Bird Monitoring

Introduction

Shenandoah National Park is home to over 200 species of resident and transient birds. Approximately half of these species breed in the park including 18 species of warblers. Roughly 30 of the species are year- round residents including slate- colored juncos, red- tailed hawks, Carolina chickadees, wild turkeys, ruffed grouse and barred owls. Due to the park's location along the crest of the Blue Ridge and the extent of the forested habitat, Shenandoah provides essential habitat for neotropical migratory birds, both for nesting and as a travel corridor. Certain areas, such as Big Meadows, support species that can be found nowhere else in the park.

Management Needs

During the past 30 years, severe decline of North American bird populations and their habitats has caused great concern among the bird conservation community. Birds are recognized as critical components of local and global genetic, species, and population diversity, providing important ecological and cultural values. Their status and conservation is a focus of worldwide conservation efforts. Direct or indirect threats to birds in North America (and Shenandoah) are; loss of habitat due to poor land use, forest clear- cutting, the draining of wetlands, and development. Other threats include mining, pollution, and invasive non- native species (which include predators, plants, insects, diseases, and other birds). Because the most significant dangers are habitat- based, large areas of protected refugia like those found in Shenandoah National Park have become increasingly important to neotropical migrants and resident woodland species.

Continued monitoring of bird populations is critical in Shenandoah National Park as birds are indicators of the health of our natural ecosystems. In addition to information we are already collecting, more robust information on bird populations such as broad- scale data on productivity and survivorship are needed to provide critical information upon which to initiate research and management actions.

Past and Current Procedures

Shenandoah National Park is part of the Appalachian Bird Conservation Region 28 (BCR 28) as established by the Partners in Flight Initiative. The park is working with other agencies to build a coordinated partnership for planning, implementing and evaluating bird conservation in the region.

Shenandoah National Park has a long standing history of supporting a variety of bird monitoring programs. These include Breeding Bird Surveys, Annual Christmas Bird Counts in and around the park, and cliff nesting bird surveys.

Between 1993 and 2003, the park supported an agreement with the Institute for Bird Populations to conduct the Monitoring Avian Productivity and Survivorship Program (MAPS). The Program was discontinued in 2004 due to lack of base funding. The main objective of the MAPS program is to provide standardized population and demographic data for birds found at Shenandoah National Park. From 1993- 2003, six MAPS stations were operated within the Park. With few exceptions, the 16 net sites per station were operated for six morning hours per day on one day per 10- day period for seven consecutive 10- day periods between May 31 and August 5. MAPS uses constant- effort mist- netting and banding stations to monitor landbirds. The purpose of the Shenandoah's MAPS Program has been to provide annual indices of adult population size and post- fledging productivity, as well as estimates of adult survivorship and recruitment into the adult population, for various bird species. The park is looking to establish a partnership with a local university or other institution that would re- implement the Monitoring Avian Productivity and Survivorship Program.

The Cerulean Warbler, a species that prefers the park's high elevation mature deciduous forest, is a species of continental concern and high regional responsibility.

What We Have Learned

The MAPS program yielded an average of 500- 700 birds banded yearly at the six stations from 1993- 2003. Adult population sizes tended to be higher at higher elevation stations and those dominated by northern red oak than at stations dominated by chestnut oak or at lower elevation stations. Stations dominated by northern red oak have tended to show higher productivity indices than other stations.

Bird Monitoring (continued...)

The overall trend in bird populations from 1993- 2003 MAPS monitoring has been stable. However, closer examination of the data indicates that the stable overall population trend actually reflects a slight/steady decrease after a substantial increase early in the study as species rebounded from the effects of a widespread gypsy- moth defoliation. The slight decreases in population size between 2002 and 2003 for all stations combined may have been significantly negative were it not for a large increase in population size seen at the Pinnacle Cliff station (see below). This pattern indicates a general decline in population size index during the greater part of the study for most species.

Productivity trends showed 11- year declining tendencies in 12 of 17 species, with substantial and significant or near- significant declines noted for four species, vs. no such increases, and a near- substantial decline for all species (an overall productivity increase between 2002- 2003 would likely have been a substantial decrease were it not for a dramatic increase in productivity at Pinnacle Cliff). This pattern indicates a general decline in productivity index at Shenandoah during the greater part of the study.

At Pinnacle Cliff, where the Pinnacles Fire of November 2000 reduced the cover of mountain laurel, the dominant shrub species, both bird population sizes and productivity decreased disproportionately between 2000 and 2001 (as compared with other stations). In 2002, breeding populations of all species again declined to a greater degree at Pinnacle Cliff than at any other station, whereas productivity increased by a greater degree at Pinnacle Cliff than at any other station. In 2003, breeding population sizes, number of young captured, and productivity all showed substantially larger increases at Pinnacle Cliff, indicating that the bird community and likely the entire ecosystem is rebounding at this station. Bird populations and productivity at Pinnacle Cliff may eventually surpass pre- fire levels, which would indicate the long- term benefits of occasional fire to breeding populations.

Cliff nesting bird surveys have shown only one re-colonization (Stony Man 2005- 2006) by perigrine falcons since . This information prompted the park to resume peregrine falcon restoration efforts (2000- 2008) in cooperation with the Virginia Department of Game and Inland Fisheries and the Center for Conservation Biology at The College of William and Mary. Yearly cliff surveys have verified the presence of at least 4- 5 raven nests throughout the park.

The 2004 Christmas Bird Count produced the greatest number of different bird species in count history (87 species). It also showed an increase in black vultures and decrease in turkey vultures. Neotropical migratory bird point counts in areas of historic hemlock stands (Camp Rapidan and Limberlost) were conducted between 1995 and 1997. These counts were restarted in 2005 after the loss of hemlock stands. We have gathered point count data from 2005- 2007 in these areas and after a few more years of data we may be able to evaluate the changes.

Future Work

Staff should continue to refine bird monitoring efforts in response to forest change and information gaps. All information should be evaluated and used for future planning and management decisions. Restarting the MAPS program at Shenandoah National Park will greatly aid with management efforts aimed at protecting the park's avifauna and ecological integrity.

Cerulean Warbler surveys directed at examining habitat use and population size were started in 2004 and need to be expanded. This is a species that requires species-specific surveys because of their irregular abundance, distribution, and rarity. BCR 28 needs include identifying distribution, responses to habitat management, and alteration. These surveys have evolved into targeted high-priority species surveys. A project to use volunteers to help survey and monitor high- priority species was started in 2007 and is still in development.

References

DeSante, D. F., et al. 2003. The 2003 Annual Report of the Monitoring Avian Productivity and Survivorship (MAPS) Program in Shenandoah National Park. The Institute for Bird Populations, Point Reyes, California.

Ludwig, J., Fleming, G., Pague, C. and Rawinski, T., 1993. A Natural Heritage Inventory of Shenandoah National Park (Natural Heritage Technical Report #93- 5), February 1993. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia.

Rich, T. D., D. W. Demarest, K. V. Rosenburg, et al. 2004. Partners in Flight North American Landbird Conservation Plan. Cornell Lab of Ornithology. Ithaca, NY.