

Rocky Mountain Research Station Science You Can Use *(in 5 minutes)*



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Vulnerable, Valuable, Variable: Science-Based Assessments of Riparian and Groundwater-Dependent Ecosystems

Small Area, Big Importance

For a land type that covers relatively little area, riparian areas and groundwater-dependent ecosystems are an extremely important component of healthy watersheds and ecological function. Yet over the past few centuries, many of these areas have been stressed by a wide range of land uses. Restoring them can be complex, expensive, and even unpopular. In the Intermountain West, National Forests often provide more range than timber, making riparian areas and groundwater-dependent ecosystems both valuable and

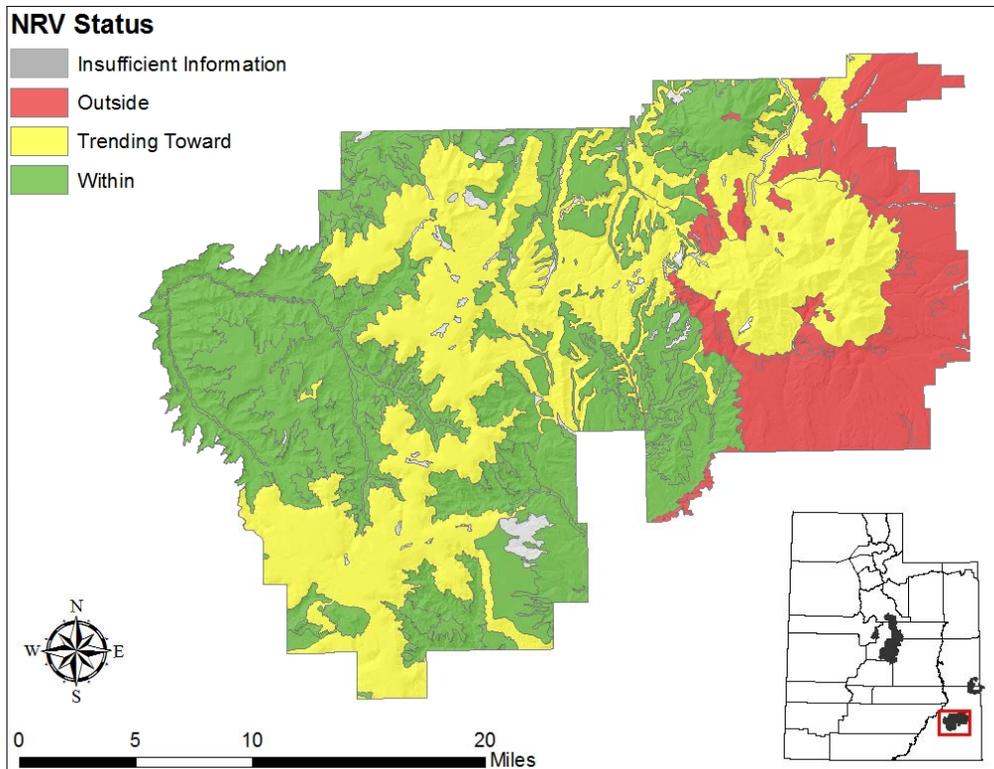
vulnerable. Additionally, more information on these systems is typically needed for planning because it is difficult to determine the natural state due to a history of heavy alteration in this area.

When USDA Forest Service Intermountain Region National Forest Plan development teams need to evaluate these areas for ecosystem assessments, many go to the [USDA Forest Service Rocky Mountain Research Station](#) for help. According to [Katey Driscoll](#), a Rocky Mountain Research Station research ecologist

based out of Albuquerque, New Mexico, groundwater-dependent ecosystems and intermittent streams have often been overlooked, making them difficult to manage today. “In some instances,” Driscoll says, “the condition of these systems has been degraded simply due to lack of knowledge of their location. In the future, mapping and monitoring of these resources is important.”

A Collaborative Approach to Riparian Assessments

According to Driscoll, the Rocky Mountain Research Station worked with the Forest Service Intermountain Region to co-develop targeted riparian mapping and assessments. “Our approach is extremely collaborative,” Driscoll



A natural range of variation status map created by the Rocky Mountain Research Station classifies Manti-La Sal National Forest areas as within, moderately altered, or outside the natural range of variation for water fluctuation in surface water systems (image: USDA Forest Service).



explains, adding, “We start with at least one site visit with the Forest Plan revision team and riparian experts on the Forest—mostly hydrologists and fish biologists but also recreation and range conservation managers. We find that face-to-face meetings are critical to our effort and outcomes are better when we have that kind of relationship.”

