

# How to Use the Wyoming Basin Rapid Ecoregional Assessment

## Ecoregional Assessments

The Wyoming Basin REA was a collaborative effort between the U.S. Geological Survey (USGS) and the BLM, with assistance from stakeholders including the National Park Service; U.S. Fish and Wildlife Service; Wyoming Game and Fish Department; Utah Division of Wildlife Resources; Montana Fish, Wildlife and Parks; Wyoming County Commissioners; and Wyoming Natural Diversity Database. The Wyoming Basin REA incorporates multi-scale information to assess the landscape-level condition and trends of ecological resources, including the direct and indirect effects of land use. The overall goal is to provide information that can be used to facilitate land-use planning and prioritize actions for conservation, restoration, and development. In addition, the REAs quantify spatially explicit cumulative effects and provide a broader-scale ecological context for decision-making and planning (such as for Ecological Impact Statements, Resource Management Plans, and strategic planning) at various spatial extents (project, field offices, state, or ecoregion) that cannot be determined using local-level information. Because of the broad spatial extent, the datasets developed by the REAs lack local details and, consequently, REAs ideally will be used in conjunction with local-level information on conditions. Local-level research and monitoring can provide crucial details (such as resource conditions related to soil stability, hydrologic function, and biotic integrity provided by the BLM's Assessment, Inventory and Monitoring [AIM] Strategy [Toevs and others, 2011]); such information is necessary for planning and management activities, and they can be used to validate the predictions of REA models. The conservation potential maps from the REA synthesize the landscape-level information for each species, species assemblage, and ecological community, thereby providing a broad-scale screening tool for identifying potential areas for conservation, restoration, and development.

The Wyoming Basin REA builds on a previous sagebrush ecoregional assessment in the Wyoming Basin Ecoregion (Hanser and others, 2011). There are many similarities between the REA and the sagebrush assessment, particularly in relation to the overall goals, but there are some important distinctions. The REA addressed all vegetation types and associated species in the Wyoming Basin, whereas Hanser and others (2011) focused on the sagebrush ecosystem and associated species. Nevertheless, there were many species in common to both assessments, including greater-sage grouse, Brewer's sparrow, sagebrush sparrow, sage thrasher, and pygmy rabbit. Because of the short time frame allotted for conducting the REAs, we relied on existing regional datasets and used or adapted available models, whereas the sagebrush assessment was a multi-year research project that involved collection of new data and new model development. When appropriate, we incorporated results and models (for example, the greater-sage grouse habitat model) from the sagebrush assessment that addressed the Management Questions for this REA. There were many regional source datasets in common to both the REA and the sagebrush assessment, such as LANDFIRE, but in some cases more recent versions were available for this REA. The sagebrush assessment provides more extensive background information on the Wyoming Basin and summarizes the landscape-level effects of development for several energy fields and over the past hundred years, whereas the REA addresses regional energy effects on current landscape structure and provides projections of the potential for future energy development. As a consequence of these and other differences, the two assessments provide complementary information at the ecoregional level.

## Report Organization

### Section I

Section I provides background information on REAs and summarizes key findings for the Wyoming Basin REA. Most readers would benefit from reviewing the chapters in Section I, which provide information not duplicated in other sections. Chapter 1—Introduction and Overview provides an overview of the BLM’s REA program and the required REA components, and it provides background on the ecological setting and management issues for the Wyoming Basin REA. Chapter 2—Assessment Framework describes the standard methodologies used to assess the landscape-level status of each Conservation Element: seven ecological communities, and 14 species and species assemblages. Chapter 3—Assessment Synthesis summarizes the key findings for the REA overall and for each individual Change Agent and Conservation Element.

### Section II

Section II evaluates the four primary Change Agents, both current and projected potential conditions, evaluated for this REA. It provides an overview of the approaches used and summaries of results for the four major Change Agents required in this assessment: Chapter 4—Development, Chapter 5—Wildland Fire, Chapter 6—Terrestrial Invasive Plant Species, and Chapter 7—Climate Analysis. The results summarized in these chapters were used for assessing the potential effects of Change Agents on species and communities, as presented in Sections III and IV.

