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Science You Can Use Bulletin

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Taking Stock with the Resources Planning Act: The Outlook for Natural Resources in the United States and the Rocky Mountain Region

Every 10 years the Forest Service presents an assessment of the nation's forests and rangelands. The 2020 Resources Planning Act Assessment (RPA Assessment) looks at historical data trends and projects the availability and condition of renewable resources across the nation's forests and rangelands 50 years into the future. Mandated by the 1974 Forest and Rangeland Renewable Resources Planning Act, it is the sixth report in almost 50 years. Scientists from USDA Forest Service research stations, including the Rocky Mountain Research Station (RMRS), and numerous collaborators have been hard at work modeling and analyzing how climate, population growth, and socioeconomic change are likely to affect a spectrum of land uses and natural resources across private and public lands.

The fact that future projections are based on both ecological and socioeconomic information is key because, as RPA Assessment coauthor and RMRS research economist Travis Warziniack puts it, "forests and rangelands are as much defined by human activities as they are the ecological processes."

Projections in the RPA Assessment are based on four different scenarios that take into consideration U.S. and global population and economic growth, technology change, bioenergy, international trade, wood-energy consumption, and climate change from 2020 to 2070.

Matt Reeves, RMRS research ecologist and lead author of the chapter on rangelands, is struck by the increasing rate of variability revealed by the analysis.

"It's hard to manage against an increasingly chaotic meteorological and ecological backdrop," Reeves says. "You can plan for warming, you can plan for cooling, you can plan for less moisture, you can plan for greater moisture, but it's difficult to plan around greater uncertainty."

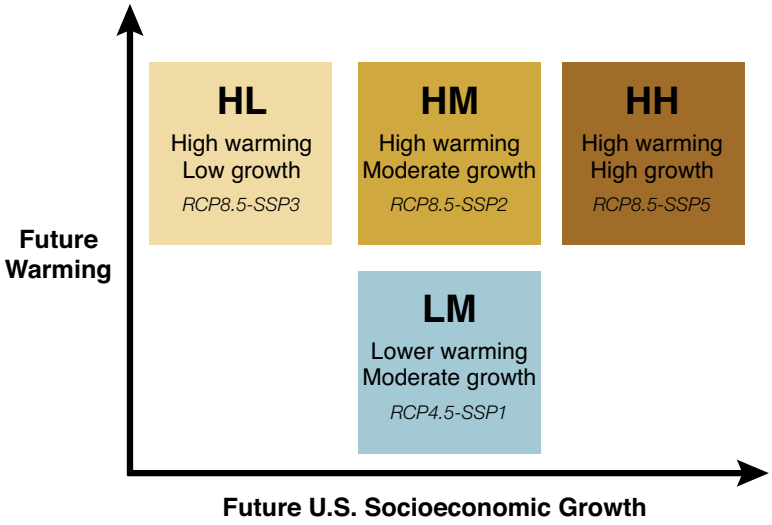
Linda Joyce is an RMRS resource ecologist (emeritus) who has devoted a significant part of her career to RPA Assessments. She has little doubt that managing national forest systems will be increasingly challenging. "On the other hand," she says, "we have a lot of research and management experience to help us look at the future."

The 2020 RPA Assessment presents a wealth of information about past trends and projected futures for land use, forests and rangelands, forest product markets, water resources, biodiversity, and outdoor recreation. As an insightful tool designed to help navigate an increasingly uncertain future, resource managers, planners, scientists, and policymakers may find that carving out time to become familiar with the report is well worth it.

Death, Taxes, and Uncertainty

In 1789, Benjamin Franklin famously remarked, "In this world nothing can be said to be certain, except death and taxes." If Franklin had been an ecologist speculating on the future of the nation's natural resources, he might have amended his remarks to include uncertainty.

To address uncertainty, RPA Assessment scientists use a scenario approach to explore how political, economic, social, and ecological changes might play out in the future. By analyzing a range of realistic scenarios, scientists can gain a deeper understanding of how systems might react to



Four scenarios used in the 2020 RPA Assessment to make projections out to 2070. The scenarios vary in terms of future atmospheric warming and socioeconomic growth.

