A Herpetofaunal Inventory of Herbert Hoover National Historic Site

Rebecca Richtsmeier

Department of Biology
Mount Mercy College, 1330 Elmhurst Drive, NE
Cedar Rapids, Iowa

May 2003

Technical report NPS/HTLN/P6370020218

Heartland Network
Inventory and Monitoring Program
National Park Service
6424 W. Farm Rd. 182
Republic, MO 65738

Table of Contents

List of Figures iii
List of Tables iii
Summary iv
Acknowledgments v
Introduction 1
Study Area 2
Materials and Methods 4
Results 5
Discussion 6
Conclusion 7
Literature Cited 8

List of Figures

Figure 1. Location of Herbert Hoover NHS, Cedar County, Iowa. 9

Figure 2. Location of herpetofaunal listening and visual survey areas, pit fall traps, and cover boards at Herbert Hoover NHS. 10

Figure 3. Distribution of herpetofauna species at Herbert Hoover NHS. 11

List of Tables

Table 1. List of amphibian and reptile expected and current status of occurrence at Herbert Hoover NHS..... 12

Summary

Little information on current species composition, distribution, and abundance existed for the park prior the inventory. Information is needed for park managers to make appropriate decisions to ensure the long-term sustainability of species and abide by the National Park Service (NPS) mission statement. Surveys were conducted from April-June 2002 via listening, visual surveys, pitfall traps, and cover boards. Only three snake species were found, a species richness and abundance considered low and attributed to lack of, or marginal, habitat. One voucher displaying typical phenotypic variation for each species encountered was collected. Management implications and recommendations identify possible steps to establish herpetofauna species populations at Herbert Hoover NHS.

Acknowledgments

The author wishes to thank the staff at Herbert Hoover National Historic Site for their kindness and willing support of the project. Thanks also go to the National Park Service' Heartland Network Inventory and Monitoring Program and Regional Offices who funded the project and to staff who assisted with project logistics. Thanks to Darcy Richtsmeier for the valuable field assistance.

Introduction

In 1998 Congress passed the National Parks Omnibus Management Act in response to concerns about the condition of natural resources within the national parks. The act requires each park to gather baseline inventory data on pertinent natural resources, data that will provide a pivotal step toward establishing an effective monitoring program furthering the ability to effectively manage and protect park resources. The National Park Service (NPS) responded with the Natural Resource Challenge program, including the establishment of biome-based inventory and monitoring networks. The Heartland Network, as part of the NPS Inventory and Monitoring (I&M) program, has undertaken inventories of vascular plants and vertebrates within fifteen parks in eight Midwestern states.

The decline of herpetofaunal species worldwide is a widely known phenomenon. The cause of declines is largely unknown but is likely a combination of habitat loss/alteration, environmental degredation, human persecution, and increased predation. Amphibians' biphasic lifecycles and permeable skin make them particularly suseptible to local hydrologic modifications and environmental pollutants and make them potential indicators of environmental health.

Stemming from the Natural Resource Challenge and a concern regarding the status of herpetofaunal populations at Herbert Hoover NHS, an inventory was deemed necessary to determine resident amphibians and reptiles.

Beginning in 1993, a prairie monitoring program was established at Herbert Hoover NHS to establish and implement inventory and monitoring methods for all taxa (plants, invertebrates, vertebrates). Later that year, an annual report listed amphibians and reptiles abundance by month based on chance findings by park staff (Osowski 1993). Four species were listed (these absent in many months and uncommon in others) and included the American toad, bull snake (*Pituophis melanoleucus*), eastern garter snake (*Thamnophis sirtalis sirtalis*), and western ribbon snake (*Thamnophis proximus*). Such a low number of species documented in this report was probably due to lack of adequate equipment and personnel time to achieve a minimal inventory. A comprehensive inventory will contribute to the development of a herpetofaunal monitoring plan.

