



An Evaluation of Biological Inventory Data Collected at Buffalo National River

Vertebrate and Vascular Plant Inventories

Natural Resource Technical Report NPS/HTLN/NRTR—2009/255



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 Buffalo National River

Vertebrate and Vascular Plant Inventories

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Contents

	Page
Tables.....	iv
Abstract.....	v
Acknowledgements.....	vi
Introduction.....	1
Methods.....	2
Expected Species Lists	2
Compiling Existing Inventory Data.....	2
The NPSpecies Database	3
Inventories	4
Inventory Certification.....	4
Results.....	5
Discussion.....	19
Future Inventory Efforts	19
Key Findings of Management Interest	20
Literature Cited	23
Appendix 1. NPSpecies bibliographic references for BUFF.....	25
Appendix 2. NPSpecies Data Dictionary.....	29

Tables

	page
Table 1. Count of species by park status categories at BUFF (NPSpecies 2009).	5
Table 2. Count of species by abundance categories at BUFF (NPSpecies 2009).....	7
Table 3. Non-native plants, occurring on BUFF, with an Invasive Species Impact Rank (I-Rank) containing high.....	8
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).....	9
Table 5. Number of species designated as present in park or probably present in HTLN parks (NPSpecies 2009).....	19

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. One thousand seven hundred and sixty five species are certified on the list of vascular plants and vertebrates for Buffalo National River (BUFF). Based on a review of the evidence, 871 (49%) species were categorized as Present in Park, and 894 (51%) as Probably Present. Twenty five species were Unconfirmed or Historic. In addition to documenting the presence of species, reviewers categorized the general abundance of 839 (96%) certified species and determined residency for all documented vertebrates with the exception of 47 (2 reptiles, 6 mammals, 6 fish, and 33 birds). Species lists for BUFF can be queried from the Natural Resource Information Portal at <http://nrinfo.nps.gov/Home.mvc>.

Forty nine non-native species are documented to occur in the park. Of these are three birds, two fish, 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. Seven of the 44 (16%) non-native plants found on BUFF received an overall I-Rank score that included the high category (i.e. most threatening).

A total of 138 species are considered to be of conservation status. Two federally listed endangered species (gray myotis and Indiana bat) are documented as present on BUFF. Nine state threatened species (Alabama snow wreath, aster, Bush's skullcap, Bush's yellow coneflower, dwarf bristle fern, French's shooting star, heartleaf plantain, ovate-leaved catchfly, and royal catchfly) are noted as probably present. 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 Buffalo National River (BUFF). 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 “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). Stan Trauth, Arkansas State University (Jonesboro), compiled expected species lists for amphibians and reptiles. The list of fishes was derived from county records reported in “The Fishes of Arkansas” (Robison and Buchanan 1988). Choate et al. (1994) “Handbook of Mammals of the South-Central States” was used to develop the mammal list. John Logan, former Arkansas Natural Heritage botanist, reviewed the flora for BUFF and standardized nomenclature and infraspecific designations, flagged potentially erroneous records (e.g. species out of range, without sufficient habitat), and derived a list of potentially occurring species from county records.

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 BUFF 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 BUFF 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, fish, and bird certifications were compiled with current inventory data (Angelo and Wiggs 2003, Petersen and Justus 2005, Kellner 2003). Mammal certifications were made by BUFF and HTLN staff. Certification of the vascular plants was completed by Johnnie Gentry, University of Arkansas-Fayetteville. 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

Forty two references (see Appendix 1) and 936 vouchers led to the certification of 1,765 species (NPSpecies 2009). In total, 871 species were categorized as Present in Park and 894 as Probably Present (Table 1). Additionally, 25 species were categorized as Unconfirmed or Historic. Unconfirmed species were ranked as such due to weak evidence supporting their existence on the park.

Currently 49% 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 99%.

