



An Evaluation of Biological Inventory Data Collected at Homestead National Monument of America *Vertebrate and Vascular Plant Inventories*

Natural Resource Technical Report NPS/HTLN/NRTR—2009/246



protecting the habitat of our heritage



Heartland
Network

Natural Resource Monitoring

ON THE COVER

Herbert Hoover birthplace cottage at Herbert Hoover NHS, prescribed fire at Tallgrass Prairie NP, aquatic invertebrate monitoring at George Washington Carver NM, the Mississippi River at Effigy Mounds NM.

An Evaluation of Biological Inventory Data Collected at Homestead National Monument of America

Vertebrate and Vascular Plant Inventories

Natural Resource Technical Report NPS/HTLN/NRTR—2009/246

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Abstract

The Inventory and Monitoring program of the NPS provides twelve basic inventories for park managers, including lists of species that occur in NPS units. Four hundred seventy two species are certified on the list of vascular plants and vertebrates for Homestead National Monument of America (HOME). Based on a review of the evidence, 441 (93%) species were categorized as Present in Park, and 31 (7%) as Probably Present. One hundred thirty nine species were Unconfirmed or Historic. In addition to documenting the presence of species, reviewers categorized the general abundance of 74 (17%) species and determined residency for all documented vertebrates with the exception of 34 (3 mammals, 31 birds). Species lists for HOME can be queried from the Natural Resource Information Portal at <http://nrinfo.nps.gov/Home.mvc>.

Fifty three non-native species are documented to occur in the park. Of these are six birds, two fish, one mammal, and 44 vascular plants. Non-native vascular plant species were assigned a NatureServe Invasive Species Impact Rank (I-Rank) based on impact to native species and natural biodiversity. Four of the 44 (9%) non-native plants found on HOME received an overall I-Rank score that included the high category (i.e. most threatening).

A total of 59 species are listed by the Nebraska Game and Parks Commission as a species of conservation status. No federally listed species are documented on HOME. Six state listed species include five threatened: massasauga, finescale dace, northern redbelly dace, river otter, and Southern flying squirrel, and one endangered: blacknose shiner. Future inventory efforts are discussed.

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Introduction

As part of the National Park Service's effort to "improve park management through greater reliance on scientific knowledge," a primary role of the Inventory and Monitoring (I&M) Program is to collect, organize, and make available natural resource data. A list of species known to occur in NPS units is considered a basic inventory need (see: <http://science.nature.nps.gov/im/inventory/index.cfm>). The I&M Program's Heartland Network (HTLN) recently completed inventories of vertebrate species and vascular plants at Homestead National Monument of America (HOME). In doing so, all existing data were cataloged, targeted field investigations were conducted, and species lists were certified by taxonomic experts. The primary goal of these efforts was to document at least 90% of the vertebrate and vascular plant species believed to occur in the park. This report provides a summary of results.

Methods

The HTLN followed a strategic plan of action set forth in an Inventory Study Plan (Boetsch et al. 2000) to complete inventories of vascular plants and vertebrate species. This plan was instigated by the Natural Resource Challenge in response to the National Parks Omnibus Management Act of 1998 and adheres to the requisite approaches delineated in Guidelines for Biological Inventories (NPS 1999) and the recommendations of the Service-wide I&M Program. The Inventory Study Plan identified steps to conduct a natural resource “information assessment” of existing park data. These steps included (1) developing master lists of species known or expected to occur in the park, (2) conducting field inventories, and (3) certifying the resultant species data.

The term species (as opposed to organism) is generically used throughout this report to refer to unique taxa at the species level or below.

Expected Species Lists

In order to determine the completeness of inventory information, the HTLN developed lists of vascular plants and vertebrates expected to occur in the park. The master lists of birds were derived from range maps in *The Golden Guide, A Guide To Field Identification Of North American Birds* (Robbins et al. 1983), and *National Geographic Society’s Field Guide To The Birds Of North America* (1987). The master list of fish was derived from fish distributions identified in the Nebraska Game and Parks Commission’s publication, *Common Fishes of Nebraska*. Expected amphibians were derived from the U.S. amphibian distribution map internet site at <http://home.bsu.edu/~00MJLANN00/USamphibians.html>. The range maps of Conant and Collins (1998) “*A Field Guide to Reptiles and Amphibians of Eastern and Central North America*” were used to derive expected reptile species lists. Any problems associated with synonymy were resolved by following Conant and Collins (1998). Jones et al. (1985) “*Guide to the Mammals of the Plains States*” was used to develop the mammal list. An initial compilation and evaluation of park floras was completed by Dr. Jim Bennett, National Wildlife Health Center, USGS BRD (Bennett 1995). Bennett compiled floras from “numerous sources: park lists, published journal articles and books, vegetation surveys, natural history reports, herbarium lists, park files and memoranda, and other miscellaneous park reports.” Species names were standardized to USDA PLANTS (1999) and inconsistencies in infraspecific designations were resolved on a case-by-case basis.

