

**The Ecological Restoration Institute (ERI)  
*Accelerating Restoration in the West*  
Fiscal Year 2019**

*FINAL*

*Approved by the Executive Team – With reinstated Overhead  
May 9, 2019*

The Ecological Restoration Institute (ERI) is grateful for the \$1.5 million provided by Congress and the Forest Service (FS) to advance landscape-scale restoration across frequent-fire forests. Congress passed the authorizing legislation creating the Institutes in 2004 in order to bridge the gap between the *production* of best available science and the *use* of best available science by land managers and stakeholders. Their vision was not to supplement or replace the work that needs to be done by land managers but rather to help land managers stay current on new science and technologies. Congress also expected the institutes to be responsive to immediate land management challenges while simultaneously anticipating and preparing for management challenges of the future.

For many years people have pursued a single, silver bullet approach to achieving restoration goals. It is an interdisciplinary problem that requires simultaneous action on multiple fronts. For example, twenty years ago, having enough science to justify restoration was considered the barrier to progress. Today, most people agree that we have enough science to move ahead as long as we are committed to monitoring and adaptive management. Some policy makers and stakeholders argued and continue to assert that the National Environmental Policy Act (NEPA) is an impediment to action, yet the Four Forest Restoration Initiative (4FRI) Environmental Impact Statement (EIS) proved that theory wrong. Another common myth was that with enough acres cleared through NEPA the harvest and wood industry will be incentivized to return; however, this one variable by itself has proven inadequate to stimulate investment. The fact is that landscape-scale restoration and reducing the risk of mega-fire continue to be a land management experiment with a myriad of challenges where we are all learning as we go and where the services of the ERI can help.

The FY19 work plan responds to the top level policy directives coming from Congress and Washington, D.C. such as the Shared Stewardship Initiative. With new, top-level directions and no new resources on the ground to deliver them, land managers and the agencies struggle to respond. ERI assistance that focuses on leverage points can make a difference. The following is the FY19 program of work project by project and how it links to land management policy and direction.

- *Project 1: Science Delivery and Support for Collaborative Restoration and Conservation from the Local to the Landscape Scale.* In this project the ERI, provides service in support of the 23 Collaborative Forest Landscape Restoration pilots authorized by the Collaborative Forest Landscape Restoration Act (CFLRA) and 4FRI. In particular, we focus on multi-party monitoring and adaptive management—two management activities critical for building stakeholder support for forest restoration.
- *Project 2: Evaluation and Synthesis of Best Available Scientific Information (BASI) for Landscape Restoration West-Wide.* Various Forest Service policies, including the 2012 Planning

Rule, direct the agency to use BASI. However, managers are confused about what it is. To answer the question of what it is, the *Journal of Forestry* published an ERI paper describing a scaled approach for defining and using BASI. The paper received wide distribution in the FS. The ERI also uses rigorous protocols to synthesize best available literature on management topics to simplify its use for managers.

- *Project 3: Monitoring, Evaluation, and Adaptive Management of Landscape Restoration in Western Fire-Adapted Forests and Woodlands.* This project uses monitoring data from a series of restoration treatments across the Southwest to understand the effects of restoration on indicators of resilience, to measure understory responses to managed fire, and to use remote sensing to examine vulnerability of ponderosa pine ecotones to climate change and wildfire as well as the effectiveness of managed wildfire for restoring dry forests of the Southwest. As managers are urged to use more managed fire to accomplish restoration goals, this work provides empirical data to evaluate the efficacy of various approaches to restoration.
- *Project 4: Understanding and Solving the Economic, Social, Political Issues and Opportunities of Ecological Restoration.* This project focuses on the human dimensions of restoration. Over the last two years, the ERI has facilitated discussions and testing of Forest Product Modernization (FPM) efforts nationally and on the ground during 4FRI implementation. This work will continue in FY19. Risk modeling is emphasized as a critical tool for all-lands coordination under the Shared Stewardship Initiative. However, use of these tools by planners and stakeholders has been slow. We will seek to answer—why?
- *Project 5: Improving Forest Operations and Biomass Utilization.* The USDA and leadership of the FS have set annual volume and acre targets as a surrogate measure for effective forest management. Yet in the frequent-fire forests of the Intermountain West these targets present a challenge without a viable wood industry to treat acres. Project 5 works to improve forest operations and biomass utilization to stimulate industry investment.
- *Project 6: Science Delivery and Outreach to National, Western, and Southwestern Audiences: Federal, State, Tribal, and Private Forestry.* This is where ERI outreach puts boots on the ground. It includes multiple approaches to science delivery including workshops, publications, web services and social media. In FY19, the ERI will initiate a new program focused on increasing tribal outreach and access to all-lands resources.

