NORTH SACRAMENTO MOUNTAINS
WATERSHED AND FOREST
RESTORATION STRATEGY

NORTH SACRAMENTO MOUNTAINS
WATERSHED AND FOREST RESTORATION
STRATEGY GROUP

a sub-committee of the

GREATER RUIDOSO AREA
WILDLAND-URBAN INTERFACE
WORKING GROUP

APRIL 2018

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LIST OF ACRONYMS

ACEP	Agricultural Conservation Easement Program
BIA	United States Bureau of Indian Affairs
BLM	United States Bureau of Land Management
CBD	Convention on Biological Diversity
CDP	Census Designated Place
CE	Categorical Exclusion
CFLRP	Collaborative Forest Landscape Restoration Program
CFRP	Collaborative Forest Restoration Program
CIG	Conservation Innovation Grant
COA	Conservation Opportunity Area
CPZ	Community Protection Zone
CWCS	New Mexico Comprehensive Wildlife Conservation Strategy
CWPP	Community Wildfire Protection Plan
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMNRD	New Mexico Energy, Minerals and Natural Resources Department
ENMU-R	Eastern New Mexico University–Ruidoso
EQIP	Environmental Quality Incentives Program
ESA	Endangered Species Act
FAC Net	Fire Adapted Communities Learning Network
FAP	Forest Action Plan
FEMA	Federal Emergency Management Agency
FLAME Act	Federal Land Assistance, Management, and Enhancement Act of 2009
FLR	Forest Landscape Restoration
GIS	Geospatial Information Systems
GRAWUIWG	Greater Ruidoso Area Wildland Urban Interface Working Group
HFI	Healthy Forests Initiative
HFPP	Healthy Forests Reserve Program
HFRA	Healthy Forests Restoration Act
IAFC	International Association of Fire Chiefs

IMG	Inn of the Mountain Gods Resort
IDNDR	International Decade for Natural Disaster Reduction
ISDR	International Strategy for Disaster Reduction
IUCN	International Union for the Conservation of Nature and Natural Resources
LANRAC	Lincoln County Land and Natural Resources Advisory Committee
LBFRC	Little Bear Forest Reform Coalition
LCAHMP	Lincoln County All Hazard Mitigation Plan
LCCP	Lincoln County Comprehensive Plan
LCMJHMP	Lincoln County Multi-Jurisdictional Hazard Mitigation Plan
LNF	Lincoln National Forest
MSO	Mexican Spotted Owl
NEPA	National Environmental Policy Act
NFF	National Forest Foundation
NFL	Non-Federal Lands Grant
NFPA	National Fire Protection Association
NMAC	New Mexico Association of Counties
NMDG&F	New Mexico Department of Game & Fish
NMED	New Mexico Environment Department
NM-FPTF	New Mexico Fire Planning Task Force
NMFWRI	New Mexico Forest & Watershed Restoration Institute
NMHU	New Mexico Highlands University
NMSCG	New Mexico State Game Commission
NMSFD	New Mexico State Forestry Division
NMSHMP	New Mexico State Hazard Mitigation Plan
NRCS	United States Natural Resource Conservation Service
NRD	Mescalero Apache Tribe Natural Resources Department
NSM	North Sacramento Mountains
NSMWFRSG	North Sacramento Mountains Watershed & Forest Restoration Strategy Group
OSE	New Mexico Office of the State Engineer
OWG	Otero Working Group

PAC	Protected Activity Center
PFA	Post-Fledging Family Areas
RCPP	Regional Conservation Partnership Program
REDD+	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
RMRS	Rocky Mountain Research Station
RTRL	Reserved Treaty Rights Lands
SBRA	Sierra Blanca Regional Airport
SCM	South-Central Mountains
SCMEDA	South-Central Mountain Economic Development Association
SCMRC&D	South-Central Mountain Resource Conservation & Development Council
SET	Stronger Economies Together
SFI	Sustainable Forestry Initiative
SGCN	Species of Greatest Conservation Need
SLO	New Mexico State Land Office
SWCD	Soil and Water Conservation District
SWAP	New Mexico State Wildlife Action Plan
TNC	The Nature Conservancy
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNCSD/Rio+20	United Nations Conference on Sustainable Development
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
UNISDR	United Nations International Strategy for Disaster Reduction
USFS	United States Forest Service
USFWS	United States Fish & Wildlife Service
WFLC	Wildland Fire Leadership Council
WTB	Water Trust Board
WUI	Wildland-Urban Interface
WWFPC	Western Wildland Fire Prevention Committee

EXECUTIVE SUMMARY

Since 2000, the Greater Ruidoso Area Wildland Urban Interface Working Group has worked to improve forest health and reduce the risk of wildfire in Lincoln County, NM, focusing primarily on the area around Ruidoso. Participants in the Working Group include the U.S. Forest Service, the New Mexico State Forestry Division, the Mescalero-Apache Tribe, the Village of Ruidoso Forestry Department, the Upper Hondo Soil & Water Conservation District, the Carrizozo Soil & Water Conservation District, the Bureau of Indian Affairs, the Little Bear Forest Reform Committee, the Lincoln County Land and Natural Resources Advisory Committee, the Lincoln County Ecoservants, Eastern New Mexico University – Ruidoso, and the South Central Mountain Resource Conservation and Development Council.

Toward the end of 2016, the Working Group initiated a process to a develop a strategy document and to expand the project area to include the Northern Sacramento Mountains. A subcommittee was formed, which met six times during 2017 and early 2018 to develop the strategy. The focus of the strategy is reducing fuels and restoring health to the forests of the Northern Sacramento Mountains, through interagency collaboration. The purpose is to provide a measure of protection to the wildland-urban interface areas in the Northern Sacramento Mountains by mitigating the threat of catastrophic wildfire in areas with vegetation that is susceptible to wildfires. Much of the forested landscape in the Northern Sacramento Mountains fits this description. Both initial forest treatments to reduce fuel loads and maintenance of treated areas are necessary to restore forests to a healthy condition. Treatments can be carried out by mechanical means, by hand, using chemicals, or using fire.

The strategy developed by the subcommittee identified boundaries for the project area and mapped six focus areas within the project area to facilitate implementation of fuel reduction projects. The strategy also identifies values at risk across the landscape, and opportunities for fundraising. Collaborators in the Working Group have opportunities for cross-boundary work and large landscape restoration as a result of the relationships that have been formed. Collaborators can share resources to reduce the costs and labor necessary to carry out restoration projects. The activities of the Working Group align with existing plans and policies at the international, national, statewide, regional and local levels.

The Working Group recognizes the importance of communications with the public to generate support for fuel reduction treatments. Good communications facilitates, among other things, working directly with homeowners to implement projects that protect their home and property. The Working Group also recognizes the importance of a viable wood products industry to utilize material removed from the forest in treatments. Along with a partner collaborative organization in Otero County, the Working Group has taken a lead role statewide in supporting the forest industry, by organizing wood industry summits held in Ruidoso.

NORTH SACRAMENTO MOUNTAINS WATERSHED AND FOREST RESTORATION STRATEGY

I. Introduction

New Mexico's South-Central Mountains ("SCM") are located between the Tularosa and Pecos River Basins, north of New Mexico's southern border with Texas, in Lincoln, Otero, Chaves and Eddy counties. The northern portion of these mountains, roughly the area north of U.S. Highway 70, includes the Sacramento, Capitan, Jicarilla and Vera Cruz mountain ranges (together, the North Sacramento Mountains, "NSM"). These chains range in elevation from about 4,500 feet above sea level in the Tularosa Basin to 12,003 feet at Sierra Blanca. The mountains are blanketed with pinyon-juniper, ponderosa pine, mixed conifer and subalpine forests.[1] Historically, most of these forests would experience frequent to occasional low-intensity wildfires. Due to past forest management practices and fire suppression, as well as extended drought conditions, many of the forested areas in the SCM are in need of restoration today to reduce the fuels and the threat of insect and disease infestations, and to improve watershed functioning and wildlife habitat.[2]

The SCM are a popular tourist draw, offering beautiful vistas, tranquil forests and many opportunities for leisure and recreation, ranging from hiking, skiing and hunting to gaming, fine dining and entertainment. In particular, the areas around the Village of Ruidoso and neighboring Ruidoso Downs, and the nearby Inn of the Mountain Gods ("IMG") resort, are popular with visitors. Many residents have homes or cabins in forested areas, and the tourism infrastructure represents a large investment as well as a source of employment and income for the area. Yet, Ruidoso has been identified as a community at high risk of a wildfire,[3] and most of the

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[1] Dick-Peddie, W. A. (1993). *New Mexico vegetation: Past, present and future*. Albuquerque, NM: University of New Mexico Press.

[2] Allen, C. D., Savage, M., Falk, D. A., Suckling, K. F., Swetnam, T. W., Schulke, T., Stacey, P. B., Morgan, P., Hoffman, M., & Klingel, J. T. (2002). Ecological restoration of Southwestern Ponderosa pine ecosystems: A broad perspective. *Ecological Applications 12*(5):1418–33.

[3] Urban wildland interface communities within the vicinity of federal lands that are at high risk from wildfire, 66 Fed. Reg. 751, 769 (Jan. 4, 2001) and 66 Fed. Reg. 43384, 43413 (Aug. 17, 2001). *See also* Griego, D., Anderson, X., Filip, B., Hester, M., Morales, R., & Valdez, G. (2016). *New Mexico communities at risk assessment plan*. Santa Fe, NM: Energy, Minerals and Natural Resources Department, Forestry Division. *Available at* http://www.emnrd.state.nm.us/SFD/FireMgt/documents/2016_CAR_PlanRevision12.13.16..pdf.

mountainous region in the NSM is also at risk. The prevalence of people who live in and use the landscape in the NSM create wildland-urban interface ("WUI") conditions, which pose complex management challenges, and increase the risk of significant damages associated with wildfires.[4] Some of the factors that are used to assess risk include fire behavior potential, values at risk, and the infrastructure that facilitates firefighting.[5]

Land ownership in the NSM is a mixture of federal, state, tribal, local and private lands. The largest landholdings are the Smokey Bear Ranger District of the Lincoln National Forest ("LNF"),[6] managed by the U.S. Forest Service ("USFS"), and the Mescalero Apache Reservation,[7] managed by the Tribal Government's Natural Resources Department in collaboration with the federal Bureau of Indian Affairs ("BIA"). Interspersed with the national forest are private lands and forested areas owned by the City of Alamogordo and the Village of Ruidoso. Private lands are used for homes, vacation cabins, grazing cattle, small tree farms, horse farms, hunting grounds, and small businesses. Ranchers run cattle on private land, as well as on allotments on the national forest. Many private landowners participate in one of the soil and water conservation districts that include land in the NSM.[8]

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[4] Noss, R. F., Beier, P., Covington, W. W., Grumbine, R. E., Lindenmayer, D. B., Prather, J. W., Schmiegelow, F., Sisk, T. D., & Vosick, D. J. (2006). Recommendations for integrating restoration ecology and conservation biology in Ponderosa pine forests of the Southwestern United States. *Restoration Ecology 14*(1):4–10.

[5] *See* Urban wildland interface communities, 66 Fed. Reg. 751, 753 (Jan. 4, 2001). *Idem*, *See* footnote 3.

[6] The Lincoln National Forest was originally created in 1902 as the Lincoln Forest Reserve by proclamation of President Theodore Roosevelt. Proclamation No. 32, 32 Stat. 2018 (July 26, 1902). The reserve's boundaries included much of the area that forms the Smokey Bear Ranger District today. In 1907, the name was changed to Lincoln National Forest. Pub. L. No. 59-242, 34 Stat. 1256, 1269 (Mar. 4, 1907). Over the years, the boundaries were adjusted several times and the Lincoln was combined with the Gallinas, Alamo, Sacramento and Guadalupe National Forests to create the Lincoln National Forest with today's boundaries. *See* USDA Forest Service. (2012). *Establishment and modification of national forest boundaries and national grasslands: A chronological record, 1891–2012*. Washington, DC: USFS Land and Realty Management Staff. *Available at* https://www.fs.fed.us/land/staff/Documents/Establishment and Modifications of National Forest Boundaries and National Grasslands 1891 to 2012.pdf.

[7] Bands of the Mescalero Apache Tribe have lived in the area that today comprises the Southwestern U.S. and northern Mexico for hundreds of years, long before European colonization. The Mescalero were nomadic agriculturalists, eventually settling in the mountainous areas of New Mexico. A reservation for the Mescalero Apache Tribe was created by an Executive Order issued by President Ulysses S. Grant on May 29, 1873. The original order was modified by several additional Executive Orders, issued by President Grant on Feb. 2, 1874 and Oct. 20, 1875, and by President Chester A. Arthur on May 19, 1882 and Mar. 24, 1883, which created the current reservation.

[8] These include the Upper Hondo SWCD, the Carrizozo SWCD, the Otero SWCD and the Chaves SWCD.

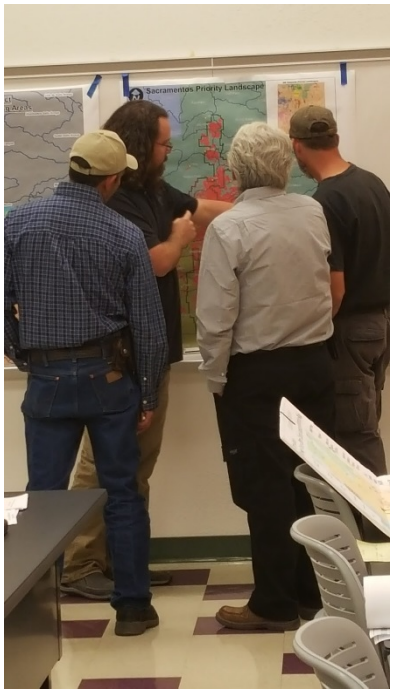
The North Sacramento Mountains Landscape Restoration Working Group ("NSMLRWG") was formed in October 2016 as a sub-committee of the Greater Ruidoso Area WUI Working Group ("GRAWUIWG").[9] The GRAWUIWG has met regularly and coordinated forest treatment projects within the Village of Ruidoso and on surrounding forested areas since 2000.[10] The NSMLRWG was created to prepare this strategy document, which will assist the GRAWUIWG in its ongoing landscape restoration projects. The NSMLRWG met several times during 2016 and 2017 to discuss the strategy and issues that the GRAWUIWG would address in the coming years. At these meetings, the NSMLRWG identified the boundaries of a project area for the GRAWUIWG, which expand the GRAWUIWG's project area. The NSMLRWG also identified and mapped focus areas that define the boundaries for specific treatments and potential collaborative projects. In addition, the group discussed the mission of the GRAWUIWG and potential groups to include in the collaborative efforts, as well as characteristics of the landscape and population to include in this strategy document.

II. The Challenge

As a short overview, the problem across the SCM is that human activity over the past century has altered the forests from their natural regimes, increasing the risk of large, fast-moving and catastrophic wildfires in the region. Forest ecosystems in the SCM are fire dependent, especially in Ponderosa pine (*Pinus ponderosa* Lawson & C. Lawson) forests, but under historic conditions fires were low-intensity and burned along the ground. Under the altered conditions, forests are denser and more susceptible to high-intensity fires that can quickly move across landscapes, scorching hundreds or thousands of acres. In dense forests, fires are more likely to climb into the canopies of trees, facilitating a rapid advancement, especially under dry and windy conditions.

[9] Participants in the NSMLRWG represented the U.S. Forest Service, the New Mexico State Forestry Division, the Mescalero Apache Tribe, the Village of Ruidoso, the Bureau of Indian Affairs, the Carrizozo Soil & Water Conservation District, the Upper Hondo Soil & Water Conservation District, the Little Bear Forest Reform Coalition, the Lincoln County Land & Natural Resources Advisory Committee, Eastern New Mexico University-Ruidoso, the South-Central Mountains RC&D, and the New Mexico Forest & Watershed Restoration Institute.

[10] National Fire Protection Association. (2016). *Firewise USA: Village of Ruidoso*. *Available at* http://www.firewise.org/wildfire-preparedness/be-firewise/success-stories/success-stories-archive/new-mexico/village-of-ruidoso.aspx.



Members of the North Sacramento Landscape Restoration Working Group meet in Ruidoso to plan the strategy document

While fire is a natural part of the landscape in the SCM, a long history of active forest management in the area has substantially altered the forests. Since the early twentieth century, forest managers have been suppressing wildfires to protect communities as well as forest resources, and fire suppression has combined with logging, grazing, predator control and effects from exotic species to alter the structure of the natural ecosystems. Today, forests are overstocked with many small diameter trees, perhaps up to 1,000 trees per acre on landscapes that had approximately 50 trees per acre historically. The large number of smaller trees provide abundant fuel for wildfires. The smaller trees and bushes also create ladder fuels that more easily transmit a fire from the ground to the crowns of the trees. Once a fire reaches the crown, it is more damaging to the tree, and kills many trees. The fire also can easily spread, jumping forward with embers that can land on trees several hundred yards ahead of the fire. As a result, New Mexico has experienced some of the largest wildfires on record since 2000.[11] In Lincoln County, from 1987 through 2007 650 fires burned 135,669 acres.[12] On the Smokey Bear Ranger District,

[11] Abrams, J., Nielsen-Pincus, M., Paveglio, T., & Moseley, C. (2016). Community wildfire protection planning in the American West: Homogeneity within diversity? *Journal of Environmental Planning and Management 59*(3):557–72.
[12] Barker, J.R. (2008). *Lincoln County community wildfire protection plan*. Boulder, CO: Walsh Environmental Scientists and Engineers.

between 1998 and 2017, there were 339 small fires between 0.1 and 10 acres, and 21 large fires that burned more than 10 acres. The total acreage burned by large fires was 249,782. See Appendix C for maps of previous wildfires in the NSM.

The U.S. and the global community have responded to the challenges posed by wildfire risks with policies that have revised forest management. In the 21st century, forest management has transitioned from a product-based enterprise, to a restoration approach. This puts the disciplines of restoration ecology and collaborative conservation front and center on the nation's forest management priorities. An immediate need throughout many of the forests in the SCM is to greatly reduce the number of trees per acre, thereby decreasing the fuels that contribute to high-intensity wildfires.

Reducing the fuel load would assist with other potential problems, as well, such as the risk of insects and diseases attacking trees. Bark beetles are common forest pests in the SCM, and commonly attack Ponderosa pine.[13] Ordinarily, bark beetle populations are relatively small, and they attack trees that are weakened or stressed by factors such as drought, disease or lightning strikes. However, bark beetle populations can grow and cause significant damage in overstocked stands of trees, and large populations can even spread to neighboring stands that are healthier. Severe bark beetle attacks can last several years. Dwarf mistletoe (*Arceuthobium spp.* M.Bieb.) is a significant disease pest in the SCM as well.[14] As a parasitic species, dwarf mistletoe is entirely dependent on its host for water, nutrients and support, weakening the host tree.[15] Fire suppression over an extended period exacerbates mistletoe infestations. Drought conditions have plagued the SCM for several years, and this increases the risk of wildfire as well as insect or disease infestations.

[13] The most common bark beetle pests in the South Central Mountains are the Western Pine Beetle (*Dendroctonus brevicomis* LeConte), the Roundheaded Pine Beetle (*D. adjunctus* Blandford), and Pine Engravers (*Ips spp.*). For more information on these species, *see* USDA Forest Service. (2011). *Western pine beetle*. *Available* at https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5343830.pdf; USDA Forest Service. (2011). *Roundheaded pine beetle*. *Available at* https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5343831.pdf; and USDA Forest Service. (2011). *Pine* Ips *species (engraver beetles)*. *Available at* https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5299326.pdf.

[14] Conklin, D. A. & Fairweather, M. L. (2010). *Dwarf mistletoes and their management in the Southwest*. Forestry and Forest Health R3-FH-10-01. Albuquerque, NM: USDA Forest Service, Southwestern Region.

[15] Hoffman, J. T. (2004). *Management guide for dwarf mistletoe*. USDA Forest Service. *Available at* https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5187427.pdf.

Climate change also produces conditions that are more conducive to large, catastrophic wildfires, as forests are drier and burn more easily in the new climate regime.[16] Changing rain and snowfall patterns, reduced snowpack in the winter, and earlier spring thaws all contribute to conditions that facilitate catastrophic wildfires, and that have extended the annual wildfire season by several weeks in recent years.[17] A changing climate also affects wind patterns, and high winds exacerbate wildfires by spreading the fire more quickly and drying out fuels in the forest. Climate change also has altered long-standing predictable characteristics in the fire season, so forest managers have had to adjust their expectations and planning to adapt to new conditions.[18] Planning is more difficult under the highly variable and increasing uncertainty stemming from climate change.[19]

The increased incidence and size of wildfires, combined with more people using forested areas, have required the USFS to dedicate more resources to fire suppression.[20] This leaves less money in USFS budgets for other activities, including forest management and, ironically, treatments to reduce the risk of wildfires. Additionally, agencies have faced "entrenched disincentives" that perpetuate suppression as the proper response to wildfire, rather than using

[16] Kent, L. Y. (2015). *Climate change and fire in the Southwest*. ERI Working Paper No. 34. Flagstaff, AZ: Ecological Restoration Institute and Southwest Fire Consortium. *See also* Funk, J., Barnett-Loro, C., Rising, M., & Deyette, J. (2016). *Confronting climate change in New Mexico: Action needed today to prepare the state for a hotter, drier future*. Union of Concerned Scientists, Cambridge, MA. *Available at* http://www.ucsusa.org/NewMexicoClimateChange.

[17] U.S. Forest Service. (2015). *The rising cost of wildfire operations: Effects on the Forest Service's non-fire work*, p. 2. Washington, DC: USDA, Forest Service. *Available at* https://www.fs.fed.us/sites/default/files/2015-Fire-Budget-Report.pdf.

