

Isle Royale National Park 2020 Season Final Report

From May to August 2020, I performed maintenance and standardized a trail camera array of 156 throughout Isle Royale National Park, established in 2019 (Figure 1). Each camera used was a Stealth Cam DS4K (Stealth Cam, Irving, Texas). All cameras take still photos with a trigger speed ≤ 0.5 seconds/trigger and 5 photos per camera trigger, at a rate of 1 frame per second. There is no delay period between triggers, and cameras would continue to trigger if an animal was still within the camera's scope of view. Cameras are positioned ~ 1.5 m above the ground and positioned angled to detect animals at a minimal distance of 4 m and a maximum distance of 14 m from the tree. Cameras are placed on and >50 m off the visitor hiking network to collect animal use on and off trails. Additionally, some cameras are located <300 meters near major trail intersections (Figure 1). Cameras are spaced >500 m, with the majority being >1 km, from the nearest camera (Figure 1).

During the survey period, I retrieved $\sim 850,000$ images from the cameras running since September 2019. The cameras detected 11 out of the 12 terrestrial mammals on the island. These included: gray wolf (*Canis lupus*; Figure 2A), moose (*Alces alces*; Figure 2B), American marten (*Martes americana*; Figure 2C), river otter (*Lontra canadensis*; Figure 2D), American beaver (*Castor canadensis*; Figure 2E), red fox (*Vulpes vulpes*; Figure 2F), ermine (*Mustela erminea*; Figure 2G), deer mouse (*Peromyscus maniculatus*; Figure 2H), muskrat (*Ondatra zibethicus*; Figure 2I), snowshoe hare (*Lepus americanus*; Figure 2J), and American red squirrel (*Tamiasciurus hudsonicus*; Figure 2K). The cameras obtained numerous detections of the wolves. I will match the photographs with the wolves' available location data to determine individuals, pack establishment, social structure, and information on wolf reproduction from these images. Using this camera array, I retrieved additional evidence of multiple wolf pups born

in 2019 and 2020 (Figure 3). The camera array that I set up from May to August is currently functional and will continue to take animal detected photographs until next summer, when the next camera maintenance period is conducted.

Figures:



Figure 1: Map of Isle Royale National Park's camera array. Cameras are placed on and off the trail network. The placement of the cameras is $>500\text{m}$ apart from one another. Each camera runs year-round.