Compiling Existing Inventory Data

Concurrent with development of expected species lists, HTLN staff worked with technical support from the Natural Resource Program Center (NRPC) to consolidate existing inventories. HTLN staff searched for existing inventory data, extracted species lists from the reports, labeled the lists with appropriate reference information, and forwarded the data to NRPC for processing.

HTLN staff mined inventory data from regional inventory databases, and transferred the network’s Flora database. Staff also assembled bibliographic data concerning the primary park inventories. The Procite bibliographic database, NatureBib (aka NRBIB), was queried to produce an initial list of references. The lists were reviewed to ensure that each inventory: 1) included primary, rather than secondary, inventory data; 2) was based on observed, not expected, occurrences; and 3) was the result of professional surveys or research, rather than amateur observations. Park resource managers then reviewed and added to the lists.

HTLN staff searched for references to botanical collections as sources of species occurrence records. The process of searching regional herbaria for pertinent species records then commenced. The primary objectives were: 1) to find previously unknown collections; and 2) to document the current repository for older, known collections. The HTLN initiated a cooperative agreement with the National Wildlife Health Center (Biological Resources Division) to conduct computerized searches of regional and national museums and herbaria for park records of vertebrate and vascular plant occurrences. Given the limited timeframe, repositories with searchable collections databases were used. Dr. Jim Bennett, author of a summary of Midwestern NPS floras (Bennett 1995), was the principal investigator and was assisted with results of a search of the HOME ANCS+ database collection provided by the HTLN.

ANCS+ is a database management system developed by NPS to accession and catalog its museum collections.

The NPSpecies Database

NPSpecies is a master database for documenting the occurrence and status of all organisms in NPS units. The database includes standardized information associated with the occurrence of species, including scientific names and their synonyms (i.e. a local list or a standard list of species names), common names, abundance, residency, nativity, T&E status, and notes of particular management interest to a park. NPSpecies supports NPS staff and collaborators at the park, network, regional, and national levels by managing fundamental park-level species information, and making this information available to other applications and databases for more specialized analyses. A primary purpose for NPSpecies is to provide park managers, planners, and scientists with basic information on species occurrences and status for making decisions and working with other agencies, the scientific community, and the public for the long-term protection of park ecosystems (NPSpecies 2009).

Within NPSpecies, each species record is supported by evidence in the form of voucher specimens, references (scientific reports or datasets), and/or observation records that document the occurrence of the species in the park. Historical and currently-accepted scientific names from multiple taxonomic classification systems are cross-referenced using taxonomic standards (e.g., the Integrated Taxonomic Information System and the USDA PLANTS database) to allow for data integration and sharing across parks and with other agencies and organizations. In addition, parks are able to produce species lists based on the taxonomic authorities that are most accepted in their region and by their partner agencies.

Populating NPSpecies focused on three objectives: 1) transferring existing data; 2) including evidence for each record; and 3) verifying the accuracy of lists. As master species lists were compiled and transferred into NPSpecies a conservative approach was taken while assigning park status (e.g. present, probably present, etc.) to ensure that assessments of completeness were based on verifiable records. Many records imported from previous databases were unsubstantiated (i.e. not linked to a verifiable data source) and were classified as unconfirmed. Verification of vertebrate taxa was conducted by comparing digital records to original sources. The process proved valuable for assuring data quality as transcription errors, spelling mistakes, erroneous names, and synonymy problems were identified and corrected. In the process, park status (e.g. present in park, probable, unconfirmed) were also updated. After verifying and

updating, any remaining species without evidence were assigned an 'unconfirmed' status. Reliable status information is necessary to generate verifiable species lists for use in assessing inventory completeness. WASO I&M then completed the processing of these data and returned an NPSpecies database.

Inventories

Targeted field inventories were conducted to augment existing inventory data while addressing information gaps and high priority information needs. Two workshops were held during FY 2000 to assist in determining and prioritizing inventory needs (see appendix F in Boetsch et al. 2000). Regional taxa experts participated in these workshops and helped to revise project plans and priorities, and develop a greater awareness of taxa-specific inventory methods.

