

# History and status of American Marten *Martes americana* at Isle Royale National Park, Michigan, USA

Mark C. ROMANSKI<sup>1</sup> and Jerrold L. BELANT<sup>2</sup>

## Abstract

Once common at Isle Royale National Park (IRNP), the American Marten *Martes americana* may have been extirpated during the early 20th century. We compiled historical and recent records to assist in evaluating its status there. Ten records were reported between 1873 and 1929 representing a minimum of 20 American Marten individuals. No observations were recorded between 1930 and 1990. From 1991 to 2006, 28 reports were received, including tracks, sightings, faeces, and photographs. We assessed the plausibility of a remnant population persisting undetected for 60 years by extending the historical record forward for American Marten by about 20 years. We further assessed the potential for recolonisation considering American Marten ecology and scientific investigations that have occurred at IRNP. Whether an undetected remnant population has experienced a bottleneck brought about by over-trapping or a recent immigration event has occurred, the importance of this isolated population increases with regards to scientific inquiry and conservation considering the mission of the National Park Service (NPS). NPS policy states the following with respect to animal population management: “preserve and restore the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native animal populations and the communities and ecosystems in which they occur; restore native animal populations in parks when they have been extirpated by past human-caused actions; and minimize human impacts on native animals, populations, communities, and ecosystems, and the processes that sustain them”. Understanding historical prevalence of American Marten at IRNP, as we have outlined here, will inform and guide future management and research of this species within the park.

*Keywords:* genetic bottleneck, historical records, immigration, recolonisation, remnant population

## Introduction

The geographic distribution of American Marten *Martes americana* before European settlement extended from Alaska across most of Canada, New England, the Alleghenies, the Great Lakes region, the Rocky Mountains south to New Mexico, the Sierra Nevadas and the Cascades (Fig. 1). Today, through localised survival, reintroductions and natural dispersal, American Marten still occurs over much of this range despite elimination from its former southern periphery through habitat loss related to settlement activities (logging, severe post-logging fires, and land clearing) and trapping (Clark *et al.* 1987). Within the upper Great Lakes Region, numerous efforts to reintroduce this species have succeeded and with the exception of Wisconsin, the American Marten can be trapped as a furbearer in those states and provinces bordering Lake Superior.

Until recently, American Marten was thought to be extirpated from Isle Royale National Park (IRNP), Michigan, USA (Johnson *et al.* 1982). American Marten was apparently common at IRNP around the turn of the 19th–20th centuries and anecdotal evidence suggested this population may have been extirpated shortly after 1905 (Mech 1962). Charles C. Adams (1909) led an ecological survey on IRNP for the University of Michigan–Museum of Zoology in 1904 and 1905. He reported that “during the past season [1904] Chas. Preulx took eleven martens along the Desor trail”. Shortly thereafter, other members of this ecological expedition reported American Marten as “seen” (skins or live specimens; Wood 1914). In the 19th century, widespread trapping occurred within the Great Lakes region and on IRNP. At this time, trappers working IRNP targeted not only American Marten, but also American Beaver *Castor canadensis*, Coyote *Canis latrans* (currently extirpated), Canadian Lynx *Lynx canadensis* (currently extirpated) and American Mink *Neovison vison*, because the island was not

sufficiently large to trap any one species economically (Tim Cochrane, Grand Portage National Monument, Grand Portage, MN, pers. comm., 2007).

We summarised available data to provide an understanding of both historical and recent distribution and prevalence of American Marten at IRNP. Ultimately, this effort was intended to elucidate aspects of genetic isolation, abundance and life history on IRNP, and coincides with our current investigation into genetic origin.

## Study Area

Established as a national park in 1931, IRNP lies on a northeast–southwest aspect in northwestern Lake Superior (48°N, 89°W), about 24 km from Ontario, Canada, 80 km from the Keweenaw Peninsula of Michigan and 35 km from Grand Portage, Minnesota, with access limited to private boat, and ferry or seaplane service. The main island of this wilderness archipelago is 72 km long and 14 km wide, and is surrounded by about 400 smaller islands. The landform of IRNP includes a series of ridges and valleys comprised of glaciated basaltic and conglomerate rock. Isle Royale has undergone several periods of glaciation (Huber 1973), ending with retreat of the Wisconsin glacier and the island’s emergence some 9,400 years ago (Flakne & Cole 1995).