[18] For example, NEPA analyses (see page 40) can be affected by a changing climate, as the choice between applying a categorical exclusion, an environmental assessment or an environmental impact statement depends, in part, on a manager's ability to predict accurately environmental effects. This is more difficult under changing climatic conditions. Local governments can assist with climate change mitigation and adaptation plans. Collaborative groups are a good venue for discussing how scarce resources will be allocated to address adaptation to a changing climate. *See* Measham, T. G., Preston, B. L., Smith, T. F., Brooke, C., Gorddard, R., Withycombe, G., & Morrison, C. (2011). Adapting to climate change through local municipal planning: Barriers and challenges. *Mitigation and Adaptation Strategies for Global Change 16*(8):889 – 909; Baker, I., Peterson, A., Brown, G., & McAlpine, C. (2012). Local government response to the impacts of climate change: An evaluation of local climate adaptation plans. *Landscape and Urban Planning 107*:127–136.

[19] Millar, C. I., Stephenson, N. L., & Stephens, S. L. (2007). Climate change and forests of the future: Managing in the face of uncertainty. *Ecological Applications 17*(8):2145–2151.

[20] U.S. Forest Service. (2015). *The rising cost of wildfire operations: Effects on the Forest Service's non-fire work*. Washington, DC: USDA, Forest Service. *Available at* https://www.fs.fed.us/sites/default/files/2015-Fire-Budget-Report.pdf.

fire, including natural ignitions, as a management tool.[21] The potential to incur legal liability is one factor working against using fire as a tool.[22] Wildfire policy and the norms that guide the behavior of individuals within agencies such as the USFS may also affect the scope and speed of adaptive change to new approaches.[23] Nevertheless, in recent years, the USFS has moved towards greater use of prescribed fire and managed wildfires as a means of implementing forest restoration objectives; however, the number of acres burned through fire management remains relatively small as fire suppression is the dominant approach to addressing wildland fires.[24] On private lands, owners face similar liability issues, and an insurance industry unwilling to issue policies to cover risks associated with prescribed burns.[25]

III. Natural Landscape

The landscape in the SCM represents a mixture of human uses and natural areas. The forest ecosystems and ecological communities generally follow patterns observed in the southern Rocky Mountains. Forest type and ecological associations are dependent on elevation, aspect, availability of moisture and the history of disturbance, including wildfires, significant insect and disease outbreaks, and human alteration. As described above, human activities, including logging and fire suppression, have altered succession patterns and have produced forests that are substantially different in structure from the historically observed range of variation. Forest restoration focuses on returning natural ecosystems, wildlife habitat, and watercourses to their historical structure and function, which includes periodic low-intensity wildfires for most forests.

[21] North, M. P., Stephens, S. L., Collins, B. M., Agee, J. K., Aplet, G., Franklin, J. F., & Fulé, P. Z. (2015). Reform forest fire management. *Science 349*(6254):1280–1.
[22] Wonkka, C. L., Rogers, W. E., & Kreuter, U. P. (2015). Legal barriers to effective ecosystem management: Exploring linkages between liability, regulations, and prescribed fire. *Ecological Applications 25*(8):2382–2393.
[23] Steen-Adams, M. M., Charnley, S., & Adams, M. D. (2017). Historical perspective on the influence of wildfire policy, law, and informal institutions on management and forest resilience in a multiownership, frequent-fire, coupled human and natural system in Oregon, USA. *Ecology and Society 22*(3):23–48; *See also* Donovan, G. H., & Brown, T. C. (2005). An alternative incentive structure for wildfire management on national forest land. *Forest Science* 51(5):387–95.
[24] Schoennagel, T., Balch, J. K., Brenkert-Smith, H., Dennison, P. E., Harvey, B. J., Krawchuk, M. A., Miekiewica, N., Morgan, P., Moritz, M. A., Rasker, R., Turner, M. G., & Whitlock, C. (2017). Adapt to more wildfire in western North American forests as climate changes. *Proceedings of the National Academy of Sciences 114*(18):4582–90.
[25] Evans, A., Rodriguez, M., & Krasilovsky, E. (2017). *Controlled burning on private land in New Mexico*. Santa Fe, NM: Forest Stewards Guild.

North Sacramento Mountains Forest Landscape

Ecology of the South-Central Mountains

The basins surrounding the SCM are dominated by high Chihuahuan desert and grasslands. Forested landscapes begin along the slopes of the mountains as they rise up from the Tularosa Basin to the west and the Pecos River Basin to the east. At lower elevations, beginning around 5,500 feet above sea level, the forests are dominated by pinyon-juniper associations, including Pinyon pine (*Pinus edulis* Engelm.), One-seed juniper (*Juniperus monosperma* [Engelm.] Sarg.), and Alligator juniper (*Juniperus deppeana* Steud.).[26] At mid-elevations, beginning at approximately 6,500 feet, pinyon-juniper transitions into Ponderosa pine forests, in some cases in association with Gamble oak (*Quercus gambelii* Nutt.) and other species. At approximately 8,000 feet, Ponderosa pine forests transition into mixed conifer forests. Species such as Douglas fir (*Pseudotsuga menziesii* [Mirb.] Franco) and White fir (*Abies concolor* [Gordon] Lindl. ex Hildebr.) intermix with Ponderosa pine in dry mixed conifer forests, and as the elevation increases, species such as Southwestern White pine (*Pinus strobiformis* Engelm.) and Blue spruce (*Picea pungens* Engelm.) appear in wet mixed conifer forests. The highest altitudes are dominated by spruce-fir associations, with Engelmann spruce (*Picea engelmannii* Parry ex Engelm.) and Subalpine fir (*Abies lasiocarpa* [Hooker] Nuttall) as the dominant species. Aspen (*Populus tremuloides* Michx) is also found in higher elevation forests, especially as an early successional species in burned areas. In canyons and arroyos near water, riparian vegetation and

[26] *See* Elmore, F. H. & Janish, J. R. (1976). *Shrubs and trees of the southwest uplands*. Tucson, AZ: Southwest Parks and Monuments Association; Kaufmann, M. R., Huckaby, L. S., Regan, C. M., & Popp, J. (1998). *Forest reference conditions for ecosystem management in the Sacramento Mountains, New Mexico*. USDA Forest Service, Rocky Mountain Research Station, GTR-19. p. 14.

mixed-species montane gallery forests occur. The species associations in these forests vary considerably, and may include willows (*Salix spp.*), alders (*Alnus spp.*), dogwood (*Cornus spp.*), maple (*Acer spp.*), oaks (*Quercus spp.*) and poplar (*Populus spp.*). At all elevations, forests on wetter north-facing slopes differ from forests at the same elevation on drier south-facing slopes.

Within each forest type, individual stands represent tremendous variation in tree size and density, species composition, understory vegetation, slope and aspect, proximity to WUI areas and values at risk, and other factors that must be considered in determining management goals and preparing a prescription for a treatment.

Fire Dependent Forests

All of the forests in the SCM are fire dependent. Under historic conditions, pure Ponderosa pine stands were open, park-like areas with clumps of trees and lots of grassy areas.[27] These forests burned frequently, every five to twenty years on average. The fires typically were ground fires that burned the grasses, bushy vegetation, and young trees. Older and larger trees resisted the fires and survived. Occasional fires would burn into the crowns of the trees and spread more rapidly, creating a stand-replacement fire, but most burns were low-intensity and limited to smaller areas. These fires served to regenerate the stands of trees. Wet mixed conifer forests tended to burn less frequently, perhaps every 200 years, and fires in these forests tended to be larger, consuming much of the vegetation. Wildfires in pinyon-juniper forests were much more variable, due to the greater variation in the structure of pinyon-juniper areas.

The natural ecology of fire dependent forests was altered through most of the twentieth century by fire suppression, which altered the regular fire regime in these forests. An important goal of forest restoration is to return fire to the landscape, so that relatively frequent, low-intensity fires can maintain healthy forest landscapes and reduce the risk of large, catastrophic wildfires. Because the public has become accustomed to fire suppression and typically views wildfires as negative, it is necessary to reorient public perceptions regarding wildfires. This

[27] Reynolds, R. T., Sánchez-Meador, A. J., Youtz, J. A., Nicolet, T., Matonis, M. S., Jackson, P. L., DeLorenzo, D. G., & Graves, A. D. (2013). *Restoring composition and structure in Southwestern frequent-fire forests: A science-based framework for improving ecosystem resiliency*. USDA Forest Service, Rocky Mountain Research Station GTR-310.

includes getting used to occasional smoky days in populated areas as a result of more frequent wildfires.

Fire suppression must continue in areas near vital resources, such as reservoirs or WUI areas, and wildfires caused by human ignitions also generally are suppressed. However, land managers are increasingly managing naturally ignited wildfires for resource benefits.[28] The viability of these policies, however, depends on careful application of fire management principles, to maintain public support for these activities.

Species of Concern

The SCM host a large population of Mexican Spotted Owls ("MSO") (*Strix occidentalis lucida* Nelson). The MSO is listed as a threatened species by the U.S. Fish and Wildlife Service ("USFWS"),[29] under the federal Endangered Species Act ("ESA").[30] The USFS and the Mescalero Tribe manage their lands to protect MSO habitat, using different protocols.[31] The USFS follows the protocols from the USFWS Spotted Owl Recovery Plan,[32] and have designated 27 Protected Activity Centers ("PACs") for spotted owl pairs on the Smokey Bear Ranger District. Owl PACs are at least 600 acres in size and protect a nesting pair, its nesting site, several roosting sites, and foraging habitat.[33] These owl PACs are clear values at risk from a wildfire, protected by the ESA.[34]

[28] Boisramé, G., Thoimpson, S., Collins, B., & Stephens, S. (2017). Managed wildfire effects on forest resilience and water in the Sierra Nevada. *Ecosystems* 20(4):717–732.
[29] Mexican Spotted Owl Recovery Team. (2012). *Recovery plan for the Mexican Spotted Owl, first revision*. Albuquerque, NM: U.S. Fish & Wildlife Service, Region 2: Southwest Region. *Available at* https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd475767.pdf. The original MSO recovery plan was published in 1995, and can be viewed at https://www.fws.gov/southwest/es/arizona/Documents/RecoveryPlans/MexicanSpottedOwl.pdf.
[30] Endangered Species Act of 1973. 16 U.S.C. §§ 1531 to 1544 (2016).
[31] Hays, Q. R. (2017). Working to address complex forest issues: A collaborative case study between the Mescalero Apache Nation and USDA Forest Service. *Journal of Forestry 115*(5):456–7.
[32] *Recovery plan for the Mexican Spotted Owl, first revision*. *Idem*, *See* footnote 29.
[33] Ganey, J. L., Ward, Jr., J. P., Jenness, J. S., Block, W. M. Hedwall, S., Jonnes, R. S., Apprill, D. L., Rawlinson, T. A., Kyle, S. C., & Spangle, S. L. (2014). Use of protected activity centers by Mexican Spotted Owls in the Sacramento Mountains, New Mexico. *Journal of Raptor Research 48*(3):210–18.
[34] The Mexican Spotted Owl was originally included on the federal list of threatened species on March 16, 1993. 58 Fed. Reg. 14248. After a protracted legal battle, 4.6 million acres of critical habitat were designated in 2001. *See* U.S. Fish & Wildlife Service, *Designated critical habitat for the Mexican Spotted Owl*, *Available at* https://www.fws.gov/southwest/es/MSO_critical_habitat_archive.html.

The Northern Goshawk (*Accipiter gentilis* L.), a species with a wide range across North America and Eurasia, is considered a Sensitive Species by the New Mexico Department of Game and Fish ("NMDG&F") and on the USFS Regional Foresters List, due to habitat disturbance in the state.[35] Goshawks inhabit Ponderosa pine, mixed conifer and spruce-fir forests and adapt easily to various structural conditions in the forests.[36] The USFS has designated 15 Northern Goshawk post-fledging-family areas ("PFA") on the Smokey Bear Ranger District.

Other listed species occurring in the NSM include the Peñasco least chipmunk (*Tamias minimus atristriatus*), listed as endangered by the New Mexico State Game Commission and as a Candidate Species by the USFWS; the Spotted bat (*Euderma maculatum* Allen), listed as threatened by the New Mexico State Game Commission; the Todsen's pennyroyal (*Hedeoma todsenii* R.S. Irving), listed as endangered by the USFWS; and the Kuenzler's hedgehog cactus (*Echinocereus fendleri kuenzleri* Castetter, Pierce & Schwerin), listed as endangered by the USFWS.[37] The Sacramento Mountain salamander (*Aneides hardii*), found in mixed conifer and spruce-fir forests above 8,000 feet, has been identified as a species of concern by the USFWS and as a sensitive species by the USFS.[38]

Neotropical migratory bird species have been the subject of several federal laws and treaties dating back more than a century. Generally, the threats to neotropical migratory birds come during the nesting season.[39] Currently, the LNF applies guidelines recommending that "where possible avoid ground disturbing activity during the breeding and nesting periods

[35] *Wildlife notes: Northern goshawk*. Santa Fe, NM: New Mexico Department of Game and Fish. *Available at* http://www.wildlife.state.nm.us/download/education/conservation/wildlife-notes/birds/northern-goshawk.pdf.
[36] Reynolds, R. T., Graham, R. T., Reiser, M. H., Bassett, R. L., Kennedy, P. L., Boyce, Jr., D. A., Goodwin, G., Smith, R., & Fisher, E. L. (1992). *Management recommendations for Northern Goshawk in the Southwestern United States*. USDA Forest Service, Rocky Mountain Forest & Range Experiment Station GTR-RM-217.
[37] New Mexico Department of Game & Fish. (2016). *Threatened and endangered species of New Mexico: 2016 biennial review*. Santa Fe, NM: NMDG&F, Wildlife Management and Fisheries Management Division; Vander Lee, B., Smith, R., & Bate, J. (2008). Ecological and biological diversity of the Lincoln National Forest, Ch. 15 in *Ecological and biological diversity of national forests in Region 3*. Phoenix, AZ & Santa Fe, NM: The Nature Conservancy of Arizona and New Mexico.
[38] *Threatened and endangered species of New Mexico: 2016 biennial review*. *Idem*, *See* footnote 37.
[39] Haulton, S. (2008). *Does logging during the nesting season negatively affect neotropical migratory bird populations?: A literature review*. Indianopolis, IN: Indiana Department of Natural Resources, Division of Forestry. *Available at* https://www.in.gov/dnr/forestry/files/fo-NestingSeasonLogging.pdf.

Mescalero Apache Reservation in Winter

(March–July).” This is primarily to avoid declines in neotropical migrant populations which might put them at risk of listing under the ESA. For the time being, the GRAWUIWG encourages landowners and land managers to carry out ground disturbing projects, such as prescribed burns, outside of the breeding and nesting periods for neotropical migratory birds.

Wilderness

There are two congressionally designated wilderness areas in the NSM. The Capitan Mountains Wilderness Area, located northeast of the Village of Capitan, protects 35,067 acres of national forest land. The White Mountain Wilderness Area, located northwest of Ruidoso, covers 47,000 acres and reaches an elevation of nearly 11,600 feet. Both wilderness areas are managed by the USFS.[40]

In the Wilderness Act of 1964, Congress defined wilderness as “an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.”[41] The Wilderness Act says “wilderness areas shall be devoted to the public

[40] *See* USFS–LNF. *Special Places*. *Available at* https://www.fs.usda.gov/attmain/lincoln/specialplaces.
[41] Wilderness Act of 1964, 16 U.S.C. § 1131(c) (2016).

purposes of recreational, scenic, scientific, educational, conservation, and historical use."[42] Roads, commercial enterprises, mechanical transports, structures and bicycles are generally prohibited in wilderness areas. An exception is made for commercial activities tied to appropriate recreational use; grazing and some mining activities; emergency situations, including wildfire suppression; access to nonfederal inholdings; some water-related infrastructure; and motorized uses such as aircraft or motorboats where these were established prior to designation.[43] Fuel reduction treatments and other restoration activities are severely limited within designated wilderness areas.

IV. Human Landscape

The NSM have a colorful history. In the 19th century, the area exemplified the Wild West, and at various times was home to iconic figures such as frontiersman Kit Carson, gunslinger Billy the Kid, and the 9th Cavalry Regiment Buffalo Soldiers. The Lincoln County War, initiated among rival factions intent on controlling the local economy, broke out in 1878 and lasted three years.[44] The war included notorious gunfights and revenge killings, and was brought under control when legendary sheriff Pat Garrett was elected in 1880, culminating in Garrett tracking down and shooting Billy the Kid at Fort Sumner, north of the NSM, in 1881. The area around the NSM gained notoriety in the 20th century as well. In 1945, west of the mountains, the U.S. military detonated the first nuclear bomb at the Trinity Site, on the U.S. Air Force's Alamogordo Range, now part of the White Sands Missile Range.[45] Two years later, on the other side of the mountains, a UFO was spotted near Roswell, an event that continues to fascinate conspiracy theorists.[46]

[42] Wilderness Act of 1964, 16 U.S.C. § 1133(b) (2016).
[43] Gorte, R.W. (2011). *Wilderness laws: Statutory provisions and prohibited and permitted uses* (CRS Report for Congress R41649). Washington, DC: Congressional Research Service.
[44] Fulton, M. G. (1980). *History of the Lincoln County War: A classic account of Billy the Kid*. Tucson: University of Arizona Press.
[45] U.S. Department of Energy, Office of History and Heritage Resources. *The Manhattan Project, an interactive history: The Trinity Test*. *Available at* https://www.osti.gov/opennet/manhattan-project-history/Events/1945/trinity.htm.
[46] Webster, D. (2017, July 5). In 1947, a high-altitude balloon crash landed near Roswell, NM. The aliens never left. *Smithsonian Magazine*. *Available at* https://www.smithsonianmag.com/smithsonian-institution/in-1947-high-altitude-balloon-crash-landed-roswell-aliens-never-left-180963917/.

Smokey Bear Historical Park, Capitan, NM

Today, these stories enchant tourists who visit the area's charming towns. The mountains offer year-round outdoor recreation, including skiing, hunting and hiking, as well as various indoor activities centered in Ruidoso.[47] Carrizozo, at the base of the western flanks, is gaining a reputation as an artistic center.[48] And Capitan features the home of the real-life Smokey Bear and nearby Fort Stanton. The South-Central Mountain's human landscape is rooted in the natural landscape as the source of the region's identity, and both the human and natural landscapes are tied to fire-dependent forests. Ensuring that forests burn relatively frequently at low intensities is key to maintaining the area's natural beauty and economic base.

Population

The lowland basins around the NSM are influenced by the watersheds in the mountains, and cities and towns in the basins depend on the mountains for water and for economic activity. Cities and towns surrounding the SCM include Alamogordo (population 31,201), Tularosa (2,907), Carrizozo (905), Roswell (48,407), Artesia (11,817) and Carlsbad (28,079).[49] Alamogordo is the location of the LNF Supervisor's Office, and Carrizozo is the county seat of Lincoln County.

[47] Shoemaker, P. B. G. (2017, Summer). Mountain paradise. *New Mexico Magazine*. https://www.newmexico.org/nmmagazine/ruidoso_summer2017/.
[48] Pike, D. (2015, Aug.). Carrizozo renaissance. *New Mexico Magazine*. *Available at* https://www.newmexico.org/nmmagazine/articles/post/carrizozo-renaissance-92077/.
[49] Population numbers are estimates for July 1, 2016, based on 5-year averages, from American FactFinder, U.S. Census Bureau, https://factfinder.census.gov/.

The Ruidoso area is the major population center in the NSM region, consisting of the Village of Ruidoso with a population of 7,833, and the City of Ruidoso Downs with a population of 2,629.[50] Other populated areas in the GRAWUIWG's project area include Capitan (2,175), Alto (2,635), Lincoln (251), White Oaks (1,237) and San Patricio (287).[51] The 2016 population for Lincoln County is 19,726.[52] The population for the Mescalero Reservation is 3,616, and for the Village of Mescalero is 1,371.[53] The northern part of the reservation is within the project area for the GRAWUIWG.

Land Ownership

The lands in the NSM are a mixture of federal, state, tribal and private landholdings. The area covered by this landscape restoration strategy includes the Smokey Bear Ranger District of the LNF, the northern half of the Mescalero Apache Reservation, and a variety of other landholdings including private land, state trust lands managed by the New Mexico State Land Office ("SLO"), and lands managed by the federal Bureau of Land Management ("BLM") and the City of Alamogordo, NM.

The LNF's Smokey Bear Ranger District is the largest landholding in the project area and covers 423,416 acres. Its offices are in Ruidoso. The land within the national forest is managed following the USFS's multiple-use mandate, according to the current forest plan.[54] Private

[50] Population numbers are estimates for July 1, 2016, based on 5-year averages, from American FactFinder, U.S. Census Bureau, https://factfinder.census.gov/.
[51] Population numbers are estimates for July 1, 2016, based on 5-year averages, for the zip codes for each location, from American FactFinder, U.S. Census Bureau, https://factfinder.census.gov/. Zip codes are: Capitan (88316), Alto (88312), Lincoln (88338), White Oaks (88301), and San Patricio (88348).
[52] Estimate for July 1, 2016, based on 5-year averages, from American FactFinder, U.S. Census Bureau, https://factfinder.census.gov/.
[53] Population numbers are estimates for July 1, 2016, based on 5-year averages, from American FactFinder, U.S. Census Bureau, https://factfinder.census.gov/. The estimate for the Mescalero Reservation is for the zip code 88340. The estimate for the Village of Mescalero is for the Mescalero, NM Census Designated Place ("CDP"), which is outside of the GRAWUIWG project area.
[54] Each national forest is required to prepare a forest plan, and activities and projects within the national forest must conform to the plan. Plans are revised periodically, generally every 10 to 15 years. The Lincoln National Forest is currently revising its plan, and the new plan should be completed in 2019. National forest planning is required by the National Forest Management Act of 1976 ("NFMA"), 16 U.S.C. §§ 1600 to 1687 (2016), and is guided by the 1982 Planning Rule, 47 Fed. Reg. 43026 (Sep. 30, 1982) and the 2012 Planning Rule, 77 Fed. Reg. 21162 (Apr. 9, 2012), codified as amended at 36 C.F.R. §§ 219.1 to 219.62 (2016).

ranchers have allotments to run cattle on national forest lands, and some recreational facilities, such as the Ski Apache ski resort, operate on national forest lands under a special use permit.