In the spring/summer of 2002 a short-term, herpetofaunal survey was conducted at the park. The inventory had three objectives: 1) document at least 90% of the amphibian and reptile species reasonably expected to occur at Herbert Hoover NHS; 2) provide an up-to-date assessment of species richness; and 3) collect and deposit with the park a representative a set of voucher specimens.

Study Area

Herbert Hoover National Historic Site is located in east-central Iowa within the incorporated city of West Branch, adjacent to businesses, residences, agricultural fields, and Interstate 80 (Figure 1). The 75.6 ha (186.8 ac) tract, includes the historic buildings, the presidential library museum, park facilities, and infrastructure. Additional resources include a tributary to the west branch of Wapsinonoc Creek, a 30.8 ha (76 ac) reconstructed tallgrass prairie, Village Green, picnic area, and open space. Approximately 21.1 ha (52 ac) are parkland grounds including landscape with sparse trees, shrubs, and grass.

The park is within the Southern Iowa Drift Plain, where drainages cut a pattern of abruptly rolling countryside. Erosion and fracturing are constant problems in these friable clay/loess (Tama-Downs) soils (Soil Conservation Service 1978). Streams that did not exist 150 years ago, such as the creek on site, have cut paths through areas that were once wetlands and seeps and are ephemeral and very susceptible to flash flooding.

Interstate-80 passes along the southern border and downtown West Branch shares the northern and eastern borders of the site. A working row-crop farm (property of NPS and on a life-time lease to a private farmer) lies along the western border. A prairie separates the Hoover gravesite from the Interstate to its south and farm to the west. This prairie should "maintain the landscape adjacent to the presidential library and gravesite in a manner appropriate to the memorial character of these areas." The prairie covers upland areas and a portion of the flood plain.

The park originally seeded 30.8 ha (76 ac) of the prairie buffer with five species of native grasses (big bluestem, *Andropogon gerardii*; switchgrass, *Panicum virgatum*; Indian grass, *Sorghastrum nutans*; little bluestem, *A. scoparium*; and side oats grama, *Bouteloua curtipendula*) in the spring of 1971.

Park staff added several forb species in 1976 and made subsequent additions of forbs and Canada wild rye (*Elymus canadensis*) in 1992 and 1994. In 1997, a savanna was created on the southeast ridge of the prairie. This savanna was intended to further buffer the gravesite from the visual development along the Interstate. A nut tree grove was planted in the spring of 2000 as another eventual savanna area immediately south and west of the gravesite.

Surrounding landscape and land uses provide a potential source of exotic weeds and invasive plants for the prairie and creek bed. Agricultural runoff enters the prairie along three drainages on the western border. Some of the most extensive invasions of exotic plants occur along these drainages and the flood plain to the creek. Fencerows and mowed areas of the park are planted to Kentucky bluegrass (*Poa pratensis*), fescue (*Festuca* spp.*),* and smooth brome grass (*Bromus inermis*). Reed canary grass (*Phalaris arundinacea*) and various woody plants, including escaped ornamentals from the cultural area of the site, have invaded the prairie. The watershed above the site consists of agricultural land, residential areas, a golf course, and abandoned agricultural land being developed for commercial and residential purposes.

The reconstructed prairie represents one of the largest protected prairies in the vicinity. Only about 2,000 ha (~5,000 ac) of tallgrass prairie are currently protected in the public domain in

Iowa. The expansive mowed area mimics savanna conditions and attracts birds associated with the oak-hickory savanna. No threatened or endangered species have been identified on site, but the site provides a significant island of habitat for native plants, neo-tropical migrant birds, and numerous other species in a highly developed agricultural landscape.

Materials and Methods

The inventory was conducted April-June 2002 using the the Iowa frog and toad survey sampling period protocol: Period 1, April 1-28 (water temperature 50°F), Period 2, May 7-June 4 (water temperature 60°F), and Period 3, June 13-July 10 (water temperature 70°F). Survey methods included evening listening for frogs and/or toads, visual surveys for turtles and water snakes, pitfall traps with drift fences, and cover boards. Due to the lack of habitat (backwaters, pools, or standing water), no trapping for salamanders was conducted.