The mammalian fauna inhabiting IRNP includes Moose *Alces alces*, Gray Wolf *Canis lupus*, Red Fox *Vulpes vulpes*, North American River Otter *Lontra canadensis*, American Mink, Short-tailed Weasel *Mustela erminea*, American Beaver, Muskrat *Ondatra zibethicus*, and six species of bats. Potential prey species of American Marten on IRNP are American Red Squirrel *Tamiasciurus hudsonicus*, Snowshoe Hare *Lepus americanus* and North American Deer Mouse *Peromyscus maniculatus*.

The northeastern third of IRNP is boreal forest; dominant



Fig. 1. Historical and current world range of American Marten (reproduced from Williams *et al.* 2007). Triangle symbol indicates the location of Isle Royale National Park.

tree species include White Spruce *Picea glauca*, Balsam Fir *Abies balsamea*, Paper Birch *Betula papyrifera*, Quaking Aspen *Populus tremuloides*, and Northern Mountain-ash *Sorbus decora*. The southwestern third of IRNP is a northern hardwood–white pine association composed of Sugar Maple *Acer saccharum*, Yellow Birch *Betula alleghaniensis*, and White Pine *Pinus strobus*. Between these two climax forests, successional stands of Paper Birch, Quaking Aspen, White Pine, and Jack Pine *Pinus banksiana* occur—the result of fires and windthrow. A fire, fuelled largely by tree branches remaining from logging, burned 19% of the main island in 1936 (National Park Service 2004a). The valleys between parallel ridges contain northern bogs in every successional stage from young to senescent (Linn *et al.* 1966).

There is a marked variation in temperatures, increasing with distance between the Lake Superior shore-line zone and inland areas (<0.5 km inland and >60 m above lake level) of IRNP (Linn 1957). Mean monthly seasonal temperatures range from -9 °C in January to 15.8 °C in July. Mean annual precipitation is 75 cm, ranging from 54 cm to 107 cm. Forty percent of annual precipitation falls as snow (Stottlemeyer *et al.* 1998). Lake Superior rarely freezes entirely between IRNP and the mainland (Canadian Ice Service 2007).

Since 1991, IRNP has averaged 20,752 visitors annually (National Park Service 2007). This visitation occurs from May to October. Due to hazardous weather conditions, the park is closed to the general public from November to April, with only a few research personnel on the island in winter months. About 66% of visitation occurs during July and August (National Park Service 2004b). Historically, census data from 1880, 1900 and 1910 recorded 56, 99, and 82 people living on Isle Royale, respectively (Elizabeth Valencia, IRNP, pers. comm. 2008).

## Methods

Historical distribution was assessed by reviewing existing published and unpublished literature, field notes of investigators, transcribed oral histories, and historical records within IRNP archives and files. Any information related to Marten was summarised and

included observer, date, location of observation, type of observation (e.g., direct observation, observation of sign), and a general description of the observation. American Marten distribution was further explored by soliciting additional information from researchers working at IRNP. In mapping locations of observations, where specific coordinates of observations were not reported, coordinates were estimated by taking the mid-point along a hiking trail where the observation occurred, a straight line between two reference points, or estimating the geographic centre of an area with known boundaries within ArcGIS 9.2 (Environmental Systems Research Institute, Redlands, California, USA).

We categorised records as historical (before 1930) or recent (after 1990). Historical records were further subdivided into those widely known before this effort and records not previously summarised. In addition, evidence of American Marten presence was documented during a survey to estimate mustelid distribution on IRNP (Romanski & Belant, unpublished data, 2007).

## Results

### Historical records

Scientific investigations regarding mammalian fauna at IRNP over the past century did not mention the presence of American Marten and generally agreed that the population was likely to have disappeared during the early 1900s (Mech 1962, Shelton 1966, Johnson 1969, Peterson 1974) based on the paucity of information following the ecological expedition by the University of Michigan–Museum of Zoology during 1904–1905 (Adams 1909). Adams and colleagues documented their trapping efforts for American Marten and reported a minimum harvest of 12 animals during the 1904–1905 season. N. A. Wood, a member of this expedition, later reported the existence of American Marten at IRNP in a checklist of Michigan mammals (Wood 1914). Efforts to trap American Marten in the winter of 1916–1917 were documented as well, but no harvest was reported, suggesting few, if any individuals were present on IRNP (Martin 1988).