Subsequent to these initial steps, the HTLN began implementing inventories of amphibians and reptiles, birds, fish, mammals, and vascular plants. When completed, inventory reports were submitted to the HTLN and, once finalized, bibliographic data and the final report were uploaded to NatureBib. Species data (ie. taxonomic name, park status, abundance, etc.) and voucher data were uploaded to NPSpecies. Primary inventory data (ie. locations, events, etc.) and inventory specific data (i.e. bird counts, amphibian observations, etc.) were entered in a Microsoft (MS) Access database standardized to the current natural resource database template (NRDT) and uploaded to the NPS Data Store.

Inventory Certification

To support the objective of documenting 90% of vertebrate and vascular plant species expected to occur, subject matter experts (i.e. those involved with HOME inventories) participated in the NPSpecies certification of taxonomic and attribute data for each taxa list. The process of certification is a data validation and quality assurance procedure for species checklists performed by subject matter experts most familiar with a particular taxonomic category. Taxon nomenclature are documented as well as park status, abundance, residency, and nativity.

Amphibian, reptile, and mammal certifications were compiled with current inventory data (Fogell 2003, Robbins 2005). Certification of the bird data relied on prior inventories (Powell 2000) through the USGS Northern Prairie Wildlife Research Center (Fayetteville, AR) and personal communications with the field researcher. Fish and vascular plant certifications were conducted by HTLN staff. Generally, species lists were distributed as MS Excel worksheets and returned with revisions. Revised expected species lists containing a species park status (present, probably present, etc), abundance (common, uncommon, rare, etc), residency (breeder, resident, etc), and nativity as well as other attribute details were then updated (where necessary) via the desktop NPSpecies to reflect the current species' park status. These lists were then uploaded to the master online version of NPSpecies.

Results

Twenty six references (see Appendix 1) and 46 vouchers led to the certification of 472 species (NPSpecies 2009). In total, 441 species were categorized as Present in Park and 31 as Probably Present (Table 1). Additionally, 139 species were categorized as Unconfirmed or Historic. Unconfirmed species were ranked as such due to weak evidence supporting their existence on the park.

Currently 72% of the species on the park's species list are documented (i.e., categorized as Present in Park). If species listed as Present in Park and Probably Present are included in the calculation, the percentage of documented species rises to 77%.

Table 1. Count of species by park status categories at HOME (NPSpecies 2009).

Park Status ¹	Bird	Fish	Mammal	Amphibian	Reptile	Vascular Plant	Total
Present in Park	79	14	31	5	8	304	441
Probably Present	2	17	10	1	1		31
Encroaching							
Unconfirmed	77	8	17	1	6	26	135
Historic				1	3		4
Total	158	39	58	8	18	330	611

¹ Refer to the Appendix for definitions of Park Status categories.

Of the 441 species documented as present, reviewers assigned a general abundance category (e.g., common, rare, etc.) to 74 (17%) (Table 2). Reviewers believed additional information was needed before an abundance category could be assigned to the remaining 367 (83%) species. Results are available to NPS staff through the Natural Resource Information Portal at <http://nrinfo.nps.gov/Home.mvc>. The portal is the product of the Integration of Resource Management Applications (IRMA) project. To learn more see: http://www1.nrintra.nps.gov/im/datamgmt/docs/IRMA_ProjectBrief_v1.0.pdf.

Residency values (e.g., breeder, migrant, resident, etc.) were assigned for all documented vertebrates with the exception of 34 that were categorized as unknown (31 birds, 3 mammals). Unknown residency values were assigned primarily because it was unclear as to whether or not the species bred on the park. Non-natives documented to occur in the park (i.e., Present in Park) total 53. Of these are six birds, two fish, one mammal, and 44 vascular plants.

NatureServe, in cooperation with The Nature Conservancy and NPS, developed a protocol to rank the impact of non-native invasive vascular plants (Morse et al. 2004). Through a series of standardized questions, non-native species are evaluated and assigned an Invasive Species Impact Rank (I-Rank) based on impact to native species and natural biodiversity. I-Ranks are categorized as high, medium, low, or insignificant. Four of the 44 (9%) non-native plants found on HOME received an overall I-Rank score that included the high category (Table 3). All are known to occur in the park (i.e., Present in Park).

A total of 59 species (Table 4) are listed by the Nebraska Game and Parks Commission as a species of conservation status. Additional NatureServe global, national, and subnational ranking

status is provided. The 59 listed species included 32 birds, three reptiles, six fish, 13 mammals, and five vascular plants. No federally listed species are documented on HOME. Six state listed species include five threatened: massasauga (*Sistrurus catenatus tergeminus*), finescale dace (*Phoxinus neogaeus*), northern redbelly dace (*Phoxinus eos*), river otter (*Lutra canadensis*), and Southern flying squirrel (*Glaucomys volans*) and one endangered: blacknose shiner (*Notropis heterolepis*).

