Aerial Survey of Boater Use in Everglades National Park

National Park Service
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South Florida Natural Resources Center
Everglades National Park

Everglades National Park (ENP) is a 1.5 million acre sub-tropical wilderness situated at the southern tip of the Florida peninsula. Nearly 1/3 of the park acreage, including Florida Bay and the Ten Thousand Islands/Cape Sable region, is a unique marine environment, renowned for its diverse natural resources, world-class fishing and boating opportunities, and spectacular scenic beauty. This ecosystem provides the foundation for multibillion-dollar fishing and tourism industries in south Florida.

Over the past several decades the combination of rapid growth of the regional human population, ever-increasing recreational use, and habitat alterations have placed significant stress on marine resources in the Florida Keys ecosystem, including the marine resources of Everglades National Park. Understanding the extent of boater use in ENP waters is important to the development of the park's General Management Plan (GMP) and for subsequent planning efforts such as fisheries management, boater education, and backcountry management. The goal of this research was to establish a cost-effective method for estimating boater use and boater activity in ENP.

Study Objectives

- Conduct an aerial census of vessels in park waters.
- Conduct a concurrent census of boat trailers at major public boat ramps in the vicinity of ENP.
- Develop mathematical models for estimating boater use levels in ENP using trailer count data.
- Determine changes in boating activity and patterns of visitor use of park marine waters over the past 20 – 30 years.
- Identify study follow up activities that will support long-term marine resources management.

Methods

- An aerial census of park boater use was implemented between fall 2006 and fall 2007. A total of 83 flights were conducted (Fig. 1). A mobile integrated GPS-GIS recording system was used to identify eight vessel classes and characterize activity type on the water.
- Photographs were taken at principal access-point marinas during each over-flight survey for obtaining trailer counts. Physical counts of trailers were taken at a limited number of marinas.
- From these data, mathematical relationships were developed to predict the number of vessels on ENP waters based on boat trailer counts at marinas for the 2006-2007 study period.
- Results were compared with historical studies of boater use in ENP conducted in the 1970s and 1980s.

Florida Bay and Backcountry Marinas at Flamingo
Photo by David McClellan, National Oceanic and Atmospheric Administration