Six widely-overlooked historical records further document American Marten presence as late as 1929 (Fig. 2, Appendix). The earliest was a type-written account of an interview with William Jeffery, who worked at Island Mine from 1873 to 1874 at age 11 as a ‘bellows boy’. In the interview he recalled trappers capturing mostly Beaver and American Mink, and also thought that American Marten was present. Three additional records were from the daily journal of trapper Blyden Hawver who camped at Lake Desor during winter of 1912–1913. Hawver described observing tracks on two occasions. Additionally, he unsuccessfully attempted to kill an American Marten with his revolver while pursuing the animal as it ran among fallen trees. Although Martin (1988) referenced the trapping efforts of W. H. Foster in the winter of 1916–1917, he failed to mention the take of one American Marten (Foster 1917). In 1929, before establishment of IRNP, Frank Oastler conducted a survey of the social, natural, and physical features of IRNP for the purpose of determining whether Isle Royale met the requirements of “National Park Standards” and listed “Eastern Marten” as inhabiting the island (Oastler 1929).

### Reintroduction

Martin (1988) recommended the American Marten as suitable for reintroduction at IRNP based on the following: neighbouring populations in the forests of northwestern Ontario and north-

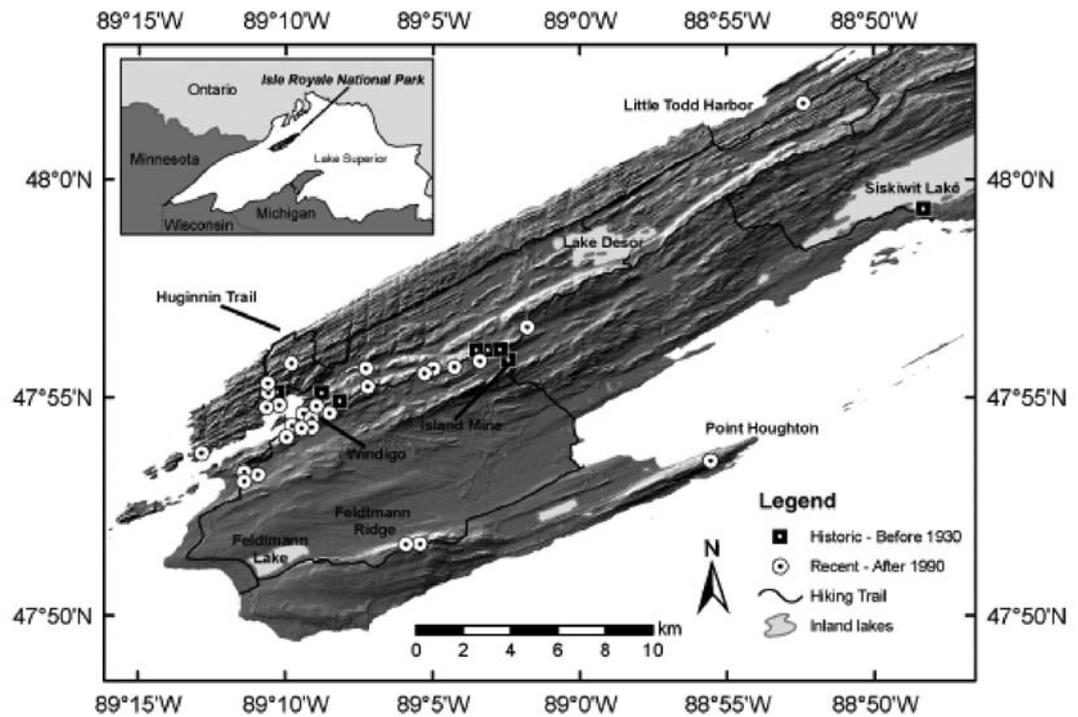


Fig. 2. Distribution of American Marten observations, Isle Royale National Park, Michigan, USA.

eastern Minnesota had recovered from near extirpation, the latter caused by over-trapping and human-initiated habitat change; population concentrations 50 km distant had been found in eastern Cook County, Minnesota; there was general agreement between researchers that suitable habitat is widely available at IRNP; and “strong” ecological evidence to suggest that resident Red Squirrel and Snowshoe Hare populations could serve as a prey base and presumably served as such prior to the early 20th century. Martin (1988) estimated that 15–30 territorial males and an equal number of females could be supported on IRNP. His estimate was based on the land area encompassing mature conifer or mixed vegetation forest types (275–325 km<sup>2</sup>) as reported by Krefting *et al.* (1970), home range size as determined by Mech & Rogers (1977) in northeastern Minnesota, and a continuation of forest succession trends in the absence of significant wildfires and other disturbances. Martin suggested that Lake Superior was a significant physical barrier to immigration from neighbouring populations.