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

Park Status¹	Bird	Fish	Mammal	Amphibian	Reptile	Vascular Plant	Total
Present in Park	209	74	15	22	37	514	871
Probably Present	2	4	43		6	839	894
Encroaching							
Unconfirmed	4	1		3		11	19
Historic	1			2	2	1	6
Total	216	79	58	27	45	1,365	1,790

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

Of the 871 species documented as present, reviewers assigned a general abundance category (e.g., common, rare, etc.) to 839 (96%) (Table 2). Reviewers believed additional information was needed before an abundance category could be assigned to the remaining 32 (4%) 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 47 that were categorized as unknown. 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 49. Of these three are birds, two fish, 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. Seven of the 44 (16 %) non-native plants found on BUFF 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 138 species (Table 4) are listed by the Arkansas Natural Heritage Commission as a species of conservation status. Additional NatureServe global, national, and subnational ranking

status is provided. The 138 species included five amphibians, three reptiles, 40 birds, two fish, eight mammals, and 80 vascular plants. Two federally listed endangered species (gray myotis, *Myotis grisescens*, Indiana bat, *Myotis sodalis*) were documented as present on BUFF. Nine state threatened species (Alabama snow wreath, *Neviusia alabamensis*, aster, *Symphyotrichum pratense*, Bush's skullcap, *Scutellaria bushii*, Bush's yellow coneflower, *Echinacea paradoxa* var. *paradoxa*, dwarf bristle fern, *Trichomanes petersii*, French's shooting star, *Dodecatheon frenchii*, heartleaf plantain, *Plantago cordata*, ovate-leaved catchfly, *Silene ovata*, and royal catchfly, *Silene regia*) are noted as probably present.

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

Abundance Category¹	Bird	Fish	Mammal	Amphibian	Reptile	Vascular Plant	Total
Abundant	42	17				12	71
Common	41	20		13	10	447	531
Uncommon	41	7		6	13	22	89
Rare	29	18		3	10	22	82
Occasional	54	12					66
Unknown	2		15		4	11	32
Total	209	74	15	22	37	514	871

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

Table 3. Non-native plants, occurring on BUFF, 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>Albizia julibrissin</i>	Silk tree	High / Low	High / Low	Medium / Low	Often a plant of human-disturbed areas, also affects naturally scoured riparian areas and forest edges; some serious impacts on biodiversity in parts of the southeastern U.S.
<i>Alliaria petiolata</i>	Garlic mustard	High / Medium	Medium / Low	Medium	Widespread, but common in highly disturbed areas; recent evidence indicates a greater range of geographic and ecological areas are being invaded.
<i>Lonicera japonica</i>	Japanese honeysuckle	High / Medium	Medium	High / Medium	Can have extremely negative consequences for forest communities/forest structure. Few effective control methods known.
<i>Microstegium vimineum</i>	Nepalese browntop	High / Medium	Medium	High / Medium	Slow to invade undisturbed vegetation but spreads fast; habitats include stream banks, river bluffs, and floodplains; removal requires major eradication and restoration efforts.
<i>Potentilla recta</i>	Sulphur cinquefoil	High / Medium	High / Low	Medium / Low	Widespread in the U.S. in open grasslands, shrubby areas, open forest, logged areas, roadsides, waste areas, and abandoned fields; very competitive in native grasslands; can become dominant in forest habitats; control is moderately difficult.
<i>Schedonorus arundinaceus</i>	Kentucky fescue	High / Medium	Medium	High / Medium	Throughout the U.S.; threatens several natural communities, including fens, prairies, woodlands, and other grasslands; aggressive, especially when infected with the fungal endophyte.
<i>Sorghum halepense</i>	Johnsongrass	High / Medium	Medium / Low	High / Medium	Severely inhibits pioneer grass species; massive size creates difficulties for the establishment of other plants; one of the most frequently listed noxious weeds in the U.S.; control is difficult and costly.

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).

