Mysterious, tucked away from reality, striving for existence among our targeting world, lies the white moose. The white moose is neither albino, nor a separate species or subspecies, they have brown eyes and brown dots on their fur. These rare moose resulted from mating between both a bull and cow carrying an altered recessive gene (Macintosh, 2002). Random genetic mutations may only occur once in a million years. Therefore, the intrigue with the white moose arises because the possibilities that one random genetic alteration could occur in two animals in minuscule. With only a few left in existence, and endemic to only a few small areas of the world, this declining type of moose is in great risk of anthropogenic extinction. Without protection these animals are at great risk of hunting and affects of habitat fragmentation. So why isn't the white moose protected? Is the overall goal of conservation biologists not to "retain all the actors in the evolutionary play and the ecological stage in which they perform" (Soule, 1985)? Even without the knowledge of intrinsic value to humans, through medicinal or economical purposes, this animal has the right to survival. While the Canadian Wildlife Associations stand idle, this spectacular creature is slowly slipping into extinction. Without protection this mystic animal will never be seen or appreciated by generations to come. My hope of this essay is that many people will join in the crusade to preserve these dwindling creatures because only at this instant in time do we have the right to decide the fate of these precious animals.

One of the unique characteristics of conservation biology is that it is a crisis discipline. Therefore, many of the problems that conservation biologists address are urgent, and require immediate action, even without complete knowledge (Caroll and Meffe, 1997). The white moose, to my knowledge, is currently an unstudied species. However, waiting to collect the necessary data could mean extinction of these last few animals. Biologists must begin working with the best intuition and creativity to preserve the white moose. The white moose demonstrates that it meets most of the criteria of an endangered animal. The only problem left is to gain acknowledgment from the world and begin the restoration process.

The white moose meets the standards of an endangered species proposed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Using COSEWIC's assessment process and criteria information, the first aspect to examine is that the white moose has taxonomic validity. COSEWIC would normally only consider species and subspecies or varieties that have been established as valid in published taxonomic works or from taxonomic specialists. However, COSEWIC would protect a distinct population if it has national significance. National significance can be determined by the Guidelines for Recognizing Designatable Units Below the Species Level (COSEWIC, 2002). The units to which status may be assigned below the species level are recognized, in the following order of precedence, 1.) Established taxonomy, 2.) genetic evidence, 3.) Range disjunction, and 4.) Biogeographic distinction. The white moose would fit into the second category, genetic evidence. The criteria necessary to meet the categories requirements are "evidence of genetic distinctiveness including, but not limited to, appropriate inherited traits and/or genetic markers" (COSEWIC, 2002). The white moose fur is a result of a recessive mutant gene in both the bull and cow. The rarely expressed gene alters the phenotype of the resulting calf making the offspring appear white. Therefore, the white moose meets COSEWIC's first criteria of an endangered animal.

Secondly, COSEWIC only considers native species. "A native species is an indigenous species that occurs in Canada naturally" (COSEWIC, 2002). The species must have "produced viable populations, and persisted in Canada for at least 50 years" (COSEWIC, 2002). The white moose is definitely an indigenous species to Canada. Originally it was only found along highway

101 between Chapleau, Foleyet, and Timmins, Ontario and in a small area of Southern Alberta. Two other sightings have since been announced in LaReine, Quebec and Newfoundland. White moose sightings have never been reported outside of Canada. The earliest reported shooting was more than 20 years ago near Cochrane, Ontario. In addition, Dumoulins Tackle Store in Timmins Ontario has a photograph of a white bull moose that was estimated to be taken in 1969. Therefore, the likelihood that these animals have been around for close to 50 years is great. However, more scientific research would be necessary.

Furthermore, the COSEWIC assessment criterion states that the animal requires habitat in Canada. COSEWIC considers species that are year round residents in Canada or require habitat in Canada for a key life history stage (COSEWIC, 2002). The white moose also meets this requirement. It spends its entire life in the Canadian forests.