Starting in July 1966 a series of correspondences involving the IRNP Superintendent, National Park Service biologists, U.S. Fish and Wildlife biologists, university scientists, and the Ontario Department of Lands and Forests documented the process of a reintroduction attempt which ultimately ended in a phone message on 27 October 1967 from the Ontario Department of Lands and Forests indicating that only six American Martens were trapped as opposed to the desired six of each sex. The park was scheduled to close operations for the winter the following day, the effort was suspended, and no Martens were transported to IRNP for release (National Park Service 1967). We have not located information regarding further attempts to reintroduce American Marten to IRNP.

#### Recent records

Recent records ( $n = 28$ ) contained mostly observation of tracks, faeces collection, and sightings. The first of these occurred on 26 January 1991 when researchers and park staff participating in the long-term Wolf/Moose study observed and measured tracks of what was believed to be American Marten 2.4 km from their re-

search station in Windigo. One member of this group, Jo Thurber, stated that she had observed similar tracks the previous winter (Kangas 1991). Researchers and park staff continued to observe tracks during winter, nearly annually, over the next fifteen years. On 21 September 1993, Thomas Rogers, a park visitor, captured two photographs of an American Marten perched in a tree alongside the trail between Todd Harbor and Little Todd Harbor, 24 km northeast of Windigo (Fig. 3). The sighting, which occurred on 16 February 2001 and was centrally located within the Huginnin Trail loop north of Windigo, accurately described the characteristics of American Marten pelage (orange throat patch and reddish brown fur as opposed to the darker fur of Mink, the only species that could possibly be confused with an American Marten in a direct sighting; Kangas 2001) and the photographs are clearly identifiable. Faeces were collected opportunistically between 2001 and 2004 and genetically analysed to discriminate for *Martes*; *M. americana* is the only species of the genus inhabiting IRNP. R. O. Peterson (Michigan Technological University, Houghton, Michigan, USA, pers. comm. 2004) reported 10 of the 12 samples submitted identified positive for American Marten, including at least two from an area of the park known as Feldtmann Ridge. Three additional sightings occurred between May 2004 and June 2005, one on Feldtmann Ridge, another along the trail crossing Grace Creek (Peterson & Vucetich 2005) and the remaining one at 5 km west of Windigo (Erin Grivicich, Isle Royale National Park, USA, pers. comm. 2005). Finally, on 27 June 2006, we recovered a female American Marten carcass on a trail 2 km northeast of Island Mine following a visitor report. The carcass contained only hind legs, tail and a portion of the chest cavity, and was probably killed by a Gray Wolf as determined by dental puncture wounds in the chest cavity (Romanski & Belant unpublished data).

Between April and June 2006 we opportunistically collected >60 potential American Marten faeces as part of an investigation to determine distribution of each species of Mustelidae on IRNP. In contrast to observations reported above, these samples are distributed throughout IRNP, extending northeast to Lane Cove, 50 km from Windigo.

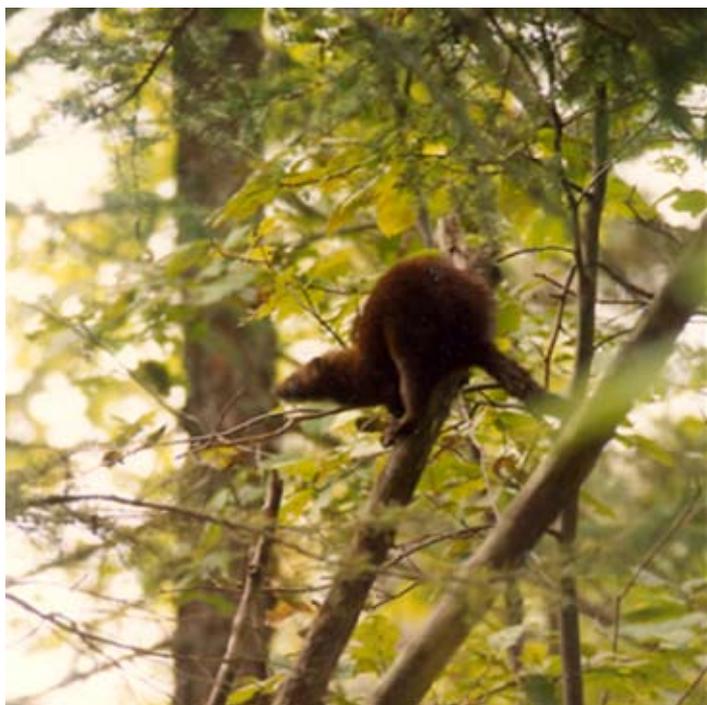


Fig. 3. Photograph of American Marten taken along the hiking trail between Todd Harbor and Little Todd Harbor; Isle Royale National Park, 1993 (photograph by Thomas Rogers).

