

2020–2021 Annual Report

to the USDA Forest Service under Sponsor Award

#20-DG-11030000-02 for 2020 (NAU Projects 1004479, 1004485-1004489)



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Summary

This report presents an integrated and coordinated series of actions for \$1.75 million awarded to the ERI in Fiscal Year 2020 under CFDA 10.694, Southwest Forest Health and Wildfire Prevention.

The information provided herein reflects our annual progress and comprises the final report for 2020 deliverables under 20-DG-11030000-02 (NAU 1004479, 1004485-1004489).

All of the activities (deliverables) summarized in this report respond to land manager and stakeholder requests and needs. The deliverables are informed by best available science and scientific evidence, which is translated into the language and product appropriate for the target audience. The ERI actively delivers information using a variety of approaches, from individual and group presentations and discussions to printed and electronically accessible fact sheets, short technical reports, longer white papers and management reports, and peer reviewed archival literature.

Like many organizations across the country, the ERI experienced impacts due to the COVID-19 pandemic. Despite the pandemic, we were able to maintain a high level of productivity; however, setbacks occurred due to COVID-19 safety protocols, such as limits to in-person gatherings/meetings and travel bans, coupled with a severe wildfire season that resulted in region-wide closures. Because of these impacts, some FY20 activities have been pushed into the 2021 fiscal year.

The Ecological Restoration Institute at Northern Arizona University is grateful for the funding that the United States Forest Service has provided for these efforts.

FY20 Deliverables (Final) – #20-DG-11030000-02

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FY20 Deliverables (Final) – #20-DG-11030000-02

Project 1. Support for Collaborative Restoration and Shared Stewardship from the Local to the Landscape Scale

1.1 Support and science delivery for the Four Forest Restoration Initiative (4FRI), a Collaborative Forest Landscape Restoration Act project.

1.1a: Support and leadership for 4FRI Committees.

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

Melanie Colavito – Co-chair of 4FRI Stakeholder Group – June through August 2021.

Amy Waltz – Co-chair of 4FRI Rim Country DEIS Working Group, July 2020 – June 2021. (*Key deliverable for FY 2020: Work with Forest Service ID Team to incorporate the stakeholder group comments for the Final Rim Country EIS*)

Bryce Esch – Co-chair for Multi-Party Monitoring Board (MPMB), July 2020 – ongoing.

Melanie Colavito – Co-chair of 4FRI Implementation Working Group, August 2020 – ongoing.

Taylor Dubay – Chair of Communications Group, August 2020 – ongoing.

1.1b: ERI staff lead the monitoring and adaptive management component of 4FRI. Recently, MPMB work has increased because of data storage and analysis gaps in Forest Service corporate databases. ERI developed an Access database for all 4FRI data and completed the first pre-treatment analysis. For FY20, we will assist the MPMB to ensure consistent post-treatment monitoring, and we will summarize and analyze spatial metrics in some of the first completed task orders of the 1st EIS planning area. ERI roles include: leadership, monitoring training, data error checking, data analysis, and reporting to 4FRI SHG and Forest Service partners.

1.1b.i: Deliverable: Monitoring report that includes an analysis and range of spatial heterogeneity metrics from other restored and reference landscapes. We will work with The Nature Conservancy (TNC) to compare the reference landscapes to the 4FRI treatments.

The Chimney Springs landscape metrics of success is a partnership project. This project is dependent on the post-treatment analysis and will not be completed in this fiscal year, but is expected by 2022. As of June 2021, post-treatment LiDAR data were collected by TNC, and analysis was initiated to reassess the 2019 pre-treatment metrics of restoration success. The TNC post-treatment data collection has been hampered by use of drones on federal land (and other delays with foreign-manufactured equipment). Paired with Project 3.4, which was the presentation and workshop.

1.1b.ii: Deliverable: Presentation of monitoring results to the 4FRI Stakeholder Group and Forest Service 4FRI team.

Data collections were delayed due to the COVID-19 pandemic, but are completed as of June 30, 2021. Analysis is forthcoming and expected presentations for fall 2021.

1.1c: 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.

Norton, H. Ongoing. Maintains all website support. *(See Project 6.3a for web analytics.)*

Covington, C. Monthly management of all administrative tasks related to the 4FRI Stakeholder Group meetings. This includes: agendas, minutes, meeting scheduling coordination, and BASECAMP. Monthly management of Steering Committee calls. This includes: agendas, minutes, and coordination.

1.2 Support for CFLRP and landscape-scale, cross-boundary projects. ERI will provide technical assistance for activities associated with landscape restoration, cross-boundary projects, including the CFLR pilots.

1.2a: Deliverable: Annual workshop, or set of technical workshops, exploring topic of concern for landscape-scale restoration and fire risk reduction (in cooperation with the other SWERI). The topic will be chosen based on the analysis of outcomes from the March 2020 workshop.

Esch, B., and ERI. Webinar. Dec. 2, 2020. [Resources for Climate Adaptation](#); coordinated 8 communicators. Region 3 national forests. 82 participants. Links to 6.1c.ii and R3 climate project.

Waltz, A., and B. Esch. Initiated SWERI coordination of in-person, 2022 cross-boundary workshop. Location Ft. Collins, CO. March 7–10, 2022.

1.2b: Deliverable: Summary of key component of 2020 workshop (completed in cooperation with the other SWERI).

Southwest Ecological Restoration Institutes (SWERI). 2020. [2020 Cross-Boundary Landscape Restoration Workshop Summary: Advancing All-Lands Restoration in New Mexico, Arizona, Colorado, and Surrounding States](#). ERI Workshop Report. Ecological Restoration Institute, Northern Arizona University. 34 p.

Colavito, M. [Lessons Learned and Recommendations for Developing and Applying Pre-Fire Planning Tools. Presentation to the PODs Collaborative Fire Planning Workshop](#). Feb. 24, 2021. 470 participants.

Other support for CFLRP including technical assistance for national set of indicator monitoring, lessons-learned analyses. For Lindsay Buchanan, CFLRP Coordinator, US Forest Service WO.

Waltz, A., with John Souther, Forest Service. [Collaborative Forest Landscape Restoration Program \(CFLRP\) All-Hands Web Meeting](#). Presentation to National Forest Foundation Peer Learning Network. June 24, 2021. 130 attendees.

Waltz, A., B. Esch., and M. Colavito. [CFLRP Ten Year Learning Effort “Level 2” Updates](#). Multiple team meetings, document review. July 2020/ongoing.

1.3 Support for the Arizona Shared Stewardship Initiative.

1.3a Deliverable: Report on actions.

Martin, J. (*In Press*). Implications for Tribal Forest Management Under New Federal Legislative Directions. ERI White Paper—Issues in Forest Restoration. Ecological Restoration Institute, Northern Arizona University.

(Final manuscript included, click [here](#).)

