MANAGEMENT AND CONSERVATION PLAN FOR AMERICAN MARTENS IN WISCONSIN

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Wisconsin Department of Natural Resources
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EXECUTIVE SUMMARY

This plan provides an update on the conservation status of the American marten (*Martes americana*) and replaces the original Marten Recovery Plan (Gieck 1986) in Wisconsin. The goal of this plan is to ensure that American martens remain a viable member of Wisconsin's natural heritage today and for generations to come. Management for American martens in Wisconsin is led by the Wisconsin Department of Natural Resources' (WDNR) Bureau of Endangered Resources based on input from other programs in WDNR, agencies, Indian tribes, and additional stakeholders. These groups and individuals interested in marten conservation and management meet regularly, as the Wisconsin American Marten Advisory Committee, to discuss issues related to martens and provide input for their management. Currently, many martens in Wisconsin reside on lands managed by the Chequamengon-Nicolet National Forest.

The plan is divided into four sections. The first provides background information on martens, the plan's objectives, and information on cultural significance and socio-economic importance of the species. The second section includes information on past and contemporary status of martens, life histories, habitats, and threats. This section contains published and unpublished information from studies conducted across North America and in Wisconsin. The third section provides information on (1) current monitoring and research activities for martens in Wisconsin, (2) management goals and criteria for listing and delisting of the species, (3) strategies and actions for both population and land management activities related to martens, and (4) marten research priorities and needs. This section also describes roles and responsibilities of the Wisconsin American Marten Stakeholders and Science Committees, the Ojibwe tribal consultation process, regional communication opportunities, education and training, law enforcement, and a proposed WDNR marten program budget. The final section provides literature cited within the document and an appendix on WDNR's marten carcass deposition policy.

The plan was reviewed by various WDNR programs, Chequamegon-Nicolet National Forest, Great Lakes Indian Fish and Wildlife Commission (GLIFWC), other agencies, Indian tribes, partners, stakeholders, and the Wisconsin American Marten Advisory Committee. In addition, 12 American marten experts from across North America reviewed and commented on the plan. The plan also had a formal 45-day public review period. This plan was unanimously approved by Wisconsin's Natural Resources Board on January 25, 2012.

To meet the goal and objectives of this plan, Wisconsin's natural resource agencies, tribal governments, non-governmental organizations, and other partners will need to continue past partnerships and collaborations, as well as, begin new ones. Only then will resource managers in Wisconsin provide the American marten a solid chance at remaining a successful member of our natural environment.

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INTRODUCTION

The American marten (*Martes americana*) is a member of the weasel family and is widely distributed throughout the boreal forests of North America (Fig. 1). American martens are native to Wisconsin but were extirpated from the state and other portions of its southern North American range in the early 20th century (Jackson 1961) due to habitat loss and overharvesting (Gibilisco 1994). Martens were listed as state-endangered in 1972 and their status has not changed to date.

This plan is intended to replace the original Pine Marten Recovery Plan (Gieck 1986), with the specific objectives to:

> (1) provide a comprehensive review of information available on martens from studies in Wisconsin and an overview of information from elsewhere across North America;
> (2) assess the current status of martens in Wisconsin;
> (3) outline a framework of actions that should enable martens to establish and maintain two viable populations in Wisconsin.

Two past reintroduction projects in 1975-83 and 1987-90 have successfully established breeding populations of American marten in both Marten Protection Areas (MPAs; Fig. 2) located within the Nicolet and Chequamegon sides of the Chequamegon-Nicolet National Forest (CNNF). Since then, annual snow track surveys have provided information on the distribution and relative abundance trends of martens in northern Wisconsin. A number of projects involving martens have occurred in both areas since the reintroductions. Many of these projects involved partnerships between multiple resource agencies (e.g., GLIFWC, WDNR, and CNNF), Indian tribes, universities, and other stakeholder groups.

Work to improve our knowledge of marten biology and ecology in Wisconsin have largely occurred through the collective efforts of staff from natural resource agencies, universities, Indian tribes, and non-government organizations. A recent collaborative project to stock 90 martens into the Chequamegon population area occurred from 2008 to 2011. This project, led by

the WDNR, CNNF, and GLIFWC, with assistance from other partners, was identified as a critical need by the Wisconsin American Marten Advisory Committee for establishing a self-sustaining marten population in the Chequamegon MPA.

Martens are a classic umbrella management species (Roberge and Angelstam 2004) for structurally complex, mature northern forest communities. Successfully managing for marten habitat is expected to also improve forest habitat conditions for other species of concern that prefer mature (>80 years old), structurally complex, interior forests [e.g., northern goshawk (*Accipiter gentilis*), pileated woodpecker (*Dryocopus pileatus*), and barred owl (*Strix varia*)]. Wisconsin's current Wildlife Action Plan (WDNR 2005) identifies several high priority conservation actions that are associated with increased amounts of mature, structurally complex forest types in the North Central Forest landscape. Sound management of forests that promote marten habitat across its range is one of the best mechanisms available to address these actions. Management of forest landscapes in marten range for marten habitat also will provide substantial benefits for many other species associated with mature forests, cavity trees, and high volumes of large woody debris.

Since the original reintroductions, marten biologists and researchers have worked to improve our knowledge of marten ecology in Wisconsin. Nevertheless, many gaps in knowledge remain, which along with other new and emerging issues (e.g., climate change and barriers to movement and dispersal) will undoubtedly complicate marten conservation efforts. This plan focuses on high priority actions needed for marten conservation. We believe the strategies presented here provide the best opportunity to make educated and efficient management decisions now and into the future.

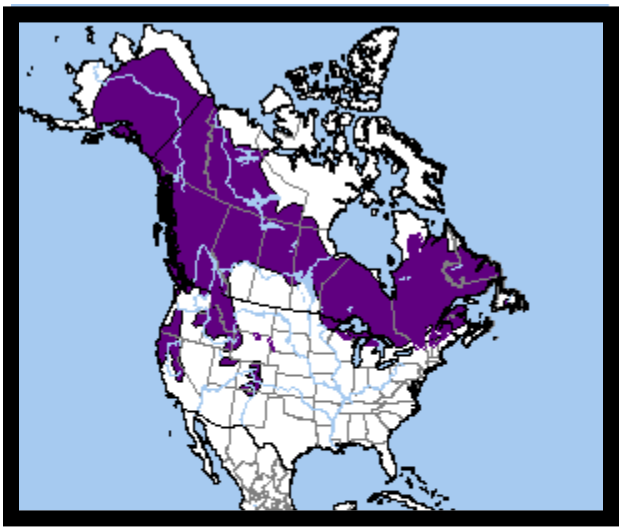

Figure 1. General distribution of the American marten (*Martes americana*) in North America. Based on data compiled from NatureServe (http://www.natureserve.org/getData/mammal/Maps.jsp) and Proulx et al. 2004.

Cultural Significance

Martens may have cultural significance for many different groups of people. The Ojibwe Indians of Wisconsin have rights to harvest resources from public lands and waters off of their reservations. Thus they also have responsibilities to manage these resources. Part of their responsibility with managing resources involves explaining the importance of different species to the Ojibwe people.

Waabezheshi (marten in the Ojibwe language) holds special significance in the Ojibwe culture in part because it is identified as a clan animal (Benton-Banai 1988). Nonetheless, it is very difficult to describe the significance of Waabezheshi in a few sentences or even a few pages. There are many stories and lessons that are told about and by Waabezheshi. Hearing those stories is the best way to learn of the significance of the species. A visit with an Ojibwe person who knows stories about the animal would be considered a primary source for a more in-depth understanding. Alternative sources would include Benton-Banai (1988), Densmore (1979), and Johnson (1976, 1982).

Socio-Economic Importance

American martens are trapped for fur in northern Minnesota and the Upper Peninsula of Michigan. Harvest estimates in these areas were 2,073 in Minnesota (Erb 2010) and 290 in Michigan (D. Etter, Michigan DNR, unpublished data) in 2009. In 2007, 499 trappers spent 4,407 recreational days trapping martens in Michigan (Frawley 2008). Prices received for a marten pelt have averaged $40-$60 during the past few years in North America. Martens were harvested for fur in Wisconsin until 1921 (Jackson 1961). Reports from historic fur trapper and trader journals list American marten pelts as much more common than fisher pelts [*Martes pennanti* (Schorger 1942)]. One report from a single fur trader in Superior listed 1600 marten and 200 fisher pelts traded in 1857 (Schorger 1942).

PART I. Distribution, Status, and Life History

A. DISTRIBUTION AND STATUS

North America

1. Former Range and Taxonomy

Historically, American marten distribution followed the boreal and boreal transition 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 heavily forested northeast, Great Lakes, Alaska, and western regions of the United States and all Canadian provinces (Gibilisco 1994).

Carr and Hicks (1997) suggested that there was evidence for a second distinct marten species (*Martes caurina*) along the higher elevations of the Sierra Nevada and southern Rocky Mountains, British Columbia, and southwestern Alaska. But, researchers and taxonomists are not in complete agreement that two species exist (Kyle and Strobeck 2003). Forested areas of Canada and Alaska formed the greatest proportion of both species' range (see Powell et al. 2003).

2. Current Range

Martens were extirpated from much of their historic range in the continental United States in the 19th and early 20th centuries, and remain absent in New Jersey, Pennsylvania, West Virginia, Ohio, Indiana, and Illinois (Gibilisco 1994, Proulx et al. 2004). Marten populations were reestablished in Michigan, North Dakota, South Dakota, Vermont, Wisconsin, and other states and provinces via numerous reintroduction and translocation projects. Eight states do not permit harvesting of martens reflecting the continued struggle to reestablish them in these areas (Table 1).

Table 1. American marten status and management in the United States, 2009.

