

Cross-boundary cooperation in wildfire management during the custodial management period of the US Forest Service: A case study of the eastern Cascades of Oregon, USA, 1905–1945

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ABSTRACT

In the U.S., federal, tribal, state, local, and private land management entities seek to implement a wildfire management strategy that spans large spatial extents and multiple ownerships to achieve wildfire risk reduction and forest restoration. This strategy requires cross-boundary cooperation. Cooperative cross-boundary forest management is not new; yet little case study research has documented historical examples. This study provides insight into how potentially overlooked models of cross-boundary cooperation of the past may be applicable to renewed cross-boundary cooperation today. We examined cooperation during the custodial management period (1905–1945) of Forest Service history. This study identifies the governance institutions, partner roles, and practices that promoted the establishment and durability of cross-boundary cooperation under two governance models adopted by the Forest Service and partners. The models are: cooperative federalism, for partnering with state and private landowner local entities – forest protective associations (FPAs); and federal interagency cooperation, for partnering with the Bureau of Indian Affairs Forestry Division, historically responsible for managing tribal lands. Using case study methods, we examined two examples of each model from the eastern Cascades of Oregon, USA. Two governance characteristics promoted durable cooperation, regardless of model: (1) the development of a bundle of cooperation-focused institutions (cross-organizational policy alignment; headquarters-level cooperative policies, laws, and/or interagency agreements; unit-level cooperative agreements) that linked multiple Forest Service administrative levels (agency headquarters, local unit) to those of partner entities; and (2) the performance of a diversity of partner roles—operating at both headquarters and local levels—that enabled management entities to offset capacity constraints. Several governance characteristics promoted cooperation in the model that engaged private landowners (cooperative federalism). These were: the state-granted authorities of a special purpose district, whereby self-organized FPAs garnered resources and developed and enforced cooperative practices that coordinated upward with state and federal policies; recognition by the state and Forest Service of authorized, local entities that represented private landowners (FPAs) as essential partners; an administrative structure for state transfer of federal funding to local entities, resulting in cost-sharing; and the state's performance of the roles of cost-sharing administrator and liaison between Forest Service and local entities. We suggest that the more partners can integrate these features into cross-boundary wildfire management cooperation today, the better its chances of establishment and durability.

1. Introduction

In the United States, a defining characteristic of twenty-first century wildfire policies at federal, tribal, state, and local levels is management at larger spatial extents and across ownerships to advance the goals of

wildfire risk reduction and forest restoration (Charnley et al., 2017, 2020; Cyphers and Schultz, 2019; Davis et al., 2021; NASF, 2009). The National Cohesive Wildland Fire Management Strategy (“Cohesive Strategy”), jointly signed by the Secretary of Interior and Secretary of Agriculture, established the vision for these policy goals at the national

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level (USDI and USDA, 2014). Authorized by the Federal Land Management Assistance (FLAME) Act of 2009 and finalized in 2014, the strategy sets goals to comprehensively plan and implement wildfire response across jurisdictions and ownerships (“across all lands”, USDI and USDA, 2014, p. 1).

The US Forest Service (“Forest Service”) has developed two new programs, the Collaborative Forest Landscape Restoration Program (established in the Omnibus Public Land Management Act of 2009) (Butler and Schultz, 2019; Schultz et al., 2012), and with the Natural Resources Conservation Service, the Joint Chiefs Landscape Restoration Partnership (initiated in 2014) (Kelly et al., 2019). Shared Stewardship, a Forest Service strategy, also contributes to cross-boundary management. A Shared Stewardship promotional document, released in 2018, communicates the agency’s vision of working with Tribes, states, and landowners to plan and implement actions that address a variety of cross-boundary challenges, including wildfire, invasive species, drought, and outbreaks of insects and pathogens (USFS, 2018). The Good Neighbor Authority (GNA), passed permanently into law in 2014 and further expanded in 2018, serves as an essential legal tool supporting Shared Stewardship at state and local levels and with Tribes.¹ This authority allows the Forest Service to enter into agreements with states, counties, and Tribes to implement restoration treatments on federal lands (Abrams, 2019; Congressional Research Service, 2020; USFS, 2018). As of 2022, dozens of states spanning regions around the U. S., including all eleven states of the US West, as well as in the Northeast, the Chesapeake Bay Watershed, and the Southern U.S., have established Shared Stewardship memoranda of understanding with the Forest Service (USFS, n.d.).

Cross-boundary cooperation frequently is necessary to reduce wildfire risk and restore the health of fire-prone forests at the landscape scale because individual landowners generally cannot achieve landscape scale goals on their own. Forestland entities often self-organize into partnerships (Charnley et al., 2020; Dockry et al., 2018), whereby they can self-govern to bring about these goals through collective action (Cyphers and Schultz, 2019; Fischer et al., 2019). Cross-boundary cooperation occurs when two or more entities representing different ownerships: (1) jointly make decisions to fulfill shared goals that cannot be achieved independently; (2) pool resources; and yet (3) preserve each party’s autonomy so that no party controls the behavior of others (Fischer et al., 2019; Thomas, 2003; Yaffee, 1999). Cooperation is a practical approach to accommodate the declining administrative capacity and in particular, the shrinking pool of resources of many land management agencies relative to demands, as is exemplified by the Forest Service’s increased use of partnerships (Abrams, 2019; Steen-Adams et al., 2022). Today, the agency’s wildfire management strategy centers on ecological restoration using hazardous fuels treatments (prescribed fire, mechanical treatments) and managed wildfire (Stelman and Burke, 2007), often in conjunction with cross-boundary cooperation in planning and implementation (Davis et al., 2021; Fischer and Charnley, 2012).

A central question for today’s forest managers, officials, and stakeholders is how to promote the establishment and durability of a cross-boundary cooperative approach to wildfire management. “Establishment” refers to instituting a policy or practice within a bureaucratic organization; “durability” refers to the time span over which a policy or practice persists in an organization. There is need for knowledge regarding opportunities to correct the institutional factors (e.g., misaligned policy goals, uncoordinated program budgets) that may impede joint decision-making across organizations (Fleming et al., 2015; Tuchmann et al., 1996). Another major knowledge need pertains to partner roles to promote cooperation (Machlis et al., 2002). As new governance arrangements emerge (Koontz et al., 2010), a variety of roles may be performed by Tribes, states, and private landowner

organizations vis-à-vis Forest Service counterparts. Such roles include resource sharing among the Forest Service and partners (Huber-Stearns et al., 2021), as an offset to shortfalls in management capacity (Abrams, 2019; USFS, 2018; Yaffee, 1999). Identifying ways to coordinate resource sharing may increase the efficiency in resource use.

Documents by the Forest Service and a state partner mention a multi-decadal history of cooperation, yet lack details, suggesting an opportunity to expand knowledge about this history. In its Shared Stewardship rollout document, the Forest Service notes, “For decades, we have worked with States, Tribes, local communities, and collaborative groups to reduce fuels and improve forest conditions” (USFS, 2018, p. 2). Similarly, the Oregon Department of Forestry affirms “a long history of collaboration” (pp. 1) in its 2019 Memorandum of Understanding on Shared Stewardship with the Forest Service” (ODF, 2018).

The history of cooperative wildfire management is relevant to present-day policy and management, despite the evolution in paradigm from fire suppression to forest restoration. In the Pacific Northwest, forest managers of the early twentieth century devised strategies to deal with many of the same challenges encountered by today’s managers: severe wildfires – such as Washington’s record-breaking Yacolt Burn of 1902, and burns in about 1910 on the Colville National Forest, Blue Mountains, and then-named Crater National Forest in the southern Cascades –, often fueled by a large volume of flammable material on private lands (Maunder, 1959; Williams, 2009); shortfalls in management capacity (Pyne, 1997); and conflicts about the respective roles and responsibilities of adjoining landowners in managing cross-jurisdictional wildfire spread (Bramwell, 2013; Robbins, 1997; Steen, 2013; Thorpe, 2011). An examination of how managers dealt with these challenges in the past can generate applications to current wildfire management (Pyne, 2015).

Our objective was to identify the key governance elements – institutions, partner roles, and activities – that historically promoted the establishment and durability of cooperation in wildfire management, and may be applicable today. We investigated examples of cooperation during the Forest Service’s custodial management period (1905–1945) (MacCleery and Le Master, 1999) when cooperative models of wildfire management first were adopted in the eastern Cascades of Oregon (Steen-Adams et al., 2017).² Policymakers, land managers, and landowners experimented with ways to establish a cooperative approach. Drawing upon four examples from the eastern Cascades (two examples of each model, distributed across two sub-regions), we examined how Forest Service managers of the agency’s custodial management period established and maintained cooperative arrangements with partners in the Bureau of Indian Affairs Forestry Division (“BIA Forestry”), the state forestry agency, and local entities representing private landowners.³

Our analysis revealed two governance characteristics that promoted cross-boundary cooperation, regardless of governance model: (1) the development of a bundle of cooperation-focused institutions (cross-organizational policy alignment; headquarters-level cooperative policies, laws, and/or interagency agreements; unit-level cooperative agreements) that linked multiple administrative levels (headquarters,

² The Forest Service’s custodial management period is characterized by custodianship of the nation’s timber estate for the benefit of then-present and future generations – a response to the unsustainable harvest practices of many private forestry entities of and predating the period (Hays, 2009; MacCleery and Le Master, 1999; Steen, 2013; Williams, 2009).

³ “BIA Forestry” rather than “tribal” is used in this study to maintain consistency with the governance conditions of the 1905–1945 study period. Historically, federal agency-employed foresters made management decisions, generally without involvement of tribal governments (Catton, 2016; Newell et al., 1986; Steen-Adams et al., 2010). The BIA Forestry Division was initially named the Branch of Forestry (1910) of the Office of Indian Affairs (created 1824).

¹ The 2014 Farm Bill expanded GNA from its pilot status in Colorado and Utah into a national law.

local unit) of the Forest Service with partner(s); and (2) the performance of a diversity of partner roles— both complementary and mutual, and operating at both headquarters and local levels — that enabled management entities to offset capacity constraints. Several governance characteristics promoted cooperation with private landowners in particular: the state-granted authorities of a special purpose district, where self-organized FPAs garnered resources and developed and enforced cooperative practices that coordinated upward with state and federal policies; recognition by the state and Forest Service of specified decision-making authorities of local entities (FPAs); an administrative structure for state transfer of federal funding to local entities, resulting in cost-sharing; and the state's performance of the roles of cost-sharing administrator and liaison between Forest Service and local entities.

