A Social and Economic Monitoring Plan and Baseline Assessment of the USDA Forest Service's Stewardship Program

2014-2023

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About the Ecosystem Workforce Program:

The Ecosystem Workforce Program is a program of University of Oregon's Institute for Resilient Organizations, Communities, and Environments. We conduct applied social science research and extension services at the interface of people and natural resources. Our publications aim to inform policy makers and practitioners and contribute to scholarly and practical discourse.

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Glossary

FACTS database: The Forest Service Activity Tracking System (FACTS), links accomplishment data and spatial identifiers to display where activities take place across forests. Data are available across all units of the National Forest System and provide a standardized format for reporting a diversity of resource activities. FACTS data are organized by activity, administrative unit, date, stage (planned, accomplished or completed) and major program.

IMPLAN: Software used to analyze and estimate direct, indirect and induced economic impacts for a sector of interest.

PALS database: The Forest Service's Planning, Appeals, and Litigation System (PALS) tracks NEPA analyses by decision type, date of initiation and decisions, administrative unit, and the status of any appeals or litigation.

Stewardship contracts: A category of contract authorized for use by the USDA Forest Service and USDI Bureau of Land Management that allows for the exchange of goods for services. Stewardship contracts can be awarded to federal, state, local, Tribal, community, and nongovernmental agencies and groups. The authorities encourage community involvement in identifying local/community goals and "best value" selection criteria. Integrated Resource Timber Contracts, Integrated Resource Service Contracts, stewardship agreements and Stewardship Service Contracts, are included under stewardship contracts:

- ***Integrated Resource Timber Contracts (IRTC):*** used when the value of timber removed is greater than the value of the identified services required under the contract. Stewardship authorities allow the National Forest unit in which the work took place to retain the revenue (called "retained receipts") for additional service work on the Forest, rather than return them to the Treasury.
- ***Integrated Resource Service Contracts (IRSC):*** used when the value of service activities exceeds the value of timber removed. In these types of contracts, the value of timber removed is supplemented by federal appropriations or retained receipts.
- ***Stewardship agreements:*** a tool the Forest Service can use to engage non-federal partners in a proposed project to be implemented on National Forest System lands where there is mutual interest and mutual benefit. The project(s) must meet one of the seven specified land management goals under the stewardship authorities.
- ***Stewardship Service Contract (SC):*** used for non-timber, small scale projects. Funded by retained receipts generated from other stewardship contracts.

TIM database: The Forest Service's Timber Information Manager (TIM) supports Forest Service employees in the creation of forest product removal permits, conventional forest product sale documents, and stewardship sale contract documents. TIM also provides automated reporting mechanisms and tools for the sales of forest products, including stewardship and other authorities. TIM and TIM data are used to collect, analyze, maintain, track and report data about forest product permits and sales, including the volume and value of forest products sold from the national forests, grasslands and prairies.

Executive Summary

Stewardship contracts and agreements (stewardship contracting) represent a set of flexible tools that the USDA Forest Service can use to accomplish management goals while also responding to local social and economics contexts. Stewardship contracting is specifically designed to allow the Forest Service to develop long-term, sustainable working relationships with non-federal partners in order to more efficiently and effectively implement forest restoration and related management.

Monitoring social and economic dimensions of land management can help managers and decision makers better understand how tools like stewardship authorities meet their intended goals. The USDA Forest Service Washington Office entered into an agreement with the Ecosystem Workforce Program (EWP) at the University of Oregon to create a new, national, program-level social and economic monitoring plan for analyzing the following:

1. Social and economic outcomes of national forest management.

2. Specific challenges, successes, and future opportunities associated with working with local communities, focusing on, but not limited to, the stewardship contracting authorities and how partners, stakeholders, and communities collaborate and participate in national forest system management processes.

3. Strengths and weaknesses of programs that involve local communities and how they may be improved.

This working paper identifies 10 social and economic monitoring questions to employ for future monitoring of stewardship contracting, including a synthesis of past research and reports on these topics to date. A full list of monitoring questions can be found in Table

2 (page 12). We conduct a baseline assessment of stewardship contracting for six of the monitoring questions through an analysis of secondary data for the years 2014-2023. The remaining four monitoring questions did not have relevant secondary data available. Those questions will be the focus of primary data collection and analysis in future monitoring. Overall, the literature review and secondary data analyses found that stewardship contracts and agreements are effectively meeting the specified goal of "perform[ing] services to achieve land management goals for the national forests and the public lands that meet local and rural community needs" (P.L. 108-148, section 604).

This social and economic monitoring baseline assessment found that in the ten years of stewardship contracting on national forest lands, a range of activities were conducted, mainly fire- and timber-related activities, through contracts that generated over $560 million in timber sales and supported the creation of more than 43,000 jobs. Most contracts were awarded to local or somewhat local businesses, and only a small fraction of related NEPA decisions faced litigation. The program engaged over 400 unique entities and leveraged federal funds with partner contributions, especially from nonprofits and local governments. Our synthesis of past research and reports on these topics to date found that studies highlight benefits such as timber supply stability, innovation, and enhanced collaboration, including Tribal involvement, however more data is needed to confirm these impacts nationally.

Key baseline findings by monitoring question were:

Monitoring Question 1: ***What management activities were accomplished under the stewardship authority, where were those activities located, and what number of acres were accomplished?***

- FACTS data from 2014 to 2023 identified approximately 31,000 stewardship activities on national forest lands involving 171 unique activity codes. Eleven million acres were treated under the activity "fire"; other activities included "timber and silviculture", "wildlife", and "range".

Monitoring Question 2: ***What was the volume and value of timber sold as a result of stewardship contracting? Where did stewardship timber contracts take place?***

- Stewardship contract sale volume from 2014-2023 totaled 7,392 MMBF worth nearly $560 million (total bid value) and $634 million (total bid for services value). In 2023, there were 195 sales with a total contract sale volume of 928 MMBF and total timber bid value worth $52 million. Across all 293 ranger districts utilizing stewardship contracting, an average of 40% of timber sale bids went to a local purchaser, 33% to a somewhat local purchaser, and 27% to a non-local purchaser.

Monitoring Question 3: ***Did stewardship contracts generate jobs in the local community?***

- Stewardship contract timber sales supported an average of 1,863 local jobs each year across all Forest Service regions (2014-2023). An additional 1,440 and 1,038 jobs were supported, on average, each year in areas that were somewhat local and non-local, respectively. The average estimated income (wage) per job varied between regions and ranged from $35,174 (R3: Southwest) to $65,899 (R6: Pacific Northwest).

Monitoring Question 4: ***What businesses and organizations are engaging in stewardship contracting?***

- TIM data show that stewardship contracts went to 410 unique businesses and organizations between 2014 and 2023. Eleven cooperator types were identified in stewardship agreements signed between 2008 and 2023. Nonprofit organizations were the most common cooperator type among all Forest Service regions nationwide. Other cooperators included county governments, for-profit organizations, Tribal governments, city or township governments, and special district governments.

Monitoring Question 5: ***Are stewardship contracts more efficient for the Forest Service than conventional timber sales or service contracts?***

- Previous survey and interview-based studies found that stewardship contracting enabled management efficiencies and cost efficiencies. Forty-four percent of respondents from a nationwide survey of forest service personnel viewed stewardship contracting as a tool to accomplish more work on the ground. More primary data collection is needed to effectively assess this question.

Monitoring Question 6: ***How does litigation and public concern of stewardship projects compare to similar timber sales and service contracts?***

- For timber sales awarded in fiscal years 2014-2023, four percent of NEPA decisions (n=110 out of 2,799) were litigated regardless of whether they involved stewardship contracts or agreements.

Monitoring Question 7: ***Did outside investment in the processing or utilization of woody biomass occur during the lifetime of the stewardship contract?***

- Previous literature noted that stewardship contracting is able to stabilize forest product supply due to longer duration of contracts, investment, and utilization of small-diameter materials. Additional data collection is needed to verify if this is happening in practice.

Monitoring Question 8: ***Did the stewardship contract attract additional funds or in-kind contributions from related partners?***

- Stewardship contracting federal funds were often leveraged by matching funds from partner organizations, as noted in past literature. Partner donations may come from groups with interests in forest health for recreation or habitat.

Monitoring Question 9: ***How do stewardship projects offer opportunities for local community participation?***

- Existing literature suggests that involving community members in decision-making processes can improve management outcomes and strengthen commitment to achieving stewardship goals. Collaborative approaches enabled local communities to build relationships, experiment with land management approaches, and create more strategic localized planning and implementation of treatments. More primary data collection is needed to effectively assess this question.

Monitoring Question 10: ***How did engagement with non-agency partners through stewardship contracting affect the agency and its management processes?***

- Previous surveys and case studies have found that stewardship contracting incorporates diverse interests, broadens project scope, fosters innovative approaches, and enhances project ownership and commitment through non-agency collaboration, including facilitating collaborative partnerships. Case studies also noted that monitoring requirements built into the stewardship contracting authorities improved monitoring through secure funding. More primary data collection is needed to confirm these findings on a national scale.

Future monitoring work (Phase 2), combining primary data with secondary data, will allow for broader understanding of how effectively the stewardship authorities are both managing federal landscapes for desired future conditions and contributing to the development of sustainable local and rural communities. We suggest that a fruitful approach could involve the use of mix-methods data collection applied to a geographically representative, systematic sample of stewardship projects. Data collection methods could involve systematic review of stewardship project documents, surveys, and semi-structured interviews or focus groups.

Introduction

In 2014, permanent "stewardship authorities" were granted to the USDA Forest Service (hereafter Forest Service) and the USDOI Bureau of Land Management (BLM) by Congress as part of the Farm Bill, extending the temporary authority that had been in place since 1999 (P.L. 105-277, section 347; P.L. 113-79, Section 8205). The purpose of the stewardship contracting authorities is to allow the agencies to "perform services to achieve land management goals for the national forests and the public lands that meet local and rural community needs" (P.L. 113-79, Section 8205). Land management goals of stewardship projects include water quality restoration and maintenance, soil productivity, promotion of wildlife and fisheries habitat, promotion of healthy forest stands, fire hazard reduction, and noxious and exotic weed control. Stewardship contracting activities used to meet these goals include road and trail maintenance, prescribed fire, timber removal, watershed and habitat restoration, and native plant re-establishment.

The stewardship contracting authorities also allow federal agencies to achieve land management goals through the exchange of goods (forest products) for services (restoration activities). Unlike traditional timber sale contracts, the agency can retain proceeds from timber sales (i.e. retained receipts) and apply those to other forest stewardship activities on the same National Forest unit. Contracts are additionally allowed to be selected by the Forest Service based upon the best overall value rather than the lowest overall cost.

Another key objective of the authorities is to contribute to the development of sustainable local and rural communities and meet local and rural community needs (USDA Forest Service n.d.). This objective was interpreted by the Forest Service as the provision of local economic outcomes such as stable sources of community income and employment (USDA Forest Service 2009). This objective is built on long-term rural development policy which was designed to promote rural community stability through ensuring sustained yield of timber supply and support for local wood products industries (Schallau and Alston, 1986; Roth, 1991). It also is aligned with Collaborative Forest Landscape Restoration Program (CFLRP) goals that seek to support local economies while reducing risks of severe wildfires and their management costs (Schultz, 2012). In service of these rural development objectives, contracts and agreements are allowed to be entered into by the Forest Service for up to 20 years, thus enabling long-term, stable relationships with local economies and defining new roles for community participation.

The stewardship contracting authorities (P.L. 113-79, Section 8205) stipulate that multiparty monitoring and evaluation processes be engaged in by agencies and community stakeholders to specifically report on (1) "the status of development, execution, and administration of agreements or contracts," (2) "the specific accomplishments that have resulted" from stewardship contracting, and (3) "the role of local communities in the development of agreements or contract plans."

As part of that effort, the USDA Forest Service Washington Office engaged the Ecosystem Workforce Program (EWP) at the University of Oregon to create a monitoring plan for analysis of:

1. Social and economic outcomes of national forest management.

2. Specific challenges, successes, and future opportunities associated with working with local communities, focusing on the stewardship contracting authority.

3. How partners, stakeholders, and communities collaborate and participate in national forest system management processes.

4. Strengths and weaknesses of programs that involve local communities and how they may be improved.

The purpose of this report is to provide a monitoring plan to address component #1— the social and economic outcomes of national forest management. We additionally used available secondary data about Forest Service use of the stewardship authorities to develop a baseline assessment of stewardship service contracts, timber sale contracts, and agreements for fiscal years 2014-2023 (referred to collectively as stewardship contracts). Monitoring social and economic dimensions of land management is expected to help managers and decision makers better understand how tools like stewardship authorities meet their intended goals.

Background

The Forest Service implements the stewardship authorities by awarding stewardship agreements and stewardship contracts, which include forest product removal and service work components. The stewardship authorities allow the Forest Service to apply the value of the timber removed to offset the cost of services received in a "goods for services" exchange. It additionally gives the Forest Service the flexibility to apply excess receipts from one stewardship project to another, and to award contracts and agreements

on a "best value" basis, which can include price, past performance, work quality, and outcomes to the local community (USDA Forest Service 2022).

The Forest Service enters into stewardship agreements with entities such as state or local governments, Tribes, or non-profit organizations when there is mutual interest and benefit in the objectives of the agreement. Stewardship agreements can last up to ten years and require a 20% match from the partner. Stewardship agreements can be stand-alone, or they can be a part of a Master stewardship Agreement or Supplemental Project Agreement.

The Forest Service awards stewardship contracts to businesses for services such as pre-commercial thinning, trail maintenance, and riparian restoration, in which some of the service costs may be offset by the value of the forest products removed. Stewardship Service Contracts (SC), Integrated Resource Service Contracts (IRSC), and Integrated Resource Timber Contracts (IRTC) are the three types of stewardship contracts. SCs involve services with no timber removal and are used to spend retained receipts, i.e. funds generated from the sale of timber. Both IRTC and IRSC contract types involve the sale of timber and service work. IRTCs are used when the value of the timber removed in a timber sale is greater than the value of the contracted services. In this type of contract, purchaser payments for timber are retained by the Forest as retained receipts or they are traded for service work performed by the timber purchaser or a subcontractor. IRSCs are mechanisms in which the value of the timber removed is less than the value of the services performed. In these types of contracts, retained receipts (from timber sales) traded for service work are supplemented by federal appropriations for service work.

As part of granting stewardship contracting authorities, Congress required the Forest Service and BLM to report annually on the involvement of local communities; cooperating local, state, and Tribal governments; and other interested parties in the development of stewardship contracts.

Report Purpose

This report expands upon previous case study approaches by the Pinchot Institute for Conservation (see https://pinchot.org/stewardship-contracting) and serves as a baseline for future nationwide monitoring. We developed a set of monitoring questions based on our (EWP) previous experience in social and economic monitoring (https://resilient.uoregon.edu/ewp/currentprojects) and in consultation with partners at Oregon State University and the Washington Office of the Forest Service. We drafted protocols for answering those questions based on a comprehensive review of literature and available secondary data. We additionally developed novel empirical methods for assessing "local" outcomes across national forest lands and adjacent communities using existing Forest Service datasets and additional secondary data. Specifically, we:

(1) developed monitoring questions through a review of previous scholarship on the outcomes of stewardship contracting and agreements,

(2) analyzed Forest Service forestry-related service contracts, timber sale contracts, and stewardship agreements, from 2014 to 2023, as a secondary data baseline, and

(3) explored the implications of our findings for informing future social and economic monitoring of activities related to the Forest Service use of the stewardship authorities, such as CFLRP related community outcomes.

Approach

Although the Forest Service has used stewardship contracting mechanisms for over 25 years, the agency's administrative datasets do not systematically track activities associated with stewardship contracts at the project level. Available data detail stewardship contracts and accomplishments, but they do not directly link those data to articulate their relationship (Figure 1). To address this challenge, we divided our monitoring plan into two phases:

Phase 1, ***which we present in this report,*** summarizes baseline data on the Forest Service stewardship program that we aggregated from contract-level and activity-level data.

Phase 2, ***which we propose as future monitoring,*** would repeat national-level secondary data analyses we used in Phase 1 and compare them with the baseline data we present in this report. We also propose primary and additional (local) secondary data collection to improve the secondary data analyses we conducted in Phase 1 and to help understand what project-level processes and outcomes reveal about the stewardship program.

To improve secondary data analyses, we recommend that Phase 2 monitoring include a national-level survey of stewardship contractors (see monitoring questions 2, 3, and 4).

To better understand processes and outcomes of stewardship projects nationally, we could also include mixed-method, qualitative-quantitative data collection and analysis in the Phase 2 research design, with specific methods tailored to individual monitoring questions. This component of Phase 2 monitoring would collect data from a geographically representative, systematic sample of recently completed (within the last five years) stewardship projects from across the National Forest System.

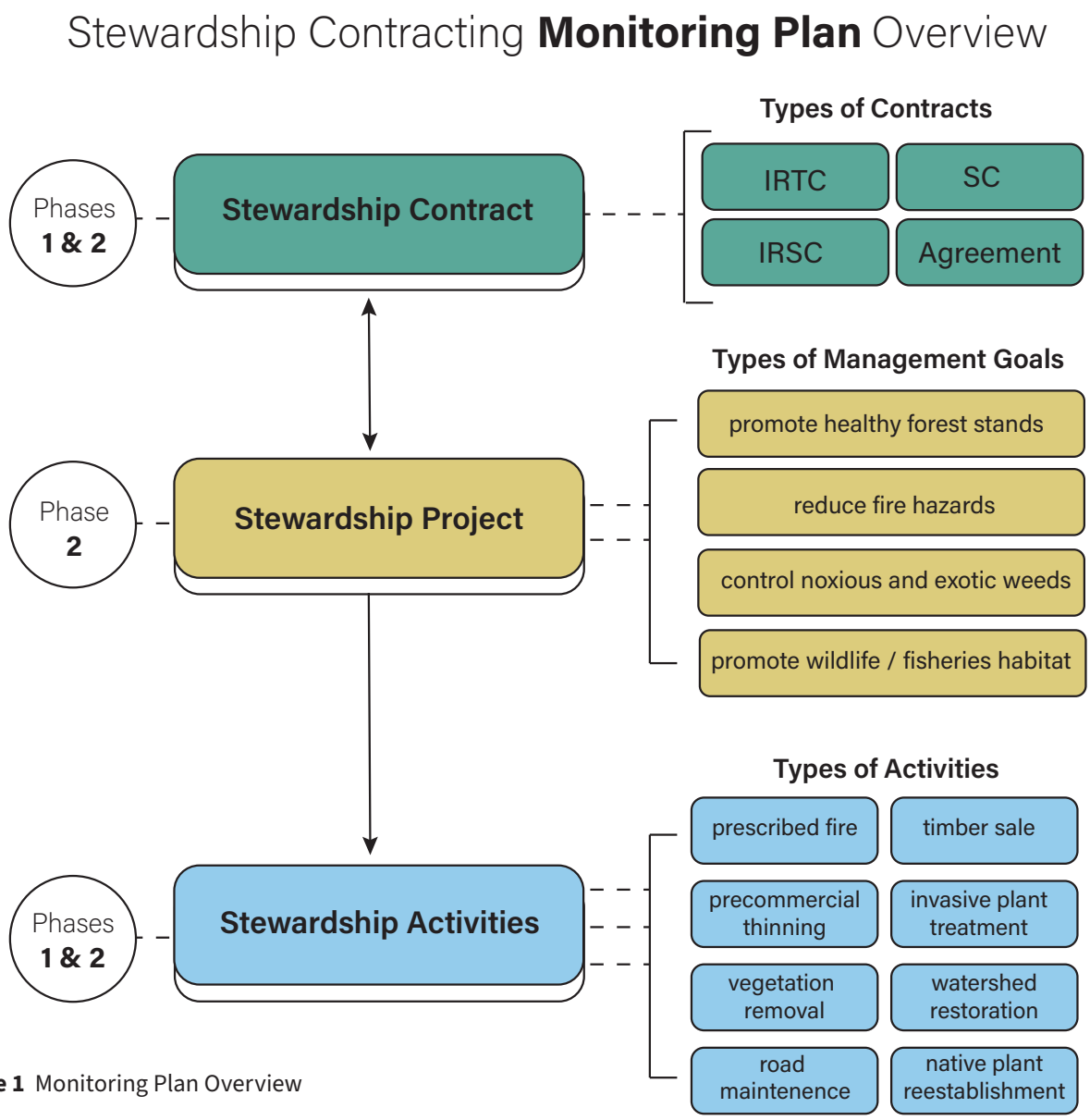


Figure 1 Monitoring Plan Overview

Development of Monitoring Questions

We developed monitoring questions through review of peer reviewed journal articles and past monitoring reports on stewardship contracting. We aimed to identify the research and monitoring questions that scholars have previously addressed about stewardship contracting. We used six different Boolean statements applied to common scholarly databases (Web of Science, JSTOR, BioOne, and PAIS Index). We limited search results to publications dated after 1998, as that year marks the first official use of stewardship contracting authorities by the Forest Service. The Boolean search terms "("stewardship contract*" OR "stewardship agreement" OR "stewardship authorities")" yielded the largest number of papers (31), with 13 results remaining after filtering by country and date of publication. We identified 10 additional sources by consulting with experts with previous experience monitoring stewardship contracting. Source types included congressional testimonies, annual reports from private and federal entities, briefing papers, news articles, and peer-reviewed articles.