The BLM manages approximately 8,676 acres within the project area, mostly in the lower elevation areas around the NSM.

The Mescalero Apache Reservation is located at the southern end of the project area. The reservation covers 460,000 acres of heavily forested and mountainous land. The GRAWUIWG project area boundary cuts across the Mescalero Reservation, and covers the northeastern part of the reservation.[55] The Tribal Division of Resource Management and Protection has offices in Mescalero. The BIA collaborates with tribal forest managers from its office, also located in Mescalero.

The Village of Ruidoso is wholly within the project area. Most of the Village consists of private parcels of land, some of which include urban forests. The Village has a Forestry Department that works with landowners to create fire resistant properties and neighborhoods, and also manages the Village's watershed.

A number of private inholdings and villages are located within the boundaries of the national forest, and private lands also surround the national forest. The New Mexico State Forestry Division ("NMSFD"), a branch of the Energy, Minerals and Natural Resources Department ("EMNRD"), has a district office in Capitan, NM, within the GRAWUIWG project area. NMSFD foresters assist private forest landowners throughout the SCM with forest management on their properties.

The SLO manages state trust lands, scattered throughout the project area. In total, the SLO manages 16,266 acres in the project area, mostly in relatively small parcels. Larger contiguous SLO parcels are located in the lowland areas west of the mountains and near Capitan. The SLO also manages Moon Mountain, adjacent to Ruidoso. The SLO has a district office in Roswell. The State of New Mexico uses funds generated on trust lands to support schools, universities, state hospitals, prisons, reservoirs and state buildings.[56]

The City of Alamogordo has a landholding within the GRAWUIWG project area. The city owns and manages about 1,700 acres encompassing Bonito Lake, northwest of Ruidoso. The

[55] South of the GRAWUIWG's southern boundary is the project area for the Otero Working Group ('OWG'), based in Cloudcroft, NM.
[56] New Mexico State Land Office. *See* http://www.nmstatelands.org/.

city manages the area for potable water supply and recreation, with fishing, camping and hiking available in the area.[57] Currently, the City of Alamogordo is carrying out restoration projects at Bonito Lake, to repair damage from debris flows following the Little Bear Fire in 2012.[58]

Private landowners in the northern part of the SCM also have joined together to form Soil and Water Conservation Districts ("SWCD"). The Upper Hondo SWCD has its headquarters in Capitan, and works in the central part of the project area. The Carrizozo SWCD has its headquarters in the village of Carrizozo, and covers the western portion of the project area. The Chaves SWCD is based in Roswell, and covers landholdings in the northeastern part of the project area. The Otero SWCD is based in Alamogordo, and its members are located in the southern part of the SCM, including a small portion of the project area in Otero County.

V. Project Area

The NSMLRWG identified the landscape boundary for the projects at meetings in October and November, 2016, and approved the overall boundary in December, 2016. Previously, much of the work of the GRAWUIWG focused on areas near the Village of Ruidoso, and the boundaries determined by the NSMLRWG extend the project area for the GRAWUIWG substantially. The project area boundary includes the Village of Carrizozo, and from there continues north through the Tularosa Basin near U.S. Highway 54 around the north end of the Jicarilla Mountains, then south and east along the north end of the Capitan Mountains, north of N.M. Highway 246. At the east end of the Capitan range, the boundaries head south, and just north of Picacho the boundary runs eastward to include a portion of the Rio Hondo and U.S. Highway 70. Past Riverside, the boundary heads a short distance south, then west, and heads southward again just east of the border of the Mescalero Apache Reservation. Near the southeast corner of the reservation, the boundary heads west and follows the southern boundary of the reservation for a short distance, and then cuts across the reservation, crossing U.S. Highway 70

[57] City of Alamogordo, Bonito Lake. *Available at* http://ci.alamogordo.nm.us/coa/communityservices/bonitolake.htm.
[58] Melton, T. (2017, Sep. 27). Commission awards $8.6 million contract for Bonito Lake restoration. *Alamogordo Daily News. Available at* http://www.alamogordonews.com/story/news/local/2017/09/27/8-6-million-contract-awarded-bonito-lake-restoration-project/710642001/.

Three Rivers Trading Post on U.S. Highway 54 between Carrizozo and Tularosa

between Ruidoso and Mescalero. The boundary continues west to the Tularosa Basin, and closely follows U.S. Highway 54 north to Carrizozo.

A map of the project area can be found in Appendix B.[59]

Focus Areas

At the meeting of the NSMLRWG in December, 2016, the group identified six focus areas within the project area boundaries. The focus areas assist in planning and implementation. Planning, funding, and carrying out landscape treatments to reduce the risk of catastrophic wildfires will be organized using the focus areas to delimit planning proposals. Maps of the focus areas are in Appendix B.[60]

The Jicarilla Focus Area covers the northernmost part of the project area, north of U.S. Highway 380 in the Jicarilla and Vera Cruz Mountains. Much of this area is within the Smokey Bear Ranger District and managed by the USFS. There also is private land within this focus area,

[59] An interactive map of the project area can be found at http://nmhu.maps.arcgis.com/apps/webappviewer/index.html?id=c28c7e4c0976429cbea72a2d480ed555. This map uses ArcGIS Online, which allows viewers to change the parameters using a simple set of menus and buttons. Viewers can select various background maps, and can select layers showing vegetation treatments, land ownership and wildfire hazard potential. In addition to the overall project boundaries, the map also shows the boundaries for the GRAWUIWG's focus areas.

[60] Interactive maps of the focus areas can be viewed at http://nmfwri.org/collaboration/north-sacramento-mountains-working-group/nsacramento-watershed-map, using ArcGIS Online.

both as inholdings within the national forest, and surrounding the national forest boundaries. The New Mexico State Land Office manages land in this area as well.

The Capitan Mountains Focus Area is southeast of the Jicarilla Focus Area, and covers much of the Capitan Mountains and extending south to Hondo, near where U.S. Highways 380 and 70 join. Most of the Capitan Mountains are within the national forest, although there are some large private inholdings. The southeastern portion of the Capitan Mountains Focus Area is mostly private land. The State Land Office also manages land within this focus area. The Peppin Fire burned about 65,000 acres in the Capitan Mountains in 2004. The first real-life Smokey Bear was rescued from this area in 1950, during the 17,000-acre Capitan Gap Fire.

The Rio Bonito Focus Area is south of the Jicarilla Focus Area and west of the Capitan Mountains Focus Area, encompassing the villages of Capitan and Lincoln, as well as most of the Fort Stanton–Snowy River Cave National Conservation Area, a 25,000 acre tract managed by the BLM's Roswell Field Office. The Village of Ruidoso also has land near the Sierra Blanca Regional Airport, at the south end of this focus area. Much of the rest of the land in this focus area is privately owned, or managed by the USFS. The Little Bear Fire burned nearly 45,000 acres and 242 houses at the west end of this focus area in 2012, much of it in the White Mountain Wilderness Area.[61] Effects of this fire are easily visible along New Mexico Highways 48 and 37 north of the Village of Ruidoso.

South of the Rio Bonito Focus Area is the Rio Ruidoso Focus Area, which includes a substantial amount of WUI and important infrastructure. This focus area encompasses the Village of Ruidoso and the City of Ruidoso Downs, the Ski Apache ski area, and the IMG resort, as well as the communities of Alto, Glencoe and San Patricio. Part of the Mescalero Apache Reservation is within this focus area, and the State Land Office owns land on Moon Mountain adjacent to the Village of Ruidoso. The BLM also has land within this area.

The Mid-Tularosa Valley Focus Area is located along the western flanks of the mountains, extending into the flatlands of the Tularosa Basin. This covers much of the western part of the project area. This area includes some of the Mescalero Apache reservation, as well as land owned by the BLM and the State Land Office, in addition to USFS land.

[61] McCaffrey, S., Stidham, M., & Brenkert-Smith, H. (2013). *Little Bear fire summary report*. USDA Forest Service, Northern Research Station, Research Note NRS-178.

The Whitetail Focus Area, at the southeastern end of the project area, covers almost all of the Mescalero Apache Reservation within the GRAWUIWG project boundaries. In the northern part of this focus area there is a mixture of national forest and private lands.

VI. Values at Risk

The conditions on forests around the western U.S. put communities and other values on or near forested lands at risk. The Healthy Forests Restoration Act ("HFRA")[62] defines at-risk communities as interface communities identified by the Secretary of Agriculture or Interior[63] or "within or adjacent to federal land in which conditions are conducive to a large-scale wildland fire disturbance event for which a significant threat to human life or property exists."[64]

The NSM landscape encompasses a significant amount of wildland-urban interface, places where people live and recreate within or near predominantly wild areas. WUI areas present a special challenge in wildfire management. Restoration of natural landscapes can be achieved by reintroducing fire to the landscape, often in a managed form, either as prescribed burns or managed wildfires; however, wildfire policy dictates that when fire threatens a WUI area, the fire should be suppressed.[65] Threats to a WUI area may occur far away from the actual human structures, as wildfires can move quickly and become more difficult to control and suppress when they grow to a large size. Thus, a substantial WUI presence in a largely wild landscape complicates wildfire management practices.

WUI structures and activities, and the presence of humans on wild landscapes, can be thought of as values that are at risk from wildfires. Values at risk are often quantified as the economic costs that would be incurred if structures, infrastructure and economic activity were lost in a wildfire. However, values at risk also include cultural, social and spiritual values, which

[62] Healthy Forests Restoration Act of 2003, 16 U.S.C. §§ 6501 to 6591c (2016).
[63] Communities in the project area identified as at risk of a wildfire include Ruidoso, Capitan, Apache Summit, Lincoln, Mescalero, and Three Rivers. *See* Urban wildland interface communities within the vicinity of federal lands that are at high risk for wildfire, 66 Fed. Reg. 751 (Jan. 4, 2001) and 66 Fed. Reg. 43384 (Aug. 17, 2001).
[64] HFRA, Section 6511(1) (2016). *Idem*, *See* footnote 62.
[65] Tidwell, T. (2010). *A perspective on fire protection in the wildland/urban interface*. Presented at the International Association of Fire Chiefs 8th Annual Conference on the WUI, Reno, NV, Mar. 29, 2010. *Available at* https://www.fs.fed.us/speeches/perspective-fire-protection-wildlandurban-interface.

are more difficult to quantify in monetary terms, but that take a toll that affects communities and their economic, social and cultural viability long after a wildfire has been extinguished.

The GRAWUIWG project area includes a number of values at risk that would represent a substantial economic, social and/or cultural loss to the area if destroyed in a wildfire. Some of the values at risk are highlighted here. Throughout the area there is a substantial infrastructure, including roads, power lines, water systems and communications infrastructure. There are schools, hospitals, office buildings, commercial businesses and private homes. All are at risk of serious damage from a large wildfire or post-fire effects.

Values at risk on the Mescalero Apache Reservation include electrical power transmission lines, communications sites, cultural sites, springs and developed wells, and individual home sites in the Mid Tularosa Basin Focus Area; Tribal business enterprises, housing subdivisions and individual home sites, Tribal recreation areas, springs and developed wells, cultural sites, electrical power transmission lines and substations, communication sites, timber resources, schools and public safety facilities in the Rio Ruidoso Focus Area; and Tribal business enterprises, springs and developed wells, cultural sites, timber resources, individual home sites, and communication sites in the Whitetail Focus Area. Tribal sacred areas, including Sierra Blanca, are also at risk from a wildfire.

The Mescalero Apache Tribe operates the Ski Apache ski resort, located 16 miles west of Ruidoso on New Mexico State Highway 532. The Tribe also operates two casinos. The IMG Resort and Casino is a large resort complex in the mountains just west of Ruidoso on Indian Service Route 4. The IMG complex includes a hotel, casino and other entertainment facilities. The Tribe also operates Casino Apache Travel Center, located on U.S. Highway 70, on the reservation just west of Ruidoso. The Travel Center includes a casino, restaurant, convenience store and fueling station.

The Village of Ruidoso includes many values at risk from a wildfire. Part of Ruidoso's character is that much of the village is forested. The Village's Forestry Department has put a lot of work into wildfire safety, but homes and businesses still bear some risk from a wildfire. The village and surrounding areas are a tourism and vacation center, and home to many permanent residents. The village covers 16.12 square miles with a population density of 498 per square

mile, and includes 3,216 households with an average home value of $167,600.[66] There are 1,476 firms in the village.[67] The Village of Ruidoso owns and operates Sierra Blanca Regional Airport, located north of Ruidoso on New Mexico Highway 220. The airport was constructed in 1987 and over the past decade, the federal, state and municipal governments have invested over $20 million in improvements to the airport. The airport serves corporate and private aviation, with an average of 39 take-offs and landings per day.[68] The Village also operates the Ruidoso Convention Center,[69] which hosts a diverse array of events during the year. One event is the Sierra Blanca Wildland Fire Academy,[70] a week-long event that offers a range of workshops in firefighter skills. The Academy is the product of an interagency collaboration with federal, state, county and local agencies participating.

The Smokey Bear Historical Park in Capitan, NM, is operated by the NMSFD. The park is the burial site for the real-life Smokey Bear, a cub firefighters rescued from the Capitan Gap fire in 1950, and named after the character that first appeared in 1944 in public service advertising created by the Ad Council.[71] The rescued Smokey lived in the National Zoo in Washington, DC for 26 years, and served as a symbol for wildfire prevention. When Smokey passed away, he was returned to Capitan for burial. In addition to Smokey's gravesite, the Historical Park includes a visitor's center and museum, picnic facilities, a playground and an amphitheater.

Fort Stanton, located south of Capitan, is a historic U.S. fort that opened in 1855.[72] During the Civil War, the fort was briefly held by Confederate soldiers, but Union forces regained control under the command of Kit Carson. After the fort was closed in 1896, the site has served as a hospital for tuberculosis patients, an internment camp for prisoners of war during World War II, a training school for mentally disabled, and briefly as a prison. In 1997, a non-

[66] Household data represent 5-year averages from 2012 to 2016 and population density data are from 2010, from the U.S. Census Bureau, QuickFacts, https://www.census.gov/quickfacts/.
[67] Data from 2012, from the U.S. Census Bureau, QuickFacts, https://www.census.gov/quickfacts/.
[68] Village of Ruidoso, NM. Sierra Blanca Regional Airport ("SBRA"). *See* https://www.ruidoso-nm.gov/airport-index/.
[69] Ruidoso Convention Center, *See* https://www.ruidosoconventioncenter.com/.
[70] Sierra Blanca Wildland Fire Academy, *See* http://www.sbwfacademy.com/.
[71] John Kelly. (2010, Apr. 25). The biography of Smokey Bear: The cartoon came first. *Washington Post*. *Available at* http://www.washingtonpost.com/wp-dyn/content/article/2010/04/24/AR2010042402441.html.
[72] Fort Stanton Historic Site. *See* http://nmhistoricsites.org/fort-stanton.

profit corporation was created to preserve the fort, and in 2007 the State of New Mexico established the Fort Stanton Historic Site. In 2009, Congress designated the area around the fort as a National Conservation Area, managed by the BLM.

A number of private facilities also represent substantial investments and are at risk from a wildfire. The Billy the Kid Casino and Ruidoso Downs Race Track offers slot machines and horse racing in a facility on U.S. Highway 70. The casino and racetrack are owned by a partnership of five businessmen, some of whom live in the Ruidoso area.[73] Opened in 1992, the Hubbard Museum of the American West is located on U.S. Highway 70 in Ruidoso Downs. The museum displays collections of artwork and items representing Western heritage and hosts Western-themed programs.[74]

The Spencer Theater for the Performing Arts is located in a rural setting 13 miles north of the Village of Ruidoso on New Mexico Highway 220, west of the airport. The Spencer Theater schedules top quality entertainment throughout the year, contributing substantially to quality of life for both residents and tourists. The $22 million construction cost was financed by Dr. A.N. Spencer and Jackie Spencer Morgan, residents of Alto, NM. The theater operates as a 501(c)(3) non-profit public charitable organization.[75]

VII. Coordination with Other Forest Health and Wildfire Mitigation Plans and Policies

Collaboration is not limited to face-to-face meetings among stakeholder groups. Collaboration also entails coordinating plans and activities with existing plans and policies that cover the same landscape, or that set statewide, national or international standards and goals. The NSMLRWG compiled other plans and has considered their perspectives and goals in preparing the strategy for the NSM. The GRAWUIWG strives to conform its activities to the goals of these other plans and policies. Other plans are identified and described briefly here.

[73] Stallings, D. L. (2017, Apr. 24). Pending sale announced of Ruidoso Downs Race Track. *Ruidoso News*. *Available at* http://www.ruidosonews.com/story/news/local/2017/04/24/pending-sale-announced-ruidoso-downs-race-track/100851628/; Barbati, D. (2017, Apr. 24). 5 horsemen agree to purchase Ruidoso Downs. *Alamogordo Daily News*. *Available at* http://www.alamogordonews.com/story/news/local/ community/2017/04/24/5-horsemen-agree-purchase-ruidoso-downs-racetrack/100845746/. Prior to the 2017 sale, the R.D. Hubbard family was a partner or sole owner of the casino and race track for nearly 30 years.

[74] Hubbard Museum of the American West. *See* http://www.hubbardmuseum.org/.

[75] Spencer Theater for the Performing Arts. *See* http://www.spencertheater.com/.

Global Plans and Policies

United Nations Forum on Forests

The United Nations Forum on Forests ("UNFF")[76] was established by U.N. Resolution 2000/35, and has met twelve times since 2001. The UNFF aims to strengthen the long-term political commitment to conserving forests among all United Nations ("U.N.") member states and specialized agencies. Global objectives include reversing forest loss, enhancing forest-based benefits, increasing sustainably managed forests, and mobilizing financial resources to assist in sustainable forest management.[77] The UNFF takes a participatory approach to its work, and its resolutions and decisions have consistently recognized that sustainable forest management depends on the active involvement of a wide range of stakeholders. Major stakeholder groups include business and industry, children and youth, farmers, indigenous people, non-governmental organizations, local authorities, the scientific and technological community, women, and workers and trade unions.[78] The activities of the GRAWUIWG conform to the principles and objectives of the UNFF.

International Strategy for Disaster Reduction

The United Nations Office for Disaster Risk Reduction ("UNISDR")[79] was created to implement the International Strategy for Disaster Reduction ("ISDR"). UNISDR has issued "Words Into Action" Guidelines for Wildfire Hazard and Risk Assessment,[80] which focuses on identifying supra-national patterns in wildfires and coordinating effective prevention and responses, facilitating research and identifying where more detailed risk assessment models are necessary. The GRAWUIWG can work with local agencies such as the Village of Ruidoso Emergency Preparedness office and the Lincoln County Fire and Emergency Services

[76] United Nations Forum on Forests, *See* http://www.un.org/esa/forests/index.html.
[77] U.N. Forum on Forests. *Global Objectives on Forests*. *Available at* http://www.un.org/esa/forests/documents/global-objectives/index.html.
[78] U.N. Forum on Forests, Major Groups, *See* http://www.un.org/esa/forests/major-groups/index.html.
[79] United Nations Office for Disaster Risk Reduction, *See* https://www.unisdr.org/.
[80] Goldammer, J., Mitsopoulos, I., Mallinis, G., & Woolf, M. (2017). *Wildfire hazard and risk assessment*. Geneva, Switzerland: UNISDR. *Available at* https://www.unisdr.org/files/52828_06wildfirehazardandriskassessment.pdf.

department to assist in preparing for wildfire disasters, in order to implement recommendations from international and national entities.

The Future We Want

At the U.N. Conference on Sustainable Development ("UNCSD")[81] in 2012, heads of state and ministers from countries around the world adopted an agenda for sustainable development titled *The Future We Want*.[82] The document lists goals for restoring land, forests, water and other natural resources, and highlights the importance of public participation and sharing of information in achieving sustainable development. As a collaborative group focused on forest and watershed restoration, the GRAWUIWG is contributing to the goals outlined in this U.N. program in the northern Sacramento Mountains.

Bonn Challenge

The Bonn Challenge,[83] issued by the International Union for the Conservation of Nature and Natural Resources ("IUCN"), establishes targets of 150 million acres of forest restored by 2020, and 350 million acres restored by 2030. The Bonn Challenge advocates the forest landscape restoration ("FLR") approach, which focuses on multifunctional landscapes to restore ecological integrity and improve human well-being. The Bonn Challenge is an implementation vehicle to assist nations in meeting existing restoration commitments made through international agreements such as Target 15 in the Aichi Biodiversity Targets, established under the Convention on Biological Diversity ("CBD")[84]; the REDD+ goals, established under the United Nations Framework Convention on Climate Change ("UNFCCC")[85]; and land degradation

[81] The United Nations Conference on Sustainable Development, aka Rio+20, was held in Rio de Janeiro from June 20–22, 2012, Brazil, twenty years after the groundbreaking U.N. Conference on Environment and Development ("UNCED"), aka the Earth Summit, was held in the same city.
[82] United Nations. (2012). *The future we want, outcome document of the United Nations Conference on Sustainable Development, Rio de Janeiro, Brazil, 20–22 June, 2012*. *Available at* https://sustainabledevelopment.un.org/content/documents/733FutureWeWant.pdf.
[83] Bonn Challenge, IUCN. *Available at* http://www.bonnchallenge.org/.
[84] CBD Target 15. *Available at* https://www.cbd.int/sp/targets/rationale/target-15/.
[85] Reducing Emissions from Deforestation and Forest Degradation in Developing Countries ("REDD+"), UNFCCC. *Available at* http://redd.unfccc.int/.

neutrality goals[86] agreed to at the UNCSD. The Bonn Challenge coordinates international goals that must be implemented at the local level by organizations such as the GRAWUIWG.

