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**Cover Photograph:** The Green Tree Frog (*Hyla cinerea* Schneider) is a common anuran in the southeastern Coastal Plain. This individual was observed at Timucuan Ecological and Historical Preserve, Duval County, FL. Photograph © by J.D. Willson.

## Herpetofaunal Species Richness of Southeastern National Parks

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**Abstract** - The Southeast is the stronghold of US herpetofaunal biodiversity and comprises approximately half of the nation's species of amphibians and reptiles, of which about 20% are endemic. However, few areas have been inventoried, thus hampering efforts to monitor and protect populations. We conducted 2-year herpetological inventories of 16 parks within the National Park Service's Southeast Coast Network. We used a wide variety of standard field techniques to document species occurrences and augmented our collecting records with historical data from museums, published literature, and personal collections. We documented the presence of 123 native species of amphibians and reptiles at the 16 parks, with numbers of species ranging between 6 and 64 per park. Many southeastern parks support rich assemblages of herpetofauna.

### Introduction

Inventories to develop site-specific lists of species typically precede monitoring efforts or research on populations and communities. Knowledge of species present at a specific site can direct conservation efforts and land management initiatives. The determination of species richness is the first step in evaluating local status and trends of species. In consideration of a nationwide effort to conserve native herpetofauna in natural habitats (Gibbons and Stangel 1999) and assist in a National Park Service (NPS) initiative to conduct biotic inventories, we recorded the presence of amphibian and reptile species on highly protected federal lands in the southeastern United States—16 parks that comprise the NPS's Southeast Coast Network. Compared to other taxonomic groups, occurrence of herpetofaunal species has been poorly documented on the majority of NPS lands, and minimal information is available on the status of populations (Stohlgren et al. 1995). Our purpose was to provide the most reliable species lists currently available for the herpetofauna of the 16 parks examined.

### The Target Species: Southeastern Herpetofauna

The southeastern United States is the stronghold of amphibians and reptiles in the United States and Canada. Of the more than 450 US herpetofaunal species, approximately half occur in the Southeast and about 20% are endemic to the region (Conant and Collins 1998, Gibbons and

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Buhlmann 2001). Amphibians and reptiles are a significant component of the native biodiversity in virtually every natural terrestrial and freshwater habitat in the southeastern geographic region. Hence, the status of southeastern herpetofauna is likely to reveal the well-being of a habitat as well as the consequences of habitat destruction or other forms of environmental degradation (Knutson et al. 1999, Vitt et al. 1990).

Despite being often overlooked, amphibians and reptiles are vital components of southeastern ecosystems. They can serve important roles as both predators and prey (Gibbons and Dorcas 2004, Taylor et al. 1988), thus forming critical trophic links in many ecosystems. Additionally, the biomass of many populations can far exceed that of endotherms (Burton and Likens 1975, Godley 1980, Iverson 1982). Because of their biological characteristics and their functional roles in natural communities, the herpetofauna can collectively serve as indicators of environmental integrity (Gibbons et al. 2000); hence, comprehensive accounts of regional species composition and richness are fundamental to initiating meaningful monitoring or research programs applicable to conservation issues.

### The Study Sites: Southeast Coast Network

Our study was conducted at 16 parks within the NPS's Southeast Coast Network (Fig. 1). The parks were located primarily in the Upper and Lower

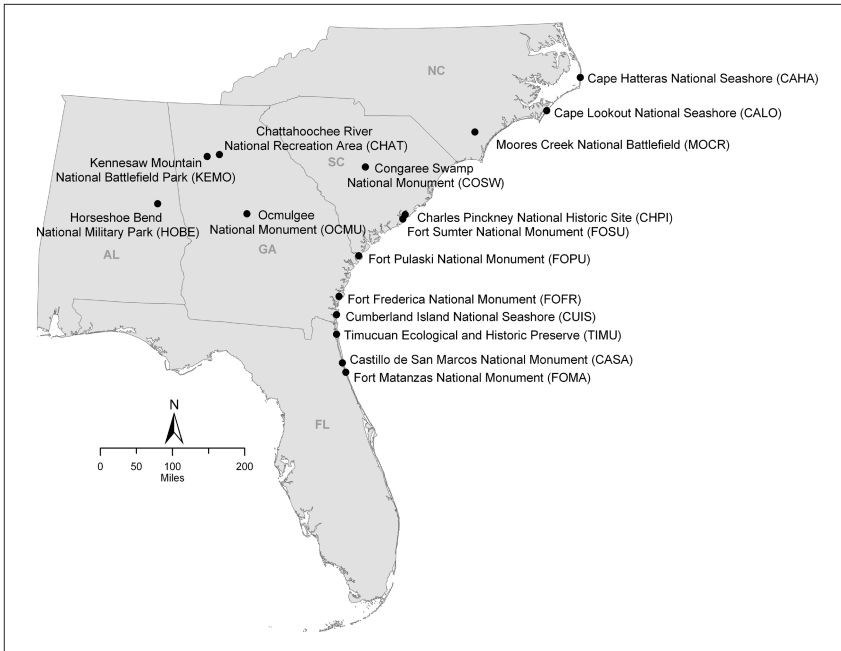


Figure 1. Park lands forming the National Park Service's Southeast Coast Network. Since the completion of this study, Congaree Swamp National Monument was designated Congaree National Park.

Coastal Plains of the southeastern US, from the Outer Banks of North Carolina, south to the Atlantic coast of northern Florida, and west into east-central Alabama. Parks ranged in size from 8.2 ha (Castillo de San Marcos National Monument) to 14,282 ha (Cape Hatteras National Seashore), and some consisted of disjunct parcels spanning as much as 112 km (Cape Hatteras National Seashore). Three “parks” were actually park groups—the Timucuan Ecological and Historical Preserve group also included Fort Caroline National Memorial; the Fort Sumter National Monument group included Fort Moultrie National Monument; and the Cape Hatteras National Seashore group included Wright Brothers National Memorial and Fort Raleigh National Historical Site.

The Southeast Coast Network includes parks protected for their historical or cultural resources—battlefields, forts, national monuments—as well as parks established to preserve environmental resources—ecological preserves and wilderness areas. As a result, the parks within the network exhibited a wide range of terrestrial and aquatic habitat diversity as well as relative proportions of native and anthropogenically altered habitats. In addition, the level of formal survey effort for amphibians and reptiles prior to our study varied dramatically among the parks—from no previous herpetofaunal inventory (e.g., Moores Creek National Battlefield, Fort Sumter National Monument) to extensive or intensive survey (e.g., Cape Hatteras National Seashore, Cumberland Island National Seashore, Fort Matanzas National Monument).

