

Appendix 1: Acronyms and definitions

Acronyms

BAAP	Badger Army Ammunition Plant ⁵⁴
BHG	Badger History Group
BIG	Badger Intergovernmental Group
BOMC	Badger Oversight and Management Commission
BOW	Badger Ordnance Works, the original name of the complex
BRC	Badger Reuse Committee
BVSD	Bluffview Sanitary District
DATCP	Wisconsin Department of Agriculture, Trade, and Consumer Protection
DFRC	Dairy Forage Research Center
DLSP	Devil's Lake State Park
DOA	Wisconsin Department of Administration
DOT.....	Wisconsin Department of Transportation
DNR	Wisconsin Department of Natural Resources
FLP	Federal Lands to Parks program
GSA	General Services Administration
GST	Great Sauk Trail
HCN	Ho-Chunk Nation
NPS	National Park Service
NRB	Natural Resources Board
PDMD	Power driven mobility devices
POU	Program of Utilization
RPA	Regional and Property Analysis
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SPSRA	Sauk Prairie State Recreation Area
USDA	United States Department of Agriculture
USH, STH, CTH	United States Highway, State Highway, County Highway
WAP	Wildlife Action Plan
WIARNG.....	Wisconsin Army National Guard

⁵⁴ Badger Army Ammunition Plant is sometimes referenced as BAAAP, which follows U.S. Army protocol of using the first two letters of a place's first word in acronyms.

Definitions of terms used in this master plan

Native, surrogate, and degraded

The existing habitats at SPSRA are in a wide variety of conditions. Although the term “surrogate” is most often associated with grasslands, in this master plan the terms “native,” “surrogate,” and “degraded” apply to all habitat types and are defined as follows:

Native

Native habitats are those dominated by native plant species and that are able to maintain functioning ecological processes (e.g., fire, nutrient cycling, species interactions). These can be either areas of remnant, unplowed sod or restorations using local genotypes of a reasonably wide diversity of native grasses, forbs, and (for savannas and forests) shrubs and trees. When in large tracts, native lands typically provide important habitat for native vertebrates. Remnant and unplowed areas, even if only small sites, often harbor a diversity of native invertebrates. An example of a native habitat at SPSRA is the Hillside Prairie.

Surrogate

Surrogate habitats are those dominated by non-native plant species or a mix of native and non-native plants that meet some life history needs of native animals. These areas may be of limited ecological value as native communities, but when in large blocks (e.g., for grasslands about 80 acres, or smaller if contiguous with other open habitats) they typically provide habitat structure that supports many native animals (notably birds), including several with high conservation need. Converting these lands to native habitats often requires planting and other intensive management techniques. Examples of surrogate habitat at SPSRA are: (1) the grasslands in the Central Grassland, (2) the former pasture in the Magazine Area with non-native grasses and scattered cottonwood trees that mimic native savanna and (3) the former agricultural lands in the Northeast Moraine that have succeeded to dense stands of early successional trees and exotic shrubs.

Degraded

Degraded habitats are those that retain some of the species or characteristics of native habitats, but which may have an altered species composition (including invasive species) or structure, or have reduced ecological function. They may or may not support most native animals based on their condition. Restoration of these areas depends greatly on the habitat and type of degradation; a degraded oak savanna with good structure might require management actions such as fire or thinning, while an extensive thicket of invasive shrubs might need more intensive techniques like clearing and replanting. Degraded sites must each be evaluated independently for the type of management needed to restore them to a more desirable condition. An example of a degraded habitat at SPSRA is an overgrown oak opening in the Magazine Area that has many large, open-grown oak trees in a forest of younger trees.

Forest to grassland continuum

Since naturalists first started exploring the state, different terms have been used to characterize Wisconsin’s landscape. The following terms are defined here to clarify the continuum of habitats found at SPSRA.

Forest

In this master plan, forests are defined as areas with 75 to 100% tree cover. At SPSRA, forests are mostly early to mid-successional in nature and most originated after 1942. Dominant trees include oaks, elms, cherry, box elder, cottonwood, and maples.

Oak savanna, oak opening, and oak woodland

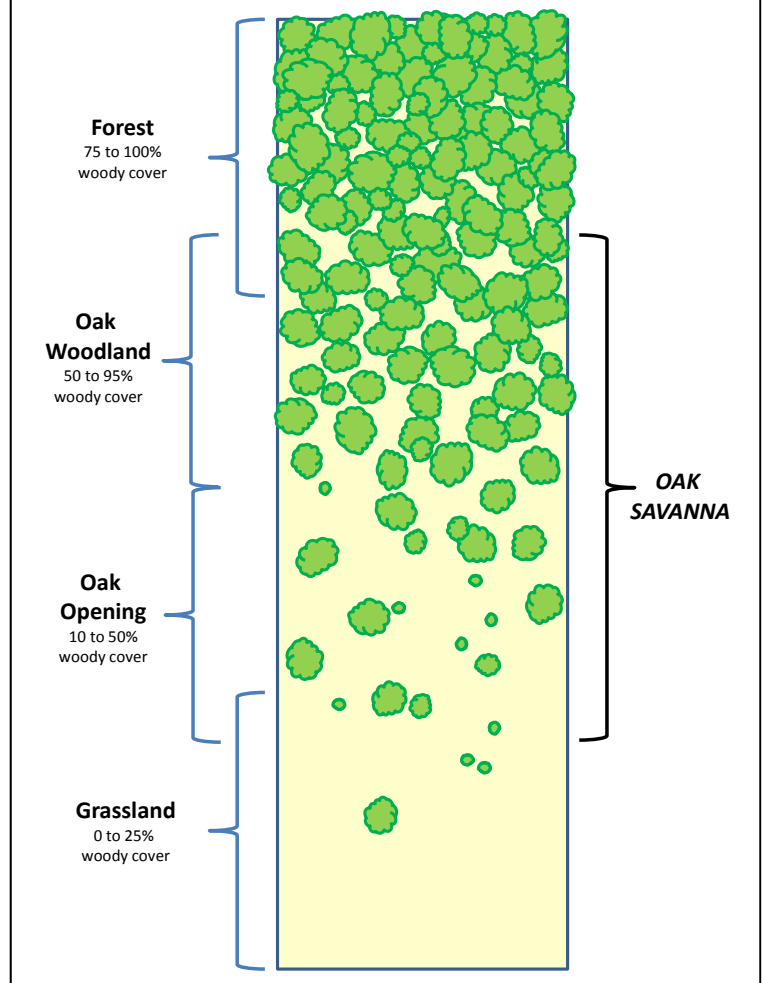
The term “savanna” has never been well defined. In the Midwest, savanna is generally used to describe an ecosystem that was historically part of a larger complex bordered by the prairies of the west and the deciduous forests of the east. The savanna complex was a mosaic of plant community types that represented a continuum from prairie to forest. Savannas were the communities in the middle of this continuum. The mosaic was maintained by frequent fires and possibly by large ungulates such as elk.⁵⁵ Oaks were the dominant trees, hence the oft-used term “oak savanna” to describe this general habitat type.