New York Declaration on Forests

The New York Declaration on Forests[87] is a U.N. initiative promoting forest restoration. The Declaration is not legally binding, but was prepared and endorsed by global political, business and civil society leaders to establish a timeline for ending the loss of natural forests and to issue recommendations for restoring forests in an accompanying Action Agenda. This Action Agenda provides guidance to groups like the GRAWUIWG, that are carrying out forest restoration in localized areas.

National Plans and Policies

National Cohesive Wildland Fire Management Strategy

The interagency Wildland Fire Leadership Council ("WFLC") prepared the National Cohesive Wildland Fire Management Strategy,[88] which sets three national goals to improve preparation and response to wildland fires: restoring landscapes, promoting fire-adapted communities and improving responses to wildfires. The WFLC also issued the accompanying National Action Plan,[89] which provides a framework for implementing the science-based National Strategy by identifying specific actions that will achieve a more efficient, effective and

[86] Land degradation neutrality is defined as "a state whereby the amount and quality of land resources, necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems." *See Achieving Land Degradation Neutrality*, https://www2.unccd.int/actions/achieving-land-degradation-neutrality. The concept emerged in the United Nations Convention to Combat Desertification ("UNCCD"), which was established in 1994 and signed by 196 parties. The UNCCD 2018–2030 Strategic Framework, adopted by the Conference of the Parties in September, 2017, establishes the framework for implementing the UNCCD as part of the U.N.'s 2030 Agenda for Sustainable Development.

[87] New York declaration on forests and action plan. United Nations Climate Summit, Sep. 23, 2014. *Available at* http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/07/New-York-Declaration-on-Forest-%E2%80%93-Action-Statement-and-Action-Plan.pdf.

[88] Wildland Fire Leadership Council. (2014). *The national strategy: The final phase in the development of the national cohesive wildland fire management strategy*. *Available at* https://www.forestsandrangelands.gov/strategy/documents/strategy/CSPhaseIIINationalStrategyApr2014.pdf.

[89] Wildland Fire Leadership Council. (2014). *National action plan: An implementation framework for the national cohesive wildland fire management strategy*. *Available at* https://www.forestsandrangelands.gov/strategy/documents/strategy/NationalActionPlan_20140423.pdf.

collaborative response to wildland fire issues. The goals and activities of the GRAWUIWG align with the National Strategy and the National Action Plan, to carry out its recommendations in the northern Sacramento Mountains region.

Healthy Forests Initiative

The Healthy Forests Initiative ("HFI")[90] was proposed by the George W. Bush Administration in 2002 to establish a national policy for addressing the increasing risk of wildfires. The initiative proposed new categorical exclusions and guidelines for preparing environmental assessments to expedite fuel reduction projects on federal lands. One year later, Congress passed the HFRA, which codifies the Initiative and authorizes fuel reduction projects that are undertaken through interagency collaboration and that incorporate meaningful public participation.[91] Groups like the GRAWUIWG are a good example of the interagency collaboration and participation necessary to implement the HFRA and carry out its mandates.

Firewise USA

The Firewise USA[92] program of the National Fire Protection Association ("NFPA") targets neighborhoods in fire prone areas, offering community education programs that teach neighbors how to adapt to living with wildfire. The Firewise approach begins by protecting homes with a buffer around the house that is free of combustible material, screening potential entry points for embers, and ensuring that roofs, decks and other potential sites of ignition are constructed of non-combustible materials. Firewise also organizes neighborhoods with emergency plans and preparedness. Firewise offers collaborative groups like the GRAWUIWG a program to enact international, national, state and local plans to reduce fire risk in WUI areas and to educate and engage their communities in practices that make their environment safer and healthier. Firewise also assigns some responsibility for fire safety to landowners and homeowners, which encourages them to educate themselves and prepare for a potential wildfire.

[90] USDA Forest Service and USDOI Bureau of Land Management. (2004). *The Healthy Forests Initiative and Healthy Forests Restoration Act interim field guide* (USFS Publication No. FS-799). *Available at* https://www.fs.fed.us/projects/hfi/field-guide/web/page03.php#environmental.
[91] HFRA of 2003, 16 U.S.C. §§ 6501 to 6591c (2016). *Idem*, *See* footnote 62.
[92] NFPA Firewise USA. *See* https://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA.

Fire Adapted Communities Learning Network

The Fire Adapted Communities Learning Network ("FAC Net")[93] was created by The Nature Conservancy ("TNC") along with federal agencies in the Departments of Agriculture and Interior to increase information sharing and knowledge of best practices to live more safely with wildfire. The FAC Net promotes resiliency concepts and taking action before, during and after a wildfire. The mission of the FAC Net is "to connect and support people and communities who are striving to live more safely with wildfire. The Network is a catalyst for spreading best practices and innovations in fire adaptation concepts nationwide."[94] In New Mexico, the statewide effort is known as the Fire Adapted New Mexico Learning Network, headquartered at the Forest Stewards Guild office in Santa Fe.[95] Like Firewise USA, the FAC Net offers a means through which the GRAWUIWG can bridge broad goals and local practices, increasing knowledge, safety and environmental health in communities in Lincoln County.

Statewide Plans and Policies

New Mexico Forest Action Plan

The New Mexico Statewide Natural Resources Assessment & Strategy and Response Plans,[96] also known as the Forest Action Plan ("FAP"), sets statewide priorities including conserving working landscapes, protecting watersheds, enhancing public benefits from natural resources, and promoting urban and community forests. The FAP was developed through a partnership between the NMSFD, the Nature Conservancy, the Forest Stewards Guild, and nearly 100 stakeholders and partners who contributed knowledge and expertise to the plan. The Plan was issued in 2010, and guides the activities of the State Forestry Division, other resource managers and planners, and the public in identifying priority landscapes for restoration, resource management, and watershed improvement. The FAP presents an assessment using core data models based on eight themes drawn from the 2008 Farm Bill, including biodiversity, development potential, economic potential, forest health, fragmentation, green infrastructure,

[93] Fire Adapted Communities Learning Network. *See* https://fireadaptednetwork.org/.
[94] FAC Net. *About the FAC Learning Network*. *See* https://fireadaptednetwork.org/about/.
[95] FAC Net. *Fire Adapted New Mexico*. *See* https://fireadaptednetwork.org/member/fire-adapted-new-mexico/.
[96] EMNRD Forestry Division. (2010). *New Mexico statewide natural resource assessment & strategy and response plans* (Forest Action Plan). Santa Fe, NM: New Mexico EMNRD, Forestry Division.

water quality and supply, and wildfire risk. Drawing on the assessment models, the FAP presents a strategy plan and a response plan to coordinate implementation of projects oriented around the core themes.

The FAP is one of the primary documents in New Mexico that guides forest management decisions. In planning and coordinating forest restoration project, the GRAWUIWG can consult the FAP for guidance.

New Mexico Communities at Risk Assessment Plan

The New Mexico Communities at Risk Assessment Plan[97] is issued by NMSFD and updated regularly. The Plan is based on the work of the New Mexico Fire Planning Task Force ("NM-FPTF"), an entity created in 2003 by the New Mexico Legislature. The goal of the NM-FPTF is to identify WUI areas in the state and establish standards for building codes and ordinances to reduce wildfire threat in WUI areas. The NM-FPTF has divided the state into 18 Community Protection Zones ("CPZs"), and within these zones ranks the 699 communities at risk as high, moderate or low risk for a wildfire. The NM-FPTF also reviews and evaluates CWPPs, and approves those that conform to all of the criteria in the HFPA.

Ruidoso and Ruidoso Downs are identified as communities at high risk for a wildfire, along with several other communities in Lincoln County.[98]

New Mexico Forest and Watershed Health Plan

The New Mexico Forest and Watershed Health Plan[99] was issued in 2004 by the NMSFD. The Plan was developed by an interdisciplinary committee of nearly 50 leaders of agencies, organizations, businesses and universities operating in New Mexico, in response to a

[97] *New Mexico communities at risk assessment plan*. *Idem*, *See* footnote 3.
[98] Communities in Lincoln County at high risk of a wildfire include Alto, Ancho, Angus, Arabela, Bonito, Carrizo Canyon, Cedar Creek-Alpine Village, Copper Ridge, Copper Ridge II, Corona, Eagle Creek, Eagle Creek II, Enchanted Forest, Fawn Ridge, Gavilan Canyon, Glencoe, Lincoln, Loma Grande, Nogal, Outlaw, Ranches of Sonterra, Ruidoso, Ruidoso Downs, Sierra Vista, Sun Valley-Sierra Vista, Villa Madonna, and White Oaks. Communities at moderate risk of a wildfire include Hondo/Tinnie, Rainmakers, and Ranches of Ruidoso. Communities at low risk include Capitan, Carrizozo and Fort Stanton.
[99] New Mexico Forest and Watershed Health Planning Committee. (2004). *The New Mexico forest and watershed health plan: An integrated approach to ecological restoration*. Santa Fe: State of New Mexico. *Available at* http://www.emnrd.state.nm.us/ADMIN/documents/FWHPLAN033005.pdf.

request from both the governor and the state legislature. Building on the National Healthy Forests Initiative, politicians wanted a statewide plan to address forest and watershed health and resiliency, to preserve social and economic values. The committee that prepared the plan took a large landscape approach and a long-term perspective, recognizing that success depended on collaboration among land owners, managers, and parties with an interest in the land.

The Forest and Watershed Health Plan presents a vision of resilient ecosystems, diverse human communities, and thriving economies supported by productive, healthy ecosystems. The Plan outlines 20 recommendations to streamline restoration work and strengthen on-the-ground efforts of the type carried out by the GRAWUIWG towards the ultimate goal of ecological health.

New Mexico Forest Restoration Principles

The New Mexico Forest Restoration Principles[100] were created by a collaborative team representing a variety of agencies and interests, convened by PNM.[101] Although the Principles are non-binding, they offer guidance to collaborative landscape restoration groups like the GRAWUIWG on reducing wildfire threats and prioritizing treatments through research, adaptive management and low-impact restoration.

The Forest Restoration Principles are: (1) collaborate on landscape assessment, project design, analysis, implementation and monitoring; (2) reduce the threat of unnatural crown fire; (3) prioritize and strategically target treatment areas; (4) develop site-specific reference conditions; (5) use low-impact techniques; (6) utilize existing forest structure; (7) restore ecosystem composition; (8) protect and maintain watershed and soil integrity; (9) preserve old or large trees while maintaining structural diversity and resilience; (10) manage to restore historic tree species composition; (11) integrate process and structure; (12) control and avoid using exotic species; (13) foster regional heterogeneity; (14) protect sensitive communities; (15) plan for restoration using a landscape perspective that recognizes cumulative effects; (16) manage grazing; (17) establish monitoring and research programs and implement adaptive management;

[100] New Mexico Forest Restoration Principles. *Available at* https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5207898.pdf.
[101] PNM is the Public Service Company of New Mexico, one of the largest energy utilities in the state.

(18) exercise caution and use site-specific knowledge in restoring or managing pinon-juniper ecosystems and other woodlands and savannas.

New Mexico Hazard Mitigation Plan

The New Mexico State Hazard Mitigation Plan ("NMSHMP")[102] was issued in 2013 and includes sections on preparing for disasters such as droughts, flooding, landslides, thunderstorms and lightning strikes, and wildland and WUI fires. The Hazard Mitigation Plan identifies wildfires as a priority threat, and notes that wildfires can cause significant injury, death and damage to property. Fires can extensively affect the economy in rural areas, especially industries such as logging, recreation and tourism. Mitigation options include fuels management and addressing growing populations in fire-prone areas. The work of the GRAWUIWG supports the goals of the State Hazard Mitigation Plan.

New Mexico Comprehensive Wildlife Conservation Strategy

The NMDG&F produced the New Mexico Comprehensive Wildlife Conservation Strategy ("CWCS")[103] in 2006 and the State Wildlife Action Plan ("SWAP")[104] in 2016. Both are planning documents that implement the requirements of the state's Wildlife Conservation Act[105] and regulations.[106] The Act and regulations were produced by the New Mexico State Game Commission ("NMSGC"). The goal of the CWCS is to encourage proactive steps to conserve wildlife through collaborative conservation, so that species do not reach threatened or endangered status. Once a species reaches the critical population level that requires listing as threatened or endangered, recovery efforts are very expensive, and also controversial. The CWCS and SWAP focus on protecting habitat of the Species of Greatest Conservation Need

[102] State of New Mexico. (2013). *New Mexico state hazard mitigation plan*. Santa Fe: State of New Mexico.
[103] New Mexico Department of Game and Fish (NMDGF). (2006). *Comprehensive wildlife conservation strategy for New Mexico*. Santa Fe, NM: NMDGF. *Available at* https://iwjv.org/sites/default/files/nm_swap_1.pdf.
[104] New Mexico Department of Game and Fish (NMDGF). (2016). *State wildlife action plan for New Mexico*. Santa Fe, NM: NMDGF. *Available at* http://www.wildlife.state.nm.us/download/conservation/swap/New-Mexico-State-Wildlife-Action-Plan-SWAP-Final-2017.pdf.
[105] New Mexico Wildlife Conservation Act of 1974, NMSA 1978, §§ 17-2-37 to 17-2-46.
[106] Sections 19.33.2 to 19.34.7 NMAC.

("SGCN").[107] Forest restoration projects such as those that GRAWUIWG partners carry out across the NSM landscape can contribute to wildlife conservation by improving habitat for many wildlife species in the region.

Regional Plans and Policies

Lincoln National Forest Plan

The Lincoln National Forest's current forest plan was issued in 1986.[108] In 2016, the LNF began a process of plan revision, a statutorily required periodic review of its forest plan.[109] Plan revision generally takes about four years to complete, and it is anticipated that the Revised Forest Plan for the LNF will be completed in 2019.[110] The revised plan will be substantially different than the original plan, given the changes in forest conditions and forest management over the more than 30 years since the original plan was issued. The new plan will certainly place more emphasis on restoration, fuel reduction, and collaboration, all objectives of the GRAWUIWG.

Stronger Economies Together Initiative

The South Central Mountain Economic Development Association ("SCMEDA") has a plan[111] modeled on the USDA Rural Development's Stronger Economies Together ("SET") initiative.[112] The SET program builds local capacity based on regional economic strengths, including capitalizing on the region's rich natural resource base, and promoting renewable energy and forest products development. The plan identifies four areas of competitive advantage and targets these for future economic growth. These include expanding tourism and recreation rooted in the area's cultural heritage; capitalizing on the region's rich natural resource base, including forest and wood products, agriculture, and energy production; expanding the

[107] A species is added to the SGCN list if it is declining, vulnerable, endemic, disjunct and/or keystone.
[108] USFS. (1986). *Lincoln National Forest land and resource management plan*. Alamogordo, NM: Lincoln National Forest. *See also* Footnote 15.
[109] National Forest Management Act of 1976, 16 U.S.C. §§ 1600 to 1687 (2016); National Forest System Land Management Planning, 36 C.F.R. §§ 219.1 to 219.62 (July 1, 2016). *See also* Footnote 15.
[110] USFS–LNF. *Plan Revision: Timelines*. *Available at* https://www.fs.usda.gov/detail/lincoln/landmanagement/planning/?cid=stelprd3814309.
[111] South Central Mountain Economic Development Association (SCMEDA). (2016). *New Mexico stronger economies together: Economic development plan*. Carrizozo, NM: SCMEDA.
[112] USDA Rural Development. (2017). *Stronger economies together*. *Available at* https://www.rd.usda.gov/about-rd/initiatives/stronger-economies-together.

workforce by attracting small corporations and light industry to the area; and providing biomedical and biotechnical services. The regional plan links Lincoln County, the Mescalero Apache Reservation, and Otero County, and is one of nine SET planning regions in New Mexico, coordinated by New Mexico State University and the Western Rural Development Center at Utah State University.[113] About 300 civic, community and business leaders met regularly for one year to develop the South Central Mountain plan collaboratively.

Otero County Community Wildfire Protection Plan

The southwestern part of the GRAWUIWG project area is in Otero County, which has a Community Wildfire Protection Plan ("CWPP"),[114] most recently updated in 2014. Like Lincoln County, Otero County is at high risk of a wildfire; there were more than 1,000 fires in the county from 1987 to 2012. Over 468,000 acres in the county have undergone fuel reduction treatments. Nevertheless, of 18 communities in the county that were assessed, six are at extreme risk of fire hazard, ten are at high risk, and two are at moderate risk.[115] Mescalero is assessed as a high risk community for wildfire hazard.

<u>County Plans and Policies</u>

Lincoln County Comprehensive Plan

The Lincoln County Comprehensive Plan ("LCPP")[116] identifies several issues that impede an effective response to wildfires, including the lack of regulations requiring residents to maintain defensible space around their homes, no on-site source of water to fight fires in many areas, limited access to many subdivisions creating bottlenecks in entering and exiting, and

[113] Moorman, J. (2017, Jun. 15). NM communities participate in Stronger Economies Together program. *Deming Headlight*. *Available at* http://www.demingheadlight.com/story/news/2017/06/15/nm-communities-participate-stronger-economies-together-program/401678001/.
[114] Amato, V., & Stropki, C. (2014). *Otero County community wildfire protection plan*. Albuquerque, NM: SWCA Environmental Consultants. *Available at* http://www.emnrd.state.nm.us/SFD/FireMgt/documents/ Otero_County_CWPP_Final_sigs.pdf.
[115] Communities at extreme risk are Cloudcroft, Sunspot, Bent, Mayhill, Timberon and the U.S. Highway 82 Corridor; communities at high risk are La Luz, Burro Flats, High Rolls/Mountain Park, Mescalero, Dungan VFD District, Weed, Sixteen Springs, Cox Canyon, James Canyon, and Dry Canyon; communities at moderate risk are Alamogordo and Tularosa, both located in the Tularosa Basin outside of the forested area.
[116] Sites Southwest, LLC. (2007). *Lincoln County comprehensive plan*. Carrizozo, NM: Lincoln County. *Available at* http://www.lincolncountynm.gov/wp-content/uploads/2017/12/Final_Comp-2.pdf.

private roads that do not connect to public roads, blocking access and evacuation routes.[117] The Plan identifies the GRAWUIWG as responsible for coordinating a response to the fire threat. The Plan also establishes County goals, including promoting sustainable harvesting of timber as a fire protection measure and working with federal agencies to address the potential for floods following wildfires.

Lincoln County Multi-Jurisdictional Hazard Mitigation Plan

The Lincoln County Multi-Jurisdictional Hazard Mitigation Plan ("LCMJHMP")[118] was issued in 2017, updating the county's first All Hazard Mitigation Plan ("LCAHMP"), which was issued in 2012. The 2017 Plan identifies wildfire as among the highest hazard risks in the county. From 2010 to 2016, wildfires represented, by far, the highest costs for damages, topping $31,000,000 in the county.[119] The second most costly category of disaster was severe winter storms, which cost $1,000,000 over the same period. The county has made a major effort to mitigate the wildfire hazard for over a decade. Over 50,000 acres of forested land have been treated for fuels reduction and many homeowners have created defensible space around their homes.

Lincoln County Community Wildfire Protection Plan

The Lincoln County CWPP was originally prepared and signed in 2008,[120] and an update was issued in 2014.[121] Priority areas for fuel reduction projects include communities identified as at risk by NMSF, USFS and Lincoln County; tribal lands near Ruidoso; private landholdings larger than 10 acres; untreated areas adjacent to treated areas; areas near infrastructure (roads,

[117] *Lincoln County comprehensive plan*, p. 23. *Idem*, *See* footnote 116.
[118] SZ Enterprises Environmental Consulting. (2017). *2017 multi-jurisdictional hazard mitigation plan: Village of Ruidoso, Lincoln County, including City of Ruidoso Downs, Town of Carrizozo, Village of Capitan, and Village of Corona*. *Available at* https://static1.squarespace.com/static/57cf2dbf1b631b3eb2d911db/t/5890caf320099e5e9e84ac67/1485884158732/2017+HMP+Update+-+Draft+1.pdf.
[119] The three largest fires from 2010 to 2016 were the White fire, which burned 10,000 acres in April, 2011; the Donaldson fire, which burned 101,563 acres in June, 2011; and the Little Bear fire, which burned 44,330 acres and 250 structures in June, 2012.
[120] *Lincoln County community wildfire protection plan*. *Idem*, *See* footnote 12.
[121] South-Central Mountains Resource Conservation & Development Council, Inc. (SCMRC&D). (2014). *Lincoln County New Mexico community wildfire protection plan, 2014 update*. Carrizozo, NM: SCMRC&D.

utility rights-of-way, evacuation routes, wells, schools, radio towers, wildlife habitat, commercial properties); untreated SLO lands; impaired and critical watersheds; and highly populated areas.

A CWPP provides communities with the opportunity to influence fuel reduction projects within their jurisdiction. A CWPP exerts influence over federal agencies in planning and executing fuel reduction on federal lands, and also how federal funds are distributed on non-federal lands.[122]

Lincoln County Open Burning Ordinance

Lincoln County has an Open Burning Ordinance[123] that applies to all unincorporated areas in the county. The ordinance regulates how fires must be handled, including extinguishing all fires, proper disposal of ashes, burning garbage, and agricultural burning. The County Manager or Emergency Services Director may also impose additional restrictions during critical fire weather conditions, and the Board of County Commissioners can declare a fire danger emergency and prohibit all open fires under severe conditions.