2. Cooperation in land management

2.1. Coordination, cooperation, and collaboration

Cooperation is related to coordination and collaboration: all three concepts pertain to inter-organizational relationships and can be characterized along a spectrum of entities' levels of interaction, effort, and willingness to defer to one another's wishes and/or strike compromises—thereby ceding autonomy—to achieve shared goals (Wondolleck and Yaffee, 1997; Yaffee, 1999) (Fig. 1). Coordination, located at the low interaction/ high autonomy end of the spectrum, is an inter-organizational relationship in which actions between parties support (or do not conflict with) one another (Yaffee, 1999). Collaboration—for instance, in collaborative environmental management—at the other end of the spectrum, implies shared decision-making among government and non-government entities (Koontz et al., 2010). The breakpoints between these three concepts along the spectrum of level interaction and autonomy are not clearcut. Cooperation overlaps with coordination and collaboration, resulting in instances when cooperation may take on characteristics of either concept. This study focuses on cooperation because it is the applicable concept to the historical study period.

2.2. Elements of wildfire management cooperation

The tools available to managers to foster a cross-boundary, cooperative approach to wildfire management fall into three categories: policies and other institutions (Schultz and Moseley, 2019); partner roles, including resource sharing (Charnley et al., 2020; Kelly et al., 2019); and management activities (Fischer et al., 2019). Here we provide an overview of these categories in present-day management as a basis for analysis of historical wildfire management cooperation.

2.2.1. Policies and other institutions

Consensus is emerging around the idea that multi-jurisdictional cohesive action, as called for in the Cohesive Strategy, requires a multi-level governance structure whereby federal, state, and local levels align policies and programs (including budgets) to coordinate management (Schultz and Moseley, 2019). Less well understood is how the deployment of a variety of institutions, operating at multiple administrative levels of an agency and its partner organization(s), affects cooperation (but see Abrams et al., 2017; Steen-Adams et al., 2020). It

may be that for cooperation to endure, a bundle of institutions that reinforce one another by operating at multiple administrative levels must be in place.

A variety of institutions (policies, agreements) contribute to cross-boundary cooperation. In the National Forest System of the Forest Service, these institutions are located at multiple administrative levels (Moseley and Charnley, 2014). Here, we focus on the headquarters and unit (e.g., national forest) levels, and consider four institutional elements. (1) At the headquarters level is policy alignment between agencies ("cross-organizational policy alignment"), based on mission alignment (Fleming et al., 2015), which addresses the impediment to cooperation of incongruent and sometimes conflicting goals. (2) Also at the headquarters level is cooperative policy and law, exemplified by the Cooperative Forest Management Act of 1950 and the Cooperative Forestry Assistance Act of 1978, which historically authorized the Forest Service to cooperate with partner organizations (Bramwell, 2013; Steen, 2013). Interagency policy alignment and cooperative policy are distinct ideas. A cooperative policy may be in place, despite misaligned missions that can undermine cooperative policy implementation (MacCleery and Le Master, 1999; Thomas, 2003). (3) At the unit level, cooperative agreements structure the implementation of cooperative policies (Wondolleck and Yaffee, 1997; NFF and USDA FS, 2005). (4) An administrative structure for interagency resource transfer, particularly of financial resources, can foster cooperation (Kelly et al., 2019; Yaffee, 1999). For analytical purposes, we group these structures into the broad category, governance institutions—enduring structures that guide regularities of social behavior (Crawford and Ostrom, 1995)—yet we acknowledge that some structures examined can be described as policy design characteristics (Cyphers and Schultz, 2019; Schultz et al., 2018).

2.2.2. Partner roles

Attention to the diversity of partner roles can promote cross-boundary cooperation (Kelly et al., 2019; Koontz et al., 2010; Steen-Adams et al., 2022). Any one entity is unlikely to have all the needed resources, capacities, and social network contacts. Partnership arrangements can enable the array of roles to be fulfilled by distributing the roles among the various partners. Partner roles can be clustered into three broad categories: **funding or resource sharing** (including labor, fundraising, and equipment sharing); **knowledge exchange and resource brokering** (including technical assistance and outreach, also liaison); and **coordination and administration** (Huber-Stearns et al., 2021). Regarding resource sharing (Kelly et al., 2019; Koontz et al., 2010; USFS, 2018), resource categories include human resources (e.g., fire crews or other types of labor), financial resources (e.g., firefighting funding), technical resources (e.g., equipment, information/data, expertise), and infrastructure (e.g., fire detection, communication, and transportation networks).

Research on partner roles generally has focused on the local level, in correspondence with most operational functions. However, agency headquarters also may perform essential partner roles, such as the creation of—and maintaining support for—cooperative frameworks and policies.

2.2.3. Management activities

Cooperative wildfire management activities can be organized into two categories: planning; and implementation (Fischer et al., 2019). Present-day cooperation emphasizes the reduction of fuels and fire risk. Planning activities include: data-sharing, communication, and mapping of cross-boundary fuels reduction operations (Charnley et al., 2017; Fischer et al., 2019). Implementation includes: trainings and cross-boundary fuels reduction (mechanical thinning, prescribed fire). Fire suppression, which involves both planning and implementation, is also an important practice in cooperative wildfire management. Fire suppression sometimes is applied cooperatively during the current period, particularly at the wildland urban interface (Cyphers and Schultz, 2019; USDA and USDI, 2014), and was the primary cooperative

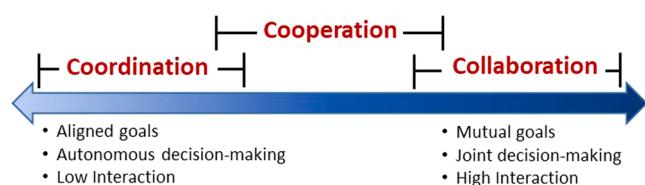


Fig. 1. Abstract representation of cooperation, in relation to coordination and collaboration.

practice during the custodial period (Bramwell, 2013; Southard, 2011; Steen, 2013).

3. Governance models of historical wildfire management cooperation adopted by the Forest Service and partners

3.1. Background

The Forest Service adopted a cooperative strategy of wildfire management early in the agency's history, soon after the transfer of agency lands from the Department of Interior to the Department of Agriculture, in 1905.⁴ During the agency's Wildfire Management Establishment Phase (1905–1924) (Steen-Adams et al., 2017) – which corresponds with the first decades of the custodial period – the Forest Service, the Executive Branch, and US Congress mutually adopted a strategy of cooperation between the Forest Service and states to promote resource conservation, consistent with the conservation paradigm of the Progressive Era (1890–1920) (Hays, 1999; Pyne, 1997). Congress enacted a series of cooperative forestry laws, beginning with the Weeks Act of 1911 (Lewis and Bramwell, 2018). In Oregon and other states, these laws were implemented through a three-part set of activities: wildfire detection, communication, and response (Bramwell, 2013; Williams, 2009; (Steen-Adams et al., 2017)). The political support for cross-boundary cooperation expanded at federal, tribal, state, and local levels during the Establishment Phase (Maunder, 1959; Steen, 2013). These statutory, operational, and political developments generated a five-decade period – the agency's Systemization-Centralization Phase (1924 – 1970s) – of institutionalized cooperation in wildfire management.⁵

During the custodial management period, the Forest Service adopted incipient forms of two governance models, which varied by partner, to structure wildfire management cooperation (Fig. 2). The Forest Service adopted federal interagency cooperation (“interagency cooperation”) (Gilman et al., 2014; Sax and Keiter, 1987; Thomas, 2003) for cooperation with a federal agency partner (here, BIA Forestry). The Forest

Service adopted cooperative federalism, another governance model (Babcock, 1996; Fischman, 2005), for cooperation with the state and the state-authorized associations of private landowners called Forest Protective Associations (FPAs).⁶ The two models are distinct from one another: cooperative federalism spans multiple levels of government – similar to the current concept in policy studies literature of multi-level governance (Peters and Pierre, 2001; Schultz and Moseley, 2019) –, while federal interagency cooperation involves only federal agencies. In both cases, government entities (including special purpose districts, described below, in the case of cooperative federalism) pool resources to achieve shared goals.

3.2. Federal interagency cooperation

Federal interagency cooperation occurs when public officials in at least two federal agencies coordinate activities and/or share resources to achieve a goal they cannot achieve individually (Ogle, 1972; Thomas, 2003; Tuchmann et al., 1996). This model often has been adopted to coordinate implementation of a particular federal law, policy, or directive that involves multiple agencies (e.g., Endangered Species Act). The defining characteristic of this model is operational coordination among federal agencies to implement policy – generally as structured by a comparatively ad hoc, practical framework and informal agreements, such as agreements based on professional relationships and situational need, rather than formal policy that specifies cooperation.

Federal land management agencies have attempted to adopt an interagency cooperation model a few times in US history (Butler and Koontz, 2005; MacCleery and Le Master, 1999). During the Progressive Era – a period of bureaucratic and social reform – interagency cooperation was advocated by then-President Theodore Roosevelt (in office, 1901–1909) because it embodied the era's ideals of efficiency, bureaucratic standardization, and expert-informed decision-making (Hays, 1999; Newell et al., 1986). One example is a 1908 cooperative agreement between the Forest Service and BIA Forestry in which the Forest Service provided technical assistance and BIA Forestry made administrative decisions regarding forestry operations on BIA lands. The short-lived agreement was scuttled in 1909 however because of contests over decision-making authority, incompatible agency roles, and disagreement about resource sharing (Catton, 2016).