Project 2. Evaluation and Synthesis of Best Available Evidence, Knowledge, and Tools to Support West-Wide Landscape Restoration

2.1 Systematic review to reconcile conflicting climate models to understand how climate change will influence fire severity in the Southwest. This review will be conducted in cooperation with the Southwest Fire Science Consortium.

2.1a: Deliverable: Publication summarizing results. Depending on the amount of literature, this may be a working paper or a manuscript.

Wasserman, T.N., and S.E. Mueller. Climate influences on future fire severity: A synthesis of predictive climate-fire models and the future of fire severity across our western forests. (*Draft manuscript submission in FY21 work plan. Draft manuscript not included with final report to avoid conflict with peer-review publishing guidelines.*)

2.1b: Deliverable: Webinar in cooperation with Southwest Forest Science Consortium.

SWFSC webinar delayed until FY21.

Project 3. Monitoring, evaluation, and adaptive management of landscape restoration in western fire-adapted forests and woodlands

3.1 Long-term Ecological Assessment and Restoration Network (LEARN). New monitoring data, and previous data from LEARN, will be used to analyze tree regeneration, fuel loads, and old tree survival responses to various restoration treatment approaches. Consequences of no action in a changing climate will also be examined.

3.1a: Deliverable: Technical Report.

Huffman, D.W., M.T. Stoddard, and J.P. Roccaforte. 2021. Effects of variation in residual tree density on resource goals in restoration of southwestern ponderosa pine forests. ERI Technical Report. Ecological Restoration Institute, Northern Arizona University. 50 p.

(Manuscript included, click [here.](#))

3.2 Remeasurement of monitoring plots within the Museum Fire, Flagstaff Watershed Protection Project (FWPP). The focus of this work is to evaluate the effectiveness of fuels reduction treatments and impacts within the Museum Fire. This work is in cooperation with the US Fish and Wildlife Service.

3.2a: Deliverable: Report on field season with timeline for data analysis and conclusions and publication.

Museum Fire first-year monitoring results were presented to S. Hedwall (USFWS) on May 19, 2021. Other presentations of findings followed in FY21. ERI staff created a PowerPoint presentation that summarizes FWPP monitoring objectives and MSO habitat goals, and Museum Fire study objectives, methods, and findings.

(Presentation included, click [here.](#))

3.3 Ponderosa pine landscape change. This project builds from a pilot study conducted in FY19 (Project 3.2b) and analyzes changes in ponderosa pine cover on a large Transition Zone landscape. Results from this study will help managers anticipate ponderosa pine ecosystem vulnerabilities to climate change effects and prioritize restoration treatments.

3.3a: Deliverable: Technical report.

Our postdoctoral scholar was the technical lead on this deliverable, and in January 2021 he accepted another position. COVID-19 budget cuts led to hiring delays, however in fall 2021, the ERI hired a new Research Scientist who will assume a primary role in the analysis. This deliverable will be completed by June 2022.

3.4 Restoration metrics of success at landscape scales. The ERI will develop a range of spatial patch and landscape metrics from a range of restored areas across northern Arizona to better inform 4FRI and other landscape-level restoration projects on how to measure and adaptively manage landscape-scale treatments towards desired condition.

3.4a: Deliverable: Presentation or workshop for managers and stakeholders.

The Chimney Springs landscape metrics of success is a partnership project. As of June 2021, post-treatment LiDAR data were collected by TNC, and analysis started, to mimic the 2019 work on pre-treatment metrics of restoration success. This project is dependent on the post-treatment analysis, and was not completed in this fiscal year. Paired with P1.1b.i, which was the report.

3.5 Perennial understory plant responses to treatments. Understory plants play critically important ecological roles in ponderosa pine forests and also can have significant cultural and medicinal values. Using new and existing data collected from ERI's LEARN sites over a span of +20 years, we will analyze understory plant community responses to ecological restoration treatments.

3.5a: Deliverable: Technical report.

A preliminary report was completed for FY20, and additional field data were collected. A final technical report is described in our FY21 work plan (Project 1.1) and will be delivered in FY21.

(Progress report included, click [here](#).)

Project 4. Understanding the Economic, Socio-Political Barriers and Opportunities for Advancing Landscape-Scale Restoration

4.1 Full-cost accounting study to capture the ongoing costs of remediation and the remediation benefits that have occurred during the last eight years since the Schultz Fire.

4.1a: Deliverable: White paper.

Colavito, M.M., T. Combrink, E. Hjerpe, C. Edgeley, J. Burnett, and A.J. Sánchez Meador. 2021. [Full-Cost Accounting Remeasurement of the 2010 Schultz Fire: Understanding the Long-term Socio-Economic Implications of High-Severity Wildfire and Post-Wildfire Flooding](#). ERI White Paper—Issues in Forest Restoration. Ecological Restoration Institute, Northern Arizona University. 45 p.

4.2 Support development of silviculture digital platform.

4.2a: Deliverable: Report on assistance.

Colavito, M.M. 2021. [Four Forest Restoration Initiative Digital Timber Sale Manager Pilot Project: Progress Report from the Ecological Restoration Institute](#). ERI Project Report. Ecological Restoration Institute, Northern Arizona University. 7 p.

Project 5. Improving Forest Operations Efficiency and Expanding Markets for Wood and Biomass Utilization

5.1 Identification of railroad networks in the US West that can strategically supply small-diameter wood and biomass to both domestic and foreign markets.

5.1: Deliverable: Report that evaluates and maps strategic railroad networks.

Report on progress. Thirty railroad sidings were identified in CO, AZ, and NM that could serve as railroad transportation hotspots to ship woody biomass to established forest products markets. Using Google Earth, we gathered data to rank the sidings using predetermined criteria. Due to the challenge of obtaining information from railroad companies, we anticipate completion of shipping cost comparisons no later than FY22. In FY21, we are currently working with our Research Scientist in ERI's Ecology Group to determine what the wood supply is within the surrounding area of each siding.

5.2 Provide expertise to business representatives, entrepreneurs, and other affected entities.

5.2a: Deliverable: Report on information requests and other services.