State	Status	Management
EAST		
Maine	Furbearer	Trapping- 25 marten per trapper
New Hampshire	Threatened	Recovery
New York	Furbearer	Trapping- 6 marten per trapper
Vermont	Endangered	Recovery
MIDWEST		
Michigan	Furbearer	Trapping in Upper Peninsula - 1 marten per trapper
Minnesota	Furbearer	Trapping- 5 marten/fishers per trapper
North Dakota	Protected	No Trapping
South Dakota	Protected	No Trapping
Wisconsin	Endangered	Recovery
WEST		
Colorado	Furbearer	Trapping – no bag limit
Idaho	Furbearer	Trapping – no bag limit
Montana	Furbearer	Trapping – no bag limit
Nevada	Protected	No Trapping
New Mexico	Threatened	Recovery
Utah	Furbearer	Trapping in 4 counties only – no limit
Wyoming	Furbearer	Trapping – no bag limit
PACIFIC NW		
Alaska	Furbearer	Trapping – no bag limit
California	Protected	No Trapping
Oregon	Furbearer	Trapping – no bag limit
Washington	Furbearer	Trapping – no bag limit

Wisconsin

1. Past Abundance and Distributions

Martens were found nearly statewide throughout the forested regions of Wisconsin prior to European settlement, but their numbers and distribution decreased due to unregulated trapping, habitat loss, and subsequent wildfires (Jackson 1961). Jackson (1961) estimated that northern Wisconsin's mixed conifer and hardwood forests supported up to 1 marten per square mile in the 1800s. Even though marten trapping was prohibited in 1921, martens were considered extirpated

by 1925 (Jackson 1961). The marten was officially listed as a state-endangered species in 1972 and as an endangered species by Wisconsin's Ojibwe tribes in 1990.

Marten reintroductions have occurred at three different areas in Wisconsin (Table 2; reviewed by Williams et al. 2007). The first attempts in 1953 and 1956 released 5 martens from Montana and 5 captive-reared martens (original stock obtained from British Columbia, Canada; R. Brander, National Park Service, pers. comm.) onto Stockton Island in Lake Superior. One marten was reported there in 1969, but no other reports have occurred since (Kohn and Eckstein 1987). Davis (1983) and Kohn and Eckstein (1987) documented a second reintroduction (N=172), which occurred in the Nicolet National Forest from 1975 through 1983. These animals were released within the Nicolet Marten Protection Area (Wisconsin State Statute: NR 11.10) east of Eagle River (Fig 2). The third reintroduction took place from 1987 to 1990, when 139 martens were released into the Chequamegon Marten Protection Area. Dryland trapping was prohibited in both Marten Protection Areas (Fig. 2).

Table 2. Past marten reintroductions and stocking events in Wisconsin (Kohn and Eckstein 1987, Williams et al. 2007, R. Brander, Apostle Islands National Park, pers. comm.).

Release Area and Year	Total Released	Males	Females	Unknown	Source
Stockton Island 1953	5	2	3		Montana
1956	5	2	3		Captive-reared stock
Nicolet MPA					
1975-1976	124	97	27		Ontario
1980-1981	19	9	10		Colorado
1981 March	18	9	9		Ontario
1981-1982	4	2	2		Colorado
1982-1983	7	3	3	1	Colorado
Totals	**172**	**120**	**51**	**1**	
Chequamegon MPA					
1987	31	27	4		Minnesota
1988	25	14	11		Minnesota
1989	42	28	14		Minnesota
1990	41	25	16		Minnesota
Totals	**139**	**93**	**42**		
Chequamegon MPA and Adjacent Areas					
2008	26	10	16		Minnesota
2009	32	12	20		Minnesota
2010	32	13	19		Minnesota
Totals	**90**	**35**	**55**		

A live-trapping and track count study was conducted from 1983 to 1985 in and around the Nicolet Marten Protection Area (MPA) to estimate marten abundance and distribution after reintroduction (Kohn and Eckstein 1987). Eighteen martens were captured during this study, but none were recaptures of released animals. Thus providing good evidence that the population was reproducing. Of the total captured, a disproportionately low number were females (N=3) and over half of the captures appeared to be juveniles (N=10). This result was not unexpected as both females and adults in general are more difficult to live-trap than juveniles (Berg and Kuehn 1994). Winter track counts within the Nicolet MPA increased from 1983-1984 to 1984-1985 (Fig. 3); however, 89% of tracks observed from 1982 to 1985 were $\leq$20 km from the original release sites. Kohn and Eckstein (1987) suggested there may have been 100 to 150 martens in their study area.

Figure 2. American marten range (dark brown) and Marten Protection Areas (MPAs; red outlines) in Wisconsin, 2009.

2. Current Abundance and Distribution

Marten populations in Wisconsin are monitored annually by winter track surveys in the two core population areas (Fig. 3; Woodford and Kohn, 2009). These surveys have not provided definite population trends, in large part due to low density of animals, variable levels of survey coverage, and inconsistent snow tracking conditions. Nonetheless they have provided good information on marten occurrence and shifts in distribution around the MPAs. In addition, two snow track surveys in each northern county (Dhuey 2008) have documented marten tracks outside the MPAs. Besides track surveys, marten locations from verified observations, research projects, recovered carcasses, and incidentally trapped animals were used to develop the annual marten range map (Fig. 2).

From 2005-08, non-invasive hair sampling surveys (coordinated by GLIFWC and the North Central Research Station in 2005-07) were used to confirm and investigate marten presence in areas of known or suspected occurrence throughout northern Wisconsin (Gilbert et al. 2006). Marten presence was confirmed by DNA genotyping (Williams et al. 2009) in two additional areas outside the MPAs in Iron and Douglas counties (Williams et al. *in prep*). Additional genotypic analyses identified the Iron County marten samples as highly related to martens sampled from the nearby Porcupine Mountain population (located in the Upper Peninsula of Michigan), while a second analysis identified the Iron County samples as closely related to the Nicolet MPA population (Williams et al. *in prep*.). Other verified movements of martens in northwest Wisconsin included the recapture of a translocated marten from Loretta, Wisconsin in Iron County in 2008 (B.Bacon, WDNR, pers. comm.), and at least two other radio-collared resident martens from southern Ashland County that moved to Iron County (J. Gilbert, GLIFWC, unpublished data). This information also provides some evidence that martens from the Chequamegon MPA could move between their core population area and the Upper Peninsula of Michigan. The single marten sample from Douglas County verified occurrence but reproduction was not documented and this animal may have been a disperser from a nearby population in Minnesota.

Woodford et al. (2005) conducted a mark-recapture study in the Nicolet MPA that provided a population estimate of 71 $\pm$30 for the area sampled. That estimate was extrapolated to 221 $\pm$ 61 for the Nicolet MPA and adjacent areas. This compares to the initial estimate of 100-150 martens for the Nicolet MPA by Kohn and Eckstein (1987).

In 2006, the Wisconsin Marten Advisory Committee reviewed available data on martens around the Chequamegon MPA and concluded this population was likely below a threshold deemed necessary for long-term viability (Woodford et al. 2008). The committee recommended stocking additional animals from a source outside Wisconsin into the Chequamegon MPA. This project, which was a partnership between WDNR, CNNF, and GLIFWC, stocked 90 martens from northern Minnesota into the Chequamegon MPA (Table 2).

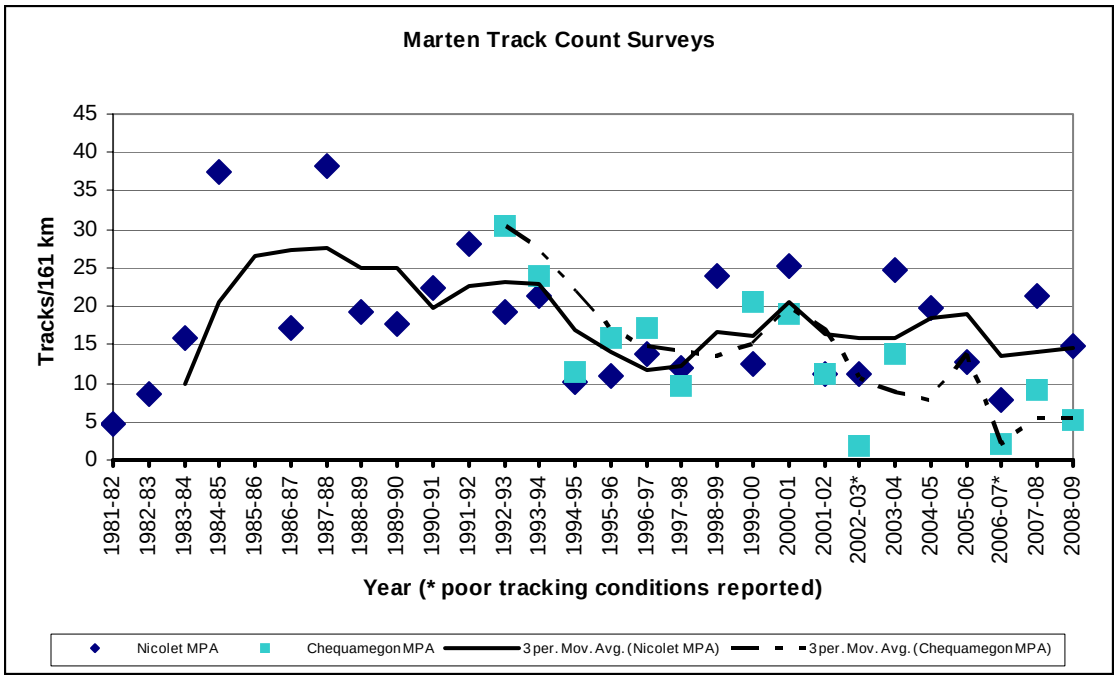

Figure 3. Marten track counts from 1981-2009 within and adjacent to the Nicolet and Chequamegon MPAs in northern Wisconsin. No surveys were completed for the Chequamegon MPA in 1998-99 and 2004-06, and survey transects were adjusted within the Chequamegon MPA prior to the 2007-08 season to better sample known marten distributions. Data and methodologies provided by Kohn and Eckstein 1987, Ashbrenner 1994, Wydeven et al. 2007, and Woodford and Kohn 2009.