Two evening surveys during each of the three sampling periods were conducted for a total of 3 hours. Listening locations included the upper portion of the prairie (south), the tributary creek as it passes through the maintained grounds, and the north access to the prairie where the tributary creek passes through. Each location was surveyed for 10 minutes, and chorus intensity determined by the following relative abundance index: 1-Individuals can be counted, there is space between the calls; 2-Calls of individuals can be distinguished, but there is some overlapping; 3-Full chorus, calls are constant, continuous, and overlapping.

A combination of visual surveys and pit fall traps with drift net fences was deployed for turtles and terrestrial reptiles. A visual survey along the nearby Wapsinonoc Creek was conducted on 22 May. The tributary that passes through the property ("Hoover Creek") was surveyed on 3 May, 29 May, and 5 June. Visual surveys were conducted throughout the prairie. Three primary points were located within the reconstructed prairie (Figure 2) and three drift net fences, 50 meters in length, were placed with 6-5 gallon pit falls for each fence.

Pitfall traps were employed for 14 days from mid-May to the end of June. Between trapping events, pit falls were covered and at the end of June, traps were removed. Three pieces of plywood, each a minimum of 1 x 1m, were deployed in the prairie and periodically checked.

Sample points were recorded using a Trimble GeoExporer 3 Global Positioning System (GPS) portable hand-held unit at the highest accuracy possible.

An expected species list (Boetsch et al. 2000) was used to evaluate species documented via this inventory (Table 1). In addition, staff were interviewed about their observations of herpetofauna at the site. Taxonomy follows Conant and Collins (1991). A single voucher specimen of each species was taken during the inventory.

Specimens prepared for museum storage were body positioned, fixed in 10% formalin, and preserved in 70% ethanol following Pisani 1973. All specimens were deposited at Herbert Hoover NHS.

Results

No amphibians and 3 reptiles (all snakes) were documented. These include the fox snake (*Elaphe vulpina*), brown snake (*Storeria dekayi*), and plains garter snake (*Thamnophis radix*) (Table 1, Figure 3).

Discussion

Expected Species

Not all herpetofaunal species listed as possible or expected were found; furthermore, no material evidence of the existence of species other than those captured was found. I would suggest that this is not a location likely to attract these species.

It was suprising that American toads (*Bufo americanus*) were not heard or seen during sampling. Other species that would be expected in this habitat include eastern garter snake (*Thamnophis sirtalis sirtalis*) and the red-sided garter snake (*Thamonphis sirtalis parietalis*) with the northern water snake (*Nerodia sipedon sipedon*) expected near the tributary. The snake identified as a black rat snake (*Elaphe obsoleta*) was possibly a mistaken identification or else a snake transported into the area. The report of a bullsnake could not be verified by this survey.

Anecdotal reporting of a snapping turtle observed in the West Branch city park and another on the National Park were not corroborated by evidence in this study. This species could have swum up the tributary and may be an occasion occurrence. Available habitat is inadequate to support snapping turtles. In addition, western painted turtles (*Chrysemys picta bellii*) and softshell turtles (*Apolone* sp.) are possible in and around this creek, but were not located in this study.

Conclusion

Based on this inventory, the authors' make two recommendations to secure and/or promote species diversity. To attract species not encountered in this inventory:

1) create an amphibian reproductive site (pond) and possibly attract northern chorus frogs (*Pseudacris* sp.) and American toads. There are two possible locations that could become good frog and toad breeding habitat: a seep on the south end of the prairie where trap-line fence three was located and the low-lying wet area west of Herbert Hoover's gravesite where trap-line fence two was placed. However, with the concern over spread of mosquito-borne viruses, development of ponds should be weighed against public health concerns;

2) provide more hibernacula sites for reptiles, particularly snakes.

