

THE AOU AND BIRD CONSERVATION: RECOMMITMENT TO THE REVOLUTION

Author: Fitzpatrick, John W.

Source: The Auk, 119(4) : 907-913

Published By: American Ornithological Society

URL: [https://doi.org/10.1642/0004-8038\(2002\)119\[0907:TAABCR\]2.0.CO;2](https://doi.org/10.1642/0004-8038(2002)119[0907:TAABCR]2.0.CO;2)

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

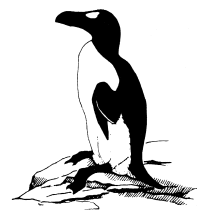
Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

The Auk

*A Quarterly
Journal of Ornithology*

Vol. 119 No. 4 October 2002



The Auk 119(4):907–913, 2002

PERSPECTIVES IN ORNITHOLOGY

THE AOU AND BIRD CONSERVATION: RECOMMITMENT TO THE REVOLUTION

JOHN W. FITZPATRICK¹

Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850, USA

EXACTLY 100 YEARS ago, with North America in full-fledged environmental crisis, prominent members of the American Ornithologists' Union (AOU) participated in major political and social upheaval. A century of unrestrained exploitation had reached catastrophic proportions, with Passenger Pigeons (*Ectopistes migratorius*) and Eskimo Curlews (*Numerius borealis*) representing only the tip of an iceberg. Birds as diverse as parakeet, egrets, ducks, terns, and plovers were plummeting in numbers. AOU leaders, led by one of the union's founders and first editor of *The Auk* (J. A. Allen), had argued publicly and lobbied privately alongside civic leaders to establish the continent's first wildlife protection laws and to monitor their consequences. Based on those efforts, the conservationist President Theodore Roosevelt would create over 50 national wildlife refuges by executive order and sign dozens of bills containing conservation statutes before leaving office. Today, we take for granted both the birth of the conservation movement and the crucial roles of government and scientists within it. A hundred years ago that was the stuff of revolution, and the AOU was intimately involved.

Does the revolution continue? Yes, of course it does. Infrastructure, laws, resources, and even professional scientific societies dedicated to conservation of biological diversity continue to grow stronger by the year. The question is,

Does the AOU still play a role? I suggest that we do, albeit with fervor that has ebbed considerably since the heady, early years of the conservation movement. Today it is time to renew our commitment and amplify our role. As a scientific body rooted in the very origins of this revolution (Barrow 1998), the AOU rarely has had as much opportunity as it now does to carry the banner and take part in the battle. Chief among our allies are two remarkable consortia that emerged in the 1990s: Partners In Flight (PIF) and the North American Bird Conservation Initiative (NABCI).

The premise of PIF seems so obvious that one wonders why it took until 1990 to be fully articulated: genuine, large-scale, long-term conservation of American birds and their habitats will be accomplished only via explicit coordination among a large and diverse constituency of organizations and individuals. At national meetings in Estes Park, Colorado (Finch and Stangel 1993, Martin and Finch 1995), Cape May, New Jersey (Bonney et al. 2000), and Asilomar, California (C. J. Ralph and T. D. Rich unpubl. manuscript) and at countless smaller ones in between, the methods and goals of PIF have remained steadfast over its first decade: find consensus, prioritize action plans, and mobilize new resources among public agencies, private non-governmental organizations (NGOs), academic professionals, and natural-product industries to leverage expertise and capacity in a collective effort to protect bird populations.

¹ E-mail: jwf7@cornell.edu

A catchy rallying cry, “keep common birds common,” differentiated PIF’s approach early on from the narrower focus on threatened and endangered species more typical of government-engaged conservation initiatives. I take the liberty of offering the following as a more robust mission statement for PIF and its sister initiatives:

Ensure persistence of all American bird populations in their natural numbers, natural habitats, and natural geographic ranges, through coordinated efforts by scientists, government, industry, and private citizens.