B. LIFE HISTORY

1. Description

American martens are medium-sized carnivores of the weasel family (*Mustelidae*) that possess the characteristic long and slender body type. In Wisconsin, marten weights range from 500-1500g and 400-990g, and total lengths from 41-84cm and 37-57cm, for males and females respectively (Wright 1999, J. Woodford unpublished data, J. Gilbert unpublished data). The tail and body are elongated and well furred, with the tail approximately 33% of body length (Powell et al. 2003). Pelage coloration is typically brown, but can vary from tan to brownish red to a dark black-brown. The head and dorsal areas are usually a paler color, and the legs and tail are somewhat darker. They have a characteristic buff to orange throat and neck patch. Winter coats are thicker with essentially the same coloration. Annual shedding to the summer coat is completed by mid-June. Martens have a pointed face with large, rounded ears. The eyes are small and black, and a vertical eye bar extends from the inside corner of the eyes. Martens have five toes on each foot and normally all touch the ground. Mean foot length, taken from the most anterior toe to the most posterior interdigital pad segment was 4 cm for males and 3.4 cm for females in California (Zielinski and Truex 1995). Mean hind foot width was 3.0 and 2.7 cm for males and females measured in Wisconsin, respectively (J. Gilbert unpublished data). Marten claws are semi-retractable, which aids them when climbing trees.

2. Reproduction

Martens reach sexual maturity by 1 year of age, but some may not breed until they are 2 years old (Powell et al. 2003). Females are believed to be induced ovulators and normally mate during the months of July & August (Strickland et al. 1982). Following a period of 7 – 8 months of embryonic diapause, the fertilized blastocyst implants in February or early March when photoperiod induces implantation (Mead 1994). Once implanted, marten embryos develop quickly over the next 27-30 days (reviewed in Mead 1994) and young (kits) are born between mid-March to late April (Powell et al. 2003). Strickland and Douglas (1987) reported corpora lutea (generally used as an index to pregnancy rates in martens) in 93% of adult (>1.5 years) female martens (N= 504) and in 78% of yearlings (N=376) in Ontario. Average litter size, again using corpora lutea counts, was 2.9 kits per pregnant female (Strickland and Douglas 1987). Kits are born altricial and blind in natal dens [usually cavities in live trees (Gilbert et al. 1997)] and are partially covered with fine hair (Powell et al. 2003). Young grow rapidly in maternal dens, are dependent on their mothers for food until at least early June, and reach adult size around three months of age (Markley and Bassett 1942). Francis and Stephenson (1972) reported kits dispersing from the natal territory by late summer or early fall; however, little is known about dispersal in martens.

In Wisconsin, wild-caught martens held in captivity and provided food and water ad libitum, produced 2.7 young per litter (N= 12; range 1-4 young per litter; R. Cochrane, unpublished data). Whelping for these same animals occurred from March 25 to April 15 (1951-1961, R. Cochrane, unpublished data). No published data are available on reproductive rates of wild martens in Wisconsin.

The ratio of captured juvenile:adult female martens was used with other indices to approximate gross (i.e., increasing, decreasing, or stable) harvest trends (Strickland and Douglas 1987, Thompson and Colgen 1987, Berg and Kuehn 1994). Woodford et al. (2005) reported ratios of 4:1 in 2004 and 3.75:1 in 2005 during a live-trapping study in the Nicolet MPA. Woodford et al. (2005) also reported juvenile-aged martens representing 51% of captured animals. In the Chequamegon MPA, juveniles represented only 11% of live-captured martens from 2000-2006 (J. Gilbert, pers. comm.). Index ratios $\geq$6:1 (Strickland and Douglas 1987) and >3:1 (Thompson and Colgan 1987) were suggested to represent populations that were not being overexploited and hence believed to be stable or increasing.

3. Mortality

A number of predator species may prey on martens in North America, including fishers, lynxes (*Lynx canadensis*), mountain lions (*Puma concolor*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), golden eagles (*Aquila chrysaetos*), bald eagles (*Haliaeetus leucocephalus*), great horned owls (*Bubo virginianus*), and other martens (Strickland and Douglas 1987, Bull and Heater 2001, Woodford et al. 2005, McCann et al. 2010).

Published accounts of mortality in unharvested populations of martens have varied (range 53-95%) widely (reviewed by McCann et al. 2010). In Wisconsin annual adult survival was 0.81 (N= 34; McCann et al. 2010) in the Chequamegon MPA. Fishers were successfully re-established in the MPAs prior to marten restoration efforts (Kohn et al. 1993), and there is strong evidence that fishers were responsible for at least 40% of the natural marten mortalities reported since 2000 (McCann et al. 2010, J. Woodford, WDNR, unpublished data). Wright (1999) and

McCann et al. (2010) reported evidence of forest raptors (e.g., great horned owl) killing radio-collared martens in Wisconsin. The number of martens killed by raptors and fishers in one study was not different (McCann et al. 2010).

The oldest documented martens in Wisconsin were 10 (J. Gilbert, unpublished data) and 9 years old (J. Woodford, unpublished data) by cementum annuli counts (Matson's Laboratory, LLC., Milltown, MT), and at least 9 years old by capture interval (Wright 1999).

4. General Habitat Associations

Schumacher (1999) hypothesized that habitat selection by martens followed an increasing gradient of forest structural complexity. Martens appear to occupy forests that have high levels of structural complexity available. Martens are often associated with mature coniferous and mixed deciduous/coniferous forests and are used as a climax forest indicator species in the western United States (Koehler et al. 1975). In the eastern part of their range, martens occupy coniferous, mixed deciduous/coniferous, and mostly deciduous stands (Chapin et al. 1997, Poole et al. 2004). The variety of forest communities used strongly suggests that tree species composition is not as important as other features (e.g., volume of downed woody debris, overhead cover, and residual patch size) used by martens (Buskirk and Powell 1994, Buskirk and Ruggiero 1994, Chapin et al. 1997).

The amount of unsuitable habitat, including recent clear-cuts (about 0-15 years post-harvest), present in the landscape appears to have a major influence on marten occupancy, abundance, and movement (Hargis et al. 1999, Dumyahn et al. 2007). Some studies have reported that 25-30% of unsuitable habitat in a home range was the maximum level tolerated by martens (Chapin et al. 1998, Hargis et al. 1999, Potvin et al. 2000, Dumyahn et al. 2007). While others have reported adult martens occupying home ranges with >30% unsuitable habitat (Hearn et al. 2010).

Den and rest sites are also an important component of habitat. For this document, marten dens are defined as locations where young are born, sleep, nurse, or are cared for, and rest sites are locations where non-dependent martens rest, sleep, loaf, or hide. Ruggiero et al. (1998) reported snags and live trees >53 cm (21 in) dbh with cavities as common den sites. Martens in Wyoming selected dens in late-successional forests with greater large woody debris and canopy closure than random sites (Ruggiero et al. 1998). Snags and live trees were used as rest sites most frequently during times of <100% snow cover (Spencer 1987). Marten rest sites have been found in rock crevices, squirrel middens, and logs (Corn and Raphael 1992). Spencer (1987) found that during periods of 100% snow cover all rest sites were subnivean, with squirrel middens and other cavities in decaying wood preferred.

High percentage of canopy closure is a habitat feature provided by mature forests (Buskirk and Powell 1994). A closed canopy likely provides a lower risk of predation to martens than open areas (Thompson 1994, Latour et al. 1994). Feske et al. (2002) and Allen (1982) arbitrarily selected canopy closures $\geq$50% as suitable for their marten habitat models. Other researchers have suggested levels >30% as a minimum acceptable canopy closure (Koehler and Hornocker 1977, Spencer et al. 1983, Hargis and Bissonette 1997), but these were winter measures from the western United States in conifer-dominated forests. Others have noted a high selection for more

open canopy bud-killed stands presumably associated with higher prey availability (Thompson and Curran 1995, Payer and Harrison 2004, Hearn et al. 2010).

Martens appear more closely tied to coniferous and structurally complex forests in winter than in summer (Buskirk and Powell 1994). When snow is present, woody debris penetrates the surface making subnivean prey and rest sites accessible (Buskirk et al. 1989, Corn and Raphael 1992). Downed large woody debris was suggested as an important component in marten winter habitat that aids in thermoregulation and habitat for prey (Buskirk and Powell 1994). Allen's (1982) habitat suitability index for martens cites an optimum ground cover of downfalls as 20-50% of the surface area. Generally, large woody debris includes snags, root mounds, stumps, and fallen logs $\geq$7.6 cm (3.0 in) in diameter (Allen 1982). A coniferous or shrub understory [e.g., balsam fir (*Abies balsamifera*)] can provide overhead and complex structure to avoid predators while traveling and foraging (Hargis and McCullough 1984, Thompson 1994, Powell et al. 2003).

5. Home Range and Density

Estimated home range sizes for martens vary widely, with male home ranges typically larger than females. Across North America mean home ranges were 8.1 km^2 (3.1 mi^2) for males and 2.3 km^2 (0.9 mi^2) for females, and ranged from 2-27 km^2 (0.8-10.4 mi^2) and 0.6-17 km^2 (0.2-6.6 mi^2) for males and females, respectively (Powell 1994). Three studies have estimated home range sizes in Wisconsin using kernel methods. Wright (1999) reported an average winter home range size of 4.7 km^2 (1.8 mi^2) and 2.7 km^2 (1.0 mi^2; 95% adaptive kernel) for male and female martens in the Nicolet MPA, respectively. Dumyahn et al. (2007) reported mean winter home ranges of 4.25 km^2 (1.6 mi^2) for males and 2.32 km^2 (0.90 mi^2) for females using the 95% fixed-kernel method in the Chequamegon MRA. A third study in the Nicolet MPA, reported an annual mean home range size of 6.1 km^2 (2.4 mi^2) for males and 4.3 km^2 (1.7 mi^2) for females using the 95% fixed-kernel method (Woodford et al. *In Prep*.).