1. Han, H-S., and D. Vaughan. PJ Woodlands (Tony Burger and Tim Leftwich) technical assistance. Meeting held via Zoom. July 9, 2020. *Technical assistance.*
2. Han, H-S., and D. Vaughan. PJ Woodlands (Tony Burger and Tim Leftwich) technical assistance. Meeting held via Zoom. July 16, 2020. *Technical assistance.*
3. Han, H-S., D. Vaughan. Daniel Sanchez (UC Berkeley professor) requested technical assistance on biochar. Meeting held via Zoom. July 17, 2020. *Technical assistance.*
4. Han, H-S., and D. Vaughan. HM3 (Hiroshi Morihara and Mary Mcswain) technical assistance. Meeting held via Zoom. July 29, 2020. *Technical assistance.*
5. Han, H-S., and D. Vaughan. Jarod Dunn (CFRI) requested technical assistance about costs of forest operations and about contacting harvesting contractors. Meeting held via Zoom. Aug. 6, 2020. *Technical assistance.*
6. Han, H-S., Vaughan, D. Biowaste group (George Kladnik, Ward Davis, Rob Vane) requested technical assistance on building a bioenergy facility in Flagstaff. Meeting held via Zoom. Aug. 11, 2020. *Technical assistance.*
7. Vaughan, D. Wood properties of southwestern ponderosa pine. Fire Adapted Communities Wood Utilization CoP call. 7 attendees. Sept. 24, 2020. *Webinar.*
8. Han, H-S. Provided an update on the 4FRI RFP to Alissa Murray, BNSF Railway Company. Email. Oct. 9, 2020. *Information request.*
9. Han, H-S., and D. Vaughan. Gary Snider requested information about nanocellulose. Supplied contact info for nanocellulose researcher via email. Oct. 7, 2020. *Information request.*
10. Han, H-S., Vaughan, D. Carmen Austin, at request of NM state forester, asked about contractors in Southwest that do timber appraisals. Supplied a list of several contractors via email. Nov. 6, 2020. *Information request.*
11. Vaughan, D. Garrett Stephens (Jefferson Conservation District) asked about biomass of trees of different diameter classes in Colorado Front Range. Supplied some literature and tables with this information via email. Nov. 12, 2020. *Information request.*
12. Han, H-S. Responded to an inquiry about utilization of forest residues for production of biochar using mobile biomass conversion techs. Arnie Irwin, BLM, Buffalo, Wyoming. Phone call. Nov. 20, 2020. *Information request.*
13. Han, H-S. Provided technical comments and suggestion on the development of forest management decision model. Tom Fry. Western Director, American Forest Foundation. Phone call. Nov. 19, 2020. *Technical assistance.*
14. Han, H-S. Wrote a letter of support for a research grant proposal on a modular pyrolysis system, which was submitted to the SBIR program. Oct. 15, 2020. *Information request.*

15. Han, H-S., and D. Vaughan. Charles Cassagnol (contractor in NM) had a question about steep slope logging equipment. We forwarded his question to Loren Kellogg at OSU and followed up with Charles. Email. Dec. 15, 2020.
16. Han, H-S. Arizona Logs and TimberWorks asked about biochar production and marketing strategies. In addition, wrote a letter of support for their proposal, which was submitted to the 2021 Forest Service Wood Energy and Wood Innovation program. Jan. 22, 2021. *Information request.*
17. Han, H-S. Provided technical comments and suggestions on nanocellulose technology development. Zoom meeting. Feb. 26, 2021. *Technical assistance.*
18. Vaughan, D. Provided technical assistance on hosting Zoom Webinars. Joanna Stevens, NAU Center for Materials Interfaces. Phone call. March 12, 2021. *Technical assistance.*
19. Vaughan, D. Facilitated two Zoom breakout sessions as part of Chris Jones' (UofA extension specialist) Southwest Biochar workshop. Zoom meeting. April 7–8, 2021. *Technical assistance.*
20. Han, H.-S. Provided technical support on biomass feedstock supply and moisture content measurement. June 3 and 28, 2021. *Technical assistance.*

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

6.1 Provide support to federal land managers with science synthesis, technical assistance, rapid assessments, learning workshops, and presentations. The new information for land managers is based on analyses from Projects 2 and 3 in the previous fiscal year.

6.1a: Deliverable: Ten (10) services that include information requests, field trips for Forest Service partners and their stakeholders, project-level support.

1. Waltz, A. Field trip to Parks West Task Order, Kaibab National Forest to assess land management and implementer's questions. Kaibab National Forest silviculturist, timber sale admin; 4FRI silviculturists and GIS analyst; TNC forest ecologist and Stewardship Agreement Manager. 10 participants (COVID-19 Forest Service policy limits field trips to 10). July 17, 2020. *Field trip.*
2. Waltz, A. Information request from Jamie Barbour, Forest Service Washington Office. Request for monitoring results from Kaibab National Forest and application for national monitoring data storage. Call with B. Esch and J. Barbour. Sept. 15, 2020. *Information request.*
3. Waltz, A., and B. Esch. Call and assistance to Rocky Mountain Research Station Science Delivery for shared promotion and delivery opportunities. Sept. 29, 2020 and recurring every six (6) weeks thereafter. *Planning and information request.*
4. Waltz, A. Presentation to 4FRI Executive Board on 4FRI SHG Rim Country work, at request of Forest Service 4FRI Team. 12 participants. Sept. 22, 2020. *Presentation.*
5. Springer, J. Presentation to Edible Forest Service Plants Webinar – Native American Heritage Month Event. 110 participants. Nov. 2, 2020. *Presentation.*

6. Waltz, A. Call with Shaula Hedwall, USFWS. MSO litigation settlement and monitoring update to assess impacts to 4FRI. September 25, 2020. *Information request.*
7. Waltz, A. Parks Community public meeting planning call. Kaibab NF and 20 partners. Follow-up sharing of Edgeley and Colavito, 2020 White Paper: Museum Fire Survey Results. November 20, 2020. *Information request.*
8. Waltz, A. Call and assistance to R3 Timber coordinator, Ali San Gil, and Ecosystem Planning Deputy, Jennifer Ruyle. Nov. 5, 2020. 5 participants. (Follow up with Alan Ager et al. treatment optimization work; and All Lands Risk Transmission report.) *Technical assistance.*
9. Colavito, M. Jeremy Kruger with the Forest Service 4FRI Team requested information on the economic costs of wildfire. The Schultz Full Cost Accounting Report and FWPP Cost Avoidance Study were provided. Nov. 10, 2020. *Information request.*
10. Waltz, A. Call and assistance to 4FRI CO, Jeremy Kruger. Discussion on ROI and opportunity to capture more data for 4FRI project as “true value of restoration.” Dec. 2, 2020. Also shared the Keith Stockman and Kirsten Gebert’s RCAT manual (CFLRP monitoring indicator) including the Deschutes Forest Collaborative example.
11. Waltz, A., and T. Wasserman. Call and needs assessment with Flagstaff Ranger District Silviculturists, Mark Nabel and Andy Stevenson. Dec. 1, 2020. Role of planting in climate adaptation, and science needs.
12. Colavito, M. Ian Fox with the FS R3 Office requested three ERI reports: Forest Products Modernization Observations (2019), Desired Business Practices Fact Sheet (2018), and role of Risk Management Prioritization DSTs. All were provided. Dec. 1, 2020. *Information request.*
13. Waltz, A. Call and needs assessment with Tonto Fire Ecologist, Mary Lata. Dec. 3, 2020. Need for desert systems fire management response. Connected to USGS RAMPS and Seth Munson. Future follow-up under climate adaptation project.
14. Colavito, M. Molly McCormick with USGS Flagstaff requested the Role of Risk Management Prioritization DSTs report. Report provided. Dec. 8, 2020. *Information request.*
15. Esch, B. Karl Buermeyer with the Santa Fe National Forest requested feedback on the Southwest Jemez Restoration Project monitoring program. Review and feedback provided. Jan. 12, 2021. *Information request.*
16. Springer, J. Assisted USFS and private consultant with questions relating to rare plant surveys at Camp Navajo. Feb. 20, 2021. *Information request.*
17. Springer, J. Greta Hyland with BLM AZ Strip District requested information on ecozones in Arizona Strip March 1, 2021. *Information request.*
18. Waltz, A. 4FRI – TCSI Peer Learning Call, Regions 3 and 5. April 5, 2021. 11 attendees.
19. Springer, J., and M. Stoddard. Field tour to Mt Trumbull pinyon-juniper demonstration site to discuss options for treatment of P-J woodlands. May 12, 2021. *Technical assistance.*
20. Springer, J. Request from Amber Franklin, NPS GC-Parashant NM for photos of crews working for social media networks. May 23, 2021. *Information request.*
21. Mt. Trumbull Coordination Meeting. ERI Research and BLM District Fire Staff. Data share and operational check in. April 7, 2021. 8 attendees.