Analysis of secondary data and creating a baseline (Phase 1)

In this monitoring plan, we present baseline information from secondary data sources (Table 1) collected by the Forest Service. For analysis, we used R Studio v2024.09.1.394 and ESRI ArcGIS Pro 3.3.2. Below, and in Appendix A, we provide additional details on methods and data limitations for each monitoring question.

Table 1 Secondary data used in this analysis

Data Source	Dates	Description and purpose
Federal Procurement Data System (FPDS): Forestry-related contracts	2014-2021	Filtered Forest Service contracts for data on labor-intensive forestry contracting. Extrapolated median distance between contractor place of business and Forest Service Ranger District where the work took place.
Forest Service Timber Information Management System (TIM): Timber sales	2014-2023	Timber sale contract data. Tabulated sales, extracted sale volume and bid amounts, and calculated distances traveled between purchaser place of business and Forest Service Ranger District where the work took place.
Forest Service Forest Activity Tracking System (FACTS): Timber harvests	2014-2023	National Environmental Policy Act (NEPA) project names
Forest Service Forest Activity Tracking System (FACTS): Stewardship activities	2014-2023	Activity type, location
Forest Service Planning, Appeals, and Litigation System (PALS): litigated projects	2005-2021	Litigation indicators for projects planned within the context of the NEPA

Monitoring Baseline and Plan Organization

This section is organized by each numbered monitoring question. Table 2 includes a list of monitoring questions, indicators, data sources, and recommended future data collection methods. For each monitoring question, we list:

1. **Approach:** methods used for analyzing secondary data available to answer the question
2. **Monitoring baseline** ***(Phase 1)***
   a. Previous research and monitoring
   b. Secondary data analysis
3. **Considerations for Phase 2 monitoring**

Table 2 Monitoring Questions, Indicators, and Data Sources

1	**Monitoring Question:** What management activities were accomplished under the stewardship authorities, where were those activities located, and what number of acres were accomplished?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Number of acres • Years completed • Type of work	• Forest Service Forest Activity Tracking System (FACTS) database	• Conduct a systematic sample of stewardship projects • Collect data from Forest Service personnel and stewardship partners
2	**Monitoring Question:** What was the volume and value of timber sold as a result of stewardship contracting? Where did stewardship timber contracts take place?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Sale volume & bid amount • Distances traveled by purchaser	• Forest Service Timber Information Management System (TIM) database	• Administer a national-level contractor survey
3	**Monitoring Question:** Did stewardship contracts generate jobs in the local community?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Jobs supported	• Forest Service Timber Information Management System (TIM) database	• Administer a national-level contractor survey • Coordinate with Forest Service Policy Office economists
4	**Monitoring Question:** What businesses and organizations are engaging in stewardship contracting?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Business or organization name • Type of business (contractor, non-profit, etc.)	• Forest Service Timber Information Management System (TIM) database	• Administer a national-level contractor survey • Identify additional sources to verify businesses and organization types

5	**Monitoring Question:** Are stewardship contracts more efficient for the Forest Service than conventional timber sales or service contracts?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Reduced costs • Achieving specific project outcomes*	• No secondary data available, *indicated from past literature	• Conduct a systematic sample of stewardship projects

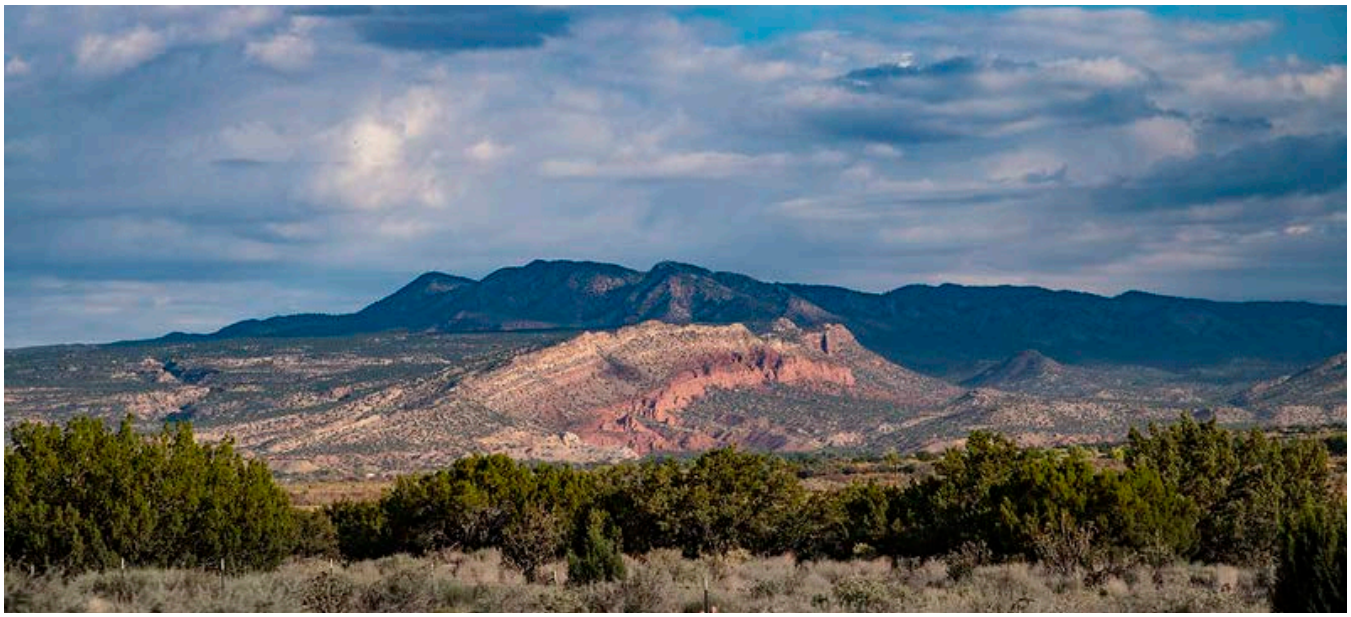
6	**Monitoring Question:** How does litigation and public concern of stewardship projects compare to similar timber sales and service contracts?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• NEPA decision	• Forest Service Timber Information Management System (TIM) database • Planning, Appeals, and Litigation System (PALS)	• Conduct a systematic sample of stewardship projects

7	**Monitoring Question:** Did outside investment in the processing or utilization of woody biomass occur during the lifetime of the stewardship contract?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Forest product supply stability*	• No secondary data available, *indicated from past literature	• Administer a national-level contractor survey

8	**Monitoring Question:** Did the stewardship contract attract additional funds or in-kind contributions from related partners?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Contribution amount(s)*	• No secondary data available, *indicated from past literature	• Collect data from forest service and non-agency partners in conjunction with the proposed systematic sample of stewardship projects

9	**Monitoring Question:** How do stewardship projects offer opportunities for local community participation?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Community participation opportunity	• No secondary data available, *indicated from past literature	• Collect data on community engagement in conjunction with proposed systematic sample of stewardship project

10	**Monitoring Question:** How did engagement with non-agency partners through stewardship contracting affect the agency and its management processes?		
	Indicators	**Phase 1 data source**	**Recommended Phase 2 monitoring**
	• Level of perceived trust* • Type of perceived trust* • Project scope and outcomes* • Funding security* • Knowledge transfer*	• No secondary data available, *indicated from past literature	• Conduct a systematic review of project-level monitoring efforts implemented in conjunction with the proposed systematic sample of stewardship projects



Monitoring Question 1:

Management Outcomes

What management activities were accomplished under the stewardship authorities (e.g. habitat improvement, fuel reduction, restoration, etc.), where were those activities located, and what number of acres were accomplished? How did management activities contribute to stewardship management goals?

Approach

Database used: Forest Service Forest Activity Tracking System (FACTS) database[1]

To assess the type and location of Forest Service stewardship accomplishments, we used publicly available, spatially explicit data from the Forest Service Forest Activity Tracking System (FACTS) database (USDA Forest Service 2024). See Appendix A: Stewardship Activities for additional methods.

We also used stewardship agreement data to study what land management activities were carried out under these agreements. Agreements were categorized by project type, such as ecosystem management, fire management, forest health, or timber management.

Monitoring baseline

Previous research and monitoring

From 1999 to 2013 the Forest Service awarded 1,511 stewardship contracts (including agreements) (Pinchot Institute for Conservation 2012b, 2013, 2014). The primary on-the-ground outcomes of stewardship contracts awarded during 1999-2013 included habitat improvement, fuel reduction, and restoration. Individual project size and scope were rarely reported in the existing literature, so we could not summarize project size ranges or the prevalence of particular types of outcomes for years prior to the reach of the FACTS dataset (see below). According to a report to the Appropriations Committees of the U.S. House and Senate, in federal fiscal year 2005 there were 86 ap-

[1] https://data.fs.usda.gov/geodata/edw/datasets.php

proved stewardship projects with example projects presented ranging in size from 22 to 18,249 acres (USDA Forest Service, 2006). However, this report does not indicate whether any of the example approved projects were awarded during that fiscal year.

Secondary data analysis (2014-2023)

Between 2014 and 2023, there were approximately 31,000 stewardship activity areas on National Forest lands involving 171 different activity codes that are generally classified into five different management categories including fire, timber and silviculture, wildlife, range, and miscellaneous (Figure 2).

Figure 2 Locations of stewardship activities, federal fiscal years 2014 -2023; *Source: FACTS (USDA Forest Service 2024)*

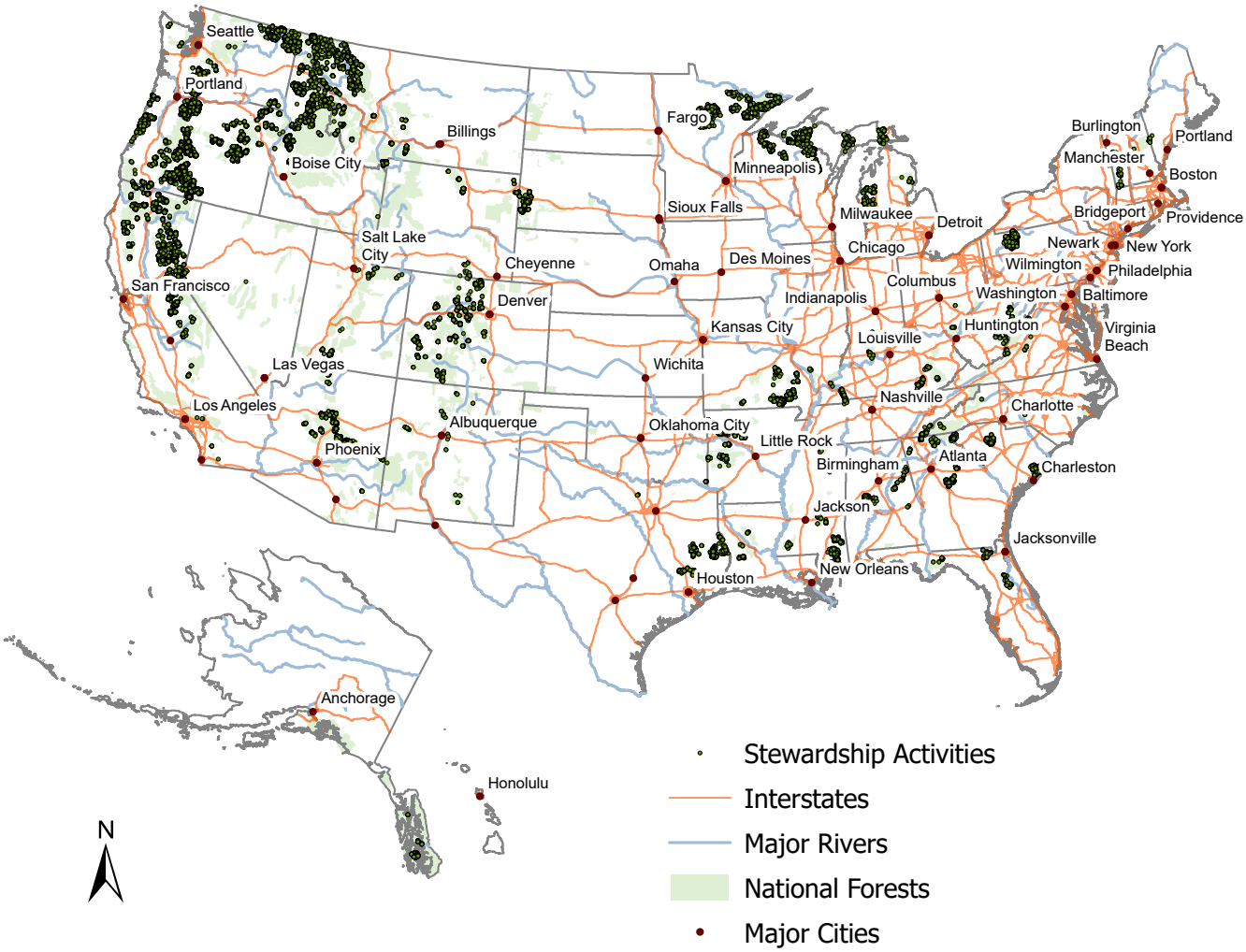


Figure 3 Stewardship activity categories by number of acres treated for federal fiscal years 2014 -2023, *Source: FACTS (USDA Forest Service 2024).*

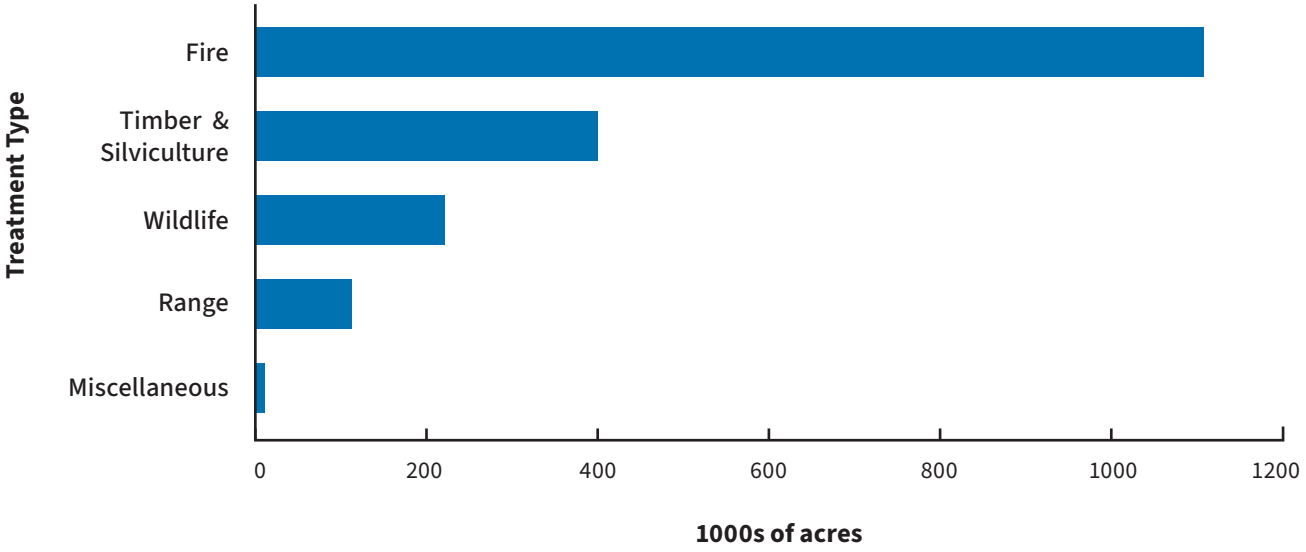


Table 3 Stewardship activity categories by number of acres treated for federal fiscal years 2014 -2023, *Source: FACTS (USDA Forest Service 2024).*

Activity Category	1000s of acres
Fire	112.6
Timber & Silviculture	422.9
Wildlife	225.7
Range	115.3
Miscellaneous	9.5
Soil, Air, and Watershed	2.6
Cultural Resources & Recreation	2.1
Vegetation/Restoration	1.3
Engineering	0.6

By far, the largest number of acres treated were within the fire category which includes fire suppression, prevention, and fuels management. Timber and silviculture activities encompassed the next largest number of acres (Figure 3, Table 3). A full list of activities using a more detailed categorical schema can be found in Table A2 in Appendix A.

Agreement project categories are summarized in Figure 4 and Table 4. Forest health comprised the most numerous project category for agreements (n = 176), followed by watershed management (n= 125) and ecosystem management (n=92). There were significantly fewer agreements for fire management and fire mitigation related to the National Priority Landscapes (n =39 and n= 25 respectively).

Figure 4 Number of stewardship agreements by project category, for federal fiscal years 2014 -2023

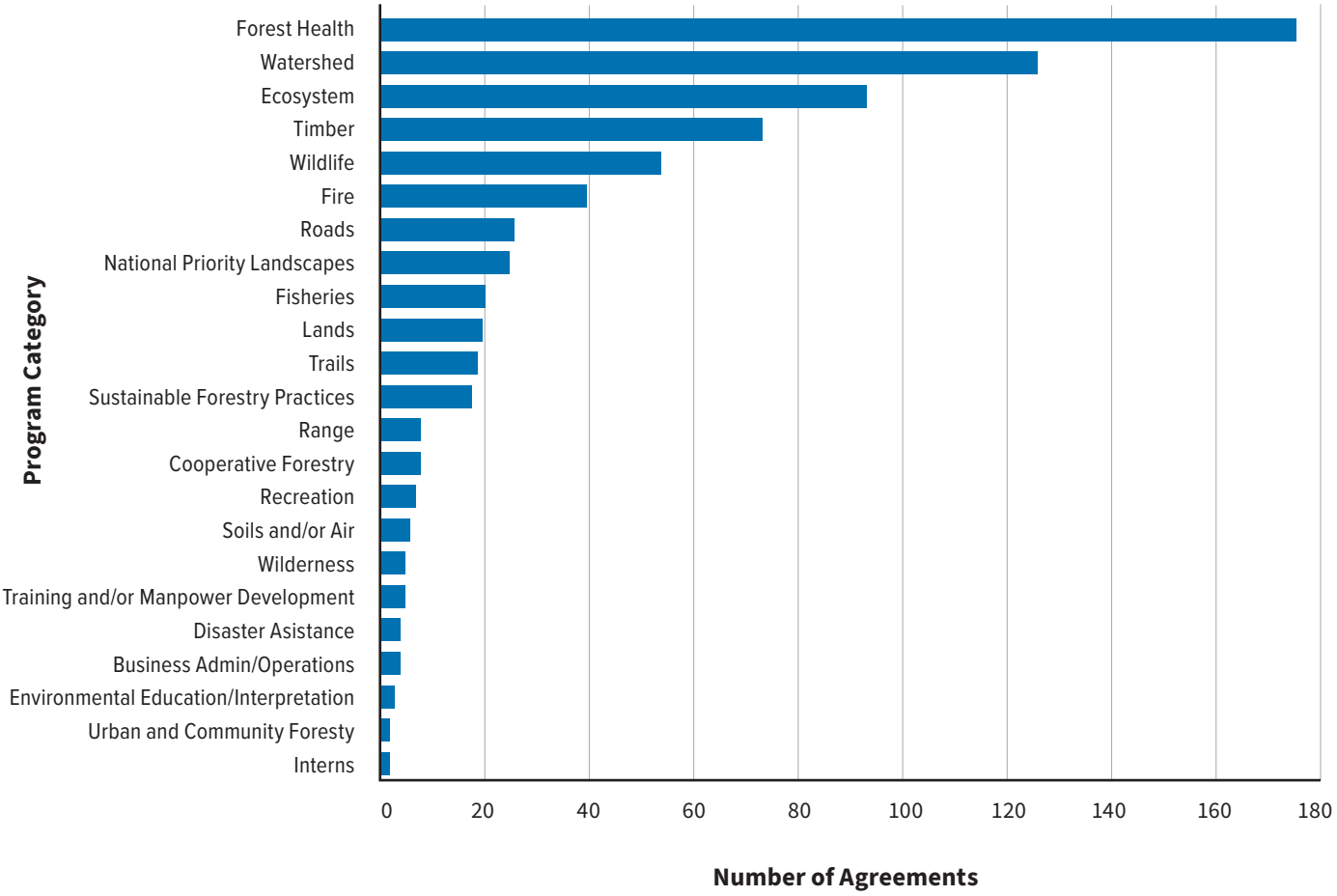


Table 4
Number of stewardship agreements by project category for projects funded by the Infrastructure Investment and Jobs Act, H.R. 3684 (Public Law 117-58), for federal fiscal years 2014 -2023.

