

## ARTICLES

### AN EXOTIC HERPETOFAUNAL BIOBLITZ SURVEY AT A STATE PARK IN SOUTHERN FLORIDA

Walter E. Meshaka, Jr.,<sup>1</sup> Henry T. Smith,<sup>2,3</sup> J. Whitfield Gibbons,<sup>4</sup> Tom Jackson,<sup>5</sup>  
Mark Mandica,<sup>6</sup> and Katrina A. Boler<sup>7</sup>

<sup>1</sup>*Section of Zoology and Botany, State Museum of Pennsylvania  
300 North Street, Harrisburg, Pennsylvania 17120*

<sup>2</sup>*Florida Department of Environmental Protection, Florida Park Service  
13798 S.E. Federal Highway, Hobe Sound, Florida 33455*

<sup>3</sup>*Florida Atlantic University, Wilkes Honors College  
5353 Parkside Drive, Jupiter, Florida 33458*

<sup>4</sup>*NOAA-NMFS-SEFSC,  
75 Virginia Beach Drive, Miami, Florida 33149*

<sup>5</sup>*Savannah River Ecology Lab, Drawer E  
Aiken, South Carolina 29802*

<sup>6</sup>*Department of Biology, University of Miami  
Coral Gables, Florida 33124*

<sup>7</sup>*Florida Department of Environmental Protection  
The Barnacle Historic State Park  
3485 Main Highway, Coconut Grove, Florida 33133*

**Abstract:** We conducted an exotic herpetofaunal bioblitz survey at the Barnacle Historic State Park (BHSP), an urban Florida state park in Miami-Dade County in November 2005. On that day and evening, we recorded seven exotic species and two native species. Three additional exotic species and six additional native species were known to occur there but were not observed that day. The exotic herpetofaunal community at the BHSP comprised 26.3% of exotic amphibians and reptiles known to occur in Miami-Dade County. Despite its protection as a park, the overwhelming dominance of exotic species at this site typifies urban systems in southern Florida. Bioblitzes, such as this one, provide a useful first step in pointing out a park's susceptibility to exotic species colonization events, so that targeted studies can subsequently evaluate impact and feasibility of various management techniques.

The state of Florida leads the United States in the number of exotic amphibian and reptile species (Meshaka, 2008), and southern Florida is the epicenter of exotic herpetofaunal diversity (Meshaka et al., 2004; Meshaka, 2006, 2008). Many but not all of these species thrive in disturbed habitats, and some species such as the Greenhouse Frog (*Eleutherodactylus planirostris*), Cuban Treefrog (*Osteopilus septentrionalis*) and Indian Python (*Python molurus*) thrive in natural habitats as well (Meshaka, 2001; Meshaka et al., 2004; Meshaka and Layne, 2005; Snow et al., 2007). Lands in the public trust are charged with maintaining natural systems as close to historical norms as possible, and parks are important sources both of remaining natural habitats and altered habitats that can be restored. We undertook an exotic herpetofaunal bioblitz survey at a small urban park located in extreme southern mainland Florida with the goal of evaluating its susceptibility to exotic herpetofaunal colonization, the results of which can be used in formulating future studies concerning ecological impact and future resource management plans.

#### Study Area and Methods

Acquired by the State of Florida in 1973, the Barnacle Historic State Park (BHSP) is located in Miami-Dade County, Florida, USA, within Coconut Grove, Miami. The park is encapsulated within high-rise urban development and likewise is the smallest, southeastern Florida state park, containing only about 9.0 acres. Four habitat types, rockland hammock (4.0 acres), mangrove swamp (0.02 acres), ruderal habitat (2.7 acres), and developed habitat (0.7 acres) comprise approximately 7.4 acres that can support terrestrial, arboreal, and building-dwelling herpetofauna. The remaining acreage is submerged estuarine habitat that parallels Biscayne Bay, unsuitable for most herpetofauna. The major residual upland natural community of rockland hammock is a hardwood forest where oolitic limestone is near or at the surface, with a thin layer of decaying leaf litter forming organic soil over the rock. This sub-tropical forest is dominated by remnant South Florida Slash Pine (*Pinus elliottii* var. *densa*), with a canopy of Gumbo Limbo (*Bursera simaruba*), Live Oak (*Quer-*

*cus virginiana*), Redbay (*Persea borbonia*), Strangler Fig (*Ficus aurea*), and Mastic (*Mastichodendron foetidissimum*). The understory consists largely of Stoppers (*Eugenia* spp.), Wild Coffee (*Psychotria nervosa*), Marlberry (*Ardisia escallonioides*), and white Indigo Berry (*Randia aculeate*).