Marten densities appeared to correlate well with prey abundance in some areas (Soutiere 1979, Francis and Stephenson 1972). For example, in Maine, Soutiere (1979) found marten densities of 1.22 per km^2 (0.5 mi^2), using live-trapping estimates in undisturbed forests with high prey abundance, but only 0.4 per km^2 (0.2 mi^2) in commercial clear-cut forests with lower prey abundance. Francis and Stephenson (1972) reported marten densities of 1.5 per km^2 (0.6 mi^2) in southern Ontario using live-trapping estimates. Marten density was estimated at 0.6 marten per km^2 in a portion of the Nicolet MPA from 1990-92 (Wright 1999). The population abundance estimate from Woodford et al. (2005) would provide a density estimate of 0.2 marten per km^2 for the Nicolet MPA and some adjacent areas. The difference between these two estimates is probably attributable to the spatial extent of the studies, the clustered distribution of martens in Wisconsin, or both. Marten density, derived from the 2005 population estimate, was 0.2 marten per km^2, which is 87 % lower than density estimates from Ontario and Maine (reviewed in Powell et al. 2003), but 5 times greater than the density estimate reported using hair surveys in the nearby Ottawa National Forest (Williams et al. 2009). Gilbert (unpublished results) estimated marten density on a 175 km^2 study area in the Chequamegon MPA at <0.1 marten/km^2 from 2001-05, but no estimate for the entire Chequamegon MPA has been completed.

6. Food

Martens are opportunistic predators influenced by local prey abundance and availability (Ben-David et al. 1997). A typical marten diet consists of rodents, rabbits, birds, and sometimes insects, fruit, and carrion (reviewed by Martin 1994). Forest voles (*Microtus* and *Myodes* spp.) were found to be the principal component of marten diets in many studies (Douglass et al. 1983, Buskirk and Ruggiero 1994, Ben-David et al. 1997). Thompson and Colgan (1987) noted extensive use of snowshoe hares (*Lepus americanus)* in winter but suggested this may have been a function of prey availability influencing preference. Another study reported red squirrels (*Tamiasciurus hudsonicus*) constituting a major portion of marten diet in Montana (reviewed in Martin 1994).

Marten reproduction is linked to fluctuations in prey populations (Strickland and Douglas 1987). When food is scarce, reproduction can decrease significantly and juvenile survival is poor (Weckworth and Hawley 1962, Thompson and Colgan 1987).

C. WISCONSIN HABITAT

1. Forest Habitat

Wright (1999) found that male martens in the Nicolet MPA selected pole (12.7-22.9 cm dbh) and saw-log (>22.9 cm dbh) sized forest stands at a level greater than available, while females selected only pole sized stands more than what was expected. He reported male martens selected red pine (*Pinus resinosa*) stands more than expected while females avoided it; red pine occupied <10% of the study area. Both sexes selected mixed hardwood-coniferous but avoided aspen/aspen-spruce/fir, swamp conifer, and non-forested types. High volumes of large woody debris were 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. Dumyahn et al. (2007) reported martens established home ranges only in areas where >70% of the habitat was identified as selected.

Collection of field data for habitat variables within high, low, and no use areas of marten home ranges in the Chequamegon and Nicolet MPAs were completed in 2007. Preliminary results showed little statistical difference between the three use categories for each habitat variable collected (e.g., basal area, canopy closure, mean tree diameter, and LWD volume; Woodford 2009, K. Gerndt, University of Wisconsin-Madison, pers. comm.).

2. Dens and Resting Areas

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). Tree species used for dens in Wisconsin were yellow birch (*Betula alleghaniensis*), white cedar (*Thuja occidentalis*), and sugar maple (*Acer saccharum*) (Harvey 2004). Marten resting areas in winter were primarily subnivian (66%), root mounds, or other downed wood, and had significantly greater volume and number of logs, new snags, and rotten root mounds than found at random plots (Gilbert et al. 1997).

D. THREATS

This section describes known and suspected threats to martens in Wisconsin. At this time, it is unclear which, if any, of these are most responsible for limiting marten success. The most plausible theory is that many or even all are partially responsible. The numbering system within this section is merely for organizational purposes and not intended to be a ranking or weighting by level of significance.

1. Predation. Direct predation, through either a competitory or predatory mechanism, is the major cause of mortality of martens in Wisconsin. McCann et al. (2010) reported predation-related mortalities for 9 of 12 (75%) verified mortalities in the Chequamegon MPA. For these mortalities, four (25%) were killed by raptors, four (25%) by fishers, one (8%) by an unknown mammal, one (8%) by incidental trapping, and two (16%) by unknown causes. Although predation was the major cause of marten deaths during this study, the annual adult rate of survival (81%) was near the average reported for untrapped populations elsewhere (McCann et al. 2010).

Woodford et al. (in prep) found no difference in survival of resident (79%; from Nicolet MPA) and reintroduced (83%) martens monitored for 200 days after release in Wisconsin. After combining the datasets, they found no statistical difference in survival between males (89%) and females (71%), but did find a difference between adults (91%) and juveniles (69%). These studies documented predation-related mortalities for the 5 of 7 (71%) resident and 10 of 12 (83%) reintroduced marten deaths in the Nicolet MPA and Chequamegon MPA, respectively (Woodford et al. in prep). For all studies in this section, the cause of death was based on necropsy and other kill site evidence.

In summary, 78% of all known marten mortalities in Wisconsin were caused by predation. McCann et al. (2010) reported no difference in survival between adult male and female martens in the Chequamegon MPA. The mortality rate for females was greater than males for resident and reintroduced female martens, but this difference was not significant (Woodford et al. in prep).

2. Incidental Trapping. Trapping for martens is prohibited in Wisconsin; however, licensed trappers setting traps for other legal furbearers in marten range do accidently catch and kill some martens. Body-grip traps set for fishers appear to be the most common method that leads to incidental take of martens in Wisconsin (J. Woodford, unpublished data). For this reason, WDNR and Ojibwe tribes continue to limit trapping opportunities in the 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. These restraint devices will increase opportunity for the regulated take of other upland furbearers (e.g., fisher, coyote, bobcat, red fox, gray fox, and raccoon) with little risk to martens. Wisconsin's Marten Advisory Committee hopes that this action will encourage trappers to use these traps in pursuit of fishers and other upland furbearers, when trapping outside the MPAs in marten range. Table 3 provides a list of all marten mortalities (except research animals) reported since 1996. It is suspected that additional trapped martens go unreported each year.

Table 3. Human-caused marten mortalities and suspected causes reported to WDNR from 1996 to 2009.

YEAR	INCIDENTALLY TRAPPED (#)	CAR-KILLED (#)	TOTAL REPORTED (County)
1996	1	0	1 (unknown)
1997	3	0	3 (unknown – 3)
1998	1	0	1 (Iron)
1999	1	0	1 (unknown)
2000	3	0	3 (Iron, unknown - 2)
2001	0	0	0
2002	1	0	1 (unknown)
2003	0	0	0
2004	0	0	0
2005	4	1	5 (Iron, Ashland, unknown – 3)
2006	2	0	2 (Iron – 2)
2007	2	1	3 (Ashland, Iron, Forest)
2008	5	0	5 (Forest – 3, Sawyer, Ashland)
2009	4	1	5 (Forest – 3, Vilas, Iron)

3. Unsuitable Habitat. In Wisconsin, forests are generally aging, but mature and old forest conditions are still limited (WDNR 2000). Martens appear to select/use mature and old forests because the structural attributes of these habitats assist them in avoiding predators, and provide resting, denning, and foraging sites. Further, some studies report martens forage more efficiently in old forests with high amounts of deadwood structure (Thompson and Harestad 1994, Andruskiw et al. 2008). Many studies have demonstrated the negative effects of intensive timber harvesting (e.g., clear cutting and any other prescriptions that remove a majority of the canopy) on American martens in North America (Soutiere 1979, Hargis and McCullough 1984, Potvin and Breton 1997). Other forest management strategies that reduce canopy coverage, create barriers to marten movements, and remove existing large diameter cavity and snag trees, appear to reduce marten carrying capacity (Thompson and Harestad 1994). Minimum threshold levels for these characteristics of marten habitat need to be identified and provided to land managers to consider when managing their properties across Wisconsin's marten range. These guidelines should be developed to protect existing marten habitats while also improving habitat conditions elsewhere.

As fuel wood markets increase, whole tree harvesting will become a predominant technique and will reduce large woody debris after harvesting in areas of northern Wisconsin. Aspen stands in Wisconsin harvested using whole-tree methods had a 56% reduction in woody debris compared to traditional harvest methods (Rittenhouse et al. *In Press*). This change in harvesting, and the corresponding reduction of woody debris, likely could reduce suitable marten habitat and potentially isolate other areas of suitable habitat.

American marten abundance is greater in areas of northern Minnesota and the Upper Peninsula of Michigan than in Wisconsin. Scientists from these other states have recently observed or suspected a decline in marten abundance, which has resulted in a reduced harvesting season in Minnesota. Most martens trapped in both states are from areas of high snow fall and snow pack

depths and landscapes comprised of greater amounts of coniferous forests (e.g., spruce-fir forests).

4. Poor Recruitment. Consistently low juvenile live-trapping rates suggest that poor recruitment is occurring in both core marten populations in Wisconsin. Field data indicate that this factor is more prevalent in the Chequamegon than the Nicolet population, but may be occurring to some degree in both (this document, section I.B.2). Poor recruitment could be caused by low reproduction (i.e., low pregnancy rates or litter size), low juvenile survival, or both. Other factors that may affect recruitment directly or indirectly include: (1) low prey abundance or availability; (2) poor or isolated habitats; (3) genetic problems; and (4) stress or other effects related to radio-collaring. All of these factors except stress are discussed in more detail under other headings of this section.