Scholarship about past efforts by land management agencies to adopt the interagency cooperation model has reached the general conclusion that “resource management agencies rarely cooperated in the past” (Thomas, 2003, p. 11) (but see the Northwest Forest Plan (Tuchmann et al., 1996) for a framework for interagency cooperation and coordination). Several factors account for the sporadic and weak nature of this model, and often, the withering of cooperation: incompatible agency missions and cultures beneath superficial commonalities, often exacerbated by dissimilar agency clienteles (Grumbine, 1991; MacCleery and Le Master, 1999; Thomas, 2003); competition over scarce resources; infrequent interactions, which hindered the nurturing of collegial relationships (Ogle, 1972); and uncoordinated legislative mandates and budgetary structures (Tuchmann et al., 1996). Despite these constraints, interagency cooperation may take root through informal ties between individuals (Ogle, 1972). Regarding wildfire management history, interagency cooperation between the Forest Service and BIA Forestry emerged through the shared stake in protecting timber resources, and

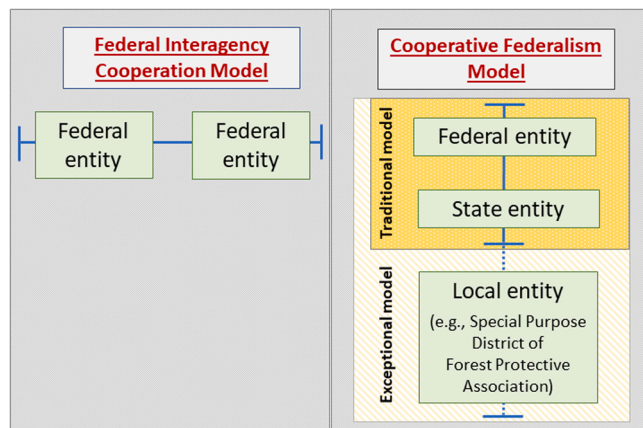


Fig. 2. Governance models adopted by the Forest Service and partners during the agency's custodial management period to promote cooperative wildfire management.

⁴ The Transfer Act of 1905 authorized the transfer of agency lands from the General Land Office in the Department of Interior to the newly established Forest Service, in the Department of Agriculture.

⁵ The Systemization-Centralization Phase in wildfire management is characterized by a coordinated array of wildfire laws, policies, and procedures that spanned the national, regional, and local administrative levels of the Forest Service and partners (Steen-Adams et al., 2017).

⁶ Cooperative federalism as a formal term emerged toward the end of the study period and was recognized primarily in legal and political science scholarship (Corwin, 1937; Strong, 1937; Mermin, 1947). The term “inter-agency cooperation” apparently came into use shortly after the study period (Durr and Vaux, 1949). Early twentieth-century managers lacked the language to formally adopt these terms. We argue that the study actors adopted incipient forms of models that became more widely recognized during the mid-/late-twentieth-century.

provides an opportunity to expand knowledge about this model.

3.3. Cooperative federalism

Federalism involves the division of government authority between the national government and the states (Robertson, 2018). In this government model, the national government grants partial sovereignty and authorities to subordinate levels of government, such as states within a nation. In the cooperative federalism model, the federal government induces coordination from subordinate jurisdictions (state (or tribal or local) government(s)) by conferring to these jurisdictions specified authorities (Babcock, 1996; Fischman, 2005). This conferral supplements the federal government's capacity to implement policies that fulfill broad national goals. In environmental law, pollution control and endangered species protection – particularly on private lands where states generally participate in the implementation of minimum federal standards and hold regulatory authorities – are important applications of cooperative federalism. To achieve these environmental goals, the national government deploys tools, including incentives, like federal grants to state (or tribal or local) agencies, to promote coordination of nonfederal policies and programs with those at the federal level (Fischman, 2005).

Traditionally, cooperative federalism involves the complementary functions of federal and state governments to jointly address shared policy goals (“traditional model”, Fig. 2). Government programs of the New Deal (1933–1939) exemplify the federal government-led, state government-engaged intervention to counteract economic depression (Fischman, 2005).⁷ In exceptional instances, this model also may involve local entities. For instance, local administrative, judicial, and policing systems have augmented the power and expertise of federal agencies (Corwin, 1937; Mermin, 1947). Rangeland fire protection associations (RFPAs) are a present-day example of a variant of cooperative federalism⁸: volunteer wildland fire protection teams, organized at local to regional levels, registered as non-profit organizations, are authorized by the state to implement certain state policies. This local implementation benefits the state by coordinating with state firefighting operations, and benefits federal entities by implementing state policies that coordinate upward with federal policies (Abrams et al., 2018).

3.3.1. Statutory basis of historical cooperation among Forest Service, state, and private entities

The Weeks Act of 1911 created the foundation for wildfire cooperation today among Forest Service, state, and private entities (Lewis and Bramwell, 2018; Pyne, 1997; Southard, 2011; Steen, 2013).⁹ Prior to the act's passage, the agency lacked statutory and budgetary tools to implement its suppression model on nonfederal lands, despite the recent creation of State and Private Forestry (1908) (Bramwell, 2013). State and private entities shared a stake in fire control: protecting valuable timber – an economic and tax revenue consideration for the state. Also, forest industry contended with political pressure to manage fire hazard. Section 2 of the Weeks Act partially addressed this cross-boundary issue

by authorizing the Secretary of Agriculture and states to cooperate in protecting forests in watersheds containing navigable streams. The act was revolutionary in providing federal funds to states to boost local protection capacities across all lands, regardless of federal land status (Lewis and Bramwell, 2018; Southard, 2011; Steen, 2013).

The Clarke-McNary Act of 1924, co-developed by agency and industry representatives (Maunder, 1959), expanded on Weeks Act authorities in two ways. One, it eliminated the restriction that the watershed contain a navigable stream. Two, it authorized national forests to enter into cooperative agreements with state forestry agencies, and through states, third-party agreements with local organizations of private landowners, called Forest Protective Associations (FPAs) (Lewis and Bramwell, 2018).¹⁰ Prior to enactment of the 1924 statute, federal, state, and private representatives deliberated over cooperative versus regulatory approaches by the Forest Service to manage the wildfire hazard to federal lands posed by industrial operators' practices (Bramwell, 2013; Steen, 2013). Forest Service framers of the Clarke-McNary Act opted to expand cooperation with – and minimize regulation of – state and private owners (Bramwell, 2013). Forest industry also weighed into the cooperative approach. Industrial forest owners, who often had amassed large land areas from the public domain – often fraudulently (Williams, 2009) – were under criticism for monopolizing the land and water resources (Robbins, 1997; Steen, 2013). Shifting the burden of fire control to the public purse was politically untenable. Led in the Northwest by the Western Forestry and Conservation Association, industry decided that the most desirable way to deal with the specter of regulation was through private landowner-organized FPAs (Steen, 2013).

Cooperative wildfire management of the custodial period can be seen as an early form of cooperative federalism. The administrations of Forest Service Chiefs Pinchot (1905–1910), Graves (1910 – 1920), and Greeley (1920 – 1928) contended with the disruption to the agency's total suppression model, due to the threat of wildfire spread from private lands onto federal lands. In response, the Weeks Act and Clarke-McNary Act engaged state capacities by providing financial inducements to establish or expand their role in regulating fire management statewide (Lewis and Bramwell, 2018; Steen, 2013), such as Oregon's state forestry system, created in 1911. The Clarke-McNary Act also engaged the local capacities of the FPAs.¹¹ The federal government conferred the authority to states to administer programs that channeled federal funds to FPAs, and the state government authorized these local entities to perform forest protection functions. This arrangement corresponds with the present-day RFPA example wherein the state confers to local entities the authority to implement state policy in particular conditions (Abrams et al., 2018).

In Oregon, private landowners historically participated in wildfire management decisions and – under specified conditions (e.g., as an elected officer) – exercised agency in a state-recognized local authority through membership in FPAs (elsewhere, “private patrol associations” (US HR, 1941) “Forest Fire Associations” (Maunder, 1959)). “Special purpose district” describes the land area stewarded by FPAs of Oregon history: an independent local unit of state government established for a particular purpose and recognized in Oregon Revised Statutes. FPAs were (and are) independent, self-governed organizations of private landowners, which were authorized by the state to protect private forest property from loss due to wildfire and insects (Oregon Department of Forestry (ODF), 2018). Historically the state forestry department administered FPA cost-share funding (Pyne, 1997; Steen-Adams et al.,

⁷ Cooperative federalism as a formal term originated during the New Deal program of the Franklin D. Roosevelt Administration when the federal government increased its importance in state programs, particularly of economic regulation such as antitrust and labor laws (Corwin, 1937; Fischman, 2005). Some scholars note that the roots of cooperative federalism date to the 19th century, as exemplified by the national government's use of land grants to support various state programs (e.g., higher education, transportation infrastructure) (Morris, 2005).

⁸ Specifically, RFPAs exemplify “bottom up” cooperative federalism (Abrams et al., 2018).

⁹ In addition, the Weeks Act was a landmark event in Forest Service history in that it provided the statutory basis, along with some funding, for the agency to begin accruing a nation-wide land base – in short, the act “nationalized the US Forest Service” (Bramwell, 2012).

¹⁰ Section 2 of Clarke-McNary authorized the Secretary of Agriculture — in practice, the Forest Service — to “cooperate with appropriate officials of each state, and through them, with private and other agencies therein, in the protection of timbered and forest-producing lands from fire.”

¹¹ In Oregon, 1904 – first informal fire patrol (organized by Booth Kelly Lumber Company, Lane County); 1908 – first formal FPA (Klamath and Lake Counties Forest Fire Protective Association (ODF, 2005).

Table 1

Examples of historical cooperative wildfire management examined in the eastern Cascades case study. ("FPA": Forest Protective Association.)

Study region	Partners - interagency cooperation model	Partners - cooperative federalism model
Deschutes sub-region	Deschutes National Forest Mt. Hood National Forest Warm Springs Indian Agency	Deschutes National Forest Oregon Department of Forestry Black Butte FPA Walker Range FPA
Upper Klamath sub-region	Fremont National Forest Klamath Indian Agency	Fremont National Forest Oregon Department of Forestry Klamath FPA

2017; Thorpe, 2011). State law vested multiple authorities in FPAs: the authority of the fire warden – who sometimes was selected by FPAs – to arrest offenders for breaking state forest fire laws; and the authority to collect a forest protection tax from private landowners located in the district for a public purpose (Maunder, 1959). In this study, “private” in a cooperation context (federal-state-private cooperation) connotes private landowner actualization within a FPA organization, not as an individual actor.

4. Methods

4.1. Analytical approach

Case study methods were employed (Bartlett and Vavrus, 2017; Bennett, 2004; Yin, 2013) to glean insights about the governance elements that historically promoted enduring cooperation. We examined four examples of wildfire management cooperation, two for each of the models described above. The models were identified inductively during the research process. Case study research – particularly using an inductive approach – can generate new hypotheses and promote theory development (Bennett, 2004), such as the governance elements that may promote the establishment and durability of a cooperative approach to wildfire management.