Program Category	Agreements
Collaborative Forest Landscape Restoration Program	4
Forest Health	1
GNA and TFPA Restoration Projects	2
National Revegetation Effort	1
Prescribed Fire and Related Activities	1
Removal of Flammable Vegetation	2
Stewardship Agreements to Restore Ecological Health	11
Timber Thinning and Harvesting	1

Considerations for Phase 2 monitoring

- **Repeat national level tracking of activities with FACTS data and compare to baseline results.**

- **Conduct primary data collection and additional project-level secondary data from Forest Service personnel and stewardship partners to link activities to projects and gather information about local impacts.**

We found that the spatial location information, activity classification, and spatial footprint of activities in the FACTS dataset were sufficient for summarizing stewardship activities at the national level. However, the FACTS dataset does not show how many types of activities or acres are involved in a given stewardship project, nor does it clarify how those activities relate to stewardship management goals. We also recognized that the FACTS classification schema may obscure important variability in management practices or approaches within specific activity categories—variability that may be critical for understanding specific local contexts.

To address these limitations, we propose a monitoring approach that uses a geographically representative, systematic sample of case studies for primary data collection. This approach aims to develop project-level understanding of how stewardship activities align with stewardship project management goals. By using survey instruments or structured interview protocols with Forest Service personnel and stewardship partners, we can generate new project-level data. As part of this effort, we can gain enhanced understanding of management outcomes through qualitative inquiry into the co-benefits that communities derive from stewardship activities on their local National Forests. These co-benefits may include economic development, increased collaboration, or specific project outcomes (Pinchot Institute for Conservation 2010).

Monitoring Question 2:

Timber Sale and Service Output

What was the volume and value of timber sold as a result of stewardship contracting?
Where did stewardship timber contracts take place?

Approach

Database used: Forest Service Timber Information Manager (TIM)[2]

We obtained Forest Service Timber Information Manager (TIM) data for federal fiscal years 2014 to 2023 from the Forest Service Washington office. This data contains information on timber sale contracts awarded by the Forest Service and lists the fiscal year of award and the location of the sale in terms of the National Forest System Region, National Forest, and Ranger District. It also lists the purchaser's business name and address, the bid amount, and the estimated sale volume, as well as indicators for whether the sale was contracted under the stewardship authorities or other authorities such as the Good Neighbor Authority.

[2] obtained from Forest Service Washington Office

Defining "Local"

Although "local" economies and communities play a significant role in policies and objectives of the Forest Service, few efforts have defined what "local" means or, further, assessed how the Forest Service has or has not used stewardship contracting to address the relative needs of local communities. However, contracting ranger districts are differentially located with respect to local communities and forestry infrastructure. Some ranger districts are adjacent to large communities with larger workforces and wood processing facilities while others are more remote or have less existing infrastructure. Therefore, to understand the potential for "local" benefits from stewardship contracting, we used locally derived distance thresholds (as opposed to one "global" definition) to define local area for each ranger district. To do this, we calculated the route-based driving distance between forestry

contractors' places of business (PoB[3]) and the center (centroid) of the ranger district where the contracted work was performed. We then used this distance data to define route-based travel distance thresholds between each ranger district and the places of business of forestry contractors. Lastly, we used these distance thresholds to classify timber sale contracts and their associated timber volume and bid values into three categories: local, somewhat local, and non-local. Definitions for distance thresholds and distance categories are presented in Appendix B, Local Analysis.

Timber Sale Analysis

We calculated the total timber sale revenue recycled into stewardship activities (retained receipts) by totaling the service bid values on IRSC (contract type 33, 33T, 1449,1449T), IRTC (contract type 13/13T), and Stewardship Agreements (contract type 21 and 21T). We report these outputs for projects classified as "accomplished" indicating that the contract has been awarded, but the activities may or may not yet be complete. Sales of firewood and cones were excluded.

To understand how contracting dynamics played out between ranger districts and across the National Forest System, we summarized the local, somewhat local, and non-local stewardship timber sale bid values and services bid values by ranger district and classified each ranger district as local, somewhat local, and non-local in terms of their stewardship contracting practices.

1. Local ranger district: the summed local bid values (for both stewardship timber sale and services) were greater than the summed bid values of the other categories combined.

2. Somewhat Local ranger district: the summed local bid values are less than the summed bid values for somewhat local contracts and the summed bid values for Local and Somewhat Local combined were greater than the summed bid value for Non-Local.

3. Non-Local: the summed Non-Local bid value was greater than the other categories combined.

Monitoring baseline

Previous research and monitoring

From 2005 to 2007, 1,587 million board feet of timber was sold by the Forest Service under the stewardship contracting authorities, increasing from four percent in 2005 to 13 percent of all Forest Service timber sold in 2007 (United States Government Accountability Office 2008). Previous studies of stewardship contracting timber sales have been limited to case studies of specific projects. Within these case studies, individual outputs and localcommunity impacts varied by project and therefore national-level conclusions are difficult to draw. For example, the Malheur 10-Year Stewardship Contract resulted in an average of 38 million board feet of timber harvested annually, mostly going to mills or log yards in northeastern Oregon (White 2018). For two stewardship contracts on the Mount Hood National Forest, $4 million was generated in output, with an output multiplier of 1.42 and economic effects primarily experienced in Clackamas County, Oregon from 2007 to 2011 (Daniels et al. 2018). The Siuslaw Stewardship Contract resulted in 50 million board feet of timber sold from 2002 to 2007 (Sundstrom and Sundstrom 2018). Lastly, the Clearwater Stewardship Project generated a $23 million increase in sales for 206 industry sectors in eight Montana counties, a $1.4 million increase in proprietors' incomes, and $570,000 in indirect business taxes from 2003 to 2004 (Kerkvliet 2010).

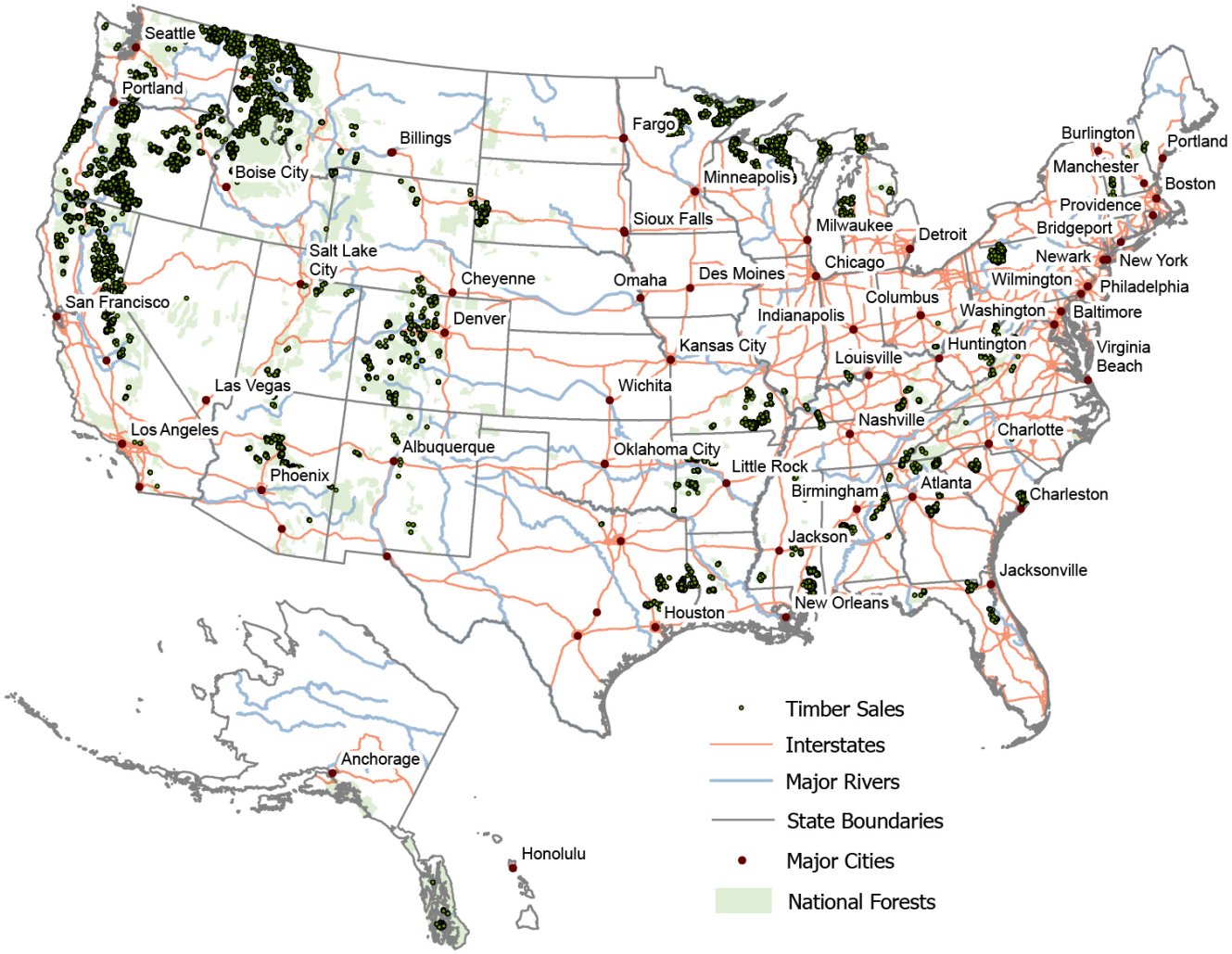
Secondary Data Analysis (2014-2023)

For fiscal years 2014-2023, we identified a total of 10,815 timber sales from 426 ranger districts within the TIM data (Figure 5).

Approximately 15 percent of those timber sales (n= 1596) were sold as stewardship contracts from 293 ranger districts awarded to 410 entities (businesses, local governments, and non-profit organizations) across 38 states. The total stewardship contract sale volume for fiscal years 2014 to 2023 period was 7,392 million board feet (MMBF) worth nearly $560 mil-

[3] Place of Business (PoB) is the administrative mailing and contact accress linked to each business in TIM and FPDS. some businesses have multiple locations that may not be reflected in the data.

Figure 5 Location of timber sales from national forest ranger districts for federal fiscal years 2014 -2023; *Source: FACTS (USDA Forest Service 2024)*



lion ("total bid value") with $634 million in associated services ("total bid for services"). Stewardship contracts account for 29 percent of all sold timber volume (25,620 MMBF), and nearly 30 percent of all timber bid value in the National Forest System between 2014 and 2023.

The number of stewardship timber contracts varied from a minimum of 138 in 2022 to a maximum of 195 in 2023. Sale volumes, bid amounts, and service components have also shifted over time (Table 5, Figure 7). These consisted of 996 Integrated Resource Timber Contracts (IRTCs), 392 Integrated Resource Service Contracts (IRSCs), and 208 stewardship agreements between 2014 and 2023 (Figure 8). Between 2014 and 2018, IRSCs and agreements accounted for 67 percent of the total bid for services and 15 percent of the total bid for timber. However, by 2023, IRSCs and agreements accounted for over 96 percent of service bid amounts and only 13 percent of the total timber bid value (Figure 9).

Table 5 Timber sale bid value, services bid value, total volume, and number of contracts by year.

*These figures exclude projects involving firewood and cones.

Fiscal Year	Total Bid for Timber* (in millions)	Total Bid for Services (in millions)	Total Volume MMBF*	Number of Contracts*
2014	$59.90	$32.53	780	159
2015	$59.34	$31.08	766	168
2016	$44.80	$42.71	655	156
2017	$78.96	$43.77	789	174
2018	$66.73	$28.50	724	156
2019	$58.25	$43.21	807	154
2020	$58.95	$46.58	831	156
2021	$45.31	$23.19	599	140
2022	$35.53	$50.56	514	138
2023	$51.68	$291.41	928	195

Figure 6 Total bid (in millions) for service and bid for timber amounts (2014-2023) *Source: TIM database.*

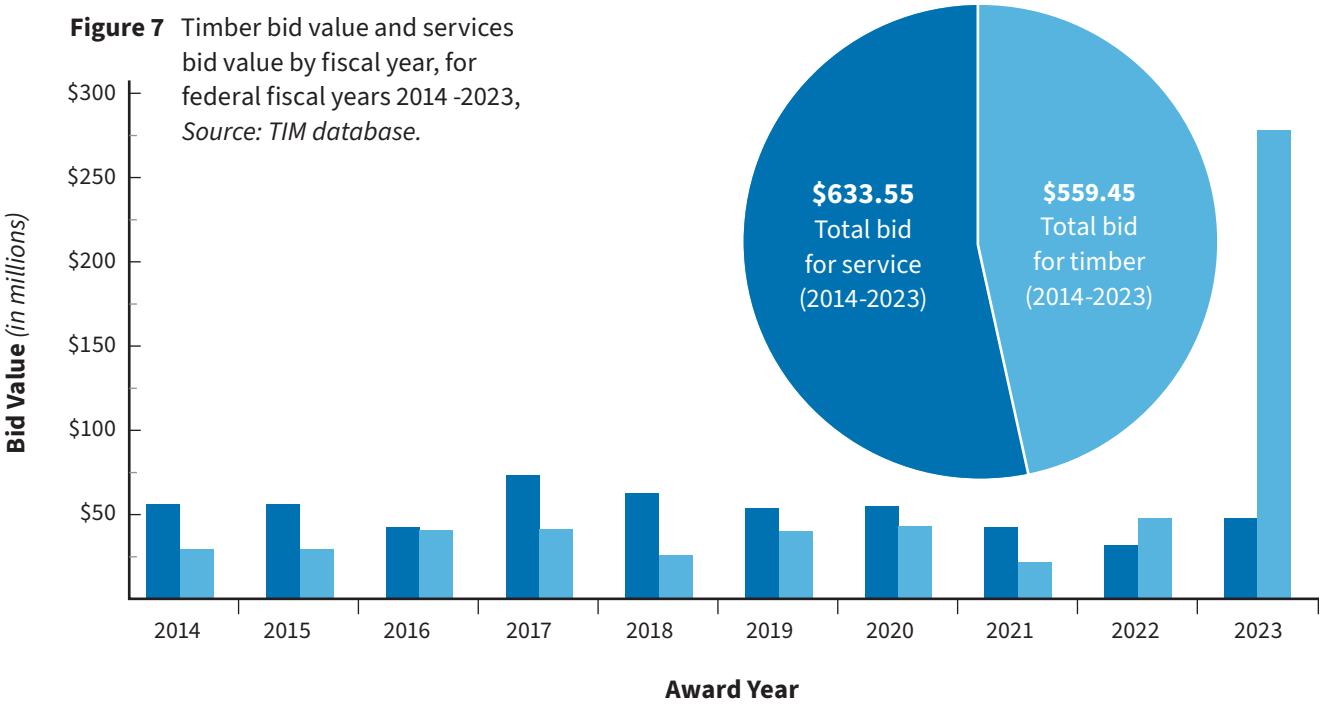


Figure 7 Timber bid value and services bid value by fiscal year, for federal fiscal years 2014 -2023, *Source: TIM database.*

Figure 8 Total number of IRSC, IRTC, and Agreements (2014-2023).

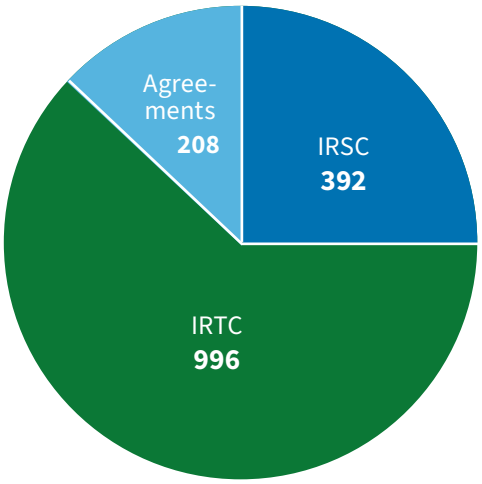
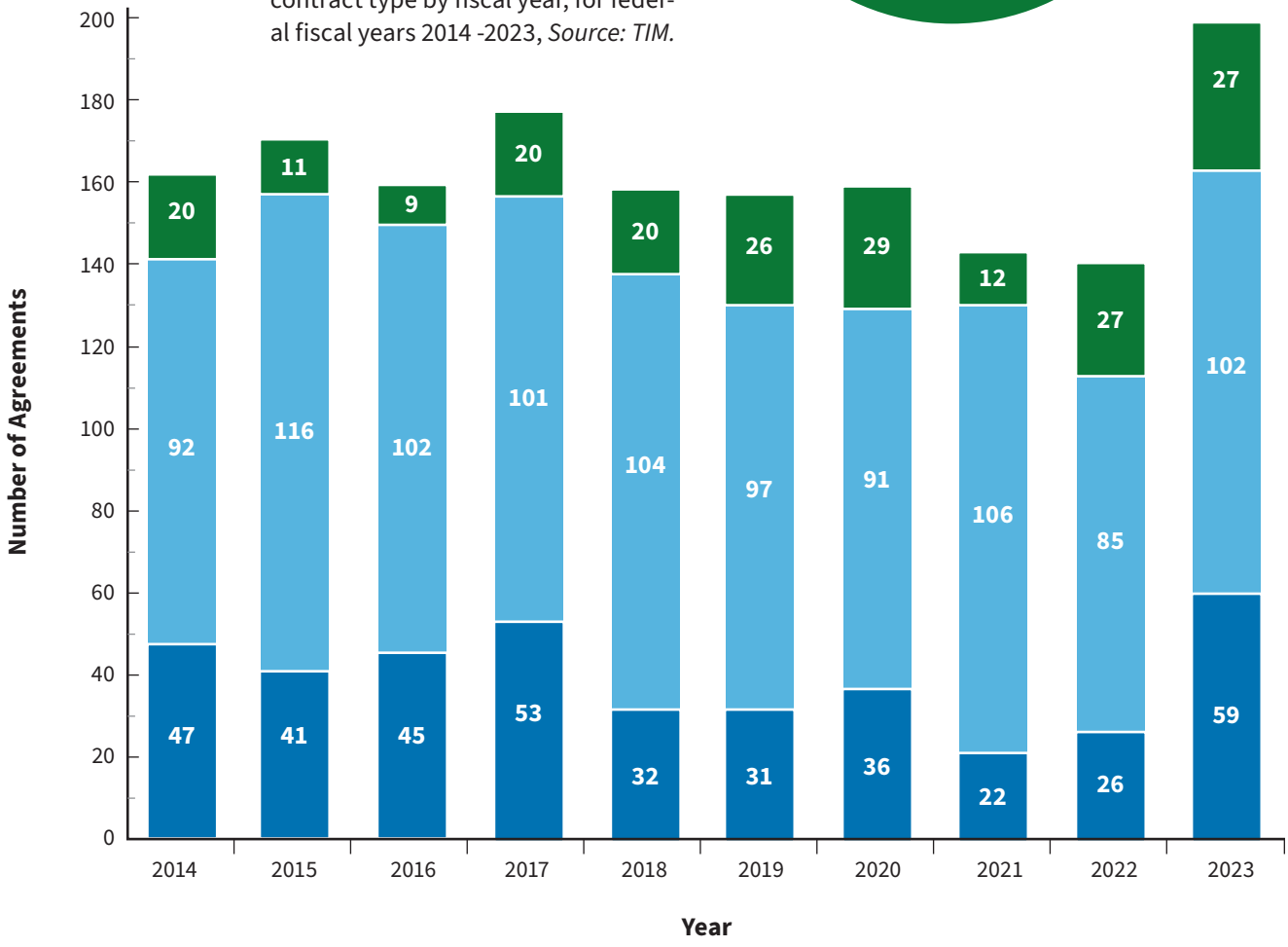


Figure 9 Stewardship timber sale number and contract type by fiscal year, for federal fiscal years 2014 -2023, *Source: TIM.*



In terms of individual sales, approximately 43 percent of stewardship timber sales were purchased by local businesses (n=688). By comparison, more than half (53 percent) of conventional (non-stewardship) timber sales went to local businesses. Local entities purchasing stewardship sales captured about 43 percent of the total stewardship sale volume for the entire period (3,225 MMBF).