Because savannas grade into both prairie and forest, there are no clear dividing lines between it and these two communities. The department includes three habitats (native plant communities) under the “oak savanna” umbrella, two of which occur at SPSRA: oak openings and oak woodlands. Oak barrens, which occur on sand soils, are a third type of oak savanna, but historically did not occur on SPSRA.

In this master plan, oak woodlands are defined as areas with more than 50% tree canopy but less than 95%. As with oak openings, there is often a diversity of tree density – small patches of open areas and dense groves of trees may be scattered through oak woodlands. In high quality examples, dominant trees included white, bur, and black oaks, sometimes mixed with red oak and shagbark hickory. Under a characteristic fire regime, shrub and sapling representation in oak woodlands would be minimal. The herb layer is potentially diverse, including some members of the prairie, oak opening, and oak forest communities, but also featuring grasses, legumes, composites and other forbs that are best adapted to light conditions of high filtered shade.

Oak openings are defined as areas with scattered trees mixed with patches of grassland openings as well as small groves of more densely growing trees. Overall, between 10 and 50% tree canopy exists. In high quality examples, bur, white, and black oaks are dominant in mature stands as large, open-grown trees with distinctive widespread limb architecture. Shagbark hickory is sometimes present. American hazelnut is a common native shrub. The herb layer is typically a mix of those found in oak forests and prairies along with several savanna specialists.

Figure 23: A visual representation of the forest to grassland structural continuum.



⁵⁵ American Bison occurred in the area prior to Euro-American settlement, but were not present in the large herds common in the Plains.

Grasslands

In this master plan, grasslands are defined as open areas largely without trees and dominated by a wide range of grasses and forbs. Although grasslands have an open aspect, portions may have up to 25% shrub or woody cover. Many of the grasslands at SPSRA have been highly disturbed and have a sizeable invasive species component. Indeed, in many portions of SPSRA there are few, if any, native grasses and forbs present.

Figure 2 shows a generalized representation of the continuum from grasslands to oak openings to oak woodlands to forests and the structural overlap that occurs across these habitats.

Species of Greatest Conservation Need

Species of Greatest Conservation Need (SGCN) have low and/or declining populations that are in need of conservation action. They include various birds, fish, mammals, reptiles, amphibians and invertebrates (e.g., dragonflies, butterflies and freshwater mussels) that are:

- already listed as threatened or endangered;
- at risk because of threats to their life history needs or their habitats;
- stable in number in Wisconsin, but declining in adjacent states or nationally; or
- of unknown status in Wisconsin and suspected to be vulnerable.

SGCNs are identified in Wisconsin's Wildlife Action Plan (WAP), a strategic approach to wildlife conservation that outlines priority conservation actions to protect species and their habitats. The plan encourages the involvement of all agencies, organizations, and private individuals in taking action to prevent wildlife from becoming endangered and offers a proactive way to conserve wildlife and natural places for future generations.

Facilities

In this document, the term “facilities” encompasses the broad range of structures and man-made features on the property. These include such things as buildings, picnic areas, roads, trails, parking lots, kiosks, and shelters.

Mountain bicycling, recreational bicycling, off-road bicycling trails

Different types of biking opportunities are proposed at SPSRA. These are defined as:

Mountain bicycling = bicycling on narrow, often curving “single-track” trails that generally use native soils and incorporate naturally occurring materials (rocks, logs) into their design. Mountain bicycling can be physically challenging and requires bikes specifically built for such use (e.g., wider tires, sturdy frames, short turning radius). Generally speaking, riders cover up to 10 miles in a half-day outing.

Recreational bicycling = bicycling on trails surfaced with compacted aggregate or asphalt. Recreational bicycling, sometimes referred to as “family friendly” bicycling, can be done using a wide range of bicycles. Recreational bike trails are generally designed to be ridden by people with a wide range of abilities, including children. Depending on the surface, adult riders generally cover about 15 to 25 miles in a half-day outing.

Off-road bicycling trails = bike trails that are not shared by motor vehicles. All mountain biking trails are “off-road” trails.

Parts of the property

SPSRA is primarily comprised of two large contiguous blocks of land. In this document, the phrase “main part of the property” refers to all of SPSRA except for the Magazine Area and the small Weigand’s Bay site.

Appendix 2:

Reference list of documents related to SPSRA, BAAP, and the general area.