There are also many special cases that allow an animal to be considered eligible for conservation. One reason is a high risk of extinction (COSEWIC, 2002). The low population size of white moose gives the moose a higher rate of extinction because it may not be able to survive even a slight natural or anthropogenic disturbance. The white moose is also vulnerable to extinction because of their high trophic levels. They are large and rare with slow population growth rates. The white moose is also an endemic species. Their restricted ranges are often threatened by habitat loss and degradation.

A combination of both in-situ (within habitat) conservation and ex-situ (unnatural environments) would be necessary to preserve the white moose. In-situ conservation involves the management of ecological processes and human activities where and when they occur (Carroll and Meffe, 1997). In order to successfully preserve the white moose in its environment three major issues that are detrimental to the moose survival must be controlled: hunting, habitat

fragmentation, and predators. Hunters have already been reported to have taken the lives of three white moose. One was shot near Cochrane Ontario, a bull moose was shot in Timmins by a local trophy hunter, and the last one was killed in between LaReine, Quebec and Smooth Rock Falls, Ontario. Furthermore, habitat fragmentation is a major issue leading to the extinction of not only moose, but many species. The logging companies are clearing trees at a miraculous rate. Forestry does not necessarily always have negative impacts on the environment. Selective cutting would allow for rapid succession and regrowth, and in turn, increase food supplies. However, clear cutting the forests is reducing the available quantity of food. "During the fall, winter, and spring, moose feed on the previous summer's growth of aspen, black poplar, willow, birch, hazel, dogwood, and balsam fir. In summer, moose prefer vegetation that grows in water" (Crichton, 2004). Additionally, habitat fragmentation results in greater exposure to predator species. "Despite their size and ability moose fall prey to wolves and bears. Some studies have shown the bears can kill up to 75 percent of newborns in their first eight weeks of life" (Crichton, 2004). The number of calves falling prey to the great bear population could be controlled by re-initiating the spring bear hunt. Human economic activities are also resulting in the death of many of the white moose. The railroad track has been designed to run through the heart of moose territory. Near the 101 highway alone, at least two white moose have been killed in train accidents. Furthermore, "in late spring, and early summer, moose lick natural salt deposits, found in salt springs or roadside runoff to replenish their mineral reserves used up over the winter" (Crichton, 2004). Although there have been no reported vehicle accidents, chances of death are amplified because the salt is attracting the moose to the highways.

It is not feasible to completely stop logging, eliminate all predator species, and abandon the railway and roadway access. However, even slight protection of their habitats would increase survival rates. One possibility for in-situ conservation would be to adapt the United States incentive-based approaches to conservation. Recently, the conservation organization Defenders of Wildlife offered a \$5000 reward to any private landowner in the northern Rockies on whose land wolves successfully reproduced. This offer lead to private landowners striving to make their property an optimal environment for the endangered wolf (Caroll and Meffe, 1997). The simple idea underlying incentive-based approaches is that, given a choice, most people will do what is in their economic self interest. If a conservation program can be designed that allows people to further their self interest by helping the environment, they will do so. This idea might bring logging private land, habitat destruction, and hunting on private property to a rapid halt.

Furthermore, another strategy that could be used to preserve the white moose is ex-situ conservation. This process involves "maintaining individuals in unnatural environments under close supervision" (Caroll and Meffe, 1997). This conservation strategy has been used for species such as the giant panda, and rhinoceros because their populations in natural habitats are so small that extinction risk is very high. It may be advantageous to capture the remaining white moose and breed them in captivity to increase the population size. If the population size reached a sustainable level, they could then be reintroduced into the wild. Furthermore, the captive populations could be studied and conservation efforts could be directed appropriately. If the white moose where in captivity it would enhance public awareness and hopefully gain increased financial support.