Local Plans and Policies

Village of Ruidoso Fire Ordinance

Chapter 42 of the Ruidoso Municipal Code includes the Village of Ruidoso Fire Ordinance.[124] The Village Fire Marshall is responsible for enforcing the fire ordinance. Article III specifies standards for fire safety and fire handling. The ordinance regulates handling fires, disposal of ashes, and restrictions on open fires, and authorizes the fire chief, director of forestry, and planning administrator to notify private landowners of the need to remove hazardous vegetation.

Section 42-80 of the Ruidoso Municipal Code is the Fuels Management Standards.[125] The purpose of the standards is to reduce the potential for a catastrophic crown fire within the Village, while maintaining the character of the Village by preserving as much of its forested appearance as possible. The goal is to retain a tree density of 40 square foot basal area per acre

[122] Griego, D., et al. *New Mexico communities at risk assessment plan,* p. 3. *Idem, See* footnote 3.
[123] Lincoln County Open Burning Ordinance, No. 2017-03, April 18, 2017.
[124] Village of Ruidoso Fire Ordinance, Ordinance 2009-01, codified at Sec. 42-1 to 80.
[125] Village of Ruidoso Fuel Management Standards, Ordinance 2013-06, codified at Sec. 42-80.

within the Village. The ordinance requires all properties to meet specified standards to protect structures and properties within the Village from a wildfire.

Village of Ruidoso Community Wildfire Protection Plan

The Village of Ruidoso issued a CWPP[126] in 2004. The CWPP was a project of the GRAWUIWG, and represents collaborative planning and implementation of common treatment priorities. These include implementing fire mitigation utilizing the best available science, restoring and monitoring forest ecosystems and watershed to maintain forest health and protect communities, engaging private enterprise in forest-based economic development, and maintaining a tourism-based economy that provides a high quality of life in forested areas. The Village of Ruidoso adopted the CWPP on October 12, 2004;[127] however, today the Village operates under the Lincoln County CWPP.

Ruidoso Wildland Fire Action Guide

The Village of Ruidoso also publishes a guidance document, the Wildland Fire Action Guide,[128] in coordination with the International Association of Fire Chief's ("IAFC") Ready, Set, Go! program.[129] The guide includes detailed tips for homeowners on preparing their homes to resist a wildfire, and information on planning for a fire event.

Upper Hondo Soil & Water Conservation District Land Use Policy Plan

The Upper Hondo SWCD has a Land Use Policy Plan, adopted in 2015.[130] The plan states that law and "mutual good" require that government agencies carrying out conservation projects, such as flood control or wildlife enhancements, should coordinate with the Upper Hondo SWCD. The Land Use Policy Plan is the vehicle that guides how coordinated activities

[126] GRAWUIWG, Greater Ruidoso Area Community Wildfire Protection Plan (2004), *See* http://www.emnrd.state.nm.us/SFD/FireMgt/documents/RUIDOSO.pdf.
[127] Village of Ruidoso Resolution 2004-24.
[128] *Ruidoso Fire Department. Ready, set, go! Wildland fire action guide*. *See* https://static1.squarespace.com/static/57cf2dbf1b631b3eb2d911db/t/590c8fc06a4963faa86bfb88/1493995919710/Ruidoso+Wildland+Fire+Action+Guide.pdf.
[129] *Ready, Set, Go!* See http://www.wildlandfirersg.org/.
[130] Upper Hondo SWCD. (2015). *Land use policy plan*. Capitan, NM: Upper Hondo SWCD. *Available at* http://upperhondoswcd.org/pdf/Upper_Hondo_Land_Use_Plan_Final.pdf.

should proceed to ensure viable conservation outcomes. One area of coordination covered in the plan is wildfire prevention and management. The plan states that "detrimental and beneficial outcomes of fire regimes need to be determined on the greater landscape within the Upper Hondo SWCD boundaries."[131]

VIII. Landscape Restoration Strategy

The purpose of the GRAWUIWG is to coordinate landscape level treatment projects, which then will be carried out by collaborators. Individual collaborators can seek funding and carry out the treatment projects to restore the landscape in accordance with this strategy. Multiple collaborating organizations may coordinate landscape treatments as well, across property boundaries, to facilitate large landscape restoration and cost sharing. The GRAWUIWG may also seek funding to support cross-boundary fuel reduction treatments.[132]

Healthy forest policies and agency practices have promoted vegetation treatments to address the increased risk of wildfire. Mechanical thinning of trees, mastication, prescribed burning, and managed wildfires aim to remove many of the small diameter trees that increase the risk of damaging crown fires, and promoting restoration of grasslands and desired conditions for forest ecosystems.

The USFS model for desired conditions in the Southwest is presented in the GTR-310 document published by the USFS's Rocky Mountain Research Station ("RMRS").[133] This document applies to frequent-fire Ponderosa pine and mixed conifer ecosystem. The predominant feature of the desired conditions model is a forest with small clumps of trees of various age and size classes, with substantial open grasslands in between, and returning frequent low-intensity fires to the management regime. This is the model for many of the forests on the project area.

Recent fires in Lincoln County (such as the Donaldson fire in 2011 and the Little Bear fire in 2012) highlight the need for treatments to reduce fuel loads. Local and federal agencies in Lincoln County have focused on restoration in WUI areas, but much work remains, especially in

[131] Upper Hondo SWCD *Land use policy plan*, § 4.2-10, p. 52. *Idem*, *See* footnote 130.
[132] Since the GRAWUIWG is an informal collaborative organization and is not legally incorporated as a nonprofit or association.
[133] *Restoring composition and structure in Southwestern frequent-fire forests*. *Idem*, *See* footnote 27.

higher elevation densely vegetated areas. Additionally, reducing fuel loads alone is only one part of a comprehensive restoration strategy. Water quantity and quality, including the threat of post-fire flooding, affects many communities in the county and within the project area. Treating vegetation beyond the communities themselves would address critical water issues, and implementing activities such as forest treatments, stream stabilization, and range management practices on a larger scale would benefit Lincoln County communities substantially.

Effective planning and implementation of vegetative treatments across a landscape requires effective collaboration among all landowners in a watershed or other ecological unit. Involvement, support and buy-in of multiple landowners to collaborative decisions is key to implementing effective landscape restoration. However, collaboration adds complexity to treatment projects as objectives, communications, capacity, regulations and resources vary by landowner. In addition, many private forestland owners in Lincoln County are absentee owners. Greater project complexity leads to time consuming, costly and at times frustrating collaborative efforts needed to accomplish these projects. Even if local jurisdictions support these efforts, funding to accomplish this work across federal, state, county and municipal agencies requires a knowledgeable and dedicated set of practitioners to work their way through the complicated requirements necessary to raise funds. Working with collaborative groups spreads out the costs associated with fundraising, including the need to keep abreast of funding opportunities, to write funding proposals, and to manage funds that are acquired. In many areas, this latter need is the most crucial, as difficulties in carrying out treatment projects often leads to delays and funding the is allocated is not spent within the specified time periods.

Moreover, today much of the available funding and interest is dedicated to initial treatment of degraded forestlands. Money and efforts to maintain treated landscapes is an area that is emerging as a significant need in the overall forest restoration program. Across New Mexico, there remains hundreds of thousands of acres that are still untreated, but within each forested county, as more acres are treated, the imperative to maintain those acres through occasional prescribed burns, managed wildfires or mechanical thinning will increase.

Collaboration

The GRAWUIWG uses a collaborative approach to guide forest management across large landscapes. The partnering organizations that have joined together to create and implement

a restoration strategy for the landscapes of the NSM include the Capitan District of the New Mexico State Forestry Division; the USFS, Lincoln National Forest and the Smokey Bear Ranger District; the Mescalero-Apache Tribal Division of Resource Management; the BIA, Mescalero Agency; the Village of Ruidoso Forestry Department; the Upper Hondo Soil and Water Conservation District; the Carrizozo Soil and Water Conservation District; the Little Bear Forest Reform Coalition; the Lincoln County Ecoservants; and the South Central Mountains RC&D. See Appendix A for more information on collaborators.

Collaborators in the GRAWUIWG believe that a more inclusive collaborative process is likely to produce better results. As a result, collaborators welcome new members to expand the range of interests represented and the perspectives expressed in discussions and decisions on land management issues. The GRAWUIWG invites additional organizations to participate in the group's regular meetings. Organizations representing business interests often are underrepresented in collaborative landscape restoration organizations. Greater participation from the business community would enhance the work of the GRAWUIWG. Organizations representing recreation businesses, ranchers and farmers, forest industry, and real estate would add to the GRAWUIWG's capacity. Conservation organizations, including wildlife organizations, also would enhance discussions, as would participation by state agencies such as the NMDG&F, the Office of the State Engineer ("OSE") and the SLO. Participation by local, state and federal political representatives also would enhance the work of the GRAWUIWG. The GRAWUIWG recognizes the importance of communication with political leaders as well, and village and county representatives as well as staff members for state and federal representatives would add to planning and managing forest restoration in Lincoln County.

The work of the GRAWUIWG and its collaborators does not only benefit communities within the project area, but it also enhances water and recreational resources for communities outside the project area.

Vision, Mission and Goals

The mission of the GRAWUIWG is to promote ecological integrity, natural processes and long-term landscape resiliency, while supporting and sustaining the values of southcentral New Mexico's diverse human communities through ecological restoration efforts that create

healthy ecosystems upon which economic productivity depends, and which will be leveraged to full advantage to support long-term ecological health.

The vision is to create a landscape in which fire plays a role in maintaining healthy forests and functioning watersheds. In order to reach this vision, collaborators will have to restore the landscape to desired conditions, creating resilient forest and grassland ecosystems. Restoration requires reducing the fuels on much of the land within the project landscape boundaries, and maintaining the treated landscapes through periodic use of forest thinning, prescribed fires and managed wildfires. Once the landscape reaches conditions of a healthy forest and watershed, social and economic conditions within the area will be enhanced, due to more reliable sources of water, greatly reduced risk of catastrophic wildfires, and more knowledge among residents and visitors about maintaining communities and properties that are resilient and that can resist and prevent catastrophic wildfires.

The goals of the GRAWUIWG are

(1) Prepare and implement a landscape restoration strategy that coordinates the plans and activities of various landowners, managers and organizations in the NSM, including portions of the Sacramento, Capitan, Jicarilla and Vera Cruz mountain ranges.

(2) Prioritize forest restoration and forest health projects in the defined project area for the GRAWUIWG.

(3) Coordinate forest restoration and forest health projects for mutual benefits.

National Environmental Policy Act

The GRAWUIWG supports forest restoration strategies that follow the processes applied in the National Environmental Policy Act ("NEPA").[134] A NEPA analysis of potential environmental impacts is necessary for all projects carried out on the LNF, the Mescalero Apache Reservation, and other federal lands in the project area, as well as projects that receive federal funding or otherwise have a federal nexus. An analysis engages the public and other agencies and organizations in the decision-making process, and can be time consuming. Under NEPA, projects that will have a significant impact on the environment must be preceded by an Environmental Impact Statement ("EIS"), which can take three or four years to complete. Projects that are determined not to have a significant impact require a less cumbersome, but still

[134] National Environmental Policy Act of 1969, 42 U.S.C. §§ 4321 to 4370m (2016).

time consuming Environmental Assessment ("EA"), and projects that meet certain requirements can be granted a Categorical Exclusion ("CE"), a streamlined analysis process that can be applied when outcomes are predictable and will not have a significant effect on the environment. Completing a CE still requires some analysis and opportunities for public participation.

Federal land managers strive to complete NEPA analyses on lands in need of fuel reduction treatments. Once a NEPA analysis is complete, it remains valid unless conditions change and a project is likely to have a more significant environmental impact. Collaborative groups such as the GRAWUIWG can assist federal managers with NEPA clearances by raising funds to pay for the analyses and coordinating public participation and consultation activities. Having NEPA-cleared parcels in their districts allows land managers to initiate fuels treatment projects when the proper conditions arise and funding becomes available.

Treatment Options

Forest managers have a variety of tools available to treat forests for restoration purposes. The most common are mechanical thinning, prescribed fires, and managed wildfires.[135] Mechanical thinning can be carried out in a variety of ways. Large machinery can be used to harvest and process timber, chainsaws can be used in sensitive areas or areas that machinery cannot access, and non-mechanized techniques can be used in especially sensitive or legally protected areas, with proper precautions. Thinning can be commercial, if the product can be utilized productively, or can be carried out to meet forest management objectives. If material is not utilized, removing or burning slash can be a problem on treated areas. Biological or chemical treatments may also be used to reduce hazardous fuels. Often, a prescription will include a prescribed burn following mechanical treatment to restore fire-dependent conditions.

Fire is also a valuable tool for carrying out restoration treatments. Since fire is a natural part of the life-cycle of many Southwestern forests, using fire as a management tool to mimic natural processes can accomplish management goals on a larger scale at a lower cost. Fire may be the only realistic option in some situations, such as steep slopes or areas with legal protections. Carefully planned and executed prescribed burns can treat relatively large landscapes effectively. Managing the smoke from prescribed fires, particularly near populated

[135] *National action plan*. *Idem*, *See* footnote 89.

areas, is a concern for managers, as is preventing a fire from escaping and burning beyond the planned area. If a fire inadvertently crosses a property boundary, or worse if it burns structures and areas that humans value, it can lead to protracted and costly legal battles as well as resentment in local populations. Managing natural ignitions is another means of using fire as a restoration tool. When an ignition occurs, a determination is made whether the fire can be managed for resource benefits, or if conditions are such that it is best to extinguish the fire quickly. Many considerations go into this decision. Understanding the landscape, knowing the conditions in the forests, and having up-to-date information on current and predicted weather assists in making a decision on a managed wildfire.

The primary goal of many treatments planned by the USFS is to reduce the hazardous fuel load on forested lands. Many small-diameter trees present a high risk of high-intensity, fast-spreading wildfires, especially under dry, windy weather conditions.[136] Restoring landscapes to mimic the historic range of variability that existed before intensive efforts were made to suppress wildfires requires removing a large number of small-diameter trees on many previously untreated or unburned forest stands within the project area. Treating forests to reduce hazardous fuel loads is of highest importance to protect structures and infrastructure in WUI areas and to protect important watersheds, such as those that supply water to urban residents.[137]

Treatments can accomplish other goals as well. Increasing resiliency to insect and disease attacks can be an independent goal, especially in stands that are vulnerable to such attacks, or it can be a goal that complements fuel reduction. Restoring wildlife habitat and providing suitable habitat for species of concern can coincide with fuel reduction treatments in some cases as well. In other cases, protecting habitat for endangered or threatened species may preclude treatments, under ESA regulations and policies. Protecting cultural resources is necessary as well, and

[136] Generally, when vegetation is drier it is more susceptible to fire. Hot weather, longer dry seasons, and extended drought thereby create a greater risk of catastrophic wildfire. More trees on the landscape also can lead to drier vegetation, as more trees are sharing the same amount of water. This has been compared to "more straws in the punchbowl." More trees transpire more water and leave each individual with less water. While weather and climate conditions are major drivers in creating large, catastrophic wildfires, the factor that humans can manipulate is thinning fuel.

[137] The Healthy Forests Restoration Act of 2003 requires the USFS to develop programs of work that "give priority to authorized hazardous fuel reduction projects that provide for the protection of at-risk communities or watersheds." HFRA, 16 U.S.C. § 6513. *Idem*, *See* footnote 62.

treatments may enhance cultural resource protection, or in some cases protecting cultural resources may preclude treatments.

Protecting water resources and watersheds can be another priority goal of vegetation treatments. Areas near municipal water storage reservoirs and water treatment plants must be managed with special care to maintain water quality and to protect investments in water treatment facilities.[138] A catastrophic wildfire in a watershed uphill from water storage and treatment facilities can be especially damaging, particularly as a result of post-fire effects, such as flooding and debris flows. Critical reservoirs cover 46 acres of surface area in the NSM, and include Grindstone Lake, Alto Reservoir, Bonito Lake and Eagle Lake.

Once treatments are complete, they must be maintained to perpetuate a fire-dependent landscape. After about a decade, new vegetative growth can reduce the value of a treatment to mitigate a fire hazard. To date, maintenance treatments have not been prioritized, as so many acres are in need of initial treatments. Increasingly in the future, however, managed wildfires and prescribed burns will play an important role in maintaining healthy fire-dependent forests and watersheds.

Previous Treatments

Previous treatments in the GRAWUIWG project area are shown on the focus area maps in Appendix B. An interactive map of previous treatments can be viewed on the New Mexico Forest and Watershed Restoration Institute's Vegetation Treatments webpage.[139] This website shows all reported previous, underway and planned vegetation treatments statewide, including within the GRAWUIWG project area. Clicking on a specific treatment opens a box with information about the treatment, including date, size, method and landowner or manager.

The Village of Ruidoso Forestry Department operates an active forest restoration program for lands within the Village boundaries and adjacent areas, especially on watersheds that directly affect homes in the Village and lands owned by the Village. The boundaries of this area roughly include forested areas west of the Village, to the border of the Mescalero Reservation to the south, and private lands to the north and east of the Village. Within Ruidoso,

[138] Bladon, K. D., Emelko, M. B., Silins, U., & Stone, M. (2014). Wildfire and the future of water supply. *Environmental science and technology 48*:8936–8943.
[139] NMFWRI Vegetation Treatments Database. *See* http://vegetationtreatments.org.

fuel reduction or restoration projects have been completed on most quarter acre lots and on a lot of the land adjacent to the Village (See Appendix B, Ruidoso Village Forestry Compliance Map). Fires in the area of the Village also have served to restore some lands to more natural conditions. The Village currently is working on maintenance of treated areas.

There are approximately 13,500 acres within the Village limits and another 1,500 acres at the Sierra Blanca Regional Airport. The Village owns approximately 1,800 acres, most of which are heavily timbered and adjacent to schools, subdivisions, water tanks and other critical areas. In 2002, Ruidoso became a Firewise community and initiated a planned progression of fuels reduction projects on both public and private property within the Village boundaries. Ordinances were passed requiring fuels reduction on all properties within the Village boundaries. Since the initiation the village has systematically progressed through the Village subdivision by subdivision requiring landowners to thin their properties to reduce fuel concentrations. The first cycle of thinning has been completed, and about 85–90% of Village property and private property within Ruidoso has been thinned to the Village Fuels Management Standards. There are about 580 acres of timbered Village-owned property adjacent to the Airport that haven't been treated and are a threat to the investments at the airport.

From 2012 to the present there has been a major bark-beetle infestation in the village that has killed thousands of trees.[140] Much of the mortality has been in the areas that had already been thinned. Due to the mortality from the bark-beetle combined with the natural reproduction of conifers and sprouting of alligator juniper, much of the area is as much at risk for wildfire as it was when the process was begun.

Maintenance of Treated Areas

Once fuel reduction or restoration treatments have been completed, the effects of the treatment should be monitored.[141] Monitoring is part of an adaptive management strategy, and allows forest managers to respond to needs as they become priorities. A treatment is not a

[140] Vina, V. (2012, Jan. 26). Thousands of acres of trees dying in Lincoln National Forest: Forest officials say bark beetle to blame. El Paso, TX: KVIA Television. *Available at* http://www.kvia.com/news/thousands-of-acres-of-trees-dying-in-lincoln-national-forest/53229715.
[141] Murray, C., & Marmorek, D. (2003). Adaptive management and ecological restoration. In P. Freiderici (Ed.), *Ecological restoration of Southwestern ponderosa pine forests* (pp. 417–428). Covelo, CA: Island Press.

permanent solution to the problem of catastrophic wildfires. If a treated area is not maintained, it will regrow and present an increasing threat of wildfires. The need for maintenance can arise as soon as ten years after a treatment, in the absence of wildfires or additional treatments. The preferred means of maintaining a treatment, generally, is a prescribed burn.[142] The treated area should allow for a relatively safe and effective prescribed burn. If a fire is ignited by lightning in the years following a treatment, and conditions are suitable, another option is to manage the wildfire for resource benefits.

Maintenance is often overlooked as a part of a comprehensive forest restoration and management strategy. This is in part because the need for original treatments is so extensive, covering millions of acres, and limited resources exist to carry out these treatments. In addition, in many areas the first treatments are still relatively recent and maintenance treatments are not yet necessary. However, in the future, all treated areas will have a need for maintenance, and so increasingly maintenance will be a part of forest restoration planning.

IX. Grants

Completing treatments is expensive. The GRAWUIWG and its partners will seek funding to support fuel reduction and restoration treatments within the project area. A variety of federal, state and private funding sources are available, each with its own targets and rules. Some funding must be spent on federal lands, others on private lands, and some can be spent on multiple jurisdictions. Many funding sources require matching funds from recipients, and many also only fund recipients working in collaborative groups.

Potential funding sources include:

- Collaborative Forest Restoration Program ("CFRP"), a New Mexico-specific program created by Congress in 2000,[143] provides grants to collaborative groups that are applied to planning (including NEPA analyses), implementation (including various treatments) and utilization (including purchasing equipment for forest operations) on federal, state, tribal, county or municipal forest lands.[144]

[142] North, M., Collins, B. M., & Stephens, S. (2012). Using fire to increase the scale, benefits, and future maintenance of fuels treatments. *Journal of Forestry 110*(7):392–401.
[143] Community Forest Restoration Act, Pub. L. No. 106-393, Title VI, 114 Stat. 1625 (Oct. 30, 2000).
[144] *See* USFS. *Collaborative Forest Restoration Program*. *Available at* https://www.fs.usda.gov/detail/r3/workingtogether/grants/?cid=FSBDEV3_022022.

