

The Ecological Restoration Institute at Northern Arizona University

Accelerating Restoration and Resiliency in the West

Fiscal Year 2023 Work Plan

April 25, 2023

Introduction

In 2004, Congress passed the Southwest Forest Health and Wildfire Prevention Act ([PL108-317](#)) that established three university-led Southwest Ecological Restoration Institutes (SWERI) in Arizona, New Mexico and Colorado. This Act was a result of congressional recognition (led by Senator Jon Kyl) that objective, practitioner-oriented science was needed to accelerate forest restoration. Today, SWERI are known for their ability to swiftly respond to a broad range of inquiries, particularly those relating to ecology, management, social concerns, and natural resource policy. As land management agency leadership develops directives to address the Wildfire Crisis Strategy, and White House executive orders examine old-growth direction, SWERI's adaptability and timely responsiveness have become increasingly valuable to its affected entities.¹

Our work at ERI spans several focal areas that contribute to building climate resilience, fostering collaborative efforts, and developing restoration knowledge. We provide cutting-edge biophysical and social science to assist land managers in understanding long-term outcomes of ecological restoration treatments, planning for landscape-scale restoration activities, and addressing social, economic, and policy barriers to restoration. We are committed to facilitating the exchange of restoration knowledge between and among tribal and agency partners, and we engage in workshops, field trips, and focus groups to work with all affected entities for shared science delivery and implementation of state and federal agency strategic goals.

Our human dimensions engagement includes assessing community perceptions of wildfire and prescribed fire use, wilderness value, the role of active management, and how managers best use decision support tools. Additionally, we assist public land management agencies in prioritizing treatments and understanding where treatments are successful and unsuccessful at decreasing wildfire hazards. We identify implementation strategies and communication approaches that allow for increased prescribed fire use and help our partners have a long-term and landscape-scale perspective in their land management and stewardship work. These efforts align directly with priorities recently discussed with Forest Service Region 3 leadership.

By capitalizing on each university's distinct assets, the SWERI tackle emerging and anticipated management issues and act as a link between knowledge development and knowledge application. Supported by congressionally appropriated funds, the institutes develop annual work plans with all affected entities that fulfill the duties of the Act, which include: 1) developing, researching, and

¹ An affected entity is defined in PL108-317 as: land managers, stakeholders, concerned citizens; and, the States of the interior West, including political subdivisions of the States.

monitoring treatments to reduce the risk of severe wildfires and improve the health of dry forests and woodlands; 2) synthesizing and adapting scientific findings for affected entities¹ to implement treatments on a landscape scale; 3) translating and transferring knowledge to all affected entities; and, 4) assisting all affected entities to implement treatments using best adaptive management practices.

The Ecological Restoration Institute's (ERI) annual work plan aligns with the Act, and additionally with ERI's [5-year strategic plan](#) (2020–2024) that tiers to the [Northern Arizona University Strategic Plan](#). The ERI 2023 Work Plan development incorporated the following:

- Staff coordination with the Colorado Forest Restoration Institute and the New Mexico Forest and Watershed Restoration Institute to identify and meet cross-region and national needs.
- Staff consultation across Forest Service Region 3, including the regional office (Climate Change Coordinator, SWERI Coordinator, Special Projects Coordinator), forest-level staff on the Prescott, Coconino, and Kaibab national forests, and the Four Forests Restoration Initiative (4FRI) Implementation Team to determine land management science gaps or questions.
- Staff meetings with Forest Service regional leadership to learn about and integrate shared regional priorities.
- Ongoing staff conversations with the Resource Integration Management Coordination team, and Ecosystem Management Coordination staff in the Forest Service Washington Office to better inform our forest assessment, forest monitoring, and adaptive management work.
- Staff communication with the Arizona Department of Forestry and Fire Management (AZ DFFM) to discuss opportunities for shared stewardship and advancing state restoration and fire risk reduction goals.
- Staff consultation with the Intertribal Timber Council, representatives from individual tribes including the Navajo, Hopi, White Mountain Apache, San Carlos Apache, Mescalero Apache, and Hualapai, forest tribal liaisons, and the Bureau of Indian Affairs and United States Geological Survey at regional and central office levels to identify strategic opportunities to assist tribes.
- Staff identification of ongoing Collaborative Forest Landscape Restoration Program (CFLRP) needs in consultation with Lindsay Buchanan (CFLRP Coordinator), Bryce Esch (CFLRP Research Associate) and CFLRP stakeholders from pilots across the Intermountain West.
- Ongoing work with the 4FRI stakeholders, Forest Service, and Rocky Mountain Research Station staff to identify and validate ongoing ERI leadership, technical, and administrative services to the 4FRI Stakeholder Group.
- Staff consultation with the Forest Products Modernization Team (Forest Service, The Nature Conservancy) to advance innovation for restoration outcomes on federal landscapes.
- Staff discussions on improving biomass utilization opportunities with the regional office (Patrick Moore) and WO (Julie Tucker), and Rocky Mountain Research Station staff.
- Staff response to literature gaps identified from past workplan efforts, including systematic reviews, and evaluation.

Focal Area Summaries

The ERI has six interdisciplinary Focal Areas that crosswalk to specific duties of the Act, and match or leverage projects developed by our sister institutes in New Mexico and Colorado. These Focal Areas help support current Forest Service and Arizona-led initiatives and priorities, including the Wildfire Crisis Strategy National Priority Landscapes, Shared Stewardship, Biomass Innovations, Arizona's Healthy Forest Initiative, and support to tribal implementation of Tribal Forest Protection Act (TFPA) and 638 contracting. Lastly, they align with the ERI's mission to address climate change, test treatment effectiveness, and support resilient and sustainable forest and woodlands in the West.

Focal Area 1 – Restoration and climate adaptation knowledge development and transfer (Fulfills duties under the Act: 1, 2, and 3). Focal Area 1 describes ERI's work to address existing and emerging biophysical and social science needs related to issues such as restoration treatment effectiveness, climate impacts on forests, and understudied forest ecosystems, as well as understanding the social, economic, and policy barriers to forest restoration and wildfire risk mitigation.

Focal Area 2 – Apply ERI expertise to restoration implementation at appropriate scales (Fulfills duties under the Act: 2, 3, and 4). In this Focal Area, the ERI applies interdisciplinary expertise to address barriers and challenges to restoration implementation, at scales appropriate for enhancing resiliency for forested landscapes and human communities. This includes tests of best available tools for landscape prioritization, and development of innovative efficiencies to more quickly get restoration treatments implemented.

Focal Area 3 – Foster and support partnerships (Fulfills duties under the Act: 2 and 3). The ERI convenes and facilitates discussions that advance restoration knowledge development and application across boundaries and at landscape scales.