22. Huffman, D. Information request regarding pinyon-juniper tree densities for Greta Hyland, BLM. March 22, 2021. *Information request*.
23. Huffman, D. Information request regarding pinyon-juniper tree densities for Jason Nez, Resource Advisor, GCNP. June 8, 2021. *Information request*.
24. Waltz, A., A. Sánchez Meador, and D. Huffman. Meeting with CPCEU and Bryce Canyon NP, Request for ERI assistance, FY22 workplan scoping. June 10, 2021. *Technical assistance*.
25. Springer, J. Request for Rafael Fire BAER assistance from Kaibab National Forest regarding weeds and rare plants. July 5, 2021. *Technical assistance*.

6.1b: Deliverable: Two (2) webinars in partnership with science-to-manager series, such as the SW Fire Science Consortium or National Forest Foundation Collaboration Resources series.

Colavito, M. The Role of Risk Management Prioritization Decision Support Tools. Webinar for Southwest Fire Science Consortium. Dec. 8, 2020. 70 participants. *Webinar*.

Esch, B. “Four Forest Restoration Initiative Monitoring.” National Forest Foundation Collaborative Forest Landscape Restoration Program Monitoring Peer Learning Session. Sept. 10, 2020. 100 participants.

Stoddard, M.T. Webinar presentation for Southwest Fire Science Consortium: “Effectiveness of restoration treatments for reducing fuels and increasing understory diversity in shrubby mixed-conifer.” April 15, 2021. 60 in attendance. *Presentation*.

6.1c: Two (2) workshops in partnership with Region 3 national forests to better disseminate best available science. See below for deliverables.

6.1c.i: Deliverable: Esch, B., D.W. Huffman, M.T. Stoddard. Pinyon Juniper Woodland Learning Workshop with Kaibab NF and ERI. March 31, 2021. Science presentation by ERI, and management concerns and needs by Kaibab NF. 25 attendees.

6.1c.ii: Deliverable: Esch, B., and ERI. Webinar. March 9, 2021. [Climate Adaptation and Manager Needs Workshop](#); coordinated 3 speakers and 8 facilitators for small group discussion. Region 3 National Forests. 80 participants.

6.1d: Two (2) Rapid Assessments.

6.1d.i: Deliverable: San Juan Canyon Rapid Assessment on Santa Fe NF. Report on Progress.

Met with Jim Youtz (R3 silviculturist), Dennis Carril, Gennaro Falco, Amber Bishop multiple times February–June 2021. Confirmed site location, field dates (Aug. 12–19, 2021), camp location, and methodology. Gathered information from other researchers, including Tom Swetnam (retired UofA), Ellis Margolis (USGS) and Craig Allen (retired USGS). Coordinated with Anne Bradley (NM TNC) to confirm past collaborative priorities. Final presentation and report moved to fall 2021 and spring 2022.

6.1d.ii: Deliverable: Waltz, A., A. Sánchez Meador and J. Donager. 2021. Testing Metrics for Implementation Success: Mobile Lidar Systems and Ground Plots. A Rapid Assessment for Kaibab National Forest – 4FRI – TNC.

Assessment complete and technical report in production.

6.1e: Deliverable: Report on support provided for forest planning, broader-scale monitoring, and adaptive management. This includes ongoing technical advice to the Tonto National Forest Revision Monitoring Plan, and Kaibab National Forest monitoring and analysis.

Continuing support to Kaibab National Forest forest plan implementation with science delivery on pinyon juniper forest types (2022 field trip in planning), and planning for 2022 forest level workshops on climate and forest adaptation.

6.2 Provide access to ERI science resources for tribes, provide technical assistance to tribes, and work with federal land management agencies to link tribes to management resources and shared stewardship opportunities.

6.2a: Deliverable: Report on services to tribes.

- *Martin, J. Scoping meeting with Hualapai Tribal Forester Melvin Hunter, Jr. regarding potential collaborations between ERI and Hualapai tribal forestry and potential research on the Hualapai Nation.*

The primary purpose of scoping was to identify specific priorities for supporting forest management and restoration activities on the Hualapai Nation. Initial discussions were broad and clarified the administrative status of Hualapai's forestry program. The Hualapai Nation has assumed all forestry and fire management functions from the Bureau of Indian Affairs (BIA) through a self-determination compact. This should make future collaborative efforts less cumbersome.

Scoping identified the following priorities:

- Research to determine the structural quality of Hualapai's ponderosa pine stock. Current stocking is even-aged and prone to wind damage. Structure will also have an impact on potential products and markets.
- Development of standard operating procedures for a recently purchased sawmill.
- Assistance in the development of technically qualified tribal forestry staff.

Hualapai has not expressed a strong desire to pursue collaborative efforts using the Tribal Forest Protection Act at this time, but might in the future.

Scoping is on-going as time permits. Melvin Hunter was assigned collateral duties as the incident commander of the tribe's response to the COVID-19 pandemic. This has limited his ability to interact on a regular and in-person basis.

Scoping has increased and will continue. Specific projects will be identified and targeted as overall support to tribal programs.

- *Martin, J., and J. Springer. Navajo Nation Natural Heritage Program engagement. Ongoing discussion on restoration and culturally significant plants, including discussions with Sara Souther of Landscape Conservation Initiative.*

Engaged with the Navajo Nation Natural Heritage Program about possible collaboration and research to support efforts regarding propagation of culturally significant plants and riparian restoration treatments. This engagement was initiated based on Sara Souther's knowledge of these efforts, Judy Springer's knowledge of plants, and Jon Martin's previous experience on the Navajo Nation.

Met with Navajo Natural Heritage Program Botanist Nora Talkington and Greenhouse Manager Jesse Mike. N. Talkington informed us that they have initiated propagation of culturally significant plants in vacant greenhouses at the Navajo Forestry Department compound. They have also initiated planning for 2 riparian restoration projects on the Navajo forest. Exclusion of livestock and coordination with permittees and grazing committee members is the greatest challenge.