## Methods

We conducted extensive field surveys and supplemented our findings with literature accounts, museum records, and personal collections and reports (Appendix 1). Field surveys were conducted from May 2001 through October 2003, although survey efforts varied from 11–259 person-days (not including assistance by park personnel) among parks, based on park size, habitat diversity within the park, and amount of prior survey work. Our survey efforts typically were more intense at larger parks having a greater diversity of habitats and at parks where little or no previous inventory had been conducted (i.e., presumably with high numbers of previously undocumented species). Additionally, field surveys were concentrated during times when conditions favored amphibian and reptile activity or when targeted species were known to be active (e.g., during spring rainy periods).

Evaluating the status of herpetofauna can be difficult because most species are clandestine and many have low activity levels, low abundance, or both. Therefore, determining species richness requires numerous techniques, careful planning, experienced personnel, and a considerable investment of time (Gibbons et al. 1997, Heyer et al. 1994). We used a wide variety of standard herpetological sampling techniques at each park including coverboards, terrestrial drift fences, aquatic dip netting, aquatic traps, automated recording of calling anurans, road-cruising, and opportunistic

visual searches (Fitch 1987, Heyer et al. 1994, Vogt 1980). In addition to captures of live animals, we collected and identified turtle shells, shed snake skins, reptile egg shells, and road kills. Park personnel provided assistance in some instances.

When possible, photographs, specimen vouchers, or both were obtained for each species found at each park (i.e., each species-park occurrence). Specimen and photo vouchers from Timucuan Ecological and Historic Preserve are housed in the museum at the site, as required by NPS. Specimens and photo vouchers for the remaining 15 parks are deposited in the Auburn University Museum and Charleston Museum.

## Results

We recorded 123 of the 147 native species of amphibians (Appendix 2) and reptiles (Appendix 3) within range of or peripheral to the NPS's Southeast Coast Network, plus 8 introduced species. The total number of species (native plus introduced) documented from parks ranged from 6–64 per park, resulting in a total of 642 species-park occurrences (Appendix 4). Species richness was strongly and positively correlated with park size (Fig. 2; linear regression of log-transformed data,  $R^2 = 0.5434$ ,  $P = 0.001$ ). We documented at least 26 new county records during the study. Our surveys documented 7 federally listed reptile species and 14 reptile and 1 amphibian species having state status of special concern (e.g., State Threatened or Endangered) in one or more of the states where they were found. We found at least one introduced amphibian or reptile species in six parks (Appendices 2–4).

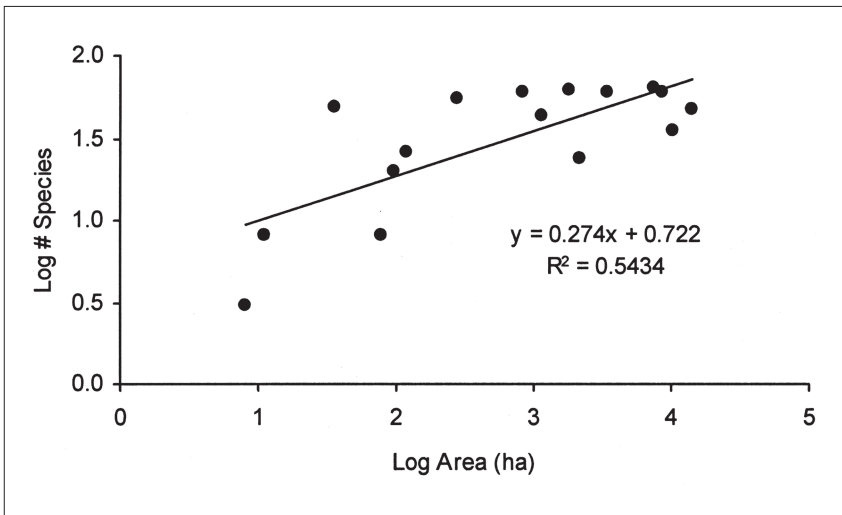


Figure 2. Relationship between land area (ha) and species richness among the 16 parks we surveyed within the Southeast Coast Network. Note the strong positive linear relationship between (log-transformed) land area and species richness ( $P = 0.001$ ). Introduced species are not included in species richness values.

In general, reptiles constituted a much greater proportion of the overall herpetofaunal species richness than did amphibians. Among the reptiles, snakes contributed the greatest number of within-range species (Appendix 3) and the greatest proportion of documented species (Appendix 4). Although anurans typically represented 20–30% of total species documented within a park, salamander richness was consistently low, particularly for coastal and island parks (Appendices 1 and 4; Fig. 1).

Several parks had been the focus of previous formal herpetofaunal surveys, contributing to the high number of species documented through museum collections, records published in the literature or available as reports, or both (Appendices 1 and 4). In addition, several herpetologists provided personal observations of amphibians and reptiles for specific parks that previously were unreported (e.g., Horseshoe Bend National Military Park, Kennesaw Mountain National Battlefield Park, Ocmulgee National Monument; Appendices 2 and 4).

### Discussion

For most of the 16 parks, our surveys increased the number of documented herpetofaunal species considerably, and thus provide the most complete list of species present or historically present. Despite variable field sampling efforts among parks, due in part to differences in habitat complexity and extent of historical information available, the species lists are the most accurate yet available for each of the parks. The lists should represent a high proportion of the herpetofaunal species actually present and allow relative comparison of species richness among the 16 parks.

In general, parks with high herpetofaunal richness tended to be large in size and have a high diversity of habitats (e.g., Chattahoochee River National Recreation Area, Congaree Swamp National Monument, Timucuan Ecological and Historical Preserve). Parks with a low herpetofaunal richness (e.g., Fort Sumter National Monument, Castillo de San Marcos National Monument, Charles Pinckney National Historic Site) typically were small in size, lacked freshwater habitats, and contained a high proportion of anthropogenically modified habitats. In some small parks containing a high diversity of habitat types, we found an unusually rich assemblage of amphibians and reptiles. These included Moores Creek National Battlefield, Horseshoe Bend National Military Park, and Ocmulgee National Monument, all three of which were established solely for their historical resources. Both Ocmulgee National Monument and Horseshoe Bend National Military Park are located near the Fall Line along the boundary between the Piedmont and Coastal Plain, and their resident herpetofauna included species characteristic of both physiographic provinces.

We documented eight species of amphibians and reptiles that presumably had been introduced, mostly in parks in Florida or southern Georgia. The two introduced species of turtles documented during our field surveys, the Pond Slider (*Trachemys scripta*) at Timucuan Ecological and Historical



Preserve and the Florida Red-bellied Cooter (*Pseudemys nelsoni*) at Chattahoochee River National Recreation Area, are native to the Southeast, but are not within-range of the parks from which they were documented. We strongly suspect that the single *P. nelsoni* captured at Chattahoochee was a released captive because of plastron abrasions characteristic of captive animals (P. Pritchard, Chelonian Research Institute, Oviedo, FL, pers. comm.). None of the remaining introduced species (4 lizards and 2 anurans) are native to the United States.