The ERI looks forward to a productive year and effective partnerships to increase the pace and scale of restoration.

## **Project 1: Science Delivery and Support for Collaborative Restoration and Conservation from the Local to the Landscape Scale**

Project 1 provides services that support collaboration and helps stakeholders gain access to and use of the best available science.

In 2019, the ERI will provide leadership for the 4FRI working group that will review and develop draft recommendations for the Rim Country Draft EIS (DEIS). The Rim Country EIS has been a challenge due to stakeholder and FS turnover. The ERI will lead the group using both institutional knowledge of what worked during the first EIS, and the key lessons learned from that experience, combined with innovative strategies for completing multi-stakeholder tasks on a short timeline.

The ERI also provides leadership to the Multi-Party Monitoring Board, which helps maintain the commitment to consistent monitoring metrics through time on the 4FRI landscape.

The Collaborative Forest Landscape Restoration Program (CFLRP) was reauthorized in 2018 to provide an additional ten years of funding to support forest restoration across the US. In response, the ERI will continue to share relevant science, tools, and lessons learned to support these projects and collaborative forest restoration West-wide. In 2019, the ERI will organize (in collaboration with the other two Southwest Ecological Restoration Institutes) a workshop to bring stakeholders and agency personnel working on collaborative forest restoration in the Intermountain West together to facilitate cross-project coordination and to assess the progress made in the ten years since the original CFLRP legislation. This workshop will not only allow coordination across projects, but will also provide an opportunity to examine accomplishments compiled in the CFLRP ten-year report and develop a path forward for the next ten years of restoration work. The ERI helped organize a similar event in 2014 that was appreciated by stakeholders and FS partners alike.

<b>Project 1: Science Support for Collaborative Restoration and Conservation</b>	
Fulfills Duties under the Act: 1, 2, 3, 4	
<b>Action</b>	<b>Requestor/Anticipatory</b>
<b>1.1) Science delivery and support for the Four Forest Restoration Initiative (4FRI), a Collaborative Forest Landscape Restoration Act project.</b>	<u>Requestor:</u> 4FRI Executive Team supports the need for ERI services. <u>Outcome:</u> Science delivery and support to stakeholder group and science transfer to assist FS planning for Rim Country EIS and implementation of EIS No. 1.
<b>1.2) CFLRP 10-year report and workshop.</b>	<u>Audience:</u> FS Washington Office (Lindsay Buchanan), RIMC, EMC and national stakeholder set, including our NGO partners. <u>Outcome:</u> Science delivery and support to the Washington Office’s National Indicator Report measuring performance of CFLRA projects.

## **Deliverables**

### **1.1) Science delivery and support for the Four Forest Restoration Initiative (4FRI), a Collaborative Forest Landscape Restoration Act project.**

- a) The ERI serves in leadership positions on the 4FRI Steering Committee, Rim Country EIS Working Group, and Comprehensive Implementation Working Group.

Deliverable: Report on leadership activities (stakeholder group and working groups).

- b) The ERI will work with the 4FRI Multi-Party Monitoring Board (MPMB) and Monitoring Coordinator to monitor and assess the initial task orders implemented under the 1st Analysis Area EIS with respect to 4FRI desired conditions. Remote sensing tools as well as plot-based metrics will be assessed and analyzed for adaptive management needs.

Deliverables:

- i. Monitoring report that includes an analysis of pre- and post- vegetation data.
  - ii. Presentation of monitoring results to the 4FRI Stakeholder Group and Forest Service 4FRI team.
- c) The ERI provides administrative and IT support to facilitate effective collaborative operations.