• Collaborative Forest Landscape Restoration Program ("CFLRP"), a national program that was modeled on the CFRP program, was created by Congress in 2009.[145] The purpose of the CFLRP is to encourage collaborative, science-based ecosystem restoration on forested landscapes. CFLRP grants provide up to $4 million annually per project, for up to two projects each year in a USFS region. A project can be funded for up to ten years. CFLRP funds must be used on USFS lands.[146]
• The Natural Resource Conservation Service ("NRCS") administers the Regional Conservation Partnership Program ("RCPP") which supports forest, range and watershed restoration on private lands through the Environmental Quality Incentives Program ("EQIP") and Conservation Innovation Grants ("CIG"). These programs work through partner organizations, such as farmer cooperatives or irrigation districts, that collaborate with producers. The NRCS also offers state, tribal and local governments and non-governmental organizations funding for range improvement and conservation through the Agricultural Conservation Easement Program ("ACEP"), and forest restoration and conservation for private and tribal landowners through the Healthy Forests Reserve Program ("HFPP").[147]
• Joint Chief's Landscape Restoration Partnership funds are available for landscape restoration projects that reduce wildfire threats, protect water quality and enhance wildlife habitat.[148] This program is a partnership between the USFS and the NRCS. Projects are funded for three years, and currently there are 28 active projects in 24 states and Puerto Rico. The agencies invest about $32 million annually in these projects.
• New Mexico State Forestry Division offers grants annually for hazardous fuels mitigation projects.[149] WUI grants are awarded to support hazardous fuel reduction, information and education, and community and homeowner actions, and are administered by the Western Wildland Fire Prevention Committee ("WWFPC"). Governmental entities in an area covered by a CWPP or a FAP are eligible to apply. Applications must meet local needs and address improving wildfire prevention, reducing hazardous fuels, restoring fire-adapted ecosystems, or promoting community assistance. Non-Federal Lands ("NFL") grants are for hazardous fuel treatments on any non-federal lands, including state and private lands. Grants are made to governmental entities which are at risk of a wildland fire due to nearby hazardous forest fuels. NFL funds come from the

[145] Omnibus Public Land Management Act of 2009, Pub. L. No. 111-11, Title IV, 123 Stat. 991, 1141 (Mar. 30, 2009), codified as amended at 16 U.S.C. §§ 7301 to 7304 (2016).
[146] *See* USFS. *Collaborative Forest Landscape Restoration Program*. *Available at* https://www.fs.fed.us/restoration/CFLRP/.
[147] *See* USDA–NRCS. *Environmental Quality Incentives Program*. *Available at* https://www.nrcs.usda.gov/wps/portal/nrcs/main/nm/programs/financial/eqip/; *Regional Conservation Partnership Program*. *Available at* https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/farmbill/rcpp/; *Agricultural Conservation Easement Program*. *Available at* https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/; and *Healthy Forests Reserve Program*. *Available at* https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/forests/.
[148] *See* USDA–NRCS. *Joint Chiefs' Landscape Restoration Partnership*. *Available at* https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/newsroom/features/ ?cid=stelprdb1244394.
[149] *See* EMNRD–NMSFD. *Archival Grant Applications*. *Available at* http://www.emnrd.state.nm.us/SFD/archivalgrantapplications.html.

USFS, and generally are applied to projects on larger tracts of land, roughly areas over 1,500 acres.

- The Bureau of Indian Affairs administers the Reserved Treaty Rights Lands ("RTRL") grants to reduce wildfire hazards and restore priority Tribal landscapes, including ancestral areas.[150] RTRL grants require significant cooperation, coordination and collaboration between Tribal entities and other stakeholders.
- The Water Trust Board ("WTB") is a state agency under the New Mexico Finance Authority that addresses water issues in the state.[151] The WTB offers grants and loans through the Water Project Fund, created by the Water Project Finance Act.[152] Projects for watershed improvement qualify for WTB funds.
- The New Mexico Association of Counties ("NMAC") offers grants through its Wildfire Risk Reduction Program for Rural Communities.[153] Grants can cover preparation of a CWPP, as well as fuel reduction, fire prevention and community outreach projects. Grants can be made to local governments and nonprofit entities.
- The National Forest Foundation ("NFF") offers grants to non-profit organizations, tribes and universities aimed at improving organizational capacity, implementing forest restoration projects, and improving forest health and outdoor experiences.[154]
- The Sustainable Forestry Initiative ("SFI") offers Conservation and Community Partnership grants, with a research focus.[155] The SFI has awarded 53 Conservation Grants and 49 Community Partnership Grants since 2010, totaling $3.4 million. Projects address topics such as wildlife habitat improvement, biodiversity conservation, and forestry education.

These, and other sources of grant funding, offer the GRAWUIWG and its collaborators opportunities to support fuels reduction and forest restoration treatments in the NSM.

X. Communicating with the Public

Building public support for fuel reduction projects, especially those involving the use of prescribed fire, is a challenge for all land management agencies and others working to reduce the risk of catastrophic wildfires. For decades, the public has been told—relentlessly—that wildfires

[150] *See* BIA. Fiscal Year 2015 *Reserved Treaty Rights Lands Plan*. *Available at* https://www.bia.gov/sites/bia.gov/files/assets/public/pdf/idc1-030969.pdf.
[151] *See* NM Finance Authority. *Water Project Fund*. *Available at* https://www.nmfa.net/financing/water-programs/water-project-fund/.
[152] Water Project Finance Act of 2001, NMSA 1978 §§ 72-4A-1 to 72-4A-11.
[153] *See* NM Association of Counties. *Wildfire Risk Reduction Program for Rural Communities*. *Available at* http://www.nmcounties.org/homepage/local-state-and-federal-collaboration/fire/.
[154] *See* NFF. *Grant Programs and Resources*. *Available at* https://www.nationalforests.org/grant-programs; and *Matching Awards Program*. *Available at* https://www.nationalforests.org/grant-programs/map.
[155] *See* SFI. *Conservation and Community Partnerships Grant Program*. *Available at* http://www.sfiprogram.org/archives/conservation-community-partnerships-grant-program/.

are a danger and something to be avoided, and the USFS and other wildland firefighting agencies have reinforced this perception by aggressively suppressing wildfires when they do break out. This complicates the goal of reintroducing fire onto the landscape.

One goal of the GRAWUIWG is to increase awareness in the region of the important role that fire plays in maintaining healthy forests, especially in Ponderosa pine and mixed conifer ecosystems. Reintroducing fire at regular intervals in the forests of the NSM is an important part of forest restoration. Managing the impacts of smoke in WUI areas will be one challenge of prescribed fires for forest restoration. The GRAWUIWG can assist with smoke management through community education programs on the reintroduction of fire to the landscape.

A second goal is to maintain a viable logging and wood products industry in the region and in the state. Utilizing wood that is removed from the forest, especially small diameter material, is a significant challenge that goes hand-in-hand with forest and watershed restoration. If forest products companies cannot make money removing and utilizing timber, then they will not bid on contracts to carry out treatments. Without companies that can contract to carry out forest restoration work, the collaborators in the GRAWUIWG have few options to complete fuel reduction treatments and restoration.

The GRAWUIWG was part of a team that organized the Sacramento Mountain Wood Industry Summit in April, 2016, held in Ruidoso.[156] The summit brought together forest managers and wood products company owners to discuss issues in forest restoration. This is a productive—and necessary—form of collaboration that can produce tangible benefits in the forest restoration process. Currently, the GRAWUIWG is collaborating with other organizations to organize a second event, the New Mexico Wood Industry Summit, to take place in November, 2018 in Ruidoso. The GRAWUIWG will participate in coordinating future events in collaboration with the South-Central Mountains RC&D and other community and economic development organizations, to advance forest and watershed restoration in the SCM.

A third goal is to encourage and assist homeowners to take steps to reduce the risk to their property from a wildfire. Collaborators assist landowners with Firewise practices, creating defensible space around homes. This is especially important within the high population density

[156] Maue, L. (2016, April 5). Sacramento Mountain wood industry summit provides opportunities to area agencies. *Ruidoso News*. *Available at* http://www.ruidosonews.com/story/money/business/2016/04/05/sacramento-mountain-wood-industry-summit-provides-opportunities-area-agencies/82601970/.

areas around Ruidoso and Ruidoso Downs. The Village of Ruidoso Forestry Department and the GRAWUIWG have put a lot of effort into assisting homeowners to protect their property, and will continue to maintain a healthy urban forest for fire safety. Education and assistance focusing on homeowners outside of the populated areas can assist them in clearing and maintaining defensible space around their homes.

Appendix A
Collaborators in the
Greater Ruidoso Area WUI Working Group

Collaborators in the North Sacramento Mountains Landscape Restoration Working Group include public and private entities in or near the project focus area. Collaborators met in 2016 and 2017 to prepare this strategy document.

Collaborators in the Greater Ruidoso Area WUI Working Group include many organizations that participated in the NSMLRWG. GRAWUIWG collaborators generate information that strengthens decision-making, assist with fundraising for forest treatment projects, and furnish services that facilitate the goals and mission of the collaborative group. Collaborators may also benefit from ecosystem services that are enhanced by restoration projects, such as improved recreational opportunities, including hunting and fishing, and increased water quantity and improved water quality.

Collaborators in the GRAWUIWG include the following organizations:

● U.S. Forest Service

The USFS, a federal agency in the Department of Agriculture, is responsible for managing the nation's national forests and national grasslands. The USFS manages its lands under a multiple use approach, producing timber, grazing, recreation, watershed protection and wildlife on national forests. Personnel from both the LNF Supervisor's Office in Alamogordo and the Smokey Bear Ranger District Office in Ruidoso participate in the GRAWUIWG.

The Smokey Bear Ranger District is located in Lincoln County, with offices in Ruidoso. The USFS actively manages the forests in the Smokey Bear Ranger District, with a focus on reducing fuels that have the potential to create catastrophic wildfires, restoring ecosystem and watershed functioning, and protecting habitat for wildlife.[157]

● Mescalero Apache Tribe

The Mescalero Apache Tribe's reservation is located in the central Sacramento Mountains, to the south of Ruidoso and the Smokey Bear Ranger District. The Mescalero Apache Tribal Government includes a Natural Resources Department ("NRD"). The NRD

[157] For more information, visit http://www.fs.usda.gov/Lincoln.

includes sections covering cattle growers, conservation law enforcement, a fence crew, a fish hatchery, and the Parks and Recreation Department. The Department also has the Division of Resource Management and Protection, the Land Office, and the Mescalero Apache Fire & Rescue. The Mescalero Apache Tribal Government and NRD collaborate with the Bureau of Indian Affairs to manage the forests and resources on the Mescalero Reservation.[158]

● Bureau of Indian Affairs

The BIA is a federal agency in the Department of the Interior. The mission of the BIA is to "enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian tribes, and Alaska Natives." The BIA has an office in Mescalero, NM, and collaborates with the Mescalero Apache Tribe on natural resources management on the Mescalero Apache Reservation.[159]

● New Mexico State Forestry Division

The NMSFD is a state agency, one of five housed in the EMNRD. NMSFD is responsible for regulating management of the state's forests located on private lands. The State Forestry Division is under the direction of the State Forester. Personnel from NMSFD's district office located in Capitan work with private landowners within the project area of the GRAWUIWG on managing their forests for various objectives, and to reduce fuel in forests to protect wildland-urban interface areas from the risk of wildfires.[160]

● Village of Ruidoso Department of Forestry

As a mountain community, much of the Village of Ruidoso is forested and the village is surrounded by forests as well. The Village of Ruidoso Department of Forestry manages the urban forest within the village as well as village-owned forest lands in the surrounding area. The goal of the department is to address forest health challenges and protect the community from the potential catastrophic effects of wildfire. The Ruidoso Department of Forestry actively works to

[158] For more information, visit http://mescaleroapachetribe.com/.
[159] For more information, visit http://www.bia.gov/WhoWeAre/RegionalOffices/Southwest/index.htm.
[160] For more information, visit http://www.emnrd.state.nm.us/SFD/districts/Capitan.html.

promote and implement fire-wise practices on village land and on private property within the village.[161]

● Upper Hondo Soil & Water Conservation District

The Upper Hondo Soil & Water Conservation District SWCD was founded in 1941, and has its office in Capitan, NM. Like other SWCD's, Upper Hondo SWCD is a political subdivision of the State of New Mexico. The purpose of the Upper Hondo SWCD is to provide farmers, ranchers, and small-tract urban land owners information about the conservation of natural resources and opportunities to take advantage of programs to improve soil and water quality. The Upper Hondo SWCD offers technical, cost-share, and educational assistance to residents within its service area.[162]

● Carrizozo Soil & Water Conservation District

The Carrizozo SWCD, with offices in Carrizozo, NM, serves landowners in the western part of the GRAWUIWG project area. The Carrizozo SWCD is a political subdivision of the State of New Mexico. The Carrizozo SWCD assists farmers and ranchers in conservation and soil and water quality. The Carrizozo SWCD offers technical, cost-share, and educational assistance to residents within its service area.

● Lincoln County Land and Natural Resources Advisory Committee

The Lincoln County Land and Natural Resources Advisory Committee ("LANRAC") was formed to advise the County Commissioners on land use issues. The Committee meets monthly at the Lincoln County Courthouse in Carrizozo. Members of the LANRAC participate in meetings on the Lincoln National Forest's Plan Revision.[163]

● Little Bear Forest Reform Coalition

The Little Bear Forest Reform Coalition ("LBFRC") was formed following the 2012 Little Bear Fire. The LBFRC, which is based in Ruidoso, NM, seeks to promote policies that

[161] For more information, visit https://www.ruidoso-nm.gov/forestry/.
[162] For more information, visit http://upperhondoswcd.org/index.html.
[163] For more information, visit https://www.lincolncountynm.gov/committees/lanrac/.

improve forest health and wildfire prevention in Lincoln County and Mescalero. The Coalition develops programs aimed at educating the public about forest policy and providing recommendations for forest policy reform.[164]

● Lincoln County EcoServants

Lincoln County EcoServants is a 501(c)(3) non-profit organization based in Ruidoso that brings Americorps volunteers to work on service projects in the county. EcoServants mentor students in environmental stewardship and engage military families in community service. Projects include building and maintaining trails in natural areas, increasing Firewise education and awareness, conducting stand exams to monitor forest treatments, promoting invasive plant management, increasing recycling, and advancing community gardens. EcoServants is the largest employer of teens and young adults in the region, and since 2007 has engaged up to 60 young people from Lincoln and Otero Counties in community service.

AmeriCorps refers to the Corporation for National and Community Service, which sponsors community development work in disaster relief, economic opportunity, education, environmental stewardship and healthy futures around the U.S.[165]

● Eastern New Mexico University – Ruidoso

For more than 25 years, Eastern New Mexico University, located in Portales, NM, has operated a branch campus in Ruidoso ("ENMU-R"). The campus operates as a community college, and offers academic and vocational training to the people of Lincoln County. Among the 17 degree programs offered, students can study natural science and wildland fire science at ENMU-R. The GRAWUIWG has met regularly on campus, and faculty participate in planning. ENMU-R is designated as both a Hispanic-Serving and a Native American-Serving Institution by the U.S. Department of Education.[166]

[164] For more information, visit http://www.lbfr.org/.
[165] For more information, visit http://www.ecoservants.org/ and https://www.nationalservice.gov/.
[166] For more information, visit https://ruidoso.enmu.edu/.

Facilitators

Facilitators provide organizational services to assist in managing group processes. Facilitators organize and steer meetings, manage group communications, and provide support services such as mapping. One organization has been instrumental in facilitating the meetings of the GRAWUIWG.

● South Central Mountain Resource Conservation and Development Council

The South Central Mountain Resource Conservation and Development Council ("SCMRC&D") was created in 1967, and is organized as a non-profit corporation. Its office is in Ruidoso, NM. The SCMRC&D Council was the vision of three soil and water conservation districts, the Carrizozo SWCD, the Otero SWCD and the Upper Hondo SWCD. Today, the eight member, all-volunteer council includes representatives of the SWCDs, as well as town and county governments in Lincoln and Otero Counties. The SCMRC&D Council partners with other groups to carry out and acquire funding for community development projects.[167]

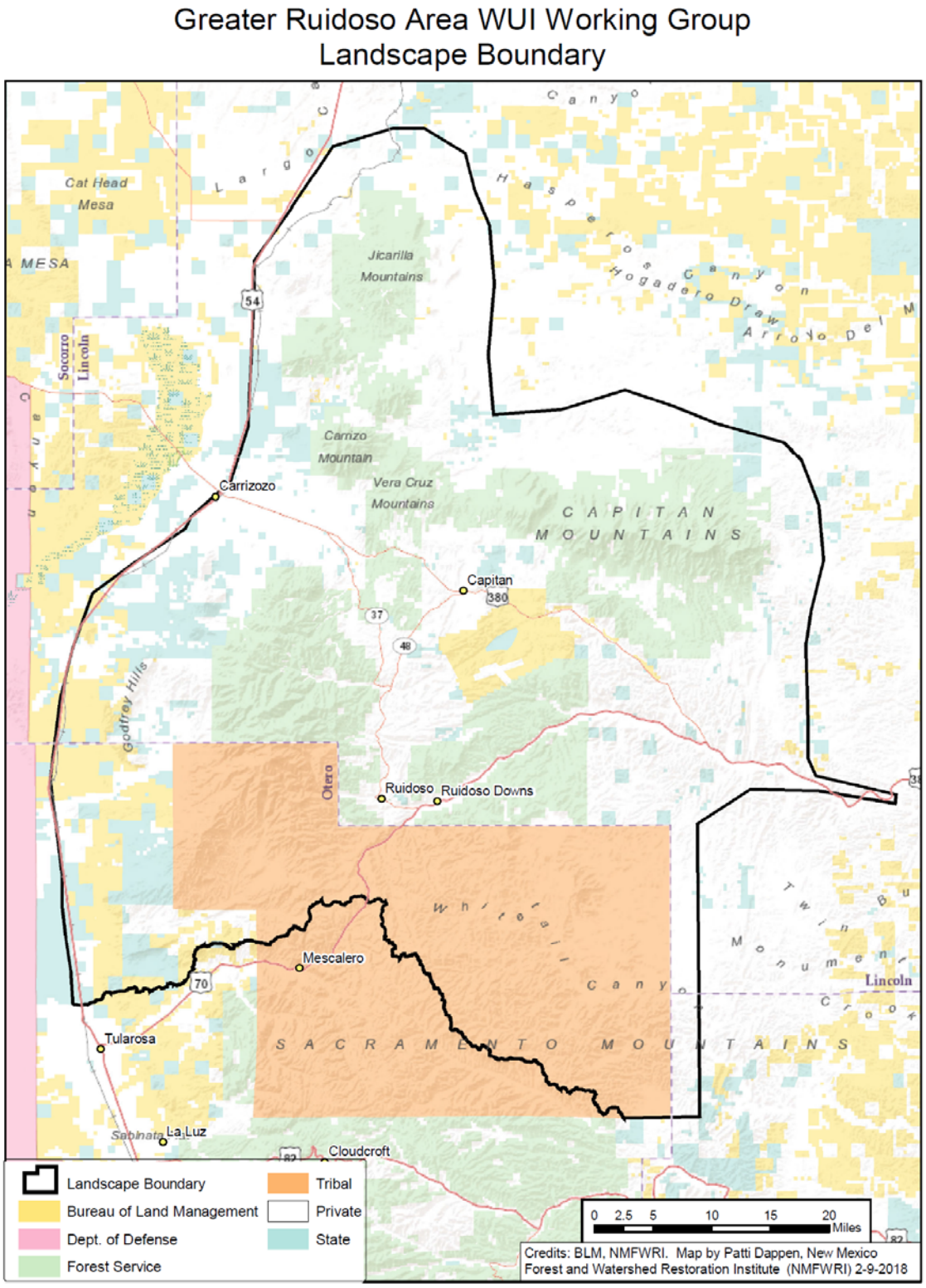
In addition, a second organization has provided facilitation and support services to the NSMLRWG, including preparing this strategy document.