BIRDS ARE JUST LIKE DUCKS

Partners In Flight focused originally on Neotropical migrant land birds, many of which were perceived to be in rapid decline as the end of the twentieth century drew near. For good reasons, the mission soon expanded to encompass all land birds not otherwise managed under game-bird laws or waterfowl management plans of the United States and Canada. A brilliant summary phrase, apparently first uttered by Gary Myers, executive director of the Tennessee Wildlife Resources Agency, became a PIF mantra: “Birds are just like ducks!” If waterfowl populations across North America could be stabilized via science-based management plans coordinated across government agencies and the private sector, why not apply the same approach to land bird populations? Indeed, key to the demonstrated success of today’s North American Waterfowl Management Plan (NAWMP) are two elements: (1) a science-based plan incorporating annual monitoring and population estimates, rigorous statistical modeling, explicit priority-setting for habitat conservation, and regionally based partnerships (called “Joint Ventures”) representing efficient delivery systems for conservation action; and, (2) lots of money, which flows from sources both inside and outside of government (e.g. duck stamps, hunting licenses, Pitman-Roberts tax revenues, and private contributions to NGOs such as Ducks Unlimited). As Gary Myers and others observed 10 years ago, accomplishing the mission of PIF will require those same two elements—good planning and significant, new resources.

PRIORITIZATION AND PLANNING

Partners In Flight organizers addressed some important realities immediately. Surely the most difficult paradox in conservation (faced by every organization attempting to base conservation action on sound scientific principles across large geographic scales) is the need for globally scaled priorities but locally based delivery systems. To help resolve that paradox, the International Association of Fish and Wildlife Agencies developed proposals to fund four regional PIF coordinators and one national coordinator. The U.S. Fish and Wildlife Service stepped up and delivered, using its own funds and also Pitman-Roberts funds allocated through consensus of state wildlife agency directors. The U.S. Forest Service, Department of Defense, and dozens of state wildlife agencies have also contributed significantly to funding PIF initiatives, as have private organizations such as American Bird Conservancy, Rocky Mountain Bird Observatory, and Cornell Lab of Ornithology.

Regional coordinators engaged researchers, NGOs, and wildlife offices in state-by-state and provincial working groups to develop a system for prioritizing North American bird species at global and statewide scales, so that action plans could be directed preferentially to those species and habitats facing the most immediate threats (Carter et al. 2000, Beissinger et al. 2000). At the same time, coordinators began assembling data and searching for consensus to develop more than 50 individual bird-conservation plans treating all physiographic regions and U.S. states (Pashley et al. 2000). Canadian scientists and conservation leaders helped develop the PIF–U.S. planning process, and today are preparing similar plans for Canadian ecoregions. Mexican scientists recently began the process of species assessment for the entire Mexican avifauna, and soon will commence ecoregional planning along the lines of the U.S. and Canadian models. A continental synthesis of bird-conservation strategies for the United States and Canada (North American Landbird Conservation Plan) is currently in its final drafting. The next version will incorporate Mexico.

The community of academic ornithologists participated in the early stages of the PIF planning process, but its involvement waned as

conceptual debate gave way to the hard work of organizing and attending meetings, assembling literature, committing to ranking criteria, and writing conservation plans. We have the regional and national coordinators to thank that the huge initial job is now largely complete. In many respects the more interesting work—implementing, evaluating, refining, and revising the plans with on-the-ground work—is just beginning. In every ecosystem and at every landscape scale, opportunity exists again for research ornithologists to become involved.

"ALL BIRDS, ALL HABITATS" AND BIRTH OF NABCI

Partners in Flight helped catalyze a union of several bird conservation initiatives during the late 1990s under a banner officially spawned by creation of the trilateral Commission for Environmental Cooperation (CEC) under the North American Free Trade Agreement. The North American Bird Conservation Initiative (NABCI) brings together long-standing initiatives such as the NAWMP and PIF with more recent ones such as the North American Colonial Waterbird Plan, the U.S. Shorebird Conservation Plan, and the Important Bird Areas programs of Audubon, BirdLife International, and American Bird Conservancy. Under NABCI, all of North America including Mexico (but, unfortunately, still excluding the Caribbean; see below) is divided into "Bird Conservation Regions" on the basis of the ecoregional classification systems of Omernik (1987, 1995) and Wiken (1986).