Deleterious effects on reproduction or survival caused by live-trapping, anesthetizing, handling, or radio-collaring of wild animals have been reported in studies of other mammals (Ramsay and Stirling 1986, Cypher 1997, Creel et al. 1997, Cote et al. 1998, Alibhai et al. 2001, Moorhouse and Macdonald 2005, Cattet et al. 2008), and in American martens (I. Thompson, Canadian Forest Service [CFS], unpubl. data). In general, these studies identified chronic stress and related impacts (e.g., greater energetic demands, greater vulnerability to predation, immune suppression) as the major factors responsible for the negative effects.

In a recently completed study, researchers observed very few radio-collared female martens giving birth to young when tagged with a 30 g radio-collar package in four of five years (I. Thompson, CFS, pers. comm.). In addition to the Ontario study, researchers have reported difficulty in documenting radio-collared adult female martens successfully whelping young in Wisconsin (Table 4) and for 18 of 28 (64%) females monitored in Minnesota (J. Erb, Minnesota DNR, unpublished data).

Table 4. Summary of adult female martens monitored during the parturition period and verified litters recorded in Wisconsin.

No. of collared adult female martens	No. of litters documented (#)	Study area and reference
5*	1	Stocking Project (2008-11); WDNR unpublished data
7	0	Nicolet MPA2004-06; J. Woodford, unpublished data
5*	0	Nicolet 1990-93; Wright 1999
15	5	J. Gilbert, unpublished data, (based on radio telemetry from 1997 – 2006)
Totals: 29	5 (17%)	

* - age determined by morphometric characteristics (i.e., tooth wear and color, mammary condition, and sagittal crest development).

5. Isolated Populations. Poorly connected suitable habitats could limit marten immigration and breeding opportunities (e.g., Allee effect), or increase the risk of predation on dispersing

juveniles and adult females with dependent young. The impacts of habitat fragmentation on marten movements, juvenile survival, and reproduction remain unstudied in Wisconsin.

Genetic problems (e.g., inbreeding depression, low allele diversity) are also possible in low-density, geographically isolated founder populations (Chakraborty and Nei 1977). Genetic diversity of martens sampled from both MPAs was similar to that sampled in animals from source populations (Williams et al. *in prep*), and likely was not a major contributing factor to the observed low recruitment rates in the Chequamegon MPA (J. Gilbert, unpublished data).

6. Low Prey Availability. Prey availability may cause marten populations to fluctuate from year to year. Thompson and Colgan (1987) found a strong association between prey scarcity and a marten population decline in Ontario. There is a dearth of data on prey abundance and availability for martens in Wisconsin. Nevertheless, because of the marten's generalist foraging habits, an apparent high diversity of fauna available in Wisconsin (WDNR 2009) relative to other regions occupied by martens and less than average home range sizes, prey availability may not be a major limiting factor here.

Home range sizes reported for martens in Wisconsin were less than mean sizes reported for males and similar to females from 17 other studies in North America (Powell et al. 2003). Home range size likely is dependent on densities of prey (Powell et al. 2003), so it appears that prey density is likely at least average in Wisconsin when compared to martens elsewhere in North America.

7. Climate Change. Most climate change scenarios for the next 45 years in Wisconsin predict (1) warmer overall temperatures; (2) an increase (~20%) in winter precipitation; (3) more extreme precipitation events; (4) less duration of lake ice cover; (5) altered flora and fauna phenologies; and (6) reduced snow pack conditions (CCR 2009, WICCI 2009, Notaro et al. 2011). Many of these scenarios should have little effect on martens, but the significantly reduced snow pack levels predicted are the exception. Notaro et al. (2011) predicted a 21-29% decrease in snowfall and 48-68% decrease in snow pack levels in Wisconsin by 2050. This result would substantially decrease the foot-loading advantage martens have over other carnivores during winter and likely increase predation rates. Consistently reduced snow levels may eliminate the competitive advantage martens have over fishers (Krohn et al. 2004) and possibly other predators. Further, interspecific aggression between marten, fishers, and other carnivores (e.g., red fox, bobcat) may increase due to increased mobility, especially for fishers, in winter (Krohn et al. 1995) or if critical resources (e.g., den trees, prey) are reduced due to climate change. Finally, herbivorous prey species (e.g., *Microtus spp*., *Myodes spp*.) are likely to shift their distributions due to changes in plant communities. Increased exposure of martens to colder temperatures through a decreased snow pack (and hence higher energetic needs) has been suggested as a possible negative effect of climate change on martens in Wisconsin; however, researchers here have yet to report any marten mortalities due to exposure or other exposure related effects (e.g. high parasite loading or disease).

In summary, it is possible that the future condition of northern Wisconsin's climate, based on predictive snowpack models, could negatively affect martens. At this time, these effects are not entirely understood, but development of adaptive strategies to lessen this impact (e.g. improve

forest habitat, reduce habitat fragmentation) should begin now to maximize the probability of long-term marten survival in Wisconsin.

PART II. Conservation and Management Strategies

A. CURRENT MONITORING, RESEARCH, AND MANAGEMENT

Marten monitoring currently consists of radio-collaring activities by Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and annual snow track surveys completed by Wisconsin Department of Natural Resources (WDNR). These surveys provide useful information on marten presence in and adjacent to the Marten Protection Areas (MPA), but have limited value in estimating total abundance. The use of non-invasive hair sampling (Williams et al. 2009) was attempted as an index to marten abundance, but the very low detection rates (0.02 and 0.36 in two study years; P. Zollner, Purdue University, pers. comm.) may limit the value of this technique. Track-plate or trail camera surveys were used with some success elsewhere; but when used in areas of low marten densities, extrapolation to the larger population was not possible (Kucera et al. 1994, Smith et al. 2008; but see Gompper et al. 2006). Hence, none of these techniques would have a high-likelihood of providing a sound estimate of abundance for martens in Wisconsin. This problem will likely occur with any sampling technique attempted until marten abundances and densities increase and sampling opportunities (i.e., sample sizes) increase.

Wisconsin DNR's Wildlife Health program completes necropsies on all marten carcasses to investigate the cause of death, collect samples for genetic, reproductive and other research, and archive tissue and serum samples for disease investigations. When possible, blood and fecal samples have been collected from martens captured during live-trapping projects. Similar investigations in Wisconsin have documented higher than expected exposure rates of common canid viruses (e.g. canine distemper virus, canine parvovirus, canine adenovirus) from trapper-collected fisher carcasses (J. Batten, WDNR, pers. comm.). Even though the rates of exposure appear high, little information exists on the effects these viruses are having on individuals or populations of fishers. There is now interest in investigating the potential impacts of these viruses on martens.

Currently, researchers from the WDNR's Bureau of Science Services are leading field studies related to survival monitoring and movement patterns of translocated martens released into the Chequamegon MPA. Researchers from Purdue University, GLIFWC, and Lac Courte Oreilles Community College are actively studying martens in the Chequamegon MPA. All of these activities are occurring in coordination with marten stocking efforts.

Another marten research project, in Iron County, is under the direction of the North Lakeland Discovery Center and WDNR staff. This project was able to verify the existence of a breeding population of martens outside the two existing MPAs, and has live-trapped and radio-collared 7 martens.

Recently, WDNR began screening all land management activities, within marten range, that have potential to permanently fragment (e.g., creating new or enlarging existing transportation and

utility corridors) marten habitats on all state and other state-approved managed lands (i.e., County Forests and Managed Forest Lands). The Chequamegon Nicolet National Forest's (CNNF) Land Resource and Management Plan (USDA 2004) acknowledges American martens as a Regional Forester's Sensitive Species. Hence, forest management guidelines for martens are used across the forest including (1) leaving 15-25% of potential timber salvage unharvested following large disturbance events (greater than 100 acres); (2) maintaining old-growth characteristics in northern hardwood stands by leaving larger trees to eventually create root mounds, snags, and large woody debris; (3) leaving and protecting existing downed logs >10 inches in diameter; and (4) retaining all dead snags or den trees (i.e., hollow, live trees >20 inches dbh) up to 10 per acre, with emphasis on retaining the largest den trees and snags available.

Martens are trapped for their fur in many states and provinces in North America (Table 1). Trapping regulations for martens in these areas vary considerably by length of season, bag limits, and numbers of licensed trappers. Martens are very curious and highly susceptible to intentional or incidental harvest. For this reason, both MPAs in Wisconsin have special regulations for trapping in upland habitats that allow only the use of box traps (e.g., cage traps) or cable restraints. Licensed trappers are required to report and turn-in any incidentally trapped marten to WDNR.

B. MANAGEMENT GOAL AND CRITERIA FOR DETERMINING ENDANGERED, THREATENED, OR DELISTED STATUS

Statewide conservation and management activities for American martens in Wisconsin are statutorily regulated by WDNR and the Wisconsin Natural Resources Board based on recommendations by the Bureau of Endangered Resources (BER). Consultation on matters dealing with martens or marten management with the Ojibwe Tribes is required in a government-to-government manner pursuant to requirements of federal court orders and stipulations (e.g., Voigt Case) and by Governor Doyle's Executive Order. Additional input is provided by the Marten Stakeholders Committee, which identifies issues and recommends solutions to BER related to martens and their management and the Marten Science Committee, which provides the best science available to BER and the Marten Stakeholders Committee.

The Bureau of Endangered Resources will use the precautionary principle (Smith and Curtis 2000) in its decision-making process whenever the issue at hand involves both scientific uncertainty and the potential for harm to martens. In addition, whenever possible, a range of alternatives (and associated consequences, including economic costs when appropriate) will be evaluated and considered to help ensure sound and objective decision-making. This process applies to policy alternatives and biological alternatives (e.g., modeling parameters to use when determining minimum viable population estimates).

The overall management objective is to establish and maintain two or more self-sustaining American marten populations in Wisconsin. Once this objective is reached, actions should be initiated to down-list martens following criteria listed in Table 5. Meeting these criteria will require accurate science-based estimates of marten performance that will require considerably more effort and funding support than currently provided.

Long-term viability of marten populations in Wisconsin is a major concern. In addition to the current resident populations that have been documented, there is evidence that martens from Minnesota and Michigan have immigrated into western Douglas County and the Nicolet MPA, respectively (Williams et al. *in prep*). These additional sources will help ensure the viability of Wisconsin's marten populations into the future.