## Discussion

There are three possibilities which may explain the present population of American Marten at IRNP. This population is either remnant, recently immigrated, or the result of a reintroduction. The three possibilities vary in the degree of likelihood of having occurred, and each for different reasons. We offer information on the potential for each of the possibilities below.

### Remnant population

For American Marten at IRNP to have gone undetected for at least 60 years, the population needed to exist at only very low levels to have avoided detection by humans. A number of factors could have exerted themselves in concert both spatially and temporally for a remnant population to have maintained persistently low numbers of individuals. These include: life history characteristics, prey and density dependence, interspecific interactions, site fidelity and disease. Additionally, the likelihood of an American Marten being observed is linked to human presence, perception, and activity at IRNP.

American Marten exhibits a life history with small litters and large spatial requirements relative to actual body size, and live as long as 14 years in the wild, an unusually long life for their small body size (Strickland & Douglas 1987). Females generally breed at 1 year with their first litter produced at 2 years; mean litter size is three (Buskirk 2002). During food shortages, females have displayed delayed reproductive maturation and reduced ovulation rates (Thompson & Colgan 1987). Although no information exists on the reproductive characteristics and diet analyses are underway (Romanski & Belant unpublished data), at IRNP the simplified prey base indicates at least the potential for limited calorific intake affecting reproductive success. A K-style life history would by definition prohibit American Marten from increasing rapidly after population declines and environmental change. At IRNP,

over-trapping and a fire which burned 19% of the main island in 1936 (National Park Service 2004a) may have affected population or distribution and growth.

Fryxell *et al.* (1999) demonstrated that a mixture of prey dependence and density dependence, provisionally attributed to agonistic intraspecific interactions, had a stabilising effect on American Marten and its prey in Algonquin Park, Ontario, Canada. At IRNP, the limited number of prey species, prey population cycles, and low reproductive potential may limit or stabilise population growth. Johnson (1969) measured biomass of Deer Mouse, Red Squirrel, and Snowshoe Hare on IRNP as 117, 719, and 788 grams per hectare, respectively. This represents about five Deer Mice, four Red Squirrels, and <1 Snowshoe Hare per hectare. However, Snowshoe Hare biomass was estimated during a cyclic low. Thompson & Colgan (1990) speculated that American Martens encountered smaller prey at a minimal cost while foraging primarily for larger prey. American Martens on IRNP may compensate for the lack of available microtine (= mouse or vole) biomass by exploiting larger prey atypical by comparison with that of mainland populations, potentially decreasing fitness and population growth. Although Cumberland *et al.* (2001) negatively correlated American Marten fecundity and abundance with small mammal abundance (mice, voles and shrews), this has yet to be analysed at IRNP where total numbers of available prey species are reduced. Seasonality of diet may contradict the importance of a limited microtine biomass, given that Thompson (1986) demonstrated 85% calorific intake from large prey during winter and 50% of calorific intake from small mammals in snow-free seasons. However, IRNP has five mammalian secondary consumers (Red Fox, American Marten, American Mink, River Otter, and Short-tailed Weasel) whose food sources overlap to varying degrees and the increased potential for exploitation competition may only serve to exacerbate the effects of a diminutive prey base.

Cause-specific mortality of American Marten at IRNP warrants further investigation. The one known example of an American Marten presumably killed by a Gray Wolf occurred along the hiking trail network. Buskirk (2002) suggested that human travel corridors (e.g., road, trails) could facilitate movements by competitors or predators of American Marten. Buskirk (2002) estimated that predation of American Marten facilitated by predator travel along these corridors was an important source of mortality for a population in the Black Hills National Forest, South Dakota, USA. Of 22 American Martens monitored during a 4-year study in Oregon, USA, 18 were killed by mammalian or avian predators (Bull & Heater 2001). In contrast, only four of 35 American Martens died from interspecific competitors in northern Michigan (Belant 2007), 200 km southeast of IRNP. What effect interference competition through aggression or direct killing by Gray Wolf, Coyote, Red Fox, River Otter, or birds has had on American Marten at IRNP is unknown.