Literature Cited

Boetsch J., M. DeBacker, P. Hughes, D. Peitz, L. Thomas, G. Wagner, and B. Witcher. 2000. A study plan to inventory vascular plants and vertebrates: Heartland Network, National Park Service.

Conant, R. and J. T. Collins. 1991. A field guide to reptiles and amphibians. Houghton Mifflin Co., Boston, MA.

Osowski, S. 1993. Herbert Hoover NHS inventory and monitoring program 1993 report. National Park Service.

Soil Conservation Service. 1978. Soil survey of Cedar County, Iowa.

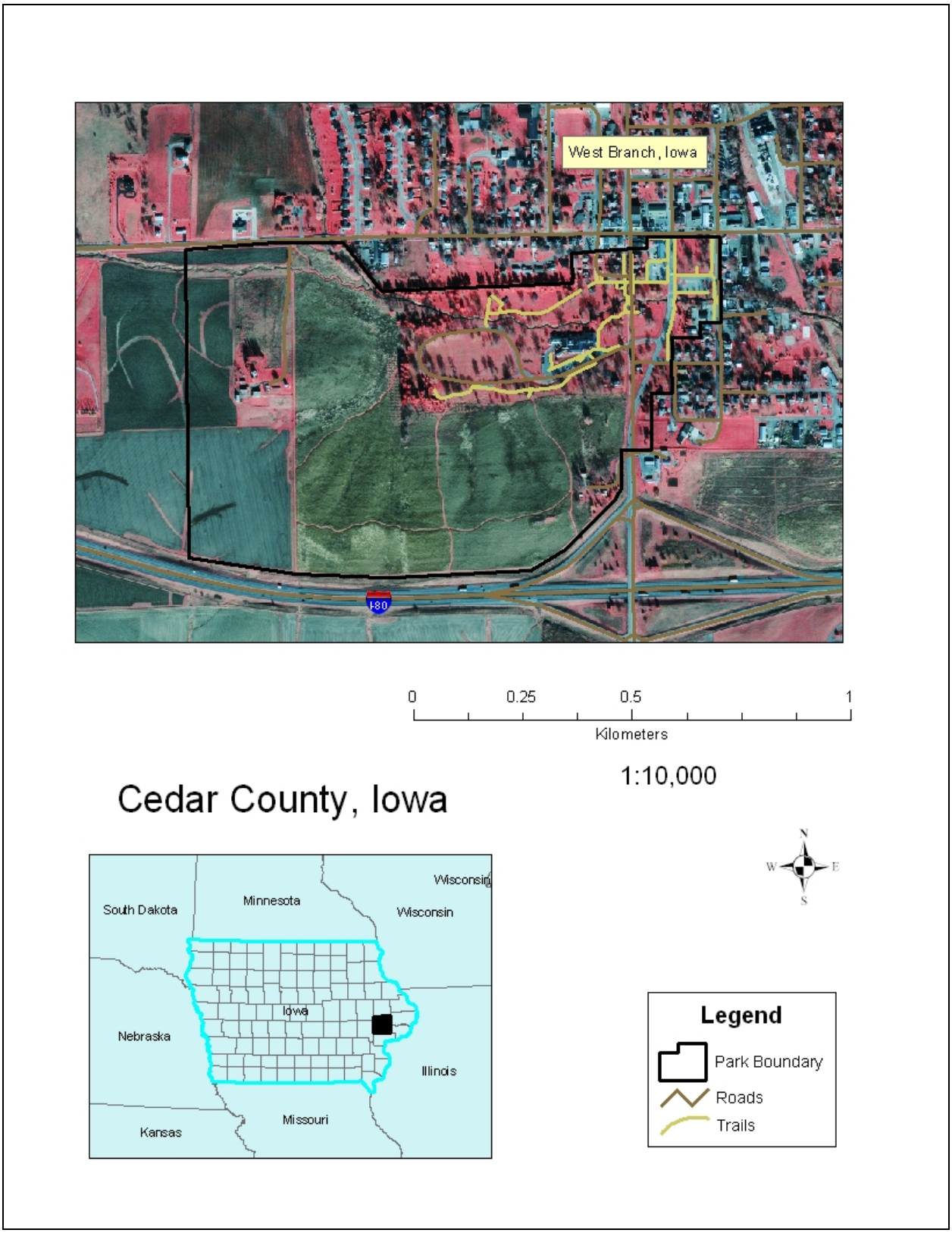

Figure 1. Location of Herbert Hoover NHS, Cedar County, Iowa.