Deliverable: Report on IT support for the 4FRI website and BASECAMP (an online collaborative work space) and administrative support, including minutes and agendas.

### **1.2) CFLRP ten-year report and workshop**

- a) Deliverable: Contributions to the National Indicators Monitoring Report.
- b) Workshop for CFLRP stakeholders and land managers with pilots in the Intermountain West. This deliverable is in cooperation with the CFRI (Project 2/Deliverable 5) and NMFWR.

## **Project 2: Evaluation and Synthesis of Best Available Scientific Information (BASI) for Landscape Restoration West-Wide**

Using evidence-based information to validate action has entered the lexicon of many disciplines. It serves as a counterweight to poor data and opinion-based facts. For the last eight years, the ERI has championed the evidence-based approach in order to identify the best available scientific information (BASI) for informing management action.

Identifying BASI is dependent on the question and application.<sup>1</sup> The systematic review is the most rigorous process to identify the most robust scientific analyses and is useful for addressing issues with conflicting science. However, the time commitment and analytical requirements present a challenge for busy land managers. For these assessments, the ERI uses rigorous, established protocols to analyze published studies and other data sources to determine the strength of scientific evidence and answer both current and anticipated management questions.

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<sup>1</sup> B.E. Esch, A.E.M. Waltz, T.N. Wasserman, and E.L. Kalies. 2018. Using Best Available Science Information: Determining Best and Available. *Journal of Forestry*, 116(5):473-480

Other BASI needs can be met with rapid reviews of key information sources to answer urgent questions; these may be produced in a matter of weeks.

For all reviews, the ERI objectively assesses the management question, and the availability of the existing literature or information to answer the question. This step takes time, and although we can only complete one in this work plan, two questions are presented in case one does not meet the criteria for full review. Once we determine sufficient literature exists for a review, the ERI assembles, evaluates, and interprets findings from scientific research, practitioner experience, and gray literature. In this way, the ERI identifies and documents the best available science to assist public land managers in management decisions.

The two questions we will examine in order to identify the FY19 topic are:

1. How effective are restoration treatments with expected climate change impacts?  
This would be an assessment of the published modeling work that evaluates expected climate change effects, with and without thinning and burning treatments. This is important because it examines restoration effectiveness in a changing climate and can help inform landscape restoration priorities and strategies.
2. What landscape metrics are most appropriate to measure land management desired conditions and detect landscape change due to natural disturbances or active management?  
The review would be based on an assessment of landscape ecology literature for metrics appropriate to FS national, regional, and forest-level desired condition metrics.

Project 2: Evaluation and Synthesis of Best Available Scientific Information (BASI) for Landscape Restoration West-Wide Fulfills Duties under the Act: 1, 2	
Action	Requestor/Anticipatory
<p><b>2.1) Synthesis of best available science on either: a) restoration treatment effectiveness with expected climate change; or, b) landscape metrics that detect change in western forests – are we meeting landscape planning goals?</b></p>	<p><u>Anticipatory</u>: Forest Supervisors, District Rangers, and Fire Management Officers in the western US, researchers, academics, stakeholders. <u>Outcome</u>: Science synthesis to inform management action.</p>

***Deliverables***

- 2.1) Evaluation of management question and synthesis of best available science literature.**
- a) Deliverable: Synthesis of best available science on a topic to be determined based on preliminary analysis.
  - b) Deliverable: Presentation at professional conference or to stakeholder group or practitioners.

### **Project 3: Monitoring, Evaluation, and Adaptive Management of Landscape Restoration in Western Fire-Adapted Forests and Woodlands**

Project 3 activities and deliverables are developed based on information and feedback gathered from literature, professional conferences, and meetings with agency partners. Often, ERI projects are organized into progressive phases that span annual work plans or leverage long-term monitoring data and previous ERI investments. The ERI prides itself on being a “good listener” and working collaboratively with agency partners, external researchers, and decision makers to develop impactful activities and science products. Project development follows a simple process: we listen, read, and discuss ideas with peers and colleagues; we communicate with partners; we develop and collaborate; execute activities; we deliver information; and we evaluate feedback.

