The Raptor Population Index Project: Current Status and Future Directions

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The Raptor Population Index Project celebrated its first anniversary in summer 2005. Although the original ideas were developed long before that, and even though some of the pieces (such as HawkCount.org) were already operating, it was the hiring of Chris Farmer as Hawk Mountain's North American Monitoring Coordinator that marked the official start of the project.

During this first year much has been accomplished. Several of the pieces that comprise this project were refined and are starting to generate some interesting results.

This article is an attempt to summarize the most important accomplishments of this first year and to make a projection of future directions. Over the long term, RPI aims to produce indices of the annual abundance of migratory raptors, create updated assessments of the status of each species, and share this information with targeted audiences. Integrating the elements of this project requires constant updates, and donors to the project routinely receive RPI Project Updates and our annual report.

Hawkwatches and HawkCount.org

During this first year, we saw a 27% increase in the number of hawkwatches that contribute data to RPI. Last fall, HawkCount.org increased the number of watchsites registered and submitting migration count information to 163. Twenty-five of these sites have submitted at least 250 site-days of counts in an hourly format, making them suitable for RPI analyses.

Data collected by professional and citizen scientists across Canada, United States, Mexico and Costa Rica is now managed differently than in previous years. HawkCount.org has a new server, with a number of features that ensure the physical safety of the data. But before I describe the curatorial procedures of data management and storage, let me describe an important issue: intellectual rights.

The hawk count data is a crucial asset, and some assurances must be offered to its owners. Last fall, Kirk Moulton (past president of HMANA), facilitated the process to develop the new Data Use and Submission Policies that ensure data publicly available in HawkCount.org is used under the highest ethical standards and that data owners receive the credit they deserve for their efforts. These new policies are available at http://hmana.org/data_policies/.

Jason Sodergren, database specialist of HMANA, has worked to ensure HawkCount.org is now a safer and faster system. Since the new Apache server was set up in May 2005, the safety of the system has improved by several levels. The complete data set is fully backed up every 48 hours, with copies of these backups stored in three separate physical locations. Ninety days worth of backups are kept as part of these data safety procedures.

Users of HawkCount.org can now enjoy monthly summary pages, profiles of each site, and comparisons of data from different seasons. In addition to the ability to export data into different formats, users without online access to a computer (such as in remote hawkwatches) can generate a blank Excel template on which to submit their data at http://www.hawkcount.org/data_export.php. Data can be later submitted to HawkCount.org as an e-mail attachment data-import@hawkcount.org.

Recruiting more sites that submit hourly count data is a challenge, but perhaps the most important one now facing RPI is the transfer of data from the paper archive into electronic format. A small group of committed volunteers has helped Laurie Goodrich at Hawk Mountain to transfer thousands of hours of counts, but still, we are in need of additional help.

Trend Analyses underway

Previous RPI updates have reported on the new statistical model developed by David Hussell and Chris Farmer that is used to analyze migration count data. The new model can incorporate variables that may affect trend estimations, such as the amount of seasonal and daily field coverage and the effects of weather. It is a more robust method of estimating population changes.

Chris Farmer at Hawk Mountain leads the analysis unit of RPI. He continues to analyze data from more sites for a regional analysis of population trends in 14 species of raptors. Chris's regional analysis will cover the northeast and the Great Lakes region that now includes seven sites: Duluth, MN; Lighthouse Point, CT; Montclair, NJ; Cape May, NJ; Hawk Mountain, PA; Waggoner's Gap, PA, and Holiday Beach, ON.

The analyses in progress allow a large-scale view of population trends at different geographic scales during the past

three decades (1974-2004). Some species show interesting results: American Kestrel (*Falco sparverius*) shows decreases at all sites. Along the Atlantic coast, these decreases are large and statistically significant, though turn to intermediate (but still statistically significant) at Hawk Mountain and are small and not significant farther west.

Another species of recent concern is the Sharp-shinned Hawk (*Accipiter striatus*), which shows mixed results in the east. Increases in the counts are seen at Lighthouse Point and Montclair, and decreases are seen in Hawk Mountain, Cape May, Holiday Beach and Waggoner's Gap. The Breeding Bird Survey (BBS) has often been used to validate trend estimations, and increases reported in BBS data support the idea that short-stopping might be a chief reason why Sharp-shinned Hawks are decreasing in migration counts.

The closely-related Cooper's Hawk (*Accipiter cooperii*) was found to be increasing across the region, as is the Bald Eagle (*Haliaetus leucocephalus*) and the Peregrine Falcon (*Falco peregrinus*). The Osprey (*Pandion haliaetus*) is another species with significant increases; it has more marked positive trends near the coast than in inland sites.

Some species' results are intriguing. Broad-winged Hawk (*Buteo platypterus*) is decreasing at all sites. These decreases are statistically significant at Holiday Beach and Hawk Mountain, and still negative, but not significant, in the remaining sites. The inter-annual variation of Broad-winged Hawk counts at eastern and Great Lakes sites makes it difficult to make appropriate estimates, since this higher variation reduces the power of trend estimates. This is possibly evidence of annually shifting routes in this long-distance migrant, a consequence of a different pattern of distribution of thermal convection.

Chris Farmer, David Hussell and Jeff Smith are currently working in an analysis of western sites operated by HawkWatch International, using the new statistical model.