Discussions are ongoing. ERI's commitment to this effort has is developing and will require coordinating two tribal programs and BIA Regional Office Forestry staff. Face-to-face discussions and site visits have been impacted by COVID-19 protocols from the Navajo Nation and NAU. Site visits with the Navajo Nation Forestry Department and Navajo Nation Natural Heritage Program have been scheduled for early to mid-November 2021.

- *Collaboration with partners within 638 workshops. Identified two potential projects: 1. San Carlos Apache Tribe, and/or 2. Apache-Sitgreaves National Forests.*

The two-day webinar workshop was hosted by the Intertribal Timber Council (ITC) through a cooperative agreement with the Forest Service. Following presentations from tribal relations and ITC staff, tribal forestry and Forest Service staff were paired up, provided agreement templates, and instructed to engage in project development. The presentations provided the latest updates to new 638 cooperative agreement authorities. These updates were informative and clarified processes for engaging in TFFPA/638 agreements. Jon Martin was paired up with two foresters from the San Carlos Apache Tribe and Forest Service personnel from the Apache-Sitgreaves National Forests. Tribes and pueblos within Region 3 were paired up with Forest Service personnel from their area and also encouraged to initiate project development.

- *Martin, J. Site visit to finalize silviculture prescription with Navajo Nation Forestry Department. El Paso #2 Fuelwood project on Navajo Nation as final step of prescription approval. Project plan submitted to BIA for their approval. 8 participants.*

Jon Martin met with staff from the Navajo Nation Forestry Department (NNFD) at the El Paso # 2 Fuelwood project. The NNFD requested Martin's assistance in reviewing and approving the prescription as part of the NEPA approval for the project. Martin completed a review of the prescription, and this site visit was the last step for approving the prescription. Alex Becenti, Navajo Forestry Department forester, Ed Sam, timber sale forester, and five technicians were on site to discuss the prescription and provided guidance on diameters of cut trees, spacing of residual trees, and the location of potential ponderosa pine seed trees. Martin approved the prescription and the project package was forwarded to the BIA Navajo Regional Office for NEPA review and approval.

6.2b: Deliverable: Support for efforts to advance biomass utilization pilots between tribes and the Forest Service.

- Martin, J. Wood for Life program organization meeting with other stakeholders. Nov. 4, 2020.
- Martin, J. Wood for Life program organization meeting with other stakeholders. Dec. 2, 2020.
- Martin, J. Wood for Life program organization meeting with other stakeholders. Jan. 6, 21, 27, 2021.
- Martin, J. Wood for Life program organization meeting with other stakeholders. Feb. 3, 17, 24, 2021.

(“Wood for Life: A Tribal Firewood Partnership in Northern Arizona” is a handout featuring project highlights. It was produced by the ERI in partnership with the National Forest Foundation. The handout is included, click [here](#).)

6.3 Provide website support for ERI, SWERI, and 4FRI.

6.3a: Deliverable: Report on technical support.

Web analytics can be found in the following report enclosure:

[Project 6.3a. Analytics ERI-SWERI-4FRI FY2020-VS-2019.pdf](#)

6.4 Edit and deliver biophysical, socio-political, and economic information to affected entities.

6.4a: Deliverable: Editorial support for three (3) white papers or working papers. Listed in detail below.

6.4a.i: Deliverable: White paper. Synthesis of rebuttals to misleading info about historic fire regimes. Note that this deliverable has changed to a Working Paper on mitigating postfire erosion.

Grover, H. 2021. [Mitigating Postfire Runoff and Erosion in the Southwest Using Hillslope and Channel Treatments](#). ERI Working Paper No. 44. Ecological Restoration Institute and Southwest Fire Science Consortium, Northern Arizona University. 11 p.

6.4a.ii: Deliverable: White Paper. Updated analysis of restoration treatment costs.*

**This deliverable was moved to the FY21 work plan, to be written by Dr. Han’s grad student, Heesol Chang; ms due winter 2021. This FY20 deliverable is now a white paper that summarizes M. Colavito’s decision support tools technical report and subsequent journal article.*

Colavito, M.M. 2021. [Integrating Decision Support Tools for Wildfire Risk Assessment and Treatment Prioritization](#). ERI White Paper—Issues in Restoration. Ecological Restoration Institute, Northern Arizona University. 25 p.

6.4a.iii: Deliverable: White paper on Museum Fire survey results.

Edgeley, C.M., and M.M. Colavito. 2020. [Local Experiences with the 2019 Museum Fire and Associated Flood Risk: A Survey of Flagstaff-Area Residents](#). ERI White Paper—Issues in Forest Restoration. Ecological Restoration Institute, Northern Arizona University. 40 p.

6.4b: Deliverable: Eight (8) fact sheets and/or Topics in Restoration and Resiliency papers.

1. Colavito, M.M., and C.M. Edgeley. 2020. [Local Experiences with the 2019 Museum Fire and Associated Flood Risk](#). ERI Fact Sheet. Ecological Restoration Institute, Northern Arizona University. 2 p.
2. Roccaforte, J.P. 2020. [Restoration Applications of Resource Objective Wildfires in Western US Forests](#). ERI Fact Sheet. Ecological Restoration Institute, Northern Arizona University. 2p.
3. Grover, H. 2021. [Mitigating Postfire Runoff and Erosion in the Southwestern US](#). ERI Fact Sheet. Ecological Restoration Institute and Southwest Fire Science Consortium, Northern Arizona University. 2 p.
4. Dubay, T. 2021. [Clearing Obstacles to Forest Restoration](#). ERI Topics in Restoration and Resiliency. Ecological Restoration Institute, Northern Arizona University. 2 p.
5. Stoddard, M.T. 2021. [Long-term Functional Responses and Ecological Resilience Across a Network of Ponderosa Pine Restoration Treatments](#). ERI Fact Sheet. Ecological Restoration Institute, Northern Arizona University. 2 p.
6. Colavito, M.M. 2021. [Calculating the Full Costs of the 2010 Schultz Fire: A Ten-Year Review](#). ERI Fact Sheet. Ecological Restoration Institute, Northern Arizona University. 3 p.
7. ERI. 2021. [Mid-Scale Drivers of Variability in Dry Mixed-Conifer Forests of the Mogollon Rim, Arizona](#). ERI Fact Sheet. Ecological Restoration Institute, Northern Arizona University. 2 p.
8. Stoddard, M.T. 2021. [Effectiveness of Restoration Treatments for Reducing Fuels and Increasing Understory Diversity in Shrubby Mixed-Conifer Forests of the Southern Rocky Mountains](#). ERI Fact Sheet. Ecological Restoration Institute, Northern Arizona University. 2 p.