The case of the eastern Cascades of Oregon was selected because of the prevalence of cooperation in wildfire management in the area during the 1905–1945 study period (Steen-Adams et al., 2017). This case can be understood as an exemplar of cooperation. The Oregon case also is potentially exceptional regarding the participation of FPAs, specifically as pertains to FPAs as independent local units of state government (Halvorson, 2000; Thorpe, 2011), as suggested by research on present-day wildfire governance in Oregon (Abrams et al., 2018).

The four examples of cooperative wildfire management were selected from two sub-regions of the eastern Cascades, referred to here as the “Deschutes sub-region” (located in central Oregon) and “Upper Klamath sub-region” (located in south-central Oregon) (Table 1). The interagency cooperation model is represented by two examples of Forest Service–BIA Forestry cooperation: (1) Warm Springs Indian Agency cooperation with the adjoining Deschutes National Forest and Mt. Hood National Forest; and (2) Klamath Indian Agency–Fremont National Forest cooperation. The cooperative federalism model is represented by two examples of Forest Service–state–FPA cooperation, where FPAs represented private landowners: (1) Deschutes National Forest–Oregon Department of Forestry (ODF)–Black Butte FPA and Walker Range FPA; and (2) Fremont National Forest–ODF–Klamath FPA.¹² ODF was an

important cooperator owing to its authority to promulgate state forest laws – particularly wildfire management laws – governing private lands. State lands comprised less than 1% of the study area. In comparing these models, we acknowledge that other kinds of partnerships also existed. For example, Forest Service cooperation sometimes involved both BIA Forestry and FPAs, and BIA Forestry–FPA cooperation also occasionally occurred.

4.2. Study area

The study area (33,218 km² (3,321,800 ha)) is situated in central and south-central Oregon, in the US Pacific Northwest. Both sub-regions (Deschutes, Upper Klamath) have an intermingled land ownership pattern (Fig. 3). During the 1905–1945 study period, the main land ownership categories were national forest and private forest industry – both of which remain predominant today – and American Indian. A smaller, yet significant proportion of land area was held by family forest owners, who continue to be an important ownership type. Other ownership categories included municipal, county, and other federal land (now mostly administered by the Bureau of Land Management (BLM)).¹³

The lands of the eastern Cascades were held by American Indians prior to Euro-American settlement. Part of this territory became Indian reservation land after Tribes ceded approximately 4 million hectares (~10 million acres) of their homelands, south of the Columbia River between the Cascade Range and Blue Mountains, to the US Government, in the 1855 Treaty With the Tribes of Middle Oregon (Tonsfeldt and Claeysens, 2004). The Warm Springs Indian Reservation (est. 1855, 259,000 ha) is located in the Deschutes sub-region. The Klamath Indian Reservation (est. 1864, 445,000 ha) existed until the Klamath Termination Act (Public Law 83–587, ch. 732, 68 stat. 718, enacted 1954) was promulgated, in 1961, resulting in the loss of the Klamath Tribes’ reservation lands. Until 1961, part of the Upper Klamath sub-region featured intermingled federal, tribal, and private lands.

The primary land-cover type of the eastern Cascades is forest. Biogeographical characteristics include mountainous topography and a steep climatic gradient, which ranges from moist, cool conditions to dry, warm conditions. Major forest types include moist mixed conifer (e.g., grand fir (*Abies grandis*)/ white fir (*Abies concolor*)/ Douglas fir (*Pseudotsuga menziesii*)), dry mixed conifer (e.g., ponderosa pine (*Pinus ponderosa*)/ Douglas fir), and semi-arid juniper (*Juniperus occidentalis*) woodland (Spies et al., 2017). The predominant historical fire regime was frequent (10–50 year) and low-severity (Spies et al., 2017).

4.3. Data resources and analysis

Archival records were collected from the National Archives and the Oregon State Archives, the primary repositories of federal and state records, respectively. We examined three document types: (1) Forest Service (national forests, Branch of State and Private Forestry); (2) BIA Forestry (Warm Springs Agency, Klamath Indian Agency); and (3) Oregon Department of Forestry (FPA documents, e.g., articles of incorporation, meeting minutes). We employed an inductive iterative approach (Yom, 2015) to construct a thematic database based on examination of archival records. An inductive iterative approach integrates a deductive, theoretical approach and an inductive, grounded approach in a multi-step process. The research team first identified *a priori* themes (e.g., institutions, partner roles, cooperative management activities) derived from the literature and past research in the study area (Steen-Adams et al., 2017). The fit of the data with these themes was assessed. The initial themes were supplemented with emergent themes (e.g., resource sharing).

¹² During the study period, the state forestry agency was called the Department of Forestry of the State of Oregon (US HR, 1941). Regarding the Klamath Forest Protective Association, a valuable resource is: Hunt-Jones, P.I. 2008. Klamath Forest Protective Association: A Legacy of Forest Protection and Cooperation, 1908 – 2008. [independently-published document], 208 pp, plus 19 Appendices.

¹³ During the study period, BLM land was administered by the General Land Office (est. 1800) and the Grazing Service (est. 1934).

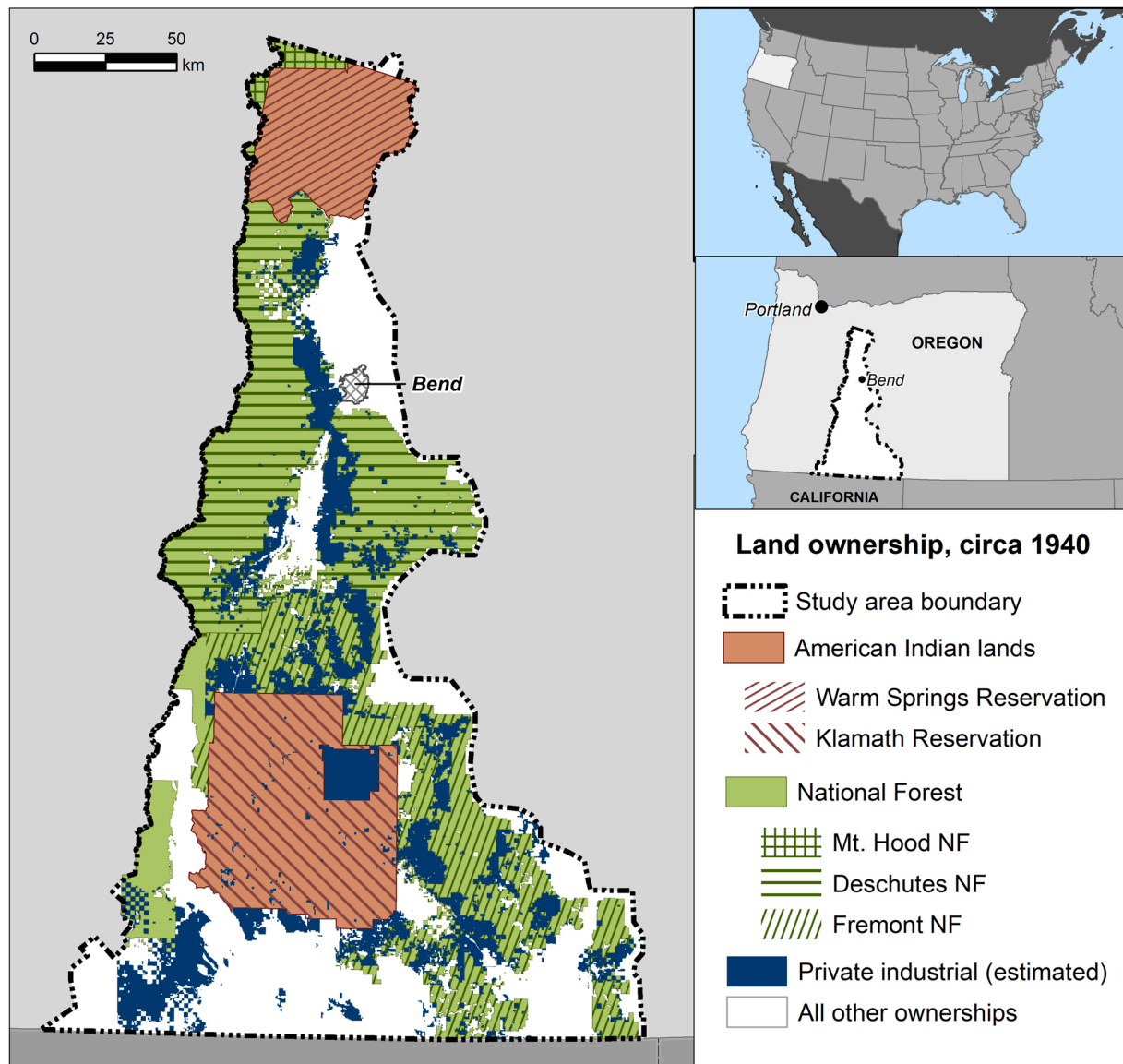


Fig. 3. Land ownership, circa 1940, eastern Cascades of Oregon.

5. Results

Managers of the eastern Cascades encountered fuel conditions that were characterized at times by low moisture, high winds, and severe lightning storms (e.g., Warm Springs Indian Reservation wildfires 1927, 1930). Ignition sources included lightning, camper fires, burning logging debris, as well as locomotive engine-emitted embers, sawmills, and unextinguished cigarettes. On national forest lands, Forest Service fuel type maps (1908–1940) indicate that the fuel condition classes were predominantly moderate and low fire hazard, but also included areas of high and extreme hazard.

The main goal of cross-boundary cooperation was forest resource protection. Viewed through the period's management paradigm, managers perceived a requirement for a suppression approach to wildfire management (as well as control of insect outbreak and pathogens).¹⁴ Addressing this goal involved three types of cooperative activities: fire

detection, communication, and response. Below we describe the institutions, partner roles, and management activities that promoted the establishment and durability of cooperation under the two governance models, federal interagency cooperation (Forest Service – BIA Forestry) and cooperative federalism (Forest Service – state – FPA).

5.1. Federal interagency cooperation model: Forest Service and BIA Forestry cross-boundary cooperation

5.1.1. Institutions

In both examples of federal interagency cooperation, three governance institutions promoted cooperation between the Forest Service and BIA Forestry: cross-organizational policy alignment; interagency agreements; and unit-level cooperative agreements (Table 2). A formal administrative structure for interagency transfer of resources was not in place, although ad hoc arrangements occasionally developed.

5.1.1.1. Interagency alignment of policy goals. Forest Service and BIA Forestry policies aligned on the goal to protect forest resources through fire suppression (Catton, 2016; Newell et al., 1986; Steen-Adams et al., 2017). On tribal lands, timber resource protection was paramount due to

¹⁴ For instance, foresters of the Warm Springs Indian Agency and Forest Service cooperated during the 1930s to manage an outbreak of mountain pine beetle (Harold Weaver Papers, Forest History Society, Durham, N.C.)