Summary

The 2020 Resources Planning Act Assessment (RPA Assessment) looks at historical data and projects the availability and condition of renewable resources across the nation's forests and rangelands 50 years into the future. Projections are based on four alternative scenarios that account for climate and socioeconomic changes in the United States and globally from 2020 to 2070. The RPA Assessment presents a wealth of information about past trends and projected futures for land use, forests and rangelands, forest product markets, water resources, biodiversity, and outdoor recreation. This Science You Can Use Bulletin presents a sampling of findings relevant to disturbance, forests and rangelands, and water, both across the nation and specifically within the RPA Rocky Mountain Region.

Broadly, the RPA Assessment shows that pressures on natural resources will increase due to both human activities and climate change over the next few decades. The primary driver of change attributed to human activities stems from land development, or urbanization. In the RPA Rocky Mountain Region, developed land area is projected to increase by 6.4 million to 8.9 million acres.

Climate-driven changes are likely to be present as shifts in temperature and precipitation patterns. For all regions, droughts are likely to last longer and increase in intensity. Wildfire is projected to kill a greater volume of trees, and moderate severity fires are expected to burn a larger area annually. Together, both human and climate drivers of change are projected to exacerbate existing pressures on forest and rangeland resources and the ecosystem services they provide, including the availability of water and carbon sequestration.

Management strategies and policies that allow for greater flexibility and adaptability, as well as greater collaboration, will help managers and landowners navigate increasing variability and growing pressures on the natural world. The RPA Assessment is an insightful tool designed to help public and private land managers and policy makers navigate an increasingly uncertain future. A Data Catalog and Quick Reference Guides are available to allow managers and scientists to access data behind the RPA Assessment to use for land management planning and research purposes, and RPA Assessment scientists are available to offer guidance.

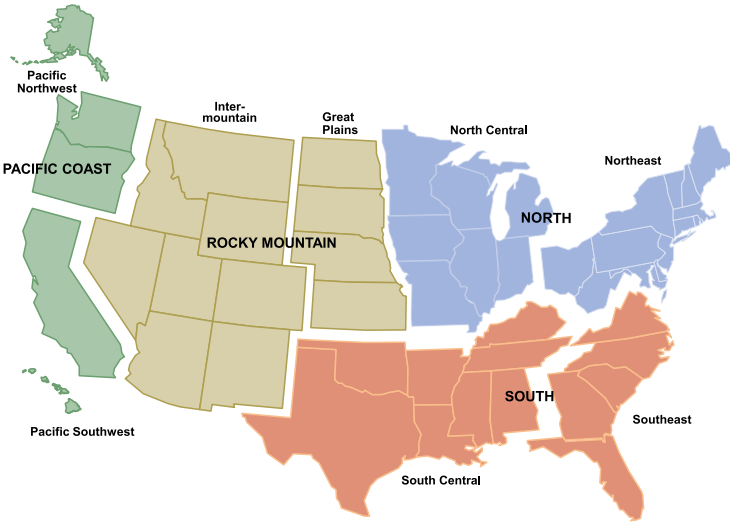
different rates of change or how different decisions could impact the future of our natural resources.

The 2020 RPA Assessment uses four scenarios based on assumptions about future atmospheric warming and socioeconomic changes in the United States. The scenarios incorporate a range of characteristics including global temperature rise, U.S. population and economic growth rates, energy demand, energy sector, global energy use, and openness to international trade. In addition, the RPA analyses encompass several climate models to examine how a particularly wet, dry, hot, least warm, or middle-of-the-road future might impact our resources in different ways.

National and Regional Insights

The 2020 RPA Assessment presents findings for the conterminous United States and across four RPA Assessment regions and subregions. The RPA Rocky Mountain Region covers a vast portion of the nation, which is divided into Intermountain and Great Plains subregions, and encompasses four Forest Service regions: Northern (R1), Rocky Mountain (R2), Southwestern (R3), and Intermountain (R4).