### Sections III and IV

Sections III and IV provide landscape-level assessments for all 21 Conservation Elements evaluated, with the ecological communities in Section III, and the species/species assemblages in Section IV. The chapters in Sections III and IV have a consistent format, which includes a narrative overview for the species or community that highlights ecological information relevant to the REA analyses. The narratives are organized using headings that directly correspond to the key ecological attributes and Change Agents summarized in tables for each chapter. It is important to note that the narratives are not meant to be exhaustive summaries or literature reviews. Rather, we provide a limited number of citations, including major review or synthesis documents when possible, and additional references as appropriate. Each Conservation Element chapter also includes an ecological conceptual model that portrays some of the primary potential interactions and feedbacks among drivers and stressors (Change Agents) evaluated. We used a standard format for all conceptual models so that key ecological attributes and Change Agents that were not addressed (either because available data were insufficient for conducting a regional-scale analysis or because the Change Agent was not expected to be a major issue for a species or community) would be readily apparent. In each chapter, the methods overview provides additional information that pertains specifically to the Conservation Element and is not addressed in Chapter 2—Assessment Framework. The maps, key findings, and summary for each chapter are based on the Management Questions.

The chapters in Section III—Ecological Communities and Section IV—Species and Species Assemblages are as follows. Chapter 8—Streams and Rivers addresses major river systems and perennial, intermittent, and ephemeral streams. Chapter 9—Wetlands addresses both riparian and

depressional wetlands and playas. Chapter 10—Riparian Forests and Shrublands addresses cottonwood and willow communities. Chapter 11—Sagebrush Steppe addresses the basin sagebrush system and associated grasslands. Chapter 12—Desert Shrublands addresses desert shrublands and associated grasslands. Chapter 13—Foothill Shrublands and Woodlands addresses mountain big sagebrush and associated deciduous shrublands (including mountain mahogany) and woodlands (including foothill aspen, juniper, and ponderosa pine, piñon and limber pines). Chapter 14—Montane and Subalpine Forests and Alpine Zones includes all mountain forest types (including mountain slope aspen, Douglas-fir, lodgepole, limber, and whitebark pines, and spruce/fir forests) and alpine areas above tree line.

The chapters in Section IV—Species and Species Assemblages are as follows. Chapter 15—Aspen Forests and Woodlands includes both foothill and mountain slope aspen. Chapter 16—Five-Needle Pine Forests and Woodlands includes limber and whitebark pines. Chapter 17—Juniper Woodlands includes Rocky Mountain and Utah juniper, and limber and piñon pines. Fish species are addressed in four chapters. Chapter 18—Cutthroat Trout covers four subspecies: Bonneville, Colorado River, Yellowstone, and Snake River fine-spotted cutthroat trout. Chapter 19—Three-Species Fish Assemblage addresses bluehead sucker, flannelmouth sucker, and roundtail chub. Chapter 20—Northern Leatherside Chub and Chapter 21—Sauger are single-species chapters. Chapter 22—Spadefoot Assemblage includes the Great Basin and plains spadefoot species. Chapters that cover bird species addressed by the REA include Chapter 23—Greater Sage-Grouse, Chapter 24—Golden Eagle, Chapter 25—Ferruginous Hawk, and Chapter 26—Sagebrush-Obligate Birds, which include Brewer’s sparrow, sagebrush sparrow, and sage thrasher. Mammals are addressed in Chapter 27—Pygmy Rabbit and Chapter 28—Mule Deer.

## Section V

Section V includes Chapter 29—Landscape Intactness. This chapter describes the ecoregion-level effects of development on landscape structure and identifies relatively undeveloped areas for terrestrial and aquatic communities in the context of the overall ecoregion. This chapter also synthesizes the conservation potential for all species and communities, and evaluates land protection status and land ownership/jurisdiction for the entire ecoregion, providing a broader context for individual chapters.

## Appendix

The Appendix includes more details on source data and methods and is written for a technical audience. Supplemental material to the report, including all source and derived datasets, map products, and geographic information systems (GIS) programs (Python scripts) used for analyses are provided to the BLM REA and will be served online by the BLM at [http://www.blm.gov/wo/st/en/prog/more/Landscape\\_Approach/reas/dataportal.html](http://www.blm.gov/wo/st/en/prog/more/Landscape_Approach/reas/dataportal.html).

## References Cited

- Hanser, S.E., Leu, M., Knick, S.T., and Aldridge, C.L., eds., 2011, Sagebrush ecosystem conservation and management—Ecoregional assessment tools and models for the Wyoming Basins: Lawrence, Kans., Allen Press, 409 p.
- Toevs, G.R., Taylor, J.J., Spurrier, C.S., MacKinnon, W.C., and Bobo, M.R., 2001, Bureau of Land Management Assessment, Inventory, and Monitoring Strategy—For integrated renewable resources management: Denver, Colo., Bureau of Land Management, National Operations Center, 34 p.