



Mountain Goats (*Oreamnos americanus*)

Resource Brief

Background Information

One of Glacier National Park's iconic species, the mountain goat is only found in the northern latitudes of North America, and is more closely related to serows and chamois from Eurasia than to domestic goats. Today, some mountain goat populations found in the United States have been introduced, but those found in Glacier are native to the landscape. Mountain goats primarily inhabit alpine and subalpine environments and are often found traversing nearly vertical cliff edges. They are exceptional climbers, using their large, muscular forequarters to climb up rocky ledges and steep slopes of 60 degrees or more. Their hooves are also helpful in maneuvering this difficult terrain. Mountain goats have cloven hooves, or a hoof split into two toes, which spread out when needed. This stability along with flexible, soft inner pads allows the goats to grip the rock walls and cliffs they inhabit.

Summer months provide abundant food for mountain goats including a variety of alpine flowers, grasses, and sedges. During the long winter months, the mountain goat's diet is more sparse. Wintering high on steep cliffs above snow line or in areas where little snow accumulates, mountain goats find exposed vegetation not eaten during the summer as well as shrubs and lichens. Although often treacherous, these steep cliffs not only provide food for the goats, but also offer protection from predators.

Status and Trends

The health and continuity of mountain goats is one indicator of a healthy alpine ecosystem. At the center of the Crown of the Continent Ecosystem, Glacier National Park provides critical protection and preservation for species of concern. When periodic monitoring began to observe a decline in the number of goats visiting Glacier's Walton Goat Lick, park biologists became concerned that the overall mountain goat population in Glacier may be unstable. To gain a greater understanding of changes in that population, resource managers needed to gather baseline data on them—a difficult task, considering the significant amount of staff and resources needed to monitor a species that lives in such rugged terrain. In most areas, aerial surveys taken by helicopter are seen as the ideal method for counting mountain goats, but helicopters can be



Photo by Chris Peterson

Exceptional climbers, mountain goats are often seen on rocky, steep cliffs. However, goats also use dense timber and creek bottoms for security and protection against extreme heat, cold, and wind.

Threats

Mountain goats are commonly seen in Glacier National Park and it's estimated that the park has one of the largest populations of mountain goats in the lower 48 states. However, declining numbers in parts of the Crown of the Continent Ecosystem and pressures from climate change are causing concern for the health of this species. Like other alpine species, mountain goats are sensitive to habitat conditions. They rely on high, cool, rocky terrain for their survival. Glacier is currently experiencing warming three times the global average at higher elevations. It is uncertain how a warming climate will affect mountain goats, but the park is near the southern extent of the mountain goat's native range. Like any species at the edge of its range, Glacier's mountain goat population is likely to feel the effects of climate change earlier than populations further north.

particularly invasive to mountain goats, disturbing to visitors, and expensive. These factors spurred the creation of the High Country Citizen Science project (HCCS), which uses a volunteer workforce to conduct ground surveys to monitor mountain goat population abundance, distribution, and trend within Glacier National Park.

The HCCS program recruits citizen science volunteers and teaches them about mountain goat ecology, field identification, and classification of age and sex. Citizen scientists work in the field with HCCS staff, learning survey protocols and how to use survey equipment. Once trained, these volunteers choose from a list of survey locations throughout the park, based on their ability and preference, and conduct a one-hour observation.

Typically, population trends for wildlife species can take many years to determine. Mountain goats are no exception. However, using an occupancy model, HCCS program managers are developing a five-year trend graph (using data collected between 2008 and 2013d) that shows the average number of goats per survey site and thus a total population estimate for mountain goats within the park. Resource managers hope to continue surveys into the future in order to detect any changes in the park's overall mountain goat population or distribution.

Management Strategy

Park managers and researchers are exploring the full potential of utilizing the HCCS program as well as exploring other avenues of annual monitoring. Research on mountain goat/human interactions and impacts from climate



Part of the citizen science mountain goat survey is to take a verification photo. The photo helps biologists identify sex, age, and number of goats.

change is also underway. The park is working with the University of Montana to test alternate, minimally invasive capture-and-collar methods to pursue the many unanswered questions about how mountain goats are affected by roads, adjacent trails, and people in relation to other factors that affect goat distribution. This information will then be incorporated into park planning documents, such as the Going-to-the-Sun Road Corridor Management Plan, in order minimize impacts to both mountain goats and visitors to the park. By obtaining baseline data, monitoring populations, and studying individual collared goats, park managers hope to ensure the long-term health of this rugged, high-country icon of Glacier.

Resources For More Information

Glacier National Park Staff

- Jami Belt, Citizen Science Coordinator
- Mark Biel, Natural Resources Program Manager

Documents and web sites

- Jami Belt. 2010. Evaluating Population Estimates of Mountain Goats Based on Citizen Science. <http://scholarworks.umt.edu/etd/391/>
- Mountain Goat Study at Logan Pass Talking Points – *contact Mark Biel for more information*
- High Country Citizen Science Education Presentation
www.nps.gov/glac/learn/crlc-citizen-science_hc.htm

The Crown of the Continent Research Learning Center

Phone: 406-888-5827

Email: glac_citizen_science@nps.gov

Websites: www.nps.gov/rlc/crown, www.nps.gov/glac