

The attached draft program guidance, “American Marten (*Martes americana*) Species Guidance” was developed to provide recommendations on Best Management Practices (BMPs) to conserve or improve forest habitat for this species within its range in northern Wisconsin. The document also includes information on the ecology of American martens, relative to Wisconsin, and provides a flow chart on how to screen a project area to determine if it has the potential to impact American martens.

These BMPs describe actions that will help maintain or enhance habitat for this species. These actions are typically voluntary unless required by permit, authorization, or approval. The BMPs were developed by an ad hoc team that included both marten and forest management experts from government agencies, universities, and the forestry community. To date, the document has been reviewed and had comments incorporated from the ad hoc team members and the various organizations they represent.

The department is now soliciting comments from the public. Once the 21 day notice period is complete, all comments will be considered, revisions will be made to the document as needed, and the final guidance will be made available to the public.

Comments on this draft guidance should be sent to Mandy Kamps, [Amanda.Kamps@wisconsin.gov](mailto:Amanda.Kamps@wisconsin.gov); (715) 359-5508.

# American marten (*Martes americana*) Species Guidance

Family: Mustelidae

Formerly known as pine marten; other common names include American sable and Waabizheshi (Ojibwe)



**State Status:** Endangered (1972)

**State Rank:** S3

**Federal Status:** none

**Global Rank:** G5

**Wildlife Action Plan**

**Mean Risk Score:** 3.4



## Species Information

**General Description:** Martens are medium-sized carnivores with elongated bodies and a well-furred tail (Powell et al. 2003). Pelage coloration is typically brown, but can vary from tan to brownish red to a dark black-brown (Powell et al. 2003). Winter coats are thicker with essentially the same coloration. Annual shedding to the summer coat is completed by mid-June (Powell et al. 2003). Martens have a pointed face with large (relative to other weasels), rounded ears. Adult males are larger than females and weigh 700-1200g and 400-800g, respectively in Wisconsin (Wright 1999, J. Woodford unpublished data). Males generally are 55-70cm and females 45-55cm in total length (Wright 1999, J. Woodford unpublished data).

**Definitive Identification:** The head and dorsal areas are usually much lighter-colored than the body, legs and tail. They have a buff to orange colored throat and neck patch that along with the large, rounded ears (relative to head size) are the best characteristics for identification.

**Similar Species:** The fisher (*Martes pennanti*) and mink (*Mustela vison*) are commonly mistaken for American martens in Wisconsin. Fishers are normally 2-7 times larger than martens, have more rounded ears, and their heads have a hoary or grizzled appearance (Powell et al. 2003). Mink are similar in size to a marten but have a uniformly dark-brown pelage with a white chin and throat area, very small ears, and are strongly associated to streams, marshes, and rivers.

**Associated Species:** Fisher, red squirrel (*Tamiasciurus hudsonicus*), and voles (*Microtus* spp.).

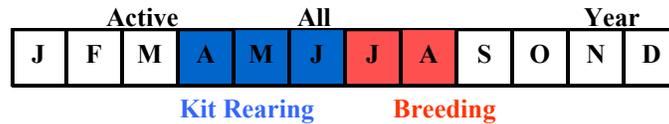
**State Distribution and Abundance:** American martens were distributed statewide across all forested areas of Wisconsin prior to the 20<sup>th</sup> century (Schorger 1942). By 1925 they were extirpated from the state (Jackson 1961). Reintroductions have occurred on Stockton Island in Lake Superior in the 1950's, the Nicolet National Forest from 1975-83, and the Chequamegon Forest from 1987-90 and again in 2008-2010 (Williams et al. 2006, Woodford and Dumyah 2012). Recently, martens or their tracks were observed in Ashland, Bayfield, Sawyer, Iron, Vilas, Oneida, Forest, and Florence counties (Woodford 2010).

**Global Distribution and Abundance:** Historically, American marten distribution followed the boreal forest zones east to west across North America with the northern limit extending to tree line (Powell et al. 2003). Generally, American martens were found in the northeast, Great Lakes, and higher elevations of the Sierra Nevada and Rocky Mountains in the lower 48 states. They are found in nearly all forested areas of Alaska and the Canadian provinces (Powell et al. 2003).