Figure 10
(A) Classification of ranger districts reflecting the distance category (local, somewhat local, and non-local) of contractors purchasing the majority of timber by dollar value;

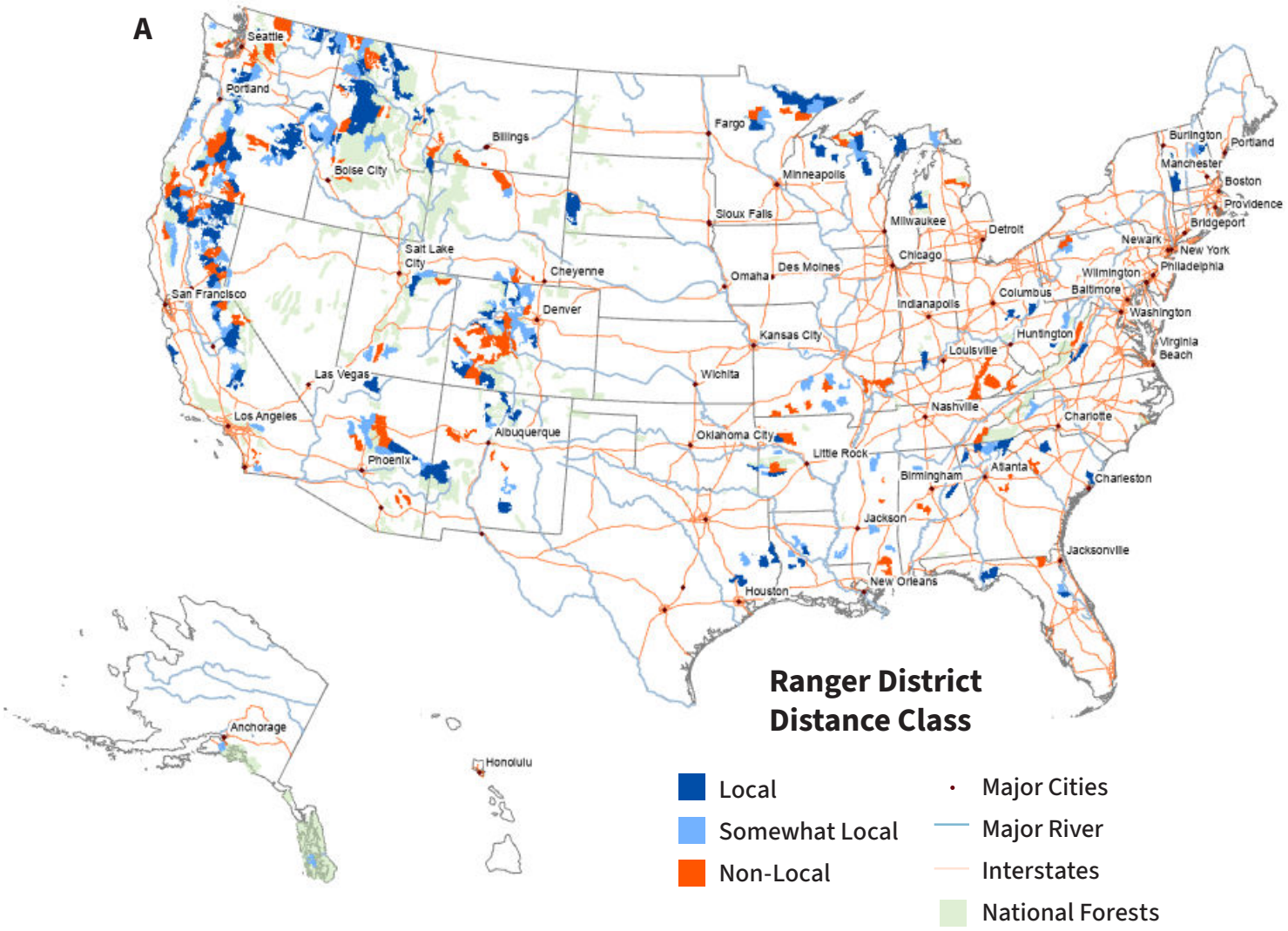


Figure 10
(B) Percent of ranger district summed sale bid value going to a local purchaser;

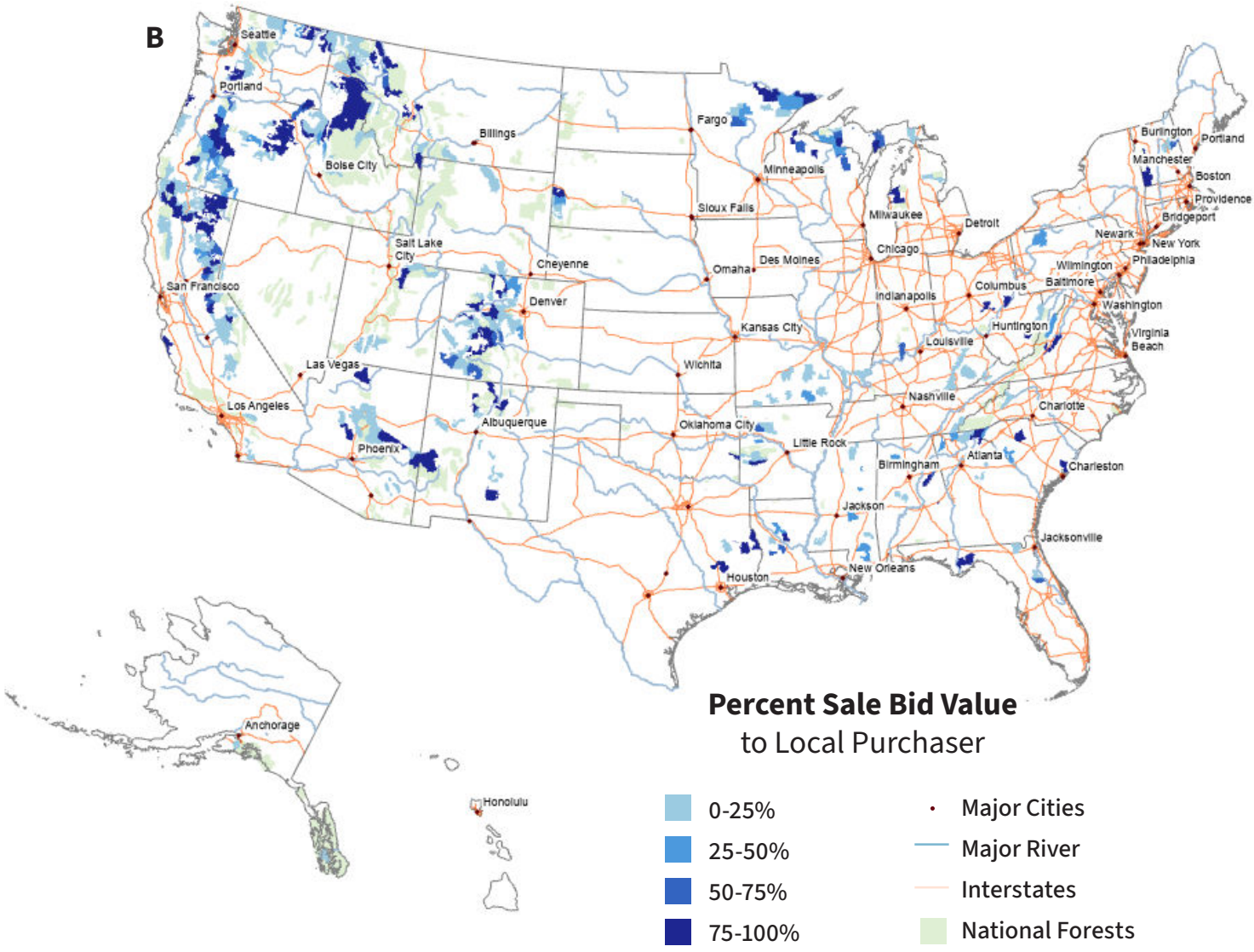


Figure 10
(C) Percent of ranger district summed services bid value going to a local purchaser;

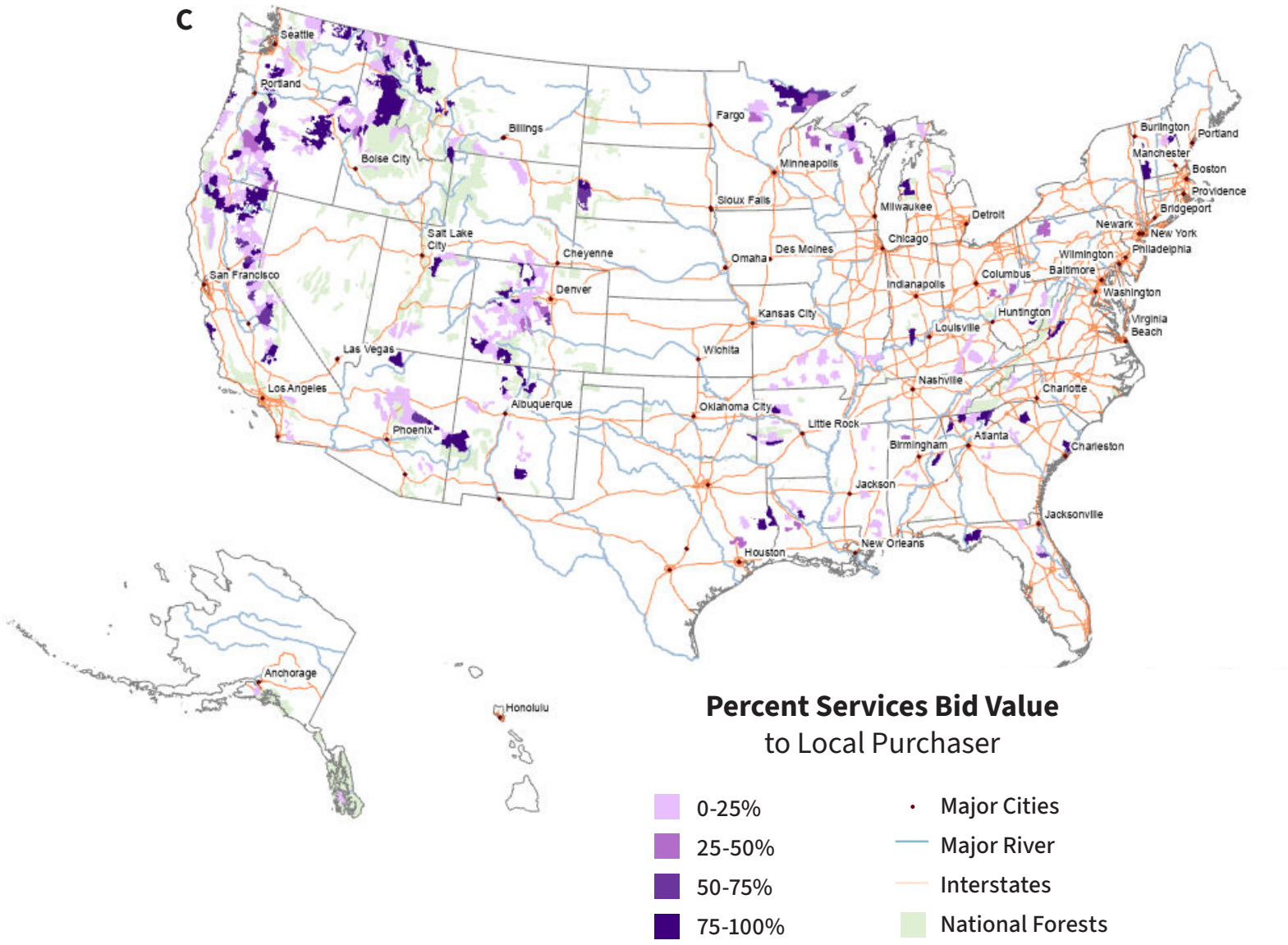
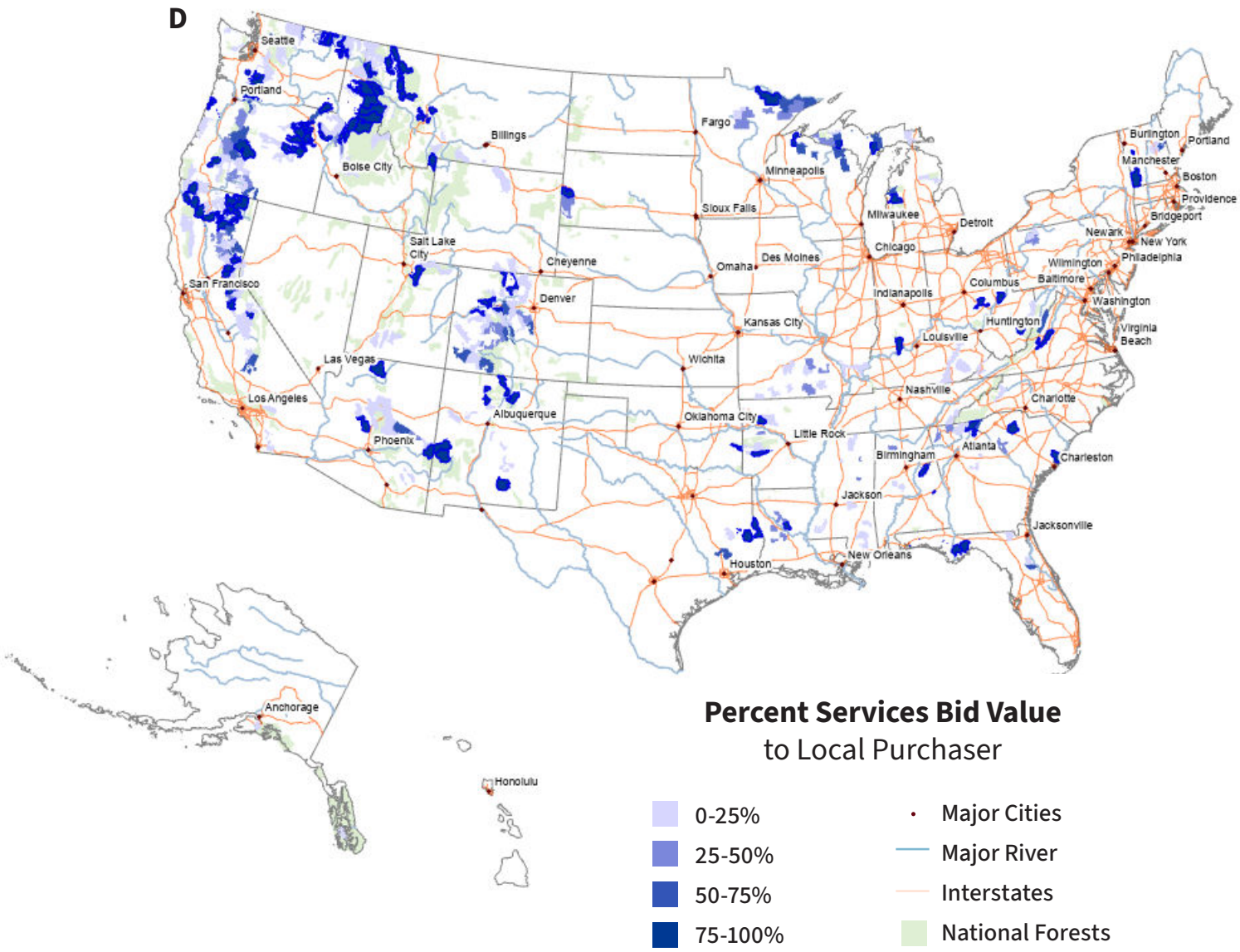


Figure 10
(D) Percent of ranger district summed timber volume (MMBF) going to local purchaser.



Across all ranger districts, an average of 40 percent of stewardship timber sale bids went to a local purchaser, 33% to a somewhat local purchaser, and 27 percent to a non-local purchaser. For fiscal years 2014-2023, 20 percent (n=60) of ranger districts in the National Forest System signed stewardship contracts with local purchasers exclusively. Sixteen percent (n=46) of ranger districts signed stewardship contracts with somewhat local purchasers exclusively and 13 percent (n=39) of ranger districts signed stewardship contracts with non-local purchasers exclusively. The remaining 148 districts sold to some combination of local, somewhat local, and/or non-local purchasers.

Since each ranger district may have stewardship contracts at one or more of the three distance categories (i.e. local, somewhat local, non-local), we summarized districts by the distance category where most of their timber (in terms of dollar value) was sold (see figure 10). This allowed us to characterize ranger districts themselves as local, somewhat local, and non-local contracting units. Ranger districts classified as local had a slightly higher mean distance threshold (114 km) for what constitutes local than either somewhat local or non-local contracting ranger districts (78 km and 81 km respectively). This means that many ranger districts who predominantly contracted with somewhat local or non-local entities nevertheless do have local contractors with whom they work. Since subcontracting data are not recorded in the national FACTS database, it seems possible that many of the non-local contractors are subcontracting to these locally-based timber operators, labor-intensive forestry contractors, or wood processing facilities.

Considerations for Phase 2 monitoring

- **Apply methods described above to TIM data and compare to baseline assessment.**
- **Pair secondary data analysis with a survey of stewardship contractors (and sub-contractors) to clarify questions related to wood processing products, business locations, and subcontracting.**

There were limitations to our approach to using secondary data for understanding local impacts. For example, 33 of the stewardship sale purchasers involved in 249 sales were non-governmental organizations with multiple offices or locations such as the Nature Conservancy and the National Wild Turkey Federation. These organizations often have their headquarters at great distances from the place of sale (average 1,078 km), but sub-contract the harvest and service work, potentially to local operators. On the other hand, anecdotal information suggests that local purchasers sometimes subcontract service work to non-local entities. There was no accessible dataset for information on subcontracting. Given these issues, we suggest that additional primary data collection on sub-contracting could provide a more comprehensive response to this monitoring question.

While existing secondary data do provide understanding of the number, value, and types of stewardship sale purchasers, a survey of stewardship contractors (identified from secondary data) could supplement secondary data analyses of timber sales by informing on wood products resulting from the sale and processing of timber sold. A survey could also help confirm the location and types of facilities that were used as well as provide more specific information on the use of subcontractors.

Monitoring Question 3:

Local Capture of Work including Direct and Indirect Economic Effects

Did stewardship contracts generate jobs in the local community?
If yes, what were the sectors that were directly and indirectly economically impacted by stewardship activities?

Approach

Database used: Forest Service Timber Information Management System (TIM)

To model the direct economic effect of timber harvest, we first summarized the timber sale volume from the stewardship timber sales in TIM data by national forest and federal fiscal year for the years 2014-2023. We then calculated the jobs and income supported by the harvesting and processing of the material sold. We applied the Forest Service tools and standard practices to calculate the jobs and income in the logging sector and primary wood processing sectors. These economic impacts represent the "direct" effects of timber sales and do not include the economic activity associated with supplies and services purchased by logging companies or mills (typically referred to as "indirect effects") or the economic activity from employees spending their paychecks (typically referred to as "indirect effects"). For additional details see Appendix C: Modeling Direct Economic Effects.