A main focus of the ERI is to monitor and evaluate long-term responses to restoration treatments and interactions of restoration treatments with climate. These studies address ecological responses at multiple scales, from small plots and forest stands to landscapes. At fine- to mid-scales, much of this analysis is done using the Long-term Ecological Assessment and Restoration Network (LEARN). As the name suggests, LEARN is a network of long-term studies of applied restoration treatments established across the Southwest on various public agency lands.

For FY19, Projects 3.1 and 3.3 leverage on-going studies (i.e., LEARN) and reflect long-standing collaborations with public land management partners. These projects will allow us to analyze patterns that may not be clear over just a few years following restoration treatment and, with continued monitoring, can provide the long look needed to identify and describe climate change effects.

The ERI will continue to provide information concerning long-term ecological responses to forest treatments at multiple scales in Project 3.1. We plan to collect and analyze data from several LEARN sites across northern Arizona where 16-25 years have passed since initial treatments were implemented. As remarkably little information is available concerning fine-mid-scale responses longer than five years, these projects will significantly increase understanding of processes such as tree growth and survival, regeneration, herbaceous community dynamics, and hazardous fuels changes. Such information is critically needed by public land managers.

We plan to conduct three landscape-scale evaluations this year in Project 3.2. The projects will address managed wildfire effectiveness as a restoration treatment, 40-year changes in ponderosa forests due to climate and fire at the ecosystems lower ecotone, and optimal metrics for evaluating restoration treatment success at the landscape scale. These projects build on past work on managed wildfire and transitional (ecotone) ponderosa pine forests that has been very well-received by our land management partners and the larger science community. In FY19 we will expand the focus of earlier work to the landscape scale using remote sensing.

Lastly, although typically small in scale, easily accessible, on-the-ground restoration demonstrations are highly effective for communicating concepts, techniques, and outcomes to local stakeholders, policy makers, public audiences, and the media. In FY19, the ERI will seek further progress in developing a mixed conifer restoration demonstration site at Camp Navajo Army Depot and/or on the Coconino National Forest. Treatments will be based on best available

science and knowledge being gained through ERI’s long-term study network (LEARN) as well as other relevant sources.

Project 3: Monitoring, Evaluation and Adaptive Management of Landscape Restoration in Western Fire-Adapted Forests and Woodlands	
Fulfills Duties under the Act: 1, 2, 3	
Action	Requestor/Anticipatory
<b>3.1) Long-term Ecological Assessment and Restoration Network (LEARN)</b>	<p><u>Anticipatory</u>: 4FRI stakeholders, 4FRI ID assistant team lead, R3 Silviculturist, District managers, researchers, academics.</p> <p><u>Outcome</u>: Information to assist fine-, mid-scale planning for restoration of ponderosa pine and mixed-conifer forests of the Southwest.</p>
<b>3.2) Landscape Analyses of Restoration Treatments and Climate</b>	<p><u>Anticipatory</u>: Prescott, Tonto, Coconino, Coronado national forests, fire, fuels, and aviation management officers, foresters, local stakeholders, researchers, academics.</p> <p><u>Outcome</u>: Information to assist landscape planning and prioritization of restoration treatments in ponderosa pine forests.</p>
<b>3.3) Analysis of Monitoring Data</b>	<p><u>Requestor</u>: 4FRI stakeholders, 4FRI ID Assistant Team Lead, R3 Silviculturist, district managers, researchers, academics.</p> <p><u>Outcome</u>: Best available science provided to inform action related to managing wildfire for resource benefit.</p>
<b>3.4) Restoration Demonstration</b>	<p><u>Anticipatory</u>: Managers designing treatments for mixed conifer, policy makers, public, media.</p> <p><u>Outcome</u>: Showcase of treatments demonstrating best available science approaches to management.</p>

**Deliverables**

**3.1) Long-term Ecological Assessment and Restoration Network (LEARN)**

- a) Deliverable: Technical report on Centennial Forest remeasurement.
- b) Deliverable: Technical report on LEARN cross-network analysis of treatment responses.
- c) Deliverable: Progress report on Gus Pearson Natural Area 25-year remeasurement.
- d) Deliverable: Progress report on Mogollon Rim mixed conifer project.