Table 2. Count of species by abundance categories at HOME (NPSpecies 2009).

Abundance Category¹	Bird	Fish	Mammal	Amphibian	Reptile	Vascular Plant	Total
Abundant	7		2				9
Common	24		17				41
Uncommon	21		3				24
Rare							
Occasional							
Unknown	27	14	9	5	8	304	367
Total	79	14	31	5	8	304	441

¹ Refer to the Appendix for definitions of Park Status categories.

Table 3. Non-native plants, occurring on HOME, with an Invasive Species Impact Rank (I-Rank) containing high.

Scientific Name	Common Name	Overall I-Rank	Ecological Impact ¹	Management Difficulty ²	I-Rank Reasons Summary ³
<i>Berberis thunbergii</i>	Japanese barberry	High / Medium	High / Medium	Insignificant	A serious problem in New England where it can form thick stands that eliminate all native understory plants. Although it was initially thought to invade mostly disturbed sites (old fields, roadsides, etc.) it is now known to invade high quality habitats.
<i>Bromus inermis</i>	Smooth brome	High / Medium	Medium	Medium	A threat to prairie and grasslands in the Midwest; alters rate of natural succession; changes native species composition; highly persistent.
<i>Carduus nutans</i>	Nodding thistle	High / Low	Medium / Insignificant	High / Medium	Persistent in open areas, including prairies, grasslands, roadsides and areas of disturbance in dense woods; prolific seed production; seeds viable for up to 15 years.
<i>Morus alba</i>	White mulberry	High / Medium	Medium / Low	Medium / Low	Distributed throughout most of the U.S.; spread by birds and mammals; moderate capability of invading undisturbed areas.

¹ Subcategory of Overall I-Rank specifically addressing species negative impacts on native plant/animal populations/communities.

² Subcategory of Overall I-Rank specifically addressing difficulty of control.

³ Summary reasons for NatureServe Overall I-Rank. For more information see the NatureServe Species Explorer at <http://www.natureserve.org>. These summaries reflective of NatureServe data last updated 6 February, 2009.

Table 4. Species on the park's local list which possess a state heritage program rank and/or other designated conservation status (State Heritage Conservation Rank/Status, Global, National, Subnational, and/or a Federal Status).

Bird	Scientific Name	Park Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
American bittern	<i>Botaurus lentiginosus</i>	Unconfirmed	S3		G4 / N4B,N4N / S4	
Bald eagle	<i>Haliaeetus leucocephalus</i>	Unconfirmed	S1		G5 / N5B,N5N / S3	Stable to increasing
Barred owl	<i>Strix varia</i>	Unconfirmed	S2		G5 / N5 / S2	
Bell's vireo	<i>Vireo bellii</i>	Unconfirmed	S4		G5 / N4B / S5	
Black and white warbler	<i>Mniotilta varia</i>	Unconfirmed	S3		G5 / N5B,N4N5N / S3	
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Unconfirmed	S5		G5 / N5B / S5	
Black tern	<i>Chlidonias niger</i>	Unconfirmed	S3		G4 / N4B / S3	Severely to rapidly declining
Blue gray gnatcatcher	<i>Poliophtila caerulea</i>	Present in Park	S3		G5 / N5B,N5N / S4	
Brewer's blackbird	<i>Euphagus cyanocephalus</i>	Unconfirmed	S2		G5 / N5B,N5N / S4	
Brown creeper	<i>Certhia americana</i>	Present in Park	S3		G5 / N5 / S2	Declining to stable
Burrowing owl	<i>Athene cunicularia</i>	Unconfirmed	S3		G4 / N4B,N4N / S5	Declining
Carolina wren	<i>Thryothorus ludovicianus</i>	Present in Park	S2		G5 / N5 / S2	
Cooper's hawk	<i>Accipiter cooperii</i>	Unconfirmed	S1		G5 / N5B,N5N / S5	Stable
Dark-eyed junco	<i>Junco hyemalis</i>	Present in Park	S1		G5 / N5 / S3	
Eastern meadowlark	<i>Sturnella magna</i>	Unconfirmed	S3		G5 / N5 / S5	Declining
Henslow's sparrow	<i>Ammodramus henslowii</i>	Unconfirmed	S1		G4 / N3B,N4N / S2	Severely declining
Lesser scaup	<i>Aythya affinis</i>	Present in Park	S3		G5 / N5B,N5N / S3	

Table 4 (cont.). Species on the park's local list which possess a state heritage program rank and/or other designated conservation status (State Heritage Conservation Rank/Status, Global, National, Subnational, and/or a Federal Status).