Monitoring baseline

Previous research and monitoring

A key perceived outcome of stewardship contracting is the generation of economic activity in local communities (Pinchot Institute for Conservation 2008). Case studies demonstrate that stewardship contracting projects create or support local employment opportunities (Lucas et al. 2017; Daniels et al. 2018; Hausbeck 2007; Kerkvliet 2010; Bennett et al. 2015; White 2018). Because stewardship contracting often involves a variety of activities, it generates economic activity across a broader range of sectors than timber harvest or service contracting alone (Daniels et al. 2018; Kerkvliet 2010). Studies commonly use economic models such as IMPLAN to describe how stewardship activities (e.g., timber sales and service work) generate economic activity in the broader economy (e.g. Daniels et al. 2018).

In this analysis, we did not estimate the broader economic activity (i.e., complete IMPLAN modeling) from

stewardship timber sales. Whereas other monitoring studies are typically focused on estimating economic activity within a single impact area (often an area nearby the national forest) we were focused on comparing outcomes across the three concentric proximities to the forest—local, somewhat local, and nonlocal—that were increasingly large. Larger geographic areas almost always have more integrated economies and a larger labor pool, all else being equal. As a result, any difference in the broader economic activity among our concentric proximities would reflect differences in the scale of the economy rather than any actionable characteristics of the stewardship sales of the forest.

To avoid this economic scale issue, we focus on the economic activity in the sectors most closely tied to timber sales. Economic impacts from timber sales are typically concentrated in the sectors involved in harvesting and processing timber, including sawmills, logging companies, wood preservation, and residue users (Kerkvliet 2010). For example, in 2014, the Malheur 10-Year Stewardship Contract supported 43 jobs in harvesting and restoration activities, 43 jobs in business sales to restoration contractors, and 15 jobs in sawtimber processing at the local Grant County mill (Bennett et al. 2015). These numbers increased to 96 jobs in harvesting and restoration activities from 2015 to 2017 (White 2018). A study by Daniels et al. (2018) found that two projects in the Mount Hood National Forest supported 36 jobs in the surrounding counties from 2009 to 2011. The Clearwater Stewardship Contract generated 148 full- and part-time jobs in eight Montana counties (Kerkvliet 2010). In its first year, the Malheur 10-Year Stewardship Contract supported 101 private sector jobs in Grant County, with an estimated 268 jobs supported annually in Grant and Harney Counties from 2015 to 2017 (Bennett et al. 2015; White 2018).

Fuels reduction programs may also utilize stewardship contracting. Across five national forests, fuels reduction programs supported 337 full-time jobs (Hjerpe and Kim 2008). Fuels reduction programs in the Coconino and Kaibab National Forests had employment multipliers of 1.46 and 1.45, respectively, suggesting that these programs create greater economic activity than the region's primary industries of tourism and recreation (Hjerpe and Kim 2008).

Sectors that commonly provide many of the inputs and services to those directly doing the stewardship activities include power generation, wholesale trade, owner-occupied dwellings, banks, and real estate (Kerkvliet 2010). Fuels reduction programs indirectly impacted regional transportation and service industries and created another 151 full-time jobs spurred by indirect economic activity in fiscal year 2005 (Hjerpe and Kim 2008) A more recent analysis found that in FY 2017, activities from the Four Forest Restoration Initiative (4FRI) provided approximately 960 full- and part-time jobs and 50 million in regional labor income (Hjerpe et al. 2021).

Secondary data analysis (2014-2023)

Across all regions, stewardship contract sales supported an average of 1,863 jobs per year. The jobs associated with timber sales to somewhat local and non-local businesses averaged 1,440 and 1,038 per year respectively. Figure 12 shows the breakdown of job locality for each Forest Service administrative region. Stewardship timber sales within the Pacific Northwest Region (Forest Service R6) supported the greatest total number of jobs (n = 6,335), and the highest percentage of jobs (53%) were associated with sales to businesses local to the forest relative to other regions. In contrast, the Southwestern region (Forest Service R3) had the smallest percentage of jobs associated with timber sales to businesses local to the forest (29%).

Figure 11 Total local, somewhat local, and non-local jobs for all USFS regions (2014-2023).

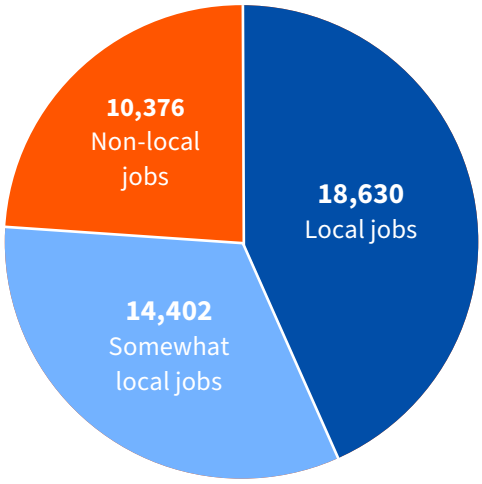
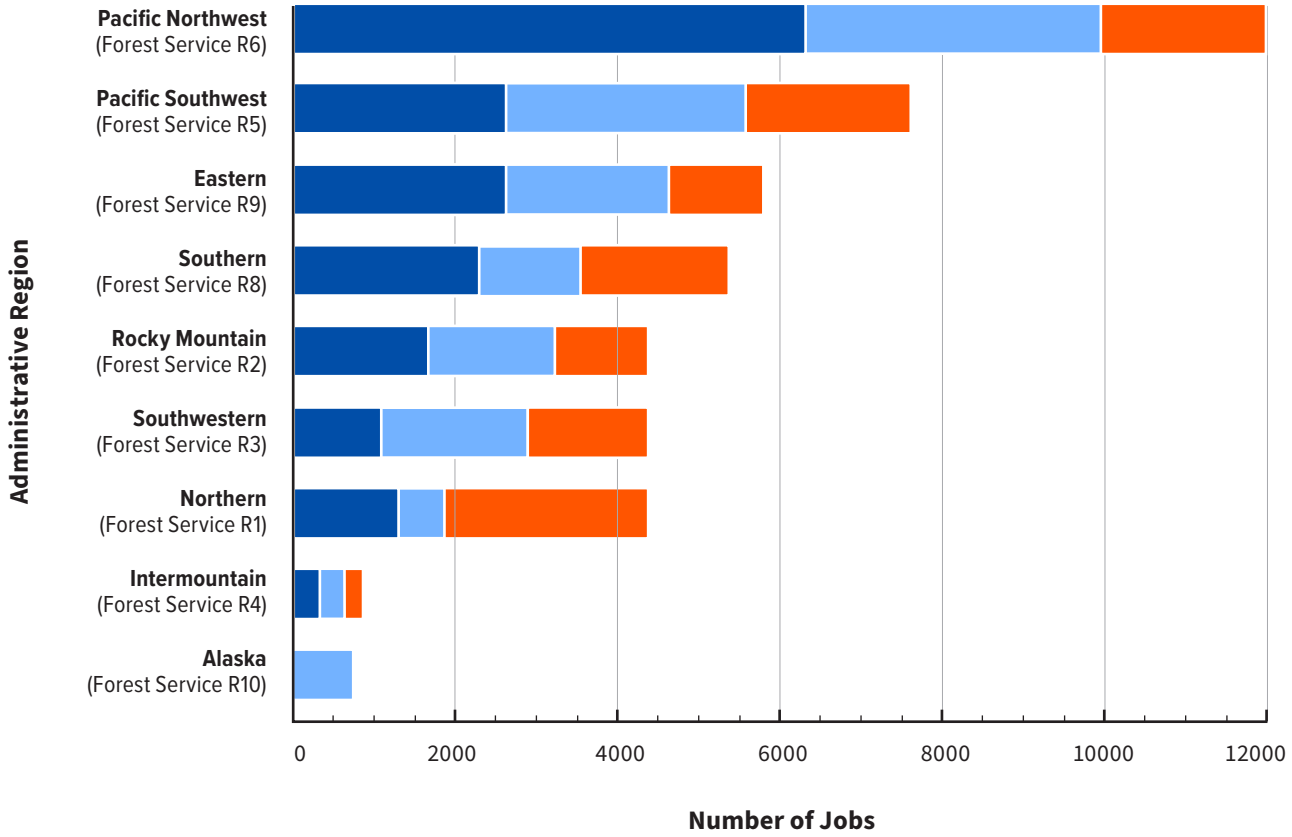
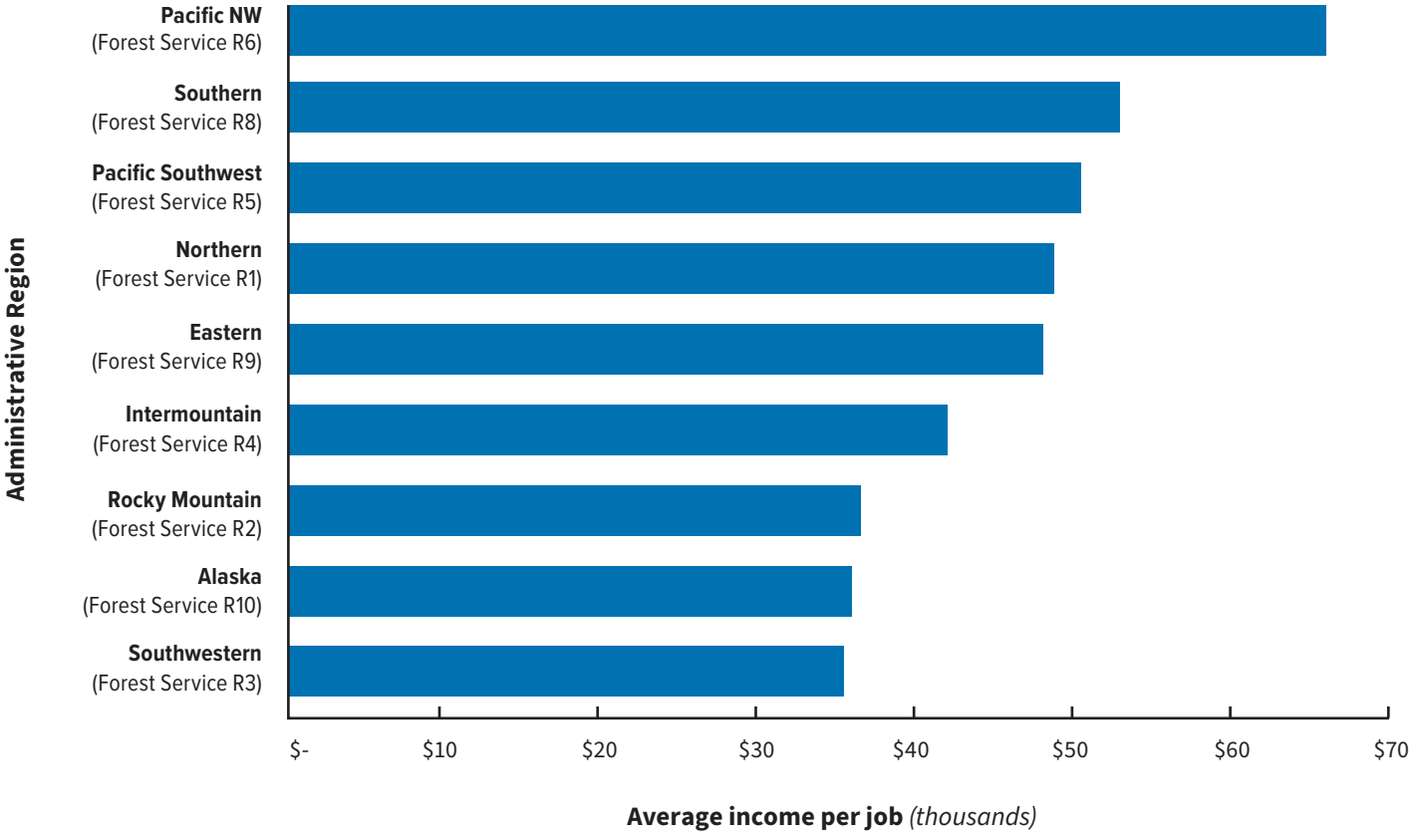


Figure 12 Total number of stewardship jobs from timber sales volume according to locality and administrative region



Average income (wages) per stewardship job also varied between regions. The average estimated income per job ranged from $35,174 (Forest Service R3) to $65,899 (Forest Service R6). Figure 13 shows the average estimated income per job according to each region. On average, employees directly engaged in harvesting and processing the material sold in stewardship timber sales received between about $35,000 and $68,000 in income from the work associated with the sales. Those regions with the highest average incomes (e.g. Forest Service R6 and Forest Service R8) likely have higher incomes because much of the timber sold in those regions is processed in mills producing construction products, such as lumber or plywood/orientated strand board, and offering relatively high wages. Regions with lower average incomes are likely to see more of their stewardship sale material processed in post and pole, fuelwood, or bioenergy facilities.

Figure 13 Average income per stewardship job (in thousands of dollars)



Considerations for Phase 2 monitoring

- **Coordination with the Forest Service Policy Office economists could provide annual estimates of economic activity associated with stewardship timber sales as part of that Office's ongoing annual reporting.**

- **Pair economic effects modeling with national-level stewardship contractor surveys to enhance understanding of wood products being manufactured and types of activities resulting from service components of the contracts.**

- **The process used here is replicable in future years given new data on stewardship timber sales and any updates to the assumptions and coefficients used in this analysis.**

Our analysis of direct economic effects from stewardship timber sales was limited by the lack of information on the specific product classes in each sale or types of processing facilities receiving the material. Our estimates reflect forest and regional assumptions about product type and processing and likely do not reflect specific nuances in these timber sales. Therefore, to refine the accuracy of this model, we recommend combining this approach with primary data collection (proposed above for Monitoring Question 2) that details sale volumes by product class and gathers additional information on the processing facility destinations of material harvested in stewardship projects.

We encountered similar limitations in our attempts to calculate the direct economic effects of stewardship service work. Economic model inputs require a classification of the type of stewardship work activities conducted along with the total dollar amount invested in those activities. To the best of our knowledge, these two variables do not exist in one dataset maintained by the Forest Service. To resolve this issue, we attempted to link FACTS stewardship activity data to IRTC and IRSC data from the TIM database using deterministic methods by matching the "date accomplished" and the ranger district place of performance (USDA Forest Service 2024). However, this method matched less than 70% of the activities to their associated IRTC/IRSC contracts and less than 60% of IRTC and IRSCs to their activities. Given this issue, we did not present results for economic effects of service work in this baseline assessment. Pairing this secondary data analysis with primary data collection proposed above (Monitoring Question 1) could resolve this issue since it would allow for new data collection on how service activities relate to stewardship projects and associated timber sales.

Monitoring Question 4:

Stewardship Contracting Businesses and Organizations

What businesses and organizations are engaging in stewardship contracting?

Approach

Database used: Forest Service Timber Information Management System (TIM), Forest Service agreement data

Contractors

We used TIM data to create stewardship timber sale profiles for entities entering into stewardship contracts. Profiles summarize the total number of stewardship contracts, total timber volume, total timber sale bid and service bid amounts, as well as the number of ranger districts where each contractor worked.

Agreement Cooperators

We used Forest Service agreement data to analyze the types of cooperators that were involved in land management decisions with the Forest Service (Figure 14). Stewardship agreements were classified by cooperator type (e.g., county government, Indian/ Native American Tribal government, nonprofit, etc.).

Monitoring baseline

Previous research and monitoring

Labor-intensive forestry contracts within the Forest Service often utilize stewardship contracting. Most labor-intensive forestry contracts (including some stewardship contracts) awarded by the Forest Service between 2001 to 2020 went to contractors performing forest fire suppression and pre-suppression, followed by conservation and non-construction forest and range improvement (Deak et al. 2023). Most contracts (including stewardship and non-stewardship types) were awarded to businesses that were non-minority-owned and ineligible for small business set-asides, while minority-owned businesses comprised only 9.3% of the businesses in the dataset but were awarded 16.1% of contracts (Deak et al. 2023).

Secondary data analysis (2014-2023)

TIM data show that stewardship contracts went to 410 unique businesses and organizations between 2014 and 2023 (see Appendix D for a full list of businesses and organizations entering into Forest Service stewardship timber contracts for fiscal years 2014-2023). Some entities had multiple contracts across multiple different ranger districts, national forests, and regions. For example, the National Wild Turkey Federation had 59 stewardship contracts between 2014 and 2023 across six different regions, 26 national forests, and 33 districts. However, Vaagen Brothers Lumber, Inc., followed by Iron Triangle, LLC, had stewardship contracts with the highest total volume (361 MMBF and 258 MMBF respectively). While Vaagen Brothers Lumber contracted with five different ranger districts on three national forests traveling a mean distance of 90 miles from their place of business to the activity location, Iron Triangle contracted with only three districts on a single forest and traveled a mean distance of 40 miles. Sierra Pacific ranked among the top five contractors in terms of their number of contracts, total timber volume purchased, total timber volume purchased locally, and the number of national forests with which they contracted (Table 6).

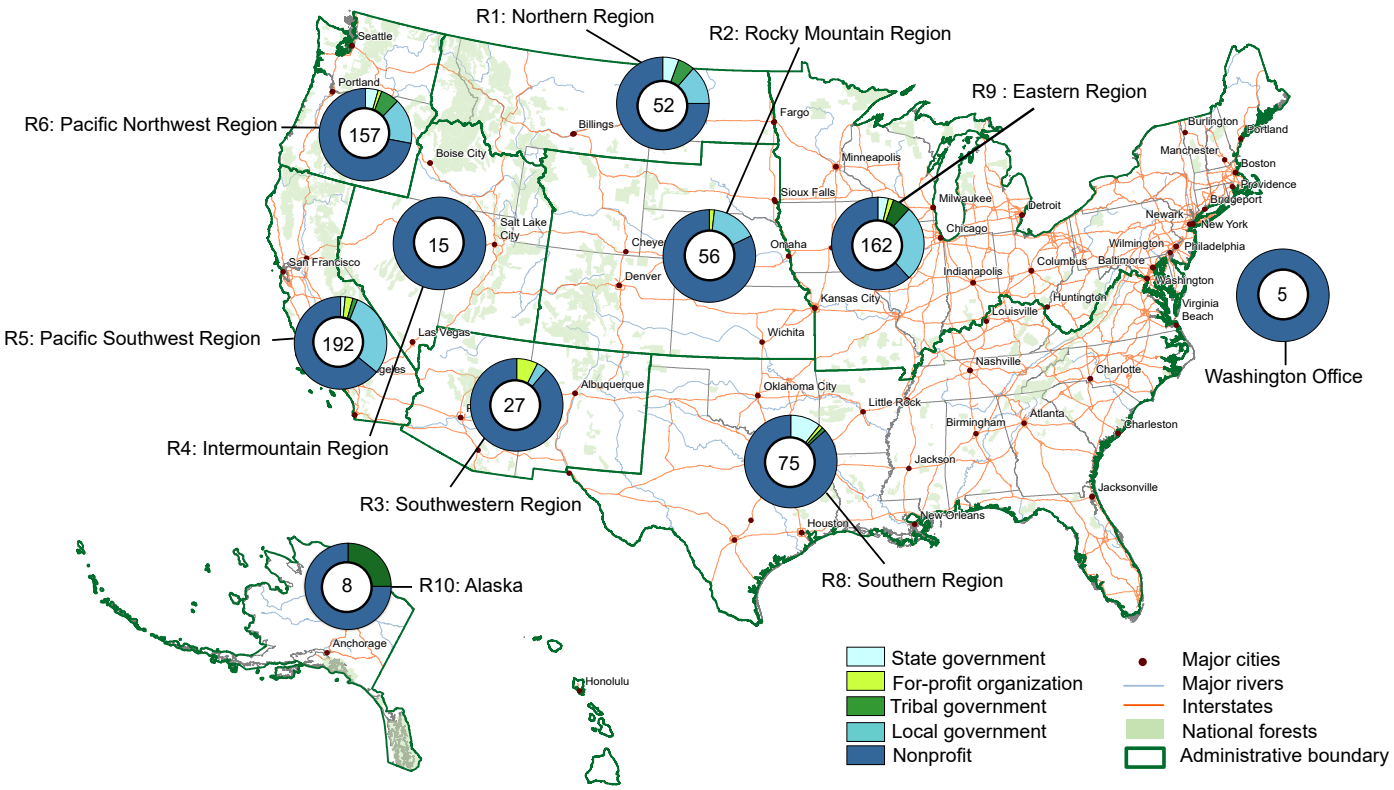
Table 6 Contractors ranked by (A) number of contracts, (B) timber volume, (C) timber sale bid value, (D) bid for services value, (E) local volume as percent of total volume, (F) number of national forests contractor is contracting with, (G) Number and type of contract (IRTC, IRSC), and (H) contractor's headquarter location.