**3.2) Landscape Analyses of Restoration Treatments and Climate**

- a) Deliverable: Technical report on managed wildfire spatial analysis.
- b) Deliverable: Progress report on understanding ponderosa pine ecotone dynamics.

- c) Deliverable: Technical report on landscape metrics of restoration success—developing adaptive management guidelines by measuring metric sensitivity among different treatment types.

### **3.3) Analysis of Monitoring Data**

- a) Deliverable: Technical report on managed wildfire effects on herbaceous communities.

### **3.4) Restoration Demonstration**

- a) Deliverable: Progress report on a northern Arizona mixed conifer demonstration in partnership with Coconino National Forest for stakeholder and elected official learning purposes.

## **Project 4: Understanding and Solving the Economic, Social, and Political Issues and Opportunities of Ecological Restoration**

In 2017, the FS launched a major initiative to modernize forest operations. The two largest efforts emphasized Environmental Analysis and Decision Making (EADM) and Forest Products Modernization (FPM). These initiatives are critical in order to accelerate the pace of restoration, bring new technologies and efficiencies to forest management, and ensure that the FS can meet the management goals established by policy makers.

The ERI provides technical and facilitation services to advance the modernization effort. Starting in 2017 we worked with FS staff from multiple levels, units, and specialties to examine and test modernized management procedures designed to improve efficiency. In 2018, ERI facilitated the partners testing innovations during 4FRI implementation. In addition, we worked with the national FPM team as a third-party analyst to bring ideas and observations that may not be readily apparent to staff within the FS. In FY19, we plan to continue our work facilitating modernization testing during 4FRI implementation and also to co-design a workshop with the FS to share lessons learned and facilitate communication and learning among FS staff.

In August 2018, the FS launched a new initiative described in [\*Toward Shared Stewardship across Landscapes: An Outcome-Based Investment Strategy\*](#). This initiative relies on informed partnerships to focus restoration treatments and wildfire risk reduction strategies on high priority and strategic areas of the landscape. It is an explicit recognition that the FS does not have the capacity or funds to solve the landscape-scale restoration and fire crisis alone. Central to the strategy is working with partners using computer-based decision support systems to collaboratively identify wildfire risk and priority areas for action. The ERI has promoted the use of decision support systems and models for twenty years. What we have observed are the numerous challenges that FS planners, specialists, and others face in trying to use these tools. It is consistent with our mission and authorizing legislation to try to understand the barriers to the use of decision support technology and identify solutions to increase their application. We propose to inventory the current use of wildfire risk assessment and treatment prioritization tools and work with FS staff to understand what learning or changes are needed to facilitate their use.



Project 4: Understanding and Solving the Economic, Social, Political Issues and Opportunities of Ecological Restoration	
Fulfills Duties under the Act: 6,7	
Action	Requestor/Anticipatory
<b>4.1) Facilitate implementation of the high priority efficiency and modernization actions identified for testing during 4FRI implementation.</b>	<u>Requestor:</u> 4FRI Executive Director and Innovations and Efficiencies Coordinator, Washington Office Product Modernization Team, TNC, industry and stakeholders. <u>Outcome:</u> Efficient treatment implementation that leads to more acres treated and targets.
<b>4.2) Analyze adoption and use of FS risk management and prioritization decision support tools to understand their acceptance and utilization.</b>	<u>Anticipatory:</u> Examines the efficacy of policy direction to understand how decision support tools can be most effectively used. <u>Outcome:</u> Strategies to help land managers adopt the use of decision support tools.

**Deliverables**

**4.1) Facilitate implementation of the high priority efficiency and modernization actions identified for testing during 4FRI implementation.**

- a) Deliverable: Coordination of quarterly webinars.
- b) Deliverable: A workshop in fall 2019 that is designed in cooperation with the FS to discuss lessons learned from the 4FRI implementation of modernization actions.
- c) Deliverable: Report summarizing workshop discussion.

**4.2) Inventory how wildfire risk assessment and treatment prioritization models are being used to inform restoration and all-lands management planning and implementation in the West.**

This deliverable is different from and complementary to the CFRI Project 1/Deliverable 6. The ERI will do a West-wide inventory to determine if prioritization tools are being used and implemented. CFRI will provide case study examples of where they have worked with groups to sort through multiple different prioritization models in the same area and the benefits/limits of their usefulness.

