Executive Summary:

Habitat Quality for Grizzly Bears (*Ursus arctos*) in Grand Teton and Yellowstone National Parks and the Efficacy of Yellowstone's Bear Management Areas

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The Greater Yellowstone Ecosystem (GYE) holds the most southern extent of a once continental grizzly bear population. The persistence and growth of the GYE grizzly population from 150 individuals in the 1980s to over 750 today is in no small part due to the foresight and action taken by Yellowstone National Park (YNP). In the early 1980s, YNP instituted Bear Management Areas (BMAs) that seasonally restrict human access to sections of the park thought to be important to grizzly bears. Biologists selected these areas based on limited data from grizzly bear observations and hoped these areas would allow bears to forage without human disturbance while simultaneously reducing human-bear conflict.

Over the last 45 years, many changes have occurred in the GYE. To date, the cutthroat trout population has plummeted, wolves were reintroduced, cougar and bison populations increased while elk declined, visitation doubled to over four million visitors per year in YNP, and climate change has altered the distribution, abundance and timing of seasonally important bear foods. Just one of these changes could warrant revisiting whether BMAs still encompass important areas for grizzlies. However, we can now capitalize on 20 years of GPS collar locations and remote sensing data to improve inferences. This wealth of data allows us to ask ecologically interesting questions about how bears navigate an altered ecosystem while also exploring whether the BMAs overlap with areas currently important to grizzlies. YNP lies at the heart of the grizzly bear distribution in the GYE and assessing the efficacy of BMAs will help ensure the longevity of the population.

This project aims to assess whether current BMAs in YNP encompass areas important to grizzly bears, to identify fine scale resources important to bears through field searches, and to use aerial surveys to determine whether areas with high densities of bears overlap with current BMAs. This information will inform current bear management in YNP and Grand Teton National Park (GTNP) as to whether BMAs reduce human-bear conflict while encompassing areas important to grizzlies and whether areas in GTNP could be considered for BMAs.

Objective I – *Assess habitat quality for grizzly bears*:

We use GPS locations from grizzly bear collars paired with remote sensing data to determine whether BMAs in YNP encompass areas with characteristics of where grizzly bears spend time. This objective draws on data collected over the last twenty years to model grizzly bear resource selection. This objective is ongoing.

Objective II – *Identify resources important to grizzly bears in different vegetation communities*:

Throughout the summer of 2020, we visited GPS locations of currently collared grizzly bears. Due to COVID-19 and other funding issues, we did not conduct a full field season during 2020 and restricted our study area to YNP. We work in close partnership with the National Park Service and the Interagency Grizzly Bear Study Team. Given that a full-time field crew was not hired, YNP Bear Management personnel and volunteers assisted with field searches and shared invaluable experience from past studies.

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Researchers investigate the species of plant a bear dug at this pond.

From June through October, we surveyed over 1,100 GPS locations from nine bears (3 females, 6 males). At each GPS location, we systematically searched for bear sign including daybeds, scat, tracks, signs of foraging and cached carcasses. At each site with sign of foraging, we recorded plant species present and

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A moose mandible found at a group of GPS locations.

measured feeding activity, such as root digs and cache excavation. In total, we surveyed about 41 days of bear activity. We also collected over 80 bear scats, which will be analyzed in the laboratory during winter 2021 to determine specific foods eaten. This information will be used to inform models from objectives I and III as to what bears are doing in different areas.

Objective III – *Determine areas with high densities of bears*: To determine whether high densities of grizzlies occur in BMAs, we are using Bear Observation Flight data and remote sensing data to determine observation rates of bears in different areas of YNP and GTNP. We can better determine the density of grizzly bears by using known locations of collared bears present during aerial surveys to determine how different environment types (e.g., forests vs. grasslands) change observation rate. This objective is ongoing.

This project is ongoing and is projected to be complete in December of 2021 for the culmination of Elise Loggers' master's thesis. We plan to have a full field season for 2021 (April-November). We anticipate presenting data at the state and national meetings of The Wildlife Society, as well as at other state and national conferences.