Land development has and will continue to threaten the integrity of forest and rangeland ecosystems. The 2013 Silver Fire in New Mexico put several communities, private properties, and infrastructure at risk from flooding, erosion, and debris flows. Photo courtesy by Dan Everett.



RPA Assessment regions and subregions

From a high-level view of the trends and projections across the four RPA Assessment regions, three overarching insights emerge: (1) land development is a key driver of change, (2) pressures on natural resources will increase, and (3) management actions can reduce those pressures. The information that supports these insights is immense; however, this Bulletin presents a sampling of findings relevant to disturbance, forests and rangelands, and water, both across the nation and specifically within the RPA Rocky Mountain Region. The RPA Assessment also examines biodiversity and outdoor recreation.

Insight: Land Development Will Be a Key Driver of Change

Land development has and will continue to threaten the integrity of forest and rangeland ecosystems. Development is expected to increase by 42 to 58 percent by 2070 across all four RPA scenarios, with the greatest expansion occurring in the South Region. Urban growth is expected to be the single most significant factor contributing to the loss of rangeland, particularly in the Pacific Coast Region. In all regions, urbanization

and population growth also stand out as the largest overall land use stressor for native ecosystems, impacting native species diversity and habitat.

In the RPA Rocky Mountain Region, developed land area is projected to increase between 6.4 million acres and 8.9 million acres under hot and dry scenarios, respectively. This region, which had the most non-Federal rangeland area in the United States (about 262 million acres; 106 million ha) in 2017, lost the greatest total amount of rangeland of all RPA regions historically (1982 to 2017). Federal rangelands have remained largely constant over time.

Development is expected to increase by 42 to 58 percent by 2070 across all four RPA scenarios. Pictured here is a WCS landscape on the border of the Wasatch National Forest. USDA Forest Service photograph by Nick Cieslak.

RPA Scenario *(RCP-SSP)*	Global Temperature Rise	U.S. Population Growth	U.S Economic Growth Rate	Bioenergy Demand	Energy Sector Focus	Global Energy Usage	International Trade Openness
LM Lower warming Moderate growth *RCP4.5-SSP1*	Lower	Medium	Medium-High	High	Renewables	Low	Medium
HL High warming Low growth *RCP8.5-SSP3*	High	Low	Low	Low	Fossil fuels	Medium	Low
HM High warming Moderate growth *RCP8.5-SSP2*	High	Medium	Medium	Medium	Mixed	Medium	Medium
HH High warming High growth *RCP8.5-SSP5*	High	High	High	High	Fossil fuels	High	High

Characteristics differentiating the 2020 RPA Assessment scenarios include global temperature rise, U.S. population and economic growth rates, energy demand, energy sector, global energy use, and openness to international trade.

Most of the nation's net loss of intact forest cover, mostly due to disturbance, has occurred on public land in the RPA Pacific Coast and Rocky Mountain regions. However, under all four RPA scenarios, the RPA Rocky Mountain Region is projected to permanently lose much less forest land, mostly due to disturbance, (less than 0.5 million acres) compared to the other regions.

Insight: Added Pressures Are Expected for Natural Resources

The interplay between socioeconomic changes and climate change, along with resulting shifts in disturbances, is anticipated to result in extra pressure on natural resources and greater management challenges.

Disturbance: Drought and Wildfire

For all regions, short periods of drought are likely to become longer, and drought intensity is likely to increase. In scenarios with higher future warming, droughts lasting more than a year are likely to occur four times more often and increase in intensity by 76 percent.

Forest and rangeland ecosystems in the Southwest, where water resources are already scarce, are expected to be at the greatest risk of exposure to drought. Increased severe or extreme drought by 2070 would add considerable strain to ecosystems. Vegetation types projected to have the greatest drought exposure include pinyon/juniper woodlands, grassland, and creosote bush scrub.

Evaluating drought trends at national and regional levels can obscure significant events at more local levels. For example, three counties in Arizona had such severe droughts in 2018 that they were designated as federal natural disaster areas, yet a summary of

"Extreme droughts lead to increased wildfire activity in rangelands where annual vegetation production is consistently high."