Bird	Scientific Name	Park Status ¹	State Heritage Program Rank/Status ²	Federal Status ³	Global / National / Subnational Status ⁴	Global Short Term Trend ⁴
Northern bobwhite	<i>Colinus virginianus</i>	Present in Park	S4		G5 / N5 / S5	Declining
Northern harrier	<i>Circus cyaneus</i>	Present in Park	S3		G5 / N5B,N5N / S4	Stable
Ovenbird	<i>Seiurus aurocapillus</i>	Unconfirmed	S4		G5 / N5B / S4	Stable
Pine siskin	<i>Carduelis pinus</i>	Unconfirmed	S3		G5 / N5 / S3	
Red crossbill	<i>Loxia curvirostra</i>	Unconfirmed	S4		G5 / N5 / S4	
Ruby throated hummingbird	<i>Archilochus colubris</i>	Unconfirmed	S3		G5 / N5B / S3	
Savannah sparrow	<i>Passerculus sandwichensis</i>	Unconfirmed	S3		G5 / N5B,N5N / S3	
Sedge wren	<i>Cistothorus platensis</i>	Unconfirmed	S2		G5 / N4B,N5N / S3	
Sharp shinned hawk	<i>Accipiter striatus</i>	Unconfirmed	S1		G5 / N5B,N5N / S1	Stable
Swainson's hawk	<i>Buteo swainsoni</i>	Unconfirmed	S3		G5 / N5B / S3	Common in areas of the Great Plains
Townsend's solitaire	<i>Myadestes townsendi</i>	Unconfirmed	S2		G5 / N5 / S2	
Tufted titmouse	<i>Baeolophus bicolor</i>	Present in Park	S3		G5 / N5 / S3	
Yellow billed cuckoo	<i>Coccyzus americanus</i>	Present in Park	S5		G5 / N5B / S5	Declining
Yellow breasted chat	<i>Icteria virens</i>	Present in Park	S5		G5 / N5B / SNR	Stable
Yellow throated vireo	<i>Vireo flavifrons</i>	Present in Park	S2		G5 / N5B,N4N / S3	Increasing

Table 4 (cont.). Species on the park's local list which possess a state heritage program rank and/or other designated conservation status (State Heritage Conservation Rank/Status, Global, National, Subnational, and/or a Federal Status).

Reptile	Scientific Name	Park Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
Common kingsnake	<i>Lampropeltis getula</i>	Historic	S2		G5 / N5 / S1	Stable
Massasauga	<i>Sistrurus catenatus tergeminus</i>	Historic	S1 / Threatened		G3 / N3N4 / S1	Declining to stable
Timber rattlesnake	<i>Crotalus horridus</i>	Unconfirmed	S1		G4 / N4 / S1	Declining
Fish						
Blacknose shiner	<i>Notropis heterolepis</i>	Unconfirmed	S1 / Endangered		G4 / N4 / S1	Unknown
Bluntnose minnow	<i>Pimephales notatus</i>	Present in Park	S3		G5 / N5 / S3	
Finescale dace	<i>Phoxinus neogaeus</i>	Unconfirmed	S2 / Threatened		G5 / N5 / S2	Stable
Northern redbelly dace	<i>Phoxinus eos</i>	Unconfirmed	S2 / Threatened		G5 / N5 / S2	
Pearl dace	<i>Margariscus margarita</i>	Unconfirmed	S3		G5 / N5 / S2	Stable
Tadpole madtom	<i>Noturus gyrinus</i>	Unconfirmed	S3		G5 / N5 / S3	
Mammal						
Black tailed jackrabbit	<i>Lepus californicus</i>	Unconfirmed	S?		G5 / N5 / S5	
Eastern chipmunk	<i>Tamias striatus</i>	Unconfirmed	S1		G5 / N5 / S1	
Eastern gray squirrel	<i>Sciurus carolinensis</i>	Unconfirmed	S3		G5 / N5 / S3	
Eastern pipistrelle	<i>Pipistrellus subflavus</i>	Probably Present	S1		G5 / N5 / S1	
Eastern spotted skunk	<i>Spilogale putorius</i>	Unconfirmed	S1		G5 / N5 / S1	

Table 4 (cont.). Species on the park's local list which possess a state heritage program rank and/or other designated conservation status (State Heritage Conservation Rank/Status, Global, National, Subnational, and/or a Federal Status).