Amphibian	Scientific Name	Park Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
Eastern spadefoot	<i>Scaphiopus holbrookii hurterii</i>	Historic	S2 / INV		G5 / N5 / S2	Stable
Four-toed salamander	<i>Hemidactylium scutatum</i>	Historic	S3 / INV		G5 / N5 / S3	Stable
Ozark zigzag salamander	<i>Plethodon angusticlavius</i>	Present in Park	S3 / INV		G4 / N4 / S3	
Ringed salamander	<i>Ambystoma annulatum</i>	Present in Park	S3 / INV		G4 / N4 / S3	Declining to stable
Wood frog	<i>Rana sylvatica</i>	Present in Park	S3 / INV		G5 / N5 / S3	Stable
Reptile						
Eastern collared lizard	<i>Crotaphytus collaris</i>	Present in Park	S3 / INV		G5 / N5 / S3	Stable
Ornate box turtle	<i>Terrapene ornata ornata</i>	Historic	S2 / INV		T5 / N5 / S2	
Queen snake	<i>Regina septemvittata</i>	Historic	S2 / INV		G5 / N5 / S2	Stable
Bird						
American bittern	<i>Botaurus lentiginosus</i>	Present in Park	S2N / WAT*		G4 / N4B,N4N / S2N	Substantial to moderate decline (decline 25-75%)
American kestrel	<i>Falco sparverius</i>	Present in Park	S3S4B,S5N / WAT		G5 / N5B,N5N / S3S4B,S5N	
American redstart	<i>Setophaga ruticilla</i>	Present in Park	S3S4B,S5N / WAT		G5 / N5B / S3S4B,S5N	Stable
American woodcock	<i>Scolopax minor</i>	Present in Park	S2B,S4N / WAT		G5 / N5B,N5N / S2B,S4N	Declining
Bald eagle	<i>Haliaeetus leucocephalus</i>	Present in Park	S2B,S4N / INV		G5 / N5B,N5N / S2B,S4N	Stable to increasing
Bank swallow	<i>Riparia riparia</i>	Probably Present	S2B,S3N / INV		G5 / N5B / S2B	

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
Barn owl	<i>Tyto alba</i>	Present in Park	S2B,S3N / WAT		G5 / N5 / S2B,S3N	
Bell's vireo	<i>Vireo bellii</i>	Unconfirmed	S3B / WAT		G5 / N4B / S3B	Significant declines
Bewick's wren	<i>Thryomanes bewickii</i>	Present in Park	S2B,S3N / INV		G5 / N5B / S2B,S3N	Declining (decline of 10-30%)
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Present in Park	S1B / INV		G5 / N5B / S1B	
Black-crowned night-heron	<i>Nycticorax nycticorax</i>	Present in Park	S2B,S3N / WAT		G5 / N5B,N5N / S2B,S3N	Stable
Black-throated green warbler	<i>Dendroica virens</i>	Present in Park	S2B,S5N / INV		G5 / N5B / S2B,S5N	Declining (decline of 10-30%)
Blue-winged warbler	<i>Vermivora pinus</i>	Present in Park	S3B,S5N / WAT		G5 / N5B / S3B,S5N	
Cerulean warbler	<i>Dendroica cerulea</i>	Present in Park	S4B / INV		G4 / N4B / S4B	Declining (decline of 10-30%)
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>	Present in Park	S1B,S5N / INV		G5 / N5B / S1B,S5N	Declining (decline of 10-30%)
Cooper's hawk	<i>Accipiter cooperii</i>	Present in Park	S1B,S3N / INV		G5 / N5B,N5N / S1B,S3N	Stable
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Present in Park	S4N / MON		G5 / N5B,N5N / S4N	Increasing (increase > 10%)
Golden-winged warbler	<i>Vermivora chrysoptera</i>	Present in Park	S2N / WAT		G4 / N4B / S2N	Declining (decline of 10-30%)
Great blue heron	<i>Ardea herodias</i>	Present in Park	S3B,S4N / MON		G5 / N5B,N5N / S3B,S4N	Stable
Great egret	<i>Ardea alba</i>	Present in Park	S2S3B / MON		G5 / N5B,N5N / S2S3B	
Harris's sparrow	<i>Zonotrichia querula</i>	Present in Park	S3N / WAT		G5 / N5N / S3N	
Hairy woodpecker	<i>Picoides villosus</i>	Present in Park	S4S5 / WAT		G5 / N5 / S4S5	Stable