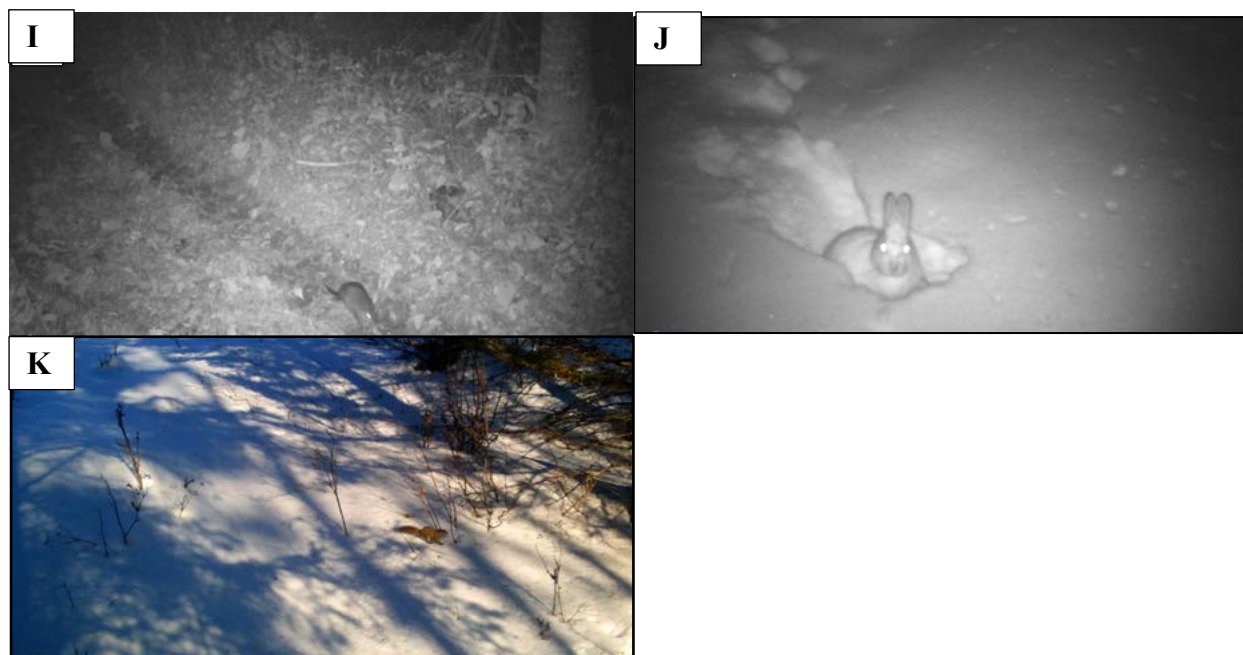


Figure 2: Photo detections of each mammal species found on Isle Royale National Park from September 2019 to August 2020. Gray wolf (*Canis lupus*; A), moose (*Alces alces*; B), American marten (*Martes americana*; C), river otter (*Lontra canadensis*; D), American beaver (*Castor canadensis*; E), red fox (*Vulpes vulpes*; F), ermine (*Mustela erminea*; G), deer mouse (*Peromyscus maniculatus*; H), muskrat (*Ondatra zibethicus*; I), snowshoe hare (*Lepus americanus*; J), and American red squirrel (*Tamiasciurus hudsonicus*; K).

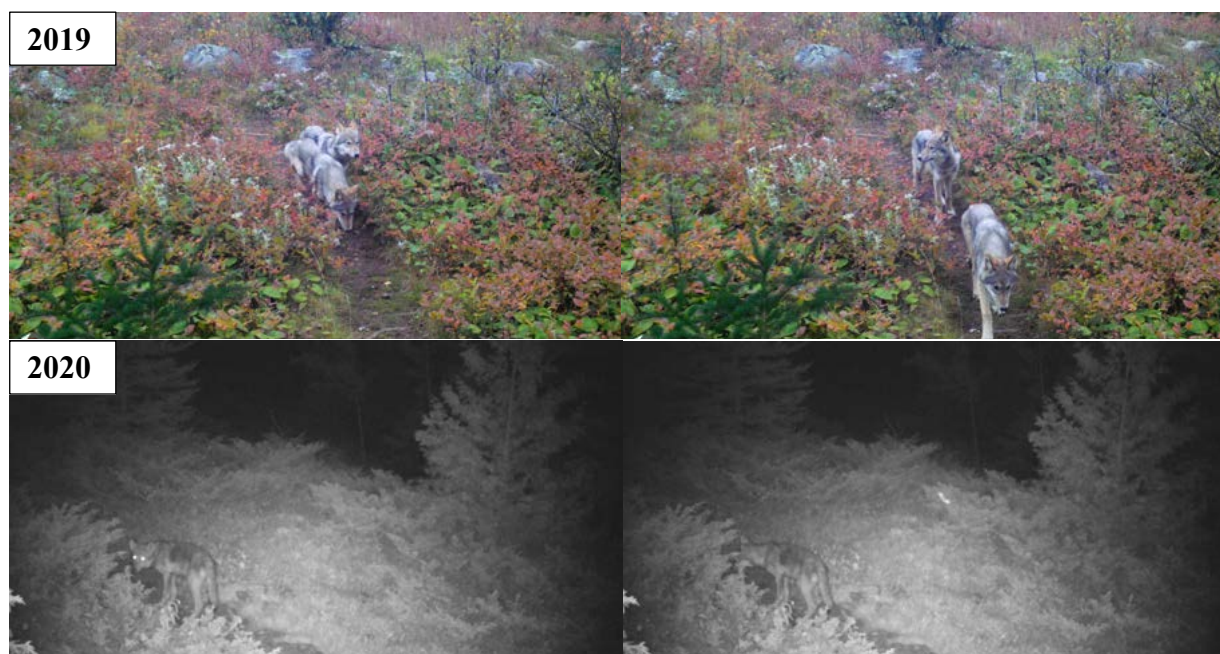


Figure 3: Photograph detections of young wolves in 2019 and 2020.