Mammal	Scientific Name	Park Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
Evening bat	<i>Nycticeius humeralis</i>	Present in Park	S3		G5 / N5 / S4	
Franklin's ground squirrel	<i>Spermophilus franklinii</i>	Probably Present	S5		G5 / N5 / S5	Declining to stable
Hispid cotton rat	<i>Sigmodon hispidus</i>	Unconfirmed	S3		G5 / N5 / S3	
Long tailed weasel	<i>Mustela frenata</i>	Probably Present	S2		G5 / N5 / S2	
Northern myotis	<i>Myotis septentrionalis</i>	Present in Park	S3		G4 / N4 / S4	Stable
River otter	<i>Lutra canadensis</i>	Unconfirmed	S2 / Threatened		G5 / N5 / S2	Stable
Southern flying squirrel	<i>Glaucomys volans</i>	Probably Present	S1 / Threatened		G5 / N5 / S1	
White tailed jackrabbit	<i>Lepus townsendii</i>	Unconfirmed	S?		G5 / N5 / S4	
Vascular Plants						
Ashy sunflower	<i>Helianthus mollis</i>	Present in Park	S1		G4 / N4? / S1	
Button snakeroot	<i>Eryngium yuccifolium</i>	Unconfirmed	S1		G5 / N5 / S1	
Pale purple coneflower	<i>Echinacea pallida</i>	Unconfirmed	S1		G4 / N4 / S1	Declining
Prairie blazing star	<i>Liatris pycnostachya</i>	Present in Park	S2		G5 / N5 / S2?	
Redseed plantain	<i>Plantago rhodosperma</i>	Present in Park	S1		GNR / N5 / SNR	

¹ Refer to the Appendix for definitions of Park Status categories.

² The official endangerment rank and status the Nebraska Game and Parks Commission has assigned to this species for Nebraska (<http://www.ngpc.state.ne.us/wildlife/programs/nongame/list.asp>). Includes Tier-1 and Tier-2 At Risk Species.

³ U.S. Endangered Species Act: Current status of the taxon as designated or proposed by the U.S. Fish and Wildlife Service (USFWS), and as reported in the U.S. Federal Register in accordance with the U.S. Endangered Species Act of 1973, as amended.

⁴ The NatureServe conservation status, developed by NatureServe and its network of member (state) programs, of a species from a state/province perspective, characterizing the relative imperilment of the species. G = global (rounded), N = national, and S = subnational; 1 = critically imperiled, 2 = imperiled, 3 = vulnerable, 4 = apparently secure, 5 = secure; B=Breeding population, NR=Not rated. Refer to <http://www.natureserve.org/explorer/ranking.htm#interpret> for additional information on conservation status ranks.

Discussion

The NPS Inventory Strategic Plan states that “the ultimate goal is to establish an accurate inventory of all life forms within a park...” (NPS 2009, see also NPS 1992). The HTLN supports this goal by documenting over 80% of all vertebrates and vascular plants known to occur at HOME. One result of these efforts is the compilation of reliable species lists. These lists, however sound, should always be considered incomplete. Inventory lists will change as new information about species distributions becomes available. The overall number of species designated as Present in Park or Probably Present is similar to similarly sized parks in the HTLN (Table 5).

Table 5. Number of species designated as present in park or probably present in HTLN parks (NPSpecies 2009).

Park	Bird	Fish	Mammal	Amphibian	Reptile	Vascular Plants	TOTALS	Park Size (ac.)
HOME	81	31	41	6	9	304	472	212
HEHO	120	28	45	1	11	230	435	186
LIBO	224	-	38	13	13	332	620	200
GWCA	192	34	44	8	17	662	957	210
HOCU	274	15	40	21	25	457	832	280
PIPE	252	20	31	6	6	557	872	282
ARPO	111	65	33	17	40	332	598	389
EFMO	220	93	43	9	21	426	812	1,481
WICR	134	53	48	11	31	569	846	1,750
PERI	74	41	44	21	36	665	881	4,300
HOSP	114	52	49	22	45	910	1,192	5,549
TAPR	136	29	42	8	27	456	698	10,894
CUVA	241	65	37	19	21	1,167	1,550	32,859
OZAR	167	122	55	29	45	880	1,298	82,196
BUFF	211	78	58	22	43	1,353	1,765	95,730

Future Inventory Efforts

While significant strides have been made in documenting the presence of vertebrate species and vascular plants, it is anticipated that additional survey efforts will be required to increase the number of documented species (i.e. Present in Park). For example, roughly half of the birds, fish, and mammals are listed as probably present or unconfirmed and lack adequate documentation. Additionally, state listed species are listed as unconfirmed, probably present, or historic. If species are thought to be Probably Present or Unconfirmed, follow-up surveys (perhaps targeted inventories?) are warranted or existing monitoring programs broadened to include searches for these species. Additional follow up inventories coupled with habitat studies may document their presence.