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 Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
Henslow's sparrow	<i>Ammodramus henslowii</i>	Present in Park	S1B,S2N / INV		G4 / N3B,N4N / S1B,S2N	Severely declining (decline 10 to > 70%)
Lark sparrow	<i>Chondestes grammacus</i>	Present in Park	S3S4B / WAT		G5 / N5B / S3S4B	Declining
Little blue heron	<i>Egretta caerulea</i>	Present in Park	S2B / WAT		G5 / N5B,N5N / S2B	
Northern harrier	<i>Circus cyaneus</i>	Present in Park	S1B,S4N / WAT*		G5 / N5B,N5N / S1B,S4N	Stable
Osprey	<i>Pandion haliaetus</i>	Present in Park	S1B,S4N / INV		G5 / N5B,N4N / S1B,S4N	Increasing
Painted bunting	<i>Passerina ciris</i>	Present in Park	S4B / WAT		G5 / N5B / S4B	Significant declines
Peregrine falcon	<i>Falco peregrinus</i>	Present in Park	S1N / INV		G4 / N4B,N4N / S1N	Increasing (increase > 10%)
Philadelphia vireo	<i>Vireo philadelphicus</i>	Present in Park	S2N / WAT		G5 / N4B / S2N	
Pied-billed grebe	<i>Podilymbus podiceps</i>	Present in Park	S2B,S4N / WAT		G5 / N5B,N5N / S4B,S4N	
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	Present in Park	S4B,S4S5N / WAT		G5 / N5B,N5N / S4B,S4S5N	Local declines
Sharp-shinned hawk	<i>Accipiter striatus</i>	Present in Park	S1S2B / INV		G5 / N5B,N5N / S1S2B	Stable
Snowy egret	<i>Egretta thula</i>	Present in Park	S2B / WAT		G5 / N5B,N5N / S2B	
Swainson's warbler	<i>Limnothlypis swainsonii</i>	Present in Park	S3B / INV		G4 / N4B / S3B	Stable
Veery	<i>Catharus fuscescens</i>	Present in Park	S2N / WAT*		G5 / N5B / S2N	Declining (decline of 10-30%)
Willet	<i>Catoptrophorus semipalmatus</i>	Present in Park	SNA / WAT		G5 / N5B,N5N / SNA	
Willow flycatcher	<i>Empidonax traillii</i>	Present in Park	S1B,S3N / INV		G5 / N5B / S1B,S3N	Significant declines

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 Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
Yellow-crowned night-heron	<i>Nyctanassa violacea</i>	Present in Park	S3B / WAT		G5 / N5B,N5N / S3B	
Yellow warbler	<i>Dendroica petechia</i>	Present in Park	S3B,S5N / WAT		G5 / N5B,N5N / S3B,S5N	Reportedly declining
Fish						
Ozark chub	<i>Erimystax harrisi</i>	Present in Park	S3S4 / INV		G3 / N3N4 / S3S4	Declining (decline 10-30%)
Ozark shiner	<i>Notropis ozarcanus</i>	Present in Park	S2 / INV		G3 / N3 / S2	Declining (decline 10-30%)
Mammal						
Eastern small-footed bat	<i>Myotis leibii</i>	Present in Park	S1 / INV		G3 / N3 / S1	Stable
Eastern spotted skunk	<i>Spilogale putorius</i>	Probably Present	S2S3 / INV		G5 / N5 / S2S3	Large decline
Gray myotis	<i>Myotis grisescens</i>	Present in Park	S2S3 / INV	Endangered	G3 / N3 / S2S3	Stable
Indiana bat	<i>Myotis sodalis</i>	Present in Park	S1 / INV	Endangered	G2 / N2 / S1	Rapidly declining (decline 10-50%)
Little brown bat	<i>Myotis lucifugus</i>	Present in Park	S3 / MON		G5 / N5 / S3	
Mountain lion	<i>Puma concolor</i>	Probably Present	SNA / MON		G5 / N5 / SNA	
Southeastern myotis	<i>Myotis austroriparius</i>	Probably Present	S3 / INV		G3 / N3N4 / S3	Declining to stable
Southeastern shrew	<i>Sorex longirostris</i>	Probably Present	S2 / INV		G5 / N5 / S2	
Vascular Plant						
Alabama snowwreath	<i>Neviusia alabamensis</i>	Probably Present	S1S2 / ST		G2 / N2 / S1S2	Stable
American squawroot	<i>Perideridia americana</i>	Probably Present	S2 / INV		G4 / NNR / S2	

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).