Focal Area 4 – Integration and engagement with tribal land restoration (Fulfills duties under the Act: 2, 3, and 4). The ERI, with Northern Arizona University, is committed to facilitating the exchange of restoration knowledge and experience between and among tribal and federal partners.

Focal Area 5 – Science and policy application and interpretation (Fulfills duties under the Act: 3 and 4). The ERI develops workshops, field trips, and focus groups to work with all affected entities for shared science delivery, and implementation of state and federal agency strategic goals.

Focal Area 6 – Communication and outreach (Fulfills duties under the Act: 3). The ERI is proud to be a known expert in forest restoration science and implementation. To meet the duties of the Act, we promptly respond to media requests, community information needs, policy questions, and practitioner information requests on a weekly basis.

Focal Area Descriptions and Deliverables

Focal Area 1: Restoration and climate adaptation knowledge development and transfer

Efforts in this project include analysis of long-term monitoring data collected on field plots, analysis of landscape-scale remote sensing data, implementation of new studies to investigate key questions aimed at accelerating the pace and scale of restoration, and social and economic research with managers and other affected entities. Specific projects are detailed in the tables below. Some highlights include:

- Assessing patterns of tree mortality and regeneration in aspen, spruce-fir, and bristlecone pine forests that are susceptible to change due to drought and warming temperatures, using ERI's high-elevation forest monitoring plots established in 2000–2003. Mortality of dominant tree species and

expansion into new habitats are climate-driven changes that are expected to be most prominent in transition zones where species occur at their environmental limits.

- Analyzing how managed fire policies and directives are interpreted and implemented by managers among multiple federal agencies with varying missions and leadership intent to better understand the realities and impacts of managed wildfire decisions.
- Assessing the ecological outcomes of managed fires and whether forests are approaching desired conditions. This work also links with our human dimension projects that seek a better understanding of policy nuances and barriers for use of wildfire to meet restoration goals. In FY23, we will resample monitoring plots established in the late 1990s on the Arizona Strip District of the Bureau of Land Management (BLM). Since plot establishment, at least two wildfires have been managed in wilderness areas to meet resource objectives. Managed wildfire use is increasingly promoted as a tool to increase the pace and scale of restoration, but more information is needed to better understand where and when restoration goals are met with this approach.
- Expanding pinyon-juniper studies and continuing our collaboration with Dr. Miranda Redmond (UC Berkely) and Dr. Andy Graves (Forest Health Protection, NM Zone) to examine factors related to pinyon mortality and analyze the effects of thinning and alternative slash treatments on forest structure, subsequent bark beetle attack, and understory community responses. Pinyon-juniper (PJ) is one of the most extensive ecosystems in the Southwest, and presently there is high demand among forest managers for information concerning restoration and fuels treatment options appropriate for PJ. Information generated from this work will help managers when considering timing of fuel reduction treatments and tradeoffs that may be associated with meeting restoration goals.
- Conducting a policy review and analysis of social dimensions of reforestation, and continuing discussions with local managers to identify reforestation questions.
- Science delivery of critical information to land managers and other stakeholders is completed through peer-reviewed technical publications, working papers, fact sheets, conferences, and workshops to best meet the requirements of a wide audience of practitioners, researchers, and policy makers.

Focal Area 1: Restoration and climate adaptation knowledge development and transfer	
<i>Fulfills duties under the Act: 1, 2, 3</i>	
Action	Requestor/Anticipatory
<p>1.1) Long-term monitoring</p> <p><i>a) San Francisco Peaks ecosystem monitoring</i></p> <p><i>b) Sunset Crater penstemon monitoring</i></p>	<p><u>Requestors</u>: Multiple units; Mark Nabel, Silviculturist, Coconino National Forest</p> <p><u>Outcomes</u>: Information on long-term impacts of drought and climate change in aspen and other higher-elevation forests; information on wildfire impacts to endemic plant species. Inform future planning for landscapes, wilderness areas, and rare species</p>

<p>1.2) Pinyon-juniper stand dynamics and treatment responses</p> <p><i>a) Bark beetle-driven pinyon pine mortality in Arizona and New Mexico</i></p> <p><i>b) Long-term changes in pinyon-juniper structure and regeneration</i></p> <p><i>c) Mt. Taylor (NM) pinyon-juniper thinning and slash treatments</i></p>	<p><u>Requestors</u>: Multiple units; Andy Graves, Forest Service Forest Health Protection, NM Zone Lead</p> <p><u>Outcomes</u>: a) Information on impacts of bark beetles and stand conditions on pinyon pine mortality; b) Information on long-term mortality and regeneration in pinyon-juniper systems; c) Information on tree understory responses to pinyon-juniper thinning and slash disposal treatments</p>
<p>1.3) Managing wildfires to meet restoration objectives; Mount Trumbull wilderness fire outcomes</p>	<p><u>Requestors</u>: Congress, local forest managers, researchers</p> <p><u>Outcome</u>: Test ecological outcomes of wildfires allowed to burn in remote BLM wilderness</p>
<p>1.4) Human dimensions of managed wildfires</p>	<p><u>Requestors</u>: Congress, local forest managers, researchers</p> <p><u>Outcome</u>: Inform future policy and decision support tools</p>
<p>1.5) Wilderness management perspectives — policy review combined with biophysical data</p>	<p><u>Requestors</u>: Forest Service, Coconino County, City of Flagstaff, Intertribal Timber Council, Congress</p> <p><u>Outcomes</u>: Understand wilderness policies and scope perspectives on wilderness management</p>
<p>1.6) Reforestation after wildfire</p> <p><i>a) Reforestation policy analysis</i></p> <p><i>b) Ecological drivers of reforestation success</i></p>	<p><u>Requestor</u>: Anticipatory</p> <p><u>Outcomes</u>: Understand recent changes in reforestation policy and social science literature gaps; better understanding of drivers of success/planting survival across large geographic extent</p>
<p>1.7) Systematic review and science summary</p>	<p><u>Requestors</u>: Congress; SWERI leadership</p> <p><u>Outcomes</u>: A systematic assessment of wildfire risk treatment effectiveness (i.e., ReSHAPE project)</p>
<p>1.8) Fire history analysis</p>	<p><u>Requestor</u>: Anticipatory</p> <p><u>Outcomes</u>: Information to support planning for restoration and prescribed fire</p>

1.1) Long-term monitoring. This work fulfills several ERI strategic goals and land management priorities related to analysis of landscape processes and climate change effects in forest ecosystems and continues FY21 and FY22 work to provide new information on understudied ecosystems. The overarching aim of this multi-year effort is to assist managers in planning for climate change and landscape-scale restoration. Information from Project 1.1a will also help managers identify goals for managing a wilderness landscape that is of major importance to Flagstaff and local tribes. In FY23, we will remeasure additional long-term monitoring plots to analyze tree mortality and changes in composition of higher elevation forest types. In Project 1.1b, we will return to sample plots established to monitor long-term dynamics of a local endemic plant species, Sunset Crater penstemon (*Penstemon clutei*). This work will provide information to local managers regarding the impact of the 2022 Pipeline and Tunnel fires on the viability of an important, rare species.