Martens were extirpated from much of their historic range in the continental United States in the 1800's and early 1900's, and remain absent in New Jersey, Pennsylvania, West Virginia, Ohio, Indiana, and Illinois (Buskirk and Ruggiero 1994). Marten populations were reestablished in Michigan, North Dakota, South Dakota, Vermont, and Wisconsin via numerous reintroduction and translocation projects.

**Diet:** Martens are opportunistic predators influenced by local prey abundance and availability (Ben-David et al. 1997). A typical marten diet consists of rodents, lagomorphs, birds, and sometimes insects, fruit, vegetation, and carrion (reviewed by Martin 1994).

**Reproductive Cycle:** Martens normally mate during the months of July & August (Strickland et al. 1982). Like some other mustelids, they have a significant delay before the fertilized eggs are implanted. Active pregnancy is believed to occur in mid to late winter and young are born between mid-March to late April (Powell et al. 2003). Young develop fast, but are dependent on care from the female for approximately 3 months before being able to hunt on their own.



**Ecology:** Marten males are polygynous and females may be polyandrous as well (Powell et al. 2003). Breeding occurs in July and August, but implantation of the fertilized blastocyst is delayed until late February or early March (approximately 6-8 months), when photoperiod induces implantation (Mead 1994). Once implanted, marten embryos develop quickly over the next 27-30 days (reviewed in Mead 1994). Kits are altricial at birth and information on litter sizes is scarce for martens, but wild martens bred in captivity averaged 2.3 young per litter (R. Cochrane, unpublished data). Kits approach adult weight by 3 months of age (Markley and Bassett 1942); however, little is known about timing of dispersal. Both males and females normally will breed during their second year, but there is some confusion on this in the literature (Powell et al. 2003). The oldest martens reported in Wisconsin were 9 and 10 years old (Wright 1999, J. Gilbert, unpublished data).

**Natural Community Associations:** (WDNR, 2005):

Significant: Boreal Forest, Northern Dry-Mesic, and Northern Mesic

**Habitat:** In Wisconsin, Wright (1999) found male martens selecting for pole (12.7-22.9 cm dbh) and saw-log (>22.9 cm dbh) sized forest stands, while females selected for pole sized stands. He reported male martens selecting red pine (*Pinus resinosa*) cover type more than expected and females avoiding it, although red pine occupied <10% of the study area. Both sexes selected mixed hardwood-coniferous while avoiding aspen/aspen-spruce/fir, swamp conifer, and non-forested types. High volumes of LWD were identified to be more important than cover type or stand class for identifying marten habitat. Dumyahn et al. (2007) used a modified habitat preference scheme based on Wright's (1999) work to investigate habitat composition of home ranges in the Great Divide District of the Chequamegon-Nicolet National Forest. They reported martens establishing home ranges only in areas where >70% of the habitat was characterized as selected.

Martens in Wisconsin tend to be year round residents with home range and habitat use more restrictive in winter than other seasons. Marten dens and resting areas are defined as locations where young are born (natal den), where dependent young sleep, and are nursed and cared for (maternal den), and where non-dependent martens rest, sleep, loaf, or hide (den or resting area). Information regarding habitat types preferred by martens for dens and resting areas is limited due to their secretive behavior and low densities in Wisconsin. Male and female den sites (N=16) in spring were found in cavities of standing, live (81%) and dead (19%) trees >50 cm (20 inches) in diameter (Gilbert et al. 1997). Marten resting areas in winter were primarily subnivalian (66%), root mounds, or other downed wood, and had significantly greater volume and numbers of logs, new snags, and rotten root mounds than found at random plots (Gilbert et al. 1997). McCann (2011) reported eastern hemlock (*Tsuga canadensis*) and northern white cedar (*Thuja occidentalis*) were more associated with marten use areas than expected. Tree species used for dens in Wisconsin were yellow birch (*Betula alleghaniensis*), white cedar, sugar maple (*Acer saccharum*) (Harvey 2004), and American basswood (*Tilia americana*) (Woodford et al. 2011; Z. Wilson, unpublished data).