Vascular Plant	Scientific Name	Park Status ¹	State Heritage Program Rank/Status ²	Federal Status ³	Global / National / Subnational Status ⁴	Global Short Term Trend ⁴
Arkansas alumroot	<i>Heuchera villosa</i> var. <i>arkansana</i>	Present in Park	S3 / INV		T3 / N3 / S3	
Aster	<i>Symphyotrichum pratense</i>	Probably Present	S2 / ST		G4 / NNR / S2	
Barbara's buttons	<i>Marshallia caespitosa</i> var. <i>caespitosa</i>	Unconfirmed	S2 / INV		T4 / NNR / S2	
Barren strawberry	<i>Waldsteinia fragarioides</i>	Probably Present	S1 / INV		G5 / NNR / S1	Stable
Blue cohosh	<i>Caulophyllum thalictroides</i>	Present in Park	S2 / INV		G4 / N4N5 / S2	Declining
Bunchflower	<i>Melanthium latifolium</i>	Probably Present	SH / INV		G5 / NNR / SH	
Bush's poppy mallow	<i>Callirhoe bushii</i>	Probably Present	S3 / INV		G3 / N3 / S3	Declining to stable
Bush's skullcap	<i>Scutellaria bushii</i>	Probably Present	S2 / ST		G3 / N3 / S2	Stable
Bush's yellow coneflower	<i>Echinacea paradoxa</i> var. <i>paradoxa</i>	Probably Present	S2 / ST		T2 / N2 / S2	Declining (decline 10-30%)
Buttercup	<i>Ranunculus aquatilis</i> var. <i>diffusus</i>	Probably Present	S2S3 / INV		? / ? / S2S3	
Butternut	<i>Juglans cinerea</i>	Probably Present	S3 / INV		G4 / N3N4 / S3	Rapidly declining (10-50%)
Canada violet	<i>Viola canadensis</i> var. <i>canadensis</i>	Probably Present	S2 / INV		T5 / NNR / S2	
Capillary beakrush	<i>Rhynchospora capillacea</i>	Probably Present	S2 / INV		G4 / NNR / S2	
Carey's caric sedge	<i>Carex careyana</i>	Probably Present	S3 / INV		G4 / NNR / S3	
Caric sedge	<i>Carex grvida</i>	Probably Present	S2S3 / INV		G5 / N5? / S2S3	
Caric sedge	<i>Carex mesochorea</i>	Present in Park	S2 / INV		G4 / N4? / S2	

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).

Vascular Plant	Scientific Name	Park Status ¹	State Heritage Program Rank/Status ²	Federal Status ³	Global / National / Subnational Status ⁴	Global Short Term Trend ⁴
Caric sedge	<i>Carex sparganioides</i>	Probably Present	S3 / INV		G5 / N5? / S3	
Caric sedge	<i>Carex suberecta</i>	Probably Present	S2 / INV		G4 / NNR / S2	
Celandine poppy	<i>Stylophorum diphyllum</i>	Probably Present	S3 / INV		G5 / NNR / S3	
Clayton's sweet cicely	<i>Osmorhiza claytonii</i>	Probably Present	S1S3 / INV		G5 / N5 / S1S3	
Crested coralroot	<i>Hexalectris spicata</i> var. <i>spicata</i>	Probably Present	S2 / INV		T4 / NNR / S2	
Davis' caric sedge	<i>Carex davisii</i>	Probably Present	S3 / INV		G4 / NNR / S3	
Dwarf bristle fern	<i>Trichomanes petersii</i>	Probably Present	S2 / ST		G4 / N3? / S2	
Early saxifrage	<i>Saxifraga virginiensis</i>	Probably Present	S3 / INV		G5 / N5 / S3	
Eaton's lip fern	<i>Cheilanthes eatonii</i>	Probably Present	SH / INV		G5 / NNR / SH	
False hellebore	<i>Melanthium woodii</i>	Probably Present	S3 / INV		G5 / NNR / S3	
Field mint	<i>Mentha arvensis</i>	Probably Present	S1 / INV		G5 / N5? / S1	
French's shooting star	<i>Dodecatheon frenchii</i>	Probably Present	S2 / ST		G3 / N3 / S2	
Fringed puccoon	<i>Lithospermum incisum</i>	Unconfirmed	S2S3 / INV		G5 / N5? / S2S3	
Giant wood fern	<i>Dryopteris goldiana</i>	Probably Present	S1 / INV		G4 / N4 / S1	Declining to stable
Glade cress	<i>Leavenworthia uniflora</i>	Present in Park	S3 / INV		G4 / N4 / S3	
Greenbrier	<i>Smilax ecirrhata</i>	Probably Present	SH / INV		G5 / NNR / SH	

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).