Table 2

Key institutions in the establishment and durability of cooperative wildfire management, as compared between two governance models (federal interagency cooperation, cooperative federalism).

Institution	Administrative level	Federal interagency cooperation model	Cooperative federalism model
Cross-organizational policy alignment	Headquarters	–Forest Service and BIA Forestry Division identified points of policy alignment regarding forest protection from wildfire	–Forest Service and state entities identified points of policy alignment regarding forest protection from wildfire
Cooperative laws, policies, and/or interagency agreements	Headquarters	– <i>Cooperative Agreement between the Department of Interior and the Department of Agriculture for the Prevention and Suppression of Forest Fires Occurring Along the Boundaries of Indian Reservations and Adjoining National Forests</i> (July 2, 1913) –Memorandum of Understanding between US Department of Interior and US Department of Agriculture regarding cooperative fire prevention and suppression (January, 1943)	–Weeks Act, 1911: authorized federal financial assistance to states for fire control on state and private lands –Clarke-McNary Act, 1924: authorized Forest Service to cooperate with state and private entities to protect forest and watershed resources, contingent on establishment of a state forestry agency –Oregon Forest Fire Laws, 1911 (Oregon Law, Chapter 278): authorized establishment of a state forestry agency (fulfilling the federal Weeks Act requirement); appointment of a State Forester and deputy; appointment of a cadre of fire wardens –Forest Patrol Act, 1913 (Oregon Law, Chapter 278): required private landowners to protect their lands from fire or pay a share of forest protective association costs –Agreement between Forest Service Regional Forester and Oregon State Forester regarding cooperative wildfire management of intermingled and adjoining lands (July 1, 1938)
Cooperative agreements	Local unit	–Informal cooperative agreements established: –Fremont National Forest and Klamath Indian Reservation (beginning in 1913) –Deschutes National Forest and Warm Springs Indian Reservation (by 1922) –Mt. Hood National Forest and Warm Springs Indian Reservation (by 1925) –Ad hoc, informal structure, occasionally employed	–Formal cooperative agreements established: –Deschutes National Forest and Walker Range FPA –Deschutes National Forest and Black Butte FPA –Fremont National Forest and Klamath FPA
Administrative structure for interagency resource transfer, resulting in cost-sharing	Multiple levels: headquarters, local unit	–Ad hoc, informal structure, occasionally employed	–Clarke-McNary Act: Authorized federal funds, on a cost-share basis, for fire control on non-federal lands (state, private) –FPAs authorized to sub-contract with the Forest Service for forest protection services on intermingled FPA lands with state forester approval, per FPA Articles of Incorporation –FPAs authorized to collect and administer forest protection assessments from private owners, per state laws and FPA incorporation by-laws; federal cost-sharing supplemented FPA funds

its economic importance (Catton, 2016; Steen-Adams et al., 2010). A 1910 federal law (18 USC § 1853) mandated the newly-created BIA Forestry Division to protect tribal timber from human-set fire and trespass by non-tribal harvesters. In 1922, federal law (16 USC § 594) authorized the Secretary of Interior to protect all federal lands, including Indian reservations, from fire and other threats, “either directly or in cooperation with other departments of the Federal Government...” These federal policies were expressed at the local level in a 1928 communication from the Commissioner of Indian Affairs to reservation superintendents:

“Immediate steps should be taken at your Agency to prepare in advance... an organization capable of successfully coping with forest fires that are liable to occur upon Indian lands under your jurisdiction... The Office desires the maximum protection be given to Indian forests consistent with such funds, supplies, and personnel...”.

Forest Service policy likewise centered on the goal of protecting forest resources, as stipulated in the *Use Book* (1905). A minor distinction of Forest Service policy involved its adoption of sustained-yield management, unlike BIA Forestry (although this difference subsided over time, as BIA Forestry later adopted a sustained-yield model). This policy directed managers to convert as-yet unharvested “old growth” stands into managed, sustained-yield stands to assure the timber supply for future generations (Williams, 2009). The Forest Service led advancements in minimizing fire hazard posed by logging debris to the advance regeneration of seedlings and saplings. Despite minor differences, the policies of both agencies aligned on the goal of forest protection from wildfire.

5.1.1.2. Cooperative policies and interagency agreements. In 1913, the US Department of Agriculture (administrator of the Forest Service) and the US Department of Interior (administrator of the BIA) issued an agreement to cooperate on wildfire management. This agreement’s title illustrated the USDA-USDI shared purpose: “Cooperative Agreement ... for the Prevention and Suppression of Forest Fires Occurring Along the Boundaries of Indian Reservations and Adjoining National Forests.” This USDA-USDI agreement authorized unit-level managers of national forests and Indian reservations to enter into cooperative agreements. Specifications included: the development of fire control maps to improve fire detection and pinpoint location, to be referenced from lookouts “without regard to boundary lines and departmental jurisdiction”; cross-agency exchange of fire plans; construction of communication infrastructure; and coordinated fire patrols. The USDA and USDI officials forged this agreement in the absence of Congressional authorization specifying cooperation, which promoted local-level cooperative agreements of an informal, rather than formal nature (described below).

The USDA-USDI agreement afforded managers with decision-making discretion. Authorizations included: incurring reimbursable costs for initial suppression activities on adjoining ownerships; and responding to fire incidents on adjoining units. The USDA-USDI agreement noted, “National forest officers will render assistance to Indian Service forest officers ... in every case where such action does not leave unduly exposed to fire danger national forest land. The Indian Service will reciprocate in like manner.” Nevertheless, fire crews remained under the line of command of their respective agency, maintaining agency autonomy.

In 1943, a USDA-USDI memorandum of understanding updated and reinforced the 1913 cooperative agreement:

“The large annual fire loss in the forests and on the range lands of the Nation continues to be a matter of grave concern to American conservationists and to land management ... agencies. Considerable progress has been made in the development of fire prevention plans and ... fire suppression... More progress must be made, and to this end, closer cooperation between ... the two departments is indicated [due to] threat to resources.”

The conditions of World War II, when timber and livestock forage were perceived as “critical war materials vitally needed in the war program”, prompted the departments to prioritize joint action. The MOU authorized the two departments to “cooperate fully and freely in the exchange of [fire control] information” and enter into legal agreements for the purpose of “fully coordinated” and “more effective” fire control activities. The 1943 memorandum also affirmed continuation of interagency cooperation after wartime: “It is not the intention to restrict or drop this program when peace arrives”.¹⁵

5.1.1.3. Local level cooperative agreements. At the local level, the interagency cooperation model featured informal cooperative agreements—terms of exchange based in manager-to-manager relationships and situational conditions—between specific Forest Service and BIA administrative units. These agreements mirrored the 1913 USDA-USDI interagency cooperative policy. In the Deschutes sub-region, federal and tribal managers had established an informal agreement by 1922; the agreement lasted until at least 1959. In the Klamath sub-region, federal and tribal managers initiated an agreement in 1913, which persisted until at least 1937 and possibly 1959. The terms specified the reciprocal provision of services. For instance, the 1928 Deschutes Fire Plan specified a “mutual exchange of lookout services” with Warm Springs Indian Reservation cooperators. Cooperative agreements were important, according to the 1928 fire plan: “In any forest area where the fire control work is administered by more than one agency, there must be full cooperation and understanding regarding the responsibility of each agency.”

5.1.1.4. Administrative structure for cross-agency resource transfer. The historical examples of interagency cooperation lacked a formal administrative structure to transfer resources between agencies. Instead, resource transfer occurred on an ad hoc, as-needed basis. Fire crews frequently provided fire suppression assistance for the adjoining jurisdiction. The administrative mechanism to request reimbursement was simply a letter from the local unit official to the counterpart official detailing costs (e.g., labor, meals, mileage), with a request to forward the reimbursement letter to regional-/ headquarters-level administrators.

5.1.2. Partner roles

The Forest Service and BIA Forestry performed both complementary and shared partner roles (Table 3). At the headquarters level, both the Forest Service and Indian Agency set the policy of interagency cooperation. At the local level, the Forest Service performed two main roles. One was the provision of technical resources, due to the Forest Service’s access to improved technology, such as the Osborn fire finder. The opportunity to increase tribal managers’ capacity to pinpoint the location of potential cross-boundary fires motivated the technical resource sharing:

“The Forest Service has developed an improved fire finder which is superior to the compass, ... which permits readings to within two to

three miles. If it is not possible for you to purchase one of these instruments, which cost about \$40.00, it may be possible that we can secure one for you ..., since Bald Peter is of great assistance to us in getting cross shots on fires in the Upper Metolius region.”

Another important Forest Service role was conducting outreach with BIA Forestry. For instance, the Deschutes National Forest invited the Warm Springs Indian Agency to provide input about cross-boundary management decisions:

“We have planned to discuss and study better methods of fire fighting toward correcting the mistakes of the past. If you desire that your men attend, we would be glad to have them with us. There are several features in our service [at fire lookouts] that we believe could be improved upon. Doubtless you have suggestions to improve our service.”

BIA Forestry’s main role was the provision of human resources, as well as equipment, to assist in fire suppression on adjoining national forests. In 1930, Warm Springs sent a crew of approximately 30 tribal members to assist on two major national forest fires “at their request.” The Deschutes National Forest Supervisor lauded, “please let the [crew] know how much their good work was appreciated... they all showed they had experience and training in fire fighting.”

Sharing human and infrastructure resources was a critical strategy to overcome the resource constraints of each agency. Both agencies shared fire lookout guard services and infrastructure, particularly on sites appropriate for cross-boundary fire detection. The 1937 Fire Plan of the Klamath Indian Reservation exemplifies how mutual partner roles supplemented capacity shortfalls. In the reservation’s fire detection plan, fire detection capacities were supplemented by resources of the adjoining Fremont National Forest: the Forest Service operated 25 % (11 of 44) of the lookout towers in the reservation’s fire detection system. The reservation’s fire suppression plan drew upon fire crews of the national forest and Crater Lake National Park.