An important, still-fluid relationship exists between NABCI's Bird Conservation Regions ($n = 38$ in the United States and Canada, plus ~ 30 more in Mexico) and the longer-standing Joint Ventures managed under the NAWMP. The latter represent explicit delivery systems, directing resources toward on-the-ground projects that improve long-term management of waterfowl habitat (remember, the "W" in NAWMP stands for "waterfowl"). Under the NABCI framework, however, "all birds, all habitats" expresses the modern goal for implementation. Joint Ventures are being modified, and new ones are being developed, to embrace the broader goals of all-habitat conservation.[†] (See note added in proof.)

A measure of success in all this planning and synthesizing is that upland, nongame species

identified as high-priority by PIF are now playing significant roles in the awarding of grants under NAWMP. Obviously, that vital step in the revolution—integration of the infrastructure for investing in waterfowl, shorebird, and land-bird conservation—will stall if its financing remains zero-sum. As was the case exactly 100 years ago, new resources must be added to the effort if the revolution is to succeed. In that context, it is worth acknowledging—and assisting—efforts by NGOs (especially Ornithological Council, Wildlife Management Institute, and The Nature Conservancy) to generate legislation that would dedicate significant new federal funding for wildlife conservation.

MEASURABLE GOALS FOR 2012

A maturing infrastructure is emerging for accomplishing large-scale, long-term conservation across the continent (by conservation, I refer only to measurable and permanent habitat protection on the ground). How will we know if this new revolution in American bird conservation is proceeding on track? Of particular relevance to the AOU, how will we know if scientists are playing as large a part in the revolution as they could and should? I suggest that a few measurable targets and timelines are appropriate, and offer the following as specific mileposts we can help attain, both individually and as a professional society. Ten years from now, late in the year 2012, I propose that we measure how many of the following goals have been achieved in the effort to conserve birds of the Americas and their habitats.

(1) *Fewer gaps in understanding of population trends.*—From tundra to rainforest, a large number of species undergo population expansions, declines, or fluctuations about which we understand far too little to suggest long-term management guidelines. Filling those gaps will require enormous investment both in monitoring programs (see below) and in creative, intensive studies of single species (e.g. Olive-sided Flycatcher [*Contopus cooperi*], significantly declining in every part of its range) or ecological assemblages (e.g. tundra-breeding shorebirds or grassland sparrows, both exhibiting large-scale declines).

(2) *Redundant, question-driven monitoring of all bird species.*—Effective conservation requires habitat management, which in turn re-

quires accurate information about both status and population ecology of component species. Although several powerful bird-monitoring programs have produced valuable data since the 1960s, vast gaps still exist. Largely uncovered by any comprehensive monitoring schemes are boreal and Arctic Canada (principal breeding grounds for hundreds of species), Mexico (wintering grounds for hundreds of species and breeding grounds for dozens of habitat-restricted endemics), and the Caribbean (proportionally, the most critically threatened avifauna in the Western Hemisphere; Stotz et al. 1996). Even within the coterminous United States, habitat-specialists with patchy distributions remain poorly tracked, numerous biases exist in survey methods (e.g. Sauer et al. 1994), and monitoring projects continue to grapple with statistical issues such as variable detection probability (e.g. Nichols et al. 2000). As pointed out by many monitoring experts over the past decade (e.g. Ralph et al. 1995), it is essential that we expand our arsenal of census approaches, so that results for individual species can be compared and pooled among projects, and we leave no species uncoun-
ted.

(3) *Effective methods for monitoring difficult-to-detect species.*—Particularly challenging for estimating population trends accurately are those species with habits, population densities, or ecological requirements rendering them difficult to detect by any conventional census method. Most notorious are marsh dwellers (Ribic et al. 1999), nocturnal species, and certain breeding raptors. Many of those species appear to be declining, but existing census techniques are inadequate to conclude even that with confidence, let alone to employ as long-term measures of management success. New technologies such as remote acoustic monitoring will be especially important in that context.