Table 5. Proposed criteria that would trigger a status assessment by WDNR for listing or delisting American martens in Wisconsin.

Marten Population Performance	**State Listing Status**
Little improvement or no change in marten performance (i.e., abundance indices and distribution) relative to 2009 levels.	Remain Endangered
Marten populations increase in abundance and fully occupy most suitable habitat in both MPAs, and increase their distribution >25% in area outside the MPAs	Consider for Threatened
Martens become well established throughout suitable habitats in northern Wisconsin and population indices show a stable or increasing trend for 5 or more consecutive years.	Consider for Protected
Meets “Protected Status” criteria for 5 additional years	Consider for Furbearer
Population indices show that marten abundance has declined for 5 or more consecutive years or distribution has decreased >25% throughout northern Wisconsin.	Consider for Threatened
Marten populations decline to 2009 abundance levels and distributions in both MPAs.	Consider for Endangered

Specific Management Objectives:

1. Monitor (via established snow track routes or other techniques) marten distribution across Wisconsin annually. Investigate feasibility of other monitoring techniques to improve indices and explore using volunteers to expand marten winter track surveys.
2. Complete a status assessment for each major population area at least once every 5 years to a level of precision needed for sound decision making following criteria in Table 5.
3. Develop forest management guidelines for martens to improve and protect habitat across their range.
4. Track the prevalence of incidental harvests of martens in traps set for other furbearers. Monitor and maintain special trapping regulations within the MPAs and promote the development and use of alternative trapping techniques designed to reduce incidental

marten mortalities. Provide recommendations to the WDNR Furbearer Committee on alternative regulations that may aid in reducing incidental catch.

5. Encourage research projects that improve our understanding of marten ecology, including investigations of juvenile mortality and recruitment rates.
6. Follow guidelines for live-trapping, handling, and collaring martens that will limit stress, eliminate most capture-related mortalities, and prevent unnecessary negative impacts on reproduction.

C. POPULATION MANAGEMENT STRATEGIES

1. Population Monitoring.

An accurate population estimate is important for determinations of marten status in Wisconsin. Woodford et al. (2005) completed a population estimate in the Nicolet MPA using mark-recapture and radio-tracking methods. Current monitoring of radio-collared martens by GLIFWC provides an estimate of abundance for their study area in the Chequamegon MPA, but a complete estimate is needed. The current stocking project within the Chequamegon MPA is scheduled to continue through summer 2011. It is recommended that this population be given a minimum of 2 years to establish themselves prior to beginning any abundance estimate. Implementation of this project would provide an informative final evaluation of the latest stocking event.

Annual snow track surveys should continue at their current levels until a more accurate or efficient technique is identified that can provide an estimate of abundance and distribution. These surveys can provide vital information on marten distribution and an index to marten abundance trends if conducted in a consistent manner. Additional marten occurrences (e.g., road-killed and direct observations) are reported using WDNR's Rare Mammal Reporting Form (http://dnr.wi.gov/org/land/er/forms/rare_mammal.asp). Staff from WDNR should continue to follow-up on all probable reports received.

Necropsy-based cause of death investigations and disease monitoring of all marten carcasses should continue. The current necropsy protocol should be re-evaluated to consider additional investigations/tissue collections that may provide information on questions related to female mortality and possible reproductive failure, especially associated with capture and handling.

2. Additional Stocking and Intrastate Translocations.

Only a few population viability assessments have been completed for American martens. Thompson and Harestad (1994) estimated a minimum effective population size of 237 based on empirical data from a study in Ontario. This estimate was similar to the theoretically modeled assessments of viability by Schneider and Yodzis (1994) that predicted population extinctions when 75-150 females remained in a population, and Lacy and Clark (1993) that predicted a 66% chance of extinction when a population contained 100 females. In many instances, the models reported populations transitioning to extinction because of decreased habitat availability or carrying capacity (i.e., degradation of habitat quality). Further, most modeled populations that persisted throughout negative random and demographic events were generally 26% larger, or from 95 to 189 females.

Based on these published results, then at least 190 to 378 martens should be present in a population to guard against a high probability of extinction over 100 years. This threshold could be less where martens are naturally immigrating from another population source, as appears to be occurring with the Nicolet MPA population (Williams et al. 2007). We believe that a conservative minimum viable population of 300 individuals (with a minimum of 50% females) is needed for a marten population to persist at least 100 years in Wisconsin.

Additional stocking to protect current MPA populations from extinction should be considered when the best available information suggests abundance has decreased below the minimum viable population. A project plan was developed for a recent stocking event (Woodford et al. 2008) by staff from WDNR, GLIFWC, and CNNF. All future stocking or translocation projects should develop a similar plan tailored to specific conditions or population of concern.

Intrastate translocations (similar to those completed in the Upper Peninsula of Michigan; Williams et al. 2007) between population areas within Wisconsin or between current populations and other suitable habitat areas should be considered to assist with dispersal of martens into new habitats or to augment a population that has fallen below the minimum viable threshold. Intrastate translocations should only be considered when the source population is >400 martens.

D. LAND MANAGEMENT STRATEGIES IN MARTEN RANGE

1. Maintain Current Marten Protection Areas

The current Marten Protection Area (MPA) boundaries should be retained and are critical for conserving this endangered species. Beginning in 2009, licensed trappers were permitted to trap under special restrictions on dry lands in the MPAs for the first time in over 50 years. These restrictions require trappers to use box traps (e.g., cage traps) and cable restraint methods to harvest furbearers (not martens) for all dry land sets. If these new opportunities are found to injure or kill martens within the MPAs, then the special trapping regulations there should revert back to pre-2009 conditions. After documenting the efficacy of these new regulations, through surveys on trapper use, harvest success, and number of violations, current MPA boundaries could be reviewed and possibly adjusted or enlarged to protect marten from being killed incidentally outside current MPAs.

2. Develop and Implement Forest Management Guidelines to Protect and Improve Marten Habitat.

Martens have attracted attention recently because forest management activities have the potential to affect suitability of marten habitat. Some forest management projects in the CNNF have been delayed because the proposed logging was believed, by some, to affect martens and their habitat negatively. Field projects in Wisconsin have used varying methods to measure marten habitat use at the home range (Wright 1999, Dumyahn et al. 2007), forest stand (Woodford 2009), and rest/den site (Gilbert et al. 1997) scales. Based on these studies and a comprehensive review of pertinent published and unpublished literature (e.g., regional and provincial management guidelines or reports), development of sound, science-based forest management guidelines should be achievable for marten habitat in Wisconsin.

The Marten Science Committee should review forest management guidelines currently being developed by WDNR and partners for both occupied and capable habitats in Wisconsin. Once accepted by WDNR, these guidelines will be used for preparation and implementation of forest management plans on all state-managed properties within marten range. Further, they will be recommended for use on all other (public and private) forested lands within marten range (Fig 1). The goal of these guidelines is to ensure land managers are meeting current and future habitat needs for martens, as well as other wildlife species that use marten habitat. The guidelines will be appended to this plan when completed.

3. Protect and Enhance Movement Corridors.

Small populations are more susceptible to extinction than are large populations. Research has also shown that small populations that are connected in some manner to outside populations are less likely to experience extinction than isolated populations. Lacy and Clark (1993) demonstrated through modeling that small marten populations (N = 50 or 100) had a low probability of extinction when as few as 2% of the population immigrated annually. However, if these movements were eliminated than the probability of extinction increased to 100% in nearly all modeling scenarios.

Given the importance of patterns of immigration and emigration to the viability of martens in Wisconsin, an important conservation strategy for martens is to connect current populations via movement corridors to more established populations in Michigan and Minnesota. Such a corridor may exist between the Nicolet MPA and Upper Peninsula of Michigan. The observed movements of martens from the Chequamegon MPA to Iron County and the similarity in genetic make-up between martens from Iron County and western Upper Peninsula of Michigan, suggests that another potential corridor exists there. Marten reports along the northwestern boundary of Wisconsin suggest a linkage between Minnesota and this region as well. Protection and enhancement of these corridors would also provide martens a buffer against potential negative effects associated with climate change.

E. RESEARCH REQUIREMENTS AND NEEDS

The current Marten Advisory Committee (Marten Science Committee once this plan is approved) will review and in some cases recommend alterations to proposed marten research projects in Wisconsin. Project leaders should provide an annual update on their progress to the Marten Stakeholders Committee. Live-trapping projects on martens or similarly sized mammals in marten range will normally cease all live-trapping activities from March 1 to July 1 to protect adult females and dependent kits. An exception to this policy could be granted based on a recommendation from the Marten Science Committee following a review of a research project's proposal and input from the appropriate Animal Use and Care Committee.

All marten projects that involve live-capture and handling of martens will be expected to (1) examine all martens captured for the presence of permanent, subcutaneous passive integrated transponder (PIT) markers; and (2) collect a small piece of tissue (normally a tiny notch taken from the outer ear pinna, roughly the size of a pencil lead). The tissue sample should be stored in a small vial containing commercial isopropyl alcohol or similar preservative. Anyone applying for an endangered resources permit for American martens will be required to follow

these requirements. Staff from BER can provide PIT tags, applicators, and a PIT tag reader to a research project, if available.

Withey et al. (2001) recommend that researchers should not assume radio-tagging has no effect on target animals, and that the collar and transmitter used should be the smallest or lightest available. Until it is shown that radio-collaring or tagging of any kind does not affect reproduction or survival of martens, no radio-collar device shall be attached to any marten in Wisconsin that is >5.0% of the body weight. Five percent is the "rule-of-thumb" recommended (Macdonald 1978, Barron et al. 2010) and followed by many who tag wild mammals (Withey et al. 2001) and some companies that build radio-collars for wild animals (Wildlife Materials, Inc. 2011).

The following are a list of research needs that were identified as critical to improving our knowledge and understanding of American martens in Wisconsin. All research needs were determined to be of equal importance, hence the numbers should not be construed as a ranking or priority.