Twenty-four species within or peripheral to the geographic range of at least one of the parks were not documented in any park during our study (Appendices 2–3). Several explanations can be given for why these species were not documented during our surveys or in previous efforts. Many or most of the undocumented species listed as “within-range” probably do not actually occur at the park in question. Because we were liberal when including species as “within range,” ranges of some species (e.g., *A. mutica*, *A. texanum*, *D. ocoee*, *G. nigrinoda*, *N. clarkii*, *N. rhombifer*) were adjacent to or had minimal overlap with the Southeast Coast Network. Thus, if a species is present at all, it may only occur in low numbers or only at isolated locations in a region. In addition, the clandestine nature of many species (e.g., *R. floridana*, *H. simus*) makes them particularly difficult to sample even in locations where they are known to occur. Therefore, it is not surprising that some of the species potentially occurring within the Southeast Coast Network were never documented at any of the parks, either because they are not actually present or are characteristically difficult to detect.

Several herpetologically important habitats were underrepresented in Southeast Coast Network parks, resulting in the absence of some species that would otherwise be expected to be present based on broad scale geographic range maps. Longleaf pine forests support many species of amphibians and reptiles (Guyer and Bailey 1993) and are habitats of major conservation concern in the southeastern United States. Longleaf pine ecosystems have been severely impacted by humans (Frost 1993), and such habitats within the Southeast Coast Network parks are limited. Other habitats critical for southeastern herpetofauna, but that are poorly represented at parks within the network, are isolated wetlands (Kirkman et al. 1999, Semlitsch and Bodie 1998). Consequently, amphibians and reptiles (including several federally protected species) typically associated with these habitats were underrepresented or undocumented during our study. Amphibians included the Gopher Frog (*R. capito*), Flatwoods Salamander (*A. cingulatum*), Tiger Salamander (*A. tigrinum*), and Striped Newt (*N. perstriatus*). Reptiles included the Mole Skink (*E. egregius*), Pine Snake (*P. melanoleucus*), Southern Hognose Snake (*H. simus*), and Eastern Indigo Snake (*D. corais*). Future land acquisition and management decisions by the NPS should consider inclusion of these and other underrepresented habitats to conserve the full spectrum of southeastern herpetofauna.



Inventory is a critical first step in monitoring and managing biodiversity (Andrewartha and Birch 1954, Krebs 1972). Biodiversity patterns in protected areas can be compared to the surrounding landscape to determine the effects of specific land-use patterns on biodiversity. For example, a study conducted in the Piedmont of North Carolina concluded that although some sensitive or rare species may become extirpated in undeveloped areas surrounded by extensive regional urbanization, the protected areas can continue to support relatively high numbers of amphibian and reptile species (Rice et al. 2001). Baseline inventories, when combined with subsequent monitoring, also can be used to detect and evaluate temporal trends in species richness and abundance. Unfortunately, the terms "inventory" and "monitoring" frequently are misused or are used interchangeably, even though the goals (and therefore the techniques and procedures) of one are quite different from the other. The primary goal of inventory is to document the presence of target species in a given area; the purpose of monitoring is to evaluate the status and population trends of those species that are known to be present. Although our multi-pronged survey approach proved to be an effective and efficient tactic for conducting inventories at a large number of sites during a relatively short time period, future monitoring will be required to determine population viability and status of species documented within the parks. In addition, active management of some habitats will be necessary to ensure the long-term persistence of certain amphibian and reptile species within these protected areas.

Government-managed lands "encompass 29% of the land area in the United States" (Gibbons et al. 1997), mostly in the West, with over 32 million ha set aside within the National Park System alone (Stohlgren et al. 1995). The National Park System is a major contributor to the protection of land and biodiversity, and national parks often serve as habitat havens for numerous species of indigenous amphibians and reptiles. These parks become especially important in situations in the Southeast where encroaching urban development (e.g., Ocmulgee National Monument, Chattahoochee River National Recreation Area) or agricultural impacts (e.g., Congaree Swamp National Monument, Horseshoe Bend National Military Park) may have resulted in local extirpations in a region. Thus, the potential contribution of protected lands in the National Park System to biodiversity conservation is far-reaching and should be widely recognized and appreciated by land managers, conservation biologists, and the general public.

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**Appendix 1.** List of data sources (by park) documenting reptile and amphibian species occurrences reported in Appendix 2–3.

Cape Hatteras National Seashore (CAHA)—*Literature records*: Beane 1998, Braswell 1988, Braswell 1997, Engels 1942, Gaddy et al. 1999, Gibbons and Coker 1978, Lazell and Musick 1973, Quay 1959, Stoneburner and Ehrhart 1981, Woodson and Webster 1999; *Museum records*: American Museum of Natural History, Carnegie Museum, Cornell University Museum, Harvard - Museum of Comparative Zoology, North Carolina State Museum; *Pers. comm.*: A. Braswell, R. Gaul and J. Mitchell, S. O’Neil, N.I. Turner (pers. notes, NPS files).

Cape Lookout National Seashore (CALO)—*Literature records*: Blaney 1979, Engels 1952, Gibbons and Coker 1978, Lazell and Musick 1973, National Park Service 1977; *Museum records*: American Museum of Natural History, Harvard - Museum of Comparative Zoology, North Carolina State Museum. *Pers. comm.*: NPS personnel.

Castillo de San Marcos (CASA)—none

Chattahoochee River National Recreation Area (CHAT)—*Museum records*: University of Georgia Museum of Natural History; *Pers. comm.*: J. Hightower, L. Wilson.

Charles Pinckney National Historic Site (CHPI)—none

Congaree Swamp National Monument (COSW)—*Literature records*: Cely and Bennett 1985, Mancke 1979; *Pers. comm.*: Cely (1996, to NPS), R. Mancke, Nathan Taylor, and NPS personnel.

Cumberland Island National Seashore (CUIS)—*Literature records*: Gibbons and Coker 1978, Hillestad et al. 1975, Lenarz et al. 1981, Ruckdeschel et al. 1982, Shoop and Ruckdeschel 1986, Shoop and Ruckdeschel 1997, Shoop and Ruckdeschel 2000; *Museum records*: Carnegie Museum, Cumberland Island Museum, National Park Service – Cumberland Island Natural History Collection, University of Georgia Museum of Natural History, Williamson and Moulis 1994a, Williamson and Moulis 1994b.

Fort Frederica National Monument (FOFR)—*Museum records*: Williamson and Moulis 1994a, Williamson and Moulis 1994b, University of Georgia Museum of Natural History.

Fort Matanzas National Monument (FOMA)—*Literature records*: King and Krysko 1999, Krysko and King 1999, Krysko and King 2000, McCoy and Mushinsky 1992; *Museum records*: Florida Museum of Natural History.