Requestors: Coconino National Forest, Flagstaff Ranger District, Sunset Crater National Monument, City of Flagstaff, Coconino County, and anticipatory

Outcomes: Information on long-term impacts of drought and climate change in aspen and other higher-elevation forests; to inform future planning for landscapes and wilderness areas

Deliverables:

- a) San Francisco Peaks ecosystem monitoring
 - i) Technical report on results from data analysis
- b) Sunset Crater penstemon monitoring
 - i) Technical report on results from data analysis

1.2) Pinyon-juniper stand dynamics and treatment responses. This work examines management questions related to climate impacts, restoration, and hazardous fuels reduction treatments in pinyon-juniper (PJ) ecosystems. Although PJ systems are extensive in the western United States, information concerning restoration treatments that align with historical ranges of variation and long-term impacts of warming/drying climatic conditions is lacking. The ERI has identified pinyon-juniper as an understudied ecosystem. Project 1.2a will revisit monitoring plots established by Forest Health Protection scientists in 2004 after an extensive mortality event that resulted from drought and severe bark beetle outbreak. This work seeks to better understand bark beetle-related mortality in pinyon pine and the importance of stand density and site conditions. Project 1.2b is an ongoing effort and an additional cooperative project being conducted with Forest Service Forest Health Protection (FHP) NM Zone Lead Andy Graves. In this project, the ERI will collect field data on understory plant community characteristics after hazardous fuels reduction and slash treatments and may entail assisting with analysis of other data collected by the New Mexico Forest and Watershed Restoration Institute or other entities. Results from this study will help managers better anticipate understory responses associated with various slash disposal alternatives.

Requestors: Multiple units; Andy Graves, FHP, NM Zone Lead

Outcomes: Analysis of structural changes due to drought, warming temperatures, and insect outbreaks. Analysis of understory responses to PJ treatments to inform future planning

Deliverables:

- a) Bark beetle-driven pinyon pine mortality in Arizona and New Mexico
 - i) Dataset for analysis
 - ii) Summary report on findings
- b) Long-term changes in pinyon-juniper structure and regeneration
 - i) Presentation for managers and/or interested stakeholders

- c) Mt. Taylor (NM) pinyon-juniper thinning and slash treatments
 - i) Progress report

1.3) Mount Trumbull Wilderness fire outcomes. Wildfires managed for objectives other than full suppression (OTFS) are becoming a more common treatment approach for meeting hazardous fuels and restoration goals. Managers expect that this approach will be relatively low cost and flexible, particularly on lands where mechanical treatments are not feasible or acceptable. Although wildfires managed under mild weather and fuels conditions can reduce surface fuels and thin small trees, there is a lack of information concerning the effectiveness of such fires to achieve larger restoration goals at various spatial scales (i.e., fine- to coarse-scale). Desired ranges for relevant metrics are developed using various sources including historical reference information, climate projections, and stakeholder input. Historical reference information can serve as a baseline to guide management decisions and evaluate wildfire outcomes. In this study, we propose to quantify structural attributes at fine-, mid-, and landscape-scales for two OTFS wildfires that occurred in the mid-2000s in the Mount Trumbull Wilderness in Grand Canyon-Parashant National Monument. Using an array of long-term monitoring plots established before the fires, we will analyze structural outcomes and compare present conditions to baseline stand reconstructions of the pre-fire-exclusion period (ca 1880). We will use complementary methods of field sampling, spatial interpolation, and remote sensing data to analyze attributes across scales. Results from this work will provide new information concerning the effectiveness of managed wildfires to meet restoration goals in frequent-fire forests. Information gained in this study will be valuable and timely for land managers needing to meet landscape-level fuels reduction and restoration objectives.

Requestors: Congress, local forest managers, researchers

Outcome: Test ecological outcomes of wildfires allowed to burn in remote BLM wilderness

Deliverable:

- a) Technical report on field data examining ecological responses to managed wildfire

1.4) Human dimensions of managed wildfires. We recently completed a white paper that reviewed policies related to managing wildfires for resource benefit, also known as managing wildfires for other than full suppression strategies (OTFS). Following lessons learned from the policy review, we are continuing to explore how managers interpret policy and guidance for wildfires managed for OTFS, what tools and resources managers use to inform decisions, and how this varies across jurisdictional entities and landscapes in coordination with the other SWERI. This will allow us to better assess the impacts of policy on decision making, and ultimately, provide important information about how decision-making factors influence the ecological outcomes of wildfires managed for OTFS. Because wildfire decision making is guided by policy but interpreted differently by managers across different jurisdictional entities and landscapes with different decision contexts, we surmise that the ecological outcomes of wildfires reflect how policy, acceptable levels of risk, and other decision factors are interpreted by managers on the ground, and additional work with these managers will allow us to better validate this line of thinking.

Requestors: Congressional request of SWERIs—examines the efficacy of current and proposed policy directions

Outcomes: Understanding policy interpretation and effectiveness; will inform future policy

Deliverable:

- a) Report (maybe publication) on open-ended interviews with managers

1.5) Wilderness management. The passage of the Wilderness Act in 1964 has spurred the creation of over 100 million acres of designated wilderness in the past several decades. Ecological conditions in these wilderness areas have been affected by over a century of fire suppression, changing climate regimes, increasing uncharacteristic wildfire, and growing pest and disease outbreaks. This project seeks to examine how we can rethink wilderness management in the era of climate change. Land managers are constrained in their options for active forest management within wilderness, but their perceptions and interpretations of the Wilderness Act and its guidelines vary. This project would explore wilderness management from both a social and ecological perspective, focusing on the Kachina Peaks Wilderness in northern Arizona, and consist of a policy and literature review on active forest management in designated wilderness areas (including but not limited to forest thinning, prescribed fire, cultural burning, and managing fire for resource objectives), contextualizing local ecological data within this policy landscape, and initiating the scoping of a broader study on the perceptions of both land managers and the nearby public on active wilderness management. This responds to local interest expressed by the City of Flagstaff, Coconino County, and Forest Service partners who have recognized the potential threat of uncharacteristic fire in wilderness, yet are not clear on how to manage forests in the Kachina Peaks Wilderness. The extensive ecological data collected over decades by the ERI within this wilderness provides a unique opportunity to combine a policy analysis with a robust long-term ecological dataset to illustrate how manager decisions to intervene or not have shaped the ecological characteristics of this wilderness.