- a) Deliverable: A report summarizing what wildfire risk assessment and treatment prioritization models are in use by FS planners and implementation staff, how they are being used, and what education and training strategies are needed to increase use.
- b) Deliverable: Report that summarizes inventory results, recommendations for increasing use of assessment and prioritization models and recommendations for when and where they are most appropriate. Presentation to appropriate staff of the FS, Arizona Department of Fire and Forest Management (DFFM) and New Mexico Energy, Minerals, and Natural Resources Department (EMNRD).

## **Project 5: Improving Forest Operations and Biomass Utilization**

Lack of industry and markets for small diameter wood and biomass remains a barrier to rapid restoration throughout the West. The ERI is committed to help solve this crucial piece of the restoration puzzle.

Our ultimate goal in Project 5 is to enhance the overall economics of restoration treatments through increased operational efficiency and improved utilization of wood and biomass. In 2018 the State of Arizona and Northern Arizona University provided start-up funds of over a million dollars to build a program to facilitate efficient forest operations and to identify and attract forest products industry partners for wood and biomass.

Presently, ERI staff are working on several important projects funded through a variety of grants or are in review for grant funding. These include:

- Working with Altree and Althin technologies to advance manufacturing of wood plastic composite products. This is funded by a US Department of Agriculture (USDA) Forest Service Wood Innovations Grant.
- Facilitating shipment of wood fiber to JA International of South Korea from the Arizona National Guard-Camp Navajo industrial area. Some of the cost for the pilot project is funded by a USDA Forest Service Wood Innovations Grant.
- Partnering with Coconino County to submit a grant to the Economic Development Agency (EDA) to test in-woods mobile processing using air curtain burners and value added processing technologies.
- Evaluating harvesting productivity and cost of implementing fuel reduction thinning treatments using various harvesting systems. Presently, the ERI is collecting data on the harvesting productivity and cost associated with helicopter logging for the Flagstaff Watershed Protection Project.

Outreach efforts will include a variety of formats, including presentations at workshops, on-site visit/discussions, publications, demonstrations, and participation in stakeholder meetings. These activities will be designed to provide stakeholders and professionals with up-to-date knowledge on forest products industries and markets.

The majority of work in this project is funded by the state or external grants. Federal funding will enable ERI support staff to contribute to the multiple efforts that will be performed by the Forest Operations and Biomass Utilization team at ERI.

<b>Project 5: Improving Forest Operations and Biomass Utilization</b>	
Fulfills Duties under the Act: 6,7	
<b>Action</b>	<b>Requestor/Anticipatory</b>
<b>5.1) Staff support for testing and evaluating improvements to forest operations and biomass utilization.</b>	<u>Anticipatory</u> : Forest products manufacturing companies, trucking industry, logging contractor, procurement officers. <u>Outcome</u> : Increased forest operations efficiency and wood/biomass utilization.

## **Deliverables**

### **5.1) Staff support for testing and evaluating improvements to forest operations and biomass utilization.**

- a) Deliverable: Report describing staff support.

## **Project 6: Science Delivery and Outreach to National, Western, and Southwestern Audiences: Federal, State, Tribal, and Private Forestry**

Science delivery is a core function of the ERI. Land managers aspire to use best available science but very few managers have the time to dig into the literature for the most recent and relevant scientific approaches to management. Project 6 provides a comprehensive suite of services that interpret and transfer science for practical application.

In FY19, the ERI will leverage state and federal funds to invest in outreach and science transfer to tribal natural resource programs and Native American communities by creating a new tribal liaison position. This individual will emphasize working with tribal members on reservations who seek to bridge the gap between modernists' and traditionalists' views of how reservation lands should be managed to best benefit current and future generations. In addition, this position will help tribal natural resource programs develop long-term natural resource management plans that create employment opportunities and enhance ecological and economic integrity over the long haul.

Recent priorities for FS management highlight the opportunity to address restoration treatment effectiveness for multiple management goals. Communication and demonstration needs in 2019 will focus on utilizing long-established research plots for management questions today, and creating new demonstrations to test implementation methods. For example, the ERI will work with the Apache-Sitgreaves National Forest on marking exercises that meet forest plan, project planning, and restoration goals while also managing pest and pathogens. Our partnership with Southwest Fire Science Consortium will produce working papers that address key components for implementing appropriate fire targets.

