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Michael Pellant
Bureau of Land Management

D. Major
The Nature Conservancy

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A strategy to select and implement restoration projects in the Great Basin desert

M. Pellant¹ and D. Major²

¹Bureau of Land Management, 1387 S. Vinnell Way, Boise, ID 83709; ²The Nature Conservancy, 1387 S. Vinnell Way, Boise, ID 83709. E-mail: Michael_Pellant@blm.gov

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Introduction The Great Basin is North America's largest desert, encompassing nearly 55 million ha of land between the Rocky and Sierra Nevada Mountains in western North America. The US Department of the Interior, Bureau of Land Management (BLM) is the largest land holder in this desert and is responsible for managing 30 million ha of rangelands. BLM initiated the Great Basin Restoration Initiative in 1999 to maintain healthy shrublands and to restore degraded lands infested with invasive species that were promoting wildfire expansion. Currently, funds for restoration are limited, stimulating the need for a land, potential-based strategy to prioritize restoration treatments.

Materials and methods A pilot study was initiated in 2005 on 4 million ha in the Owyhee Uplands area where the states of Idaho, Oregon and Nevada join to develop assessment tools that could be used to develop a strategy to prioritize restoration treatments. The basis for determining the potential plant communities are USDA soil surveys (Third Order Soil Survey) and the ecological sites associated with mapped soils (Figure 1). Current plant communities are mapped using remote sensing, image analysis software, and ground data (Figure 2). Comparing the potential plant communities on a landscape with the current plant communities allows managers to identify potential treatment areas to restore desired native plant communities. In this example, encroachment of Western Juniper (*Juniperus occidentalis*), a native conifer tree, is replacing big sagebrush (*Artemisia tridentata*) and associated herbaceous species due primarily to fire exclusion.



Figure 1 Soil mapping unit (dark gray) with sagebrush potential and 15% historic juniper woodland inclusions.

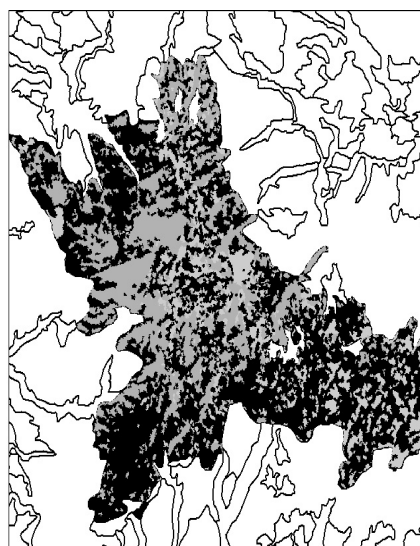


Figure 2 Existing plant communities showing historic juniper communities in black, juniper encroachment in dark gray, and sagebrush in light gray.

Results Managers would like to reduce juniper encroachment and restore native sagebrush/herbaceous species while maintaining the historic juniper woodlands. This approach classifies the western juniper encroachment areas suitable for treatment and the historic juniper woodlands where treatments should be avoided. Treatments to reduce juniper encroachment include prescribed fire, mechanical cutting, and herbicides. This landscape scale approach provides information for the strategic prioritization and selection of treatment areas after considering additional resource and economic criteria.

Conclusions Large landscapes can be evaluated for departure from the potential plant community by comparing edaphic/climate-based soil surveys and their associated ecological sites with existing plant communities derived from remote sensing data. Land treatments to restore desired plant communities can be focused on areas with the greatest ecological benefits and potential for success.