(4) *Scientific auditing of monitoring projects and conservation plans produces adaptive responses in both.*—A paradox for conservation is that knowledge is always incomplete, yet the scale of ongoing human influence on ecosystems demands action without delay. Resolution of that paradox depends absolutely on adherence to scientific methods in our conservation practices. Specifically, we probe, test, experiment upon, and challenge the assumptions and framework upon which we base our plans and

our actions, and we do so without embarrassment. Conservation plans and management practices can be modified continually to reflect current knowledge, as long as all parties approach the challenge with this adaptive framework. Recently, for example, The Nature Conservancy formally instituted this adaptive research cycle throughout the organization as its *modus operandi* for accomplishing large-scale conservation. Its challenge—and that facing all conservation agencies and NGOs—is to approach land management as a scientific experiment, investing the talent and resources required to measure accurately the consequences of management alternatives. The vital role of research ornithologists in meeting that challenge is clear: opportunities abound today for conducting field experiments that test the assumptions of conservation plans and directly dictate new management decisions. Testing the assumptions of conservation plans can be accomplished even while addressing some of the most basic conceptual issues in ecology (e.g. Winter and Faaborg 1999, Winter et al. 2001).

(5) *Habitat management in place to stabilize all high-priority species in Canada, the United States, Mexico, and the Caribbean.*—The rubber must meet the road. Simply having plans in place does not accomplish conservation. Ten years from now the vision statements represented by PIF and NABCI planning documents should have led to measurable action and results on the ground, or they were colossal wastes of time. Let us commit even more specifically: by 2012 every bird species ranked today as having high conservation priority should be under habitat management intended to stabilize or increase its overall numbers. Uncertainty as to best management options for so many species is no reason for inaction. Rather, as discussed above, areas of uncertainty represent needs and opportunities for research as we implement best-guess management scenarios. Ten years is not a long time. Although the process of implementing bird conservation plans indeed has begun, it needs to be ramped up a hundredfold to meet the target proposed here. Moreover, as long recognized by PIF planners, conservation plans and implementation efforts under the NABCI banner need to expand to encompass the Caribbean region, home to some of the most endangered bird species in the hemisphere.

(6) *Substantial new funding supports all-bird conservation.*—Federal, state, and private infrastructures for funding conservation initiatives today are insufficient to meet the challenges of the all-bird approach, especially as it expands to incorporate Mexico and the Caribbean. Using the highly successful waterfowl model as inspiration, we must invigorate the efforts to dedicate new funds for upland, colonial waterbird, shorebird, and tropical birds and their habitats. As the world's dominant economy, and by far its largest consumer of energy and resources, the United States must lead the way in creating a funding infrastructure that leaves out no bird or habitat. As discussed below, the AOU must redouble its own commitment to amplifying funds for conservation action. Countless avenues exist for doing so without sacrificing our basic research mission.

(7) *NGOs shepherd bird conservation.*—Mission-focused not-for-profits (including scientific organizations such as the AOU) must supply the ultimate guidance system for American bird conservation. Well-intentioned and well-staffed as many public agencies are, their procedures and infrastructure often inhibit genuine adaptive management. Collaborating NGOs can make all the difference in setting long-term objectives, engaging in self-criticism, adjusting management strategies in mid-course, measuring results, and willingly dividing the labor required to achieve long-term conservation. NGOs also can draw on the resources of private industry on behalf of ecosystem protection (e.g. The Nature Conservancy and Disney in Florida) and conservation science (e.g. Audubon and Ford Motor Company), whereas industry and government often find themselves adversarial over the very same issues. The 10 year challenge for NGOs: coordinate better among ourselves to take full advantage of our respective strengths, our access to industry, and our dedication to mission. Partners in Flight and NABCI remain crucial to that coordination.

(8) *Bird conservation objectives stewarded by dedicated coordinators.*—The most important jobs get accomplished because specialists are hired to do them. Today we have a comprehensive set of bird conservation plans to criticize, implement, test, and improve upon specifically because skilled individuals were hired to compile and write them. As those plans permeate

the conservation infrastructure for the all-important implementation phase, it is equally vital that regional specialists be hired to track research and management accomplishments, keep the plans fresh and updated, coordinate research objectives, catalyze interactions among partners and funding sources, and generally keep the pressure on. Coordination among so many issues and entities cannot come about for free. Recently, the U.S. Fish and Wildlife Service took a pivotal step by hiring a full-time national coordinator for PIF. Funding for regional PIF and NABCI coordinators remains an uncertain scramble, however, and the AOU would make a significant contribution to American bird conservation by helping to solve that problem.