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

6.5a: Deliverable: List a minimum of ten (10) activities

1. Colavito, M. Ron Dungan from KJZZ requested an interview for a radio segment on the issues of hazardous fuel, thinning, and Community Wildfire Protection Plans. July 1, 2020. *Media request*.
2. Colavito, M., and C. Edgeley. C. Edgeley presented findings from the Museum Fire survey work to the Greater Flagstaff Forest Partnership monthly meeting. Online. July 15, 2020. 15 participants. *Presentation*.
3. Colavito, M. Presentation on Assessment of Community Wildfire Protection Plans in Arizona and other western states project to the Fire Adapted Communities Learning Network. Online. July 16, 2020. 20 participants. *Presentation*.

4. Colavito, M. Keala Hagmann with the University of Washington requested social science citations about the impacts of scientific uncertainty collaboration for a paper on the state of fire-adapted forests. Review done and citations provided. July 20, 2020. *Information request.*
5. Colavito, M. Terry Greene Sterling with the ASU Cronkite journalism school requested a phone call to inform research she is conducting to write a grant to fund a series of articles on forest restoration. Phone call on July 23, 2020. *Information request.*
6. Colavito, M., and B. Esch. Anna Santo from the Ecosystem Workforce Program asked for an external review of the joint Ecosystem Workforce Program/Rural Voices for Conservation Coalition “Implementing outcome-based performance measures aligned with the US Forest Service’s Shared Stewardship Initiative” report. Review provided Aug. 7, 2020. *External review request.*
7. Colavito, M. Presented findings from the Assessment of Community Wildfire Protection Plans project to the Greater Flagstaff Forest Partnership monthly meeting. Online. Aug. 19, 2020. 15 participants. *Presentation.*
8. Colavito, M. Presented findings from the Assessment of Community Wildfire Protection Plans project to the NAU School of Forestry Graduate Seminar Series. Online. Aug. 26, 2020. 20 participants. *Presentation.*
9. Dubay, T., and T. Wasserman. Melissa Sevigny, science reporter for NPR’s KNAU affiliate, emailed to request an interview with Tzeidle Wasserman about her white paper on wildfire trends across the western US in relation to the California wildfires. An interview was scheduled for Sept. 1. Aug. 31, 2020. *Media request.*
10. Colavito, M. and A. Sanchez Meador. Gary Gold with Senator Sinema’s office requested input on the proposed “Emergency Wildfire and Public Safety Act of 2020” bill. Sept. 9, 2020. *Information request.*
11. Dubay, T. Kirk Siegler, NPR western correspondent, emailed to request an interview with A. Sánchez Meador for a story on past forest management and the wildfire problem in the West. Interview was conducted and two stories were produced for NPR online and NPR's Morning Edition program. (Sept. 15 and Sept. 16, respectively). Sept.14, 2020. *Media request/interview.*
12. Colavito, M., and A. Sánchez Meador. Trevor Pearson with Senator McSally’s office requested input on the proposed “Forest Health and Biomass Energy Act of 2020” bill. Sept. 16, 2020. *Information request.*
13. Dubay, T. Sylvie Haller, a producer for broadcast reporter Anne Thompson, with NBC News and the Today Show emailed to request an interview with Wally Covington on forest management for a piece on climate change. Sept. 17, 2020. *Media request.*
14. Colavito, M. Terry Hudson with Hudson Environmental LLC requested information about developing a Community Wildfire Protection Plan for Yarnell, AZ, based on our assessment of CWPPs in AZ. Sept. 21, 2020. *Information request.*
15. Colavito, M. Emery Cowan with the Rural Voices for Conservation Coalition requested information on Forest Service contracts and agreements with community-based organizations in the Southwest. Sept. 24, 2020. *Information request.*
16. Waltz, A. Media request and interview with Jacob Fischler at *AZ Mirror*. Oct. 1, 2020. *Media request/interview.*

17. Waltz, A. Forest Policy Update. Presentation to Arizona Forward. 15 participants. At the request of Joanne Keene. Flagstaff, AZ. Oct. 8, 2020. *Presentation*.
18. Colavito, M. Claire Chandler with *Cronkite News* Washington emailed a request (via Diane Vosick) looking for information about the fire season in Arizona and 4FRI. Interview was provided by Melanie Colavito. Oct. 20, 2020. *Media request*.
19. Colavito, M. Jay Smith with Coconino County requested an ERI publication on climate change and the effects on ponderosa pine forests. Four ERI publications were provided: Wasserman 2020, Stoddard et al. 2020, Stoddard et al. 2019, Stoddard et al. 2015. Oct. 20, 2020. *Information request*.
20. Colavito, M. Peter Aleshire with the *White Mountain Independent/ Payson Roundup* requested information about non-cash benefits of biomass for forest restoration. The memo Dr. Han and Dr. Kim (SoF) developed in December 2018 for the AZ Corporation Commission was provided. Feb. 28, 2021. *Information request*.
21. Dubay, T., via M. Colavito and A. Sánchez Meador. *Arizona Republic* reporter Anton Delgado requested interviews to help inform a story about the Bill Williams Mountain restoration project in Williams, AZ. Interviews were provided by M. Colavito and A. Sánchez Meador. Oct. 27, 2020. *Media request*.
22. Colavito, M. Interview with *Arizona Republic* reporter Anton Delgado. Oct. 30, 2020. *Media interview*.
23. Dubay, T., via M. Colavito. Student reporter Laura Kraegel with ASU's *Cronkite News* requested interviews with M. Colavito and T. Wasserman about their research for a story on restoration and wildfire. Interviews were arranged. Nov. 4, 2020. *Media request*.
24. Colavito, M. Joe Trudeau with the Center for Biological Diversity requested the FY19 Project 4 report on barriers and facilitations to the of wildfire risk assessment decision support systems. Report was provided. Nov. 10, 2020. *Information request*.
25. Wasserman, T. Info request to Bruce Higgins, a retired FS Planner on the Kaibab, requested info on assessing historical evidence due to USFS regeneration planting in Belle Fire area on A1 mountain. He requested assistance in discussing with silvi Andi Stevensen and other Coconino NF staff. Oct. 5, 2020/Ongoing. *Information request*.
26. Wasserman, T. Interview with ASU *Cronkite News* with Laura Kraegel and Maya Leachman on wildfire across the West and restoration and fuels treatments. Oct.10, 2020. *Media interview*.
27. Waltz, A., A. Sánchez Meador, and J. Donager. Meeting with Oliver Adams from AZ Forward to discuss AZ Forward "Healthy Forest Sustainability Plan." Request for Alan Ager Optimization Work, and Wood Supply Analysis (for HM3) by P. Rappold and H. Sup Han (total 3). Nov. 6, 2020. *Information request*.
28. Colavito, M. Interview with ASU *Cronkite News* with Laura Kraegel and Maya Leachman on wildfire and communities. Nov. 13, 2020. *Media interview*.
29. Colavito, M. Phil Saks with Blue Forest requested an interview to develop a newsletter piece about the "Integrating Art and Science to Communicate the Social and Ecological Complexities of Wildfire and Climate Change in Arizona, USA" manuscript. Interview provided. Nov. 13, 2020. *Information request*.

