

AN EVALUATION OF A GIS-BASED HABITAT MODEL FOR BIGHORN SHEEP WINTER RANGE IN GLACIER NATIONAL PARK, MONTANA

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Abstract: Increasing interest in restoring bighorn sheep (*Ovis canadensis*) populations through reintroduction and augmentation has led wildlife managers to pursue Geographic Information System (GIS) software programs as a means to quantitatively assess large land areas for suitable bighorn sheep habitat. A distinct need, however, exists for performance tests of GIS-based predictions of bighorn sheep presence or absence, and assessments of potential reintroduction sites. Recently, a National Park Service (NPS) bighorn sheep restoration program used a GIS-based Habitat Evaluation Procedure (HEP) to identify suitable habitat for reintroductions in Rocky Mountain Region National Parks and adjacent lands. In Montana's Glacier National Park, systematic ground surveys for bighorn sheep on winter ranges provide for a rigorous test of the winter range habitat component of the HEP being used by the NPS restoration program.

The GIS-based HEP delineates suitable habitat through user-defined criteria for basic habitat parameters: escape terrain (slope), escape terrain buffer, aspect, water sources, natural barriers, man-made barriers, and human development. GIS-based delineations are derived from USGS digital elevation models, digital line graphs, and digitized features from topographic maps. The HEP may also incorporate, either from GIS databases or from field-gathered data, information on vegetation composition, horizontal visibility (vegetation height and density), and presence of domestic livestock.

Through identification of the parameters that best explain observed bighorn sheep locations on Glacier National Park's two primary winter range areas, the accuracy of suitable winter range habitat predictions generated by the GIS-based HEP will be assessed. Bighorn sheep surveys, conducted during January through April of 2000 and 2001, are augmented with focal observations of individual sheep during daylight hours for 2 or 3 consecutive days to guard against under-representation of sheep use in some habitat types.

Preliminary results from ground surveys in January and February 2000 indicate that ewe-lamb bands primarily use high-elevation (6800-7600 feet) ridges and saddles characterized by broad scree and talus slopes and sparsely distributed alpine vegetation; while ram groups primarily use mid-elevation (5600-6400 feet), south-facing slopes with patchy fescue grasslands. Two significant management concerns for Glacier National Park are poaching of bighorn sheep and trespass of livestock within Park boundaries. Modeling of bighorn sheep winter range will allow assessment of Park boundary areas where sheep may be excluded from suitable winter range.