Contractor name	**A** Number of contracts	**B** Timber volume (MMBF)	**C** Timber sale bid value (millions)	**D** Bid for services value (millions)	**E** Local volume as percent of total volume	**F** Number of national forests	**G** Number and type of contract	**H** Headquarter location
	total / rank	total / rank	total / rank	total / rank	total / rank	total / rank	IRTC / IRSC	State
National Wild Turkey Federation	59 / 1	225 / 5	$9.5 / 12	$42.4 / 2	0% / 234*	26 / 1	0 / 3	SC
Nature Conservancy	37 / 2	219 / 6	$27.8 / 4	$25.4 / 4	8% / 48*	11 / 3	8 / 0	Multiple
Sierra Pacific Industries	34 / 3	237 / 4	$16.4 / 6	$6.7 / 26	56% / 4	9 / 5	34 / 0	CA, OR, WA
Tri Star Logging	27 / 4	155 / 10	$3.1 / 34	$1.1 / 83	72% / 5	2 / 52	27 / 0	AZ
Biewer Forest Management	26 / 5	96 / 17	$11.4 / 9	$1.8 / 68	54% / 9	2 / 49	26 / 0	MI
National Forest Foundation	26 / 6	117 / 14	$1.1 / 88	$68.6 / 1	0% / 235*	6 / 7	0 / 0	MT
JW Bamford	24 / 8	137 / 13	$3.9 / 29	$38.0 / 3	29% / 15	8 / 4	7 / 17	WA
Vaagen Brothers Lumber	22 / 10	361 / 1	$36.7 / 2	$10.4 / 15	97% / 1	3 / 21	11/ 11	OR
IFG Timber	20 / 11	256 / 3	$38.7 / 1	$11.3 / 12	35% / 6	5 / 10	22 / 0	ID, MT
The Mule Deer Foundation	20 / 14	63 / 24	$2.7 / 39	$8.4 / 18	0% / 238*	12 / 2	0 / 0	UT
Interfor US*	17 / 19	168 / 9	$16.0 / 7	$4.7 / 36	86% / 3	4 / 15	17 / 0	CA
Iron Triangle	16 / 22	258 / 2	$9.8 / 11	$9.8 / 11	62% / 2	1 / 80	0 / 16	PA
Boise Cascade Wood Products	16 / 23	182 / 8	$20.0 / 5	$20.0 / 5	42% / 7	6 / 8	14 / 2	OR, WA
B and G Logging & Construction	15 / 25	152 / 11	$35.0 / 3	$35. 0 / 3	34% / 8	2 / 37	15 / 0	OR
The Ruffed Grouse Society	10 / 37	23 / 71	$1.9 / 53	$1.9 / 53	0% / 244*	8 / 6	0 / 0	OR, WA
Great Basin Institute	7 / 52	42 / 35	$0.7 / 124	$0.7 / 124	30% / 61	3 / 20	0 / 0	NV

*Nationally headquartered non-profits often sub-contract with local contractors, but data on these subcontracts is not available.

Across all regions, most cooperators were nonprofits other than an institution of higher education (Figure 14). Although some nonprofits were local organizations, many were not. Local governments were the next common cooperator type, followed by state, tribal, and for-profit organizations.

Figure 14 Total number of agreements and cooperator types by forest service region.
**Local government includes city, county, township, or independent school district; nonprofits do not distinguish between those with or without 501c3 status.*



Considerations for Phase 2 monitoring

- Stewardship contractor profiles can be generated from secondary data sources such as TIM and compared with this baseline assessment.
- Additional business and organization details could be gleaned from other secondary data sources to develop a more detailed understanding about entities engaging in stewardship contracting.
- Pairing these secondary data analyses with a contractor survey could provide further understanding of business and workforce demography.

Secondary data analysis could be expanded to encompass other data sources related to contractor businesses. Further, the businesses and business attributes identified through this analysis could inform a sampling and recruitment strategy for a survey of business owners. This primary data collection effort could supplement information from secondary sources.

Monitoring Question 5:

Contract and Management Efficiencies

Are stewardship contracts more efficient for the Forest Service than conventional timber sales or service contracts?

- *Were there key factors that enabled work on the ground to be more efficient?*
- *Did the stewardship contract reduce costs for the Forest Service relative to estimated costs for conventional contracts?*

Approach

Database used: Forest Service Forest Activity Tracking System (FACTS) database[4]

We were unable to assess on the ground management efficiencies or perceptions about them through existing secondary datasets. However, we were able to provide some evaluation of stewardship activity costs.

Monitoring baseline

Previous research and monitoring

Management efficiencies

Qualitative survey- and interview- based studies indicate that some participants in stewardship contracting (Forest Service personnel, partner organizations, and contractors) consider it to be more efficient than conventional timber sales or service contracts for accomplishing on-the-ground work (Pinchot Institute for Conservation 2008, 2012a, 2012b, 2013, 2014; United States Government Accountability Office 2008; MacCleery 2004; Davis 2021; Cowan et al. 2022). However, these participants could have views of efficiency that include time factors rather than simply cost. Approximately 44% of respondents from a nationwide survey of Forest Service personnel, partner organizations, and local contractors involved in stewardship contracting projects described stewardship contracting as a tool to accomplish more work on the ground, with non-agency respondents more often suggesting it is the best available approach to accomplish work on the ground (Pinchot Institute for Conservation 2008). Participants of stewardship contracting view on-the-ground work as both a defining feature and one of the primary outcomes of stewardship contracting. For three consecutive years, "on-the-ground work" was one of the top two most frequently cited outcomes of stewardship contracting in surveys conducted by the Pinchot Institute from 2011 to 2013 (The other benefit was "specific project outcomes.") (Pinchot Institute for Conservation 2012b, 2013, 2014). The primary motivation reported for partici-

[4] https://data.fs.usda.gov/geodata/edw/datasets.php

pation in future stewardship contracting projects was its perceived efficiency in accomplishing more work relative to other contracting approaches (Pinchot Institute for Conservation 2013). It is important to note, however, that most of these studies to date only account for the perspectives of people involved in stewardship contracting mechanisms, but not necessarily in comparison to other approaches. This consideration should inform Phase 2 monitoring.

The goods-for-services authority and reduced overhead costs are perceived as key mechanisms enabling the achievement of more work on the ground (United States Government Accountability Office 2008; MacCleery 2004; Davis 2021). In surveys and interviews with Forest Service and BLM personnel, respondents noted that the authority to exchange forest products for service work enabled agency officials to accomplish work that would otherwise be delayed or unexecuted due to funding constraints (United States Government Accountability Office 2008; MacCleery 2004). Further, some respondents noted that reduced overhead costs for agency and partners, achieved by combining work into a single contract and bypassing the use of Knutson-Vandenberg funds, allowed more funding to be used on the ground (Davis 2021; MacCleery 2004).

Cost efficiencies

Existing literature suggests that stewardship contracting additionally reduces costs by bundling work into a single contract (United States Government Accountability Office 2008; MacCleery 2004; Mattor and Cheng 2015). This decreases net cost per unit area due to reduced solicitation, administrative, and contract expenses (United States Government Accountability Office 2008; MacCleery 2004). Agency staff save time and money developing, advertising, and implementing a single stewardship contract as compared to multiple timber sale and service contracts. A comparative analysis of four stewardship contracting projects demonstrated cost reduction by allowing timber sale and service work to be completed simultaneously (Mattor and Cheng 2015). In turn, net cost per unit area is decreased due to reduced solicitation, administrative, and contract expenses (United States Government Accountability Office 2008; MacCleery 2004).

Considerations for Phase 2 monitoring

- **Better define and evaluate economic and process efficiencies as part of proposed sampling of project-level details for Phase 2.**

Although FACTS stewardship activity data do often list cost per unit (usually acres or miles), cost variables are sometimes missing. An examination of the data suggests that cost data may actually refer to more than one activity on a project (perhaps all activities, in some cases). This means that the costs calculated for a specific treatment type (e.g thinning) may reflect additional treatment activities (e.g. survey project prep) that we are unable to parse from the data. Although we were able to find previous analysis of treatment costs for non-stewardship projects, these studies are often place-specific and do not offer national-level cost ranges. In addition, because previous studies provided their own definitions for particular activities or sets of activities, it is often difficult to find costs for specific FACTS stewardship activities.

This question might best be answered through primary data collection from Forest Service personnel and stewardship partners. This type of data collection would be most efficient as part of a systematically sampled project-level approach (proposed above). This analysis would require additional data collection on comparable non-stewardship activities implemented by the same national forest or ranger district. Another potentially informative method could be a systematic review of documents associated with contracting processes (i.e. contracts and payment documentation).

Monitoring Question 6:

Reduced Litigation

How does litigation and public concern of stewardship projects compare to similar timber sales and service contracts?

Approach

Database used: Forest Service Forest Activity Tracking System (FACTS) database[5]; Planning, Appeals, and Litigation System (PALS)[6]

We assessed which stewardship contracts were associated with projects litigated during the planning phase. The National Environmental Policy Act (NEPA) requires the Forest Service to assess the potential environmental impacts and seek public input on alternative management actions and to document its decisions as part of the planning process. Ideally, NEPA decisions align with public interests, but when decisions are challenged in court (i.e. litigated) planning and project implementation can be delayed.

To assess how often NEPA decisions involving stewardship contracts or agreements were litigated in comparison to NEPA decisions that did not involve stewardship contracts or agreements, we relied on FACTS timber harvest data which contains information linking individual timber harvest units with their associated timber sales and NEPA decisions. This information within FACTS included project name and a unique identification number matching NEPA decisions recorded in the Planning, Appeals, and Litigation System (PALS) (USDA Forest Service 2024). Although the FACTS timber harvest data lacks a stewardship indicator, we were able to identify stewardship projects through the timber sale name or implementation project name which often contain terms associated with stewardship (e.g. Stewardship, Stew, STWD, IRTC, IRSC).

Using the NEPA project name and ID associated with each timber harvest, we linked the FACTS data with a previously curated dataset from the Forest Service's Planning, Appeals, and Litigation System (PALS) (USDA Forest Service 2024; Fleischman et al. 2020; 2022). Since 2005, the Forest Service has used PALS to track and record all decisions made by the agency under the National Environmental Policy Act (NEPA). The curated PALS dataset documents NEPA decisions and litigation for completed land management projects conducted by the Forest Service between 2005 and 2021 (Fleischman 2020; 2022).

[5] https://data.fs.usda.gov/geodata/edw/datasets.php

[6] US Forest Service Planning, Appeals, and Litigation Data on NEPA compliance, 2005-2021

Monitoring baseline

Previous research and monitoring

Some research has found or suggested that increased public trust may prompt reduced litigation, enabling work to be accomplished on a faster timeline (United States Government Accountability Office 2008; Lucas et al. 2017; Moseley and Charnley 2014). Pennick McIver and Becker (2021) found evidence of greater planning efficiency, increased number of acres treated, and accomplishment of more diverse objectives, when using a more collaborative approach. There is therefore some evidence that land management agencies may not have to sacrifice efficiency for greater public involvement with these approaches. Across four case studies of fire-prone national forests and their surrounding communities in Oregon, Washington, and Northern California, timber harvest was less frequently litigated when packaged in a stewardship contract with the goal of hazardous fuel reduction than in a traditional timber sale (Moseley and Charnley 2014). Interviews with stakeholders associated with the White Mountain Stewardship Contract indicate that the legal challenges that typically slow or prevent harvest operations were not present throughout the duration of the stewardship contract (Lucas et al. 2017). However, Pennick-McIver and Becker found no statistical difference in the probability of appeals or litigation for collaboratively developed projects as compared to traditional projects.

Secondary Data Analysis (2014-2023)

We were able to link approximately 10,030 out of 11,246 individual timber sales within FACTS Timber Harvest data to their corresponding NEPA project ID within the PALS dataset processed by Fleischman et al (2020). From these 10,030, we identified 2,025 as being associated with stewardship contracts. We estimate that our methods failed to link approximately eight percent of the timber harvest units from FACTS (85,300 out of 92,700 harvest units). We believe at least some of these projects are linked to NEPA decisions that either pre-date the PALS dataset (i.e. prior to 2005) or to NEPA projects that were not completed by 2021. We also note here a discrepancy between the FACTS Timber Harvest data and TIM data, for which timber sales during the 2014-2023 federal fiscal years totaled 10,815 and the number of those sales involving stewardship contracts or agreements was 1,596. Clerical errors within the FACTS data likely resulted in misattribution of some harvest units to sales, leading to a slight overcount of timber sales broadly. Given these issues, we suggest that the results of this analysis be taken with caution.

We found that four percent of NEPA decisions involving timber sales awarded in federal fiscal years 2014-2023 were litigated regardless of whether or not they involved stewardship contracts or agreements. In other words, NEPA decisions that involve stewardship contracting or agreements were equally as likely to be litigated as projects that did not involve the use of stewardship contracting or agreements. However, this litigation rate varied by Forest Service Region (Table 8). For example, Region 1 (Northern Region) had the highest litigation rate overall with 13 percent of NEPA decisions involving stewardship contracting, but this rate was comparable to that of NEPA decisions not involving stewardship contracts or agreements (15 percent). Region 6 (Pacific Northwest Region) had a higher rate of litigation for stewardship projects at 6 percent versus 2 percent for those involving non-stewardship timber sales.

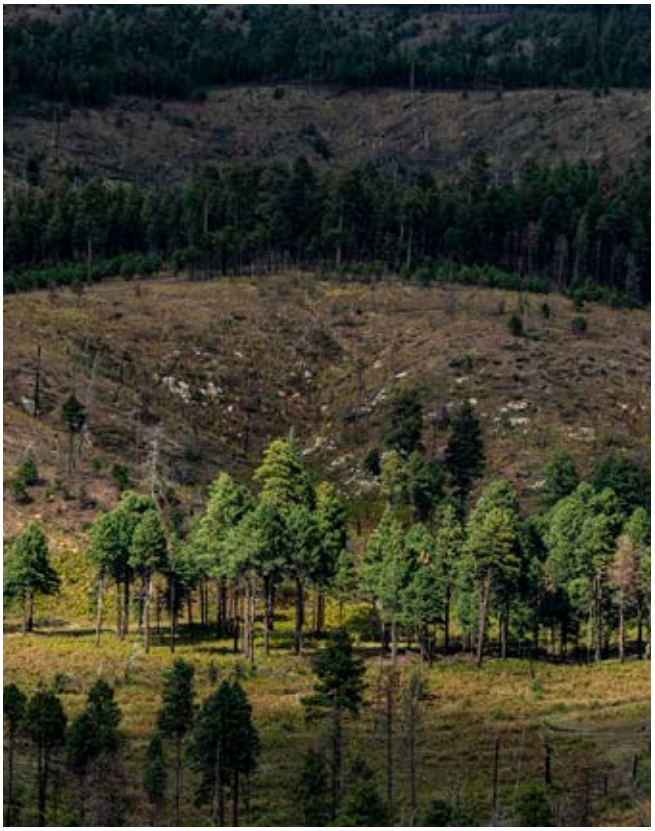
Table 8 NEPA projects litigated in each administrative region

Administrative Region	Stewardship Contract	Conventional Contract
	NEPA projects litigated / %	NEPA projects litigated / %
R1: Northern Region	6 out of 45 / **13%**	35 out of 226 / **15%**
R2: Rocky Mountain Region	2 out of 61 / **3%**	3 out of 228 / **1%**
R3: Southwestern Region	1 out of 22 / **5%**	5 out of 89 / **6%**
R4: Intermountain Region	0 out of 14 / **0%**	3 out of 150 / **2%**
R5: Pacific Southwest Region	5 out of 103 / **5%**	23 out of 231 / **10%**
R6: Pacific Northwest Region	9 out of 141 / **6%**	7 out of 329 / **2%**
R7: Southern Region	0 out of 96 / **0%**	1 out of 477 / **0%**
R8: Eastern Region	3 out of 190 / **2%**	6 out of 372 / **2%**
R9: Alaska Region	0 out of 2 / **0%**	1 out of 23 / **4%**

Considerations for Phase 2 monitoring

- Baseline information presented in this report could help guide a sampling strategy for Phase 2 project-level analyses to collect primary data related to litigation (or lack of it) on stewardship projects.
- This analysis is not recommended for future monitoring as secondary data analysis did not allow for analysis beyond the NEPA decision.

Since our previously curated PALS data only included completed projects, we were unable to assess project litigation for stewardship contracts or agreements where the project remains on-going. We are also unable to assess whether the stewardship contract or agreement specifically related to litigation of the NEPA decisions. A combination of primary data collection (involving survey or interview methods) on case study stewardship projects and legal and administrative document review could provide more insight into whether stewardship contracting helps reduce litigation.



Monitoring Question 7:

Infrastructure Investment

Did outside investment in the processing or utilization of woody biomass occur during the lifetime of the stewardship project?

Approach

We conducted a literature review for baseline analysis of this question. We were unable to identify any secondary data that addressed this question.

Monitoring baseline

Previous research and monitoring

Stakeholders surveyed in the literature perceived stewardship contracting to stabilize forest product supply due to the longer duration of contracts, which can, in turn, promote investment in the utilization of small-diameter materials (Pinchot Institute for Conservation 2008, 2012a, 2013; Donovan et al. 2008; Hjerpe et al. 2009). In a report from the Southeastern Region (Forest Service R8), respondents from a 2012 sample of regional stewardship contracts identified stabilization of forest product offering as a key benefit of stewardship contracting due to the relatively longer duration of contracts (Pinchot Institute for Conservation 2012a). Similarly, in a national survey of agency and non-agency stakeholders involved in stewardship contracting projects, respondents noted that one of the perceived outcomes of stewardship contracting is supporting local economies by stimulating the supply of forest products necessary to promote investment in facilities using small-diameter materials (Pinchot Institute for Conservation 2008).

Case studies indicate that stewardship contracting projects stabilized woody biomass supply, which spurred investment in the utilization of these materials. (Abrams and Burns 2007; Abrams 2011; Lucas et al. 2017; White 2018). An analysis of the White Mountain Stewardship Contract on the Apache-Sitgreaves National Forest found that the contract facilitated a stable supply of wood fiber, which stimulated $2.6 million in logging and processing equipment investment (Abrams and Burns 2007; Abrams 2011). These investments supported the development of local industries, including the construction of small-diameter mills and development of value-added products such as pressure-treated posts and poles (Lucas et al. 2017). Additional grant funding was then contributed by the Forest Service Forest Products Laboratory to support technical innovation in the use of small-diameter materials and creation of value-added products (Abrams and Burns 2007). Similarly, an analysis of the Malheur 10-Year Stewardship Contract found that the contract stabilized forest product supply and restoration work from year to year, and in response, businesses made investments in Grant and Harney Counties (White 2018).

Considerations for Phase 2 monitoring

- **Collect primary and secondary data related to investments in woody biomass utilization in conjunction with proposed systematic samples of stewardship projects or through the national-level contractor survey.**

Monitoring Question 8:

Leveraged Funds from Non-Agency Partners

Did the stewardship project attract additional funds or in-kind contributions from partners?

Approach

We used Forest Service agreements data to summarize cooperator matching funds by forest service region and cooperator type.