5.1.3. Cooperative wildfire management activities

Cooperative activities involved both coordinated planning and coordinated implementation of fire detection and suppression (Table 4). Planning involved: exchange of fire plans, including maps; maintaining a file of updated fire plans; and coordinated infrastructure (fire detection lookouts, telephone lines, road networks). Implementation consisted of coordinated fire detection, patrol, and suppression activities (e.g., exemplified in the Deschutes sub-region during the 1920s). Regarding fire detection, the Deschutes National Forest operated two lookouts – “very strategically located for finding fires both on the reservation and on the National Forest” (according to a 1924 document) – positioned along the federal-tribal boundary. Regarding fire suppression, Warm Springs Indian Reservation officials regularly deployed a fire crew, along with required vehicles and supplies, to the adjoining national forests. Reciprocally, the national forests issued resources to suppress fires on Warm Springs lands.

5.2. Cooperative federalism model: Forest Service, state, private landowner cross-boundary cooperation

5.2.1. Institutions

Four governance institutions promoted cooperation among Forest Service, state, and FPA entities (where FPAs represented private owners) during Forest Service custodial management period: cross-organizational (USFS - ODF) policy alignment; headquarters-level cooperative laws, policies, and interagency agreements; unit-level cooperative agreements; and a formal administrative structure for interagency resource transfer (Table 2).

5.2.2. Interagency alignment of policy goals

Policy alignment at federal and state levels set the foundation for

¹⁵ Memorandum to Commissioner, Office of Indian Affairs, from L. Muck, Assistant to the Secretary, March 15, 1943.

Table 3

Partner roles in cooperative wildfire management, presented at headquarters and unit levels.

Role and administrative level	Federal interagency cooperation model		Cooperative federalism model		
	Forest Service	BIA Forestry Division	Forest Service	State	Forest Protective Association (FPA)
Cooperative policy creation: Headquarters level	–Established interagency cooperative agreement (1913) and memorandum of understanding (1943)	–Established interagency cooperative agreement (1913) and memorandum of understanding (1943)	–Co-developed cooperative institutions (Weeks Act, Clarke-McNary Act)	–Co-developed cooperative institutions (Clarke-McNary Act) –Developed state laws that coordinated upward with federal laws	–Co-developed cooperative institutions: industry organization activities (Western Forestry and Conservation Association)
Coordination and Administration: Headquarters level	n.a.	n.a.	n.a.	–Administered statewide forest protection system: FPA districts, FPA associations, and federal cost-share (Clarke-McNary) funds –Supervised and employed fire wardens for all forest protective districts, promoting consistency among FPAs –Enforced state wildfire laws, which coordinated with federal policies –Oversaw fire control infrastructure projects	n.a.
Coordination and Administration: Unit level	–Coordinated resource sharing (e.g., fire lookouts) in fire detection and suppression plans	–Coordinated resource sharing (e.g., fire lookouts) in fire detection and suppression plans	–Coordinated protective units (Forest Service, FPA) to comply with mutual requirements	–Liaison between Forest Service and FPAs	Collected and administered forest protection payments from private owners
Knowledge exchange and resource brokering: Unit level	–Outreach: invited BIA Forestry to participate in cross-boundary decisions; hosted planning meetings	n.a.	–Outreach: Engaged FPA partners for input in cross-boundary decisions		–Outreach: Organized and engaged private landowners
Funding: Headquarters level	n.a.	n.a.	–Fire control cost-sharing funds (Clarke-McNary funds)	n.a.	n.a.
Resource sharing: Unit level	–Shared resources: –Technical: Panoramic photographs for pin-pointing location of cross-boundary fires; Osborne fire finder; trainings –Infrastructural: Fire lookout towers, telephone line network –Human: fire lookout guards, fire crews ^a	–Shared resources: –Human: fire crews, fire lookout guards –Infrastructural: Fire lookout towers, telephone line network –Requested cost-sharing resources from BIA headquarters	–Shared resources: –Technical: firefighting trainings –Infrastructural: Fire lookout towers, telephone line network, road network –Human: fire lookout guards	n.a.	–Shared resources: -Human and infrastructural, fulfilling service contracts ^b

^a Provision of human resources by the Forest Service to BIA Forestry was infrequent and primarily for fire detection.^b Field labor (e.g., patrol, firefighting, fire warden, road maintenance) and administrative labor (e.g., secretary, clerk).

wildfire management cooperation. The Forest Service policy of resource protection through fire suppression was specified in the 1905 Forest Service *Use Book* and expanded in the 1912 *National Forest Manual* (Pyne, 1997). At the state level, the Oregon Forest Fire Laws (Oregon Law (O.L.) 1911, Chapter 278) were enacted to protect Oregon forests – including both public (state, county) and private lands – through wildfire prevention and suppression (Halvorson, 2000; Thorpe, 2011).¹⁶

5.2.3. Cooperative policies and interagency agreements

Federal law authorizing federal-state-private cooperation, in combination with the promulgation of state law that fulfilled federal law requirements, was a second institution that promoted cooperation in the eastern Cascades. In Oregon, the Clarke-McNary Act (1924) requirement for cost-sharing of the establishment of a state forestry agency had been met prior to enactment, thus green-lighting the Forest Service authorization to cooperate with state and private entities to protect forests on

intermingled ownership landscapes (Thorpe, 2011). In response to the Weeks Act (1911), the Oregon Forest Fire Laws (1911) had established the Oregon Department of Forestry and the office of State Forester to oversee the agency's activities, particularly the control of forest and grassland fires. These laws also established a State Fire Warden Service and designated state fire districts, subsequently known as forest protective districts.¹⁷ At the protective district-level, the state directed private FPAs to control wildfire on their respective districts. Forest protective districts (termed “forest protection units” by the Forest Service) were created by dividing the multi-ownership landscape into units and assigning fire protection responsibility to the majority entity (FPAs, Forest Service). Customarily, the majority entity extended protection to the intermingled lands of the adjoining ownership (US HR, 1941). Further, Oregon's Forest Patrol Act (Oregon Law, 1913, Chapter 248)—the first of its kind in the US (Thorpe, 2011)—required private landowners to either pay a share of FPA costs or independently protect their

¹⁶ Elsewhere, General Laws of Oregon (Halvorson, 2000). Oregon Forest Fire Laws, O.L., 1911, Chapter 278, <https://ia802609.us.archive.org/10/items/oregonforestfire00oreg/oregonforestfire00oreg.pdf>

¹⁷ The Oregon Board of Forestry, which continues to govern ODF today, was established in 1907, initially as a temporary board (O.L. 1907, Chapter 131 (Halvorson, 2000)).

Table 4

Cooperative wildfire management activities, as implemented under the federal interagency cooperation model and cooperative federalism model.

Cooperative management activity category	Federal interagency cooperation model	Cooperative federalism model
Planning	–Coordinated development and maintenance of fire detection infrastructure –Exchanged fire management plans	–Coordinated development and maintenance of fire detection infrastructure –Exchanged fire management plans –Coordinated forest protective districts of Forest Service and FPA partners via “blocking”: practice of integrating intermingled parcels of adjoining landowner into the partner’s protective unit, conferring fire suppression responsibility for entire area of unit, regardless of ownership –Coordinated adjustment to boundaries of partners’ forest protective districts, when needed due to land ownership change, to maintain compliance with service contract terms of agreement
Implementation	–Coordinated detection, patrol, and suppression of wildfires, as structured by: (i) cross-organizational interpersonal relationships and (ii) loosely coordinated fire plans	–Coordinated detection, patrol, and suppression of wildfires, as structured by contracts

lands from fire.

In 1938, the Regional Forester (of the Forest Service) and the Oregon State Forester executed a cooperative agreement that formalized the customary practice of reciprocal protection of intermingled lands.¹⁸ It did so by directing division of “intermingled and adjacent lands...into practicable protective units regardless of ownership.” To provide “effective and efficient fire protection,” this agreement adjusted practices in intermingled ownerships landscapes: “The Forest Service will protect ... all [private] tax roll lands within Forest Service protective units...”; and reciprocally, “State Fire Warden(s) will enforce Oregon forest fire laws on all private lands [in USFS protective units].” In so doing, officials problem-solved to fulfill the ODF policy of private tax roll land protection, as stipulated by the State Forest Patrol Law (Section 42–602, Oregon Code 1930), and the Forest Service policy (under the Organic Act of 1897 (Williams, 2009)) to protect the lands administered by the agency.

5.2.4. Unit-level cooperative agreements

Contractual agreements between a specific national forest and the FPA of the adjoining private lands directed cooperation at the local level. Interagency (Forest Service – State of Oregon) cooperative agreement(s), such as the one executed in 1938, provided an important foundation for unit-level cooperative agreements (generally, service contracts between particular national forests and adjoining FPAs). The state performed the role as administrator of FPAs and federal cost-share funds, and employer of FPA fire wardens.¹⁹ Thus, national forest – FPA

agreements involved the state. These unit-level agreements specified the terms by which the designated forest protective entity (Forest Service, FPA) would render wildfire detection services on its respective forest protection district. The basis of exchange was service, cash, or both (US HR, 1941). In the Deschutes sub-region, agreements were made between the Deschutes National Forest and the FPAs of Walker Range and Black Butte, respectively; in the Upper Klamath sub-region, between the Fremont National Forest and Klamath FPA.

Certain governance features of the FPAs legitimized the fire patrol contracts in the eyes of private landowners, the state, and the Forest Service. State law vested FPAs with authority to enter into wildfire protection contracts with the Forest Service and the state. For example, the 1936 articles of incorporation of the Black Butte FPA states: “the ... business of this corporation... shall be: ...the preservation of forests [and timber] generally, particularly the preservation from fire, insect infestation; ... to prepare, execute, and sign contracts with the Deschutes National Forest or any other part of the [Forest Service and] with the State Forester and the Oregon State Board of Forestry pertaining to [forest] protection.” Also, the FPAs operated under a stable, procedural system of governance: a constitution and by-laws set procedures and policies, and a Board of Directors oversaw adherence to decision-making procedures and contract compliance. These governance qualities of organizational stability and adherence to procedure supported on-going cooperation among individual FPAs, adjoining national forests, and the state. Finally, FPAs had authority to levy and collect tax assessments from member forest owners for association costs – primarily for forest protection services – thereby generating funds that supplemented any partner payments, as set by the cooperative agreements.

5.2.5. Administrative structure for interagency resource transfer

Unlike the federal interagency cooperation examples, the cooperative federalism examples featured a formal administrative structure for interagency resource transfer—specifically from national forests to FPAs (via the state) for wildfire management services. Through the Clarke-McNary Act, the Forest Service was authorized to cost-share up to 50% of wildfire management costs on state and private lands. Federal Clarke-McNary fire control funds were deposited with ODF, and ultimately distributed to FPAs. For example, in 1944 the Klamath FPA received 32.5% of its \$30,396 in total receipts from Clarke-McNary funds; FPA members contributed 56.7%, generated by private land levies, and the state contributed the remainder.