The following documents relate to the past, present, and future of the Badger Army Ammunition Plant and may be of interest for those seeking more information about the property and the surrounding area.

- Attig, J.W. 2000. *Field Trip Guide Book: Badger Army Ammunition Plant*. 37th Annual Meeting of the American Institute of Professional Geologists. Milwaukee, WI, 16 pp.
- Attig, J.W., L. Clayton, K.I. Lange, and L.J. Maher. 1990. *The Ice Age geology of Devils Lake State Park*. Wisconsin Geological and Natural History Survey, Educational Series 35. 28pp+.
- Badger Reuse Committee. 2000. *Natural, Historical and Cultural Resources at the Badger Army Ammunition Plant, Sauk County, Wisconsin*. A report to the BAAP Reuse Committee by the Historical Resources Subcommittee and the Badger History Group. 20 October 2000.
- Badger Reuse Committee. 2001. *Final Report on the Work of the Badger Reuse Committee, including Values, Criteria and Concept Map Plan for the Reuse of the Badger Army Ammunition Plant Property*. (“Badger Reuse Plan”). Sauk County Department of Planning and Zoning. Baraboo, WI.
- Bockenstedt, P. 1999. *Badger Army Ammunition Plant Rare Species Inventory and Management Plan*. Bonestroo and Associates: St. Paul, MN.
- Clayton, L., and J. W. Attig. 1990. *Geology of Sauk County, Wisconsin*. Wisconsin Geological and Natural History Survey, Information Circular 67. 68pp+.
- Cole, H.E. 1918. *A Standard History of Sauk County, Wisconsin: An Authentic Narrative of the Past, with Particular Attention to the Modern Era in the Commercial, Industrial, Educational, Civic and Social Development*. Volume I. Lewis Publishing Co., Chicago. 566 pp.
- Daylor Consulting Group, Inc. 1998. *Preliminary Highest and Best Use Analysis, Badger Army Ammunition Plant, Sauk County, Wisconsin*. Prepared for: Property Disposal Division, General Services Administration, Boston, MA. 58 pp & maps and appendices.
- Derleth, August. 1948. *Sauk County, a centennial history*. Sauk County Centennial Committee. Baraboo, WI.
- Duff, Allison J. 2006. *Identifying site priorities for the ecological restoration of the Badger Army Ammunition Plant*. Master’s thesis. Gaylord Nelson Institute for Environmental Studies, the University of Wisconsin: Madison.
- Erickson, Dave. 2002. *Powder to the People: Stories from the Badger Army Ammunition Plant*. Video documentary. Ootek Productions. Lone Rock, WI 53556.
- Goc, Michael .J. 2002. *Powder, People and Place: Badger Ordnance Works and the Sauk Prairie*. New Past Press. Friendship, WI.
- Ho-Chunk Nation. 2000. “The bison will return to Sauk Prairie.” *Wisconsin Academy Review* 46 (4):38-39.
- Kreitinger, K. 2011. *Badger Army Ammunition Plant Breeding Bird Surveys*. Unpubl. report, Bureau of Endangered Resources, Wisconsin Department of Natural Resources, Madison.

- Lange, K.I. 1990. *A postglacial vegetational history of Sauk County and Caledonia Township, Columbia County, south central Wisconsin*. Wisconsin Department of Natural Resources, Technical Bulletin 168. Madison. 40pp.
- Luthin, C. 1999. *Preliminary Ecological Restoration Plan for 1300 Acres of the Badger Army Ammunition Plant*. Unpublished document. Baraboo, Wisconsin.
- Mossman, Michael J. 1999. *Breeding Birds of the Badger Army Ammunition Plant, Sauk County, Wisconsin*. Unpubl. report, Wisconsin Department of Natural Resources, Bureau of Science Services, Madison. 91pp.
- Mossman, Michael. 2000. Of people and prairie. *Wisconsin Academy Review* 46 (4):24-26, 33-34.
- Mossman, Michael. 2003. *Birds and Conservation Issues at the Badger Army Ammunition Plant*. Synopsis for WDNR and other agencies involved in the future of the BAAP, 18 Sep 2003. Updated from a report to the Sumpter Township Land Use Committee, 29 Feb 2000.
- Mossman, Michael J., and K.I. Lange. 1982. *The breeding birds of the Baraboo Hills: their history, distribution, and ecology*. Wisconsin Department of Natural Resources and Wisconsin Society for Ornithology. Madison. 196pp.
- Mossman, Michael, M. Lannoo, and G. Casper. 2010. *Update Report on Neotenic Tiger Salamanders in the East Water Reservoir of Badger Army Ammunition Plant, Sauk County WI*. Unpubl. report to Wisconsin Department of Natural Resources. 29 Sep 2010.
- Mossman, Michael. 2014. Nomination for Badger Army Ammunition Plant Important Bird Area. Wisconsin Bird Conservation Initiative. Madison WI.
- Rhead, D. 1998. *Natural resources management plan*. Badger Army Ammunition Plant. Baraboo, WI. 300pp.
- Sample, David .W., and M.J. Mossman. 1997. *Managing habitat for grassland birds: a guide for Wisconsin*. Wisconsin Department of Natural Resources, Madison. 154pp.
- Thompson, K. and J. Welsh. *The biological inventory of the Badger Army Ammunition Plant, Sauk County, Wisconsin*. Wisconsin Chapter, The Nature Conservancy, Madison. 98pp+.
- U.S. Army Joint Munitions Command. Undated. Badger Army Ammunition Plant Historical Overview: 1941-2006. Unpubl. report, AMSJM-HI, Rock Island, IL. 28pp.
- Vandewalle and Associates. 1999. *Reuse of the Badger Army Ammunition Plant (BAAP): review and analysis of existing plans and studies*. Report to Sauk County Planning and Zoning Committee, 9 March. Baraboo, Wisconsin. 60pp.
- Van Driesche, J. and M. Lane. 2002. Conservation through conversation: collaborative planning for reuse of a former military property in Sauk County, Wisconsin, USA. *Planning Theory & Practice* 3(2):133-153.
- Wenny, Dan. 2002. *Grassland Bird Surveys at Badger Army Ammunition Plant*. Report to US Army. Illinois Natural History Survey, Center for Biodiversity Tech Report 2002 (16). Savanna, IL.
- Wisconsin Department of Natural Resources. 2012. *Draft Regional and Property Analysis: Sauk Prairie Recreation Area*. July 2012. Wisconsin DNR PUB LF-063. <http://dnr.wi.gov/files/PDF/pubs/lf/LF0063.pdf>