Requestors: Forest Service, Coconino County, City of Flag, Intertribal Timber Council, Congress
Outcome: Understand wilderness policies and scope perspectives on wilderness management

Deliverable:

a) Report on policy and literature review, case study design

1.6) Reforestation after wildfire. Forests in the western US are increasingly facing challenges in natural tree regeneration due to the impacts of climate change and the growing scale of uncharacteristic wildfire, droughts, and pest and disease outbreaks. The current pace and scale of reforestation has not kept up with this growing need, and reforestation techniques used in the past may not succeed in current and future climatic conditions. The reforestation landscape in the US has recently changed with the passage of the Infrastructure Investment and Jobs Act (IIJA) in 2021. The IIJA included the Repairing Existing Public Land by Adding Necessary Trees (REPLANT) Act that more than quadruples the amount of funding available to the Forest Service for reforestation and mandates the completion of a 3–5-million-acre reforestation backlog over the next decade. While financial barriers to reforestation have been somewhat alleviated by this new funding, social and political barriers may inhibit implementation, and little is known about the outcomes of the REPLANT Act, how managers are considering climate impacts and uncertainty in reforestation, what are other major barriers beyond financial limitations, or how the REPLANT Act should be interpreted in different ecological contexts. This project would be an initial phase of a multi-year endeavor and consist of ecological as well as policy and social science studies. In FY23, we will begin working with local managers to evaluate successes of past efforts to replant and seed sites after severe wildfire. We will also initiate a policy and literature review on the human dimensions of reforestation in the western US affecting public and tribal lands. Field surveys and on-site visits of reforestation success will begin in summer 2023 and culminate in FY24 with a large extent analysis using remote sensing data. We also will compile relevant literature and policies, legislation,

regulations, and guidelines to analyze how they shape the current potential for reforestation in the US. We will conduct open-ended interviews with managers who work for or with federal land agencies on reforestation to better understand what factors shape reforestation and ensure we are reviewing the appropriate policies affecting their work. Once this foundation is laid, we will expand this study in the next fiscal year to include more interviews with or a survey of key actors in western US reforestation.

Requestor: Anticipatory, builds off other ERI projects (reforestation monitoring with remote sensing)

Outcome: Understanding recent changes in reforestation policy and social science literature gaps

Deliverables:

- a) Reforestation policy analysis
 - i) Report that identifies how policies and regulations are influencing reforestation in the US West, examines the current state of social science research on reforestation on US public and tribal lands, and identifies research gaps in this rapidly changing environment
- b) Ecological drivers of reforestation success
 - i) Report on progress and remote sensing design

1.7) Systematic review and science summary. Work in FY23 will leverage systematic reviews and summaries funded by alternative sources. Assistance to leverage externally funded “fuel-treatment effectiveness” systematic review, with SWERI partners.

Requestors: Congress, SWERI leadership

Outcomes: A systematic assessment of wildfire risk treatment effectiveness (i.e., [ReSHAPE](#) project)

Deliverable:

- a) Report on progress

1.8) Fire history analysis. Better understanding of the historical role of fire in forests of the Southwest can assist land managers in gauging ecological restoration needs, particularly in terms of landscape extents requiring regular entries with prescribed and natural fire. Further, the number of acres that burn in wildland fires every year appears to be on the rise, with major implications for fire management, planning, and policy decisions. Building on work completed in FY22, we will collaborate with Dr. Chris Guiterman (University of Colorado at Boulder) to initiate a multi-century reconstruction of area burned by analyzing fire scars recorded in tree rings in frequent-fire forests across Arizona and New Mexico. Area burned reconstructions have been done for sites and small landscapes, but never at a regional scale. Results from this multi-year study will aid managers in regional wildfire and forest restoration planning. In FY23, we will collect fire scars at new fire history sites that fill spatial gaps identified in [the North American Tree-Ring Fire Scar Network](#) of sites in Arizona and New Mexico. With these new data, we will calibrate the fire-scar network to modern area burned and conduct an empirical reconstruction of fire activity back through time.

Requestor: Anticipatory

Outcome: Region-wide information on historical area burned in frequent-fire forests

Deliverable:

- a) Progress report on data collection and initial analysis

Focal Area 2: Apply ERI expertise to restoration implementation at appropriate scales

In 2023, the ERI continues to create strategies to economically and efficiently utilize small-diameter wood and biomass resulting from restoration treatments. Our Forest Operations and Biomass Utilization Program, led by Dr. Han-Sup Han, leverages successful competitive grants that fund much of the work in this research area. For FY23, the program will:

- Collaborate to realize a workforce training facility in northern Arizona. The ERI continues its partnerships with NAU and Coconino County to inform workforce needs and advance the opportunity to fill gaps for skilled workers in the forest industry. There is a need to run this work over multiple years, to best realize multiple funding opportunities.
- Innovate biomass utilization. Partnerships with RMRS in 2022 led to a field-based experiment to test a mobile operation of a CharBoss to convert woody biomass materials into biochar.
- Facilitate the development of the Digital Timber Sale Manager (DTSM) pilot. Since 2017, the ERI has worked in partnership with the Forest Service, including the Forest Products Modernization (FPM) team, The Nature Conservancy, and other partners to facilitate innovation and modernization approaches that will reduce the time and cost of implementing restoration treatments. The DTSM is a system that will manage spatial data for the life of a timber sale and help improve efficiency in restoration treatment implementation.

Focal Area 2: Apply ERI expertise to restoration implementation at appropriate scales	
<i>Fulfills duties under the Act: 2, 3, 4</i>	
Action	Requestor/Anticipatory
2.1) Expanding the capacity of forest operations and biomass utilization	<p><u>Requestors</u>: Multiple stakeholders, state and local municipalities, forest product businesses</p> <p><u>Outcomes</u>: Rural economic development to benefit sustainable land management; expanding markets for wood; informing job training needs</p>
2.2) Facilitate the development and integration of new technologies to advance restoration implementation	<p><u>Requestors</u>: Forest Service FPM team, The Nature Conservancy</p> <p><u>Outcomes</u>: Lessons learned; informing future implementation processes</p>

2.1) Expanding the capacity of forest operations and biomass utilization. This ERI program area is to expand industrial capacity and markets to utilize small-diameter wood and biomass. These projects are mostly supported by a mix of external grants and state funding. The federal work plan will support this broad program with administrative support, public relations, and outreach, in three key project areas, which include:

- a) The development of the Forest Operations Training Program (FOTP) plan was initially supported by an external grant (US Economic Development Administration). As a final step in

that planning effort for the FOTP, we will develop a cash flow model that can be used to assess the financial sustainability of running the FOTP for the next 20 years in partnership with Coconino County and local community colleges. The team will perform break-even and sensitivity analysis using the model to evaluate financial risks associated with high-cost items and discontinued incomes.