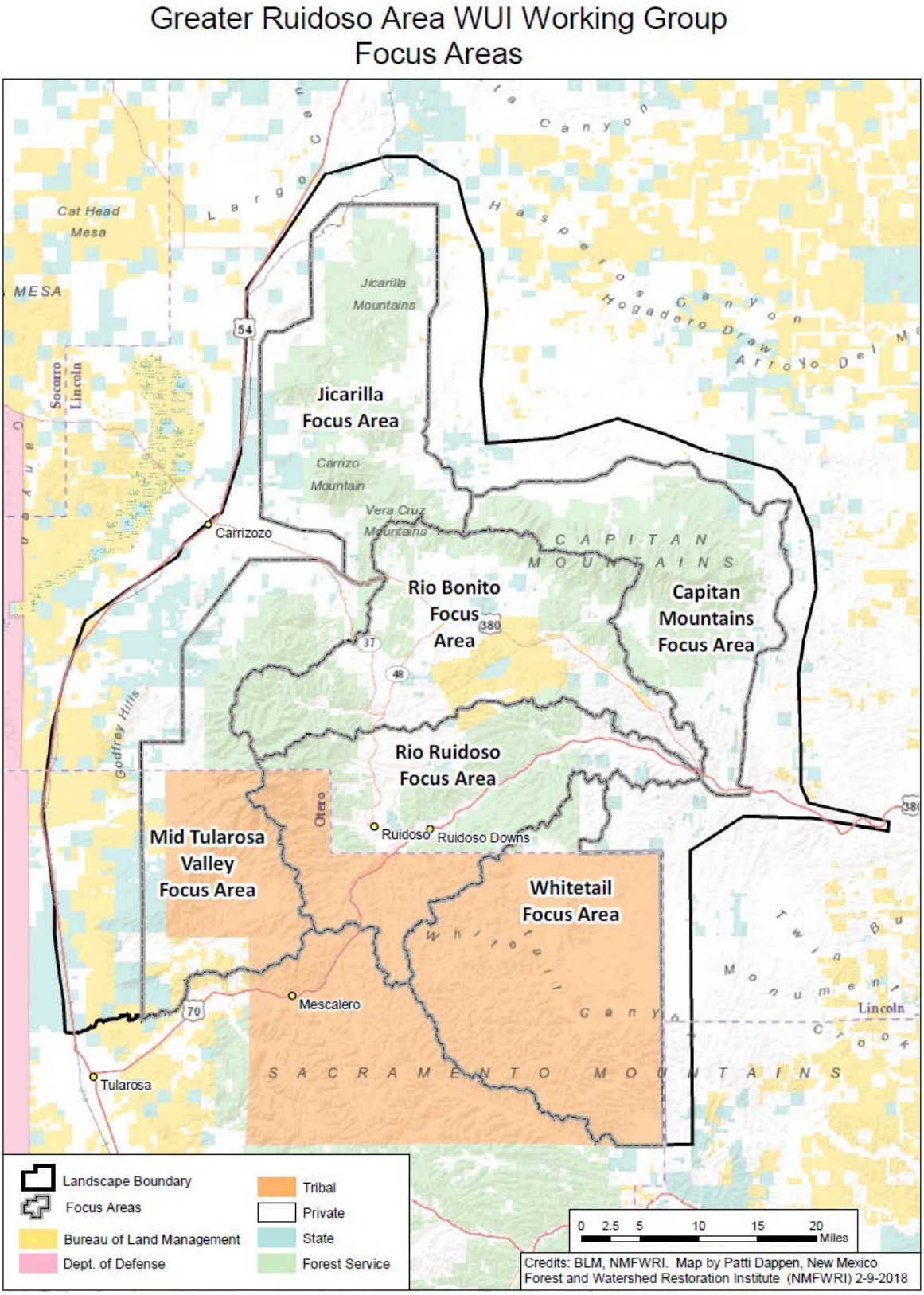
● New Mexico Forest and Watershed Restoration Institute

The New Mexico Forest & Watershed Restoration Institute ("NMFWRI") is located in Las Vegas, NM, on the campus of New Mexico Highlands University ("NMHU"). The mission of the NMFWRI is to promote adaptive forest management and support practices which reduce the risk of catastrophic wildfires and improve watershed health in New Mexico. The NMFWRI was created by Congress by the Southwest Forest Health and Wildfire Prevention Act of 2004,[168] and is supported by funding from the USFS and the State of New Mexico. The NMFWRI has expertise in monitoring the effects of forest treatments on ecological characteristics, assisting collaborative groups and mapping using Geospatial Information Systems ("GIS").[169]

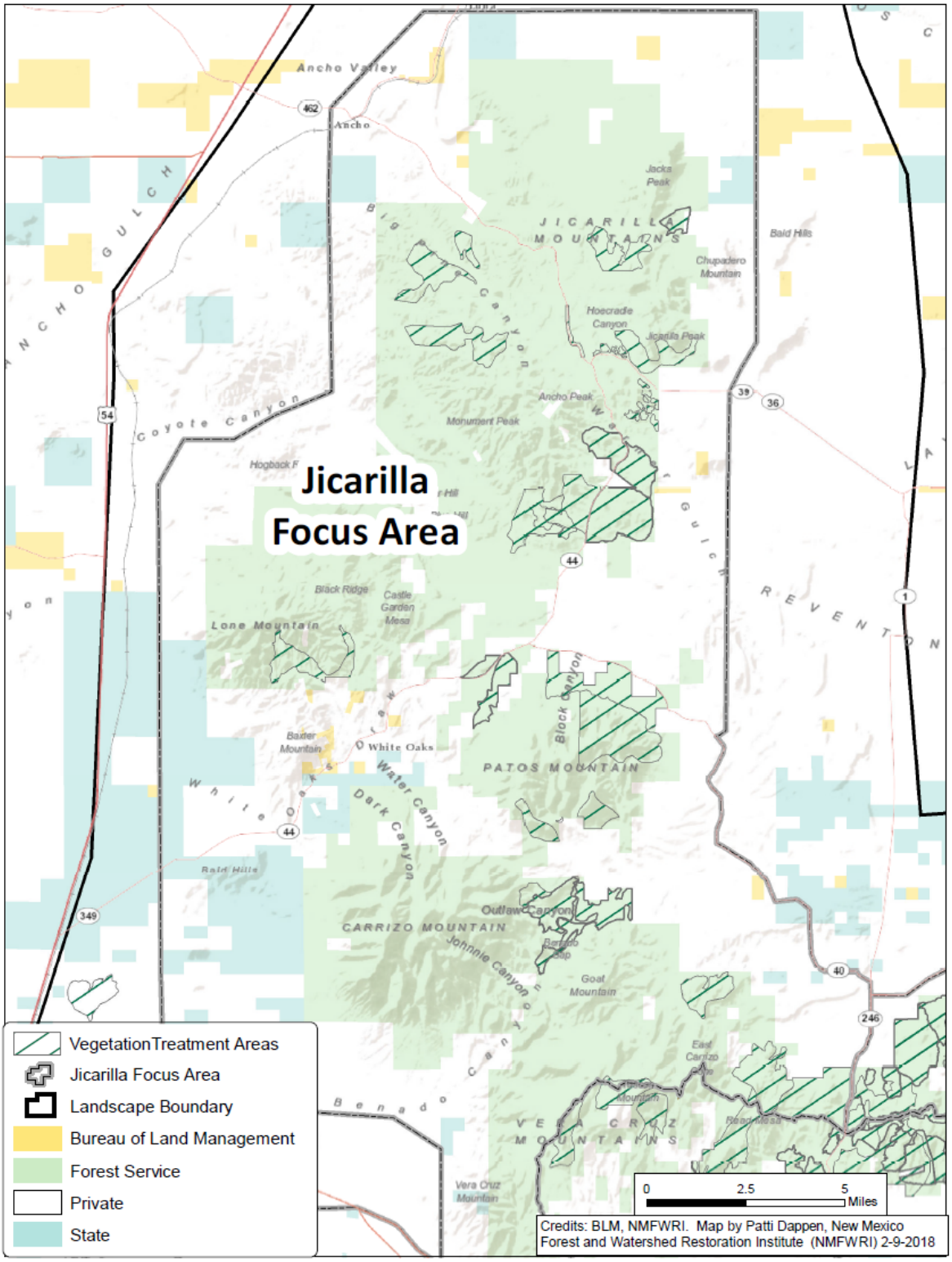
[167] For more information, visit http://www.scmrcd.org/.
[168] Southwest Forest Health and Wildfire Prevention Act of 2004, 16 U.S.C. §§ 6701 to 6707 (2016).
[169] For more information, visit http://nmfwri.org/.

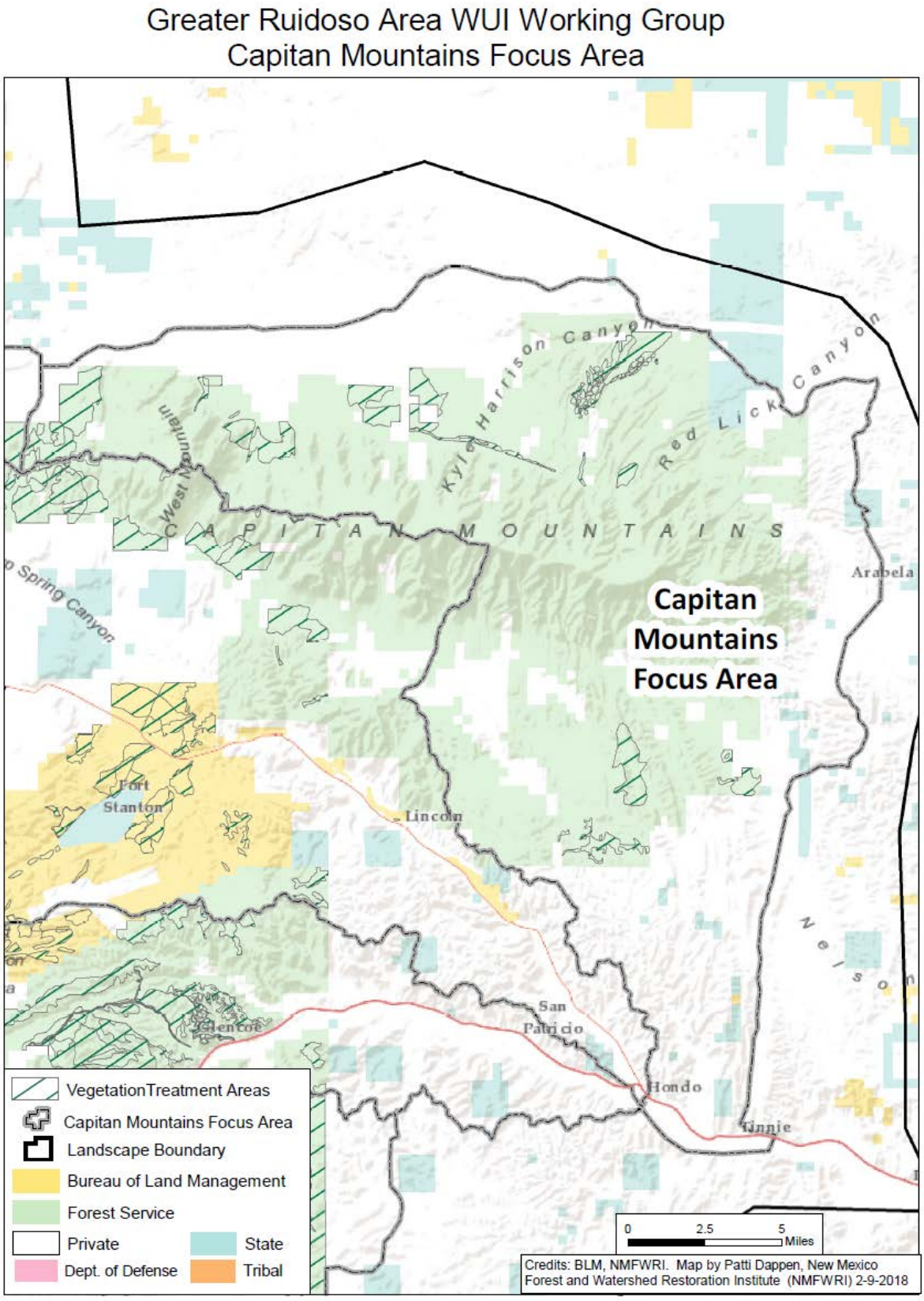
Appendix B:
Maps of the Greater Ruidoso Area WUI Working Group Project Area

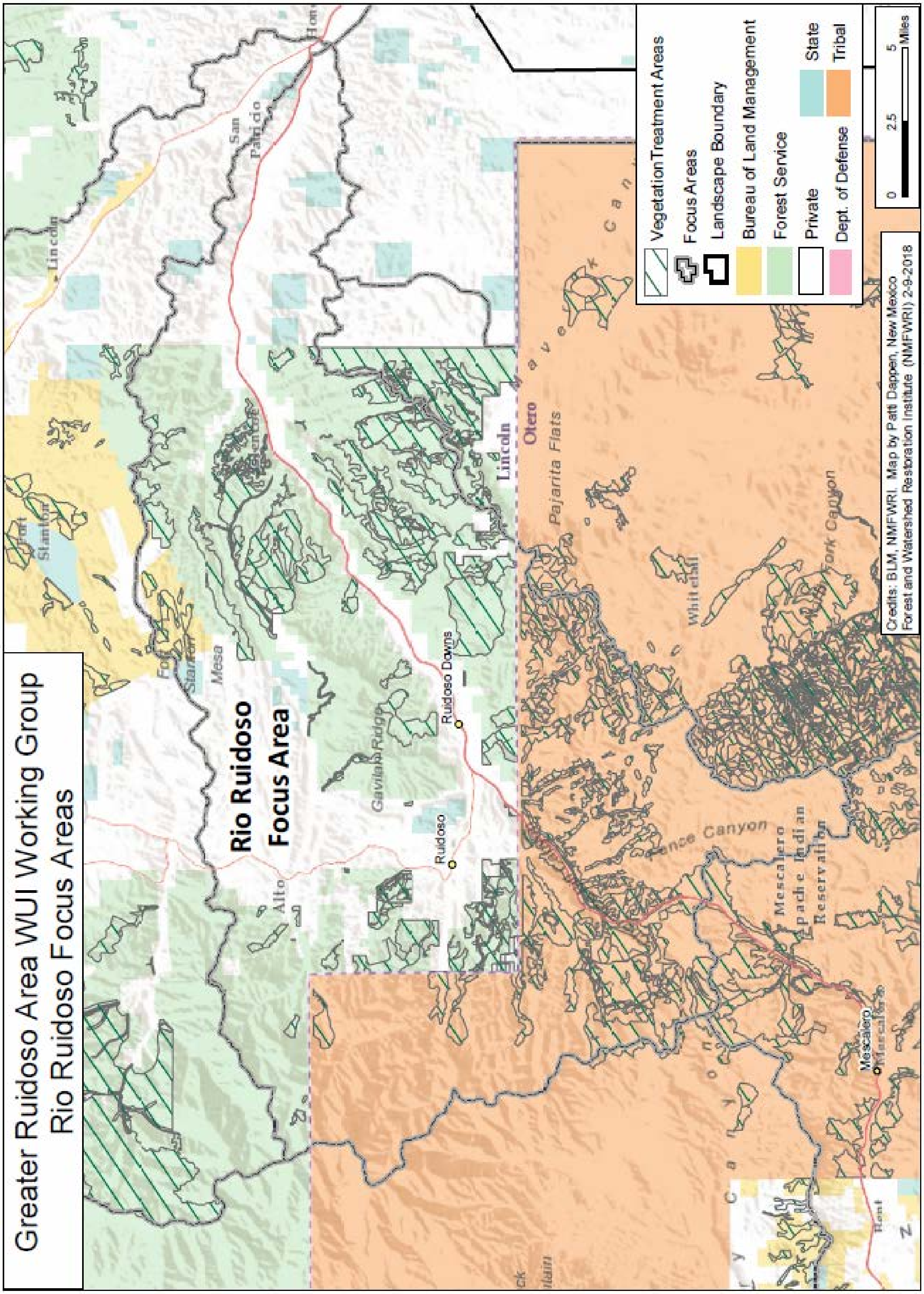


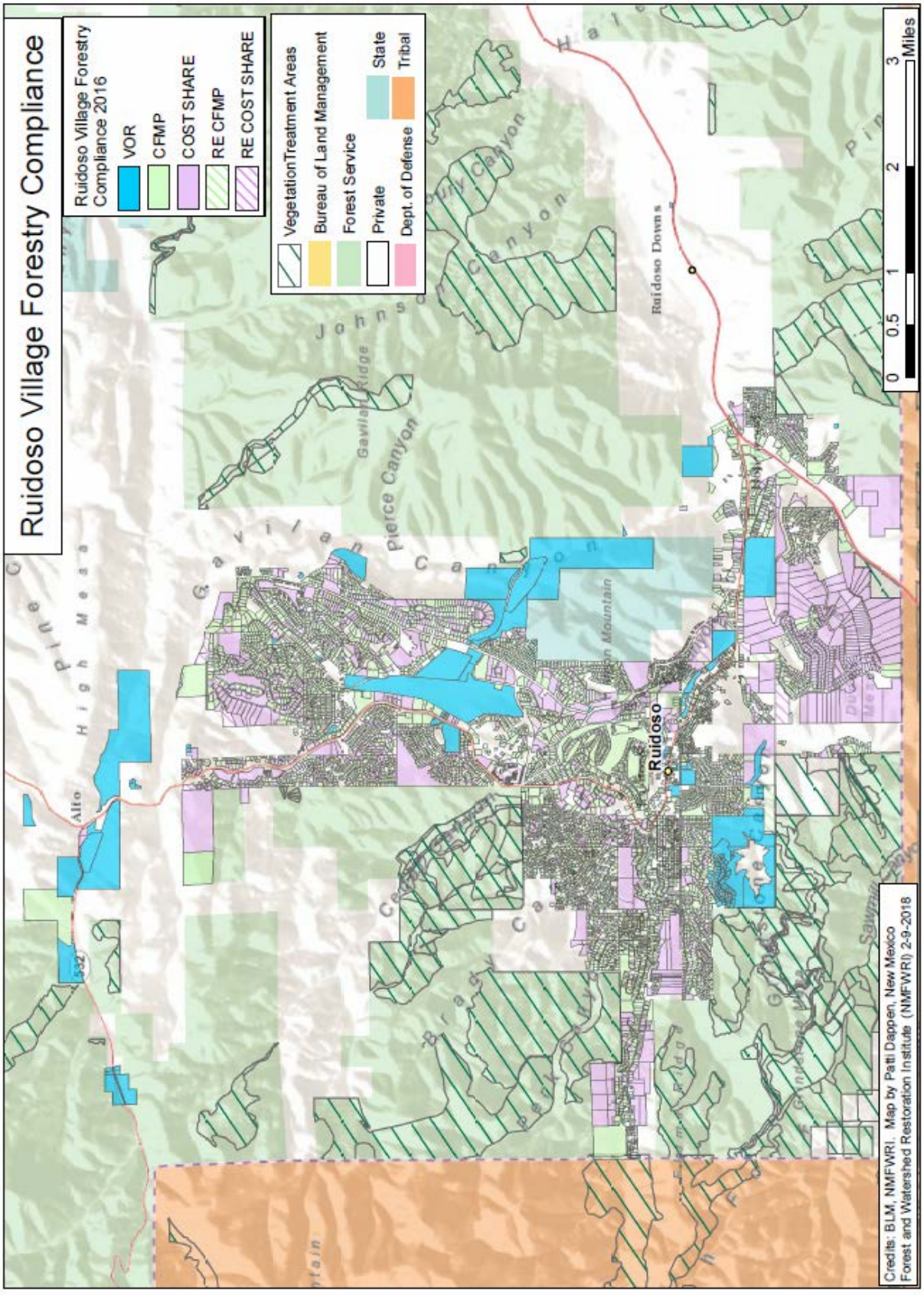

Greater Ruidoso Area WUI Working Group
Focus Areas
Cat Head Mesa
MESA
Jicarilla Mountains
Jicarilla Focus Area
Carrizo Mountain
Vera Cruz Mountains
Carrizozo
CAPITAN MOUNTAINS
Rio Bonito Focus Area
Capitan Mountains Focus Area
Rio Ruidoso Focus Area
Godfrey Hills
Otero
Ruidoso
Ruidoso Downs
Mid Tularosa Valley Focus Area
Whitetail Focus Area
Mescalero
Tularosa
SACRAMENTO MOUNTAINS
Lincoln
Socorro
Lincoln
Landscape Boundary
Focus Areas
Bureau of Land Management
Dept. of Defense
Tribal
Private
State
Forest Service
0 2.5 5 10 15 20 Miles
Credits: BLM, NMFWRI. Map by Patti Dappen, New Mexico Forest and Watershed Restoration Institute (NMFWRI) 2-9-2018

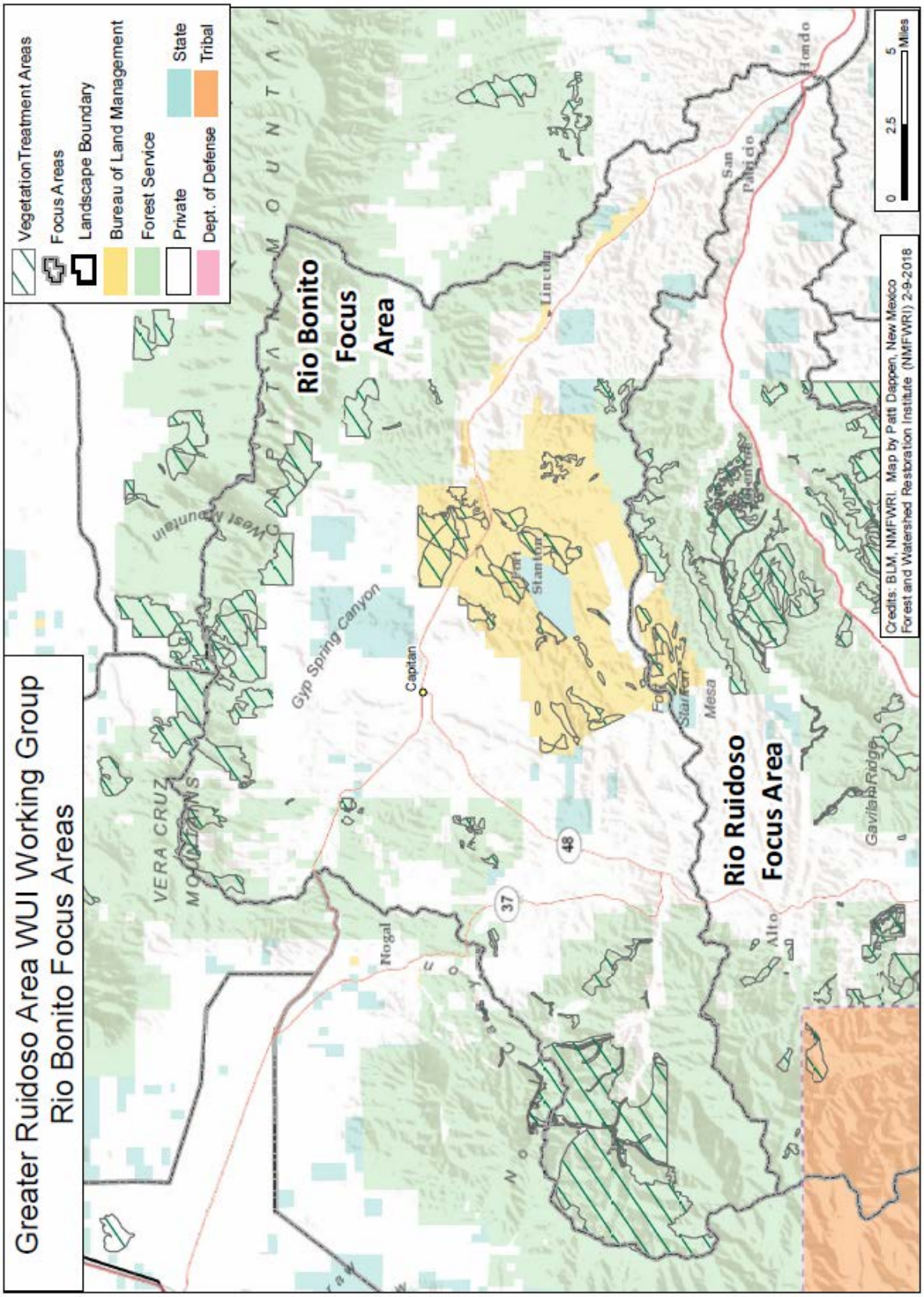
Greater Ruidoso Area WUI Working Group
Jicarilla Focus Area