(9) *Citizens engaged in numbers befitting a revolution.*—Well-designed surveys confirm explosive growth of bird watching across North America over the past two decades (e.g. Cordell and Herbert 2002). Irrespective of debates over the true number of participants (estimates suggest up to 70 million adults in the United States alone), it is clear that many millions, perhaps tens of millions, of amateur birders regularly enjoy identifying wild birds in wild places. Those numbers bfit a revolution, yet direct involvement by those amateurs in the challenges outlined here remains at scales in the thousands rather than millions. The huge pool of committed amateurs has enormous potential to assist in monitoring bird populations and measuring their responses to land-management alternatives. A growing body of literature attests to the capacity of citizens even to help answer fundamental scientific questions, including ones of profound importance to conservation (e.g. Hames et al. 2002). To that end, a new Internet-based project jointly sponsored by the Cornell Lab of Ornithology and Audubon (<http://ebird.org>) permits individuals to contribute to a permanent data archive by logging bird observations through time from any site in North America (Fitzpatrick et al. 2002). Ten years from now the amateur bird watcher should play a far more important role in conservation science than is the case today.

(10) *The AOU actively assisting in American bird conservation.*—Just as our forerunners found 100 years ago, passion and commitment to birds place members of the AOU in a unique position in the conservation revolution. Birds

are among nature's most accessible indicators of habitat change, and as teaching tools they are more effective at changing human behavior than is any other group of animals or plants. As the scientific society authoritatively studying birds of the Americas, we owe it to the subjects of our research to foster their long-term survival by recommitting to the revolution. The recently invigorated AOU Conservation Committee has begun producing scholarly reports on knotty issues at the intersection of conservation and science (e.g. current issues: cormorant control, Red-cockaded Woodpecker [*Picoides borealis*] recovery status, captive-rearing and wild-release of endangered species; Walters et al. 2000, Beissinger et al. 2000). In addition, we are examining our annual expenditures and dues structure with an eye toward improving our capacity to contribute to bird conservation directly with our own resources. We should amplify investment in the Ornithological Council if it proves to be an effective agent for increasing conservation legislation and appropriations in Washington, D.C. We should contribute effort and resources to promote coordination and scientific review of bird conservation plans. We should dedicate a percentage of our annual research awards budget to applied projects that test and improve those plans. To ensure long-term growth in our ability to finance conservation science, I suggest that the AOU launch a planned-giving campaign targeting that area explicitly (we have bequests largely to thank for our strong financial condition today).

Coast to coast and tundra to tropics, efforts to conserve American birds and their habitats benefit from an unprecedented amount of research by professional ornithologists. Coordination of those efforts through "all bird" conservation planning of NABCI—to implement what The Nature Conservancy calls "conservation by design"—would be an achievement of timeless value. As individual AOU members, time and opportunity are right for each of us to align ourselves with a public or private conservation organization and pitch in. In myriad ways each of us can help grow the relationships among public agencies, conservation NGOs, land managers, and research scientists that will constitute the twenty-first century phase of the revolution. Our individual roles will compound upon those we can play collectively through the AOU. Our holy grail—guaranteed

persistence of all American birds in natural numbers and habitats—is indeed worthy of revolutionary fervor.

***Note added in proof:** As this article was going to press, the Director of the U.S. Fish and Wildlife Service signed *Director's Order no. 146* on Joint Venture Administration, formally "broadening of scope for most joint ventures to include species other than waterfowl . . . [in order to] ensure a logical and coordinated approach to the development and support of joint ventures that are regionally based, biologically driven, landscape-oriented partnerships delivering the full spectrum of bird conservation." Full text of this historic document, which includes detailed description of the structure and purpose of joint ventures, is available at <http://policy.fws.gov/do146.pdf>.