We assembled 10 field workers, who collectively spent 38.75 hours searching during the day and evening of 14 November 2005. Vouchers were taken of the species encountered, and the specimens were deposited in the Sternberg Museum of Natural History, Fort Hays State University, Hays, Kansas. Common names follow Collins and Taggart (2002).

### Results and Discussion

The 10 collectors searched in the park and captured 30 individuals of seven exotic amphibian and reptile species and two individuals of a native species (Table 1). On average, 0.18 exotic species was captured every hour and 0.77 specimens of each of these exotic species was captured every hour. It should be noted, however, that the latter estimate is extremely conservative of the overall abundance of individual specimens because numbers were based on capture only. As noted by Gibbons (2005), more than 200 Brown Anoles (*Anolis sagrei*) were encountered during the survey. In light of the overcast weather, we were not surprised that the Common Agama (*Agama agama*), known to occur along the rocky bank in front of a building, and the Green Iguana (*Iguana iguana*) and Knight Anole (*Anolis equestris*), also known from this park, were not encountered on our visit.

Typical of the southern Florida herpetofauna, more reptile species, especially lizards, were encountered than amphibians (Meshaka, et al., 2004). The exotic herpetofaunal community at the BHSP, 10 species, comprised 26.3% of the possible 38 exotic species in Miami-Dade County (Meshaka et al., 2004; Meshaka, 2006; Snow et al., 2007). The eight native reptile species, on the other hand, comprised only 21.1% of the possible 38 lizard and snake species native to Miami-Dade County and 10.5% of the total herpetofauna (n=76) native to Miami-Dade County (Meshaka and Ashton, 2005). This lopsided pattern of exotic herpetofaunal species-dominance typifies urban developments (Meshaka et al., 2008) and small island-like gardens that are surrounded by urban development (Meshaka, 1999a,b).

The single *Eleutherodactylus planirostris* and three Brahminy Blind Snakes (*Ramphotyphlops braminus*) were found under rocks in the tropical hardwood hammock at the fore of the park. The Bark Anole (*Anolis distichus*) was found mostly on smooth-barked trees at approximately eye level. Whereas *A. sagrei* was most commonly seen on the vegetation growing near and on the walls of the property, the Puerto Rican Crested Anole (*A. cristatellus*) occurred mostly in the tropical hardwood hammock. What morphologically appeared to be

Table 1. Species of amphibians and reptiles known from The Barnacle Historic State Park in Coconut Grove, Miami-Dade County, Florida. \* = detected during the Bioblitz survey on 14 November 2005.

Exotic Species	Native Species
<i>Eleutherodactylus planirostris</i> *	* <i>Anolis carolinensis</i>
<i>Agama agama</i>	<i>Aspidoscelis sexlineata</i>
<i>Anolis cristatellus</i> *	<i>Plestiodon inexpectatus</i>
<i>Anolis distichus</i> *	<i>Sphaerodactylus notatus</i>
<i>Anolis equestris</i>	<i>Coluber constrictor</i>
<i>Anolis porcatu</i> s*	<i>Diadophis punctatus</i>
<i>Anolis sagrei</i> *	* <i>Pantherophis guttatus</i>
<i>Hemidactylus mabouia</i> *	<i>Tantilla oolitica</i>
<i>Iguana iguana</i>	
<i>Ramphotyphlops braminus</i> *	

the Cuban Green Anole (*A. porcatu*s) was found on trees at heights above 180 cm, and *Hemidactylus mabouia* was found under rocks during the day (n = 2), and on trees (n = 6) and a house (n = 2) at night. These habitat associations and structural uses that we report at the BHSP did not conflict with those noted for these species in Florida (Meshaka et al., 2004). Few young Green Anoles (*A. carolinensis*) were found in trees, and the single Eastern Corn Snake (*Pantherophis guttatus*) was found on a palm tree at night.