The Earlton Zoo is the only zoo north of Toronto. This zoo has undergone a recent transformation. The exotics such as tigers, lions and zebras have found new homes in other Canadian zoos. The focus is now on the fascinating wildlife of Canada's North (James Bay Frontier Travel Association, 2003). This zoo could provide a magnificent new habitat for the

white moose. With the Earlton Zoo already being designed to accommodate large carnivores and herbivores, minimal funding would be needed to provide a habitat for the white moose. This new addition to the zoo would allow for conservation biologists to study the species and optimally increase the population size. The increase in funds from tourism would be able to pay for many of the additional costs.

The ongoing rally to protect the white moose has begun in a few small northern communities: Foleyet, Chapleau, and Timmins. With the support of the Ministry of Natural Resources the white moose would help the struggle to promote ecotourism. These northern communities have a resource at their fingertips that could help the depressed economic environment while promoting ecotourism. In Chapleau, there is a 2,000,000 acre crown game preserve, which is the largest game preserve in the world (Bob Riviere, 2004). If the ministry would aid in the protection of the white moose, these animals could be bred in captivity and greatly increase tourism. The government is distributing great funds into this game preserve, and the simple addition of the white moose could result in a drastic increase in support. Jane Armstrong, a Foleyet resident, battled with the Ministry's District Managers to have a white calf put in the protection of Cedar Meadows after its mother was killed in a train accident last fall. However, no action was taken to protect this abandoned animal. Jane Armstrong now believes that the white moose population may have dwindled to two sole survivors.

With the numerous conservation strategies that would reverse the white moose decline, it is amazing that action has not yet been taken. Around the world, many similar distinct animal classes are considered endangered. For example, the white Bengal tiger has the similar genetic distinctions that define the white moose. White tigers are not a different species of tiger. They are just white colored Bengal tigers. Like the white moose, they are not albinos, they have blue eyes, pink noses, and black stripes on their fur. However, one difference is the United States is spending millions of dollars to raise the last individuals by ex-situ conservation. With only 30-90 white tigers in the United States, drastic measures are being taken to increase the population size and insure high genetic diversity (White Tigers Organization, 2001). Not only the United states, but many other countries have recognized the white tiger as an endangered animal. India has a 426-hectare park, Nanadankanan Zoological Park, dedicated to preserving the remaining white tigers (White Tiger Organization, 2001). With all of these other countries fighting to preserve this genetically distinct lineage of animals, why are Canadian wildlife associations standing idle while the white moose slips into extinction?

Thirteen states have also passed a law making it illegal to kill albino game animals (The Hunters Network, 2004). The Montana Fish, Wildlife and Parks Commission has issued a regulation prohibiting the shooting of any deer with more than 75 percent white colorations in Golden Valley Country. The broad law would allow for not only the protection of albinos, but also the recessive mutant animals that would arise like the white moose. In addition, the Idaho Fish and Game were informed in September 2003 of a white albino moose. Steve Huffaker, head of Idaho Fish and Game, immediately signed a closure order to immediately protect the moose. The order termed the white moose as a "unique and rare animal, worthy of protection to allow study and public viewing" (The Hunters Network, 2004). These few examples demonstrate the immediate action that is being taken around the world to preserve genetically distinct animals. It is Canadians' responsibility to join in the same crusade to protect our endangered white moose from extinction.

With the aid of the Ministry of Natural Resources and every additional signature on the Save The White Moose Petition, many northern communities begin to bind together to fight for the preservation of one of the most magnificent creatures of our Canadian forest. As we walk into the future, our ultimate goal should be to preserve the natural beauty and species diversity for generations to come. As a resident of Foleyet, Ontario, the self proclaimed white moose capital of the world, I am hoping that this extra bit of public awareness will be enough to touch the hearts of many northern residents. Currently there are thousands of signatures on the Save the White Moose Petition. However, with the amount of effort that would be needed to save these wonderful animals, many more are still needed. So my plea to you is to you pledge your support however you can. Take a stand and join the crusade to save these exceptional, mystic creatures.



The Rare, The Wondrous, The White Moose



Quote given by hunters to the disappointed owner of the tourist operation, Air Ivanhoe Limited.



"What's wrong with killing it? Looks to me like there's nothing wrong with the meat."

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