Reviewers assigned a general abundance category for all but 367 of the documented species (five amphibians, 27 birds, 14 fish, nine mammals, eight reptiles, and 304

vascular plants). Reviewers also assigned a residency value for all but 34. Continued monitoring of the species may provide for updated abundance and residency.

Based on the results of the data reported herein, future inventory recommendations include:

- additional resources to survey for species listed in Table 4,
- coupled with the above, focus on species listed as Probably Present, Unconfirmed, and Historic,

Key Findings of Management Interest

- The mammal inventory (Robbins 2005) noted that species are typical of tall grass prairies and riparian forest areas. Three mammal species were added to the parks species list.
- The recent herpetofauna inventory (Fogell 2003) resulted with lower than expected species numbers. Only six of eight species of amphibians and 10 of 17 species of reptiles were encountered. It was noted that given the park's natural history status as a restored prairie, and the fact that nearly all properties surrounding the park are involved in extensive row crop agriculture, it should be expected that many historic species might be extirpated, and only generalist species would still survive.
- The vascular plant inventory (Mlekush and DeBacker 2003) documented a rare, mesic bur oak (*Quercus macrocarpa*) forest community type. Mesic bur oak forest is known from fewer than four sites in Nebraska.
- The deer survey (Bolli 2004) documented a baseline data set on deer population status and age/sex structure that will better enable land managers to conduct appropriate methods of control to ensure that deer numbers will have a minimal impact on park resources and the number of deer-vehicle collisions.
- The exotic plant inventory (Bolli 2005) identified six plants that pose the greatest risk to the integrity of the prairie. These include three introduced species: smooth brome (*Bromus inermis*), reed canary grass (*Phalaris arundinacea*) and musk thistle (*Carduus nutans*); and three native species: tall thistle (*Cirsium altissimum* - native), American plum (*Prunus americana*) and dogwood (*Cornus* spp.).

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Appendix 2. NPSpecies Data Dictionary

Park Status	The current status of each species in each park.	Applicable only to organisms with the <i>Local List</i> checkbox checked. The possible values reflect a combination of confidence, and availability and currency of verifiable evidence in NPSpecies.
Present in Park	Species' occurrence in park is documented and assumed to be extant.	Extremely high confidence that the species is currently in the park. A current, verifiable reference, voucher, or observation is included in NPSpecies.
Probably Present	Park is within species' range and contains appropriate habitat. Documented occurrences of the species in the adjoining region of the park give reason to suspect that it probably occurs within the park. The degree of probability may vary within this category, including species that range from common to rare.	Very high confidence that the organism is currently in the park. Verifiable evidence may exist in NPSpecies, but is not considered current enough to elevate the status to Present in Park. Efforts should be made to obtain current, verifiable evidence in NPSpecies to elevate the Park Status to "Present in Park". If reasonable efforts to obtain current, verifiable evidence are unsuccessful, then the Park Status should be changed to Unconfirmed, Historic, Encroaching, or False Report as applicable.
Unconfirmed	Included for the park based on weak ("unconfirmed record") or no evidence, giving minimal indication of the species' occurrence in the park.	Any confidence from very low to high that the organism is currently in the park. Verifiable evidence may exist in NPSpecies, but it is not considered sufficient enough to elevate the status to Probably Present, nor current enough to elevate the status to Present. Efforts should be made to obtain current, verifiable evidence in NPSpecies to elevate the Park Status to "Present in Park". If reasonable efforts to obtain current, verifiable evidence are unsuccessful, then the Park Status should be changed to Historic, Encroaching, or False Report as applicable.
Encroaching	The species is not documented in the park, but is documented as being adjacent to the park and has potential to occur in the park.	Extremely low confidence that the organism is currently in the park, but extremely high confidence that the organism is currently adjacent to the park. Verifiable evidence may exist in NPSpecies documenting the occurrence in the park, but it is not current. Potential invasive organisms are good candidates for this Park Status designation, either before they enter a park or after they have been eliminated from a park.
Historic	Species' historical occurrence in the park is documented, but recent investigations indicate that the species is now probably absent.	Extremely low confidence that the organism is currently in the park. Verifiable evidence exists in NPSpecies, but is not current. Extinct, extirpated or eliminated species are candidates for a Historic <i>Park Status</i> designation.
False Report	Species previously reported to occur within the park, but current evidence indicates that the report was based on a misidentification, a taxonomic concept no longer accepted, or some other similar problem of interpretation.	Extremely low confidence that the organism is currently in the park. Evidence exists in NPSpecies, but it cannot be sufficiently verified.

