



EDITORIAL

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Indigenous stewardship rights and opportunities to recenter Indigenous fire

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Abstract

Wild and intentionally ignited fires are not new to North American landscapes or to the Indigenous cultures whose ancestral places encompass them. For millennia, Indigenous fire stewardship has been regionally and locally distributed across North American ecosystems. These practices reshaped fire regimes to provide safe living and foraging conditions and reduced wildfires and their emissions prior to Euro-American colonization. Euro-American colonization impacts initially included introduction of foreign diseases and widespread genocide, which broadly diminished the extent of Indigenous fire stewardship. Colonial policies and practices thereafter effectively altered vegetation and fuel patterns, fire regimes, and the once far-reaching effects of Indigenous fire stewardship. These influences have contributed to the current state of wildfires and their climate effects. Prior to colonization, Indigenous stewardship rights had been passed down through generations for millennia of active stewardship, and those rights were and continue to be protected under Indigenous law. However, US federal laws do not recognize these fundamental rights despite their legal standing in international law. Re-instating these rights would provide many advantages to addressing the modern wildfire and climate crisis. Re-instatement could be accelerated through linked land access, policy reform, and learning opportunities.

Resumen

Los incendios naturales o iniciados intencionalmente no son nuevos en los paisajes de Norteamérica, o para las culturas indígenas cuyos lugares ancestrales abarcan. Por milenios, las Administraciones Indígenas de Tierras para mitigar los incendios (*Indigenous Fire Stewardship*, IFS) han sido regional- y localmente distribuidas a través de los ecosistemas de Norteamérica. Esas prácticas reconfiguraron los regímenes de fuegos para proveer de condiciones de vida más seguras y también de forraje, y redujeron los incendios naturales y sus emisiones previo a la llegada de la colonización Euro-americana. Los impactos de esta colonización incluyeron la introducción de enfermedades foráneas, y genocidios diversos, lo que disminuyó en gran medida la extensión de las IFS. Las políticas y prácticas coloniales posteriores efectivamente alteraron la vegetación y los patrones de combustibles, los regímenes de fuegos, y también los efectos de las IFS, por entonces poderosas y de gran alcance territorial. Esas influencias han contribuido al estado actual de los incendios de vegetación y sus efectos sobre el clima. Antes de la colonización, los derechos de las IFS se pasaban de generación en generación y por milenios, mediante la administración activa de las IFS, y esos derechos fueron, y continúan siendo protegidos, bajo la ley indígena. Sin embargo las leyes federales de los EEUU no reconocen ese derecho fundamental a pesar de su status legal dentro de las leyes internacionales. Reinstalar esos derechos proveerá

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de muchas ventajas para ser adicionadas a la crisis moderna de los incendios y del clima. Esta reinstalación puede acelerarse a través de accesos ligados a diferentes tierras, una reforma de las políticas y las oportunidades que brinda el aprendizaje.

Keywords Indigenous fire stewardship, Forest policy, Fire resilience, Climate resilience, Landscape, Landback

Introduction

The fire-prone landscapes of North America co-evolved for millennia with Indigenous fire stewardship, lightning and volcano ignited wildfires, and other Earth system processes (Kimmerer and Lake 2001; Stephens et al. 2007; Bowman et al. 2009; Eisenberg et al. 2024; Hankins 2024). Synergistically, these fires created landscape conditions to support Indigenous lifeways and enhance ecological conditions. Today, these landscapes are vulnerable. The loss of regularly burned landscapes began with massive Indigenous depopulation from introduced European diseases (Koch et al. 2019) and extends to current fire exclusion and suppression policies (Calkin et al. 2015), which have diminished burning in most ecosystems to an all-time low (Hagmann et al. 2021; Parks et al. 2023). Fire exclusion has created landscape conditions that are susceptible to wildfire damage and mortality (Hessburg et al. 2019; McClure et al. 2024), furthering the loss of species through diminished genetic and habitat diversity generated by fire (Moritz et al. 2011; He et al. 2019; Kelly et al. 2020; Steel et al. 2025). The coupled influences of rapid climatic warming and drying multiply these vulnerabilities as the annual area burned at high severity increases at an alarming rate (Taylor et al. 2016; Turco et al. 2023). Amidst these changes, a common theme emerges: the lack of ongoing, active and scale-appropriate fire stewardship of North American wildlands (Kimmerer and Lake 2001; Hankins 2024).

Interrupted Indigenous fire stewardship

The interruption of Indigenous fire stewardship in North American landscapes has many origins, all which stem from colonization by Euro-American settlers. Principal among them was the intentional disruption of the tightly entwined relationship of Indigenous peoples to their ecosystems by settlers (Rodríguez Trejo 2008; Fulé et al. 2011; Miller and Davidson-Hunt 2013; Hoffman et al. 2021; Roos et al. 2022; Copes-Gerbitz et al. 2023; Hankins 2024). The aforementioned die-off from introduced diseases (Koch et al. 2019), genocidal acts, policies of forced removal from ancestral places, boarding schools, wholly inadequate Native Title arrangements, and devaluation of Indigenous knowledge systems are among many other factors. Today there is growing recognition of the time-tested contributions Indigenous knowledge systems

and cultural practices can provide (Hoffman et al. 2021; UNEP (2022); Martinez et al. 2023; Eisenberg et al. 2024; Hankins 2024). However, revitalization of Indigenous fire stewardship is muddled by constraints from conflicting legal understandings of ownership, access, and stewardship rights (Maclean et al. 2023) and systemic racism that continues to impact the policies and practices of agencies (Williams 1992; Eriksen 2024).

