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**Alberta Arctic Butterfly Surveys in the
Capulin Volcano National Monument Area
2003-2004: Lay Report**

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The area east of Raton, New Mexico consists of a variety of extinct volcanic features such as lava flows, shield volcanoes, and cinder cones. Extending eastward from the Rocky Mountain Front Range into the high plains, the Raton Mesa complex varies in elevation from 2200m to 2700m, and the climate is harsh compared to surrounding areas. This archipelago of volcanic uplands harbors several endemic butterfly subspecies and relict butterfly species not known from other localities in New Mexico or Colorado. Capulin Volcano National Monument is one of several uplands in this complex.

North American butterflies in the genus *Oeneis* are commonly called "arctics," because they generally inhabit windy, tundra-like habitats, often at high elevation. The Alberta arctic occupies the lowest habitats for its genus. Its core population is on the prairies of Alberta, Saskatchewan, Manitoba, Montana and North Dakota. A small number of outlier colonies have been identified far to the south in the White Mountains of Arizona, in central Colorado, and on the Raton Mesa complex of northeast New Mexico.

The Capulin subspecies of the Alberta arctic butterfly was first collected by Brown and associates in May 1969, who promptly described it as a new subspecies. The Capulin Volcano population has been found in patches of bunch grass on the outer slope of the north volcano rim and on the inner slope of the cinder cone's south rim. Since its discovery at Capulin Volcano, it has been found to inhabit other windblown grassy mesas in the Raton Mesa complex: Little Horse Mesa at Sugarite Canyon State Park, Dale Mountain on Johnson Mesa, and Sierra Grande.

At Capulin Volcano, Brown found the butterfly in flight at the crater rim in mid-May, but not after early June. In Brown's study, only males were flying, while females stayed in grass clumps or cracks in the rock. Coloration is variable, from light to darker grayish brown. The underside is lighter than the upper side. The upper forewing typically has one to three dark eyespots on the forewing and one on the hindwing. The female upper forewing may be less gray than that of the

male, making females appear brighter in color. The host plant is not known with certainty, but the butterfly associates with fescue grasses.

The Capulin Alberta arctic butterfly has not been considered threatened by human activities within the national monument. However, so little is known about the species' distribution and biology within the park that it is difficult to assess potential threats. Brown found the subspecies to be much more variable than other populations of this species. This variation suggested a small population in which isolation has allowed for reduced genetic variation.

Human or natural impacts on the small known populations could threaten the subspecies' existence. For example, loss of larval host plant(s) within the park would threaten the butterfly. Implementation of a fire management plan could heavily impact the butterfly. Because the population is so small and its distribution within the park so limited, drought and severe weather such as hailstorms during the flight period could greatly affect the Capulin Volcano National Monument butterflies. Basic natural history information is needed before potential impacts to the population can be anticipated and a management strategy developed.

The purpose of this study was to investigate the biology of the Capulin Alberta arctic butterfly at Capulin Volcano National Monument, with focus on its distribution, larval host plant(s), and potential conservation issues. The primary goal was to provide management recommendations for this endemic butterfly.

In May 2003, we conducted surveys for Alberta arctic butterflies at Capulin Volcano National Monument and Johnson Mesa, NM. In 2004, we surveyed at Capulin Volcano, Little Horse Mesa, Johnson Mesa, and Sierra Grande. We found no Alberta arctics at Capulin Volcano in either year. At Johnson Mesa we found five and 22 on subsequent days in 2003 and two in 2004. In 2004 we had one possible sighting at Little Horse Mesa but were unable to capture the butterfly, and we found no Alberta arctics at Sierra Grande.

It is possible that timing of our surveys explains the small numbers of butterflies encountered. We doubt this explanation, however, because the absence or small numbers of individuals occurred at all sites and at all dates. Intensive survey at the four known sites over the next few years would strengthen knowledge of its occurrence at those sites.

It would be premature to offer reasons for this butterfly's decline until further field work convincingly documents falling numbers or expiring colonies. However, Alberta arctics may face several potential threats in the study area. Those threats may include grazing by domestic livestock, for example at Johnson Mesa. Suppression of fire may lead to senescent grasslands or to succession of grasslands to undesirable, non-host grasses. Simple random events like weather may destroy tiny colonies; eventual re-colonization of such sites is typical for metapopulations, but modern conditions may interfere with re-colonization. New Mexico populations of this species are relicts from earlier, colder climates. Global climatic warming might drive Pleistocene relict species uphill, but uphill movement is not an option at historical New Mexico sites. We recommend continued monitoring of the historically-occupied sites in New Mexico to determine status of this subspecies.