Appendix (cont.). NPSpecies Data Dictionary

Abundance	The current abundance of each organism in each park.	Applicable only to organisms with the <i>Local List</i> checkbox checked and a <i>Park Status</i> of "Present". The values attempt to balance abundance with suitable habitat, and temporal/behavioral considerations. In practice, the entered value should apply (although there are numerous exceptions) to the abundance in the most suitable habitat of the organism, and at the time that the organism is engaged in its principle behavior in (e.g. breeding, migrating, hibernating, etc.), or most important behavior to, the park. A future generation of NPSpecies will address the coding of <i>Abundance</i> (and associated <i>Residency</i>) to separate out the temporal and behavioral aspects. The Data Source field for Abundance is available to provide a citation that specifically addresses abundance in more detail.
Abundant		Animals: May be seen daily, in suitable habitat and season, and counted in relatively large numbers. Plants: Large number of individuals; wide ecological amplitude or occurring in habitats covering a large portion of the park.
Common		Animals: May be seen daily, in suitable habitat and season, but not in large numbers. Plants: Large numbers of individuals predictably occurring in commonly encountered habitats but not those covering a large portion of the
Uncommon		Animals: Likely to be seen monthly in appropriate season/habitat. May be locally common. Plants: Few to moderate numbers of individuals; occurring either sporadically in commonly encountered habitats or in uncommon habitats.
Rare		Animals: Present, but usually seen only a few times each year. Plants: Few individuals usually restricted to small areas of rare habitat.
Occasional		Animals: Occurs in the park at least once every few years, but not necessarily every year. Plants: Not applicable.
Unknown		Abundance unknown.
Residency	Current residency classification for each ANIMAL species in each park.	Applicable only to ANIMALS with the <i>Local List</i> checkbox checked and a <i>Park Status</i> of "Present". The values attempt to balance temporal and behavioral considerations. In practice, the entered value should apply (although there are numerous exceptions) to the residency of the organism at the time that the organism is engaged in its principle behavior (e.g. breeding, migrating, hibernating, etc.) in, or most important behavior to, the park. A future generation of NPSpecies will address the coding of <i>Residency</i> (and associated <i>Abundance</i>) to separate out the temporal and behavior aspects. The Data Source field for Residency is available to provide a citation that specifically addresses Residency in more detail.
Breeder		Population reproduces in the park.
Resident		A significant population is maintained in the park for more than two months each year, but it is not known to breed there.
Migratory		Migratory species that occurs in park approximately two months or less each year and does not breed there.
Vagrant		Park is outside of the species' usual range.
Unknown		Residency status in park is unknown.

Appendix (cont.). NPSpecies Data Dictionary

Nativity	Nativity classification for each organism for each park	Applicable only to organisms with the <i>Local List</i> checkbox checked. If the park-status of an organism is not “Present in Park”, then nativity represents the nativity if the organism were eventually confirmed in the park.
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Native	Native The organism is native, or would be native, to the park (either endemic or indigenous).
Non-native	The organism is not native, or would not be native, to the park (neither endemic nor indigenous).
Unknown	Nativity status in the park is unknown.

The NPS has organized its parks with significant natural resources into 32 networks linked by geography and shared natural resource characteristics. The Heartland Network is composed of 15 National Park Service (NPS) units in eight Midwestern states. These parks contain a wide variety of natural and cultural resources including sites focused on commemorating civil war battlefields, Native American heritage, westward expansion, and our U.S. Presidents. The Network is charged with creating inventories of its species and natural features as well as monitoring trends and issues in order to make sound management decisions. Critical inventories help park managers understand the natural resources in their care while monitoring programs help them understand meaningful change in natural systems and to respond accordingly. The Heartland Network helps to link natural and cultural resources by protecting the habitat of our history.

The I&M program bridges the gap between science and management with a third of its efforts aimed at making information accessible. Each network of parks, such as Heartland, has its own multi-disciplinary team of scientists, support personnel, and seasonal field technicians whose system of online databases and reports make information and research results available to all. Greater efficiency is achieved through shared staff and funding as these core groups of professionals augment work done by individual park staff. Through this type of integration and partnership, network parks are able to accomplish more than a single park could on its own.

The mission of the Heartland Network is to collaboratively develop and conduct scientifically credible inventories and long-term monitoring of park “vital signs” and to distribute this information for use by park staff, partners, and the public, thus enhancing understanding which leads to sound decision making in the preservation of natural resources and cultural history held in trust by the National Park Service.

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The Department of the Interior protects and manages the nation’s natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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