30. Colavito, M. Art Babbott with Coconino County requested information regarding ERI monitoring within the Museum Fire burn scar. He was connected with Dave Huffman who provided more information. Nov. 16, 2020. *Information request.*
31. Wasserman, T. Request from ASU *Cronkite News* for additional info on sources to examine wildfire severity data and wildfire data for AZ. Responded with data sources, websites, and the 2019 Wildfire Season in the Southwest report. Nov. 18, 2020. *Information request.*
32. Colavito, M. Scott Buffon with the *AZ Daily Sun* requested an interview on the Museum Fire survey findings. Interview provided with Cat Edgeley participating. Nov. 24, 2020. *Media request.*
33. Colavito, M. Christy Farley with NAU External Affairs requested fact sheets on ERI. The ERI DC March 2020, Chip and Ship, and Museum Fire fact sheets were provided. Nov. 25, 2020. *Information request.*
34. Waltz, A. Call and needs assessment with National Forest Foundation, Rebecca Davidson and Sasha Stortz. Follow up with Modernization 2-year update; and overview of SRP-funded LiDAR work to characterize fuel loading. Future partnerships discussed. Dec. 3, 2020.
35. Normandin, D. Equipment loan to Katie Laushman, US Geological Service (2 spherical densimeters). Sept. 15–Oct. 19, 2020. *Information request.*
36. Dubai, T., via NAU Comms Office. Received a media request from Adrian Skabelund, a reporter with the *AZ Daily Sun*, regarding 2020 being the driest year on record and what that means going into fire season. Jan. 11, 2021. *Media request.*
37. Sánchez Meador, A. Spoke with reporter Adrian Skabelund with the *AZ Daily Sun* about this year's drought impacts on area forests and upcoming wildfire season. Jan. 13, 2021. *Media interview.*
38. Dubai, T. Adrian Skabelund called to talk on background about the forest industry, 4FRI and the recent announcement of the new NewLife Forest Products sawmill in Flagstaff. Referred Adrian to ERI's Dr. Han and Coconino County's Jay Smith. Jan. 14, 2021. *Media request.*
39. Han, H-S. Spoke with Liam Combs, a reporter with the NAU school newspaper the *Lumberjack*, about the new Bellemont sawmill facility and its implications for the rural economy and restoration efforts. Jan. 19, 2021. *Media request.*
40. Dubai, T. Allie Berry, a student from the University of Washington, emailed to request that we assist on a student project that focuses on a threatened and endangered species, specifically the Columbia River Pygmy Rabbit. She was referred to several natural resource non-profits working in the PNW. Jan. 20, 2021. *Information request.*
41. Dubai, T. Charity Swanner from Don Swanner Tree Service, LLC in Nogal, New Mexico emailed to request information on operator training in their area. Dr. Han replied to their request with the appropriate info. Jan. 20, 2021. *Information request.*
42. Esch, B. Zach Wurtzebach, Program Manager at the Center for Large Landscape Conservation, requested information on 4FRI for a presentation on large landscape forest planning. Responded with 4FRI summary materials. Jan. 29, 2021. *Information request.*
43. Colavito, M. Coral Evans with Senator Kelly's office asked for information on Han's programs. Two briefing papers on the Business Cluster and Forest Operations Program, as well as the 2013 Schultz Fire Full Cost Accounting were provided. Feb. 1, 2021. *Information request.*

44. Dubay, T. Spoke with NAU environmental journalism student Ian Sloan about forest restoration for a story he's writing as a class assignment. Feb. 5, 2021. *Media interview.*
45. Sánchez Meador, A. Spoke with reporter Jim Carlton from the *Wall St. Journal* about the increase in wildfire size and severity and the influence of climate change for an article. Feb. 8, 2021. *Media interview.*
46. Dubay, T. Interpretive Specialist William Meyst with Palomar State Park in San Diego County, Calif. called to request a copy of "Ponderosa Pete" as a teaching tool for visitors to learn more about frequent-fire forests. Copies were mailed. Feb. 8, 2021. *Information request.*
47. Sanchez Meador, A. Was interviewed via Zoom by reporter Jaimie Cerreta for Channel 3 and 5 in Phoenix on the SRP remote sensing project at CC Cragin. Feb. 11, 2021. *Media interview.*
48. Springer, J. Zoom webinar on climate resilient habitats for wildlife. Arizona Field Ornithologists. 48 attendees. Feb. 17, 2021. *Information request.*
49. Waltz, A., and M. Colavito. Monthly coordination and science update with Flagstaff Fire District Calls. Ongoing. *Technical assistance.*
50. Colavito, M., A. Sánchez Meador, T. Dubay. Coral Evans with Senator Kelly's Office asked for a list of barriers to restoration. A list of barriers and solutions were compiled into a 2-page briefing document for Senator Kelly. March 5, 2021. *Information request.*
51. Dubay, T. Flagstaff citizen named Anna called about using woody biomass from area restoration projects for her personal garden. Information and recommended contacts were provided. March 9, 2021. *Information request.*
52. Colavito, M. Paul Babbitt with Congressman O'Halleran's office requested the 2013 Schultz Fire Full Cost Accounting Report. March 9, 2021. *Information request.*
53. Colavito, M., A. Sánchez Meador, H. Han. Nick Matiella with Senator Kelly's office requested information and talking points on the biomass bottleneck and the cost of restoration versus wildfire. Talking points for the Senator were compiled. March 17, 2021. *Information request.*
54. Waltz, A. Forest Health Webinar for Arizona Forward. Request by Oliver Adams. April 23, 2021. 100 attendees from the State of Arizona. *Webinar.*
55. Waltz, A. Presentation for Flagstaff City Fire Department Fire Academy. At the request of Paul Oltrogge and Neil Chapman. March 30, 2021. 25 attendees. *Presentation.*
56. Colavito, M., A. Sánchez Meador, H. Han, A. Waltz. Coconino County Supervisor Patrice Horstman requested a briefing on ERI/ forest restoration/ 4FRI. A 90-minute meeting with Supervisor Horstman, Jay Smith, and Julian Wolff from Coconino County was hosted on Zoom. April 1, 2021. *Virtual field trip.*
57. Sánchez Meador, A. Spoke with David Frey, managing editor for the Wildlife Society, on a story about the impacts of megafires on wildfire. April 9, 2021. *Media interview.*
58. Colavito, M. Lee Ann Beery with Department of Forestry and Fire Management called to ask for findings from the Community Wildfire Protection Plan Project. She was provided with the project report, white paper, and a presentation PDF. April 7, 2021. *Information request.*
59. Dubay, T. Anton Delgado, a reporter for the *Arizona Republic*, emailed to request an interview with an ERI ecologist about post-fire rehab, the ecological response to fire, and BAER efforts. Interviews with staff were coordinated. April 12, 2021. *Media request.*