**Appendix 3:
Estimated costs of proposed facilities at SPSRA.**

Roads and trail estimated costs:

	Total Miles	Cost per mile	Estimated Cost
Roads (miles)			
Asphalt (moderately developed)	14.6	\$80,000	\$1,168,000
Gravel (lightly, moderately developed)	7.6	\$35,000	\$266,000
<i>Total Roads</i>	22.2		\$1,434,000
Trails (miles)			
Hiking, longer distance trail (primitive)	12	\$19,000	\$228,000
Hiking, short loop trails (primitive to moderately developed)	8	\$19,000	\$152,000
Biking (moderately developed)	15	\$22,000	\$330,000
Mt. Biking, single track (primitive)	10	\$19,000	\$190,000
Equestrian (lightly developed)	12	\$25,000	\$300,000
Snowmobile	7	-	\$0
Great Sauk Trail	5.5	\$29,000	\$159,500
<i>Total Trails</i>	63		\$1,359,500
TOTAL			\$2,793,500

Proposed facilities estimated costs:

Facility	Location	Number of units	Unit Cost	Estimated Cost
Visitor center	to be determined	1	\$575,000	\$575,000
Entrance sign	Gateway Corridor	1	\$8,500	\$8,500
Interpretive signs	Property-wide	15	\$1,000	\$15,000
Viewing deck	Bluff Vista	1	\$45,000	\$45,000
Amphitheater	Bluff Vista	1	\$50,000	\$50,000
Amphitheater	NE Moraine or Gateway Corridor	1	\$100,000	\$100,000
Corral, hitching posts	NE moraine horse DUA	1	\$8,000	\$8,000
Vault toilets	Reservoir DUA NE moraine horse DUA Lake WI overlook DUA Magazine area special events DUA Weigand's Bay DUA	5	\$65,000	\$325,000
Picnic tables, grills	Reservoir DUA NE moraine horse DUA Lake WI overlook DUA Magazine area special events DUA Weigand's Bay DUA	5	\$2,500	\$12,500
Fishing platform/pier*	Weigand's Bay	1	\$606,000	\$606,000
Gates	Property-wide	15	\$1,500	\$22,500
Shop /maintenance building	Gateway Corridor	1	\$200,000	\$200,000

Parking lots	Location	Number of units	Unit Cost	Estimated Cost
6 car (paved)	Entrance lot	1	\$18,000	\$18,000
10 car (gravel)	NE moraine Rocketry site DUA Lake WI overlook DUA Hillside prairie Thoelke cemetery	5	\$8,000	\$40,000
30 horse trailer & 6 car (gravel)	NE moraine horse DUA	1	\$20,000	\$20,000
15 car (paved)	Visitor center	1	\$40,000	\$40,000
20 car (gravel)	Weigand's Bay DUA Special event staging area	2	\$16,000	\$32,000
50 car (paved)	Reservoir DUA	1	\$85,000	\$85,000

Shelters	Location	Number of units	Unit Cost	Est. Cost
20'x30'	Reservoir DUA	1	\$45,000	\$45,000
20'x20'	NE moraine horse DUA Magazine area special events DUA	2	\$35,000	\$70,000
16'x16'	Lake WI overlook DUA Weigand's Bay DUA	2	\$25,000	\$50,000

TOTAL **\$2,367,500**

DUA = Designated Use Area

*The estimated cost for the fishing platform/pier includes addressing the underwater portion of the former pump house and removing the upper structures.

Appendix 4:

Rare species recorded at Sauk Prairie State Recreation Area.

Species name	Common name	Taxa	Current Legal Status	SGCN*		Species status at SPSRA**	Current population trend	Anticipated effect of proposed management on population trend
				2005 WAP	2015 WAP			
<i>Ammodramus henslowii</i>	Henslow's sparrow	Bird	State Threatened	Y	Y	Present	decreasing	increase
<i>Ammodramus savannarum</i>	Grasshopper sparrow	Bird	Special Concern – Watch	Y	Y	Present	decreasing	increase
<i>Anrostomus vociferus</i>	Whip-poor-will	Bird	Special Concern	Y	Y	Present	decreasing	increase
<i>Bartramia longicauda</i>	Upland sandpiper	Bird	State Threatened	Y	Y	Likely extirpated	NA	increase
<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Bird	Special Concern – Watch	Y	N	Present	stable	stable
<i>Coccyzus erythrophthalmus</i>	Black-billed cuckoo	Bird	Special Concern – Watch	Y	N	Present	increasing	decrease
<i>Colinus virginianus</i>	Northern bobwhite	Bird	Special Concern	Y	Y	Unknown/uncertain	decreasing	increase
<i>Dolichonyx oryzivorus</i>	Bobolink	Bird	Special Concern – Watch	Y	Y	Present	decreasing	increase
<i>Empidonax minimus</i>	Least flycatcher	Bird	Special Concern – Watch	Y	Y	Present	stable	decrease
<i>Empidonax traillii</i>	Willow flycatcher	Bird	Special Concern – Watch	Y	N	Present	increasing	stable
<i>Hylocichla mustelina</i>	Wood thrush	Bird	Special Concern	Y	N	Present	increasing	decrease
<i>Icteria virens</i>	Yellow-breasted chat	Bird	Special Concern	N	Y	Unknown/uncertain	unknown	decrease
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	Bird	Special Concern – Watch	Y	Y	Present	decreasing	increase
<i>Poocetes gramineus</i>	Vesper sparrow	Bird	Special Concern – Watch	Y	Y	Present	decreasing	increase
<i>Scolopax minor</i>	American woodcock	Bird	Special Concern – Watch	Y	Y	Present	stable	increase
<i>Setophaga citrina</i>	Hooded warbler	Bird	State Threatened	Y	Y	Present	increasing	stable
<i>Spiza americana</i>	Dickcissel	Bird	Special Concern – Watch	Y	Y	Present	stable	increase
<i>Spizella pusilla</i>	Field sparrow	Bird	Special Concern – Watch	Y	N	Present	stable	stable

