

**Metapopulation Dynamics and Invasive Species:
Identifying Conservation and Management Processes for the Monk Parakeet**

Significance

Originally from Latin America, the Monk Parakeet has become widely established in North America with at least 20 states reporting populations of this species. Current monitoring programs suggest that the population is growing exponentially or nearly so and may soon spread across much of the North American landscape, as did the European Starling and House Sparrow before. The ecological impact of the Monk Parakeet on native species and natural ecological systems is so far largely unknown. Existing populations are exclusively birds of the urban landscape where their color, chatter, and constant activity elicit interest and affection from some, irritation from others that decry their noisiness and habit of building enormous stick nests on light and power poles, buildings, and other edifices.

The appearance of this invasive species in the urban landscapes of the Northeast prompted two major and several minor eradication campaigns so far. The first was conducted by the U.S. Fish and Wildlife Service in the early 1970's in an attempt to eliminate this newly arrived invasive before it became widely established. The second occurred just two years ago, when the United Illuminating Company removed nests from power line poles and destroyed the birds. This latest eradication campaign galvanized animal welfare concern groups and wildlife enthusiasts intent upon saving North America's only parakeet species. Legal proceedings were initiated against UI and a cease and desist order was issued in the New Haven Superior Court to prevent further harm to the birds. The UI promised to challenge this ruling but this interim provides further opportunity to study the natural population dynamics of Connecticut's populations of

Monk Parakeets. A key issue is determining aspects of population dynamics that might help identify conservation and management tools acceptable to all concerned parties including the Monk Parakeet.

Metapopulation Concept and Dynamics. Monk Parakeets occur in small colonies consisting of several nests. Each nest is cooperatively constructed and attended by one or more pairs. Pairs reproduce in late spring and the young either remain in the colony to build new nests or disperse in small groups to form new colonies, often at some distance from the original colony. Thus, within a short time Monk Parakeets of a given region occur in several to many colonies, each consisting of several to many nests with their attendant pairs. Ecologically, each colony functions as a population. Collectively, these colonies/populations and the ecological relationships between them is termed a metapopulation. Ecological theory predicts that Monk Parakeet metapopulation consists of source and sink colonies. Source colonies are strong contributors of new individuals while sinks act as drains on the metapopulation and may become extinct if not augmented by the source colony/population. It is also predicated that recruitment in source colonies/populations provides excess members that disperse to form new colonies. Dynamics of recruitment and interchange between source and sink colonies/populations of the overall metapopulation may be a key factor in explaining why Monk Parakeet populations in the Northeast have managed to survive 40 years of climate extremes and periodic eradication campaigns but this has not been demonstrated nor documented.

The purpose of my proposed study is to document extent, distribution, and dynamics of the Monk Parakeet metapopulation that now occurs along the Connecticut shoreline and the supportive and sustaining interactions that occur among the colonies/populations

of the metapopulation. It is anticipated that this work will identify ecological insights for conservation and management measures that eliminates the need to destroy these bright and colorful members of our urban environments.

Workplan

The experimental design will focus on determining how interactions amongst populations of the urban metapopulation reinforce one another and thereby contribute to further spread/dispersal of this important but controversial invasive species. Evaluating metapopulation dynamics of this species has not been conducted in any previous study and it is anticipated that results will have broad application for the conservation and management purposes wherever this species is recognized as a management problem.

Focus components include:

1. Survey existing colonies/populations to determine number of nests and pairs at each colony/population.
2. Determine recruitment in each population.
3. Determine fate of annual recruitment (how many young of the year remain in each colony and how many disperse).
4. Identify source colonies that produce excess individuals for dispersal.
5. Determine fate of young of the year that leave the colony (do they form new colonies or simply augment sink colonies, for example?)

Time Line. Study will commence in late spring. Initial components of the study will be to locate and map existing colonies of Monk Parakeets across Connecticut's coastal urban landscape. Information on each colony will be mapped via GPS and analyzed via ARCVIEW software.

Timeline for this research will extend from late April through the summer 2007 months and into Fall 2007.

March---June	Locate and plot existing Monk Parakeet nesting colonies.
July--August	Document productivity/recruitment of nests in each colony
August-September	Document dispersal of young, formation of new colonies
October	Preparation and submission of manuscripts

Outcomes and Reporting

Anticipated outcomes and reporting of this research will be to: (a) develop a data base which can be used to manage future population recruitment and dispersal of the Monk Parakeet population in Connecticut and, by extension, elsewhere within its North American range (b) involvement of undergraduate students in applied research (c) preparation and submission of manuscripts to target journals including Environmental Management, Urban Ecology, Conservation Biology, and Urban Wildlife, among others based on results and (d) development of a timely and relevant discussion topic for my courses in Conservation Ecology, Ornithology, and Population Ecology.

The last is as important as the first re the outcomes and reporting goals for this project that I indicate immediately above. I submit that this topic provides immediacy of involvement and relevancy for students at undergraduate and graduate levels of biology. It provides a local and regional introduction to the “real world” of conservation issues with respect to wildlife.

Budget Item	Amount (Whole Dollars)	Brief Justification
Faculty Stipend	\$1500	
Support Services		
Supplies and Equipment		
Travel	\$3500	Extensive travel required as per below
Total	\$5000	N/A

Primary component of the requested budget is for travel funds. Both type and magnitude of this study require extensive and repeated field trips primarily along the coastal corridor but scattered reports of inland colonies will be searched for as well. I anticipate a minimum of 2-3 days per week in the field mostly from just before sunrise until 1-2 hours after sunset to gather data needed for completion of this study, hence the large travel fund request.