For all regions, short periods of drought are likely to become longer, and drought intensity is likely to increase. In scenarios with higher future warming, droughts lasting more than a year are likely to occur four times more often and increase in intensity by 76 percent. USDA photo by Cynthia Mendoza.

The RPA projects forestland net change from 2020 to 2070, by RPA region and scenario. Severe disturbance, like the Hayman Fire shown here, leave long-lasting effects. USDA photo by Erika Reiter.

drought indicators across the RPA Rocky Mountain Region does not show a distinct drought signal in that year. To more accurately determine the extent of drought and account for its impacts locally, it is essential to combine national and regional analyses with monitoring of local conditions.

The percent and area of forest and rangelands burned by large fires increased dramatically from 1984 to 2017, more than doubling in the second half of that 32-year period (2000 to 2017). By 2070, tree mortality caused by forest fires is expected to increase with the highest rates occurring in hot or dry climate futures. Depending on the RPA scenario, the volume of trees lost to fire annually in forests of the Rocky Mountain Region is expected to increase between 20 and 55 percent, from about 777 million cubic ft (22 million cubic m) in 2020 to between 918 and 1,200 million cubic ft (26 and 34 million cubic m) by 2070.

The RPA Rocky Mountain Region had the highest average annual rangeland area burned since 2000 (approximately 638,000 ha per year).

Forest Area and Carbon Sequestration

Across RPA scenarios, demand for wood and shifts in land use have a greater effect on future forests than climate shifts. This is not to say that climate changes are unimportant. Rather, the authors write, "it highlights how the influence of forest management activities over broad spatial scales occurring over shorter timeframes outpaces the influence of climate. More simply, humans may impact the forests of the United States more quickly than climate shifts."

However, for the Rocky Mountain Region, climate is projected to have a stronger influence on future conditions than demand for timber or land use changes. This is because the region produces the smallest share of U.S. timber for products, so forest management harvesting has a lesser impact on forest conditions. The interaction of future climates with conditions, types of forests, and disturbances in the region is a much stronger driver in this region.

Whether forests remain a net sink or a net source of carbon varies across regions and RPA scenarios. Under all scenarios, the amount of carbon sequestered by forests is projected to decline between 2020 and 2070. Aboveground carbon density is projected to increase by 17 to 25 percent over 2020 levels, while annual carbon stock change is projected to decrease—an indication that the capacity of forest

"Although forest area increased 3.6 percent between 1977 and 2017, forest area is projected to decrease between 2020 and 2070, with net losses primarily driven by conversion to developed uses."

Whether forests remain a net sink or a net source of carbon varies across regions and RPA scenarios. Under all scenarios, the amount of carbon sequestered by forests is projected to decline between 2020 and 2070. RMRS Research Ecologist John Frank troubleshoots an eddy flux system in the Cameron Peak Fire burn scar on the Arapahoe Roosevelt National Forest. Photo courtesy of Alexandre Dupeyron.

ecosystems to sequester more carbon will be limited. Under future scenarios that include high demand for timber and net forest loss, the forest ecosystem is projected to become a net source of carbon by 2070.

Forests in the Eastern United States have been the driving force behind carbon accumulation since 1990 and stored most forest carbon stocks by 2019. Forest ecosystems in the Western United States, which tend to have slower growth rates and are exposed to more severe disturbance, have contributed only modestly to carbon stocks since 1990. Forests in the Rocky Mountain Region have become and are projected to remain a source of carbon, with stocks decreasing over the next five decades.

Across the country, an estimated 9.6 million family forest owners control more forest land than any other ownership category (39 percent, excluding interior Alaska), yet most family forests do not have a forest management plan. However, in the Rocky Mountain Region, 67 percent of forest land is federally owned and largely under the jurisdiction of the USDA Forest Service or the U.S. Bureau of Land Management. The Rocky Mountain Region has the highest percentage of tribal land (8 percent) in the country. As primary family forest decisionmakers age (56 percent are 65 or older), the intergenerational transfer of forest land has the potential to significantly impact ownership dynamics in the future.

