



The Voyageur Messenger

What is the Future of Moose in Voyageurs National Park?

Moose are a charismatic species emblematic of the boreal forest. Moose, which are near the southern limit of their North American range in Minnesota, can become heat-stressed when summer or winter temperatures become too warm. Mean annual temperatures in northern Minnesota are predicted to increase from 5 to 16° F over the next 100 years from global climate change. Moose populations in the state already appear to be declining and the future of moose in Voyageurs National Park, and elsewhere in Minnesota, remains in doubt.

Voyageurs National Park scientists, in collaboration with professionals from other agencies, are striving to understand more about the ecology and behavior of moose in a changing climate. Currently there are 16 adult moose, 6 bulls and 10 cows, wearing Global Positioning System (GPS) collars in the park and surrounding area. The collars record precise locations of the moose every 20 minutes for two years. These collars allow park officials to monitor fine-scale movements of moose allowing for a better understanding of what habitats moose prefer under various weather conditions such as on hot, humid days in mid-summer or clear, sunny days in late winter. Officials are also measuring the temperature of the park's landscape to understand how thermal conditions change for moose in different habitat types over the course of a day, week, month or year. Information from these projects will be used to evaluate if Voyageurs currently has enough of the necessary habitats to sustain its existing moose population. Scientists will also predict what habitats will be available in 50-100 years under various climate change scenarios and determine what



An adult female moose outfitted with a GPS telemetry collar in Voyageurs National Park.

that will mean for future moose. Park officials can then make management decisions that can influence moose habitat in both the short and long term. These decisions include: how and where to allow wildfires or prescribed burns to alter habitat conditions or converting existing habitat into other habitat types that might be more resistant to climate change while also being more valuable to moose.

Beavers are a dominant force on the landscape of Voyageurs National Park, as their activities can create new wetlands by flooding forests and other habitats. Moose use beaver ponds for feeding but they may also use them to cool off when warm. But not all beaver ponds are created equal – some are shallow and full of tasty aquatic plants and others are

relatively deep, up to 10 feet, and contain few plants. A new project aims to measure the diversity and abundance of aquatic forage as well as water temperature in different types of beaver ponds. In combination with the GPS locations from collared moose, officials will then evaluate how moose use beaver ponds during the ice-free period (April-November). Scientists will also try to understand why moose use some beaver ponds and not others. It may turn out that maintaining beavers on the landscape will be critical to long-term survival of the moose.

Cool Blue Skies

Voyageurs National Park's Aviation Program has been around for well over twenty years and flying over the "land of sky blue waters" has been the responsibility and joy of many pilots and crewmembers.

This unique aerial resource covers the tri-state area of Michigan, Minnesota, and Wisconsin. It services five national park units: Isle Royale, Apostle Islands, St. Croix, Mississippi River, and Voyageurs National Park. The aviation program also assists neighboring agencies such as the Minnesota Department of Natural Resources, the Koochiching County Sheriff's Office, the United States Border Patrol, the United States Forest Service, and the United States Fish and Wildlife Service.

The park's aircraft is a single engine, two-seat, Aviat Husky A1B. It is configured on floats in the summer and wheel skis in the winter. The aircrew is comprised of a pilot and backseat crewmember – usually a park biologist. The aircraft is relatively small but a highly maneuverable and exceedingly effective flying machine. It serves all work groups and employees with a primary emphasis on visitor and resource protection missions including: search and rescue, wildland fire, interpretation, wildlife monitoring, and law enforcement. With the majority of the flight time being dedicated to natural resource projects where a park biologist is collecting visual or telemetry data on a given animal species including moose, wolf, deer, beaver, and the bald eagle. Much of the remaining flight time is routine patrol providing air support for the protection rangers, patrolling on boat, or snowmobile.

The park's aviation program is a busy four season operation with priorities on safety, service, and teamwork.



Voyageurs National Park's Aircraft and Pilot - Steve Mazur.

Mukooda Lake Genetic Research

Mukooda Lake is one of three lakes within Voyageurs National Park that contain lake trout. Lake trout typically inhabit the deep, cold, clear lakes of the Canadian Shield. With a surface area of 754 acres and maximum depth of 78 feet, Mukooda Lake has the physical and chemical characteristics needed to support lake trout. Mukooda has an unusually diverse fish community which also includes walleye, northern pike, smallmouth bass, largemouth bass, and black crappie. Most of these fish were present in the initial fisheries assessment that was done in 1969. However black crappie, bluegill, green sunfish, black bullhead and burbot have all found their way into Mukooda Lake in recent years and could now be competing with the native lake trout.

The Minnesota Department of Natural Resources (DNR) has a history of stocking lake trout in Mukooda Lake that dates back to 1942. Since 1988, all lake trout that were stocked had a fin clipped so they could be later identified in fish population assessments. The presence of stocked (clipped) fish in subsequent investigations ranged from zero to as high as 50 percent. A winter creel survey of anglers completed in 2002 revealed relatively few stocked fish among the angler's catch; only four of the 57 fish examined by the creel clerk had clipped fins. This seemingly low contribution of stocked fish to the anglers catch caused DNR fisheries managers to question the value of their stocking efforts on Mukooda Lake. Questions also arose about the continued presence of unclipped fish. Could these fish be remnants of the original lake trout population that were present before the stocking program began?