**Survey Guidelines:** Due to their low abundance and elusive behavior, martens are difficult to document in Wisconsin. However, a number of surveys have been used, with varying degrees of success, to detect presence of American martens. These include snow tracking, camera and track plate, and hair-snaring surveys. To date, the most widely accepted and efficient method has been snow tracking surveys. Snow tracking methods are quite simple, but some seasoned trackers have difficulty distinguishing marten tracks from small fisher tracks.

**Threats:** During the late 1800's and early 1900's American marten abundance and distribution decreased due to unregulated trapping, clear-cut logging, and subsequent wildfires (Jackson 1961). Even though marten trapping was prohibited in 1921, they were considered extirpated in Wisconsin by 1925 (Jackson 1961). Martens were officially listed as a state endangered species in 1972 and as an Ojibwe tribal endangered species in 1990.

Current threats to martens in Wisconsin include (1) low population abundance, (2) fragmented and isolated habitat, (3) climate change, (4) predation and incidental trapping, and (5) low recruitment into existing populations (Woodford and Dumyahn 2012).

**Climate Change Impacts:** Climate change has potential to affect marten populations in Wisconsin through a number of mechanisms (Woodford and Dumyahn 2012). First, consistently reduced snow levels may eliminate the competitive edge martens have over fishers (Krohn et al. 2004) and other mammalian predators. Second, interspecific aggression between marten, fishers, and other carnivores (e.g., red fox, bobcat) may increase due to their increased mobility in winter (Notaro et al. 2011), or if critical resources (e.g., den trees, prey) are reduced due to climate change. Third, herbivorous small mammals (preferred marten prey) are likely to shift their distributions due to changes in plant communities, which may also affect martens.

**Inventory, Monitoring and Research Needs:** There are a number of critical data gaps and research needs for martens in Wisconsin, including (1) estimating population abundance using new techniques, (2) development of forest management guidelines, (3) investigations on the effects of radio-collars and handling, (4) studies on habitat connectivity and barriers, and (5) investigations on the effects of climate change (Woodford and Dumyahn 2010).

## Management Guidelines

*- The following guidelines typically describe actions that will help maintain or enhance habitat for the species. These actions are typically not mandatory unless required by permit, authorization, or approval.*

The following **Best Management Practices (BMPs)** should be followed to protect existing suitable American marten habitat if directed by the screening procedure provided on page 4 of this document.

The BMPs zones (or maps) for American Martens were created using ArcGIS (computer geographical mapping software) and the following process:

1. American marten range around the two core marten populations in the state of Wisconsin was established using all recent verified marten occurrence records and the average size of an American marten home range in the state (approximately 1,125 acres; Wright 1999, Dumyahn et al. 2007, Woodford et al. 2013; WDNR unpublished data). The marten range was reduced at some of the outermost boundaries to exclude unsuitable habitat and to match barriers, such as rivers, lakes, and highways, which would prevent martens from expanding their range in those locations. This new boundary is referred to as the “American Marten BMP Zone”
2. Within the American marten range, all unforested land was removed, and then isolated stands of suitable forest habitats were also removed. A stand was considered to be isolated if, within a surrounding area the size of an average marten home range (1,125 acres), less than 70% of the habitat was forested.
3. In the remaining areas, where stand type data was available, all unsuitable forest types were removed. Unsuitable forest types included the following:
  - Red pine plantation
  - Jack pine
  - Oak
  - Aspen (to be managed for aspen regeneration)
  - Paper birch
  - Swamp conifer without white cedar component
  - well drained lowland hardwoods