Rangeland

In 2017, the total rangeland area in the conterminous United States was about 658 million acres (266.3 million ha). More than half is privately owned, 34 percent is federally owned, and about 11 percent is owned by states and tribes. Rangeland has been decreasing by about 399,000 acres per year since 1982, largely from privately owned rangeland lost to conversion to urban and agricultural land uses. Federally owned rangeland tends to remain constant, and the rate of loss is expected to remain relatively constant in the future. At a loss rate of about 242,412 acres (98,101 ha) per year, the total loss by 2070 is projected to be 11,613,935 acres (4,699,993 ha).

Non-Federal rangeland in the Rocky Mountain Region accounted for 65 percent of all non-Federal rangeland area in the United States (about 262 million acres; 106 million ha) in 2017. To put this in perspective, consider that from 1982 to 2017, the RPA Rocky Mountain Region lost the greatest number of acres of rangeland (7,680,035 acres, 3,108,000 ha) or 2.9 percent of the total area; whereas the North Region lost 20 percent of the total area, which accounted for only 49,421 acres (20,000 ha).

By midcentury, rangeland losses are expected to be minor nationally, decreasing 2.7 percent to a base of 635 million acres (257 million ha). But regional and local projections tell a different story. The Pacific Coast Region is projected to lose the most rangeland area, as much as 8.1 percent by midcentury. Some counties within that region could lose up to 25 percent to urbanization. Comparatively, the RPA Rocky

There are projected shifts in growing seasons. Both the start and the end of the growing season are projected to shift earlier through time, resulting in shorter periods of plant growth overall. Weather data collected by a technician at a blue bunch wheatgrass experimental plot in Idaho is used by researchers to explore how different populations are adapted to different climates. USDA Forest Service photo by Francis Kilkenny.

Mountain Region is projected to lose a maximum of 1.6 percent by midcentury.

Nonetheless, rangelands throughout the United States are experiencing an assortment of disturbances, including invasive species, wildfires, and drought, some of which are changing ecosystem dynamics in unprecedented ways. Invasive species are found on 30 percent or more of the non-Federal rangelands in the United States. Annual grasses like cheatgrass are considered one of the greatest threats to rangelands because they can completely replace native vegetation and increase fire-return intervals. The increasing prevalence of invasive annual species has contributed to an increased amount of rangeland area burned, which has nearly doubled since 2000. The prevalence of invasive species varies locally. While cheatgrass was present on 18.6 percent of non-Federal rangeland from 2011 to 2015, it occupied 50 percent or more of non-Federal rangelands in Oregon, Washington, Idaho, Nevada, South Dakota, and Utah. From year to year, changes to forage occur alongside increases to invasive species and drought intensity and frequency, with impacts for livestock and wildlife. The presence of invasive annual grasses reduces resiliency to drought.

In addition to disturbance, changes in plant productivity are a concern. "The north is getting greener and the south, on average, is getting browner," Reeves says. Net primary productivity of U.S. rangeland has increased in northern regions and decreased in southern regions where droughts of the last 20 to 40 years have been pulling down the productivity trend line.

Also concerning are projected shifts in growing seasons. Both the start and end of the growing season are projected to shift earlier through time, resulting in shorter periods of plant growth overall. Nationally, the start of the season is projected to range from 4 to 5 days earlier from 2020 to 2040, and 6 to 8 days earlier by midcentury (2041 to 2070) under RCP 4.5. Start of season projections for the Rocky Mountain Region are similarly earlier, 4 to 5 days (2020 to 2040) and 4 to 8 days (2041 to 2070). The end of season is projected to shift more than the start of season for all regions under both time periods, with the Rocky Mountain Region losing 6 to 10 days from 2040 to 2070.

While longer frost-free periods could theoretically result in longer growing seasons across U.S. rangelands, shorter growing seasons are attributed to limitations in the availability of water and nitrogen. Shifts in growing season even by a few days can have cascading impacts to food webs.