Monitoring baseline

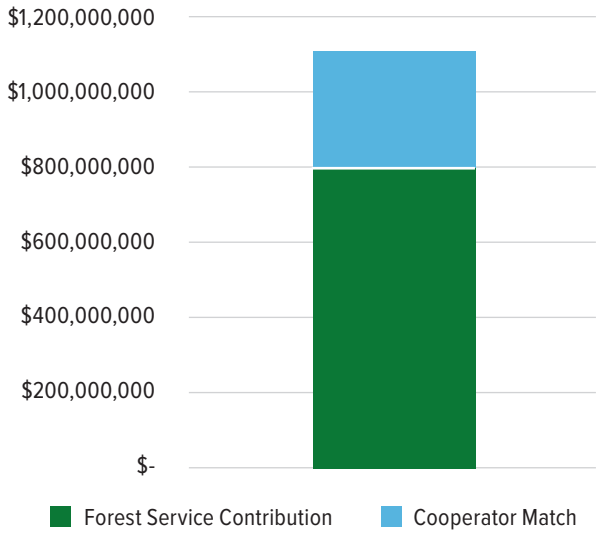
Federal funds used to conduct stewardship projects often yield matching funds from non-governmental partners (MacCleery 2004; Pinchot Institute for Conservation 2012b, 2013, 2014; Cowan et al. 2022; Daniels et al. 2018; Abrams and Burns 2007; Moseley 2010; Sundstrom and Sundstrom 2018). In response to a questionnaire on stewardship contracting, Forest Service regional offices noted that federal funds were often leveraged by matching funds from partner organizations (MacCleery 2004). Partner donations may come from groups who depend on forest health and habitat for recreation, such as the Rocky Mountain Elk Foundation, who contributed funds to the White Mountain Stewardship Contract on the Apache-Sitgreaves National Forest (Hjerpe et al. 2009).

In two of four studied stewardship contracting cases, Forest Service and partner staff indicated that project partners' ability to leverage private-sector funding enabled more prompt contractor payment and completion of on-the-ground work (Cowan et al. 2022). Stewardship contracts on the Mount Hood National Forest resulted in $545,000 in retained receipts (distributed in direct payment to contractors and project personnel), which were leveraged by about $823,000 in contributions from partner organizations. By contrast, a traditional timber sale is estimated to have generated about $110,000 from commercial thinning (Daniels et al. 2018). On the Siuslaw National Forest, restoration efforts that were conducted through retained receipts on adjacent project lands attracted matching funds from related interest groups (Hjerpe et al 2009).

Federal funds and cooperator match for stewardship agreements from 2014-2023 totaled over 1.1 trillion dollars (Figure 15a). All Forest Service regions cooperated with non-profits most often, and non-profits contributed the greatest total contribution amounts (Figure 15b). However, in some regions, local governments and for-profit organizations contributed a significant percent match. Notably, local governments in Region 2 contributed 73 percent match, for-profit organizations in Region 3 contributed 70 percent match, and for-profit organizations in Region 5 contributed 69 percent match (Appendix Table A3). In some cases these percentages represented only small amounts of the overall total contributions (Figure16). Regional average cooperator match percentages ranged from 37 percent to 0 percent. The median cooperator match percentage was 26 percent.

Local governments in Region 5 also contributed a significant portion of total match. Region 5 had the most investments in stewardship agreements for this time period, nearly double all other regions combined (Figure 16). Cooperators in Region 5 contributed over $204 million in match, while the Forest Service contributed $598 million in federal funds. By comparison, cooperators in all other regions combined contributed a total match of just under $106 million while the Forest Service contributed $201 million.

Figure 15a Total Forest Service contribution and cooperator match for all administrative regions (2014-2023)



Considerations for Phase 2 monitoring

- **Collect primary data from Forest Service and non-agency partners in conjunction with the proposed systematic sample of stewardship projects.**

Figure 15b Total Forest Service contribution amount and cooperator match by cooperator type (2014-2023)

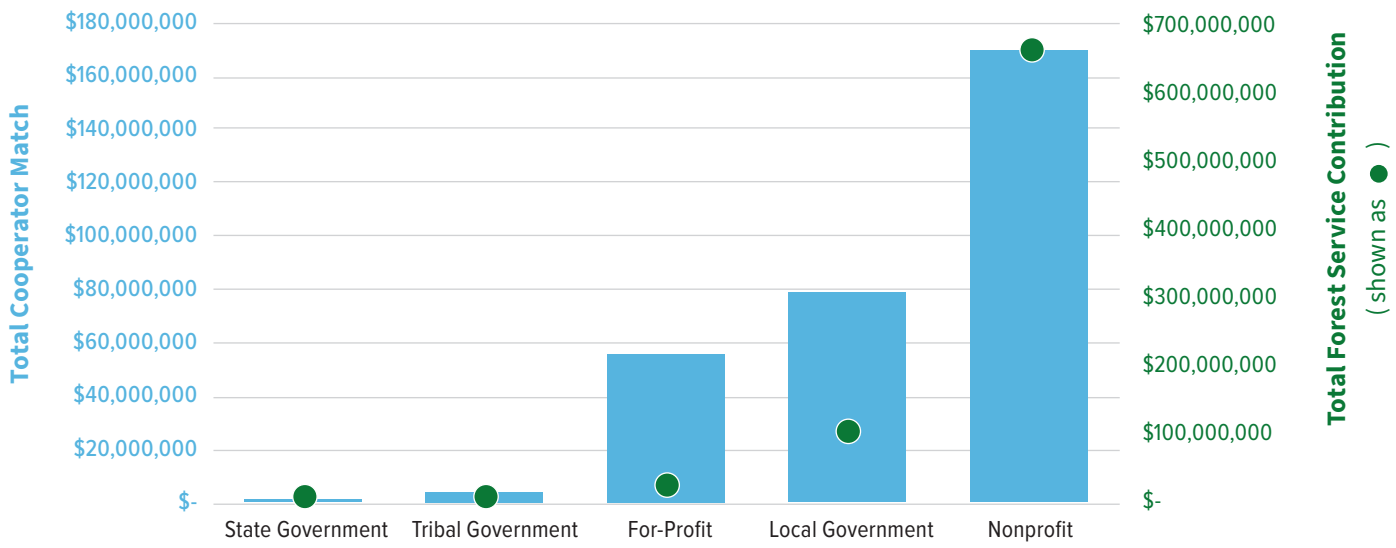
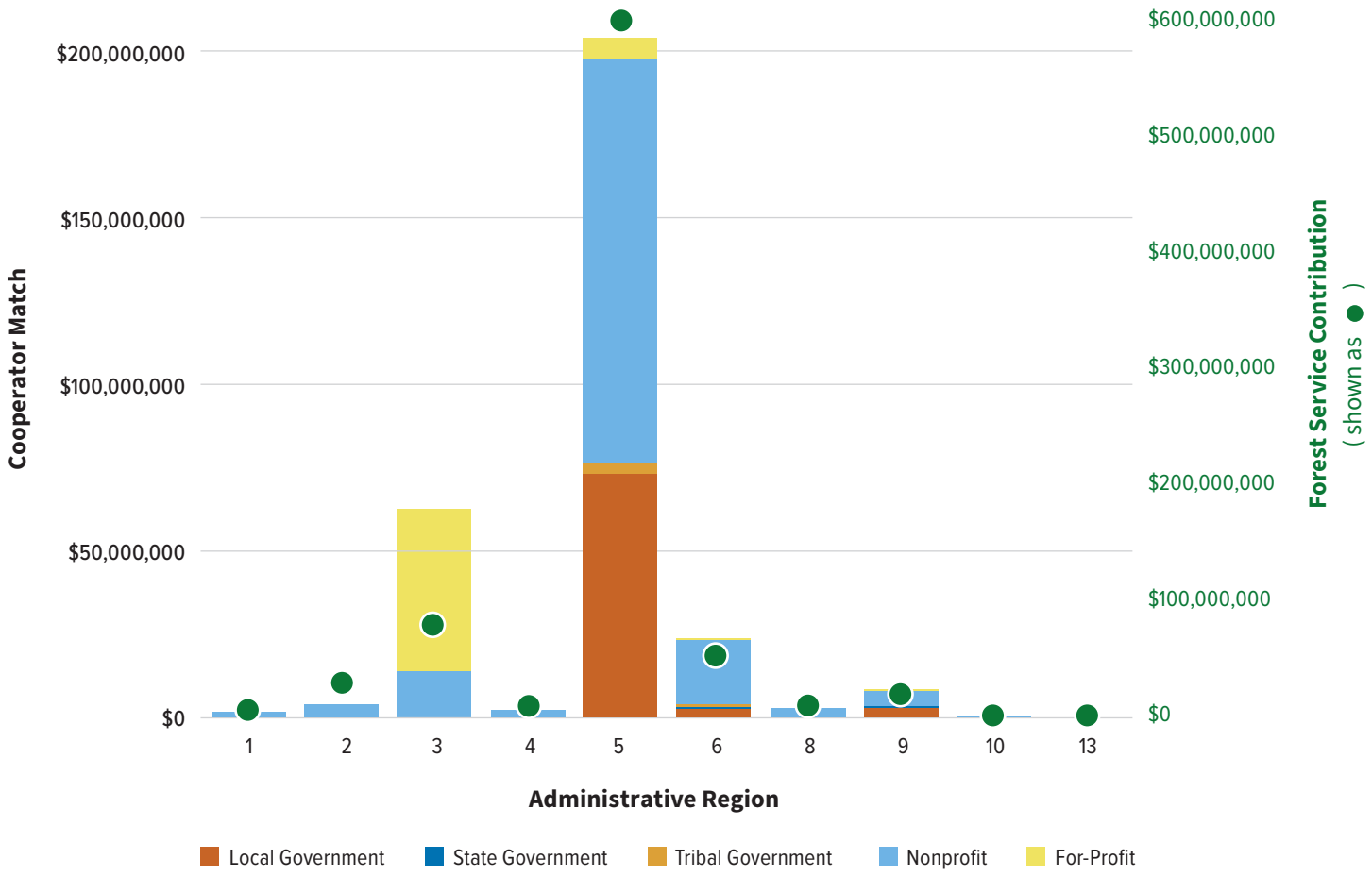


Figure 16 Cooperator type and match contributions for each administrative region.
Total Forest Service contribution amounts per region in green (see secondary axis).



Monitoring Question 9:

Opportunities for Local Community Participation

How did engagement with non-agency partners through stewardship contracting affect the agency and its management processes?

Approach

We conducted a literature review for baseline analysis of this question. We were unable to identify any secondary data that addressed this question.

Monitoring baseline

Previous research and monitoring

Stewardship contracting enables members of the local community to become involved in land management decisions that directly affect them through multiparty monitoring requirements (D'Ambrosio 2013; Inman et al. 2018; Egan 2007). Community involvement has been identified in the literature as a necessary approach to build confidence in management decisions (Egan 2007), and such an approach can foster increased sense of ownership and commitment to achieving stewardship objectives among non-agency stakeholders (Davis 2021; MacCleery 2004). For example, non-agency stakeholders involved in large stewardship agreements in the Pacific Northwest noted that establishment of a collective vision between agency members and community stakeholders enabled partners to work together more effectively, identify solutions, and sustain meaningful partnerships between the agency and non-agency partners (Davis and White 2015; Davis 2021). A key point is that these large agreements took place between groups that already had a strong collaborative history, which was able to be further utilized under stewardship contracting authorities (Davis 2021).

Similar community collaboration has been highlighted under the White Mountain Stewardship Contract (Egan 2007; Abrams and Burns 2007). For example, community capacity was built through collaborative forums, including the Natural Resources Working Group (NRWG), a multi-stakeholder collaborative forum which allowed the community to identify areas

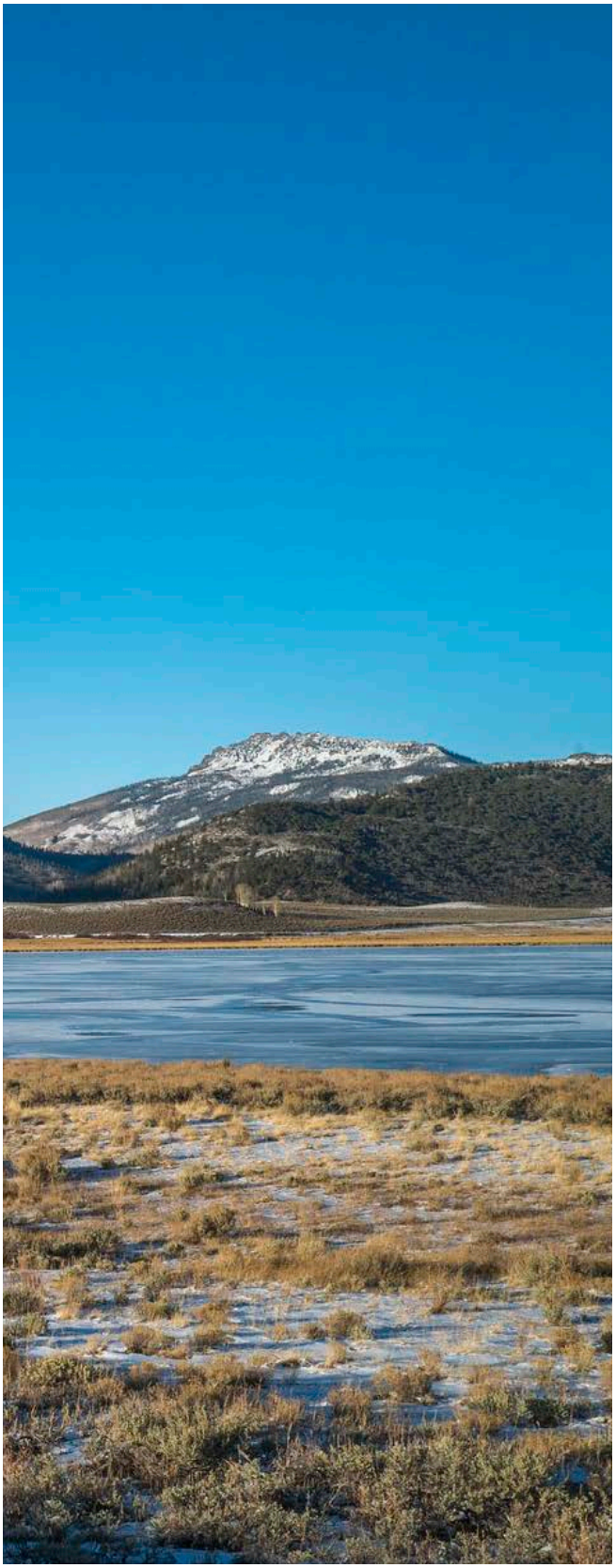
of common concern, build working relationships, and experiment with land management approaches under the contract. The community was also engaged using demonstration sites, which demonstrated various approaches to restoration and engaged the environmental community by implementing one treatment alternative based on the guidelines developed by regional environmental groups. Additionally, community involvement was achieved under the White Mountain Stewardship Contract by focusing treatments on areas identified and prioritized by Community Wildfire Protection Plans, which signaled to communities that the agency took community values seriously and provided land managers with strategic direction for the planning and implementation of treatments (Abrams and Burns 2007). These avenues for community participation may support local communities in taking voluntary action to produce individual and community benefits (Egan 2007).

Considerations for Phase 2 monitoring

- **Collect primary data on community participation in conjunction with proposed systematic sample of stewardship projects.**

- **Incorporate baseline monitoring results or newer secondary data on stewardship agreements into case study sampling and recruitment strategy.**

Grants and agreements data should be cross-validated with TIM data to ensure that all entities associated with agreement-related timber sales are cross-listed.



Monitoring Question 10:

Agency Engagement with Non-Agency Partners

How do stewardship projects offer opportunities for local community participation?

- *Did engagement with non-agency partners improve agency- non-agency relations?*
- *Did participation from non-agency partners broaden project scope?*
- *Did partnerships with non-agency restoration organizations facilitate improved monitoring?*

Approach

We conducted a literature review for baseline analysis of this question. We were unable to identify secondary data that adequately addressed this question.

Monitoring baseline

Previous research and monitoring

Agency-non-agency relations

Participants of stewardship contracting reported that the approach helped build mutual trust between the agency, project partners, and local communities (Pinchot Institute for Conservation 2008, 2012a, 2012b, 2013; Abrams and Burns 2007; Lucas et al. 2017; Hausbeck 2007; Moseley 2010). In a national survey of Forest Service staff, partner organizations, and contractors involved in stewardship contracting, perceived benefits included building mutual trust between the agency and its partners, increased opportunity for public input, increased support for the agency, and improved public trust (Pinchot Institute for Conservation 2008, 2012b, 2013). Survey respondents from the Forest Service Southeastern Region (Region 8) noted that stewardship contracting helped the agency build trust with local communities while meeting management and restoration objectives (Pinchot Institute for Conservation 2012a). On the White Mountain Stewardship Contract, interviewees felt that the project achieved long-term goals through trust-building among historically polarized collaborators (Abrams and Burns

2007; Lucas et al. 2017). The Clearwater Stewardship Contract Forest Service monitoring report describes building trust between the agency and Seeley Lake community (Hausbeck 2007). Although trust was reportedly initially low between agencies and partner organizations involved in a stewardship contract on the Deschutes National Forest, the collaborative process built trust over time (Moseley 2010).

Project scope

Stewardship contracting can enable diverse interests to be included in project planning and implementation, often broadening project scope to expand project objectives or strategies (Pinchot Institute for Conservation 2008, 2012b, 2013; Cowan et al. 2022). In three of four studied stewardship contracting cases, Forest Service staff indicated that partners contributed more outside-the-box thinking, prompting novel approaches, use of technologies not typically leveraged by Forest Service personnel, greater experimentation within regulatory frameworks, and broadening of project scopes (Cowan et al. 2022). Further, agency staff surveyed noted that non-agency participation in harvest and restoration operations provided a stronger sense of project ownership and increased commitment to making their ideas work (MacCleery 2004).

The collaborative partnerships facilitated by stewardship contracting can support Tribes in conducting stewardship activities directly, rather than deferring to federal nontribal management (Long and Lake 2018). Several stewardship contracts have supported Tribes in applying traditional ecological knowledge on national forestland to achieve desired social-ecological outcomes. For example, the Forest Service Fremont-Winema National Forest engages with the Klamath Tribes under a Master Stewardship Agreement to mitigate wildfire risk, conduct forest restoration activities, provide training to the tribal workforce, and improve local wood product processing capacity (Hatcher et al. 2017). In the Forest Service Pacific Southwest (Forest Service R5), a 10-year master stewardship agreement with the Pit River Tribes and Lomakatsi Restoration Project accomplished restoration treatments on 800,000 hectares of forestland across the Lassen, Modoc, and Shasta-Trinity National Forests (Long and Lake 2018).

Monitoring baseline

Partnerships with non-agency stakeholders enable improved monitoring of restoration efforts (Davis 2021). Interviews with key informants involved in five large stewardship contracting projects indicate that the collaborative partnerships established through stewardship contracting allowed the scientific expertise of project partners to play a core role in project implementation (Davis 2021). In turn, interviewees perceived partner expertise to facilitate improved monitoring efforts and an improved quality of restoration (Davis 2021).

Monitoring requirements built into the original stewardship contracting authority also facilitated improved monitoring by securing funding for those efforts. Although some interviewed agency personnel noted that funding for future monitoring is often uncertain, some ranger districts fulfilled required monitoring by setting aside a percentage of the project funds for monitoring. For example, the White Mountain Stewardship Contract dedicated three percent of project funding to a monitoring program (Schultz and Nie 2012).

Considerations for Phase 2 monitoring

- **No comprehensive secondary data are available without new data collection.**
- **Evaluation of the influence of non-agency partnerships on agency-non-agency relationships as well as project planning and scope will require new qualitative data collection. This could be accomplished in conjunction with the proposed Phase 2 systematic sampling of stewardship projects.**
- **To assess the role of partnerships in monitoring, a systematic review of project-level monitoring efforts could be implemented in conjunction with the proposed systematic sample of stewardship projects.**

As part of a nationwide sample of stewardship projects, project participants could be engaged through survey or interview techniques. Questions could be posed on the impacts of stewardship projects on agency-non-agency relations as well as project planning and scope.

For future monitoring, the concept of trust could be analyzed using more nuanced, updated frameworks and concepts. Prior studies focused in a general way on the presence of trust and what might explain that trust. Other work since has expanded on the concept of trust in more nuanced ways, identifying different types of trust (dispositional trust, rational trust, procedural trust) and how they function (Stern and Coleman 2015, Coleman and Stern 2018, Davis et al. 2018). For example, a lack of dispositional and rational trust in the Forest Service may foster challenges to affinitive trust within the group, and to procedural trust in the collaborative as an effective venue (Davis et al. 2018). In conjunction with this effort, a systematic review of monitoring protocols and reporting as well as datasets generated by monitoring efforts could be used to evaluate partner contributions to project monitoring.