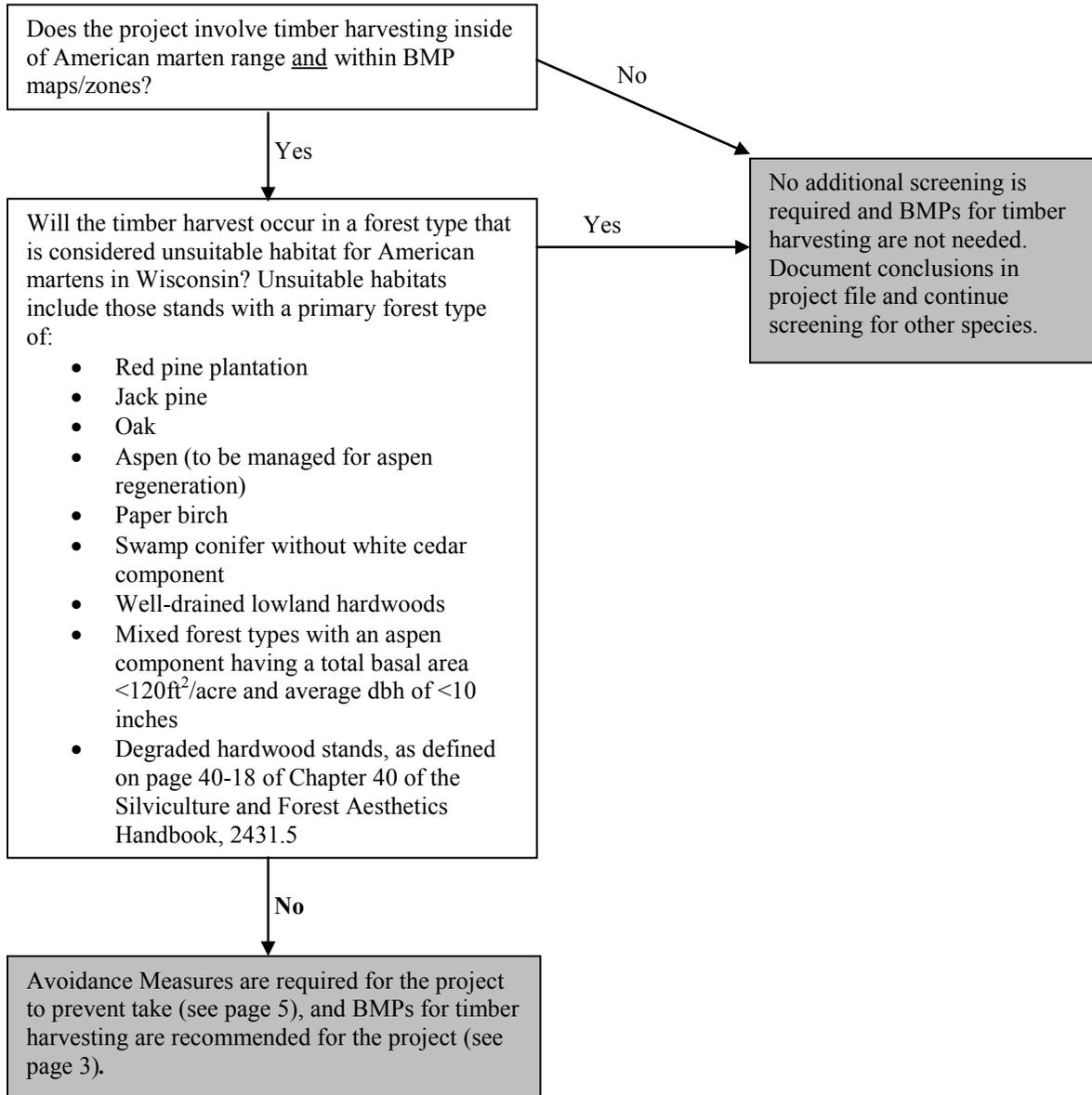
For forest stands in suitable habitat (determined using Screening Procedure on page 4) with even-aged and uneven-aged management goals, follow these BMPs for timber harvesting:

- a. **Hemlock/Cedar pockets** (a pocket is <2 acres): Encourage no harvest in these pockets, but allow removal of individual aspen, paper birch, and red maple trees. (Note: forest stands of hemlock and white cedar are suitable habitats).
- b. **Tree retention:** Follow existing guidelines for green tree retention, snags, wildlife, and mast trees. Ten percent of the retained trees should be living wildlife trees  $\geq 20$  inches diameter at breast height (dbh), if present (Note: wildlife trees can include hollow or sound, live trees).
- c. **Woody debris:** Design transport and removal paths to minimize crushing tree tops, limbs, and other woody debris. The vertical structure provided by post-harvest slash may provide an important habitat component for American martens.
- d. **Travel corridors:** Consider maintaining travel corridors to avoid isolating suitable American marten habitat. Travel corridors are forested areas that connect one area of suitable habitat to another area of suitable habitat.
- e. **In addition, for forest stands with uneven-aged management goals:**
  - i. If the average stand diameter is  $\leq 11$  inches dbh, then maintain a minimum average residual basal area of 70-90ft<sup>2</sup>/acre across the stand.
  - ii. If the average stand diameter is  $> 11$  inches dbh, then maintain a minimum average residual basal area of  $\geq 85$ ft<sup>2</sup>/acre across the stand.