LITERATURE CITED

- BARROW, M. V., JR. 1998. *A Passion for Birds*. Princeton University Press, Princeton, New Jersey.
- BEISSINGER, S. R., J. M. REED, J. M. WUNDERLEE, JR., S. K. ROBINSON, AND D. M. FINCH. 2000. Report of the AOU Conservation Committee on the Partners in Flight species prioritization plan. *Auk* 117:549–561.
- BONNEY, R., D. N. PASHLEY, R. J. COOPER, AND L. NILES, EDs. 2000. *Strategies for Bird Conservation: The Partners in Flight Planning Process*. U.S. Department of Agriculture, Forest Service Proceedings RMRS-P-16.
- CARTER, M. F., W. C. HUNTER, D. N. PASHLEY, AND K. V. ROSENBERG. 2000. Setting conservation priorities for landbirds in the United States: The Partners in Flight approach. *Auk* 117:541–548.
- CORDELL, H. K., AND N. G. HERBERT. 2002. The popularity of birding is still growing. *Birding* 34:54–61.
- FINCH, D. M., AND P. W. STANGEL, EDs. 1993. *Status and management of Neotropical migratory birds*. U.S. Department of Agriculture, Forest Service General Technical Report RM-229.
- FITZPATRICK, J. W., F. B. GILL, M. POWERS, AND K. V. ROSENBERG. 2002. Introducing eBird: The union of passion and purpose. *North American Birds* 56:11–13.
- HAMES, R. S., K. V. ROSENBERG, J. D. LOWE, S. E. BARKER, AND A. A. DHONDT. 2002. Adverse effects of acid rain on the distribution of the Wood Thrush *Hylocichla mustelina* in North America. *Proceedings of the National Academy of Science USA* 99:11235–11240.

- MARTIN, T. E., AND D. M. FINCH, EDs. 1995. Ecology and Management of Neotropical Migratory Birds. Oxford University Press, New York.
- NICHOLS, J. D., J. E. HINES, J. R. SAUER, F. W. FALLON, J. E. FALLON, AND P. J. HEGLUND. 2000. A double-observer approach for estimating detection probability and abundance from point counts. *Auk* 117:393–408.
- OMERNIK, J. M. 1987. Ecoregions of the Conterminous United States. [Map.] *Annals of the Association of American Geographers* 77:118–125.
- OMERNIK, J. M. 1995. Ecoregions: A framework for environmental management. Pages 49–62 in *Biological Assessment and Criteria: Tools for Water Resource Planning and Decision Making* (W. Davis and T. Simon, Eds.). Lewis Publishers, Boca Raton, Florida.
- PASHLEY, D. N., C. J. BEARDMORE, J. A. FITZGERALD, R. P. FORD, W. C. HUNTER, M. S. MORRISON, AND K. V. ROSENBERG. 2000. *Partners in Flight: Conservation of the Land Birds of the United States*. American Bird Conservancy, Arlington, Virginia.
- RALPH, C. J., J. R. SAUER, AND S. DROEGE, EDs. 1995. *Monitoring bird populations by point counts*. U.S. Department of Agriculture, Forest Service General Technical Report PSW-GTR-149.
- RIBIC, C. A., S. J. LEWIS, S. MELVIN, J. BART, AND B. PETERJOHN. 1999. *Proceedings of the Marsh Bird Monitoring Workshop*. U.S. Department of the Interior, Fish and Wildlife Service and U.S. Geological Survey Administrative Report, Denver, Colorado.
- SAUER, J. R., B. G. PETERJOHN, AND W. A. LINK. 1994. Observer differences in the North American Breeding Bird Survey. *Auk* 111:50–62.
- STOTZ, D. F., J. W. FITZPATRICK, T. A. PARKER III, AND D. K. MOSKOVITS. 1996. *Neotropical Birds: Ecology and Conservation*. University of Chicago Press, Chicago.
- WALTERS, J. R., S. R. BEISSINGER, J. W. FITZPATRICK, R. GREENBERG, J. D. NICHOLS, H. R. PULLIAM, AND D. W. WINKLER. 2000. The AOU Conservation Committee review of the biology, status, and management of Cape Sable Seaside Sparrows: Final report. *Auk* 117:1093–1115.
- WIKEN, E. 1986. *Terrestrial Ecozones of Canada. Ecological Land Classification Series no. 19*. Environment Canada, Ottawa, Ontario.
- WINTER, M., AND J. FAABORG. 1999. Varying patterns of “area-sensitivity” in grassland-nesting birds. *Conservation Biology* 13:1324–1434.
- WINTER, M., D. H. JOHNSON, J. A. DECHANT, T. M. DONOVAN, AND W. D. SVEDARSKY. 2001. Evaluation of the Bird Conservation Area concept in the northern tallgrass prairie, annual report: 2001. [Online.] Northern Prairie Wildlife Research Center. Available at <http://www.npwrc.usgs.gov/resource/2002/bca2001/bca2001.htm>.