<b>Project 6: Science Delivery and Outreach to National, Western, and Southwestern Audiences</b> Fulfills Duties of the Act: 1, 2, 3, 4	
<b>Action</b>	<b>Requestor/Anticipatory</b>
<b>6.1) Provide support to federal land managers with science synthesis, technical assistance, rapid assessments, learning workshops, and presentations.</b>	<u>Requestor</u> : Federal land managers that include district rangers, specialists, silviculturists. <u>Outcomes</u> : RAPs, workshops, field trips, transfer of best available science.
<b>6.2) Provide scientific support for forest planning and incorporation of best available science into forest planning efforts and at the regional level.</b>	<u>Requestor</u> : R3 Planning Director; WO EMC and RIMC Adaptive

	<p>Management Team; Tonto NF Plan Revision lead;  <u>Outcomes:</u> Forest plans use best available information, increase use of adaptive management, and increased sharing across forest planning efforts via BSMS.</p>
<p><b>6.3) Provide scientific and technical support to tribal natural resource programs and communities.</b></p>	<p><u>Anticipatory:</u> The goal is to improve science delivery to tribal natural resource managers and communities.  <u>Outcome:</u> Best available science that incorporates recognition of traditional ecological knowledge (TEK) contributes to tribal land management decisions.</p>
<p><b>6.4) Maintain and transfer science through the ERI, SWERI, 4FRI, and AZ Prescribed Fire Council websites for land managers and all affected entities.</b></p>	<p><u>Requestor:</u> West-wide scientific community, AZ Department of Forest and Fire Management, NM State Lands and Department of Forestry, and the stakeholder community.  <u>Outcomes:</u> Science is available for managers and stakeholders.</p>
<p><b>6.5 Translate and summarize scientific and journal articles for land managers and affected entities.</b></p>	<p><u>Requestor:</u> Southwest Fire Science Consortium and fire manager audience, 4FRI ID team, public and private land managers.  <u>Outcomes:</u> Knowledge transfer and best available science used to inform action.</p>
<p><b>6.6) Transfer science to non-federal entities using field trips, filling information requests, and making presentations.</b></p>	<p><u>Requestor:</u> Stakeholders, tribal nations, nonfederal land managers.  <u>Outcomes:</u> Knowledge to inform action.</p>
<p><b>6.7) Educate the general public.</b></p>	<p><u>Affected entities:</u> General public.  <u>Outcomes:</u> Raise awareness and support for restoration.</p>

## **Deliverables**

### **6.1) Provide support to federal land managers for restoration treatment planning and implementation.**

- a) Deliverable: Report on actions to deliver science to support project assessments, data collection, treatment design, and use of best available science by federal land managers.
  - i. A combination of ten (10) total services based on previous and anticipated demand that may include: information requests, technical assistance, field trips, and presentations. This outreach is opportunistic dependent on audience request but information is based on ERI Work Plan 2016-18 Project 3.
  - ii. Present two (2) webinars in partnership with the Southwest Fire Science Consortium and/or National Forest Foundation to present emerging science to land managers and practitioners. This outreach developed from Work Plans 2017-2018 Project 3.
- b) Deliverable: Develop and implement two (2) workshops to disseminate science information directly to practitioners.
  - i. Treatment effectiveness in transitional pine on the Tonto and Prescott national forests. Research dissemination and lessons-learned across national forests. This outreach developed from ERI FY18 work plan Project 3.2 and FY17 work plan Project 3.2.
  - ii. Workshop with partners to be determined.
- c) Deliverable: Rapid assessments to support restoration projects at the forest-level.
  - i. Two (2) Rapid Assessment Projects (RAPs) to support restoration projects at the forest level.
    - 1. Mistletoe marking and restoration demo within West Escudilla project (requestor: ASNF–Randy Fuller and James Johnston; 4FRI SHG)
    - 2. Rapid literature review or demonstration for additional Arizona land management agencies.