Fort Pulaski National Monument (FOPU)—*Literature records*: Rabolli and Ellington 1999, Southeastern Wildlife Services 1981; *Museum records*: Cornell University, Williamson and Moulis 1994a, Williamson and Moulis 1994b; *Pers. comm.*: NPS files.

Fort Sumter/Fort Moultrie (FOSU)—none

Horseshoe Bend National Military Park (HOBE)—*Literature records*: Hanlin and Russell 1978; *Museum records*: Auburn University Museum; *Pers. comm.*: H. Hanlin.

Kennesaw Mountain National Battlefield Park (KEMO)—*Museum records*: University of Georgia Museum of Natural History, Williamson and Moulis 1994a; *Pers. comm.*: G. Beaton, L. Wilson.

Moore's Creek National Battlefield (MOCR)—*Museum records*: North Carolina State Museum; *Pers. comm.*: NPS personnel.

Ocmulgee National Monument (OCMU)—*Literature records*: Jensen and Moulis 1997; *Pers. comm.*: H. Berna, NPS personnel.

Timucuan Ecological and Historical Preserve (TIMU)—*Museum records*: American Museum of Natural History, Florida Museum of Natural History; *Pers. comm.*: B. Mansel, P. Moler.



**Appendix 2.** Amphibian species documented during herpetofaunal surveys of the National Park Service's Southeast Coast Network: (o) park not within geographic range, (S) documented by SREL field surveys, (M) documented by a previously existing museum specimen, (L) documented by a published literature record, (P) documented by a reliable personal communication. Introduced species were not considered potential species unless they were documented. Data sources for this table are listed by park in Appendix 1. Full names for parks are provided in Figure 1 and Appendix 1. TIMU includes Ft. Caroline National Monument; FOSU includes Fort Moultrie National Monument; CAHA includes Wright Brothers National Memorial and Fort Raleigh National Historic Site. Scientific names follow Crother (2000).

|  | TIMU | CAHA           | CALO           | CASA | CHAT  | CHPI | COSW  | CUIS           | FOFR | FOMA  | FOPU  | FOSU | HOBE | KEMO | MOCR | OCMU    |
|--|------|----------------|----------------|------|-------|------|-------|----------------|------|-------|-------|------|------|------|------|---------|
| <b>Anurans</b>                                       |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| <i>Acris crepitans</i><br>Baird, 1854                |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| Northern Cricket Frog                                | o    | o              | o              | o    | P     | o    | S     | o              | o    | o     | o     | o    | S,P  | S,P  | o    | S       |
| <i>Acris gryllus</i><br>(Le Conte, 1825)             |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| Southern Cricket Frog                                | S,M  |                |                |      |       |      | L     | L              |      | P     |       |      | S    |      | S    | S,P     |
| <i>Bufo americanus</i><br>Holbrook, 1836             |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| American Toad  | o    | o              | o              | o    | S,P   | o    | o     | o              | o    | o     | o     | o    | S    | P    | o    | S       |
| <i>Bufo terrestris</i><br>(Bonnaterre, 1789)         |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| Southern Toad  | S,M  | L <sup>2</sup> |                | S    | o     | S    | S,L   | S,M,L          | S    | M,L   | S,M,L | S    |      | o    | S    | S,M,P,L |
| <i>Bufo fowleri</i><br>Hinkley, 1882                 |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| Fowler's Toad  | o    | S,M,L          | M,L            | o    | S,M,P | o    | o     | o              | o    | o     | o     | o    | S,P  | S,P  | S    | S       |
| <i>Bufo quercicus</i><br>Holbrook, 1840              |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| Oak Toad   |      |                | M <sup>4</sup> | o    | o     |      |       | L <sup>6</sup> |      |       |       |      |      | o    |      |         |
| <i>Gastrophryne carolinensis</i><br>(Holbrook, 1836) |      |                |                |      |       |      |       |                |      |       |       |      |      |      |      |         |
| Eastern Narrowmouthed Toad                           | S,M  | S,M,L          | S,M,L          | M,P  | M,P   | S    | S,M,L | S              | M,L  | S,M,L | S     | S,P  | S,P  | S    | S    | S,P     |



|  | TIMU | CAHA             | CALO           | CASA | CHAT  | CHPI | COSW | CUIS           | FOFR | FOMA | FOPU | FOSU | HOBE | KEMO  | MOCR | OCMU |
|--|------|------------------|----------------|------|-------|------|------|----------------|------|------|------|------|------|-------|------|------|
| <i>Pseudacris crucifer</i><br>(Wied Neuwied, 1839)                                   |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Spring Peeper  | S    |                  |                |      | P     |      | S,L  | S,M,L          |      |      |      |      | S,P  | P     | S    | S    |
| <i>Pseudacris feriarum</i><br>(Baird, 1854)  |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Southeastern Chorus Frog   | o    | o                | o              | o    | S,M,P |      | S    |                | o    |      |      |      | S    | S,P   | S    |      |
| <i>Pseudacris nigrata</i><br>(Le Conte, 1825)  |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Southern Chorus Frog   |      |                  |                |      | o     |      | S    | L <sup>6</sup> |      |      |      |      |      | o     |      | S    |
| <i>Pseudacris ocularis</i><br>(Bosc and Daudin in<br>Sonnini and Latreille,<br>1801) |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Little Grass Frog  | S,M  | M,L <sup>3</sup> | M <sup>4</sup> |      | o     |      |      | S,L            |      | L    |      |      |      | o     | S    |      |
| <i>Pseudacris ornata</i><br>(Holbrook, 1836)   |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Ornate Chorus Frog   |      |                  |                |      | o     |      | S,L  |                |      |      |      |      |      | o     | S    | S    |
| <i>Rana capito</i><br>Le Conte, 1855   |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Gopher Frog  | M    |                  |                |      | o     |      |      |                |      |      |      |      |      | o     |      |      |
| <i>Rana catesbeiana</i><br>Shaw, 1802  |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| American Bullfrog  | S    | S,M,L            |                |      | S,P   |      | S,L  |                |      |      |      |      | S,P  | S,P   | S    | S    |
| <i>Rana clamitans</i><br>Latreille in Sonnini and<br>Latreille, 1801                 |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Green Frog   | S    | L <sup>2</sup>   |                |      | S,M,P |      | S,L  |                |      |      |      |      | S,P  | S,M,P | S    | S,P  |
| <i>Rana palustris</i><br>Le Conte, 1825  |      |                  |                |      |       |      |      |                |      |      |      |      |      |       |      |      |
| Pickereel Frog   | o    |                  |                | o    | S,P   |      | S    | o              | o    | o    | o    |      | S,M  | P     | S    | o    |