- b) ERI staff recently published a [journal article](#) summarizing thinning costs throughout the western US over the last 40 years (1980–2020). As a follow up, the ERI team is developing a spreadsheet-based model for users to quickly estimate thinning costs by entering key variables in thinning prescriptions and operations. Workshops demonstrating the model will be offered for forestland managers and logging contractors. This project is funded by the state and the Forest Service’s Rocky Mountain Research Station.
- c) The NAU–ERI team has been conducting a field-based experiment to test a mobile operation of CharBoss to convert woody biomass materials into biochar. The team will expand the research to broaden our knowledge on the benefits of biochar in improving the soil properties and enhancing plant growth in sodic/saline soils with additional funding provided by a USDA Forest Service’s Rocky Mountain Research Station.

Requestors: Forest Service, forestry contractors, local communities, and State of Arizona

Outcomes: Rural economic development that benefits sustainable federal land management needs; expanding markets for wood; informing job training needs

Deliverables:

- a) Report and a fact sheet of the FOTP financial sustainability analysis
- b) A spreadsheet-based model, which will be available on the ERI website, and two to three (2–3) subsequent workshops
- c) A manuscript to be submitted for publication summarizing biochar benefits in ecological restoration

2.2) Facilitate the development and integration of new technologies to advance restoration

implementation. In FY23, the ERI continues to add capacity to the development of a Digital Timber Sale Manager (DTSM) pilot. The DTSM is a digital system that manages spatial data for the life of a timber sale to improve efficiency in restoration implementation. It will be used in the Four Forest Restoration Initiative (4FRI) project in partnership with The Nature Conservancy and Forest Service, including the FPM team. In FY23, the ERI will continue convening and facilitating the development of the DTSM pilot, as well as capturing and communicating the lessons learned from the pilot that may serve as a guide for the integration of new technologies in Forest Service implementation processes beyond the 4FRI area.

Requestors: Forest Service FPM Team, The Nature Conservancy, Forest Service Region 3

Outcomes: Lessons learned from innovative project planning; to inform future implementation processes

Deliverable:

- a) Progress report

Focal Area 3: Foster and support partnerships. Convene and facilitate discussions that advance restoration knowledge development and application across all lands.

In addition to science translation, the ERI maintains a large commitment to developing, facilitating, and supporting the partnerships and collaborations that advance forest restoration at appropriate scales and across ownership boundaries. In the last year, the ERI supported partnerships locally with place-based Arizona collaboratives, and regionally and nationally with the Forest Service CFLRP and Risk Management Assessment (RMA) programs. Partnership projects are detailed below; they include:

- Supporting the 4FRI collaborative with leadership and science information. Now a Wildfire Crisis Strategy (WCS) National Priority Landscape (NPL), the 4FRI landscape is working to optimize the NEPA-approved treatments across the original multi-million-acre landscape. Last year, the ERI co-lead stakeholder engagement in the final 4FRI Rim Country Final EIS, which advanced with minimal objections from the collaborative’s partners. Additionally, ERI leadership worked on the 4FRI stakeholder implementation direction and goals, culminating in a newly emerging vision for collaboration in 4FRI implementation.
- Working with SWERI and other partners to support metrics of success for the national CFLRP and the RMA program.
- At finer scales, continuing to provide local science support to the Burnt Corral collaborative on the Kaibab National Forest.
- Working closely with the SWERI in New Mexico and Colorado to leverage West-wide shared learning.

Focal Area 3: Foster and support partnerships	
<i>Fulfills duties under the Act: 2, 3</i>	
Action	Requestor/Anticipatory
3.1) Support and science delivery for the 4FRI collaborative project	<u>Requestors:</u> Forest Service and northern Arizona stakeholders <u>Outcomes:</u> Best available science for landscape restoration, landscape prioritization, monitoring assistance, and effective science collaboration
3.2) Kaibab National Forest Burnt Corral: Incorporating treatment prioritization	<u>Requestors:</u> Kaibab National Forest and North Rim Stakeholders <u>Outcome:</u> Best available science to meet project desired conditions of fire risk reduction in an efficient, optimized process
3.3) Development of a collaborative governance indicator for national CFLRP monitoring	<u>Requestors:</u> Forest Service CFLRP Coordinators Lindsay Buchanan and Bryce Esch <u>Outcome:</u> A national core monitoring indicator for collaborative governance and resiliency

<p>3.4) Risk Management Assistance (RMA) and Potential Operational Delineation (POD) use on wildfire incidents</p>	<p><u>Requestors:</u> Risk Management Assistance Team (Rick Stratton, Forest Service Fire and Aviation Management; Dave Calkin, RMRS)</p> <p><u>Outcomes:</u> Findings and recommendations to inform RMA/POD use</p>
<p>3.5) Support for the Wildfire Crisis Strategy</p>	<p><u>Requestors:</u> Forest Service, AZ DFFM, and Flagstaff Fire District</p> <p><u>Outcome:</u> Increased shared fire risk mitigation across Arizona</p>
<p>3.6) SWERI partnership and across-region science delivery</p>	<p><u>Requestors:</u> Forest Service, all affected entities</p> <p><u>Outcome:</u> Shared landscape restoration best practices</p>

3.1) Support and science delivery for the 4FRI collaborative project. The ERI has provided leadership, administration, and science support to the 4FRI collaborative project since the 2009 request for proposals. Now a Wildfire Crisis Strategy National Priority Landscape, 4FRI is working to optimize NEPA-approved treatments across the multi-million-acre landscape. The ERI is committed to continued collaboration in the multi-stakeholder partnership to realize landscape resiliency and restoration.

Requestors: Forest Service and northern Arizona stakeholders

Outcomes: Best available science for landscape restoration, landscape prioritization, monitoring assistance, and effective science collaboration

Deliverables:

- a) Report on leadership activities and work group technical support for 4FRI Stakeholder Group and working groups
- b) 4FRI Landscape Treatment Prioritization–Optimization Work Group: Workshop and a report on progress
- c) Report on administrative support to facilitate effective collaborative operations; and IT support for the 4FRI website and BASECAMP; and administrative support

3.2) Kaibab National Forest Burnt Corral. The ERI will provide steering committee support, forest ecology science support for collaborative issues, including old growth identification and management, and provide technical optimization work.

