Topic & Title of Project

Use of LANDFIRE Data in Bighorn Sheep Viability Analysis: Payette National Forest Area

Date of Project

April 2007

Background

In response to a Forest Plan appeal reversal by the Washington Office in 2005, the Payette National Forest (PNF) completed a report and an assessment designed to provide Forest Plan direction for maintaining habitat for viable populations of bighorn sheep on the PNF. The Hells Canyon Bighorn Sheep Restoration Committee manages the Hells Canyon Initiative, which is a state, federal, and private partnership to restore Rocky Mountain bighorn sheep in the Hells Canyon area of Oregon, Idaho, and Washington. As part of that effort, habitat data and model documentation developed for the Hells Canyon Initiative were used as a basis for identifying and mapping source habitat requirements for bighorn sheep. The habitat map from the Hells Canyon Initiative, however, did not cover the full extent of the PNF. The limiting factors were the vegetation components of that model. The vegetation components were then crosswalked from satellite imagery vegetation maps for southwest and central Idaho. This provided the spatial extent to complete a report titled, *"Risk Analysis of Disease Transmission between Domestic Sheep and Bighorn Sheep on the Payette National Forest."* Once work began on the additional analysis to the Southwest Idaho Ecogroup Forest Plan for the SEIS (Supplemental Environmental Impact Statement), it was discovered that, once again, a larger spatial extent was required to conduct the analysis. LANDFIRE existing vegetation type and canopy cover maps provided the only continuous and consistent data covering lands of the assessment area.

Key Points

Description of analysis

This assessment was designed to provide Forest Plan direction for maintaining habitat for viable populations of bighorn sheep on the Payette National Forest. The first step in the process was to determine the amount and distribution of vegetation characteristics and topographic characteristics needed to identify bighorn sheep source habitat areas. Source habitat refers to the physical extent of vegetation and terrain characteristics, or habitat requirements, where bighorn sheep currently or potentially could live in a sustainable manner. This information was determined via a habitat model developed by the Hells Canyon Initiative. The model consists of two components: 1) an escape terrain model which looks strictly at physical characteristics of the landscape using a digital elevation model and 2) a horizontal visibility model that uses vegetation mapping to determine areas open enough to support bighorn sheep (fig. A). LANDFIRE existing vegetation type and canopy cover data provided the spatial extent and scale needed to complete this analysis of the Hells Canyon and the PNF areas.

With the newly developed source habitat model, it was determined that the amount and distribution of habitat was not the limiting factor in bighorn sheep viability; rather, the factor most directly affecting bighorn sheep viability was disease. Using the source habitat identified on a map along with telemetry and observation data, the analysis could be focused on areas of known bighorn use, areas of suspected bighorn use, known and suspected migration corridors, and areas of potential habitat expansion (fig. B).

Increased spatial extent

Use of the LANDFIRE vegetation data allowed for a view of bighorn sheep habitat far beyond the boundary of the PNF. The broader view allowed the team to look at the possible vectors of disease transmission to and from the herds of bighorn sheep on and near the forest. This broad approach allowed for the participation of various cooperators, which included the State of Idaho, The State of Oregon, The State of Washington, The Nez Perce Tribe, The Shoshone-Bannock Tribe, The Shoshone-Paiute Tribe, and The Confederated Tribes of the Umatilla.

Model accuracy

The source habitat model developed for this project has not yet had a formal accuracy assessment; however, informal analysis has shown it to be a reasonably accurate portrayal of bighorn sheep habitat. Between the telemetry and observation data on Hells Canyon and the Salmon River, over 50,000 data points exist. When these data points were compared to the habitat data, 92% fell within modeled habitat. Also, ocular reviews of the modeled data compared against 1-meter color orthophotography have shown the model to be a highly useful tool in determining viable source habitat areas for this species.

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Key Points, continued...

Results / summary The use of broad and consistent LANDFIRE vegetation data for this analysis allowed an assessment of bighorn sheep habitat sources to be quantified showing distributions across a large tri-state area far beyond the mere forest scale, which, in turn, engaged various cooperators from across the region. The analysis of the habitat data indicated that bighorn sheep use areas and disease interactions were the limiting factors in bighorn sheep viability, rather than the amount and distribution of source habitat. In addition, the comprehensive nature of LANDFIRE data allows this approach to be used elsewhere in the country at regional and/or national scales for assessing bighorn sheep source habitat areas. As LANDFIRE data are updated to account for changes in conditions, the source habitat model can easily process updated data for management needs.