"Climate change can create a mismatch between the time specific vegetation (food) is available and the time when consumers are seeking

Net primary productivity of U.S. rangeland has increased in northern regions and decreased in southern regions where droughts of the last 20 to 40 years have been pulling down the productivity trend line. Rocky Mountain Research Station researchers constructing a rainout shelter for a drought study in the Buffalo Gap National Grassland. USDA photo by Alexis Neukirch.

that vegetation," the 2020 RPA Assessment authors write.

For example, if pollinators such as bees and butterflies arrive in spring to find that the plants they depend on have flowered early, the opportunity for pollination and seed development could be lost, threatening not only the ability of the pollinators to reproduce, but also the food webs that hinge on pollination.

Water

In addition to changes in plant productivity, the availability of fresh water in the future is uncertain. One thing that is clear, however, is that forests will continue to play a significant role. Within the conterminous United States, 39 percent of all freshwater originates on forested lands, and 15 percent from national forests and grasslands. The Eastern United States has a larger forested land base, but in the West the extent of federally managed forests is greater. In the RPA Rocky Mountain Region, 32 percent of the water yield comes from forests on National Forest System land. In the Western states (Rocky Mountain Region and Pacific Coast regions combined) that number is 26 percent. Regardless of region, stewardship of freshwater resources requires managing both public and private forests.

Water conservation strategies of the past four decades tell an encouraging story. Even in areas with significant population increase, conservation efforts have reduced total water demand throughout the country. Water use in the United States decreased 9 percent between 2010 and 2015, making 2015 the lowest level of water use since before 1970. This is largely due to efficiency gains in household appliances, thermoelectric power generation, and irrigated agriculture, along with changes in the U.S. economy that have favored less water-intensive service industries.

Within the conterminous United States, 39 percent of all freshwater originates on forested lands, and 15 percent from national forests and grasslands. Field techs recording sample data by the side of a stream in the forest. USDA photo by Alexis Neukirch.

Still, large regions of the country are projected to face increasing water scarcity in the future. Periods of drought are likely to become longer, and drought intensity is likely to increase considerably in the future. Under lower and high-atmospheric warming futures, extended dry spells in the Southwest are projected to turn short-term shortages into long-term intense shortages. This pattern extends into the southern Rocky Mountains (but with lower intensity), as well as the North Central Subregion, which currently experiences only low-intensity shortages.

The availability of fresh water in the future will be influenced by population growth, technological innovations, and continued changes in regional climatic patterns. Water conservation policies, practices, and incentives have proven successful in the past and will continue to be important. Policies that either impose restrictions or provide incentives to reduce water use are likely to become more common.

Developing drought management plans and promoting conservation practices among water users will be critical. However, longer-term responses to climate change could require substantial transfers from agriculture to urban users, which could have serious negative impacts on rural communities. While increasing reservoir storage might provide short-term relief, lack of sufficient water to fill reservoirs is already an increasing problem throughout the country. Regions that rely on hydroelectric power may be significantly impacted if reservoir levels are too low.

Insight: Management Can Make a Difference

The combination of population growth, land use development, and increasing demand for resources from water and forest products to rangeland and recreation will create an increasingly challenging and complex management landscape. The resulting pressures on the natural world and increasing variability of conditions will intensify the importance of incorporating flexibility and adaptation into management strategies and policies.

"The way we manage annual operating instructions for grazing permits," says Reeves, "while flexible, may not be flexible enough to deal with the types of shocks that we are seeing, and that we're going to see: longer fire seasons, earlier

Developing drought management plans and promoting conservation practices among water users will be critical. However, longer-term responses to climate change could agriculture to urban users, which could have serious negative impacts on rural communities. The South Platte River flows from Elevenmile Canyon near Lake George, Colorado, on the Pike-San Isabel National Forest. USDA photo by Erika Reiter.

green up, greater drought, bigger green periods."

For rangeland management, greater adaptability means having better and more timely information to inform decisions, technological innovations like virtual fencing, and more flexible permit administration that includes collaboration with other agencies.