Requestors: Forest Service and northern Arizona and southern Utah stakeholders

Outcome: Best available science to meet project desired conditions of fire risk reduction in an efficient, optimized process

Deliverables:

- a) Report on activities

3.3) Socio-economic monitoring and science delivery for the USDA Collaborative Forest Landscape Restoration Program (CFLRP). In FY23, the ERI, in coordination with the other SWERI and the Forest Service CFLRP coordinator, will continue to expand the implementation of a core socio-economic monitoring indicator for CFLRP projects. The SWERI are working to inventory and document information pertaining to the collaborative function, health, governance, and resilience of CFLRP projects. In FY21, a core social monitoring indicator was piloted on the Northern Blues CFLRP, and in FY22, this indicator (questionnaire) was expanded to all 15 of the newly funded CFLRPs throughout the country in coordination with the CFLRP leaders, regional coordinators, and CFLRP participants. In FY23, the SWERI will synthesize results across all projects to generate a national-level report, as well as initiate in-depth case studies in 3–5 CFLRP projects starting in FY23. We will utilize open-ended interviews to add context to findings. The SWERIs are co-developing this monitoring indicator with the Forest Service WO to ensure that the information collected by SWERI supplements the national core CFLRP monitoring requirements. The SWERI will work with CFLRP collaborators to disseminate learning about collaborative resilience to the newly funded CFLRP projects, the Forest Service WO and regional coordinators, and Congress to provide information about the social outcomes of the CFLRP.

Requestors: Forest Service CFLRP Coordinators Lindsay Buchanan and Bryce Esch

Outcome: A national monitoring indicator for collaborative governance and resiliency

Deliverables:

- a) Technical report synthesizing findings to the Forest Service and Congress
- b) Annual progress and accomplishments report
- c) Coordinate and/or participate in one to two (1–2) peer learning activities or conference

3.4) Risk Management Assistance (RMA) and Potential Operational Delineations (PODs) evaluation.

The use of spatial wildfire analytical and decision support tools is increasing to support complex decision-making environments on wildfire incidents, as well as pre-fire planning and post-fire response, but there is a limited understanding of how effective these decision support tools are and what conditions support their use (FY20 Outcomes, Colavito 2021). In FY23, in collaboration with the other SWERI, RMRS researchers, the Forest Service RMA team, and other researchers, the ERI will continue to conduct applied social science to assist in evaluating the use and effectiveness of RMA and PODs to advance the science and practice of decision support tool use for wildfire response, as well as pre-fire planning and post-fire recovery. This will involve a range of approaches, including follow-up assessments on the use of RMA/PODs, case studies of tool use in different contexts, and evaluating the use of these tools in Wildfire Crisis Strategy landscapes. This is a multi-year, ongoing project in coordination with partners across SWERI and the Forest Service.

Requestors: RMA Team (Forest Service Fire and Aviation Management); RMRS

Outcomes: Findings and recommendations to inform RMA/POD use

Deliverables:

- a) Annual progress and accomplishments report
- b) Peer-reviewed manuscript or technical report synthesizing findings
- c) Coordinate and/or participate in one to two (1–2) peer learning activities

3.5) Support for Wildfire Crisis Strategy. The ERI will assist in creating greater state capacity to reduce wildfire fuels around our communities, making greater use of partner capacity to reduce wildfire fuels, and increasing partnerships to reduce wildfire risks on federal lands neighboring our communities. In addition, the ERI partners with the DFFM Northern District and local municipal fire stations.

Requestors: Forest Service, AZ DFFM, and Flagstaff Fire District

Outcomes: Increased shared stewardship across Arizona and shared landscape restoration best practices

Deliverable:

a) Report on support to the Wildfire Crisis Strategy federal and state partners

3.6) SWERI partnership and across-region science delivery. The three SWERI are uniquely positioned to synthesize and share science outreach and delivery. Currently, the SWERI coordinate to leverage monitoring knowledge and to realize cross-region biomass utilization grant outcomes. Following the Cross-Boundary Landscape Restoration Workshop in May 2023, the SWERI will produce a workshop summary and identify high-leverage project areas for the FY24 Work Plan.

Requestors: Forest Service, all affected entities

Outcomes: Cross-boundary, cross-state, and cross-region shared learning

Deliverable:

a) Report on support

Focal Area 4: Integration and engagement with tribal land restoration

The ERI Native American Forest and Rangeland Management Program continues to expand opportunities for shared learning and science exchanges with tribal partners across Arizona and New Mexico. In FY22, the Tribal Student Summit at NAU brought together several tribal natural resource professionals to provide insight and experience to native students from across the Southwest. For FY23, the ERI will continue to work on building relationships and assessing needs. In particular, the ERI will:

- Provide support to the Wood for Life program. The ERI will participate in outreach to other geographies interested in similar programs and will assess wood distribution gaps and needs for fuelwood in vulnerable populations.
- Promote the use of the Tribal Forest Protection Act and 638 authorities. Additional work will facilitate the exchange of information from successful 638 use to emerging tribal opportunities.
- Assess post-fire governance in tribal communities, with a multi-state partnership, including the other SWERI.
- Contribute to a Tribal Climate Adaptation Menu.

Focal Area 4: Integration and engagement with tribal land restoration	
<i>Fulfills duties under the Act: 2, 3, 4</i>	
Action	Requestor/Anticipatory
4.1) Wood for Life project	<u>Requestors:</u> Navajo and Hopi nations, Forest Service, The Nature Conservancy, and National Forest Foundation <u>Outcome:</u> Support and meet tribal fuelwood needs through restoration biomass utilization
4.2) Tribal Forest Protection Act (TFPA)/638 authorities and biomass utilization pilot projects	<u>Requestors:</u> Forest Service, southwestern tribal nations <u>Outcome:</u> Identify best practices to utilize new cross-boundary authorities
4.3) Engage with tribal partners to identify and exchange existing ecological questions or gaps	<u>Requestor:</u> Anticipatory <u>Outcomes:</u> Grow tribal partnerships; exchange restoration needs; address science gaps
4.4) Tribes and post-fire governance	<u>Requestors:</u> Multiple tribes and fire and land management organizations (leverage SW CASC grant) <u>Outcome:</u> Inform post-fire management with attention to the needs of tribes in the Southwest
4.5) Support to Tribal Climate Adaptation Menu Development	<u>Requestors:</u> Climate Hubs, CASCs, SWFSC, IT Climate Adaptation, NM Tribal Adaptation Network, ITEP <u>Outcome:</u> Increase efficiency of multiple efforts, and the co-development of products

4.1) Wood for Life project. The ERI will continue to work in partnership with the National Forest Foundation, The Nature Conservancy, the Forest Service, and tribal partners to evaluate needs and assess capabilities to formalize and sustain the Wood for Life program. Wood for Life is a tribal fuelwood program that utilizes biomass produced from restoration projects in the 4FRI and Flagstaff Watershed Protection Project footprints. The ERI will support Wood for Life capacity needs (e.g., grant proposals, communication briefs, after action reviews, etc.) to increase sustainability of the project, as well as help to review and evaluate existing program efforts to inform learning and future processes.