5.2.6. Partner roles

Forest Service, state, and FPA entities generally performed complementary partner roles, although the Forest Service and state performed some mutual roles (Table 3). Both the Forest Service and ODF set the broad policy of cooperation and administered supporting laws. The Forest Service provided financial resources to state and private entities, as demonstrated by the Clarke-McNary fund revenue line in the FPA budget structure. At the local-level, the Forest Service conducted outreach with FPA cooperators in cross-boundary decisions. The state performed functions as administrator and liaison. ODF administered the statewide FPA system, distributed federal Clarke-McNary Act cost-share funds to the FPAs, and enforced compliance (via reporting requirements) with state wildfire laws. The state functioned as a liaison by assisting with Forest Service-FPA cooperative agreements. In this role, the state brought about consistent, uniform adherence by private entities to state and federal policies. FPAs performed a governance role of organizing and engaging local landowners in cross-ownership cooperative decision-making; and a management role of coordinating operations with Forest Service and state counterparts. FPAs also provided human resources, particularly to fulfill service contract needs.

¹⁸ Regional Forester C.J. Buck and State Forester J.W. Ferguson, July 1, 1938, Agreement, Oregon State Archives.

¹⁹ Over time however, non-state sources covered a portion of fire warden salaries.

5.2.7. Cooperative wildfire management activities

In Oregon, cooperation between Forest Service, state, and FPA entities began in 1913, when the state's Forest Patrol Act was passed.²⁰ Cooperative activities involved both coordinated planning and implementation (Table 4). These practices were tailored to the land ownership conditions, described as a “complex patchwork” of Forest Service and private lands (US HR 1941).

Coordinated planning involved blocking together intermingled ownerships, as exemplified by one of the protective units of the Deschutes National Forest (Fig. 4). This practice increased management efficiency and effectiveness, according to managers, by consistently applying each entity's wildfire operations across the entire unit, regardless of ownership. Coordination between Forest Service and FPA partners involved negotiating adjustments to the boundary line between the partners' protective units. Such negotiations occurred due to two reasons. Operational factors, such as topographical interference with fire lookout sight lines, often necessitated boundary movement. Adjustments also occurred to correct emergent disparities in the size of protective units, as required by service contract terms of agreement. Disparities sometimes emerged due to parcel transfer, such as from private to federal ownership. In 1949, for instance the Klamath FPA's service to Forest Service land intermingled within its protective district had grown to 133,000 acres, while the Forest Service protected 118,000 acres of FPA lands. To correct the disparity, the Klamath FPA transferred parcels of federal land from its protection area to that of the Forest Service.

Coordinated implementation pertained to wildfire suppression. FPA forest guards stationed in lookouts surveyed the entire protective district to detect signs of ignition, as was reciprocally conducted by Forest Service guards. When a fire incident occurred on a protective district, its fire-fighting force took action to suppress the fire, regardless of ownership.

6. Discussion

Cross-boundary wildfire has posed a major challenge to land managers since the early twentieth century. This challenge persists today, despite the evolution in central goal from forest conservation and protection – achieved through fire suppression – to wildfire risk reduction and forest restoration. Insight into the governance elements that historically enabled the establishment and durability of a cooperative cross-boundary approach to wildfire management may prove useful to today's managers. The case of the eastern Cascades sheds light on important governance elements (institutions, partner roles) under two governance models employed by the Forest Service: interagency cooperation, for partnering with counterpart federal agencies (Forest Service – BIA Forestry cooperation); and cooperative federalism, for partnering with state and private landowner-affiliated local entities (Forest Service – state – FPA cooperation). Insights regarding the cooperative federalism model may be applicable to the multi-level governance model in particular (Schultz and Moseley, 2019; Schultz et al., 2021), due to the similarity in the policy design characteristic of policy and program coordination between federal and nonfederal entities.

The custodial management period (1905–1945) of Forest Service history is a fertile period to probe. Propelled into action by the 1910 fires of the intermountain west – as well as somewhat lesser-known contemporaneous fires of the Pacific Northwest (Williams, 2009) – and concerns about the risk posed by fuels on private lands, Forest Service officials sought to forge policies and practices to protect the nation's future timber supply (Bramwell, 2013; Pyne, 1997; Steen, 2013). Tribal, state, and private entities likewise sought to control the

wildfires that consumed valuable timber property (Newell et al., 1986). Pacific Northwest land managers confronted a challenging combination of conditions: an intermingled, often checkerboarded land ownership pattern (Bramwell, 2012; Robbins, 1997); ignitions sparked by forestry operations, as well as embers of locomotive engines (Williams, 2009); and run-away fires of agricultural land clearance (Maunder, 1959). In response, officials, land managers, and private landowners innovated institutions and partnership arrangements to address the wildfire threat.

The Oregon examples demonstrate a policy design characteristic that promoted the establishment and durability of a cooperative strategy, regardless of governance model: the development of a bundle of cooperation-focused institutions (cross-organizational policy alignment, cooperative policies, laws, and interagency agreements, unit-level cooperative agreements) that spanned multiple administrative levels (headquarters, unit) of the Forest Service and the partnering organization. Attention to administrative levels is important in promoting cross-boundary cooperation (Abrams et al., 2017; Moseley and Charnley, 2014; Steen-Adams et al., 2020) – in addition to multi-level governance policy design (Schultz and Moseley, 2019). For unit-level decision-makers, the establishment of cross-organizational policy alignment, combined with and headquarters-level policies, laws, and/or interagency agreements, imparted consistency among all parties in authority to forge unit-level cooperative agreements. The coordinated nature of authorities among respective entities provided managers with discretionary flexibility to take up cooperation invitations when the mix of organizational and interpersonal conditions allowed and resource constraints made resource pooling a mutually beneficial option. This finding suggests that today's emphasis on cross-boundary cooperation (e.g., of the Cohesive Strategy) may be promoted through efforts by each partner (Forest Service, BIA Forestry, tribes, states, local governments) in developing and regularly updating cooperation-focused institutions at both the headquarters and unit levels.

Policy alignment between partners was an essential enabling element of cross-boundary cooperation during the historical period. Alignment was the foundation upon which headquarters-level officials and administrators, along with industry stakeholder representatives, crafted a variety of formal institutions – federal and state statutes and interagency cooperative policies and agreements – which then authorized unit-level managers to craft cooperative agreements. Forest Service management goals (forest protection through fire suppression) were shared among adjoining forest entities, and thus policy alignment was readily established.

In many states and localities today however, the historical alignment in forest management paradigm and goals has not endured, given differences in paradigm evolution among federal, tribal, state and private entities (Steen-Adams et al., 2017). Federal and non-federal entities often grapple with conflict over management objectives (Butler and Schultz, 2019; Wondolleck and Yaffee, 1997; Schultz et al., 2021), such as restoration of fire-prone forests (Spies et al., 2017; Steen-Adams et al., 2020). Consequently, policy alignment may have become more difficult to achieve, prospectively resulting in heightened challenge to establishing and maintaining cross-boundary cooperation. This shift in governance conditions suggests that a useful starting point in establishing cross-boundary cooperation is careful, focused scoping of the variety of prospective points of alignment toward the goal of identifying a sub-set of fundamental shared goals – goals that can then serve as the focus of crafting aligned federal and state statutes, interagency agreements, or other cooperative institutions.

How to involve private landowners in forest governance is an important question in cross-boundary management today (Fischer and Charnley, 2012; Charnley et al., 2017, 2020). Federal land management agencies contend with on-going challenges to capacity and the legitimacy of decision outcomes (Abrams, 2019) – factors that heighten the relevance of private landowner involvement. The Oregon examples demonstrate three policy design elements that historically supported enduring cooperation and may be applicable today.

²⁰ U.S. Forest Service, 1963. “Cooperative Fire Control (C-M 2)”, R6 Fact Sheet No. 3000–2. Portland, Oregon, National Archives and Records Administration, Seattle.

