online database system for gathering, storing, and displaying bird monitoring information from across North America. The DoD eBird application, developed in consultation with DoD resource managers (Chris Eberly, Rich Fischer, Kyle Rambo) will have the ability to integrate the monitoring projects across all DoD sites into a single DoD bird-monitoring database containing historical and current data. This application will allow DoD officials to recruit individuals to do bird surveys at specific predefined sites following point count, transect, or area search protocols, fostering partnerships with public groups such as bird clubs and ornithological societies. The results of these surveys can be restricted from general public access, but allow an across-sites analysis of survey results. DoD eBird will be the first step in a complete data management system through the Avian Knowledge Network (http://avianknowledge.net) that will allow the compilation of all bird-observational data on and around installations, including records from visiting birders, organized field trips, Christmas Bird Counts, as well as professional surveys.

General Description of eBird: A real-time, online checklist program, eBird has revolutionized the way that the birding community reports and accesses information about birds. Launched in 2002 by the Cornell Lab of Ornithology and National Audubon Society, eBird provides basic information on bird abundance and distribution at a variety of spatial and temporal scales. eBird's goal is to maximize the utility and accessibility of the vast numbers of bird observations made each year by recreational and professional bird watchers. It is amassing one of the largest and fastest growing biodiversity data resources in existence. For example, in 2006, participants reported more than 4.3 million bird observations across North America. eBird enables the use of these observations by a global community of educators, land managers, ornithologists, and conservation biologists. In time these data will become the foundation for a better understanding of bird distribution across the western hemisphere and beyond.

eBird documents the presence or absence of species, as well as bird abundance through checklist data. A simple and intuitive web-interface engages tens of thousands of participants to submit their observations or view results via interactive queries into the eBird database. eBird encourages users to participate by providing Internet tools that maintain their personal bird records and enable them to visualize data with interactive maps, graphs, and bar charts. A birder simply enters when, where, and how they went birding, then fills out a checklist of all the birds seen and heard during the outing. eBird provides various options for data gathering including point counts, transects, and area searches. Results from more standardized or professional surveys using these basic protocols are also easily accommodated by eBird. Automated data quality filters developed by regional bird experts review all submissions before they enter the database. Local experts review unusual records that are flagged by the filters.

As eBird has grown, we have developed customized portals that are managed and maintained by local partner organizations. In this way eBird targets specific audiences with the highest level of local expertise, promotion, data quality, and project ownership. Portals may have a regional focus (aVerAves, eBird Puerto Rico) or they may have more specific goals and/or specific methodologies (Louisiana Winter Bird Atlas, Bird Conservation Network eBird). As part of this Legacy project, we worked with DoD resource managers to develop a phase-1 prototype of a DoD-customized eBird portal.

Features of the DoD eBird portal: A primary feature of the DoD portal is the addition of access restrictions based on user/password. Approved DoD users will create their own login name and password, which they will then use to securely access the Department of Defense eBird. This feature will allow DoD resource managers to control which bird-monitoring data are entered from DoD lands, and which data may be viewed by authorized users. DoD users will be able to access and view bird data from all public locations in eBird, including sites on and around publicly accessible DoD facilities, but public users will not be able to access or view restricted data entered into the DoD-specific eBird application. The Phase 1 release, which is currently available for review, includes the secure access to the data entry and report portions of the application, utilizing the existing DoD user accounts for the Birds of North America project at the Cornell Lab of Ornithology. Phase 2 will include data visualizations and reports from DoD lands, based on polygon coverages being developed by eBird and DoD managers. Registered users with access to the DoD portal will have the ability to select specific DoD lands and view data reports and maps from those lands. The phase 1 version is available at http://ebird.org/DoD (Fig. 1).

Fig. 1. Screen capture of DoD eBird Home Page:

Example of eBird data output: As an example of the powerful outputs available from eBird, we provide a portion of a seasonal bar-graph (Fig. 2.), depicting bird-species' abundances from publicly accessible sites on Fort Huachuca, AZ (a popular birding destination), as well as nearby sites in the Huachuca Mountains (Fig. 3). This output was

generated via eBird's public application web site, based on 199 checklists submitted by birders visiting that area through March, 2007. As DoD managers enter data from monitoring projects on Fort Huachuca, and visiting birders are encouraged to enter observation from publicly accessible and nearby sites, a more complete picture of year-round abundance and distribution of bird species will emerge. Meanwhile, DoD managers will be able to restrict public access to sensitive data on threatened species or from restricted sites.