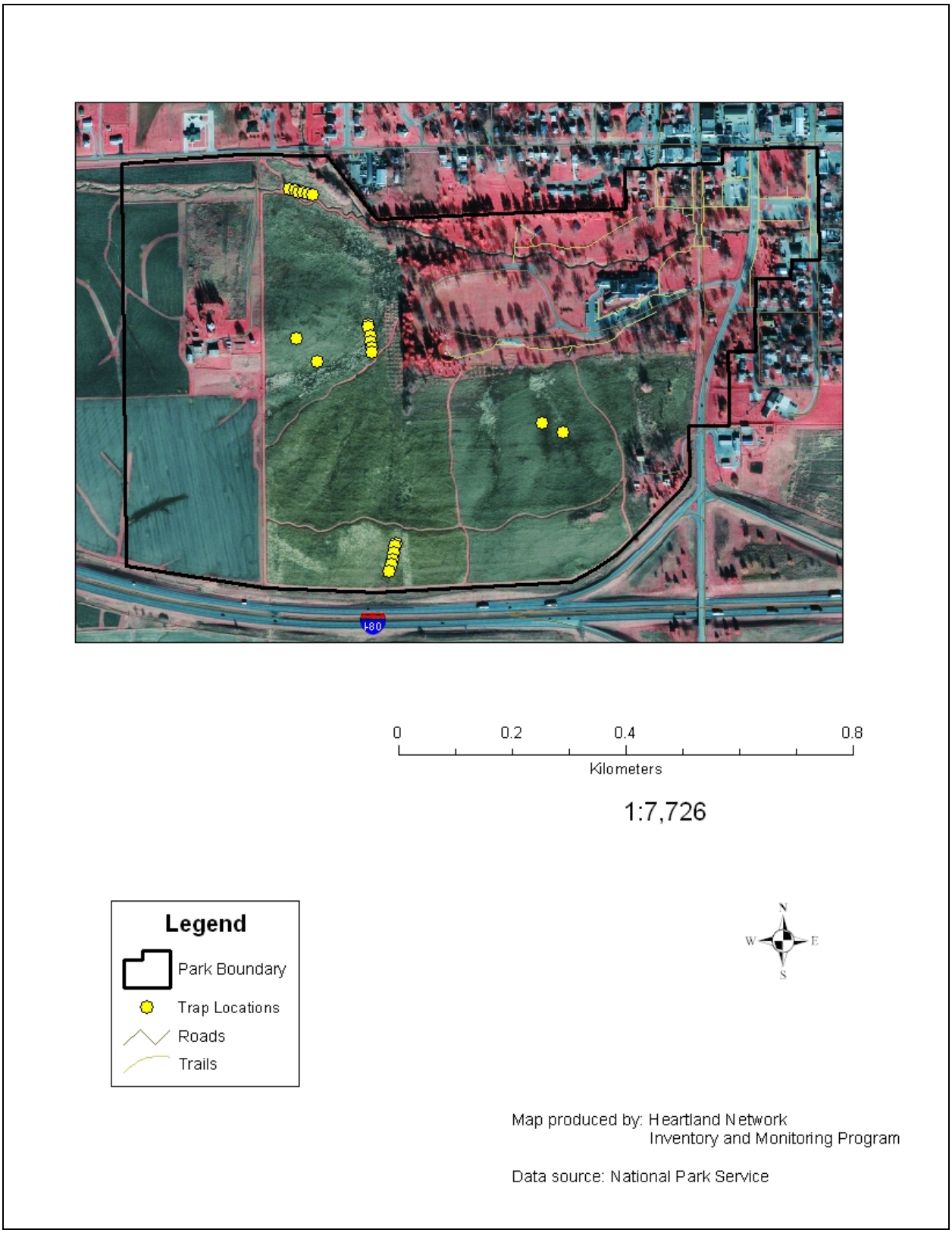

Figure 2. Location of herpetofaunal survey areas at Herbert Hoover NHS.