|  | TIMU | CAHA             | CALO | CASA | CHAT  | CHPI | COSW | CUIS | FOFR | FOMA | FOPU | FOSU | HOBE  | KEMO  | MOCR | OCMU |
|--|------|------------------|------|------|-------|------|------|------|------|------|------|------|-------|-------|------|------|
| <i>Notophthalmus viridescens</i><br>(Rafinesque, 1820)<br>Eastern Newt                       | S,P  | M <sup>d</sup>   |      |      | S,P   |      |      | L    |      |      |      |      | S,M,P |       |      |      |
| <i>Plethodon glutinosus</i><br>complex<br>Slimy Salamander                                   | M    | M,L <sup>3</sup> |      |      | S,P   | S    | S,L  |      |      |      |      |      | S,P   | S,M,P | S    | S,P  |
| <i>Plethodon cinereus</i><br>(Green, 1818)<br>Eastern Redbacked<br>Salamander                | o    | S,L <sup>2</sup> | o    | o    | o     | o    | o    | o    | o    | o    | o    | o    | o     | o     | o    | o    |
| <i>Plethodon serratus</i><br>Grobban, 1944<br>Southern Redbacked<br>Salamander               | o    | o                | o    | o    | S,P   | o    | o    | o    | o    | o    | o    | o    | o     | S,M,P | o    | o    |
| <i>Plethodon websteri</i><br>Highton, 1979<br>Webster's Salamander                           | o    | o                | o    | o    |       |      |      |      |      |      |      |      |       | S,M,P | o    | o    |
| <i>Pseudobranchius striatus</i><br>(Le Conte, 1824)<br>Northern Dwarf Siren                  |      |                  |      |      |       |      |      |      |      |      |      |      |       |       |      |      |
| <i>Pseudotriton montanus</i><br>Baird, 1849<br>Mud Salamander                                |      |                  |      |      |       |      |      |      |      |      |      |      |       |       |      |      |
| <i>Pseudotriton ruber</i><br>(Latreille in Sonnini and<br>Latreille, 1801)<br>Red Salamander | o    | o                | o    | o    | S,M,P | o    |      | o    | o    | o    | o    | o    | S,P   | S,P   | o    | S    |



|   | TIMU | CAHA | CALO | CASA | CHAT | CHPI | COSW | CUIS | FOFR | FOMA | FOPU | FOSU | HOBE | KEMO | MOCR | OCMU |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <i>Siren intermedia</i><br>Barnes, 1826                       |      |      |      |      | o    |      |      |      |      |      |      |      |      | o    |      | M    |
| Lesser Siren  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <i>Siren lacertina</i><br>Linnaeus, 1766                      |      |      |      |      | o    |      | S,L  |      |      |      |      |      | o    | o    |      | S    |
| Greater Siren   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <i>Stereochilus marginatus</i><br>(Hallowell, 1856)           |      |      |      |      |      |      |      |      |      | o    |      |      | o    | o    |      |      |
| Manylined Salamander  | o    |      |      | o    | o    | o    | o    | o    | o    | o    |      |      | o    | o    |      | o    |
| <b>Introduced amphibians</b>                                  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <i>Eleutherodactylus planirostris</i><br>(Cope, 1862)         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Greenhouse Frog   | S    |      |      | S    |      |      |      |      | S    |      |      |      |      |      |      | M,L  |
| <i>Osteopilus septentrionalis</i><br>Duméril and Bibron, 1841 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Cuban Treefrog  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | M,L  |

<sup>1</sup>Reported historically, not found in contemporary surveys.<sup>2</sup>Reported only from Wright Brothers National Memorial, Kill Devil Hills, Bodie Island; apparently not established within park boundaries at other sites.<sup>3</sup>Reported only from Ft. Raleigh National Historic site on Roanoke Island; apparently not established within park boundaries on Hatteras, Bodie, or Ocracoke Islands.<sup>4</sup>Reported only from NPS land on Harker's Island; apparently not established on Shackleford or Core Banks.<sup>5</sup>Reported by Hillestad et al. (1975); not found in contemporary surveys and believed to be erroneous by Shoop and Ruckdeschel (2000).



|   | TIMU | CAHA  | CALO | CASA | CHAT | CHPI | COSW | CUIS | FOFR | FOMA  | FOPU | FOSU | HOBE | KEMO | MOCR | OCMU |
|---|------|-------|------|------|------|------|------|------|------|-------|------|------|------|------|------|------|
| <i>Clemmys guttata</i><br>(Schneider, 1801)                                     |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Spotted Turtle  | M,L  | M,L   |      |      | o    |      | P    |      |      |       |      |      | o    | o    |      |      |
| <i>Deirochelys reticularia</i><br>(Latreille in Sonnini and<br>Latrielle, 1801) |      |       |      |      |      |      |      | M,L  | S    |       |      |      |      |      |      | o    |
| Chicken Turtle  |      |       |      |      | o    |      |      |      |      |       |      |      |      |      |      | o    |
| <i>Graptemys nigrinoda</i><br>Cagle, 1954                                       |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Blacknosed Map Turtle   | o    | o     | o    | o    | o    | o    | o    | o    | o    | o     | o    | o    | o    | o    | o    | o    |
| <i>Graptemys pulchra</i><br>Baur, 1893  |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Alabama Map Turtle  | o    | o     | o    | o    | o    | o    | o    | o    | o    | o     | o    | o    | o    | o    | o    | o    |
| <i>Gopherus polyphemus</i><br>(Daudin, 1802)                                    |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Gopher Tortoise   | S,P  | o     | o    | o    | o    | o    | o    | L    |      | S,M,L |      |      | o    | o    | o    |      |
| <i>Kinosternon baurii</i><br>(Garman, 1891)                                     |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Striped Mud Turtle  | M    |       |      |      | o    |      |      | L    |      |       |      |      | o    | o    | S    |      |
| <i>Kinosternon subrubrum</i><br>(Lacépède, 1788)                                |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Eastern Mud Turtle  |      | S,M,L | M,L  |      | P    |      | S,L  | S,L  |      |       |      |      | S,P  | S    | S,P  |      |
| <i>Macrochelys temminckii</i><br>(Troost in Harlan, 1835)                       |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Alligator Snapping Turtle   | o    | o     | o    | o    | o    | o    | o    | o    | o    | o     | o    | o    | o    | o    | o    | o    |
| <i>Malaclemys terrapin</i><br>(Schoepff, 1793)                                  |      |       |      |      |      |      |      |      |      |       |      |      |      |      |      |      |
| Diamondbacked<br>Terrapin   | M,P  | M,L   | M,L  |      | o    |      | o    | M,L  | S    | S     | S,L  |      | o    | o    | o    | o    |