The Importance of Consistent Data

One important lesson from the analyses done thus far is that even though hawkwatches seem to follow the standardized data collection protocol of HMANA, differences in its application may result in different count outcomes. Based on trend analyses for the six eastern sites, it appears that inter-annual variability in counts is higher at some sites than at others. This is likely influenced by two factors that sites can control to some extent: annual turnover of observers and use of a written protocol and training program for observers.

Localities with less rigorous training schemes and high personnel turnover may result in higher annual variation in counts. These additional sources of variation are very difficult to incorporate in analyses and might affect the final trend estimates. A revision of data collection protocols and a careful documentation of the specific method followed in each site is underway, and we will soon have a standard data collection protocol available for use.

Future Prospects

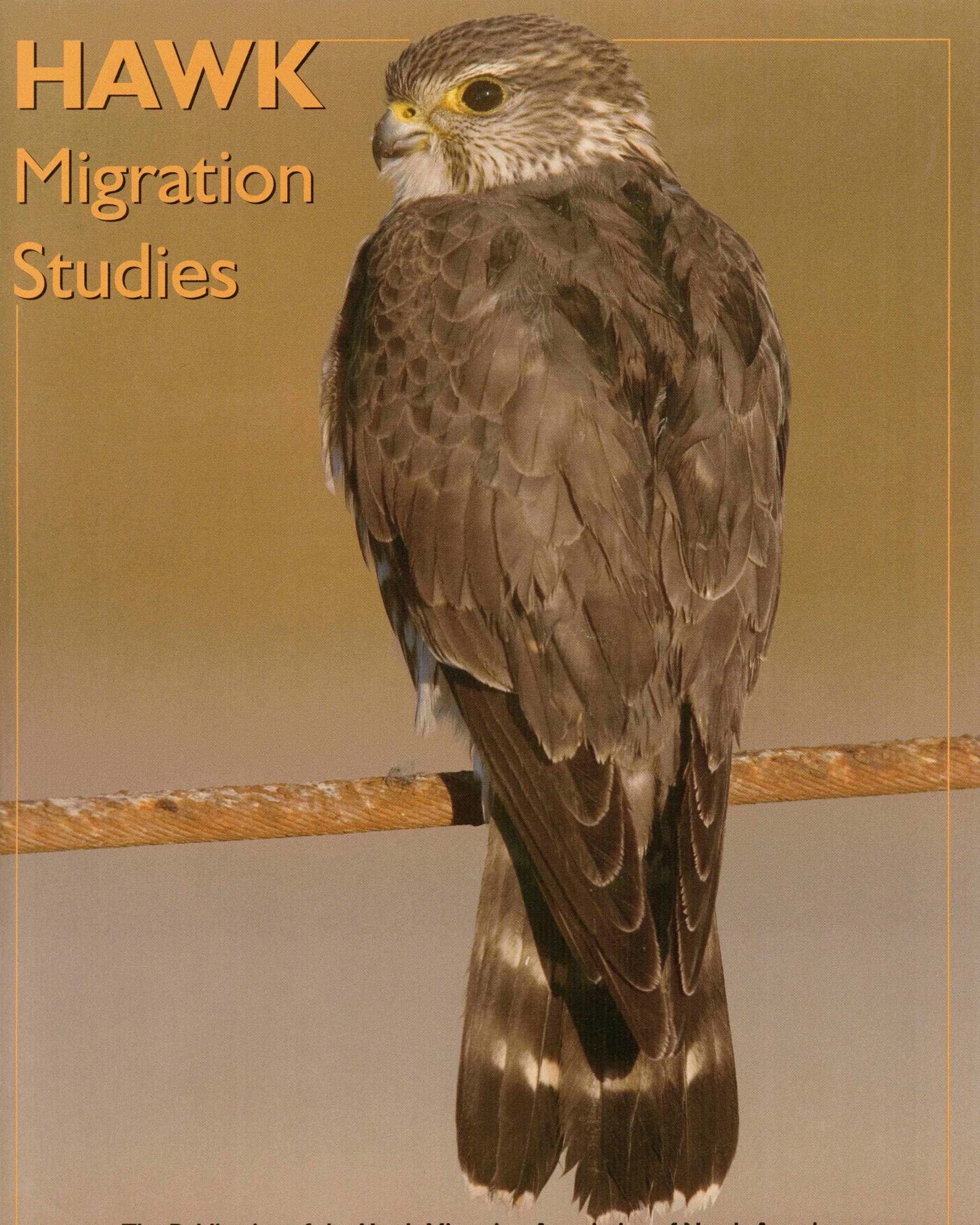
To keep RPI running, our Management Committee and support staff have worked very hard to secure additional funding. The National Fish and Wildlife Foundation (NFWF) has agreed to support a second year of work, and we mailed a pledge for matching funds to RPI supporters at the end of 2005. We are seeking $60,000 to match the NFWF grant, and at the time of printing of this journal we have secured about 25% of this goal.

Over long term, the RPI team expects to diversify the sources of funding and to develop an even stronger membership that helps to sustain this citizen science project – this project could have not taken off without help the contribution of data, time, effort and money of our constituency.

This year will be a year to consolidate RPI. The most relevant goals of RPI for 2006 are to complete trend analyses for publication in peer-reviewed journals, to generate species conservation assessments, create a generic data collection protocol and to improve the data management and reporting capabilities of HawkCount.org. RPI is poised to fill an important gap in North American raptor population monitoring.

ZACH SMITH

HAWK Migration Studies



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