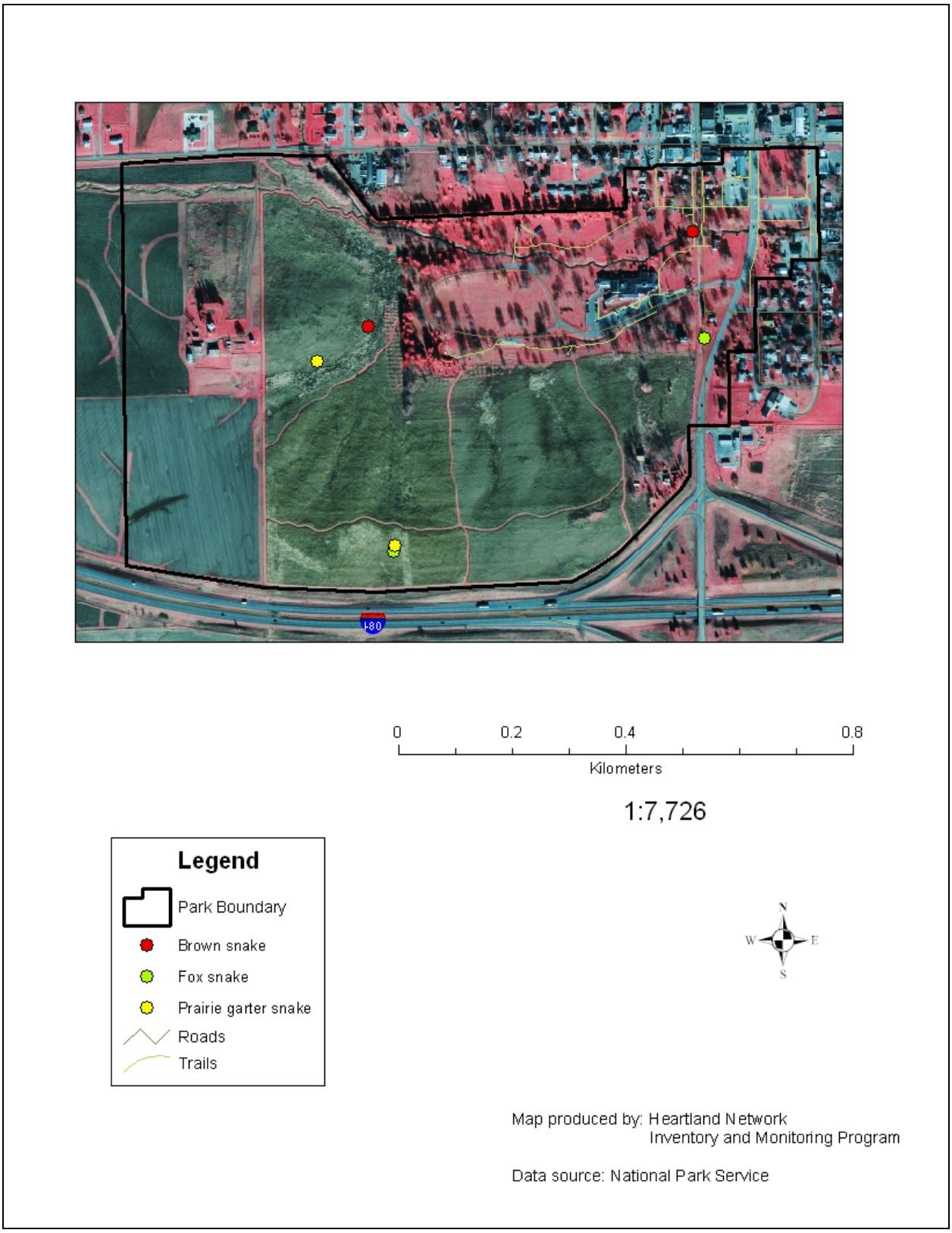

Figure 3. Distribution of herpetofauna species at Herbert Hoover NHS.

Table 1. List of amphibian and reptile expected and current status of occurrence at Herbert Hoover NHS.

Amphibians	**Family**	**Scientific Name**	**Common Name**	**Old**	**New**	**Author**
Order Anura	Bufonidae	Bufo americanus	American toad	2	?	No
	Hylidae	Acris crepitans	Cricket frog	1	?	No
		Hyla chrysoscelis/versicolor	Gray treefrog	1	?	No
		Pseudacris crucifer	N. spring peeper	1	?	No
		Pseudacris triseriata	Western chorus frog	1	?	No
	Ranidae	Rana blairi	Plains leopard frog	1	?	No
		Rana catesbeiana	Bullfrog	1	?	No
		Rana clamitans	Green frog	1	?	No
		Rana palustris	Pickerel frog	1	?	No
		Rana pipiens	N. leopard frog	1	?	No
Order Caudata	Ambystomatidae	Ambystoma texanum	Smallmouth salamander	1	?	No
		Ambystoma tigrinum	E. tiger salamander	1	?	No
	Salamandridae	Notophthalmus viridescens	Central newt	1	?	No
Class Reptilia	Chelydridae	Chelydra serpentina	Snapping turtle	1	1	No
Order Testudines	Emydidae	Chrysemys picta	Painted turtle	1	1	No
		Emydoidea blandingii	Blanding's turtle	1	?	No
		Graptemys geographica	Map turtle	1	?	No
		Terrapene ornata	Ornate box turtle	1	?	No
	Trionychidae	Trionyx muticus	Smooth softshell	1	1	No
		Trionyx spinifer	Spiny softshell	1	1	No