From 1986 to 2006, reintroduced populations of American Marten in the Nicolet National Forest of northern Wisconsin, USA, maintained low numbers of individuals when compared with the number of individuals stocked, and exhibited release site fidelity and/or a homing instinct (Williams *et al.* 2007). Estimated at 150–200 individuals in 1986, this population measured  $221 \pm 61$  individuals in 2006 and remained concentrated within 20 km of the original release site. This propensity for site fidelity combined with probable low abundance is likely to have reduced opportunities for observation on IRNP.

Within the region, epidemics of canine distemper have occurred and IRNP may not have remained unaffected. Fredrickson (1990) demonstrated that canine distemper was highly virulent to American Marten. If American Marten inhabited IRNP at this time, canine distemper could have affected the population. Between 1980 and 1982, the population decline of Gray Wolves from 51 to 14 was likely attributable to canine parvovirus (Peterson and Vucetich 2002). The potential for disease epidemics to dramatically affect the mammalian fauna at IRNP has been demonstrated despite its isolation.

That a remnant population went undetected on IRNP for six decades seems improbable; however, there are several potential explanations for how it could have done so. With the exception of information presented by Adams (1909), historical record validity could be questioned (McKelvey *et al.* 2008) and may have led previous authors to disregard these accounts had they seen them. We suggest that at least some of these accounts are valid because the American Marten was distributed throughout this portion of North America during this period and the species is easily identifiable. The absence of records for American Marten between 1917 and 1929 may be related in part to the value of its pelt. Seton (1929) reported that an American Marten pelt was worth about US\$200 in the early 1920s. This equates to US\$2,300 in 2006 when using the Consumer Price Index. Johnson (1969) stated that Adolph Murie, who studied Moose on IRNP, interviewed trappers in 1929 who said American Marten was "extinct". In this same year, Oastler (1929) reported the American Marten as present. For a trapper to report directly or indirectly to potential competitors that American Marten inhabited IRNP at this time would not have been fiscally responsible. Trappers working IRNP are likely to have targeted Beaver as well, worth US\$75 per pelt, and for which an extensive illegal trade during this period is well documented (Wolff 1981). Interestingly, during the 1920s and 1930s, there was a similar paucity, and paralleling degree of uncertainty, of information regarding Beaver presence at IRNP (Shelton 1966).

Between 1929 and 1991, numerous scientific investigations occurred on IRNP, none of which directly investigated mustelids. The long-term Wolf/Moose study was the only investigation that occurred during winter; therefore, we will limit our discussion to this study. Based on recent observations (Appendix), personnel during a study at this season would have had the greatest opportunity for an observation. John Vucetich (Michigan Technological University, USA, pers. comm. 2008) estimated an average of 20 (range = 15–30) winter-killed Moose, for which selected remains were collected annually during January and February, for the previous 50 years. Given that American Marten will scavenge (Strickland & Douglas 1987), it is interesting that it went unobserved, if present. Personnel of this study traversed IRNP throughout winter, typically during the day. American Marten activity is low during late winter (Zielinski 2000), and probably coincides in time of day with prey activity (Cumberland *et al.* 2001). At IRNP this would be crepuscular to coincide with Snowshoe Hare and Red Squirrel activity. Activity patterns of study personnel and American Marten probably did not overlap extensively. Additionally, snowfall can readily obscure and hide tracks, decreasing detection. Finally, American Marten tracks are similar to American Mink in size, stride and gait patterns (Elbroch 2003), making identification more difficult. If it be presumed that American Marten did not inhabit IRNP, the preconceived notion all scientists operated under from 1930 to 1990, then an American Marten track may have been

simply taken as that of a Mink. It was not a trained scientist who made the first recent observation of American Marten but rather a law enforcement officer for the National Park Service who had naturalist skills and whose previous work assignment provided exposure to American Marten (Kangas 1991).

#### *Immigration*

Although conditions were not favourable for immigration by American Marten, it probably occurred in the past as evidenced by its historical presence on IRNP. Adams (1909) and Shelton (1966) offered speculation on how different members of IRNP's fauna may have arrived. Adams (1909) suggested rafting as a means of transport for smaller terrestrial species, walking across the ice for the larger species (including American Marten), and swimming for aquatic species. Shelton (1966) also included intentional or unintentional transport by humans.