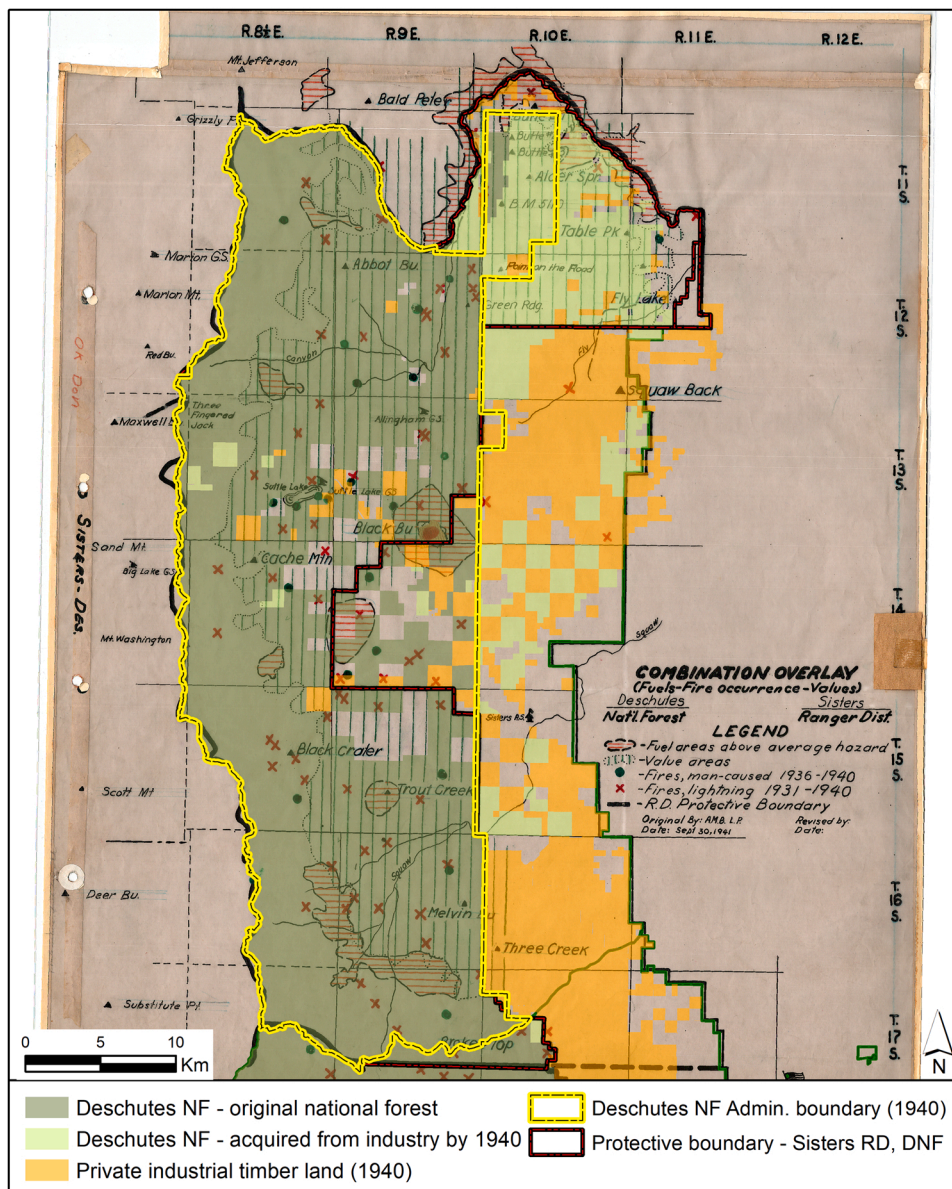


Fig. 4. Coordinated planning between Forest Service and Forest Protective Association (FPA) entities, developed for the Sisters Ranger District (RD), Deschutes National Forest (DNF), 1940. Cooperators negotiated the location of boundary line (in black) between the protective units of the Forest Service and FPA. Also depicted: the practice of blocking lands in the protective unit. The service contract for forest protection applied to the entire protective unit regardless of ownership, including intermingled lands of the partner organization. Map repository: National Archives and Records Administration, Seattle Federal Records Center.

(1) The state-granted authorities of a special purpose district enabled self-organized FPAs to garner resources and develop and enforce cooperative practices that coordinated upward with state and federal policies. The state vested FPAs with several important authorities in their protective district: levying forest protection assessments on landowners; entering into contracts with adjoining protective districts (of national forests); and enforcing compliance with state fire laws (via the fire warden). The state-granted authority to levy forest protection assessments on landowners enabled FPAs to accrue resources. Second, the self-governed, local nature of FPAs – particularly when supplemented by federal cost-share funds (of the Clarke-McNary Act) – contributed to the political tenability of imposing a service tax. Finally, FPAs developed forest protection practices (plans, patrols) that coordinated upward with state laws, such as Oregon's Forest Patrol Act (1913) and federal statutes (Weeks Act, Clarke-McNary Act). FPAs garnered resources to support shared goals among federal and nonfederal entities, generated political support at the local level, and coordinated local practices with state and federal policies. In these respects, the policy design featuring the state-authorized FPAs and special purpose district of the cooperative federalism model aligns with the characteristics of

multi-level governance (Schultz and Moseley, 2019). This similarity suggests a policy design element to consider in future forest governance developments. Special purpose districts modeled on Oregon's historical FPAs – with objectives updated to fit current wildfire fuels strategies – may be a viable type of structure to enable involvement by private landowners and other local interests in wildfire governance today, and may be a useful topic for future research.

(2) Both the Forest Service and the state recognized self-organized, local entities representing private landowners (FPAs) – specifically state-authorized entities – as essential partners in wildfire governance. Forest Supervisors (of the Forest Service) and state forestry officials engaged with FPA representatives in cross-boundary decisions and negotiations, for instance in adjustments to the boundary line of protective units. The self-governed, self-organized nature of FPAs enabled direct representation of private landowners (as FPA officers) in state-/ federal-interactions, generating the benefits of tailoring agreements to local conditions (topographical, infrastructural) and possibly also local buy-in to decision outcomes involving federal entities – outcomes that are applicable to collaboration today (Koontz et al., 2010; Wilson, 2006).

(3) **An administrative structure for state transfer of federal funds to local entities, resulted in cost-sharing among federal, state, and local entities.** Oregon statutes authorized FPAs to assess a share of the protective district's patrol costs to private landowner members. Federal cost-share funds augmented locally-generated funds in FPA budgets. Cost-sharing promoted budgetary stability. Consequently, FPAs maintained a stable capacity to deliver wildfire protection services to the protective unit's private landowners, along with protecting intermingled Forest Service lands. Federal cost-sharing for private land protective units – as authorized by the Weeks Act and Clarke-McNary Act – generated the benefit of cohesive, uniform federal-state policy implementation across federal and nonfederal lands (Lewis and Bramwell, 2013; Steen, 2013). This outcome, which aligns with the Cohesive Strategy (USDA and USDI, 2014), suggests a policy design opportunity.

A prospective downside of a historical FPA-based governance model should be noted, however. Access to FPA membership was comparatively closed, with membership generally limited to timberland owners and operators. Today's contests to the legitimacy of federal agency decisions (Abrams, 2019) – especially those heightened by unprecedentedly severe disturbances (Schultz et al., 2021; Steen-Adams et al., 2020) – call for participation by a broad array of partners and a collaborative model (Koontz et al., 2010); although governance solutions with a narrower array of partners may succeed in places where conflict is low. This situation suggests that a policy design that features the reintroduction or expansion of a FPA-modeled cross-boundary governance structure may be appropriate only in local contexts where conflict – along with challenges to agency legitimacy – is relatively low (for a schematic of the variation in opportunity for innovation associated with levels of conflict, see Abrams, 2019).

Attention to partner roles can promote efficient use of limited resources, as expressed by the National Wildfire Coordinating Group (Machlis et al., 2002), which maintains many of the historical cooperative practices documented in this study. The performance of the combination of mutual and complementary roles historically supported cooperation durability. Both the Forest Service and partnering entity performed an implementation role by providing fire detection and suppression services, while the Forest Service generally provided technical resources, FPAs performed outreach and private landowner engagement, and states performed the roles of administering federal cost-share funds and liaison. The Oregon examples demonstrate that attention to the diversity of partner roles can promote partnership effectiveness, consistent with research on the Joint Chiefs Landscape Restoration Partnership (Kelly et al., 2019).

Regarding Forest Service-state-FPA cooperation, this study's examples highlight the essential roles that state forestry agencies may play in cross-boundary management: as an administrator of state-wide law and rules that promote consistency across localities; as a liaison that fosters alignment between federal strategies and local interests; and as an administrator of federal cost-share funds. Also, these examples highlight roles for special purpose district associations, such as Rangeland Fire Protection Associations, to engage private land owners, such as outreach and capacity-generation.

Agency headquarters-level actors performed essential partner roles – an insight that is distinct from social science findings at the operations level (Koontz et al., 2010; Huber-Stearns et al., 2021). Agency officials and administrators created cooperative policies and interagency agreements – often by seeking out policy alignment from counterparts – resulting in availability of coordinated authorities to local managers. Thus, roles performed at the headquarters level may promote the likelihood of establishing and maintaining partnerships at the unit-level.

Scholarship on the evolution of forest governance has tended to present a simple dichotomy: “top-down” federal managerial control by the Progressive Era technocratic bureaucracy, contrasted with participatory decision-making approaches, such as ecosystem management, of the later twentieth century (Hays, 1999; Yaffee, 1999). Twenty-first

century forest governance has evolved in significant ways – particularly as influenced by the National Environmental Policy Act and the Endangered Species Act and on Forest Service lands, the National Forest Management Act (1976) (Koontz et al., 2010). Collaboratives and partnerships that involve states, tribes, local government, and private landowners have become prevalent (Abrams, 2019; Charnley et al., 2020; Schultz et al., 2021). The Good Neighbor Authority and Shared Stewardship also exemplify this shift. This case study demonstrates that partnerships are not novel, however. During the early decades of the Forest Service, agency managers and partners identified common ground to fulfill mutual goals and pooled resources to offset capacity constraints. This said, there are some dissimilarities between historical cooperation and today's collaborative models. Cooperation of the agency's custodial period engaged a limited diversity of parties – particularly forest industry – that generally held similar viewpoints to those of the Forest Service. The historical governance model is quite different from the governance situation today in many places (e.g., Wilson, 2006), where the spectrum of viewpoints and values is much wider.

7. Conclusion

An “all lands” strategy that involves entities across jurisdictions and at larger spatial extents is essential to achieving today's federal policy goals of wildfire risk reduction and forest restoration. This study documents how a cooperative cross-boundary strategy of wildfire management was established and endured for several decades during the early twentieth century in Oregon. We described the nature of cooperative wildfire management across land ownerships during the Forest Service's custodial management period, expanding upon research about the wildfire policy histories of Forest Service, tribal, and private ownerships in Oregon's eastern Cascades (Steen-Adams et al., 2017), and scholarship that documents Forest Service cooperative wildfire management history at a national level (Bramwell 2012; Lewis and Bramwell, 2018; Pyne, 1997; Southard, 2011; Steen, 2013).

Our findings regarding private landowners in historical forest governance, specifically regarding enabling institutions and partnership roles of FPAs (and their associated special purpose district unit of state government), to the best of our knowledge have not been described using case study methods for other states (Pyne, 1997 notwithstanding). This limitation obscures whether the phenomenon of cross-boundary cooperation that featured a network of state-authorized, self-organized local entities (FPAs) with Forest Service and state entities was widespread historically, and raises an important area for future research.

Our research found that elements promoting enduring cross-boundary cooperation fell into two categories. First was a bundle of cooperation-focused institutions linking multiple administrative levels of the Forest Service to that of agency partner(s). Such institutions included: cross-organizational policy alignment; headquarters-level cooperative policies, laws, and/or interagency agreements; unit-level cooperative agreements, an administrative structure for interagency resource transfer, resulting in cost-sharing; and private landowner involvement in forest governance through the state-granted authority of a special purpose district. Second was attention to the diversity of partner roles – whether complementary or mutual, and performed at both local and headquarters levels – that can increase the capacity of partners to accomplish shared goals. These two categories of enabling elements operated across both governance models of our study. Thus, although the specific form that cooperative forest management takes likely will vary depending upon context and partners involved, the underlying building blocks that foster cooperation remain relevant. Policymakers may find it useful to consider these enabling elements in promoting cross-boundary cooperation in wildfire and forest management today.

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Declaration of Competing Interest

None.

Data Availability

Archival data are not suitable for sharing; nevertheless, the authors will respond to requests regarding data details.

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