Driscoll and others have completed reports for the Ashley, Manti-La Sal, Salmon-Challis, and Bridger-Teton National Forests, and they are working on assessments for several other National Forests in the Intermountain Region including the Dixie, Fishlake, and Humboldt-Toiyabe.

These extensive assessments address drivers, stressors, structure, function, composition, and connectivity of terrestrial and aquatic ecosystems. The approach used by Driscoll and the Forests addresses locally specific needs. The published reports provide a citable resource that can be referenced in Forest Plans and any riparian, wetland, and groundwater-dependent ecosystem projects in the future.

Prioritizing Management Efforts

Each assessment includes an inventory of known riparian and groundwater-dependent ecosystems within a National Forest, as well as an evaluation of stressors. For example, the team found that encroachment

by upland vegetation, plant invasions, hydrological changes, and livestock use were the greatest issues affecting riparian and wetland ecosystems in the Ashley National Forest. On the Manti-La Sal National Forest, the main stressors included grazing, road construction, invasive species, insects, disease, and altered flow and fire regimes. The assessments also provide maps for identifying and prioritizing needs for change in management approaches and areas where restoration may be appropriate.

“An important component of our assessments is the identification of information gaps. For example, some areas of the forests have no mapped springs, though they’re known to occur in these locations. By finding such gaps, we’re helping the Forests prioritize areas for inventory and evaluation. “ says Max Smith, an RMRS scientist and assessment co-author.

PROJECT LEAD

Katey Driscoll and **Max Smith** are Research Ecologists with RMRS’s Grassland, Shrub and Desert Ecosystems program and work in Albuquerque, NM. Connect with them at www.fs.usda.gov/rmrs/people/katelyndriscoll and www.fs.usda.gov/rmrs/people/david.smith4.

FURTHER READING

Driscoll, Katelyn P.; et al. [Riparian ecosystems of the Manti-La Sal National Forest: An assessment of current conditions in relation to natural range of variability](#). Gen. Tech. Rep. RMRS-GTR-386. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 160 p.

Driscoll, Katelyn P.; et al. [Riparian ecosystems of the Salmon-Challis National Forest: An assessment of current conditions in relation to the natural range of variability](#). Gen. Tech. Rep. RMRS-GTR-394. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 190 p.

Smith, Max; et al, Deborah M. 2018. [Riparian and wetland ecosystems of the Ashley National Forest: An assessment of current conditions in relation to natural range of variation](#). Gen. Tech. Rep. RMRS-GTR-378. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 101 p.

Smith, D. Max; et al. [Riparian and groundwater-dependent ecosystems of the Bridger-Teton National Forest: An assessment of resources and current conditions](#). Gen. Tech. Rep. RMRS-GTR-407. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 204 p.

KEY MANAGEMENT CONSIDERATIONS

- Rocky Mountain Research Station scientists are working together with the Intermountain Region and National Forests to identify drivers, identify stressors, and evaluate current conditions of riparian and groundwater-dependent ecosystems.
- A general technical report for each National Forest is published and provides a synthesis of best available science and compilation of available data and field information.
- Each National Forest is supplied with a spatial database that includes information on the distribution of streams, springs, and fens, stressor levels, indicators, and conditions of riparian systems. These data can be used for Forest Plan revision and other project planning that involves riparian systems.
- Read more about this riparian assessment work at www.fs.fed.us/rmrs/projects/riparian-wetland-and-groundwater-dependent-ecosystems-assessments-current-conditions

Forest Service Research and Development (FS R&D) works with partners to deliver the knowledge and tools that land managers need to sustain the health, diversity, and productivity of our Nation’s forests and grasslands for present and future generations. The Rocky Mountain Research Station (RMRS) is one of seven FS R&D units, rooted in the geography of the Interior West, and integrated into a national program with global applications. RMRS science improves lives and landscapes. More information about Forest Service research in the Rocky Mountain Region can be found here: <https://www.fs.usda.gov/rmrs/>



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