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Evaluation of Potential Habitat for Peregrine Falcon Reintroduction in Southern Illinois.

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FINAL REPORT

Date: August 10, 2008

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Project: Evaluation of potential habitat for Peregrine Falcon reintroduction in southern Illinois.

Funding Source(s): Illinois Dept. of Natural Resources, State Wildlife Grant T-30-P

Principal investigator(s): Charlotte Roy and Eric Hellgren

Graduate Research Assistant/Staff: Sarah Wakamiya (Graduate Research Assistant)

SUMMARY (from attached thesis)

In Illinois, the peregrine falcon (*Falco peregrinus anatum*) has not yet recolonized natural cliff sites, remaining restricted to urban areas. I identified cliffs in southern Illinois using slope in a Digital Elevation Model, visited 38% of these cliffs, and assessed their suitability as nesting sites based on agreement with attributes reported in the literature for existing peregrine populations. Most (18 of 23) of the cliffs identified, possessed attributes consistent with good peregrine falcon nesting sites, suggesting that slope can be used as a simple habitat model. Using this model, southern Illinois should be capable of supporting approximately 5-16 territorial pairs on 69 km of cliffs, primarily along the Mississippi and Ohio Rivers and in the Shawnee National Forest. I identified 10 possible reintroduction sites that lacked great horned owls, a predator of young peregrines, with top sites in Monroe and Jackson Counties.

Using the slope model, I constructed a habitat map for southern Illinois and the surrounding region and linked it with a stage-structured population matrix to analyze peregrine population viability and reintroduction strategies. I derived habitat-specific demographic rates from peregrines in the central Mississippi River region during 1982-

2006. Mark-recapture analysis showed that juveniles fledged from cliffs had an annual survival rate of 20%, whereas juveniles from urban areas had an annual survival rate of 24%. Annual survival rates of subadults from cliff sites (84%) were similar to subadults from urban sites (85%) and to adults from both habitat types (85%). I also estimated average number of fledglings from cliff sites (1.8 ± 0.5) and urban sites (2.6 ± 0.1) during 2000-2005. Population viability analysis results indicated that the peregrine population in the study region is stable and slowly increasing. Cliff populations are stable, but not increasing. However, recolonization of cliff sites in southern Illinois will occur via dispersal from urban populations. A cost-benefit analysis indicates that the most cost-effective reintroduction strategy would cost approximately \$280,000 and would result in only 2 additional breeding pairs from the no action scenario. Thus, funds would be more effectively used in other management efforts such as habitat preservation.

Job 1.1 Identification and survey of sites potentially suitable for peregrine falcons

- a. Identify sites with habitat features required by peregrine falcons and verify their suitability with site visits.

A 10-m resolution digital elevation model (DEM) was used to identify cliffs and bluffs by querying for slopes ≥ 45 degrees. Based on the query, 69 km of cliffs, primarily located along the Mississippi and Ohio Rivers and in the Shawnee National Forest were identified. Cliffs in natural areas, nature preserves, state conservation areas, and parks were visited to assess site suitability. Eighteen of 23 sites visited were considered suitable for nesting based on cliff height, distance

to water, elevation, and cliff dominance. Ten of these 18 sites were considered suitable for reintroduction based on the absence of great horned owls, a predator of young peregrine falcons. The most suitable reintroduction areas include 4 sites in Monroe County and the Little Grand Canyon in Jackson County.

Job 1.2 Population viability analysis

- a. Determine viability of theoretical peregrine falcon population under different reintroduction scenarios, based on availability of suitable habitat in southern Illinois.

A spatially-explicit population viability analysis was constructed for southern Illinois and the surrounding region (416-km buffer) using program RAMAS/GIS. Multiple reintroduction scenarios were modeled with varying cohort sizes, supplementation schedules, and number of reintroduction sites. A base scenario with no reintroductions was also modeled. Under all scenarios, the peregrine falcon population did not go extinct in the region surrounding Illinois. Without reintroductions, cliffs in southern Illinois are expected to be recolonized in approximately 11 years and 2 breeding pairs are expected in the region after 50 years. The most cost-effective reintroduction strategy released 8 juveniles from each of 2 sites every 3 years during a 10 year period and cost approximately \$300,000. Under this release strategy, cliffs in southern Illinois are expected to be recolonized in 3 years and should contain 4 breeding pairs in 50 years.

Job 1.3 Recommendations and report

- a. Provide the IDNR with data necessary to evaluate the feasibility and likelihood of successful reintroductions of peregrine falcons to southern Illinois.

A final report including a Master's thesis was submitted to the IDNR discussing potential reintroduction sites, cost-effectiveness of release strategies, and viability of peregrine populations in southern Illinois. Two manuscripts have emerged from the thesis. Based on Jobs 1.1 and 1.2, southern Illinois and the surrounding region can support a healthy peregrine falcon population. However, at a cost of \$300,000, reintroductions would increase the population in southern Illinois by only 2 breeding pairs after 50 years, compared to the no-action scenario. The current peregrine population in the lower Midwest appears to be healthy, and in time peregrines should naturally recolonize the cliffs in southern Illinois without human assistance. We recommend investing funds in other conservation efforts.