## Screening Procedure

– *The following procedures must be followed by DNR staff reviewing proposed projects for potential impacts to the species (see the [Endangered Resources Screening Guidance for the Wisconsin DNR for more information](#)).*

Follow the “Conducting Endangered Resources Reviews: A Step-by-Step Guide for Wisconsin DNR Staff” document (summarized below) to determine if American martens will be impacted by a project (WDNR 2012):



## Avoidance Measures

- The following measures are specific actions typically required by DNR to avoid take (mortality) of state endangered or threatened species per Wisconsin's Endangered Species Law (s.29.604, Wis. Stats.). These guidelines are typically not mandatory for non-listed species (e.g., special concern species) unless required by permit, authorization, or approval.

American martens are a low-density, secretive, and difficult to inventory mammal species that tend to be year-round residents within their range. Felling of an occupied den tree when young are dependent on their mothers could result in take of a marten(s). For this reason, tree harvesting and road building activities should only occur in occupied or suitable habitats of marten range, as determined using the **Screening Procedure, from June 1 to March 14**, when females and their young are likely to be away, or can move away from tree dens. If take (or the potential for take) cannot be avoided then a survey for marten presence within the project area could be completed or an Incidental Take Authorization or Incidental Take Permit will be needed.

Trapping for martens is prohibited in Wisconsin. However, licensed trappers setting traps for other legal furbearers in marten range can and do accidentally catch and kill some martens. Body-grip traps set for fishers appear to be the most common technique that results in incidental take of martens in Wisconsin (J. Woodford, unpublished data). For this reason, WDNR and Ojibwe tribes continue to limit trapping opportunities in the Marten Protection Areas (MPAs). In 2009, WDNR began allowing the use of box traps (i.e., cage traps) and cable restraints in upland areas of the MPAs for the first time in over 50 years. It is believed that these restraint devices will allow the regulated take of other furbearers (e.g., fisher, coyote, bobcat, red fox, gray fox, and raccoon) with no risk to martens. A brochure ([http://dnr.wi.gov/org/land/er/mammals/pdfs/marten\\_avoidance\\_techniques.pdf](http://dnr.wi.gov/org/land/er/mammals/pdfs/marten_avoidance_techniques.pdf)) was developed that highlights additional techniques that trappers can use when trapping in marten range outside the MPAs, that should help reduce the number of incidentally trapped martens in Wisconsin.

## Additional Information

### References:

- Ben-David, M., R.W. Flynn, and D.M. Schell. 1997. Annual and seasonal changes in diets of marten: Evidence from stable isotope analysis. *Oecologia* 11:280-291.
- Buskirk, S.W. and L.F. Ruggiero. 1994. The American marten. Pp. 7-37 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski, eds. *The scientific basis for conservation of forest carnivores: American marten, fisher, lynx, and wolverine in the western United States*. United States Forest Service General Technical Report RM-254.
- Dumyahn, J.B., P.A. Zollner, and J.H. Gilbert. 2007. Winter home-range characteristics of American marten (*Martes americana*) in northern Wisconsin. *American Midland Naturalist* 158:382-394.
- Gilbert, J.H., J.L. Wright, D.J. Lauten, and J.R. Probst. 1997. Den and rest-site characteristics of American marten and fisher in northern Wisconsin. Pp. 135-145 in G. Proulx, H.N. Bryant, and P.M. Woodard, eds. *Martes: Taxonomy, ecology, techniques, and management*. Provincial Museum of Alberta, Edmonton, Alberta, Canada.
- Harvey, S. L. 2004. Recovery measures for the state endangered American marten: an internship with two Wisconsin natural resource agencies. MS thesis. Miami University, Oxford, OH.
- Jackson, H.H.T. 1961. *Mammals of Wisconsin*. University of Wisconsin Press, Madison, WI.
- Krohn, W., C. Hoving, D. Harrison, D. Phillips, and H. Frost. 2004. Martes foot-loading and snowfall patterns in Eastern North America: Implications to broad-scale distributions and interactions of mesocarnivores. Pp. 115-131 451 in D.J. Harrison, A.K. Fuller, and G. Proulx, eds. *Martens and fishers (Martes) in human-altered environments: An international perspective*. Springer, New York, NY.
- Markley, M.H., and C.F. Bassett. 1942. Habits of captive marten. *American Midland Naturalist* 28:604-616.
- Martin, S.K. 1994. Feeding ecology of American martens and fishers. Pp. 297-315 in S.W. Buskirk, A.S. Harestad, M.G. Raphael, and R.A. Powell, eds. *Martens, sables, and fishers: biology and conservation*. Cornell University Press, Ithaca, NY.
- McCann, N.P. 2011. American marten survival and movement in the presence of fishers. Dissertation, Purdue University, West