Fisheries Managers turned to Dr. Loren Miller, a DNR Research Scientist who maintains a genetics lab at the University of Minnesota to help answer these questions. Fortunately, a good collection of scale samples had been preserved from earlier investigations and Miller was able to obtain genetic material from these structures. VNP Park Rangers and DNR fisheries staff collected additional samples for Miller to examine. Using DNA fingerprinting methods like those seen on crime



Lake Trout, Cruiser Lake, NPS

shows, Miller was able to determine the genetic background of each individual fish that was sampled. The results were surprising. In spite of decades of stocking lake trout in Mukooda Lake, the unclipped fish had a genetic makeup that was very different from any of the stocked fish. In other words, the fish that were raised in a fish hatchery have had poor reproduction and there has been little if any mixing between them and the fish that were present when stocking began. With this new information in hand, the Minnesota DNR suspended lake trout stocking in Mukooda Lake in 2010.

When you consider all the stressors the lake trout of Mukooda Lake encountered, including competition from stocked fish, new species introductions, and climate warming, it is remarkable they have persisted all these years. Minnesota may be the land of 10,000 lakes, but only about one hundred of these lakes have populations of lake trout. Many of these lakes face the same kind of threats from invasive species and loss of habitat due to climate warming. Research on the unique lake trout of Mukooda Lake is ongoing and may provide clues as to how other populations may be able to survive under similar conditions. DNR Fisheries Managers, Voyageurs National Park Biologists and Research Scientists will continue working together to monitor the population and develop appropriate management strategies. One thing seems clear; this unique genetic strain of lake trout in Mukooda Lake is a valuable resource that deserves protection.

Voyageurs Kabetogama Important Bird Area

Important Bird Areas (IBAs) provide essential habitat for one or more breeding, wintering, and migrating bird species. The IBA program is designed to be proactive, voluntary, participatory, and science-based and works to identify, monitor, and conserve the most essential habitats for birds.

Increasing land use pressures threaten to diminish both the quantity and quality of critical bird habitat throughout the state. Minnesotans have long expressed a widespread interest in the birds of our state, yet despite this interest, there has never been an effort to systematically identify and protect the habitats most crucial to the long-term survival of Minnesota's native bird populations.

IBAs serve as a catalyst for involving Audubon members and for informing the public about those areas most critical for the long-term survival of birds. These areas are an important tool for prioritizing land use options for national, state, and local land managers. Improved decision making regarding land use options will help ensure the long-term health of both common and uncommon bird species.

IBAs are international in scope. Birdlife International conceived and initiated the IBA program in Europe in 1981. Since then,



Yellow Warbler, USFWS.

more than 7,500 sites, in 170 countries, have been identified as IBAs. In 1995 the National Audubon Society became the officially designated U.S. partner of Birdlife International for the purpose of implementing the IBA Program. Currently, efforts are underway in 46 states to identify IBAs, resulting in the official identification of more than 1,800 U.S. sites to date.

Audubon Minnesota, in partnership with the Minnesota Department of Natural Resources Nongame Program, began implementing the IBA program in Minnesota in February 2003. An IBA Technical Committee was formed, comprised of numerous bird experts and

conservationists from Audubon, other birding groups, and federal and state agencies. The Technical Committee has established State-specific criteria and a nomination form for the Minnesota IBA program and evaluates sites for IBA identification. In Minnesota, 54 sites have been identified and Voyageur country is one of the IBA's.

The Voyageurs Kabetogama IBA was initiated by Voyageurs National Park Association and supported by Voyageurs National Park. It is comprised of state, federal and public lands, including one National Park, state forest lands, two state Scientific Natural Areas, and one state Wildlife Management Area. Major vegetation types present within this IBA include fire-dependent mixed pine and boreal forests, mesic hardwoods, floodplain forest, and rich peatland forests. Other major vegetation types include open acid peatlands, marshes, and wet meadow environments. These systems combined with rock outcrop, lakeshore and rivershore systems provide environments that attract a rich diversity of bird life where more than 240 Neo-tropical birds live in and migrate through the park.

To find out more about IBA's go to: <http://mn.audubon.org/important-bird-areas-3>.



National Park Service
U.S. Department of the Interior

Going Green in the North Woods

Sustainability is an ever present word in the National Park Service (NPS). Parks across the nation are going green in a whole new way: with renewable energy systems, high efficiency lighting, water conservation efforts, and recycling programs. The Green Parks Plan (2012) calls for the NPS to "reduce our impact on the environment, mitigate the effects of climate change, and integrate sustainable practices into every aspect of our operations."

Voyageurs National Park is no different. The park is working towards being more energy efficient. The new headquarters building in International Falls just received "LEED Silver" certification from the United States Green Building Council. This status reflects the reduction of operating costs by roughly 24 percent for electricity and heat and water consumption over the life of the building. The building was designed to conserve energy with high-efficiency heat pumps, spray-on foam insulation, and lighting sensors that adjust exterior and interior lights according to daylight and staff activity levels. Paint on the exterior siding uses reflective pigments that improve energy efficiency. Eco-friendly materials are used throughout; including sustainably harvested wood, locally-sourced stonework, recycled flooring and baseboards, and recycled steel. Indoor air quality was also an important consideration, prompting the use of low-emission paints, flooring materials, ceiling tiles, and other products. In essence a LEED building uses less energy resulting in reduced greenhouse gases. The building is owned by the City of International Falls who leases the building to the Federal government for the Voyageurs National Park Headquarters.

Park officials have put a number of other green practices in place throughout the park. The park is switching to fuel-efficient engines in many of the boats they use for visitor tours, lake patrols, and campsite maintenance. Park maintenance personnel use electric cars to help limit greenhouse gas emissions. The park has also initiated a recycling program at boat ramps to reduce solid waste from visitors.