

Potential Beaver Recolonization at Indiana Dunes Being Evaluated by Means of GIS Analysis

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The beaver (*Castor canadensis*) originally inhabited much of the North American continent and was a valued resource for many settlers and native Americans. Northwest Indiana supported large beaver populations throughout the 1800s as noted by Kubik (1993). Beavers were extirpated thereafter, following loss of habitat due to wetland drainage operations and exploitation by settlers, native Americans, trappers, and hunter.

By the early 1900s, beavers existed only in the most remote and isolated areas of North America, and the original presettlement population of 60 million had been reduced to an estimated 100,000 animals. The beaver, that had become a symbol of a wilderness species, had been wiped out in areas inhabited by people.

Since the 1900s, Indiana and many other states have restored the beaver to much of its original range where suitable habitat still exists (USFWS 1987). Beaver restoration efforts in the U.S. began in the early 1900s, with releases of live trapped animals in New York, California, and Missouri. More live-trapped beavers were released in West Virginia, Michigan, and Wisconsin in the early 1940s.

Federal aid in the form of Wildlife Restoration Funds was made available through the Pittman-Robertson (P-R) Act. The P-R Act taxed the purchase of hunting equipment and provided the initial source of funding for beaver restoration throughout the U.S. P-R monies have provided over \$2 billion toward wildlife restoration and recreational wildlife use. With the influx of P-R funding, live-trapped beavers continued to be released in unoccupied U.S. habitats, specifically Arkansas, Maine, Idaho, Wisconsin, Mississippi, Washington, Iowa, Pennsylvania, Massachusetts, Wyoming, Alabama, Louisiana, Colorado, and Indiana.

Beaver populations have made dramatic recoveries by the mid-1950s, and by the 1970s populations were estimated at 15 million nationwide. Beavers now are present throughout the U.S. and their numbers and range continue to grow. Suitable habitat that includes preferred food and water resources appears to be the key limiting factor to beaver recolonization.

Beaver population growth and dispersal is influenced by land use, hydrology, food availability, and predation. Potential beaver recolonization within Indiana Dunes National



Lakeshore (NL) will focus on areas that provide adequate food resources, cover, and surface water. For example, beavers recently have been observed along the Little Calumet River in the NL and have been known to travel into other areas of the NL as well. This article focuses on the probable effects of potential beaver recolonization in the East Unit of Indiana Dunes NL, using Geographic Information Systems (GIS) with emphasis on beaver habitat suitability and potential carrying capacity.

The GIS analysis used the 68 previously classified plant communities of the NL's East Unit and reclassified them into the food habitat category types, based on known beaver food preferences (Martin et al. 1961) that included: Poplar-Aspen-Willow; Birch-Maple; Emergent Vegetation-Forested Fen-Wetland; Crops-Fields-Orchards-Grassland-Revegetation Communities; Dogwood-Cedar-Tamarack; Mesic Forest-Mesic Successional-Floodplain Scrub; Upland Forest-Upland Scrub-Sumac-Vines, and other habitat types (e.g. open water).

The vegetation community reclassification and the total area for each of the beaver food habitat types were generated for the East Unit using *r.reclass* and *r.report* (GRASS 4.0, 1991), respectively. National Lakeshore surface water and beaver food habitat categories also were analyzed to determine the amount of preferred beaver food habitat within 100 meters of surface water within the NL using *r.mask* and *r.buffer* (GRASS 4.0, 1991).

The GIS analysis investigated land use, surface water, and food availability to determine optimum beaver density and habitat for the NL. Potential beaver density, or carrying capacity, is expressed as number of colonies per km². Beaver colonies usually are made up of 8 to 10 individuals. Beaver density values reported in the literature range from 0.38 to 0.76 colonies per km² by Voight et al. (1976) working in Algonquin Park, Ontario, and by Aleksuk (1968) working in the Mackenzie Delta, Northwest Territory.

Total beaver food habitat potential for the NL's East Unit is estimated at 42 km² (Table 2). This amount of preferred food is capable of supporting more than 40 beaver colonies. If 100 meter wide buffer strips adjacent to NL surface water are considered exclusively in the analysis, total preferred habitat is approximately 14 km². Buffer strips this size probably correspond to primary beaver movement perpendicular to watershed.

This amount of habitat should support more than 20 active beaver colonies assuming this area represents the East Unit beaver carrying capacity. However, since trapping is not permitted and the coyote is the only known significant predator to inhabit the NL, a much lower number of active beaver colonies probably would be a more realistic threshold level for optimum beaver density at Indiana Dunes NL. This conclusion reflects the knowledge that beaver has been known to be a nuisance species in many areas of the U.S.

Recolonizing beaver in the NL's East Unit would provide many positive ecological benefits: Soil erosion control, ground water recharge, restoration of the Great Marsh to original presettlement hydrology, and creation of high grade waterfowl, furbearer, and aquatic species habitat.

Beaver populations also could expand to areas outside the park through emigration, thereby providing trapping opportunities to residents on private lands in northwestern Indiana. Resource Management staff will monitor beaver populations at the national lakeshore to determine if threshold levels are being exceeded, and will apply appropriate management actions as necessary.

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