1. Determine Population Performance

There is a critical need for sound, reliable, and accurate population monitoring for martens in Wisconsin. This will allow for a status assessment to be completed following the criteria listed under Table 5 (this document) and meet management objective two (page 24, this document). Monitoring marten performance could be completed through a capture-mark-recapture model, development of new monitoring indices (e.g., trail camera stations, track plates, and scat dogs), or by some combination of both approaches. Development of a less-invasive technique (e.g., Williams et al. 2009) to estimate abundance is preferred over methods requiring capturing and handling of animals. A genetic mark-recapture study that can sample animals through less-invasive methods may be feasible and should be considered.

2. Demographic Data

Additional demographic data on martens is needed to foster population and viability modeling in Wisconsin. Specific data gaps that need investigation include fecundity (i.e., pregnancy rates, litter size, etc.), juvenile survival rates, and immigration/emigration rates.

3. Investigate Effects of Climate Change

Climate change has the potential to affect martens in Wisconsin through a number of mechanisms (reviewed in this document, section I. D-3). Therefore, additional information and quantification of both biotic and abiotic factors (e.g., snow depth and duration, forest type and prey range shifts) affecting martens related to climate change are needed. Knowledge gained through this work will greatly aid our ability to develop and implement strategies to conserve Wisconsin's martens in the future.

4. Habitat Requirements, Connectivity, and Barriers to Marten Movement.

Additional investigations are needed to manage landscapes better for martens and to understand the potential negative effects new or enlarged barriers (e.g., transportation and

utility corridors, metallic and non-metallic surface mines) may have on them. Published studies on habitat requirements at small and landscape scales are needed to develop sound management guidelines in Wisconsin.

Harvey (2004) used available information and data to estimate the amount of suitable marten habitat in the CNNF by forest cover type and reconnaissance data. A similar approach investigating the effects of known (e.g., lakes, rivers, and large highways) and potential barriers to marten movements in northern Wisconsin may address this need.

5. Investigation(s) into Effects of Handling and Radio-collaring on Martens

No conclusive information is available on the effects of drugging and handling on marten demography. Nevertheless, at least some likelihood exists that these stressors could add to the overall burden placed on martens that are live-trapped, immobilized, or radio-tagged. Although a mechanism for these observations is unclear, it appears that physiological stress due to radio-collar weight is at least a plausible explanation and should be investigated to see if it may be responsible for the lower recruitment rates reported for marten populations in Wisconsin.

Because of the uncertainty related to this factor, research designed specifically to address it is needed. Such investigations are extremely difficult because of the need to capture, handle, and mark wild martens to test for possible effects. One suggested approach is a comparison study where a portion of a MPA is dedicated for intensive handling and radio-collaring to collect demographic parameters while a control area is simultaneously studied using noninvasive methods. A number of proxies exist for measuring physiological stress in wild animals. One example is to compare fecal glucocorticoid metabolite excretions (Moll et al. 2008) collected from radio-collared martens to uncollared martens.

6. Prey Abundance and Availability

As described previously (Part 1, Section D. 6, this document), data are lacking on marten prey abundance and availability in Wisconsin. Additional research is recommended to fill this knowledge gap.

F. INTERAGENCY COOPERATION AND COORDINATION

1. Wisconsin Marten Stakeholders Committee

Stakeholder input is integral to helping the Bureau of Endangered Resources (BER) make sound resource management decisions. Wisconsin DNR is committed to working in partnership with all stakeholders, regularly seeking and taking into account their knowledge, experience and perspectives. The Wisconsin Marten Stakeholders Committee (Stakeholders Committee) is charged to provide input, verbally or though written documents, on marten related issues to BER. Input is anticipated to focus on social, cultural, ethical, and economic aspects of the issue, but may also include conservation and other areas.

Membership will be composed of individuals (in many cases representing organizations, agencies, local units of government, etc.) with an interest in the issues and/or who may affect or be affected by issues related to marten. It is anticipated that stakeholders may include industry,

other management or regulatory agencies, local units of government, conservation groups, affected landowners, and the interested public. All organizations represented on the current Wisconsin Marten Advisory Committee will be invited to participate in the new Stakeholders Committee. In addition, BER will seek out and invite other relevant and interested stakeholders that may have an interest to participate. The Bureau of Endangered Resources will work to ensure that the composition of the group is balanced, adequate to address the issue at hand, and reflect a diversity of perspectives and areas of knowledge and expertise.

The Bureau of Endangered Resources, as the resource manager, is a stakeholder in all decisions and will lead and participate in this committee. Participants in stakeholder advisory groups are expected to represent the interests of other similar individuals, businesses, organizations, communities, etc., as applicable. Conflicts of interest (i.e., a situation in which an individual or organization is involved in multiple interests, one of which could possibly corrupt the motivation for an act in the other), financial and otherwise, are in some ways unavoidable in stakeholder advisory groups. Stakeholders by definition may affect and be affected by the decision at hand. Stakeholders will be required to disclose to the group and to BER potential conflicts of interest at the first meeting. If conflicts of interest exist that are detrimental to the functioning of the group, the individual may be precluded from (or asked to discontinue) participation in the group. This is an ongoing participant responsibility – if new conflicts of interest arise during the process, these must be disclosed promptly in a similar manner.

This committee is not expected to vote or reach consensus on all points, but the group will establish a preferred process for doing so if requested. The committee shall meet at least once annually or more often if needed. Documents produced by the group should reflect the input requested, indicate when consensus has been reached (or explain why it could not be reached), and identify conflicting or alternate views expressed within the group.

2. Wisconsin Marten Science Committee

The purpose of the Wisconsin Marten Science Committee (Science Committee) is to provide information and recommendations to BER, helping to ensure that decisions regarding management of American martens in Wisconsin are based on the best available science. The Science Committee will provide scientific and technical expertise to the overall processes, including to BER and to the Stakeholder Committee, through testimony or written documents. The Science Committee is expected to focus on biological and ecological aspects of the issue, but may also provide scientific and technical expertise in environmental, economic, social, and other aspects of the issue; members will be appointed by BER. The Bureau of Endangered Resources will work to ensure that the knowledge, experience, and perspectives represented on the committee are both adequate and balanced to address the issues at hand. The Bureau of Endangered Resources will also ensure that no individual appointed to serve on the Science Committee has a conflict of interest that is relevant to the issue at hand. In situations where conflicts of interest are unavoidable the participant will be required to promptly and publicly disclose to the committee and to BER the conflict of interest and to refrain from participating in decision-making regarding that issue. This is an ongoing participant responsibility. If new conflicts of interest arise during the process, these must be disclosed in a similar manner.

This committee is not expected to vote or reach consensus on all points, but the group will establish a preferred process for doing so if requested. Documents and testimony provided by the group should represent the facts and technical expertise requested and indicates when consensus has been reached (or explains why it could not be reached). Documents/testimony should also identify data or studies that may suggest alternate hypotheses or conclusions, and identify uncertainty associated with conclusions presented whenever possible.

The Science Committee shall consist of 10 or fewer permanent members at any one time but, additional experts may be invited to participate under BER direction on issues when needed. This committee shall meet as needed. A staff person from BER will act as liaison for this group to the Stakeholders Committee and organize and facilitate meetings. Active members of the Science Committee are prohibited from being standing members of the Stakeholder Committee, but they may be asked to provide results on issues being addressed in the Stakeholders Committee.

3. Ojibwe Tribal Consultation

The Ojibwe tribes in northern Wisconsin (and some in Michigan and Minnesota) have rights to hunt, trap and gather natural resources from public lands in the ceded territories. These rights imply some level of management responsibility for martens and marten habitat. During the more than 25 years since the Voigt Decision (affirming the existence and extent of the treaty rights) the tribes and the WDNR have developed consultation strategies to complement the State of Wisconsin's management responsibility with tribal perspectives and input. The importance of these strategies is recognized in Governor Doyle's executive order #39 on government-to-government consultation and in Orders and Stipulations resulting from the Voigt Decision.

As management plans, decisions, or actions are being contemplated, input should be sought from the Ojibwe tribes, prior to any alternative development. Once plans are formulated they should be shared with the tribes and input collected prior to public release. Finally, prior to plans being approved, tribes should be consulted to obtain their further input. The Great Lakes Indian Fish and Wildlife Commission can assist WDNR in conducting some of this required consultation.

4. Marten DNA Management and Specimen Procedures

Currently, tissues collected for DNA extraction are kept at multiple sites across northern Wisconsin. A system for housing these samples and existing genetic profiles should be developed. Genetic profiles extracted from tissues collected during previous work (from 2000-2007) are currently archived at Michigan State University. These data or copies should be controlled and housed in-state, preferably in an agency or institution that can provide long-term archival.

Anyone collecting or receiving an American marten carcass (e.g., incidentally trapped, road-kill, and research carcasses) is required to follow WDNR's current disposition policy (see Appendix A).

5. Regional Communication

Similar marten management directions and research questions are being asked and investigated in Minnesota and Michigan. Staff from BER and the Marten Science Committee are urged to

communicate with experts from Minnesota, Michigan, and elsewhere in the region on issues related to martens. This communication is critical because animals from Michigan, Minnesota, and Ontario are the most logical sources for any additional interstate or provincial translocation projects.

G. EDUCATION AND TRAINING

1. Marten Outreach and Education Materials

The WDNR, Stakeholder Committee, and Tribal or GLIFWC Biologists are urged to provide general information about this endangered species to interested universities, non-governmental organizations, tribal governments, trappers, and other agencies with land management responsibilities within marten range. These same materials should be made available to individuals or organizations requesting information on martens. Specific outreach materials available and current dissemination methods are:

- Species Factsheet – available at (http://dnr.wi.gov/org/land/er/biodiversity/index.asp?mode=info&Grp=17&SpecCode=AMAJF01010) and hardcopy by request
- A Marten Poster providing a physical description, life history information, and contact information if one is seen – hardcopy only (limited to 500 copies total); contact BER for availability.
- Marten Monitoring and Research Reports – available through WDNR's EcoAtlas Webpage (http://ecoatlas.wiatri.net/)
- Annual Trapping Regulations – available from WDNR's website and hardcopy at license vendors
- Marten Avoidance Document – available at (http://dnr.wi.gov/org/land/er/mammals/pdfs/marten_avoidance_techniques.pdf) and hardcopy - contact BER.
- Promote development and dissemination of American marten educational materials to school and conservation groups, and the general public.