Recommendations

Models and species assessments If the method employed for analyzing bighorn sheep habitat is used for other species, care should be taken. Bighorn sheep tend to use broad vegetation types, whereas many other species occupy very narrow vegetation types. This habitat specialization can make it difficult if not impossible to map the habitat of such species with any accuracy without fine-scale data. Model parameters and habitat modeling must be checked carefully for accuracy.

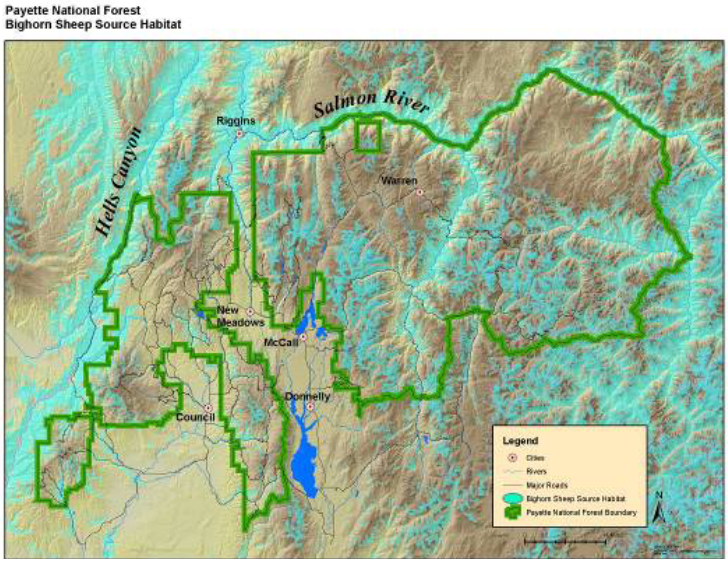

Figure A *- Bighorn sheep (existing and potential) habitat map of the Payette National Forest area. The source habitat (areas in light blue) is based on modeled parameters of the physical landscape characteristics (vegetation type and openness, elevation, visibility, and escape terrain) which, using LANDFIRE vegetation data, identify habitat areas for bighorn sheep.*

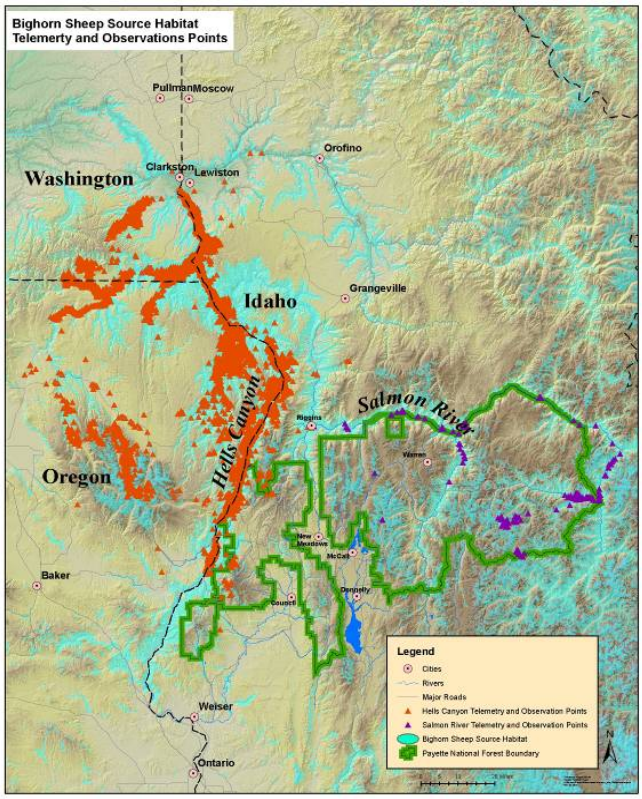

Figure B *- Map showing bighorn sheep distribution overlaid on the modeled source habitat areas where bighorn sheep could naturally or potentially exist across the greater Payette National Forest area.*