Species name	Common name	Taxa	Current Legal Status	SGCN*		Species status at SPSRA**	Current population trend	Anticipated effect of proposed management on population trend
				2005 WAP	2015 WAP			
<i>Sturnella magna</i>	Eastern meadowlark	Bird	Special Concern – Watch	Y	Y	Present	decreasing	increase
<i>Sturnella neglecta</i>	Western meadowlark	Bird	Special Concern	Y	Y	Likely extirpated	NA	increase
<i>Toxostoma rufum</i>	Brown thrasher	Bird	Special Concern – Watch	Y	N	Present	stable	increase
<i>Vermivora cyanoptera</i>	Blue-winged warbler	Bird	Special Concern	Y	N	Present	increasing	stable
<i>Vireo bellii</i>	Bell’s vireo	Bird	State Threatened	Y	Y	Present	increasing	stable
<i>Micotus ochrogaster</i>	Prairie vole	Mammal	Special Concern	Y	Y	Present	decreasing	increase
<i>Lithobates palustris</i>	Pickerel frog	Frog	Special Concern	Y	N	Present	stable	increase
<i>Agabus inscriptus</i>	A predaceous diving beetle	Invert	Special Concern	Y	N	Present	stable	increase
<i>Agabus leptapsis</i>	A predaceous diving beetle	Invert	Special Concern	Y	Y	Present	stable	increase
<i>Laccophilus undatus</i>	A predaceous diving beetle	Invert	Special Concern	Y	Y	Present	stable	increase
<i>Lepidostoma libum</i>	A lepidostomatid caddisfly	Invert	Special Concern	Y	N	Present	unknown	unknown
<i>Sanfilippodytes pseudovilis</i>	A predaceous diving beetle	Invert	Special Concern	Y	N	Present	unknown	increase
<i>Asclepias lanuginosa</i>	Woolly milkweed	Plant	State Threatened	N	N	Likely extirpated	NA	increase
<i>Carex prasina</i>	Drooping sedge	Plant	Special Concern	N	N	Likely extirpated	NA	increase
<i>Lespedeza leptostachya</i>	Prairie bush clover	Plant	State Endangered	N	N	Likely extirpated	NA	increase
<i>Myosotis laxa</i>	Small forget-me-not	Plant	Special Concern	N	N	Likely extirpated	NA	unknown

* SGCN = Species of Greatest Conservation Need
WAP = Wildlife Action Plan

** Status at SPSRA:

Present (recorded in a survey conducted after 2010; habitat still appears suitable).

Unknown/uncertain (recorded in a survey conducted after 1990, but not recorded or re-located in most recent survey; habitat appears potentially suitable).

Likely extirpated (recorded in a survey conducted after 1990, but not recorded or re-located in most recent survey; habitat no longer appears suitable)

Additional rare vertebrates that have not been recorded at SPSRA, but are known to occur nearby in similar habitats and may establish breeding populations in the future at SPSRA as habitats are restored.

Species name	Common name	Taxa	Legal Status	2005 WAP	2015 WAP	Species status at SPSRA	Current population trend	Anticipated effect of proposed management on population trend
<i>Anas discors</i>	Blue-winged teal	Bird	Special Concern – Watch	Y	N	Not recorded	NA	increase
<i>Asio flammeus</i>	Short-eared owl	Bird	Special Concern	Y	Y	Not recorded	NA	increase
<i>Circus cyaneus</i>	Northern harrier	Bird	Special Concern – Watch	Y	N	Not recorded	NA	increase
<i>Haliaeetus leucocephalus</i>	Bald eagle	Bird	Special Concern	Y	N	Nest on DFRC land	NA	stable
<i>Setophaga cerulea</i>	Cerulean warbler	Bird	State Threatened	Y	Y	Not recorded	NA	increase
<i>Crotalus horridus</i>	Timber rattlesnake	Snake	Special Concern	Y	Y	Not recorded	NA	increase
<i>Pantherophis spiloides</i>	Gray ratsnake	Snake	Special Concern	Y	N	Not recorded	NA	increase
<i>Pituophis catenifer</i>	Gophersnake	Snake	Special Concern	Y	Y	Not recorded	NA	increase
<i>Emydoidea blandingii</i>	Blanding's turtle	Turtle	Special Concern	Y	Y	Not recorded	NA	increase

Figure 24: View of the Central Grassland unit looking northwest. The Ho-Chunk Nation land (with many buildings on it) can be seen in the distance. The Baraboo Hills are beyond.