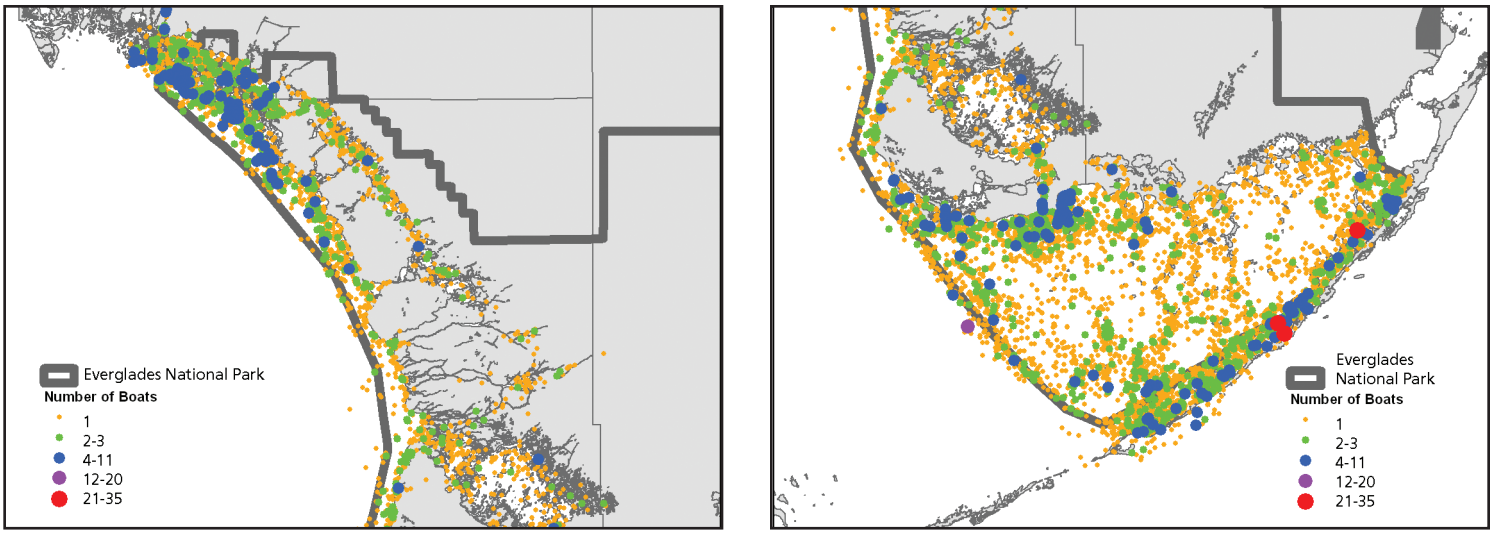

Figure 1. Summary flight maps for 2006-2007 seasons-combined surveys (83 flights) for the Ten Thousand Islands region and Florida Bay region showing distributions of small motorboats (<23 ft) and canoes/kayaks, which together represent more than 90 percent of the vessels in the marine waters of the park.

Results and Recommendations for Future Studies

The results of this study indicate that boater use has increased about 2 to 2.5 times over the last three decades in ENP. As an example, the statistical model developed for the study conducted during the period 1972-1984 found that for every 100 boat trailers counted at the Flamingo marina, approximately 140 boats were observed in park waters. However, the current study found that for the same 100 trailers at Flamingo, approximately 320 boats would be on the water. This result suggests that more boats are transiting into the park from additional points of origin such as locations throughout the Florida Keys, and the Naples to Everglades City area. This finding is not unexpected given the more than doubling in recreational vessels registered in the south Florida region over the last 3 decades (Fig. 2).

Previous efforts only censused boat trailers at Flamingo. This study developed models that more reliably predict boater use (i.e., numbers of vessels) in park waters by including data from counts of trailers at specific marinas in Chokoloskee and the upper Florida Keys in addition to Flamingo. Small recreational vessels represent more than 90 percent of boats in ENP. The number of recreational boats on the water in the Ten Thousand Islands area and in the park waters of Florida Bay were found to vary by season and day of the week. Boats were most numerous during the winter and spring. These seasonal differences were more pronounced in the Ten Thousand Islands area. Recreational boats were most abundant on weekends and holidays in both areas.

To assess boating use in future years in the park, the study recommends deploying an automated system (i.e., digital cameras) capable of producing daily marina trailer counts at various locations identified in this study. These data, along with the models developed in this study, will enable accurate estimation of the number of vessels using park waters on a given day. These estimates could then be used to determine boater use on weekly, monthly, and annual bases. Study results suggest that the vessel-trailer mathematical relationships will need periodic updating in response to regional changes in human population size, number of registered vessels, and available access points in the vicinity of park waters.

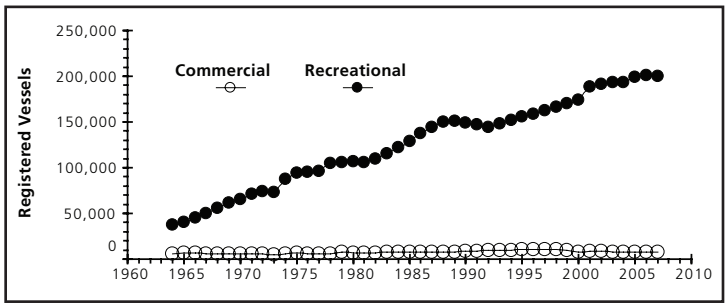

Figure 2. Registered vessels in the five-county (Collier, Dade, Broward, Monroe and Palm Beach) south Florida region from 1964-2007.

The vessel-trailer survey database developed in this study can be further used to investigate a variety of issues pertaining to conservation and management of park natural resources, including restoration and enhanced protection of shallow water habitats. Vessel-survey data could be combined with those on vessel groundings and propeller scarring of seagrass beds to guide development of educational programs and boating regulations, locate navigational markers, and help identify transit corridors in park waters. Temporal and spatial data on vessel position and activity make it possible to analyze patterns of park resource use, including spatial patterns of fishing within ENP creel survey zones and fish habitats. Vessel-trailer survey data will be integrated with creel survey data to improve estimation of population abundance indices for key sportfish and to analyze conditions for sustainable fisheries.

This study was conducted under a cooperative agreement between Everglades National Park, the University of Miami's Rosenstiel School of Marine and Atmospheric Science, and the National Oceanic and Atmospheric Administration, Southeast Fisheries Science Center. The complete report is available on the park's homepage (www.nps.gov/ever). Click on "General Management Plan" and then "GMP Documents."