|   | TIMU | CAHA             | CALO           | CASA | CHAT  | CHPI | COSW | CUIS | FOFR | FOMA | FOPU | FOSU  | HOBE | KEMO | MOCR | OCMU |
|---|------|------------------|----------------|------|-------|------|------|------|------|------|------|-------|------|------|------|------|
| <i>Pseudemys peninsularis</i><br>(Carr, 1938)                                 |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Peninsula Cooter  | S    | 0                | 0              | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| <i>Pseudemys concinna</i><br>(Le Conte, 1830)                                 |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| River Cooter  | 0    |                  |                | 0    | S,P   |      | S    |      |      | 0    |      | S,M,P |      | S    | S,P  |      |
| <i>Pseudemys rubriventris</i><br>(Le Conte, 1830)                             |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Northern Redbellied Cooter  | 0    | M,L <sup>3</sup> |                | 0    | 0     | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0    |
| <i>Pseudemys nelsoni</i><br>(Carr, 1938)                                      |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Florida Redbellied Cooter   | S    | 0                | 0              | 0    | 0     | 0    | 0    | M,L  |      |      |      |       |      | 0    | 0    |      |
| <i>Sternotherus minor</i><br>(Agassiz, 1857)                                  |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Loggerhead Musk Turtle  | M    | 0                | 0              |      | P     | 0    | 0    |      |      |      |      | 0     | S    | 0    | 0    |      |
| <i>Sternotherus odoratus</i><br>(Latreille in Sonnini<br>and Latrielle, 1801) |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Stinkpot  | S    |                  |                |      | S,M,P |      | S,L  |      |      |      |      |       | S    | S,P  | S    | S,P  |
| <i>Terrapene carolina</i><br>(Linnaeus, 1758)                                 |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Eastern Box Turtle  | M    | L <sup>2</sup>   | S <sup>4</sup> |      | S,P   |      | S,L  |      | M,L  | S    |      |       | S,P  | S,P  | S    | S,P  |
| <i>Trachemys scripta</i><br>(Schoepf, 1792)                                   |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Pond Slider   | 0    | S,M,L            |                | 0    | S,P   |      | S,L  | M,L  | 0    | S,L  |      |       | S,P  | S    | S    | S,P  |
| <b>Marine Turtles</b>   |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| <i>Caretta caretta</i><br>(Linnaeus, 1758)                                    |      |                  |                |      |       |      |      |      |      |      |      |       |      |      |      |      |
| Loggerhead Seaturtle  |      | M,L              | S,M,L          |      | 0     | 0    | 0    | M,L  |      | L    |      |       | 0    | 0    | 0    | 0    |

|  | TIMU | CAHA  | CALO  | CASA | CHAT  | CHPI | COSW | CUIS           | FOFR | FOMA  | FOPU | FOSU | HOBE | KEMO | MOCR | OCMU |
|--|------|-------|-------|------|-------|------|------|----------------|------|-------|------|------|------|------|------|------|
| <i>Chelonia mydas</i><br>(Linnaeus, 1758)            |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Green Seaturtle                                      | M,L  | M     |       |      |       |      |      | M,L            |      | L     |      |      |      |      |      |      |
| <i>Dermochelys coriacea</i><br>(Linnaeus, 1766)      |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Leatherback Seaturtle                                | L    | M,L   |       |      |       |      |      | M,L            |      | L,S   |      |      |      |      |      |      |
| <i>Eretmochelys imbricata</i><br>(Linnaeus, 1766)    |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Hawksbill Seaturtle                                  |      |       |       |      |       |      |      | M,L            |      |       |      |      |      |      |      |      |
| <i>Lepidochelys kempi</i><br>(Garman, 1880)          |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Kemp's Ridley Seaturtle                              | L    | P     |       |      |       |      |      | M,L            |      |       |      |      |      |      |      |      |
| <b>Lizards</b>                                       |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| <i>Anolis carolinensis</i><br>Voigt, 1832            |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Green Anole  | S,M  | S,M,L | S,M,L |      | S,M,P | S    | S,L  | S,M,L          | S    | S,M,L | S,L  | S    | S,P  | S,P  | S    | S,P  |
| <i>Cnemidophorus sexlineatus</i><br>(Linnaeus, 1766) |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Sixlined Racerunner                                  | S,M  | S,M,L | S,M,L |      | M,P   |      |      | M,L            | S    | S,M,L |      | S    | M,P  | S    | S    | S    |
| <i>Eumeces egregius</i><br>(Baird, 1859)             |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Mole Skink   |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| <i>Eumeces anthracinus</i><br>(Baird, 1850)          |      |       |       |      |       |      |      | M,L            |      |       |      |      | P    |      |      |      |
| Coal Skink   |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| <i>Eumeces fasciatus</i><br>(Linnaeus, 1758)         |      |       |       |      |       |      |      |                |      |       |      |      |      |      |      |      |
| Common Fivelined Skink                               |      |       |       |      | S,M,P | S    | S,L  | L <sup>5</sup> |      |       |      |      | S,P  | S,P  | S    | S,P  |

|  | TIMU           | CAHA              | CALO    | CASA | CHAT | CHPI | COSW    | CUIS | FOFR    | FOMA | FOPU    | FOSU | HOBE    | KEMO | MOCR | OCMU |
|--|----------------|-------------------|---------|------|------|------|---------|------|---------|------|---------|------|---------|------|------|------|
| <i>Eumeces inexpectatus</i><br>Taylor, 1932                                  |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Southeastern Fivelined<br>Skink  | S              | S, M, L           | S, M, L | P    |      | S, L | M, L    |      | S, M, L | L    |         | P    |         | S    |      | P    |
| <i>Eumeces laticeps</i><br>(Schneider, 1801)                                 |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Broadheaded Skink  | S              | M, L <sup>3</sup> |         | S, P | S    | S, L | M, L    |      | S       |      |         | S, P |         | S    |      | S, P |
| <i>Ophisaurus attenuatus</i><br>Cope, 1880                                   |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Slender Glass Lizard   | P <sup>1</sup> |                   |         | P    |      |      |         |      |         |      |         |      |         |      |      |      |
| <i>Ophisaurus compressus</i><br>Cope, 1900                                   |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Island Glass Lizard  |                | o                 | o       | o    | o    | o    | M, L    |      |         |      |         | o    | o       | o    |      | o    |
| <i>Ophisaurus mimicus</i><br>Palmer, 1987                                    |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Mimic Glass Lizard   |                |                   |         | o    |      | o    |         |      |         |      |         | o    | o       | o    |      | o    |
| <i>Ophisaurus ventralis</i><br>(Linnaeus, 1766)                              |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Eastern Glass Lizard   | S, M           | S, M, L           | S, M, L | P    |      | M, L | M, L    |      | S       | M, L | S, M, L |      |         |      |      |      |
| <i>Rhineura floridana</i><br>(Baird, 1859)                                   |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Florida Worm Lizard  |                | o                 | o       | o    | o    | o    | o       | o    | o       | o    | o       | o    | o       | o    | o    | o    |
| <i>Sceloporus undulatus</i><br>(Latreille in Sonnini and<br>Latrielle, 1802) |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Eastern Fence Lizard   | S              |                   |         | S, P |      |      | S, M, L |      | S       |      |         | S    | S, M, P | S    |      | S, P |
| <i>Scincella lateralis</i><br>(Say in James, 1823)                           |                |                   |         |      |      |      |         |      |         |      |         |      |         |      |      |      |
| Little Brown Skink   | S              | S, M, L           | S, M, L | S, P | S    | S, L | S, M, L | S, M | M, L    | L    |         | S, P | S, P    | S    |      | S, P |