John Olson, 2004

Appendix 5:

References related to environmental impacts associated with human activities.

Bibliography of selected references related to impacts associated with human activities, and particularly outdoor recreation, on wildlife and plants.

- Banks, Peter B., and Jessica Bryant. 2007. Four-legged friend or foe? Dog walking displaces native birds from natural areas. *Biology Letters* 3: 611-613.
- Barber, Jesse R., Chris Burdett, Sarah Reed, Katy Warner, Charlotte Formichella, Kevin Crooks, Dave Theobald, and Kurt Fristrup. 2011. Anthropogenic noise exposure in protected natural areas: estimating the scale of ecological consequences. *Landscape Ecology* (26) 9: 1281-1295.
- Barton Daniel C. and Aaron Holmes. 2007. Off-highway vehicle trail impacts on breeding songbirds in northeastern California. *Journal of Wildlife Management* 71(5): 1617–1620
- Bautista, Luis. M., Jesus Garcia, Ricardo Calmaestra, Carlos Palacin, Carlos Martin, Manual Morales, Raul Bonal, and Javier Vinuela. 2004. Effect of weekend road traffic on the use of space by raptors. *Conservation Biology* 18(3): 726-732.
- Beale, Colin M. and Pat Monaghan. 2004. Behavioural responses to human disturbance: a matter of choice? *Animal Behaviour* 68: 1065-1069.
- Bennett, Karen A. and Erik F. Zuelke. 1999. The effects of recreation on birds: a literature review. Delaware Natural Heritage Program; Smyrna, DE. 17 pages.
- Benninger-Traux Mary, John Vankat, and Robert Schaefer. 1992. Trail corridors as habitat and conduits for movement of plant species in Rocky Mountain National Park, Colorado, USA. *Landscape Ecology* 6(4): 269–278.
- Boyle, Stephan A. and Fred B. Sampson. 1985. Effects of nonconsumptive recreation on wildlife: a review. *Wildlife Society Bulletin* 13: 110-116.
- Buckley, Ralf. 2004. Environmental impacts of motorized off-highway vehicles. In: *Environmental impacts of ecotourism*, ed. R Buckley, pp. 83-97. CABI Publishing, New York.
- Burger, Joanna, Robert T. Zappalorti, Michael Gochfeld, and Emile DeVito. 2007. Effects of off-road vehicles on reproductive success of pine snakes (*Pituophus melanoleucus*) in the New Jersey pinelands. *Urban Ecosystem* 10: 275-284.
- Burgin, Shelley and Nigel Hardiman. 2012. Is the evolving sport of mountain biking compatible with fauna conservation in national parks? *Australian Zoologist* 36: 201-208.
- Bushell, Robyn. 2003. Balancing conservation and recreation in protected areas. In: *Nature Based Tourism, Environment and Land Management*, ed. R. Buckley, C. Pickering and D. B. Weaver, pp. 197-208. CABI Publishing, Cambridge, MA.

- Campbell, Jonathan E. and David Gibson. 2001. The effect of seeds of exotic species transported via horse dung on vegetation along trail corridors. *Plant Ecology* 157(1): 23–35.
- Campbell, Michael O. 2011. Passerine reactions to human behavior and vegetation structure in Peterborough, Canada. *Urban Forestry & Urban Greening* 10(1): 47–51.
- Casas, F., F. Mougeot, J. Vinuela, and V. Bretagnolle. 2009. Effects of hunting on the behavior and spatial distribution of farmland birds: importance of hunting-free refuges in agricultural areas. *Animal Conservation* 12: 346-354.
- Cole, David N. and Peter Landres. 1995. Indirect effects of recreation on wildlife. In: *Wildlife and Recreationists: Coexistence Through Management and Research*, ed. R.L. Knight and K.J. Gutzwiller, pp. 183-202. Island Press, Washington, DC.
- Davis, Craig A., David Leslie, W. David Walter, and Allen Graber. 2010. Mountain biking trail use affects reproductive success of nesting golden-cheeked warblers. *The Wilson Journal of Ornithology* 122: 465-474.
- Deluca, William V. and David King. 2014. Influence of hiking trails on montane birds. *The Journal of Wildlife Management* 78(3): 494-502.
- Drewitt, Allan L. 2007. Birds and recreational disturbance. *Ibis* 149(Suppl. 1): 1-2.
- Fahrig, Lenore and Trina Rytwinski. 2009. Effects of roads on animal abundance: an empirical review and synthesis. *Ecology and Society* 14(1): article 21 (online).
- Fernandez, Carmelo and Paz Azkona. 1993. Human disturbance affects parental care of marsh harriers and nutritional status of nestlings. *Journal of Wildlife Management* 57(3): 602–608.
- Fernandez-Juricic, Esteban. 2000. Local and regional effects of pedestrians on forest birds in a fragmented landscape. *Condor* 102(2): 247–255.
- Fernandez-Juricic, Esteban, Maria Jimenez, and Elena Lucas. 2001. Alert distance as an alternative measure of bird tolerance to human disturbance: implications for park design. *Environmental Conservation* 28(3): 263-269.
- Fernandez-Juricic, Esteban, M. Paula Venier, Daniel Renison, and Daniel Blumstein. 2005. Sensitivity of wildlife to spatial patterns of recreationist behavior: a critical assessment of minimum approaching distances and buffer areas for grassland birds. *Biological Conservation* 125: 225–235.
- Finney, S.K., James Pearce-Higgins, and D.W. Yalden. 2005. The effect of recreational disturbance on an upland breeding bird, the golden plover *Pluvialis apricaria*. *Biological Conservation* 121: 53-63.
- Francis, Clinton D., Catherine P. Ortega, and Alexander Cruz. 2009. Noise pollution changes avian communities and species interactions. *Current Biology* 19(16): 1415–1419.
- Gill, Jennifer A. 2007. Approaches to measuring the effects of human disturbance on birds. *Ibis* 149(Suppl. 1): 9-14.
- Gill, Jennifer A., Ken Norris, and William Sutherland. 2001. Why behavioural responses may not reflect the population consequences of human disturbance. *Biological Conservation* 97: 265–268.
- Gower, Stith T. 2008. Are horses responsible for introducing non-native plants along forest trails in the eastern United States? *Forest Ecology and Management* 256(5):997–1003.