Requestors: Navajo and Hopi nations, Forest Service, The Nature Conservancy, and National Forest Foundation

Outcome: Utilization of restoration biomass to support and meet tribal societal fuelwood needs

Deliverables:

- a) Report on progress
- b) One to two (1–2) presentations to and with partners on Wood for Life
- c) Needs assessment to estimate amount of firewood necessary for “vulnerable and needy” residents using US census data and supplemental community level questionnaires.
- d) Provide support, assistance, and/or facilitation to a proposed TFPA agreement between tribal entity and the Forest Service to support Wood for Life
- e) Facilitation for Wood for Life meetings (rotating chair duties)

4.2) Tribal Forest Protection Act (TFPA)/638 authorities and cross-boundary pilot projects. The ERI will assist tribal partners in scoping cross-boundary opportunities for forest, woodland, and fire management with Arizona tribal entities.

Requestors: Forest Service, southwestern tribal nations

Outcome: Best practices to utilize cross-boundary opportunities with newer authorities

Deliverable:

- a) Report on forest-level and tribal program use of TFPA agreements to advance cross-boundary collaboration

4.3) Engage with tribal partners to identify and exchange existing ecological questions or gaps. The ERI has initiated partnerships with the San Carlos Apache and Hualapai tribal nations and will expand those partnerships to exchange restoration information and develop a science needs assessment. The ERI tribal program works with the ERI’s ecology and human dimensions programs to realize opportunities for research and partnerships.

Requestor: Anticipatory

Outcomes: Develop and grow tribal partners to exchange restoration science needs, through an assessment with tribal nation partners

Deliverable:

- a) Needs assessment of restoration science partnership opportunities

4.4) Tribes and post-fire governance. Post-fire recovery priorities held by tribes may differ from those held by federal agencies or non-tribal stakeholders. This project leverages funding provided by the Southwest Climate Adaptation Science Center (SW CASC) to examine several questions in the southwestern states of Arizona, Utah, Nevada, and California: 1) What are post-fire priorities for tribes in this region? 2) What are management options to address these priorities? 3) How are post-fire governance regimes affecting tribes? 4) What are governance barriers and opportunities to support post-fire recovery to meet the needs of tribes? Through a literature review, interviews, case studies, and roundtables, this project team (consisting of partners at Northern Arizona University, Colorado State University, and the Forest Service) will provide results to inform tribes, federal agencies, policymakers, and non-tribal forest stakeholders working on post-fire recovery.

Requestors: White Mountain Apache Tribe, Karuk Tribe, Washoe Tribe, Institute for Tribal Environmental Professionals, Western Klamath Restoration Partnership, Southwest Fire Consortium, State of New Mexico Energy, Minerals, and Natural Resources Department

Outcomes: Understand and inform post-fire management with attention to southwestern tribal needs

Deliverables:

- a) Report on progress

4.5) Support to tribal climate adaptation partnerships. Federal directives include integrating tribal voices, needs, and perspectives into climate vulnerability and adaptation planning. This has led to multiple new partnerships and working groups aimed at developing climate adaptation plans that address issues of social justice, ecological impacts, adaptation strategies, climate action plans, and tribal sovereignty to manage tribal lands. ERI will continue to provide knowledge and support to the development of these products, fostering partnerships with Southwest tribal fire and climate resiliency strategies and work groups, and through continued work with the SW CASC, Southwest Fire Science Consortium (SWFSC), the Tribal Burning Learning Network, Institute of Tribal Environmental Professionals (ITEP), The Nature Conservancy, and other groups.

Requestors: Climate Hubs, CASCs, SWFSC, IT Climate Adaptation, NM Tribal Adaptation Network, ITEP

Outcomes: Support to cross-boundary partnerships to increase efficiency of multiple efforts and avoid duplication. Support to working groups, and the co-development of products

Deliverables

- a) Report on progress

Focal Area 5: Science and policy application and interpretation

The ERI mission is to serve diverse audiences with objective science and implementation strategies. This our strength, and delivering actionable science is a component of every project we design. An effective way to address a current management or policy issue is through our working papers, white papers, and fact sheets. These publications synthesize research to provide clear, concise explanations of biophysical (working papers) or socio-economic (white papers) restoration topics. Management and policy implications are outlined so that practitioners or elected officials can make quick, informed decisions. Our commitment to putting knowledge into the hands of all affected entities is one of the unique services provided by the ERI and what distinguishes us from traditional academia.

Focal Area 5: Science and policy application and interpretation	
<i>Fulfills duties under the Act: 3, 4</i>	
Action	Requestor/Anticipatory
5.1) Provide support to federal land managers with technical assistance, learning workshops, and presentations	<p><u>Requestors:</u> Forest Service leadership, specialists, fire professions, boundary organizations</p> <p><u>Outcomes:</u> Advance and share landscape restoration and climate adaptation best practices; transfer of best available science</p>
5.2) Support to climate adaptation strategy in the southwestern region	<p><u>Requestors:</u> Forest Service Region 3 Climate Coordination, Ecologist, Southwest Climate Hubs</p> <p><u>Outcome:</u> Practical climate adaptation strategies for Forest Service practitioners</p>

<p>5.3) Translate and summarize scientific and journal articles for land managers and affected entities</p>	<p><u>Requestors:</u> Land managers, stakeholders, Southwest Fire Science Consortium, federal agency ID teams, decision and policy makers</p> <p><u>Outcomes:</u> Science synthesis briefs; best available science to practitioners and policy-writers</p>
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5.1) Provide support to federal land managers with technical assistance, learning workshops, and presentations. The ERI works closely with Forest Service partners at the district, forest, and regional scales to assess science needs and meet science questions with summaries of existing science. To reach broader audiences, we partner with our sister institutes at the SWERI and other boundary organizations to utilize West-wide webinar and workshop venues for science dissemination. In FY22, we worked with RMRS Science Delivery to initiate a joint webinar series. Together, we share science information from RMRS, academic and non-government organizational researchers to our combined audiences of over 400 attendees. Many of these projects are determined within the FY as fast responses to immediate needs.