2. Training and Research Requirements

- Trapper education courses should at a minimum discuss marten ecology, current regulations, MPA locations, and alternative trapping techniques to reduce incidental mortalities.
- Basic marten identification should be provided as needed to personnel responsible for land management decisions within marten range. This training should include information on identification of marten and similar sized mammals, habitat requirements, marten biology, and related trapping information. Staff interested in completing winter track surveys should be trained and evaluated on their ability to correctly identify marten tracks, before being assigned a survey.
- Foresters and land managers responsible for forest management on public and private lands within marten range should receive training/information on habitat requirements and forest management guidelines for martens in Wisconsin.
- WDNR, university, and non-WDNR researchers interested in conducting marten research normally will need to provide a research proposal and an approved Animal Use Animal Care (AUAC) protocol to the Wisconsin Marten Science Committee prior to initiating any field activities. In addition, research involving direct or indirect manipulation (i.e.,

live-trapping, surveys, and any other activity that may disrupt an animal) of martens, either as a target or non-target species, in Wisconsin may need an Endangered Resources permit from BER. Depending on the particular project, a Scientific Research License (Wis. Statutes 29.614) from WDNR-Wildlife Management may be needed as well.

H. LAW ENFORCEMENT

The Wisconsin state legislature, through s. 29.604, Wis. Stats., has found that certain wild animals and wild plants are endangered or threatened and are entitled to preservation and protection as a matter of general state concern. Each federally recognized Indian tribe has their own laws and ordinances for on reservation and of reservation wildlife concerns. The federal Endangered Species Act of 1973 and the Lacey Act (1900) provide for the protection of wild animals and wild plants threatened with worldwide extinction by prohibiting the importation of endangered or threatened wild animals and wild plants and by restricting and regulating interstate and foreign commerce in wild animals and wild plants taken in violation of state, federal and foreign laws. The state, however, also has assumed its responsibility for conserving these wild animals and for restricting the taking, possession, transportation, processing or sale of endangered or threatened wild animals within this state to assure their continued survival and propagation for the aesthetic, recreational and scientific purposes of future generations.

The department is required under s. 29.604(3), Wis. Stats., to establish an endangered and threatened species list which shall consist of 3 parts:

1. wild animals and wild plants on the U.S. list of endangered and threatened foreign species;
2. wild animals and wild plants on the U.S. list of endangered and threatened native species; and
3. a list of endangered and threatened Wisconsin species.

The American marten, is listed as a state-endangered species in Wisconsin under s. NR27.03(1), Wis. Adm. Code. Unless permitted by the department, no person may take, transport, possess, process or sell within this state any wild animal specified by the department's endangered and threatened species list. [s. 29.604(4)(a), Wis. Stats.]

In addition to generally being considered an endangered species, martens are defined under Wisconsin state law as “Protected Wild Animals” under ss. NR 10.02(5) and 19.001(14), Wis. Adm. Code. It is unlawful for any person to take, attempt to take, transport, harass, disturb, pursue, shoot, trap, catch, kill or possess any protected wild animal at any time unless specifically authorized in writing by the department. [NR 10.02 and NR 19.25, Wis. Adm. Code]

1. State penalties for shooting or killing an American marten

a. Intentional Shooting or Killing. Whoever intentionally takes, shoots, kills, transports, possesses, processes or sells an endangered species shall be fined not less than $2,000 nor more than $5,000, or be imprisoned for not more than 9 months, or both. In addition, the court shall order the revocation of all hunting approvals issued to the person under this chapter and shall prohibit the issuance of any new hunting approvals under this chapter for 3 years [s. 29.604(5)(a)1., Wis. Stats.]. Because this is a criminal violation, a mandatory court appearance would be required.

b. Accidental Shooting (Taking or Killing). In the situation of an accidental shooting of a marten the marten would continue to be treated as a "Protected Wild Animal". Wisconsin Administrative Code s. NR 10.02 and 19.25 state that no person may harass, disturb, pursue, shoot, trap, catch, take, or kill a protected wild animal. Wis. Stats. s. 29.971 states that whoever violates a statute or regulation pertaining to hunting, taking, transportation, or possession of game shall forfeit not more than $1,000 [s. 29.971(3), Wis. Stats.]. In addition, the court may revoke or suspend any or all privileges and approvals granted under this chapter for a period of up to 3 years [s. 29.971(12), Wis. Stats.] . The 2010 Uniform Deposit and Bail Schedule for Conservation Violations sets the deposit permitted in lieu of an appearance in court at a forfeiture of $80. With the required associated court costs and surcharges, the total deposit required for this violation would be $303.30.

c. Incidental Trapping. Incidental take of American martens through otherwise legal, regulated trapping has and likely will continue to occur. All such cases should be reported to law enforcement either directly to the local Conservation Warden or to the DNR hotline at 1-800-TIP-WDNR (847-9367). The animal should be tagged with a seizure tag and trap location recorded. Upon completion of law enforcement investigations, all incidentally taken martens will be turned over to the Endangered Resources Marten Biologist or local Wildlife Manager. If the case is not an enforcement case, disposition of the carcass will follow the policy listed under Appendix 1 of this document.

2. Violation Protocols

When a report or complaint is received for intentional or unintentional killing of an American marten, it should be reported to the local conservation warden for the county in which the incident occurred. Such reports may be made either directly to the warden or through the nearest DNR Service Center, Sheriff's Department, or by calling the DNR violation hotline at 1-800-TIP-WDNR (847-9367). Wardens will document the report and disposition of the investigation into the killing or possession of a marten in the law enforcement complaint database.

As soon as practical after receiving a report of the killing or possession of a marten the warden or the warden supervisor shall notify the Regional Enforcement and Science leader and the Bureau of Endangered Resources Marten Biologist or local Wildlife Manager. Any seized carcass of an unlawfully killed or possessed marten will be tagged by the warden with a seizure record tag (Form # 4100-190). Proper chain of custody will need to be maintained for any incidents that might result in enforcement action.

I. MARTEN PLAN BUDGET (for WDNR funds; other agencies, tribes, or partners are encouraged to spend funds on implementing this plan, but this is not required). Many state funding sources are available for other agencies, Indian tribes, and partners to apply for funding to implement this plan, usually through a competitive proposal process. Some examples of funding support include the Citizen-based Monitoring Partnership and State Wildlife Grants Programs.

1. Current Marten Spending (by WDNR- FY10)
   - Annual snow tracking surveys require approximately 160 hours of staff time (with 2 observers per survey) and 1,200 vehicle miles (~$550) to complete.
   - Approximately $40,000 to $65,000 was spent to complete each year of the 3-yr stocking project.

   (Note: other agencies, tribes, and partners are currently spending additional funds related to marten research and management in Wisconsin)

2. Estimated Costs to Implement Conservation and Management Plan

A specific budget allotment and secure funding source(s) are needed to implement this plan. At present all WDNR activities are funded by annual internal requests (i.e., track surveys) and competitive proposal writing (e.g., 2005 Nicolet MPA estimate and 2008-10 stocking activities). Base Funding Commitment Needed (at FY10 levels):

- Approximately $5,500 per year for tracking (or other monitoring) surveys
- At least $40,000 per year is needed to complete additional population monitoring activities listed in this plan or to support research to develop new monitoring indices to evaluate population performance.

Secure funding to support the base needs (~ 45k per yr) is required to implement key strategies and meet management objectives of this plan. Additional funding can be sought by staff and partners (e.g., university or research staff) to address other research needs and knowledge gaps identified in this plan.

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Appendix A. Current policy for dealing with all American marten specimens.

PROCEDURES FOR HANDLING AMERCIAN MARTEN CARCASSES

DNR personnel and cooperating partners (e.g., research project partners) should follow one of the procedures listed below for processing, routing, and final disposition of all American Marten carcasses encountered.

A. Road-killed or naturally-killed specimen

1. Immediately report each Marten carcass that you pick-up or receive to the Endangered Resources Marten Biologist (contact info: Jim Woodford – ER/Rhinelander; phone: 715-365-8856; email: James.Woodford@wisconsin.gov).

2. Double bag, freeze, and attach a specimen label (DNR form 2300-144) to the carcass. Feel free to complete and submit a rare mammal observation report available on-line at: http://dnr.wi.gov/org/land/er/forms/rare_mammal.asp Each form should contain the best locational information available that describes where the carcasses was recovered.

3. Send or arrange transport of all specimens to Marten Biologist to screen for identification marker (i.e., PIT tags) and DNA tissue sampling.

4. After screening, the carcass will be delivered to DNR Wildlife Health for necropsy, disease screening, and tissue sampling (tooth, reproductive tract, etc.).

5. For final disposition, carcasses should be offered to any Museum or University Collection located within Wisconsin.

B. Incidentally taken specimen (including cases with legal action):

If carcass involves legal action:

1. Immediately report each Marten carcass picked-up or received to the Endangered Resources Marten Biologist (715-365-8856). Provide information on where the animal was trapped and where carcass will be stored.

2. Double bag, freeze, and attach a specimen label (DNR form 2300-144) to the carcass.

3. Arrange for carcass transfer to Marten Biologist at conclusion of legal case. A pelt may be retained (removed from carcass by a taxidermist prior to transport) to create a mount, or tanned skin for educational purposes, if a necropsy is not needed to determine the cause of death or for an enforcement action. Complete and submit an Endangered and Threatened Species Permit Application (form 1700-001) or contact the Endangered Resources Marten Biologist to request a pelt.

If the carcass does not involve legal action, follow steps 2 through 5 from section A