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Appendix A:

Stewardship Activities, Further Methods and Details

We downloaded shapefiles (points, lines, and polygons) associated with stewardship projects in January 2024 from the Forest Service "FSGeodata Clearinghouse" website (USDA Forest Service 2024). This data was last updated in September 2024 and consists of activities planned as early as 2001 and "accomplished" (signifying contract signed) between FY 2014 and FY 2023. The data consist of 68,951 discrete activities and includes details such as the years planned and completed, type of work completed, National Forest unit (Ranger District) place of performance, and the number of acres of national forest involved.

Forest Service FACTS datasets contain duplication in terms of intra- and inter-duplication (Knight et al. 2022). Intra-duplication occurs when a sequence of activities occur across the same footprint (activity area) within the same dataset. Knight et al. (2022) provide an example of commercial thinning, followed by piling of brush, followed by underburning. Intra-duplication occurs when that same sequence of activity is recorded as biomass removal in another dataset. Such duplications are best identified using the stand unit ID and the acreage of the activity footprint. Within the FACTS Stewardship Activities dataset, we found that while in some cases intra-duplications recorded a sequence of events that were completed over a span of years, sometimes they simply denoted different aspects of the same activities. Consequently, to summarize stewardship activities, we grouped activities by activity footprint (subunit ID and acreage) and year of completion. For Figure 3 above, we used the FACTS activity categories provided within the metadata for FACTS Stewardship Activities (https://data.fs.usda.gov/geodata/edw/edw_resources/meta/Actv_StwrdshpCntrctng_LN.xml). In this appendix on stewardship activities, we additionally re-classified FACTS activities according to a more granular activity schema used previously for monitoring terrestrial vegetation restoration work in Oregon (Coughlan et al. 2023) (Table A1). Table A2 summarizes acres treated by this activity schema.

Table A1 NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Invasives - Biocontrol, Classic	Biological treatment
Group Selection Cut (UA/RH/FH)	Biomass Removal
Harvest Without Restocking	Biomass Removal
Improvement Cut	Biomass Removal
Invasives - Mechanical /Physical	Biomass Removal
Liberation Cut	Biomass Removal
Overstory Removal Cut (from advanced regeneration) (EA/RH/FH)	Biomass Removal
Patch Clearcut (EA/RH/FH)	Biomass Removal
Patch Clearcut (w/ leave trees) (EA/RH/FH)	Biomass Removal
Re-vegetation treatments - vegetation removal	Biomass Removal
Seed-tree Final Cut (EA/NRH/FH)	Biomass Removal

Table A1, cont. NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Seed-tree Preparatory Cut (EA/NRH/NFH)	Biomass Removal
Seed-tree Removal Cut (w/ leave trees) (EA/NRH/FH)	Biomass Removal
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	Biomass Removal
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	Biomass Removal
Shelterwood Preparatory Cut (EA/NRH/NFH)	Biomass Removal
Shelterwood Removal Cut (EA/NRH/FH)	Biomass Removal
Shelterwood Removal Cut (w/ leave trees) (EA/NRH/FH)	Biomass Removal
Shelterwood Staged Removal Cut (EA/NRH/NFH)	Biomass Removal
Single-tree Selection Cut (UA/RH/FH)	Biomass Removal
Special Products Removal	Biomass Removal
Stand Clearcut (EA/RH/FH)	Biomass Removal
Stand Clearcut (w/ leave trees) (EA/RH/FH)	Biomass Removal
Two-aged Coppice Cut (w/res) (2A/RH/FH)	Biomass Removal
Two-aged Patch Clearcut (w/res) (2A/RH/FH)	Biomass Removal
Two-aged Preparatory Cut (w/res) (2A/NRH/NFH)	Biomass Removal
Two-aged Seed-tree Seed and Removal Cut (w/res) (2A/RH/FH)	Biomass Removal
Two-aged Shelterwood Establishment and Removal Cut (w/ res) (2A/RH/FH)	Biomass Removal
Two-aged Shelterwood Establishment Cut (w/res) (2A/RH/NFH)	Biomass Removal
Two-aged Shelterwood Final Removal Cut (w/res) (2A/NRH/FH)	Biomass Removal
Two-aged Stand Clearcut (w/res) (2A/RH/FH)	Biomass Removal
Wildlife Habitat Regeneration cut	Biomass Removal
Yarding - Removal of Fuels by Carrying or Dragging	Biomass Removal
Broadcast Burning - Covers a majority of the unit	Broadcast Burn
Control of Understory Vegetation- Burning	Broadcast Burn
Site Preparation for Natural Regeneration - Burning	Broadcast Burn
Site Preparation for Planting - Burning	Broadcast Burn
Site Preparation for Seeding - Burning	Broadcast Burn
Underburn - Low Intensity (Majority of Unit)	Broadcast Burn
Wildlife Habitat Prescribed fire	Broadcast Burn
Invasives - Pesticide Application	Chemical
Site Preparation for Natural Regeneration - Chemical	Chemical
Site Preparation for Planting - Chemical	Chemical

Table A1, cont. NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Wildlife Habitat Chemical treatment	Chemical
Chipping of Fuels	Chipping
Compacting/Crushing of Fuels	Crushing
Grazing and Range Mgt. for Hazardous Fuels Reduction	Grazing
Range Control Vegetation	Grazing
Range Cover Manipulation	Grazing
Jackpot Burning - Scattered concentrations	Jackpot Burn
Rearrangement of Fuels	Lop and Scatter
Site Preparation for Natural Regeneration - Manual	Lop and Scatter
Site Preparation for Planting - Manual	Lop and Scatter
Slashing - Pre-Site Preparation	Lop and Scatter
Permanent Land Clearing	Machine Pile
Piling of Fuels, Hand or Machine	Machine Pile
Range Piling Slash	Machine Pile
Site Preparation for Natural Regeneration - Mechanical	Machine Pile
Site Preparation for Planting - Mechanical	Machine Pile
Site Preparation for Seeding - Mechanical	Machine Pile
Visual Resource Slash treatment	Machine Pile
Wildlife Habitat Mechanical treatment	Machine Pile
Wildlife Habitat Slash treatment	Machine Pile
Burning of Piled Material	Machine Pile Burn
Road Maintenance - Vegetation Reduction	Mastication/Mowing
Acres Improved - Construction/Reconstruction of Range Grz Structural Improv Area	N/A
Animal Control for TSI	N/A
Animal Damage Control for Reforestation	N/A
Certification of Natural Regeneration with Site Prep	N/A
Certification of Natural Regeneration without Site Prep	N/A
Certification-Planted	N/A
Certification-Seeded	N/A
Control of Understory Vegetation	N/A
Coppice Cut (EA/RH/FH)	N/A
Coppice Cut (w/leave trees) (EA/RH/FH)	N/A

Table A1, cont. NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Cruising	N/A
Disease Control	N/A
Disease Inventory	N/A
Disease Prevention	N/A
Evaluation Plantation Examination/ Measurement	N/A
Genetic Evaluation Plantation Establishment	N/A
Initiate Natural Regeneration	N/A
Inland Fisheries Habitat Improvement Activities	N/A
Invasives - Treatment Activity Monitoring	N/A
Landing Treated - Area Mitigated	N/A
Leave Tree Protection	N/A
Leave Trees (Wildlife Reasons) - Area	N/A
Leave Trees (Wildlife Reasons) - Each	N/A
Low Intensity Stand Examination	N/A
Maintenance of Animal Damage Control for Reforestation	N/A
Marking/Designation	N/A
Natural Recovery	N/A
No Treatment Matrix	N/A
Nonrange Fences - Area	N/A
Nonrange Fences - Length	N/A
Other Stand Tending	N/A
Planned Treatment Burned in Wildfire	N/A
Plantation Survival Survey	N/A
Planting propagules and cuttings	N/A
Pollinator habitat improved, restored or maintained	N/A
Post Treatment Exam Fuels Mgt	N/A
Post Treatment Vegetation Monitoring	N/A
Pretreatment Exam for Reforestation	N/A
Range Cover Type Conversion	N/A
Range Forage Improvement	N/A
Range Seeding and Planting	N/A

Table A1, cont. NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Recreation Gate roads or trails	N/A
Recreation Removal of hazard trees and snags - Area	N/A
Reforestation Enhancement	N/A
Road Obliteration	N/A
Road ReConstruction	N/A
Scarify and Seed Landings	N/A
Seed (Trees)	N/A
Seed Orchard Establishment / Improvements	N/A
Seed Production Area Maintenance	N/A
Seeding grasses, forbs and/or shrubs	N/A
Sensitive Species Protection	N/A
Silvicultural Stand Examination	N/A
Soil Productivity Improvement	N/A
Stand Diagnosis Prepared	N/A
Stand Silviculture Prescription	N/A
Stocking Survey	N/A
T&ES non-structural improvement	N/A
T&ES structural habitat improvement	N/A
TES and Sensitive Species Activities	N/A
Trail Maintenance	N/A
Transporation Related Activities	N/A
Tree Encroachment Control	N/A
TSI Certification - Pruning	N/A
TSI Certification - Release/weeding	N/A
TSI Certification - Thinning	N/A
TSI Need Created- Precommercial Thin	N/A
Visual Enhancement	N/A
Visual Resources Protection & Improvement	N/A
Watershed Resource Activities	N/A
Watershed Resource Non-Structural Improvements Erosion Cont	N/A
Watershed Resource Non-Structural Improvements Maintanence	N/A
Watershed Resource Non-Structural Improvements Riparian	N/A

Table A1, cont. NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Watershed Resource Non-Structural Improvements Soil Productivity	N/A
Watershed Resource Non-Structural Improvements Stream Chann	N/A
Watershed Resource Road Closure - Area	N/A
Watershed Resource Road Obliteration - Area	N/A
Watershed Resource Road Obliteration - Length	N/A
Watershed Resources Structural Improvement	N/A
Wildland seed collecting	N/A
Wildlife Habitat Access management (Closure Area)	N/A
Wildlife Habitat Activities	N/A
Wildlife Habitat Create corridors	N/A
Wildlife Habitat Create openings	N/A
Wildlife Habitat Improvement	N/A
Wildlife Habitat Nest structures, dens development	N/A
Wildlife Habitat Non-Structural Improvement	N/A
Wildlife habitat non-structural maintenance	N/A
Wildlife Habitat Rehabilitate openings	N/A
Wildlife Habitat Release and weeding	N/A
Wildlife Habitat Seeding and planting	N/A
Wildlife Habitat Snags created	N/A
Fill-in or Replant Trees	Planting
Plant Trees	Planting
Burn Plan - Fuels	Preparation
Cover brush pile for burning	Preparation
Fireline Construction	Preparation
Fuel Inventory	Preparation
Layout and Design	Preparation
Facility construction and reconstruction	Replace administration
Commercial Thin	Thinning
Fuel Break	Thinning
Precommercial Thin	Thinning
Precommercial thinning for visual	Thinning

Table A1, cont. NEPA projects litigated in each administrative region

Activity Name	Treatment Type
Prune	Thinning
Pruning to Raise Canopy Height and Discourage Crown Fire	Thinning
Salvage Cut (intermediate treatment, not regeneration)	Thinning
Sanitation Cut	Thinning
Site Preparation for Natural Regeneration - Other	Thinning
Site Preparation for Planting - Other	Thinning
Thinning for Hazardous Fuels Reduction	Thinning
Tree Release and Weed	Thinning
Wildlife Habitat Intermediate cut	Thinning
Wildlife Habitat Precommercial thinning	Thinning

Table A2 Treatment type and acres treated

Activity Name	Acres Treated (in 1000s)
Mastication/ Mowing	0.54
Recreation	4.41
Range Improvement	6.93
Thinning	7.79
Watershed-related Restoration	8.82
Other Fuels Management	8.88
Biomass Removal	10.2
Chemical	10.32
Monitoring or Certification	12.43
Salvage	17.16
Chipping of Fuels	17.44
Revegetation	19.67
Preparation	20.05

Activity Name	Acres Treated (in 1000s)
Lop and Scatter	21.3
Planting	30.22
Grazing	48.41
Stand Survey and Prep	57.72
Mechanical Surface Treatment	92.73
Silviculture Prescription	102.32
Invasive Treatment	112.5
Wildlife Habitat Restoration	217.15
Precommercial Thin	300.72
Hand or Machine Pile	305.13
Commercial Sale	358.76
Burning	879.8

Table A3 Summary of stewardship agreement funding by cooperator type and Forest Service region.

Region #	Cooperator Type / Agreements	Match (Thousand $)	Forest Service Contribution (Thousand $)	Match as % Total
1	Local Government / **6** State Government / **3** Tribal Government / **3** Nonprofit / **31**	142.67 9.50 148.99 1226.67	382.248 808.298 482.075 2962.049	27% 1% 24% 29%
2	Local Government / **1** Nonprofit / **25** For Profit / **1**	312.26 3605.51 0.00	117.985 28195.82 0	73% 11% 0%
3	Local Government / **1** Nonprofit / **23** For Profit / **2**	312.26 3605.51 0.00	25.43 13606.65 49335.98	15% 19% 70%
4	Nonprofit / **15**	2304.12	8074.855	22%
5	Local Government / **48** State Government / **3** Tribal Government / **8** Nonprofit / **101** For Profit / **5**	73053.46 89.00 2621.92 121959.82 6649.43	93362.59 253.07 7230.684 494543.9 2930.4	44% 26% 27% 20% 70%
6	Local Government / **23** State Government / **7** Tribal Government / **7** Nonprofit / **81** For Profit / **2**	2345.36 676.95 669.08 19773.59 268.44	7841.267 1495.163 819.373 37635.66 5036.861	23% 31% 45% 34% 5%
8	State Government / **7** Tribal Government / **1** Nonprofit / **50** For Profit / **1**	111.18 467.16 2375.03 0.00	111.478 1793.176 5835.88 0	50% 21% 29% 0%
9	Local Government / **35** State Government / **4** Tribal Government / **7** Nonprofit / **86** For Profit / **3**	2898.29 245.12 111.85 4636.29 19.31	2934.223 400.419 297.089 15612.22 22.62	50% 38% 27% 23% 46%
10	Tribal Government / **2** Nonprofit / **6**	84.73 101.38	238.971 482.827	26% 17%
13	Nonprofit / **4**	0.00	0	0%

Appendix B:

Local Analysis

Defining "Local"

Contracting ranger districts and their local communities have varying levels of forestry infrastructure. Some ranger districts are adjacent to large communities with larger workforces and wood processing facilities while others are more remote. Therefore, to understand the potential for "local" benefits from stewardship contracting, we used locally derived distance thresholds (as opposed to one "global" definition) to define local area for each ranger district. To do this, we calculated the route-based driving distance between forestry contractors' places of business (PoB) and the ranger districts where the contracted work was performed. We then used this distance data to define route-based travel distance thresholds between each ranger district and the places of business of forestry contractors.

Our distance analysis relied on two different datasets: (1) timber sale contract data from the TIM database and (2) Federal Procurement Data System (FPDS) contract data. We obtained the timber sale contract data (TS) for fiscal years 2014-2023 from the Forest Service Washington office. For each timber sale award, this data lists the fiscal year of award, National Forest System Region, Forest, and ranger district, the purchaser business name and address, the bid amount, sale volume, as well as indicators for whether the sale was contracted under the stewardship authorities or other authorities such as the Good Neighbor Authority. FPDS data were downloaded from the System for Award Management (SAM.gov) website. The FPDS data contained similar information to the TS data, including purchaser business name and address and ranger district where the work was performed. It also contains product service codes which allowed us to filter for contracts most similar to service work performed under stewardship agreements (Deak et. al., 2023).

To construct our definition of local, we created the following distance metrics:

- **Median timber sale distance** by ranger district: This metric is the median route-based driving distance between contractor PoB and the center of the ranger district offering the sale (technically the centroid, which, in the case of fragmented land ownership, is the center point of all parcels) for all non-stewardship timber sales7 2014-2023.

- **Median forestry contractor distance** by ranger district: This metric is the median route-based driving distance between contractor PoB and the center of the ranger district where the work was performed for all forestry-work contracts in the FPDS data 2014-2023.

- **Minimum forestry contract distance** by ranger district: This metric is the minimum route-based driving distance between contractor PoB and the center of the ranger district where the work was performed for all forestry-work contracts in the FPDS data 2014-2023.

In constructing these variables, we noted that the global median timber sale distance was significantly lower than the global median forestry contract distance. Given this fact, our definition for distance thresholds consisted of the following conditions:

Local	Somewhat Local	Non-Local
≤ median timber sale distance if the median timber sale distance < median forestry contractor distance or if there were no forestry contracts, ***OR*** ≤ median forestry contract distance if the median timber sale distance > median contract distance, ***OR*** = minimum forestry contract distance if there were no timber sales	> local threshold and ≤ median forestry contract distance if the median timber sale distance < median forestry contract distance, ***OR*** > local threshold and ≤ median timber sale distance if the median timber sale distance > median forestry contract distance	> somewhat local

Local is

(1) equal to or less than the median ranger district timber sale distance if the median ranger district timber sale distance is less than the median ranger district forestry contractor distance or if there were no forestry contracts, ***or***

(2) equal to or less than the median ranger district forestry contract distance if the median ranger district timber sale distance was greater than the median ranger district contract distance, ***or***

(3) equal to the minimum ranger district forestry contract distance if there were no timber sales.

Somewhat local is

(1) greater than the local threshold and equal to or less than the median ranger district forestry contract distance if the median ranger district timber sale distance was less than the median ranger district forestry contract distance, ***or***

(2) greater than the local threshold and equal to or less than the median ranger district timber sale distance if the median ranger district timber sale distance was greater than the median ranger district forestry contract distance.

Non-local is

(1) greater than Somewhat local.

We used these thresholds to classify each stewardship timber sale contract, thus classifying the total sale volume, total bid value, and total service bid value as either local, somewhat local, or non-local in comparison to other types of timber sales and contracts for work similar to stewardship service activities. Some organizations that entered into stewardship timber sale contracts were national or even international non-profit organizations such as the Nature Conservancy or the National Wild Turkey Federation that typically subcontract most of their work to local entities. Because we did not have the contract details for those subcontracts, we filtered sales going to those organizations out of our analysis.

To understand how contracting dynamics played out between ranger districts and across the National Forest System, we summarized the local, somewhat local, and nonlocal timber sale bid values and services bid values by ranger district and classified each ranger district as local, somewhat local, and non-local in terms of their stewardship contracting practices.

4. Local ranger district: the summed local bid values (for both timber sale and services) were greater than the summed bid values of the other categories combined.

5. Somewhat Local ranger district: the summed local bid values are less than the summed bid values for somewhat local contracts and the summed bid values for Local and Somewhat Local combined were greater than the summed bid value for Non-Local.

6. Non-Local: the summed Non-Local bid value was greater than the other categories combined.

Appendix C:

Modeling Direct Economic Effects

Because the TIM data includes only the total volume of each sale, we had to make assumptions about the types of products in the sale (e.g., sawtimber, pulpwood, fuelwood) and the types of processing facilities that would receive the volume sold. We applied the average mix of product classes from recent timber sales on each forest to all the stewardship sales for that forest. Within product classes (e.g., sawtimber, or pulpwood) we assumed the types of processing facilities that would be receiving that material using average patterns for the appropriate Forest Service region. So, for a given stewardship sale, we assume the volume of material from that sale falls into different product classes using forest-specific information and then we assume the type of processing facility(ies) receiving that volume based on Forest Service regional information. This forest and regional information was provided by the Forest Service Policy Office economists and we followed their standard procedures for applying these assumptions.

The Forest Service relies on the direct employment and labor income response coefficients produced annually by the Bureau of Business and Economic Research8 to estimate the direct effects from timber harvesting and processing. These coefficients translate the volume handled by each segment of the wood processing chain (e.g., logging companies, sawmills, mills using residues) into an estimate of the jobs and income supported in that segment. The coefficients are produced for several U.S. regions. We followed standard practices used by the Forest Service policy office economists to calculate the direct effects associated with each timber sale and then summed those effects to report aggregated direct job and income effects associated with stewardship sales during our study period.

Appendix D:

Stewardship Timber Contractors

A full list of businesses and organizations entering into Forest Service stewardship timber contracts for fiscal years 2014-2023 can be found here: https://hdl.handle.net/1794/31416.

Ecosystem Workforce Program

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