Order Squamata	Colubridae	Coluber constrictor	Racer	1	?	No
		Diadophis punctatus	Ringneck snake	1	?	No
		Elaphe obsoleta	Black rat snake	1	?	No
		Elaphe vulpina	Fox snake	1	2	Yes
		Heterodon platyrhinos	E. hognose snake	1	?	No
		Lampropeltis calligaster	Prairie kingsnake	1	?	No
		Lampropeltis triangulum	Milk snake	1	?	No
		Nerodia sipedon	Northern water snake	1	1	No
		Pituophis melanoleucus	Bull snake	2	?	No
		Regina grahami	Graham's crayfish snake	1	?	No
		Storeria dekayi	Brown snake	1	2	Yes
		Storeria occipitomaculata	Redbelly snake	1	?	No
		Thamnophis proximus	Western ribbon snake	3	?	No
		Thamnophis radix	Plains garter snake	1	2	Yes
		Thamnophis sirtalis parietalis	Garter snake	na	1	No
		Thamnophis sirtalis sirtalis	Garter snake	2	1	No
		Tropidoclonion lineatum	Lined snake	1	?	No
	Viperidae	Sistrurus catenatus	Massasauga	1	?	No

"Old" indicates the status prior the inventory, "New" the status after the inventory, and "Author" indicates whether the author vouchered the species. Values for Old and New follow Boetsch et al (2000): a "1" is used to indicate that a given species is expected, "2" indicates that the species was observed (documented within the park), "3" indicates species that were not on the expected species list but were observed, and "4" indicates an extinct or regionally extirpated species.