Vascular Plant	Scientific Name	Park Status ¹	State Heritage Program Rank/Status ²	Federal Status ³	Global / National / Subnational Status ⁴	Global Short Term Trend ⁴
Hairy scorpionweed	<i>Phacelia gilliioides</i>	Probably Present	S2S3 / INV		G5 / NNR / S2S3	
Heartleaf plantain	<i>Plantago cordata</i>	Probably Present	S2 / ST		G4 / N4 / S2	
Hitchcock's caric sedge	<i>Carex hitchcockiana</i>	Present in Park	S1S2 / INV		G5 / NNR / S1S2	
Horned pondweed	<i>Zannichellia palustris</i>	Probably Present	S2S3 / INV		G5 / NNR / S2S3	
Illinois tick trefoil	<i>Desmodium illinoense</i>	Probably Present	S2 / INV		G5 / N5? / S2	
Leadplant	<i>Amorpha canescens</i>	Probably Present	S1 / INV		G5 / NNR / S1	
Leed's hybrid log fern	<i>Dryopteris X leedsii</i>	Probably Present	S1 / INV		GNA / NNA / S1	
Lobed spleenwort	<i>Asplenium pinnatifidum</i>	Probably Present	S3 / INV		G4 / N4 / S3	
Log fern	<i>Dryopteris celsa</i>	Probably Present	S2 / INV		G4 / NNR / S2	
Mock orange	<i>Philadelphus hirsutus</i>	Probably Present	S2S3 / INV		G5 / NNR / S2S3	
Monkey flower	<i>Mimulus ringens</i> var. <i>ringens</i>	Present in Park	S1S2 / INV		T5 / NNR / S1S2	
Moore's larkspur	<i>Delphinium newtonianum</i>	Present in Park	S3 / INV		G3 / N3 / S3	
Nodding muhly	<i>Muhlenbergia bushii</i>	Probably Present	S2 / INV		G5 / NNR / S2	
Northern swamp milkweed	<i>Asclepias incarnata</i> ssp. <i>incarnata</i>	Probably Present	S2 / INV		T5 / NNR / S2	
Nuttall's pleat leaf	<i>Nemastylis nuttallii</i>	Present in Park	S2 / INV		G4 / NNR / S2	
Ovate-leaved catchfly	<i>Silene ovata</i>	Probably Present	S3 / ST		G3 / N3 / S3	Declining (decline 10-30%)

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).

Vascular Plant	Scientific Name	Park Status ¹	State Heritage Program Rank/Status ²	Federal Status ³	Global / National / Subnational Status ⁴	Global Short Term Trend ⁴
Ozark chinquapin	<i>Castanea pumila</i> var. <i>ozarkensis</i>	Present in Park	S3S4 / INV		T3 / N3? / S3S4	Severely to rapidly declining
Ozark cornsalad	<i>Valerianella ozarkana</i>	Probably Present	S3 / INV		G3 / N3 / S3	Stable
Ozark spiderwort	<i>Tradescantia ozarkana</i>	Present in Park	S3 / INV		G3 / N3 / S3	Declining to stable
Powdery cloak fern	<i>Argyrochosma dealbata</i>	Present in Park	S2 / INV		G4 / NNR / S2	
Prairie turnip	<i>Pedimelum esculentum</i>	Probably Present	S2 / INV		G5 / NNR / S2	
Prickly gooseberry	<i>Ribes cynosbati</i>	Probably Present	S2S3 / INV		G5 / N5? / S2S3	
Rocky Mountain sage	<i>Salvia reflexa</i>	Probably Present	SH / INV		G5 / N5? / SH	
Rough hawkweed	<i>Hieracium scabrum</i>	Probably Present	S2 / INV		G5 / NNR / S2	
Royal catchfly	<i>Silene regia</i>	Probably Present	S2 / ST		G3 / N3 / S2	Declining (decline 10-30%)
Running strawberry bush	<i>Euonymus obovatus</i>	Present in Park	S3 / INV		G5 / N5 / S3	
Sand phlox	<i>Phlox bifida</i> ssp. <i>bifida</i>	Probably Present	S3 / INV		T5 / N5? / SNR	
Shining club-moss	<i>Huperzia lucidula</i>	Probably Present	S2S3 / INV		G5 / NNR / S2S3	
Shining ladies'-tresses	<i>Spiranthes lucida</i>	Probably Present	S2 / INV		G5 / NNR / S2	
Short's aster	<i>Symphyotrichum shortii</i>	Probably Present	S1 / INV		G5 / N5 / S1	
Short's caric sedge	<i>Carex shortiana</i>	Present in Park	S2 / INV		G5 / NNR / S2	
Showy beard-tongue	<i>Penstemon cobaea</i>	Present in Park	S3 / INV		G4 / NNR / S3	
Silky aster	<i>Symphyotrichum sericeum</i>	Present in Park	S2 / INV		G5 / N5? / S2	