Although anoles provide an abundant prey base for the Eastern Racer (*Coluber constrictor*) and *P. guttatus*, we are concerned that the inclusion of vertebrates in the diets of several of these anoles (Meshaka et al., 2004) combined with their high abundances could prove to be a source of mortality for the geographically-restricted Reef Gecko (*Sphaerodactylus notatus*), the regionally-imperiled Six-lined Racerunner (*Aspidoscelis sexlineata*), and the state-listed Rim Rock Crowned Snake (*Tantilla oolitica*).

With more management attention being paid to exotic herpetofauna by the Florida Park Service, herpetofaunal bioblitz surveys, such as the one we report here, provide a useful first step with respect to awareness of exotic species impact on public trust lands as measured by diversity and relative abundance. Subsequently, more targeted study can be conducted, the results of which can form the basis for good management decisions that balance the severity of ecological impacts by these species with the feasibility of removal programs.

Acknowledgments—We wish to thank C. Blair, H. Cress, K. Kingsland, M. Nelson, and T. Smith for field assistance.

### Literature Cited

- Collins, J. T. and T. W. Taggart. 2002. Standard Common and Current Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodylians. Publication of The Center for North American Herpetology, Lawrence, Kansas. Fifth Edition. 44 pp.
- Gibbons, J. W. 2005. Tropical lizards make the city home in

- Miami. Tuscaloosa News, Ecoviews. November 20.
- Meshaka, W. E., Jr. 1999a The herpetofauna of the Kampong. *Florida Scientist* 62: 153–157.
- Meshaka, W. E., Jr. 1999b The herpetofauna of the Doc Thomas house in South Miami, Florida. *Florida Field Naturalist* 27: 121–123.
- Meshaka, W. E., Jr. 2006. An update on the list of Florida's exotic amphibian and reptile species. *Journal of Kansas Herpetology* 19:16–17.
- Meshaka, W. E., Jr. 2008. The exotic amphibians and reptiles of the United States. *In*: Graeter, G. J., K. A. Buhlmann, S. C. Walls, C. R. Peterson, L. R. Wilkinson, and J. W. Gibbons (eds.). *Inventory and Monitoring: Recommended Techniques for Reptiles and Amphibians, with application to the United States and Canada*. PARC Technical Report. Aiken, South Carolina. In Press.
- Meshaka, W. E., Jr. and R. E. Ashton, Jr. 2005. The Florida herpetofauna in a changing environment, Pp. 3–14. *In*: Meshaka, W. E., Jr. And K. J. Babbitt (eds.). *Amphibians and Reptiles: Status and Conservation in Florida*. Krieger Publishing Co., Malabar, Florida. 317 pp.
- Meshaka, W. E., Jr., B. P. Butterfield, and J. B. Hauge. 2004. *The Exotic Amphibians and Reptiles of Florida*. Krieger Publ. Co., Malabar, Florida. 166 pp.
- Meshaka, W. E., Jr., B. S. Ferster, M. L. Meshaka, and M. L. Meshaka. 2008. Exotic species dominance in the herpetofaunal community of a new residential development in southern Florida: implications for faunal turnover rates. *Florida Scientist* 71: 65–75.
- Meshaka, W. E., Jr. and J. N. Layne. 2005. Habitat relationships and seasonal activity of the Greenhouse Frog (*Eleutherodactylus planirostris*) in southern Florida. *Florida Scientist* 68: 35–43.
- Snow, R. W., K. L. Krysko, K. M. Enge, L. Oberhoffer, A. Warren-Bradley, and L. Wilkins. 2007. Introduced populations of *Boa constrictor* (Boidae) and *Python molurus bivittatus* (Pythonidae) in southern Florida. Pp. 416–438. *In*: R.W. Henderson and R. Powell editors, *Biology of the Boas and Pythons*. Eagle Mountain Press. Eagle Mountain, Utah. 438 pp.