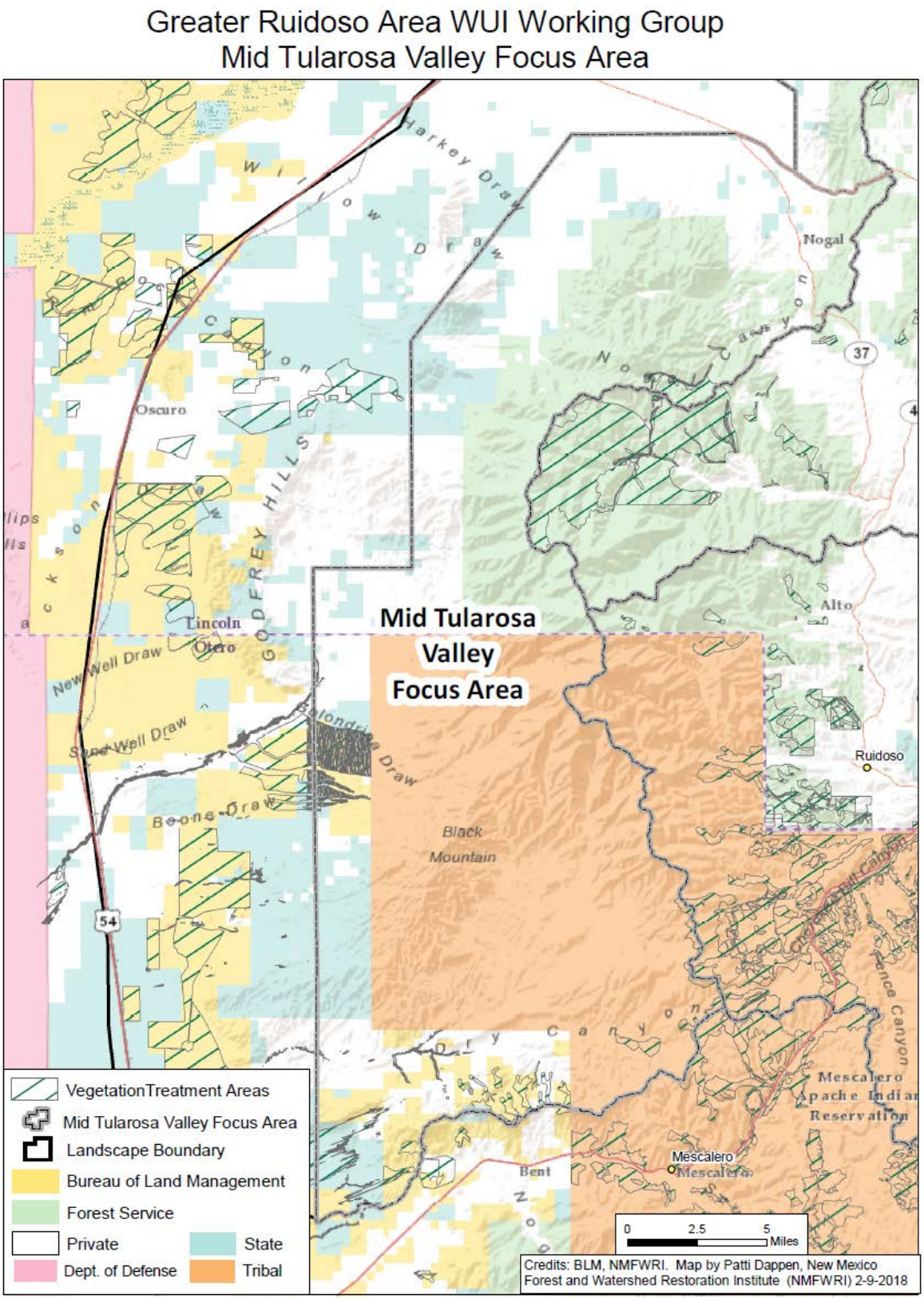



Greater Ruidoso Area WUI Working Group
Capitan Mountains Focus Area
Kyle Harrison Canyon
Red Lick Canyon
West Mountain
CAPITAN MOUNTAINS
Spring Canyon
Arabela
Capitan Mountains Focus Area
Fort Stanton
Lincoln
Nelson
San Patricio
Glencoe
Hondo
Tinnie
VegetationTreatment Areas
Capitan Mountains Focus Area
Landscape Boundary
Bureau of Land Management
Forest Service
Private
State
Dept. of Defense
Tribal
0 2.5 5 Miles
Credits: BLM, NMFWRI. Map by Patti Dappen, New Mexico Forest and Watershed Restoration Institute (NMFWRI) 2-9-2018

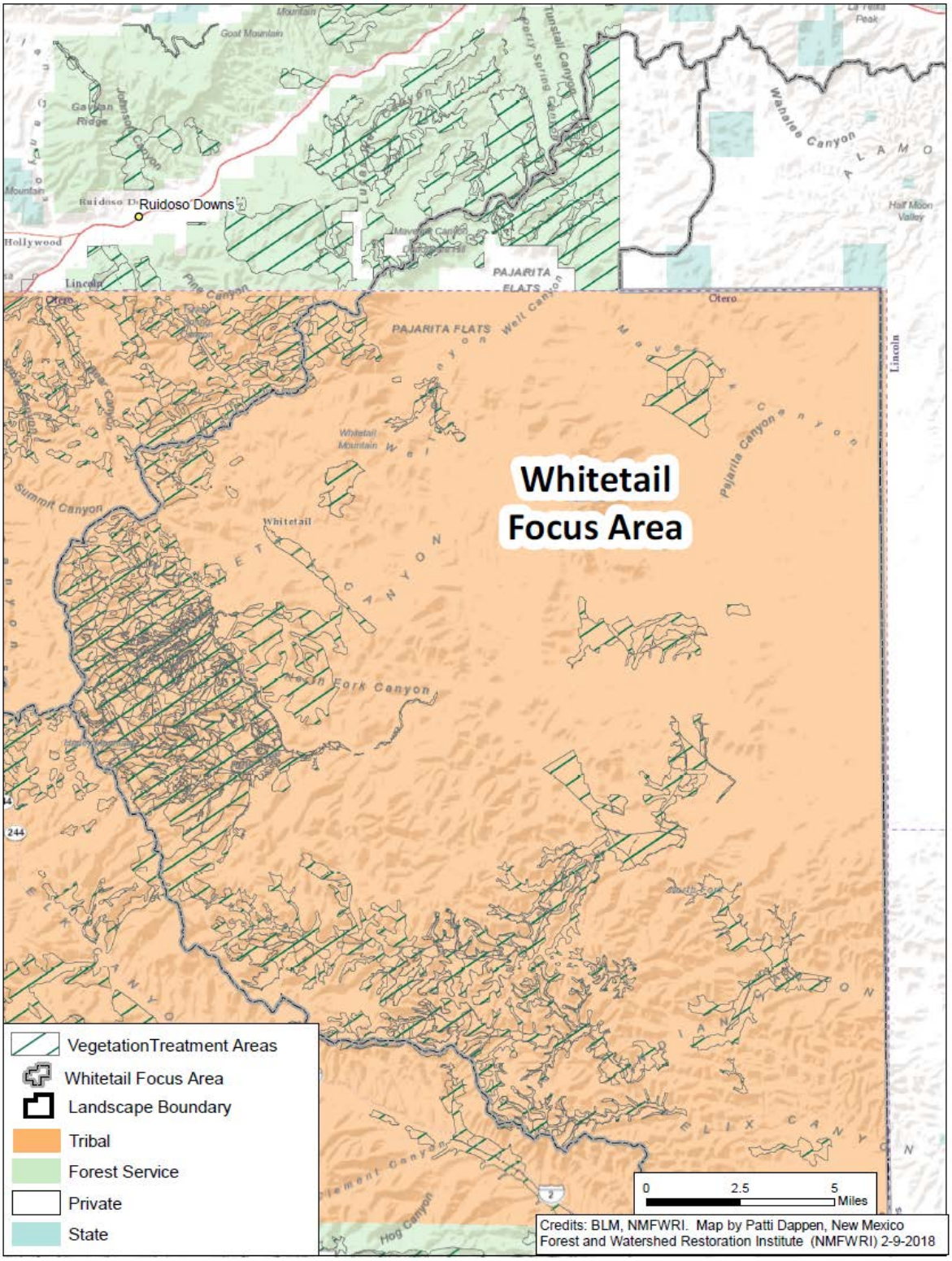

Greater Ruidoso Area WUI Working Group
Rio Ruidoso Focus Areas
Rio Ruidoso Focus Area
Vegetation Treatment Areas
Focus Areas
Landscape Boundary
Bureau of Land Management
Forest Service
Private
Dept. of Defense
State
Tribal
0 2.5 5 Miles
Credits: BLM, NMFWRI. Map by Patti Dappen, New Mexico Forest and Watershed Restoration Institute (NMFWRI) 2-9-2018
Ruidoso Downs
Ruidoso
Alto
Mescalero
Lincoln
Otero
Pajarita Flats
Mesa
Mescalero Apache Indian Reservation


Ruidoso Village Forestry Compliance
Ruidoso Village Forestry Compliance 2016
VOR
CFMP
COST SHARE
RE CFMP
RE COST SHARE
Vegetation Treatment Areas
Bureau of Land Management
Forest Service
Private
State
Tribal
Dept. of Defense
0 0.5 1 2 3 Miles
Ruidoso
Ruidoso Downs
Alto
Pierce Canyon
Gavilan Canyon
Credits: BLM, NMFWRI. Map by Patti Dappen, New Mexico Forest and Watershed Restoration Institute (NMFWRI) 2-9-2018


Greater Ruidoso Area WUI Working Group
Rio Bonito Focus Areas
Vegetation Treatment Areas
Focus Areas
Landscape Boundary
Bureau of Land Management
Forest Service
Private
State
Tribal
Dept. of Defense
Rio Bonito Focus Area
Rio Ruidoso Focus Area
Gyp Spring Canyon
Capitan
Fort Stanton
Mesa
Gavilan Ridge
Nogal
Alto
Lincoln
San Patricio
Ruidoso
West Mountain
VERA CRUZ MOUNTAINS
37
48
0 2.5 5 Miles
Credits: BLM, NMFWRI. Map by Patti Dappen, New Mexico Forest and Watershed Restoration Institute (NMFWRI) 2-9-2018

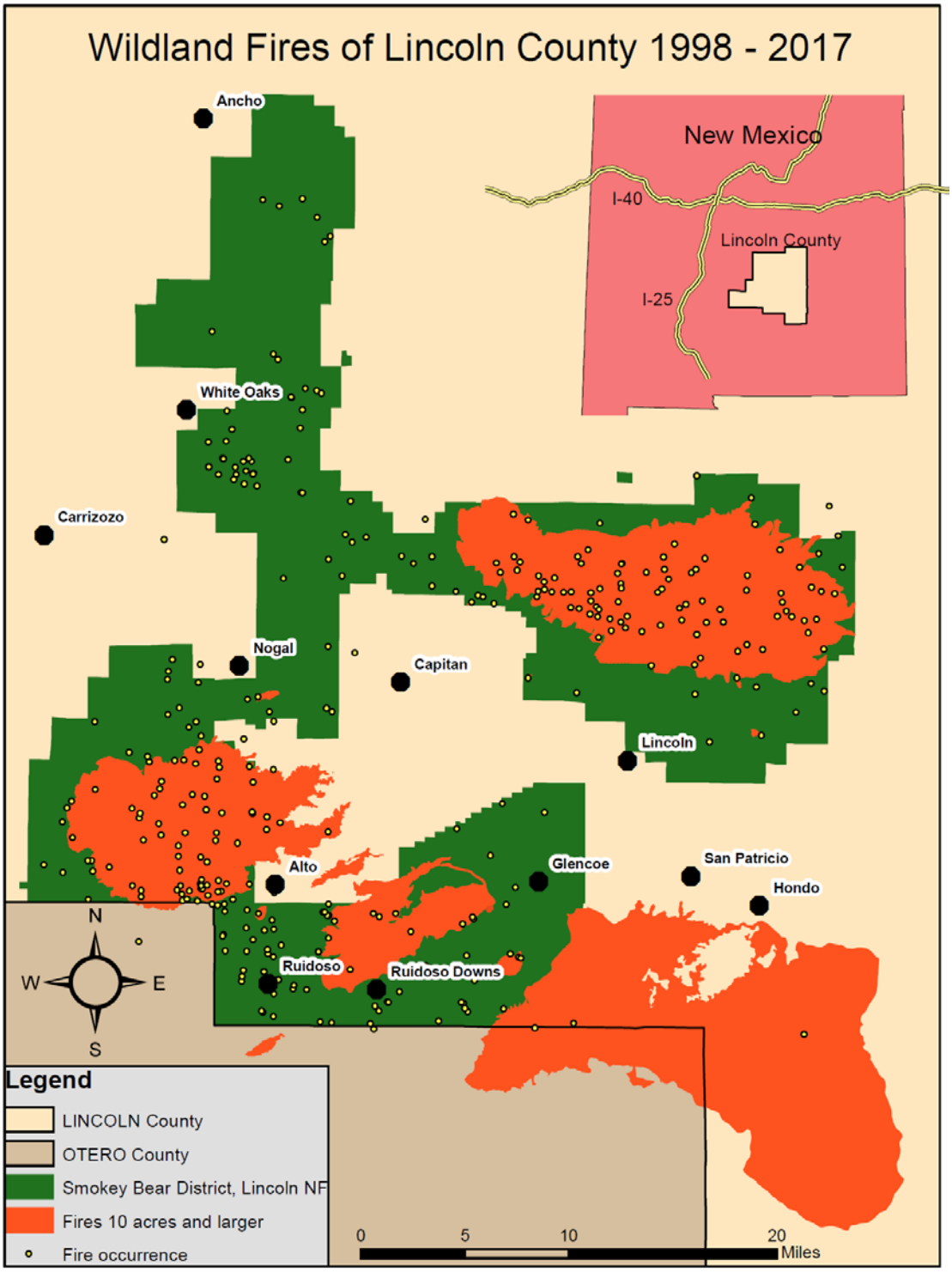

Greater Ruidoso Area WUI Working Group
Mid Tularosa Valley Focus Area
Mid Tularosa Valley Focus Area
Harkey Draw
Willow Draw
Nogal
Oscuro
Godfrey Hills
Alto
Lincoln
Otero
New Well Draw
Stone Well Draw
Boone Draw
Ruidoso
Black Mountain
54
37
Mescalero Apache Indian Reservation
Mescalero
Bent
VegetationTreatment Areas
Mid Tularosa Valley Focus Area
Landscape Boundary
Bureau of Land Management
Forest Service
Private
State
Dept. of Defense
Tribal
0 2.5 5 Miles
Credits: BLM, NMFWRI. Map by Patti Dappen, New Mexico Forest and Watershed Restoration Institute (NMFWRI) 2-9-2018

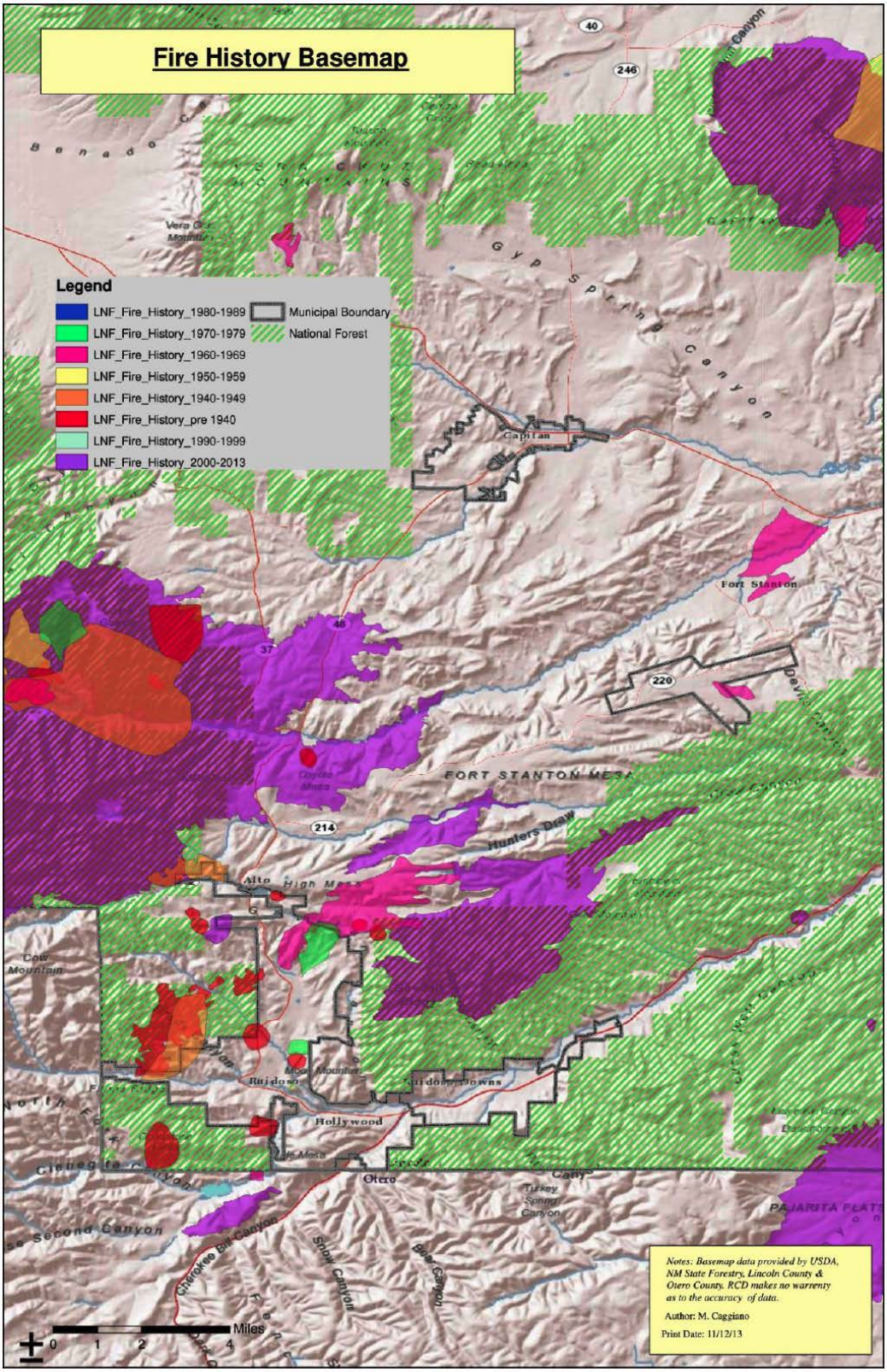
Greater Ruidoso Area WUI Working Group
Whitetail Focus Area



Appendix C:
Maps of Previous Wildfires in the GRAWUIWG Project Area

Wildland Fires in Lincoln County, 1998–2017





Source: SZ Enterprises Environmental Consulting. (2017). *2017 multi-jurisdictional hazard mitigation plan: Village of Ruidoso, Lincoln County, including City of Ruidoso Downs, Town of Carrizozo, Village of Capitan, and Village of Corona,* p. 43.

The North Sacramento Mountain Watershed and Forest Restoration Strategy was prepared by Alan W. Barton, J.D., Ph.D., Collaboration Program Manager at the New Mexico Forest & Watershed Restoration Institute (NMFWRI), Box 9000 NMHU, Las Vegas, NM 87701. Maps were prepared by Patti Dappen, M.S., of the NMFWRI. The strategy was formulated by the North Sacramento Mountain Watershed and Forest Restoration Strategy Group (NSMWFRSG), a sub-committee of the Greater Ruidoso Area Wildland-Urban Interface Working Group. The NSMWFRSG met between October 2016 and January, 2018, to discuss and formulate the strategy for the North Sacramento Mountains. Participants in the NSMWFRSG were Mark Cadwallader (LNF), Craig Wilcox (LNF), Dick Cooke (RFD), Eric Boyda (RWR), Frank Silva (NMSF), Thora Padilla (MATNR), Leland Pullman (MATNR), Jodie Canfield (SBRD), Dan Ray (SBRD), Leroy Cockrell (LBFRC), Mike Smith (BIA), Melvin Johnson (CSWD), Laura Johnson (UHSWCD), Robert Barber (LANRAC), and Jim Miller (ENMU-R). The process was facilitated by Rick Merrick of the South Central Mountains RC&D.

Organizations:

BIA: Bureau of Indian Affairs, Mescalero Office
CSWD: Carrizozo Soil & Water Conservation District
ENMU-R: Eastern New Mexico University–Ruidoso
LANRAC: Lincoln County Land and Natural Resources Advisory Committee
LBFRC: Little Bear Forest Reform Coalition
LNF: Lincoln National Forest Supervisor's Office
MATNR: Mescalero Apache Tribe, Natural Resources Department
NMFWRI: New Mexico Forest & Watershed Restoration Institute
NMSF: New Mexico State Forestry, Capitan Office
RFD: Village of Ruidoso Forestry Department
RWR: Village of Ruidoso Water Rights Department
SBRD: Smokey Bear Ranger District, Lincoln National Forest
SCMRC&D: South Central Mountains Resource Conservation & Development Committee
UHSWCD: Upper Hondo Soil & Water Conservation District