To illustrate this point Reeves offers a hypothetical situation where a rangeland fire burns in October and wipes out winter elk habitat. In this case, managers may need to respond quickly to avert the possibility of starvation for animals and may consider options for providing different winter habitat for native ungulates. Flexible permits to graze cattle in the same area could allow the Forest Service to work with the permittee to find alternative sources of forage, perhaps on neighboring BLM land.

Closer collaboration among public and private landowners, scientists, managers, and stakeholders becomes increasingly important as competing demands for natural resources expand. Linda Joyce advises early career scientists to cultivate relationships with managers and policymakers to better understand how their research can directly address management needs. She also recommends finding opportunities to work on the ground alongside managers. Reeves' advice for early career resource managers is

"As the characteristics of disturbances and disturbance regimes change—becoming more severe, more frequent, longer in duration, or spreading to previously unaffected ecosystems—they could challenge the effectiveness of existing management techniques and paradigms and may force changes or adjustments."

—2020 RPA Assessment

Key Management Implications

- The 2020 RPA is a valuable resource for land managers as they develop strategies to sustain natural resources.
- Several support tools have been developed to help managers and planners use the 2020 RPA Assessment, including the RPA Assessment Land Management Planning Data Catalog, Quick Reference Guides, and webinars.
- Data accessed via the RPA Assessment Land Management Planning Data Catalog can be applied regionally and at finer scales and used to inform forest planning.
- Land management and adoption of conservation measures can reduce pressure on natural resources.
- Management strategies and policies that allow for greater flexibility and adaptability, as well as greater collaboration, will help managers and landowners navigate increasing variability and growing pressures on the natural world.
- Water conservation in the United States is a management success story, but challenges lie ahead that will warrant drought management plans and further conservation strategies.

Key Findings

- Land development will continue to threaten the integrity of forest and rangeland ecosystems in the lower 48 United States.
- The combination and interaction of socioeconomic change, climate change, and the associated shifts in disturbances will strain natural resources and lead to increasing management challenges.
- In some RPA scenarios, shifts in land use and demand for wood may have a greater effect on future conditions than changes in climate.
- The amount of carbon sequestered by forests annually is projected to decline, and under some future scenarios the forest ecosystem is projected to become a net source of carbon by 2070.
- By midcentury, rangeland growing seasons are projected to be 6 to 10 days shorter nationally, which can cause cascading impacts to food webs.
- Even in areas with significant population increases, conservation efforts have reduced total water demand throughout the country. However, the future availability of water is uncertain, and more frequent and intense droughts are likely.

similar: "Invest more time in relationships because the job is too hard to do it on your own." This means not only reaching out to colleagues and scientists, but also being responsive to constituent needs. With increasing variability, he says, "it will be important for stakeholders to understand why you're making the decisions you're making, and we need to invest in the ability to explain them."

The 2020 RPA Assessment in a Snapshot

The 2020 RPA Assessment projects the effects of socioeconomic and climate change, both nationally and regionally for natural resources in the United States from 2020 to 2070.

Features of the 2020 RPA Assessment include:

- 8 assessment topics (chapters)
- 45 overall key findings at your fingertips
- Discussion of management implications at the end of each chapter

New to the 2020 RPA Assessment:

- Revised projection scenarios
- Finer spatial and temporal resolution for analyses
- Improved land use model that projects future land use at the county scale
- Finer-scaled 90m representations of county-scale land use projections
- Improved and extended resource analyses, including developing projections of forest fragmentation
- A new focus on disturbance, including projections of fire and drought

Land Resources

Forest Resources

Forest Product Markets

Disturbance

Rangeland

Water Resources

Wildlife & Biodiversity

Outdoor Recreation

A Crosswalk to Forest Planning: How to Get the Most Out of the 2020 RPA

The RPA Assessment is dense with information about national and regional trends and projections. Managers looking for more regional or local-scale information and data might appreciate the RPA Data Catalog, which distills the information into management-relevant products.

"A report like the 2020 RPA Assessment can't cover everything," says report coauthor and RMRS research ecologist Matt Reeves, "but the underlying information that's not reported on is available at scales that may be more meaningful. You can access data for your grassland, or an area that you're interested in, through the Data Catalog."