Lafayette, IN.

- Mead, R.A. 1994. Reproduction in Martes. Pp. 404-422 in S.W. Buskirk, A.S. Harestad, M.G. Raphael, and R.A. Powell, eds. Martens, sables, and fishers: biology and conservation. Cornell University Press, Ithaca, NY.
- Notaro, M., D. J. Lorenz, D. Vimont, S. Vavrus. C. Kucharik, and K. Franz. 2011. 21<sup>st</sup> century Wisconsin snow projections based on an operational snow model driven by statistically downscaled climate data. International Journal of Climatology 31:1615-1633.
- Powell, R.A., S.W. Buskirk, and W.J. Zielinski. 2003. Fisher and Marten. Pp. 635-649 in G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, eds. Wild mammals of North America: Biology, management, and conservation. Johns Hopkins University Press, Baltimore, MD.
- Schorger, A.W. 1942. Extinct and endangered mammals and birds of the upper Great Lakes region. Transactions of the Wisconsin Academy of Sciences, Arts, and Letters 34:23-44.
- Strickland, M.A., C.W. Douglas, M. Novak, and N.P. Hunzinger. 1982. Marten. Pp. 599-612 in Wild mammals of North America. Johns Hopkins University Press, Baltimore, MD.
- Williams, B.W., J.H. Gilbert, and P.A. Zollner. 2007. Historical perspective on the reintroduction of the fisher and American marten in Wisconsin and Michigan. U.S. Dept. of Agriculture, U.S. Forest Service, General Technical Report NRS-5.
- Wisconsin Department of Natural Resources (WDNR). 2005. Wisconsin's Strategy for Wildlife Species of Greatest Conservation Need. Wisconsin Department of Natural Resources. Madison, WI.
- Wisconsin Department of Natural Resources (WDNR). 2012. Conducting Endangered Resources Reviews: A Step-by-Step Guide for Wisconsin DNR Staff. Bureau of Natural Heritage Conservation. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Woodford, J. 2010. Results of winter track surveys for American marten in northern Wisconsin: 2009-10. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Woodford, J.E., A. Dubruiel, M. Worland, S. Roepke, and D. MacFarland. 2011. Stocking American martens in the northcentral forest landscape of Wisconsin. Final Project Report. Wisconsin Department of Natural Resources, Madison, Wisconsin.
- Woodford, J.E. and S.L. Dumyah. 2012. Conservation and management plan for American marten in Wisconsin. Wisconsin Department of Natural Resources, Madison, WI.
- Woodford, J.E., D. M. McFarland, and M. Worland. 2013. Movement, survival, and home range size of translocated American martens (*Martes americana*) in Wisconsin. Wildlife Society Bulletin 37:616-622.
- Wright, J.L. 1999. Winter home ranges and habitat use by sympatric fishers (*Martes pennanti*) and American marten (*Martes americana*) in northern Wisconsin. M.S. Thesis, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin.

#### Linked Websites:

- Natural Communities of Wisconsin: <http://dnr.wi.gov/landscapes/community/>
- Wisconsin Natural Heritage Working List Key: <http://dnr.wi.gov/org/land/er/wlist/key.htm>
- Wisconsin State Threatened and Endangered Species: <http://dnr.wi.gov/org/land/er/wlist/statelisted.asp>
- Wisconsin's Wildlife Action Plan: <http://dnr.wi.gov/org/land/er/wwap/explore/profiles.asp?mode=detail&Species=AMAJF01010>

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