The shortest distance across Lake Superior between IRNP and an offshore island of Ontario, Canada is 20 km; and the distance from IRNP to the mainland is 35 km. Thermal and energetic requirements of American Marten are likely to preclude survival of a 20 km swim across Lake Superior, suggesting ice as the only plausible mechanism for immigration. However, Buskirk (2002) suggested overhead cover as the primary limiting factor for American Marten, both for the species' geographic distribution and selection of home ranges. American Marten avoids large openings, and home ranges generally contain >60% forest cover (Chapin *et al.* 1998). Drew (1995) demonstrated that individuals seldom travel in forest openings and when they do, it is in a linear manner. These characteristics suggest an immigration event across the intermittent winter ice of Lake Superior to be nearly impossible.

#### *Reintroduction*

We surmise that the 1967 reintroduction attempt was not revisited. A three-year small mammal survey begun in 1966 would have encompassed American Marten had there been another attempt at reintroduction (Allen 1966, Johnson 1969). Both intentional and unintentional introduction of mammalian species have occurred on IRNP, and included the Norway Rat *Rattus norvegicus*, White-tailed Deer *Odocoileus virginianus*, and Red Fox (Shelton 1966; Elizabeth Valencia, Isle Royale National Park, USA, pers. comm. 2008). It is entirely possible that American Marten had been purposely transported to IRNP by a private individual. Numerous examples documenting human-caused introductions of wildlife have been documented (Demarias *et al.* 1998, Fitzgerald & Gibb 2001).

## **Conclusion**

Whether a remnant population persisted or recolonisation occurred remains unresolved after comprehensive examination of historical and recent evidence regarding American Marten at IRNP. Zielinski & Kucera (1995) suggested one of the most sensitive measures of the integrity of natural ecosystems is whether populations of consumers, like American Marten, occur in an area and can be sustained there. As stewards of natural resources, the National Park Service, including IRNP, desire to make informed decisions regarding these resources to ensure population viability and ecological integrity in perpetuity. Our current investigations of American Marten status, distribution, genetic origin, and diet begin to address these concepts.

## Acknowledgements

Much of the historical information would not have been readily attainable without the valued help of Tim Cochrane and Elizabeth Valencia. Previous investigators at IRNP provided excellent resources for review and in some instances prudent discussion. In particular, Rolf Peterson and John Vucetich provided numerous field records, faecal samples and insights regarding American Marten. The logistical, administrative and financial support of IRNP staff was crucial to this effort. Specifically, Larry Kangas, whose initial verification of the current existence of American Marten on IRNP provided the impetus of this work. The support of Jean Battle, Division Chief of Natural Resources Management, is greatly appreciated. Field personnel involved in faeces collection included Cindy Glase, Katy Goodwin, Deb Goodwin, Beth Kolb, Abram Schneck, and Dieter Weise.

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**<sup>1</sup>Isle Royale National Park, 800 East Lakeshore Drive, Houghton, Michigan 49931, USA.**  
**Email: mark\_romanski@nps.gov**

**<sup>2</sup>Department of Wildlife and Fisheries, Mississippi State University, Box 9690, Mississippi State, Mississippi 39762, USA.**  
**Email: jbelant@cfr.msstate.edu**

Appendix. Historical records and recent observations of American Marten at Isle Royale National Park.

Location	Coordinates	Date(s)	Sign or evidence	Observer, reference	Other Notes
<i>HISTORICAL</i>					
Island Mine*	47°55'38"	89°02'19"	1873–1874	unknown	Jefferey, William Thought Martens were present but could not be sure
Desor Trail	47°55'33"	89°05'46"	Winter 1904–1905	trapped	Adams 1909 Chas Preulx trapped 11 Martens along trail
Washington Creek	47°55'40"	89°08'57"	Winter 1904–1905	trapped	Adams 1909 Hollinger trapped one near creek
Ridge N of Beaver Island	47°55'23"	89°10'21"	Winter 1904–1905	trapped	Adams 1909 Hollinger trapped one at this location
Desor Trail*	47°55'33"	89°05'46"	8 December 1912	tracks	Hawver, Blyden Saw two sets of tracks, on trail from Desor to Windigo
Desor Trail, within 3 km of Windigo*	47°54'52"	89°08'01"	31 December 1912	sign	Hawver, Blyden “Saw good sign of Marten but they are all over this end of the route.”
Desor Trail*	47°55'06"	89°02'32"	18 January 1913	observed	Hawver, Blyden Chased Marten from windfall to windfall with revolver
Unknown		1914	observed	Wood 1914	Member of University of Michigan Museum of Zoology Expedition in 1904–1905 (Adams 1909) reported live specimens and/or fresh skins