|   | TIMU           | CAHA           | CALO           | CASA | CHAT  | CHPI | COSW | CUIS  | FOFR | FOMA           | FOPU  | FOSU | HOBE | KEMO  | MOCR | OCMU |
|---|----------------|----------------|----------------|------|-------|------|------|-------|------|----------------|-------|------|------|-------|------|------|
| <b>Snakes</b>   |                |                |                |      |       |      |      |       |      |                |       |      |      |       |      |      |
| <i>Agkistrodon contortrix</i><br>(Linnaeus, 1766)<br>Copperhead                                 | o              |                |                | o    | S,P   |      | S,L  |       | o    |                |       |      | S,P  | P     | S    | P    |
| <i>Agkistrodon piscivorus</i><br>(Linnaeus, 1766)<br>Cottonmouth                                | P <sup>1</sup> | S,M,L          | L <sup>8</sup> |      |       |      | S,L  | M,L   |      | L <sup>1</sup> |       |      | S    |       | S    | S    |
| <i>Carphophis amoenus</i><br>(Say, 1825)<br>Eastern Wormsnake                                   | o              |                |                | o    | S,P   |      | L    | o     | o    | o              |       |      | M,L  | M,L,P | S    | S    |
| <i>Cemophora coccinea</i><br>(Blumenbach, 1788)<br>Scarletsnake                                 | S,M            |                |                |      | P     |      |      | M,L   | S    |                |       |      |      |       |      |      |
| <i>Coluber constrictor</i><br>Linnaeus, 1758<br>Eastern Racer                                   | S              | S,M,L          | S,M,L          |      | S,M,P |      | S,L  | S,M,L | S    | S,M,L          | S,M,L | S    | P    | S,P   | S    | S,P  |
| <i>Crotalus adamanteus</i><br>Palisot de Beauvois, 1799<br>Eastern Diamondbacked<br>Rattlesnake | S,M            | L <sup>9</sup> |                |      | o     |      | o    | M,L   |      | S,M,L          | S,M,L |      | o    | o     |      | o    |
| <i>Crotalus horridus</i><br>Linnaeus, 1758<br>Timber Rattlesnake                                |                | M,L            |                | o    |       |      | S,L  | L     | o    |                |       |      | P    |       |      | P    |
| <i>Diadophis punctatus</i><br>(Linnaeus, 1766)<br>Ringnecked Snake                              | S              | M,L            |                |      | S,M,P |      | S,L  | M,L   |      |                |       |      | S,P  | S,P   |      | S    |
| <i>Drymarchon corais</i><br>(Boie, 1827)<br>Eastern Indigo Snake                                | P <sup>1</sup> | o              | o              | o    | o     | o    | o    |       | M,L  |                |       | o    | o    | o     | o    | o    |



|  | TIMU           | CAHA             | CALO | CASA | CHAT | CHPI | COSW | CUIS | FOFR | FOMA | FOPU | FOSU | HOBE | KEMO | MOCR | OCMU |
|--|----------------|------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <i>Elaphe guttata</i><br>(Linnaeus, 1766)<br>Cornsake  | M              | S,M              |      | P    |      |      | M,L  | M    | M,L  | M,L  |      |      | P    |      |      | P    |
| <i>Elaphe obsoleta</i><br>(Say in James, 1823)<br>Eastern Ratsnake                                       | S              | M,L              | M,L  | S,P  | S    | S,L  | M,L  | S    | M,L  | M,L  | S    | P    | S,P  |      | S    | S,M  |
| <i>Farancia abacura</i><br>(Holbrook, 1836)<br>Redbellied Mudsnake                                       |                |                  |      | o    |      | L    | M,L  |      |      |      |      |      | o    |      |      |      |
| <i>Farancia erytrogramma</i><br>(Palisot De Beauvois in<br>Sonnini and Latreille, 1801)<br>Rainbow Snake |                | M,L <sup>3</sup> |      | o    |      |      |      |      |      |      |      |      | o    | o    | S    |      |
| <i>Heterodon platirhinos</i><br>Latreille in Sonnini and<br>Latreille, 1801<br>Eastern Hognosed Snake    |                | M,L              | M,L  | S,P  |      | L    |      |      |      |      |      |      | o    | o    | S    |      |
| <i>Heterodon simus</i><br>(Linnaeus, 1766)<br>Southern Hognosed Snake                                    |                |                  |      | o    |      |      |      |      |      |      |      |      |      |      |      |      |
| <i>Lampropeltis calligaster</i><br>(Harlan, 1827)<br>Yellowbellied Kingsnake                             | o              |                  | o    | P    |      |      | o    | o    | o    | o    |      |      |      |      |      |      |
| <i>Lampropeltis getula</i><br>(Linnaeus, 1766)<br>Common Kingsnake                                       | P <sup>1</sup> | M,L              | M,L  | S,P  |      | S,L  | M,L  | S    |      | L    |      | S,P  | S,P  | S,M  |      | S,P  |





|   | TIMU           | CAHA  | CALO | CASA | CHAT | CHPI | COSW | CUIS | FOFR  | FOMA | FOPU | FOSU | HOBE | KEMO | MOCR | OCMU |
|---|----------------|-------|------|------|------|------|------|------|-------|------|------|------|------|------|------|------|
| <i>Storeria dekayi/victa</i><br>(Holbrook, 1839)<br>DeKay's/Florida<br>Brownsnake   | P <sup>1</sup> | S,M,L |      | S,P  | S    |      |      |      |       |      |      | S,P  | P    |      |      | P    |
| <i>Storeria occipitomaculata</i><br>(Storer, 1839)<br>Redbellied Snake              | S              |       |      | S,P  | S,L  | M,L  | S    |      |       |      |      | S    | P    |      |      |      |
| <i>Tantilla coronata</i><br>Baird and Girard, 1853<br>Southeastern Crowned<br>Snake | o              |       |      | P    |      |      | o    | o    | o     |      |      |      |      |      |      |      |
| <i>Thamnophis sauritus</i><br>(Linnaeus, 1766)<br>Eastern Ribbonsnake               | M,P            | S,M,L | M,L  | P    | L    | M,L  | L    |      |       |      |      |      |      |      |      | S,P  |
| <i>Thamnophis sirtalis</i><br>(Linnaeus, 1758)<br>Common Gartersnake                | S,P            |       |      | S,P  | S    | M,L  | S    |      |       |      |      | P    | P    |      |      |      |
| <i>Virginia striatula</i><br>(Linnaeus, 1766)<br>Rough Earthsnake                   | S              |       |      | o    |      |      |      |      |       |      |      |      | o    | S    |      |      |
| <i>Virginia valerieae</i><br>Baird and Girard, 1853<br>Smooth Earthsnake            | o              |       |      | P    |      |      |      |      |       |      |      |      |      |      |      | S,P  |
| <b>Introduced reptiles</b>  |                |       |      |      |      |      |      |      |       |      |      |      |      |      |      |      |
| <i>Anolis sagrei</i><br>Cocteau in Duméril and<br>Bibron, 1837<br>Brown Anole       | S              |       |      | S    |      |      |      |      | S,M,L | S    |      |      |      |      |      |      |