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).

Vascular Plant	Scientific Name	Park Status¹	State Heritage Program Rank/Status²	Federal Status³	Global / National / Subnational Status⁴	Global Short Term Trend⁴
Soft-leaved arrow-wood	<i>Viburnum molle</i>	Probably Present	S1 / INV		G5 / N5 / S1	
Southern hybrid log fern	<i>Dryopteris X australis</i>	Probably Present	S1 / INV		GNA / NNA / S1	
Speedwell	<i>Veronica anagallis-aquatica</i>	Probably Present	S2 / INV		G5 / NU / S2	
Tassel flower	<i>Brickellia grandiflora</i>	Probably Present	S2 / INV		G5 / N5 / S2	
Threadstem caric sedge	<i>Carex leptalea</i> var. <i>harperi</i>	Probably Present	S2S3 / INV		T4 / N4N5 / S2S3	
Trelease's larkspur	<i>Delphinium treleasei</i>	Probably Present	S3 / INV		G3 / N3 / S3	Declining to stable
Turk's-cap lily	<i>Lilium superbum</i>	Probably Present	S1 / INV		G5 / NNR / S1	
Tussock sedge	<i>Carex stricta</i>	Probably Present	S3 / INV		G5 / N5? / S3	
Two-leaf bishop's cap	<i>Mitella diphylla</i>	Probably Present	S2 / INV		G5 / NNR / S2	
Willdenow's caric sedge	<i>Carex willdenowii</i>	Present in Park	S1 / INV		G5 / NNR / S1	
Witch alder	<i>Fothergilla major</i>	Probably Present	S1 / INV		G3 / N3 / S1	
Yellow mandarin	<i>Prosartes lanuginosa</i>	Probably Present	S2 / INV		G5 / N5 / S2	
Yellow monkey flower	<i>Mimulus floribundus</i>	Probably Present	S2S3 / INV		G5 / NNR / S2S3	

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

² The official state rank and status the Arkansas Natural Heritage Commission has assigned to this species. S1 = Extremely rare. Typically 5 or fewer estimated occurrences in the state, or only a few remaining individuals, may be especially vulnerable to extirpation. S2 = Very rare. Typically between 5 and 20 estimated occurrences or with many individuals in fewer occurrences, often susceptible to becoming extirpated. S3 = Rare to uncommon. Typically between 20 and 100 estimated occurrences, may have fewer occurrences but with large number of individuals in some populations, may be susceptible to large-scale disturbances. S4 = Common, apparently secure under present conditions. Typically 100 or more