Fig. 2. Screen-capture of eBird output, showing seasonal abundance of bird species on and around Fort Huachuca, AZ, based on 199 checklists submitted to eBird.org through March, 2007.

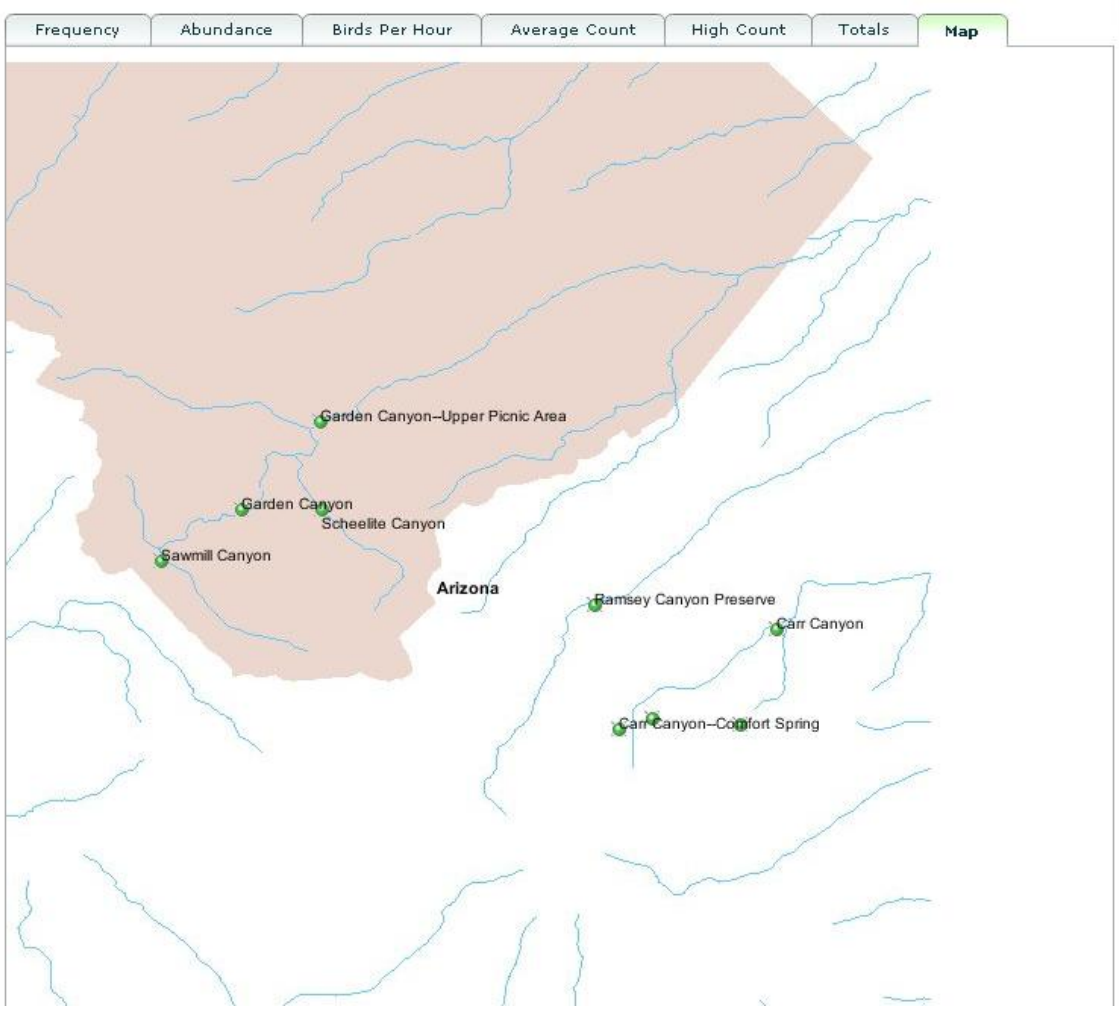

Fig. 3. Map of locations on and around Fort Huachuca, where birders have submitted checklists to www.eBird.org.