The 2020 RPA Assessment is an excellent source of information for assessing the 15 forest planning topics outlined by the 2012 Forest Service Planning Rule to develop national land management plans. Many resources are available to help planners and managers identify, understand, and locate useful and relevant RPA data, including a Data Catalog and Quick Reference Guides.

RPA-Land Management Planning Data Catalog

To make it easier for forest planners to locate and use resource trend and projection information, the RPA Assessment team partnered with planning staff to create a user-friendly catalog that links RPA Assessment data with specific Planning Rule directives. The RPA-Land Management Planning Data Catalog is a tool designed to help planners identify, locate, and use nationally consistent trend and projection data from the RPA Assessment to address requirements of the 2012 Planning Rule. The Data Catalog is an Excel workbook that highlights connections between 15 Planning Rule assessment topic areas/directives and numerous relevant datasets, tools, reports, maps, and other information from the 2020 RPA Assessment. The tool allows users to filter information by assessment topic, resource area, or planning directive to get a quick view of the RPA Assessment datasets that may meet a specific planning need. The Data Catalog introduces 32 RPA datasets as well as six non-RPA information sources and addresses nearly 50 different planning directives. It will be updated as new information from future RPA Assessments becomes available.

Data Quick Reference Guides

In addition to the Data Catalog, Quick Reference Guides to past and future projection data are available for 11 resource areas. Each Guide lists the 2020 RPA Assessment data products, and basic information about each dataset including units, spatial/temporal scale and resolution, and examples of use. The Guides provide the locations for data downloads where available, and contact information where data are not yet accessible to the public.

Eleven Data Quick Reference Guides:

- Land Resources
- Forest Resources
- Forest Product Markets
- Rangeland Resources
- Water Resources
- Biodiversity Resources
- Recreation Resources
- Disturbances
- Wildland Urban Interface
- Climate
- Socioeconomic Information

The RPA-LMP Data Catalog, a guide to navigating it, and the Data Quick Reference Guides can be found online.

Additional RPA Resources

In addition to underlying datasets, RPA Assessments and periodic updates dating back to 1977 are available, as well as supporting General Technical Reports and journal articles including more than 35 supporting publications for the 2020 RPA Assessment. The RPA Assessment team has also produced a series of supporting webinars.

Webinars

- Scenarios and Projections for the 2020 RPA Assessment
- Climate Scenarios and Projections for the 2020 RPA Assessment
- Forest Resources of the United States
- SCIENCE x Planning for Forests of the Future: Land Resources and Outdoor Recreation
- SCIENCE x Planning for Forests of the Future: Forest Resources and Disturbance
- SCIENCE x Planning for Forests of the Future: Forest Products and Water Resources
- SCIENCE x Planning for Forests of the Future: Rangeland Resources and Biodiversity

Last but not least, planners and managers are encouraged to reach out to the RPA Assessment team of scientists for help.

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Science You Can Use Contributors

Linda A. Joyce is a research ecologist (emeritus) with RMRS. Her research interests include extending climate and ecological output to assess the impacts of climate change to assist land managers; synthesizing adaptation theory and approaches for rangelands; and developing techniques to assess the vulnerability of ecosystems and natural resources at large spatial and institutional scales.

Matt Reeves is a research ecologist with the RMRS Human Dimensions Program. He specializes in use of remote sensing and GIS to facilitate evaluation of contemporary issues facing U.S. rangelands. He is interested in facilitating management and administration of U.S. rangelands and is pursuing numerous efforts to partner with the National Forest System to improve the quality and usefulness of forest plan revisions.

Claire B. O'Dea is the National Program Leader for the Resources Planning Act (RPA) Assessment, overseeing research and development activities related the Renewable Resources Planning Act of 1974 and ensuring continued production of the RPA Assessment.

Travis Warziniack is a research economist with RMRS. His work focuses on valuation of ecosystem services, particularly as they relate to water resources and watershed health. He is generally interested in the role natural resources play in community and economic development.

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