### **6.2) Assist with forest planning and implementation by recommending best available science and program support.** Science and timing of support are variable for each national forest based on each individual forest planning schedule. This deliverable may include the opportunity to provide BSMS support the Tonto National Forest, just initiating monitoring plan revision under 2012 Planning Rule.

- a) Deliverable: Report on support.

### **6.3) Native American outreach program.**

- a) Deliverable: Report on outreach actions including filling information requests, linking tribes to science, technical resources, and field trips. Meet with or call Susan Rich from NM-EMNRD to discuss Traditional Ecological Knowledge (TEK).

### **6.4) Provide website science-delivery support for ERI, SWERI, the Arizona Prescribed Fire Council, and 4FRI (See Project 1 for 4FRI web support).**

- a) Deliverable: Redesigned 4FRI website and website maintenance for AZPFC, SWERI, and 4FRI.
- b) Deliverable: Report on technical support for ERI, SWERI, 4FRI, and AZ Prescribed Fire Council websites.

**6.5) Edit and deliver biophysical and social-political-economic information for affected entities.**

- a) Deliverable: Editorial support for a total of three (3) white papers and/or working papers.
  - i. White Paper: Are wildfires getting more frequent, bigger, and more severe? Myths vs. Facts.
  - ii. White paper: How much do restoration treatments cost? What is typical? What are the main drivers?
  - iii. Working paper: Fire management question to be developed in collaboration with the Southwest Fire Science Consortium.
- b) Deliverable: Eight (8) Fact Sheets and Topics on Restoration that translate and summarize scientific papers and journal articles.

**6.6) Initiate and facilitate knowledge services and science support for non-federal entities through field trips, filling information requests, and presentations for affected entities.**

These numbers may vary based on demand.

- a) Deliverable: Report on actions to educate and support affected entities. Provide a minimum of ten (10) activities that may include field trips, presentations, and information requests.

**6.7) Educate the general public.**

- a) Deliverable: Two (2) newspaper articles to educate the general public about the need for forest restoration to restore frequent-fire forests.

**Project 7: Science Delivery and Outreach to National, Western, and Southwestern Audiences: Federal, State, Tribal, and Private Forestry**

The legislation establishing SWERI requires an annual progress report.

***Deliverable***

**7.1) Complete annual progress by October 31, 2020.**

## BUDGET

**FY19 Budget \$1,500,000**

	Project 1: Science Delivery and Support for the Four Forest Restoration Initiative (4FRI), a Collaborative Forest Landscape Restoration Act project.	Project 2: Evaluation and Synthesis of Best Available Science Information (BASIS) for Landscape Restoration West-Wide	Project 3: Monitoring, Evaluation and Adaptive Management of Landscape Restoration in Western Fire-Adapted Forests and Woodlands	Project 4: Understanding and Solving the Economic, Social, and Political Issues and Opportunities of Ecological Restoration	Project 5: Improving Forest Operations and Biomass Utilization	Project 6: Science Delivery and Outreach to National, Western, and Southwestern Audiences: Federal, State, Tribal and Private Forestry	Total
<b>Personnel:</b>	\$ 121,329	\$ 91,176	\$ 472,232	\$ 130,936	\$31,550	\$ 422,142	\$ 1,269,365
<b>Outside Services:</b>	\$ -	\$ -	\$ -	\$ 4,200	\$ -	\$ -	\$ 4,200
<b>Travel:</b>	\$ 6,617	\$ 1,000	\$ 22,326	\$ 8,459	\$ 1,000	\$ 22,207	\$ 61,609
<b>Operations &amp; Supplies:</b>	\$ 2,735	\$ 397	\$ 12,970	\$ 2,647	\$ 184	\$ 9,530	\$ 28,463
<b>Total Direct Costs:</b>	\$ 130,681	\$ 92,573	\$ 507,528	\$ 146,242	\$32,734	\$ 453,879	\$ 1,363,637
<b>Indirects:</b>	\$ 13,068	\$ 9,257	\$ 50,753	\$ 14,624	\$ 3,273	\$ 45,388	\$ 136,363
<b>Total Project Costs:</b>	\$ 143,749	\$ 101,830	\$ 558,281	\$ 160,866	\$36,007	\$ 499,267	\$ 1,500,000