Requestors: Forest Service leadership, land management resources specialists, fire professions, boundary organizations

Outcomes: Advance and share landscape restoration and climate adaptation best practices; transfer of best available science

Deliverables:

- a) Shared learning via workshops or technical support to Forest Service to meet landscape restoration planning, implementation, and/or monitoring goals. Two to three (2–3) workshops or support
- b) Up to three (3) webinars or workshops in partnership with science-to-manager series, including the SWFSC, RMRS Science Delivery, or National Forest

5.2) Climate adaptation in the southwestern region. The ERI supports efforts with SW Climate Hubs and SW CASCs to engage cross-boundary climate adaptation audiences with shared learning. ERI will continue partnerships and work to advance climate adaptation planning, development of adaptation strategies and tactics within the southwestern US. We will provide continued support to work groups and the development of case studies within these work groups. We will provide support to Region 3 workshops rolling out the regional climate adaptation strategy and workshops focused on forest-level development of adaptation tactics (dependent upon Forest Service development of workshops). Continued work on products and support with the Southwest Climate Hubs, SW CASC, SWFSC, and the Southwest Fire Climate Adaptation Partnership (SWFireCAP).

Requestors: Forest Service Region 3 Climate Coordination, Ecologist, Forest Service Southwest Climate Hubs

Outcomes: Practical climate adaptation strategies for Forest Service practitioners; Arizona audiences awareness of Climate Hub projects and deliverables, and R3 climate adaptation strategies

Deliverables:

- a) Provide support to forest-level climate adaptation workshops (set to start Fall 2023)
- b) Provide support to a Phoenix, AZ Climate Hub workshop, Spring 2024

5.3) Translate and summarize scientific and journal articles for land managers and affected entities. The ERI develops [white papers](#) that address socio-economic policy issues and [working papers](#) that summarize science applications for land managers. [Fact sheets](#) are two-page, brief summaries of peer-reviewed science and [Topics in Restoration and Resiliency](#) papers explore a broad restoration topic, like what fire scars tell us about the past and what to expect after restoration, written for a general audience.

Requestors: Land managers, stakeholders, SWFSC, federal agency ID teams, decision and policy makers

Outcome: Science synthesis briefs for busy practitioners and policy-writers

Deliverables:

- a) Three (3) white and/or working papers, potential topics to include:
 - i) 4FRI: Lessons learned from 12 years and 2.4 million acres of collaboration
 - ii) Pinyon pine: State of knowledge of pinyon pine ecological value, old growth characteristics, and vulnerability, with best management practices
 - iii) Metrics of managed fire success: A summary of management recommendations from recent literature on measuring success across unplanned and managed ignitions.
- b) Six to eight (6–8) Fact Sheets and/or Topics in Restoration and Resiliency papers

FOCAL AREA 6: Communication and outreach. Media, community outreach, and information requests.

For more than 20 years, the ERI has served as an objective resource for our land management partners, government agencies, non-government organizations, and our community. The ERI is a recognized expert in the restoration of fire-adapted forests across the western US, and staff from all ERI program areas receive regular requests for information, technical support, and knowledge resources. Focal Area 6 and its deliverables capture the unique services that ERI provides. This suite of outreach and communication services is what distinguishes us from conventional academic units.

In the past five years, we have continued to exceed information request goals from all affected entities. For example, ERI staff receive approximately 20–30 media requests a year. Our information sharing includes social media outlets like Twitter and Facebook, and the ERI continues to serve as an expert for print, radio, internet, and broadcast media. Often, the level of requests to the ERI depend on the local, regional, and national level of discourse on subjects including wildfire, climate change, and landscape sustainability. Our outreach efforts are multi-faceted, with media coverage on the science that informs these critical issues being an important communication piece for shaping the public discourse on wildfire and forest health.

Focal Area 6: Communication and outreach	
<i>Fulfills duties under the Act: 3</i>	
Action	Requestor/Anticipatory
6.1) Social media and innovative science delivery	<u>Requestor:</u> Anticipatory <u>Outcome:</u> Broaden, grow audience reach using innovative, interactive tools

6.2) Provide website support for the ERI, SWERI, and 4FRI to best meet deliverables	<u>Requestors:</u> All affected entities, 4FRI Stakeholder Group, SWERI <u>Outcome:</u> Science updates and information repository
6.3) Media outreach and engagement	<u>Requestor:</u> All affected entities <u>Outcome:</u> Science synthesis briefs
6.4) Science support, knowledge resource services to federal and non-federal entities	<u>Requestors:</u> Land managers, state forestry agencies, local government, elected officials, and community organizations <u>Outcomes:</u> Knowledge to inform action; raise awareness, support for restoration
6.5) Report on FY23 Work Plan activities to SWERI Program Manager	<u>Requestor:</u> SWERI Program Manager <u>Outcome:</u> Final Report

6.1) Social media and innovative science delivery. Over the last 6 years, the ERI has created and successfully launched a monthly [Science Flash](#) e-mail with quick links to the latest ERI science, outreach product, or SWERI news. Additionally, our bi-annual newsletter, dispersed to more than 1,000 contacts, highlights each program of work and contains a complete listing of all recent publications and products. The ERI coordinates across all SWERI to cross-post and leverage intermountain and West-wide actionable science to our shared, diverse audiences. In FY23, the ERI will continue to grow our social media impact and develop innovative outreach across multiple media platforms.

Requestor: Anticipatory

Outcome: Increase audience reach with innovative and interactive social media tools

Deliverables:

- a) Media campaign link and Google analytic summaries
- b) ERI “Science Flash”: ten to twelve (10–12)
- c) ERI biannual e-newsletter: Two (2)

6.2) Provide website support for the ERI, SWERI, and 4FRI to best meet deliverables.

Requestors: All affected entities, 4FRI Stakeholder Group, SWERI

Outcome: Science updates and information repository for all affected entities

Deliverables:

- a) Report on actions. Includes website analytic reports on each website’s user site visits and engagement metrics.

6.3) Media outreach and engagement. Support the education of the general public through media outreach.

Requestor: All affected entities

Outcome: Science synthesis briefs for busy practitioners and policy-makers

Deliverables:

- a) Ten (10) media interviews
- b) Ten (10) media articles

6.4) Science support, knowledge resource services to federal and non-federal entities. These activities include filling information requests, technical assistance, field trips, and presentations.

Requestors: Land managers, state forestry agencies, local government, elected officials, and community organizations

Outcomes: Knowledge to inform action; raise awareness and support for restoration

Deliverables:

- a) A minimum of forty (40) services or activities

6.5) Report on FY23 Work Plan activities to SWERI Program Manager.

Deliverable:

- a) Final report to SWERI Program Manager