- Green, Ronda J. and Karen Higginbottom. 2000. The effects of non-consumptive wildlife tourism on free-ranging wildlife: a review. *Pacific Conservation Biology* 6(3): 183 – 197.
- Holmes, Tamara L., Richard Knight, Libby Stegall and Gerald Craig. 1993. Responses of wintering grassland raptors to human disturbance. *Wildlife Society Bulletin* 21: 461–468.
- Klein, Mary L. 1993. Waterbird behavioral responses to human disturbances. *Wildlife Society Bulletin* 21:31-39.
- Klein, Mary L., Stephen R. Humphrey, and H. Franklin Percival. 1995. Effects of ecotourism on distribution of waterbirds in a wildlife refuge. *Conservation Biology* 9(6): 1454-1465.
- Knight, Richard L. and Kevin Gutzwiller. 2013. *Wildlife and Recreationists: Coexistence Through Management And Research*. Island Press, Washington, D.C. 389 pages.
- Knight, Richard L. and David Cole. 1995. Factors that influence wildlife responses to recreationists. In: *Wildlife and Recreationists: Coexistence Through Management and Research*, ed. R.L. Knight & K.J. Gutzwiller, pp. 71–79. Washington, DC, USA: Island Press.
- Knight, Richard L. and Stanley Temple. 1995. Wildlife and recreationists: coexistence through management. In: *Wildlife and Recreationists: Coexistence Through Management and Research*, ed. R.L. Knight & K.J. Gutzwiller, pp. 327–333. Washington, DC, USA: Island Press.
- Koshak, Dianne C. (Compiler). N.d. The impacts of wildlife viewing and related non-consumptive outdoor recreation activities on avian populations: an annotated bibliography. Colorado Division of Wildlife.
- Langston, Rowena, D. Liley, G. Murison, E. Woodfield, and R.T. Clarke. 2007. What effects do walkers and dogs have on the distribution and productivity of breeding European Nightjar *Caprimulgus europaeus*? *Ibis* 149 (Suppl. 1): 27-36.
- Lenth, Benjamin E., Richard Knight, and Mark Brennan. 2008. The effect of dogs on wildlife communities. *Natural Areas Journal* 28(3):218-227.
- Leung, Yu-Fai and Jeffrey Marion. 2000. Recreation impacts in wilderness: a state-of-the-knowledge review. USDA Forest Service Proceedings RMRS-P-15-VOL-5.
- Lindsay, Karen, John Craig, and Matthew Low. 2008. Tourism and conservation: The effects of track proximity on avian reproductive success and nest selection in an open sanctuary. *Tourism Management* 29: 730-739.
- Mallord, John W., Paul Dolman, Andy Brown, and William Sutherland. 2007. Linking recreational disturbance to population size in a ground nesting passerine. *Journal of Applied Ecology* 44(1): 185-195.
- Marzano, Mariella and Norman Dandy. 2012. *Recreational use of forests and disturbance of wildlife: a literature review*. Forestry Commission Research Report, Forestry Commission, Edinburgh. 40 pages.
- Miller, James R. and N. Thompson Hobbs. 2000. Recreational trails, human activity, and nest predation in lowland riparian areas. *Landscape and Urban Planning* 50:227-236.
- Miller, Scott G., Richard Knight, and Clinton Miller. 2001. Wildlife responses to pedestrians and dogs. *Wildlife Society Bulletin* 29(1): 124–132.