Location	Coordinates	Date(s)	Sign or evidence	Observer, reference	Other Notes
Island wide trapping effort based out of Siskiwit Lake*	47°59'19" 88°48'19"	Winter 1916–1917	trapping	Foster 1917	W. H. 'Ping' Foster led crew for State Michigan & set traps for Coyote, Canadian Lynx, Red Fox, American Mink and American Marten; took only one Marten
Unknown*		1 October 1929	present	Oastler 1929	On page 8 Oastler listed "Eastern Marten" in a list of animals on Isle Royale
<i>RECENT</i>					
Windigo Area, up Greenstone Trail	47°55'01" 89°08'03"	26 January 1991	tracks	Kangas 1991	Followed fresh tracks for several hundred yards, provided track measurements
Windigo Area	47°54'41" 89°09'09"	January–February 1992	tracks	Peterson 1994	Tracks observed near Windigo
Between Todd Harbor and Little Todd	48°01'31" 88°52'42"	21 September 1993	photographs of live animals	Peterson 1994	Two photographs taken of an individual, by Thomas Rogers, park visitor.
Washington Harbor	47°54'58" 89°10'02"	20 January 1996	tracks	Peterson 1996	Larry Kangas observed a set of tracks nearby
Grace Creek	47°53'05" 89°11'01"	Winter 1997	tracks	Peterson 1997	Graham Neale observed one set of tracks
Windigo Area	47°54'41" 89°09'09"	Winter 1998	tracks	Peterson 1998	Several tracks observed
Point Houghton	47°53'25" 89°55'55"	Winter 1998	tracks	Peterson 1998	Larry Kangas observed tracks
Windigo Area	47°54'41" 89°09'09"	Winter 1999	tracks	Peterson 1999	Tracks observed
Windigo Area middle of Sec. 20, R38W, T	47°55'36" 89°09'41"	Winter 2001	observation	Kangas 2001	Spotted one marten in the snow at 15–20 m.
Windigo Area, Sec. 28 SW	47°54'38" 88°09'47"	Winter 2002	tracks	Peterson & Vucetich 2002	
Feldtmann Ridge	47°51'12" 89°08'14"	14 October 2003	faeces	Peterson & Vucetich 2005	More than one faeces sample came back from DNA analyses as positive for <i>M. americana</i>
Grace Creek Drainage, Sec. 06 SW 1/4, NE 1/4	47°53'05" 89°11'01"	Winter 2004	tracks	Kangas 2004	
Windigo Area, Sec. 28 SW	47°54'51" 89°10'16"	Winter 2004	tracks	Kangas 2004	
NW of Beaver Island, SE corner of Sec. 30	47°54'51" 89°10'16"	Winter 2004	tracks	Kangas 2004	
North of Windigo, Across Washington Harbor, Sec. 29, NW 1/4, NE1/4	47°55'20" 89°09'38"	Winter 2004	tracks, faeces	Kangas 2004	Possible den site, numerous fresh and old tracks at base of stump, fresh faeces collected when site revisited a day later
Windigo Area, Feldtmann Ridge, West Huginnin Cove Trail		February 2001–May 2004	faeces	R. O. Peterson pers. comm. 2004	12 faeces collected are screened for American Marten, 10 are positive
Lower Grace Creek Drainage, Sec. 6	47°53'03" 89°11'19"	May 2004	observation	Peterson & Vucetich 2005	Reliable observations of American Marten were recorded in 2004–2005
Greenstone Trail, Sec. 24	47°55'46" 89°04'10"	Winter 2005	observation	Peterson & Vucetich 2005	
West of Windigo, on the northern shoreline of Washington Harbor	47°53'42" 89°12'50"	June 2005	observation	E. Grivicich 2005 pers. comm.	Erin Grivicich observed an individual along the shoreline of the harbour from his boat
Greenstone Trail, Between Windigo and Island Mine	47°55'15" 89°07'12" 47°55'33" 89°05'16" 47°55'42" 89°04'15" 47°55'15" 89°07'12" 47°54'52" 89°08'55" 47°54'08" 89°09'59"	2–6 February 2006	tracks	Romanski & Belant unpublished data	Six different reports of fresh tracks over this 8 km section of trail
1.6 km E of Island Mine Junction on Greenstone Ridge Trail	47°56'45" 89°01'44"	27 June 2006	carcass	Romanski & Belant unpublished data	Female apparently killed by Gray Wolf is recovered

\*Historical records or information not previously reported.