|  | TIMU | CAHA | CALO | CASA | CHAT | CHPI | COSW | CUIS | FOFR | FOMA | FOPU | FOSU | HOBE | KEMO | MOCR | OCMU |
|--|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| <i>Pseudemys nelsoni</i><br>Carr, 1938                   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Florida Redbellied Cooter                                |      |      |      |      | S    |      |      |      |      |      |      |      |      |      |      |      |
| <i>Trachemys scripta</i><br>(Schoepf, 1792)              |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Pond Slider  |      |      |      |      |      | S    |      |      |      |      |      |      |      |      |      |      |
| <i>Hemidactylus garnotii</i><br>Duméril and Bibron, 1836 |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | M,L  |
| IndoPacific Gecko  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| <i>Hemidactylus turcicus</i><br>(Linnaeus, 1758)         |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Mediterranean House Gecko                                |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | M,L  |
| <i>Phrynosoma cornutum</i><br>(Harlan, 1825)             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Texas Horned Lizard                                      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | M    |

<sup>1</sup>Reported historically, not found in contemporary surveys.

<sup>2</sup>Reported only from Wright Brothers National Memorial, Kill Devil Hills, Bodie Island; apparently not established within park boundaries at other sites.

<sup>3</sup>Reported only from Ft. Raleigh National Historic site on Roanoke Island; apparently not established within park boundaries on Hatteras, Bodie, or Ocracoke Islands.

<sup>4</sup>Reported only from NPS land on Harker's Island; apparently not established on Shackleford or Core Banks.

<sup>5</sup>Reported by Hillestad et al. (1975); not found in contemporary surveys and believed to be erroneous by Shoop and Ruckdeschel (2000).

<sup>6</sup>Individuals occasionally reported from the park, almost certainly not a resident population.

<sup>7</sup>Suspected to be an introduced species.

<sup>8</sup>Historically reported, we and the NPS (1977; Management Report No. 22) find no evidence that these species still exist within park boundaries.

<sup>9</sup>Report (Quay 1959) is believed to be erroneous by several authorities; we found no evidence that the species is present within the park today.

<sup>10</sup>Apparently only known from Little Cumberland Island (Shoop and Ruckdeschel 2000).

**Appendix 4.** Summary of herpetofaunal surveys of the National Park Service's Southeast Coast Network. Full names for parks are provided in Figure 1 and Appendix 1. TIMU includes Ft. Caroline National Monument; FOSU includes Fort Moultrie National Monument; CAHA includes Wright Brothers National Memorial and Fort Raleigh National Historic Site.

|  | TIMU | CAHA   | CALO   | CASA | CHAT | CHPI | COSW | CUIS | FOFR | FOMA | FOPU  | FOSU | HOBE | KEMO | MOCR | OCMU |  |
|--|------|--------|--------|------|------|------|------|------|------|------|-------|------|------|------|------|------|--|
| Park size (ha)   | 3462 | 14,282 | 10,192 | 8    | 1847 | 11   | 8621 | 7631 | 97   | 121  | 2,172 | 79   | 826  | 1166 | 36   | 284  |  |
| # native species documented  | 60   | 48     | 35     | 3    | 62   | 8    | 61   | 64   | 20   | 26   | 24    | 8    | 61   | 43   | 49   | 55   |  |
| % within range native species documented   | 61.2 | 48.5   | 34.7   | 3.1  | 77.5 | 7.6  | 59.8 | 61.0 | 19.0 | 26.5 | 21.1  | 7.4  | 58.7 | 55.1 | 50.5 | 58.5 |  |
| # introduced species   | 4    | 0      | 0      | 3    | 1    | 0    | 0    | 0    | 1    | 5    | 1     | 0    | 0    | 0    | 0    | 0    |  |
| <b>Herpetofaunal assemblage composition (% of total number of native species documented)</b> |      |        |        |      |      |      |      |      |      |      |       |      |      |      |      |      |  |
| Anurans  | 25   | 23     | 23     | 67   | 19   | 25   | 34   | 23   | 25   | 23   | 29    | 50   | 30   | 23   | 37   | 29   |  |
| Salamanders  | 8    | 6      | 6      | 0    | 18   | 13   | 13   | 8    | 0    | 0    | 4     | 0    | 18   | 26   | 12   | 15   |  |
| Crocodilians   | 2    | 2      | 0      | 0    | 0    | 0    | 2    | 2    | 5    | 0    | 4     | 0    | 0    | 0    | 0    | 2    |  |
| Turtles  | 17   | 23     | 26     | 0    | 15   | 0    | 11   | 22   | 10   | 23   | 13    | 0    | 13   | 12   | 12   | 13   |  |
| Lizards  | 13   | 13     | 14     | 0    | 15   | 50   | 8    | 16   | 25   | 19   | 17    | 25   | 13   | 9    | 14   | 13   |  |
| Snakes   | 35   | 33     | 31     | 33   | 34   | 13   | 31   | 30   | 35   | 35   | 33    | 25   | 26   | 30   | 24   | 29   |  |
| <b>Survey technique effectiveness (number of species documented by method)</b>               |      |        |        |      |      |      |      |      |      |      |       |      |      |      |      |      |  |
| SREL field surveys   | 44   | 21     | 13     | 6    | 43   | 8    | 52   | 8    | 19   | 11   | 15    | 8    | 48   | 28   | 46   | 50   |  |
| Museum specimens   | 22   | 38     | 30     | 0    | 20   | 0    | 0    | 44   | 2    | 26   | 7     | 0    | 7    | 8    | 2    | 2    |  |
| Literature records   | 0    | 46     | 27     | 0    | 0    | 0    | 43   | 64   | 0    | 30   | 21    | 0    | 3    | 1    | 0    | 2    |  |
| Pers. communications   | 16   | 0      | 1      | 0    | 62   | 0    | 4    | 0    | 1    | 0    | 0     | 0    | 41   | 37   | 1    | 31   |  |