60. Springer, J. Presentation for volunteers at Museum of Northern Arizona on ecology and conservation of native medicinal plants. Delivered at NAU Greenhouse. April 20, 2021. 13 in attendance. *Presentation.*
61. Dubai, T., via ERI Twitter ([@ERI_NAU](#)). Received a tweet from Jesse Duhnack (@jduhnack), FBAN/SOPL with Northern Rockies IMT1 and former wildland fire policy lead for DOI, FMO with NPS, and IHC firefighter, asking for information on the latest “standard” for a user-friendly climate change projection tool that federal land management agencies could/should/would be using in developing Land and Resource Management Plans. Information was provided. April 15, 2021. *Information request.*
62. Dubai, T. Jerolyn Byrne with the Flagstaff Fire Department requested and received ~65 copies of the *Restoration for Homeowners* guide for Wildfire Community Preparedness Day in May. April 23, 2021. *Information request.*
63. Colavito, M. Presentation/webinar to the Arizona Geographic Information Council (AGIC) – Title: Lessons Learned and Recommendations for Using Decision Support Tools in Forest and Fire Management. April 28, 2021. 57 participants. *Presentation.*
64. Colavito, M., A. Sánchez Meador, and H. Han. ERI response to the Request for Public Comment on the Executive Order on Tackling the Climate Crisis at Home and Abroad, Docket Number: USDA-2021-0003. ERI was asked by Coconino County to provide input. *Information request.*
65. Dubai, T. John Vankat, Professor Emeritus, Department of Botany at Miami University, emailed to request the files for the decade layers used to build our Flagstaff-area fire history map. May 4, 2021. *Information request.*
66. Dubai, T. Mark Christiano, GIS Coordinator, Kaibab National Forest, emailed to request the data used to develop ERI’s greater Flagstaff area fire history map. He was connected to Joe Crouse, who developed the map. May 5, 2021. *Information request.*
67. Colavito, M., A. Sánchez Meador, and H. Han. ERI hosted Senator Kelly for a portion of a field trip to Chimney Springs to discuss forest restoration. ERI materials were provided. May 5, 2021. *Field trip.*
68. Colavito, M., and A. Sánchez Meador. Provided input on a draft bill being proposed by Senator Bennett (CO) and co-signed by Senator Kelly on a forest restoration fund. May 5, 2021. *Information request.*
69. Colavito, M., A. Sánchez Meador, and H. Han. Provided input on two draft bills being proposed by Senator Kelly on accelerating forest restoration and biomass energy. May 10, 2021. *Information request.*
70. Colavito, M., and A. Sánchez Meador. Joint interview with Rod Griffin who is a freelance author writing articles on fire, forest restoration, and 4FRI. May 11, 2021. *Media interview.*
71. Dubai, T. TV news editor Christine Goodfriend with Fox 10 news out of Phoenix emailed to request a zoom interview with Dr. Waltz and reporter John Hook on fire suppression, restoration, and forest management. An interview was arranged. May 13, 2021. *Media request.*
72. Dubai, T. Melissa Sevigny, science reporter for KNAU requested a zoom interview with M. Stoddard to discuss his recent paper on climate change and the efficacy of restoration treatments. May 17, 2021. *Media request.*

73. Stoddard, M. Interview with Adrian Skabelud (*Arizona Daily Sun*) on recent paper, *Ecological restoration guided by historical reference conditions can increase resilience to climate change of southwestern US Ponderosa pine forests*. News article appeared May 11, 2021. *Media interview*.
74. Stoddard, M. Interview with Melissa Sevigny (KNAU) on recent paper, *Ecological restoration guided by historical reference conditions can increase resilience to climate change of southwestern US Ponderosa pine forests*. May 20, 2021. *Media interview*.
75. Colavito, M. Nick Matiella with Senator Kelly asked for information about juniper die-off. He was provided with a press release from the Kaibab National Forest on the matter, as well as contacts for more information. May 21, 2021. *Information request*.
76. Dubay, T. Fox 10 producer Christine Goodfriend called to request an interview with an ERI ecologists about a recent drought report for the SW and its implications for wildfire season. Christine was referred to Forest Service PAOs who could connect her with fuels specialists. May 24, 2021. *Media request*.
77. Springer, J., and M. Stoddard. Field trip pertaining to Mt. Trumbull PJ work and information about juniper die-off for Greta Hyland (BLM) Natural resource specialist. May 10, 2021. *Field trip*.
78. Dubay, T., via M. Stoddard. Ron Dungan from KJZZ public radio in Phoenix emailed to request an interview with ecologist Mike Stoddard on his recent study on long-term efficacy and resilience of forest restoration treatments. June 2, 2021. *Media request*.
79. Colavito, M., A. Sanchez Meador, H. Han. Nick Matiella with Senator Kelly's office requested feedback on a Community Wood Facilities Bill and a bill on Forest Service modernization. June 17, 2021. *Information request*.
80. Dubay, T. Joe Dana, a reporter with Channel 12 News in Phoenix, emailed to request an interview with Andrew Sánchez Meador to discuss the drought and its effects on the current wildfires burning in Arizona. An interview was conducted via Zoom. June 21, 2021. *Media request and interview*.
81. Waltz, A. Becca Shively with Wallow Resources information request on use of Prescribed Fire Councils or lack thereof, in Arizona. April 19, 2021. *Information request*.
82. Waltz, A. A. Barton, NMWFRI Interview request for data project on CFRP. May 20, 2021. *Information request*.
83. Waltz, A. Deschutes Forest Collaborative Steering Committee. Information request on 4FRI. May 11, 2021. *Presentation*.
84. Waltz, A. Paige Fischer, University of Michigan professor request for interview for Southwestern status of collaborative knowledge, and collaborative contacts (WFFI). May 12, 2021. *Information request*.
85. Colavito, M. Invited to write guest opinion piece on Wood for Life with Sasha Storz from NFF in the *AZ Capitol Times*. Piece published June 26, 2021. *Media request*.
86. Stoddard, M. Interview with Rob Dungan (KJZZ) on recent paper, *Ecological restoration guided by historical reference conditions can increase resilience to climate*. June 11, 2021. *Media interview*.
87. Martin, J. Interview with Anton Delgado, *Arizona Republic*. Interview to discuss the benefits of old fire scars in suppression efforts and traditional ecological knowledge about the use of fire. June 21, 2021. *Media interview*.

6.6 Educate the general public.

6.6a: Deliverable: Two (2) newspaper articles to educate the general public about forest restoration.

Buffon, S. 2020. [New survey suggests some Flagstaff residents are confused about evacuation systems, based on Museum Fire](#). *Arizona Daily Sun*. Dec. 2, 2020.

Skabelund, A. 2021. [Thinning and fire make ponderosa forests healthier amid climate change, new Northern Arizona University study shows](#). *Arizona Daily Sun*. May 11, 2021.

Project 7. Improving Forest Operations and Biomass Utilization

Complete annual progress report by October 29, 2021.

This report serves as the final deliverable for Project 7, FY20 Work Plan.