estimated occurrences, but may be fewer with many large populations, may be restricted to only a portion of the state, usually not susceptible to immediate threats. S5 = Demonstrably widespread, common, and secure in the state and essentially ineradicable under present conditions. SA = Accidental. SH = Historically known from the state, but not verified for an extended period, usually 15 years. SU = Possibly in peril in the state, but status uncertain, more information is needed. SX = Apparently extirpated from state. INV = Inventory Element; The Arkansas Natural Heritage Commission is currently conducting active inventory work on these elements. Available data suggests these elements are of conservation concern. These elements may include outstanding examples of Natural Communities, colonial bird nesting sites, outstanding scenic and geologic features as well as plants and animals, which, according to current information, may be rare, peripheral, or of an undetermined status in the state. The ANHC is gathering detailed location information on these elements. WAT = Watch List Species; The Arkansas Natural Heritage Commission is not conducting active inventory work on these species, however, available information suggests they may be of conservation concern. The ANHC is gathering general information on status and trends of these elements. An "*" indicates the status of the species will be changed to "INV" if the species is verified as occurring in the state (this typically means the agency has received a verified breeding record for the species). SE = State Endangered; The Arkansas Natural Heritage Commission applies this term to native plant taxa which are in danger of being extirpated from the state. ST = State Threatened; The Arkansas Natural Heritage Commission applies this term to native plant taxa which are believed likely to become endangered in Arkansas in the foreseeable future, based on current inventory information.

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 BUFF. 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.)
BUFF	211	78	58	22	43	1,353	1,765	95,730
HOME	81	31	41	6	9	304	472	160
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

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, almost 75% of the mammals and over half of the vascular plants are listed as probably present and lack adequate documentation. Additionally, all of the state listed species are listed as probably present. 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 32 of the documented species (two birds, 15 mammals, 4 reptiles, 11 vascular plants). Reviewers also assigned

a residency value for all but 47. 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 recent USGS fish inventory (Petersen and Justus 2005) documented several species of interest. Ten species are endemic to the Ozark Plateaus area and most of these are restricted to the White River Basin; for some species the Buffalo River is a population stronghold. The yoke darter (*Etheostoma juliae*) and Ozark bass (*Ambloplites constellatus*) are especially abundant in the Buffalo River. In Arkansas, the Ozark shiner (*Notropis ozarcanus*) is most abundant in the Buffalo River and, although populations of Ozark shiners are declining in Arkansas, this is not typically the case in the Buffalo River. Data from 2001-2003 indicate that gilt darters (*Percina evides*) are less common in the Buffalo River than during the 1970's. Populations of channel catfish (*Ictalurus punctatus*) (and any other fish species whose movements are inhibited by the cold water temperatures of the White River) may continue to decline without remedial efforts.
- The riparian bird inventory (Kellner 2003) documented five Swainson's warblers (*Limnothlypis swainsonii*) and eight cerulean warblers (*Dendroica cerulea*). Habitat composition appeared to have an influence on avian composition.
- The vascular plant inventory (Logan 2003) of seeps and springs found the study sites to be fairly depauperate and to contain a fairly high number of dry, weedy species. Most sites showed evidence of human manipulation as several structures were built around the seeps and springs to contain or capture water for human or livestock use. It is estimated that more than 90% of the species found in seeps and springs were documented.
- The vascular plant inventory for savannas (Logan 2003) documented nine areas as savanna and included the large and previously identified Turkey Mountain Savanna, an even larger area on the south slope of Granite Mountain and Prince Fred Knob, and several smaller areas. Two glades were discovered which had not been located in a previous glade survey. Due to past histories of overgrazing and fire suppression, the potential savanna sites located in the Lower Buffalo Wilderness are not typical savanna. It is estimated that all savanna areas within the Lower Buffalo Wilderness have been located and that species lists are well developed.

- The recent amphibian and reptile inventory (Angelo and Wiggs 2003) yielded 60 species with nine additional species reasonably expected to occur within BUFF and the surrounding watershed. It was noted that undeveloped portions of the BUFF watershed retain a rich diversity and abundance of herpetofauna and current good management practices (including the authors' proposed recommendations) should insure long term viability of sustainable populations of herpetofauna within BUFF.
- The bat inventory (Slay et al. 2004) documented 78 new sites (caves, karst features, shelters, and abandoned mines) and five species of bats including: eastern pipistrelle bat (*Pipistrellus subflavus*), northern long-eared myotis (*Myotis septentrionalis*), little brown bat (*Myotis lucifugus*), big brown bat (*Eptesicus fuscus*) and unidentified *Myotis* sp.

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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 it's 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.
Native	Native	The organism is native, or would be native, to the park (either endemic or indigenous).
Non-native	Non-native	The organism is not native, or would not be native, to the park (neither endemic nor indigenous).
Unknown	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.

www.nature.nps.gov/im/units/htln/



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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