- Miller, Scott G., Richard Knight, and Clinton Miller. 1998. Influence of recreational trails on breeding bird communities. *Ecological Applications* 8(1): 162–169.
- Murison, Giselle, James M. Bullock, John Underhill-Day, Rowena Langston, Andrew F. Brown, and William J. Sutherland. 2007. Habitat type determines the effects of disturbance on the breeding productivity of the Dartford Warbler *Sylvia undata*. *Ibis* 149(Suppl. 1):16-26.
- Newsome, David, Amanda Smith, and Susan Moore. 2008. Horse riding in protected areas: a critical review and implications for research and management. *Current Issues in Tourism* 11(2):144-166.
- Ouren, Douglas S., Christopher Haas, Cynthia P. Melcher, Susan Stewart, Phadrea Ponds, Natalie Sexton, Lucy Burris, Tammy Fancher, and Zachary Bowen. 2007. *Environmental Effects of Off-Highway Vehicles on Bureau of Land Management Lands: A Literature Synthesis, Annotated Bibliographies, Extensive Bibliographies, and Internet Resources*. U.S. Geological Survey, Open-File Report 2007-1353. 225 pages.
- Park, Logan O., Robert Manning, Jeffrey Marion, Steven Lawson, and Charles Jacobi. 2008. Managing visitor impacts in parks: A multi-method study of the effectiveness of alternative management practices. *Journal of Park and Recreation Administration* 26(1):97-121.
- Parris, Kirsten M. and Angela Schneider. 2009. Impacts of traffic noise and traffic volume on birds of roadside habitats. *Ecology and Society*, 14(1): article 29 (online).
- Pickering, Catherine M. 2010. Ten factors that affect the severity of environmental impacts of visitors in protected areas. *Ambio* 39:70-77.
- Pickering, Catherine M. 2008. *Literature review of horse riding impacts on protected areas and a guide to the development of an assessment program*. Environmental Protection Agency: Brisbane.
- Pickering, Catherine M., Wendy Hill, David Newsome, and Yu-Fai Leung. 2010. Comparing hiking, mountain biking and horse riding impacts on vegetation and soils in Australia and the United States of America. *Journal of Environmental Management* 91(3): 551-562.
- Potito, Aaron P. and Susan Beatty. 2005. Impacts of recreation trails on exotic and ruderal species distribution in grassland areas along the Colorado Front Range. *Environmental Management* 36(2):230-236.
- Quinn, Lauren D., Adda Quinn, Mietek Kolipinski, Bonnie Davis, Connie Berto, Mark Orcholski, and Sibdas Ghosh. 2010. Role of horses as potential vectors of non-native plant invasion: an overview. *Natural Areas Journal* 30(4): 408-416.
- Reed, Sarah E., Courtney Larson, Kevin Crooks and Adina Merenlender. 2014. *Wildlife response to human recreation on NCCP Reserves in San Diego County*. Final report to Wildlife Conservation Society. 160 pages.
- Reed, Sarah E. and Adina Merenlender. 2008. Quiet, non-consumptive recreation reduces protected area effectiveness. *Conservation Letters* 1(3):146-154.
- Riffell, Samuel K, Kevin Gutzwiller, and Stanley Anderson. 1996. Does repeated human intrusion cause cumulative declines in avian richness and abundance? *Ecological Applications* 6(2): 492–505.
- Rooney, Tom. 2009. *Best management practices for preventing the spread of invasive species by outdoor recreation activities in Wisconsin*. Wisconsin Council of Forestry.

- Rosenberg, Kenneth V., Barbara Kott, Ralph S. Hames, Ronald W. Rohrbaugh, Jr., Sara Barker Swarthout, James D. Lowe. 2004. *Effects of recreational development on forest-breeding birds in U.S. National Forests*. Final report to USDA Forest Service, Cornell Lab of Ornithology, Ithaca, NY. 19 pages.
- Slabbekoorn, Hans and Erwin Ripmeester. 2008. Birdsong and anthropogenic noise: implications and applications for conservation. *Molecular Ecology* 17:72-83.
- Smith-Castro, Jennifer R. and Amanda Rodewald. 2010. Effects of recreational trails on northern cardinals (*Cardinalis cardinalis*) in forested urban parks. *Natural Areas Journal* 30: 328-337.
- Smith-Castro, Jennifer R. and Amanda Rodewald. 2010. Behavioural responses of nesting birds to human disturbance along recreational trails. *Journal of Field Ornithology* 81(2): 130-138.
- Sokos, Christos K., Periklis K. Birtsas, John W. Connelly, Konstantinos G. Papaspyropoulos. 2013. Hunting of migratory birds: disturbance intolerant or harvest tolerant? *Wildlife Biology* 19(2): 113-125.
- Steidl, Robert J. and Brian F. Powell. 2006. Assessing the effects of human activities on wildlife. *The George Wright Forum* 23(2): 50-58.
- Steven, Rochelle, Catherine Pickering, and J. Guy Castley. 2011. A review of the impacts of nature based recreation on birds. *Journal of Environmental Management* 92:2287-2294.
- Stokowski, Patricia A., and Christopher LaPointe. 2000. *Environmental and social effects of ATVs and ORVs: an annotated bibliography and research assessment*. School of Natural Resources, University of Vermont, Burlington.
- Summers, Patricia D., Glenn Cunnington, and Lenore Fahrig. 2011. Are the negative effects of roads on breeding birds caused by traffic noise? *Journal of Applied Ecology* (48(6): 1527-1534.
- Taylor, Audrey R., and Richard Knight. 2003. Wildlife responses to recreation and associated visitor perceptions. *Ecological Applications* 13(4):951-963.
- Thompson, Bill. 2015. Recreational trails reduce the density of ground-dwelling birds in protected areas. *Environmental Management* 55: 1181-1190.
- U.S. Department of Agriculture. 2012. *Non-native invasive species best management practices: guidance for the U.S. Forest Service Eastern Region*. 288 pages.
- U.S. Department of Transportation, Federal highway Administration. 2004. *Synthesis of noise effects on wildlife populations*. Publication No. FHWA-HEP-06-016. 75 pages.
- van der Zande, A. N, J. C. Berkhuizen, H. C. van Latesteijn, W. J. ter Keurs, and A. J. Poppelaars. 1984. Impact of outdoor recreation on the density of a number of breeding bird species in woods adjacent to urban residential areas. *Biological Conservation* 30(1): 1-39.
- van der Zande, A.N., W. J. ter Keurs, and W. J. van der Weijden. 1980. The impact of roads on the densities of four bird species in an open field habitat - evidence of a long-distance effect. *Biological Conservation*: 18(4): 299-321.
- Wells, Floye H. and William Lauenroth. 2007. The potential for horses to disperse alien plants along recreational trails. *Rangeland Ecology and Management* 60(6):574-577.

Widman, C. G. 2010. Discouraging off-trail hiking to protect park resources: evaluating management efficacy and natural recovery. M.S. Thesis, Virginia Polytechnic Institute.

Wolf, Isabelle D., Gerald Hagenloh, and David Croft. 2013. Vegetation moderates impacts of tourism usage on bird communities along roads and hiking trails. *Journal of Environmental Management* 129: 224-234.

Wilson Patrick I. 2008. Preservation versus motorized recreation: institutions, history, and public lands management. *Social Science Journal* 45(1):194–202.