Indigenous rights of stewardship

Indigenous issues are complex when viewed in the light of present-day legal and political cultures. For example, the United States (US) federal government formally recognizes many tribal governments as sovereign nations, and federal laws (e.g., Public Law [PL] 93–638) identify tribal self-determination as a federal trust responsibility. However, the sovereignty of all Indigenous peoples and their ability to steward ancestral places the USA now occupies is not universally afforded by the federal government. Furthermore, there is disparity among involved federal political bodies and their modes of action, which often fail to address broad differences in cultural practices, ways of knowing, and knowledge retention and transfer (Lake et al. 2021; Maclean et al. 2023; Hankins 2024). At the heart of the differences are broadly differing ecologies of ecosystems, people, and places, and divergent cosmologies and epistemologies. Despite these differences, Indigenous peoples seek to maintain their unique cultural practices and identities and eliminate inequities in recognition status as the original peoples of the landscape. Stewardship of ancestral places (i.e., Indigenous cultural landscapes) is a primary means of doing so. In this way, cultural and ecological (ecocultural) stewardship practices produce and maintain resilient, safe, and sustainable landscapes.

Indigenous fire stewardship—i.e., the Indigenous cultural practice of tending vegetation conditions with intentional burning to complement other wildland ignitions to achieve myriad outcomes—is a core practice of Indigenous peoples (Lewis 1973; Anderson 2005; Martinez et al. 2023; Fisk et al. 2024; Hankins 2024). Indigenous fire stewardship as used here encompasses the holistic and cyclical nature of these practices specific to Indigenous peoples versus other types of cultural or intentional burning. Indigenous fire stewardship

maintains a reciprocal relationship between ancestral places, lifeways, species, and ecosystems to form an eco-cultural system (Hankins 2024). In reciprocity, Indigenous people take from and give back to the land in equal measure to ensure their sustainability and that of the landscape they depend on. This ethic of reciprocity requires those in reciprocal relations with a landscape and its ecosystems to give in order to receive (Kimmerer 2013; Eisenberg et al. 2024).

The centrality of Indigenous fire stewardship

For Indigenous entities (i.e., tribes, tribal organizations, communities, family bands, and individuals), these stewardship traditions are strong. Bearing the responsibility for cultural stewardship practices is what enables an ancestral place to sustain culture. Culture is sustained whether an Indigenous entity is federally recognized or not because Indigenous cultures are maintaining their ancestral responsibilities to their ancestral places. These ancestral places often include those that are also affiliated with federal, state, local, and non-governmental organizations (Hankins 2024). Although not all Indigenous peoples have retained the knowledge or ability to engage in stewardship of their ancestral places due to the myriad impacts of colonization, opportunities to improve and sustain resilient landscape conditions are highly valued. The individual and community benefits of stewardship, which contribute to the physical, mental, and spiritual health gained from revitalizing and maintaining these traditions, are likewise significant (Burgess et al. 2005; Hobson Hagerty et al. 2018).

Effects of policies

Many current policy initiatives identify Indigenous stewardship as a means to achieve climate resilience and biodiversity conservation goals (e.g., see Hankins 2024; Dinerstein et al. 2019) and Indigenous peoples provide strong potential to contribute to these goals (Eisenberg et al. 2024). Yet, despite such acknowledgement and despite the urgent need for actions to curtail escalating wildfire impacts, including their strong positive feedbacks to global warming, broad reforms have languished when it comes to effectively engaging Indigenous entities to address these problems at a sufficient scale (e.g., see Hessburg et al. 2021). Policies which could lead to more extensive Indigenous stewardship have met significant obstacles in opposing policies. For instance, competing presidential orders have supported then rescinded such initiatives. Examples include Presidential Executive Order (E.O.) 14,008—*Tackling the Climate Crisis at Home and Abroad*, E.O. 14,072—*Strengthening the*

Nation's Forests, Communities, and Local Economies, versus E.O. 14,154—*Unleashing American Energy*.

At the agency level, well-intentioned policies have been interpreted and applied narrowly. The *Traditional Gathering Policy* between the US Forest Service and the Bureau of Land Management, for example, was developed in 2007 to ensure tribal access and stewardship of traditional plant materials on approximately 14 million ha (35 million acres) of public land within California. The crafters of this policy were clear that the needed management included burning as part of traditional practices to maintain ecosystem health. Despite this apparent understanding, agency staff have deferred to other Acts or agency policies (e.g., Endangered Species Act or strict adherence to National Wildfire Coordinating Group qualifications) that limit their ability to partner with Indigenous entities and implement Indigenous fire stewardship. Considering the co-evolution (Hessburg and Agee 2003; Hessburg et al. 2005; He et al. 2019; Kelly et al. 2020) of North American landscapes with constant Indigenous fire stewardship in pre-Columbian times, it is timely that managers and policymakers consider how they might actively revitalize Indigenous fire stewardship practices, reconnect Indigenous peoples to landscapes, and simultaneously contribute to climate resilience and biodiversity conservation goals.

Addressing wildfires and their interrelated impacts in North America would greatly benefit from the diverse time-tested practices that stem from the revitalization and maintenance of Indigenous fire stewardship. Indigenous-led efforts involving Indigenous fire stewardship informed by Indigenous knowledge (IK) is a good starting place for this understanding. Specific stewardship actions to address needs including those of individual species (e.g., enhancing plant traits) to broader landscape-scale outcomes (e.g., enhancing stream flow or habitat diversity) have been guided through careful observation informing IK through time and have been reinforced by the cultural and ecological benefits of such stewardship. Such foundational knowledge and experience are essential to navigating the significant differences between Indigenous and western legal frameworks in a manner that can address past grievances through reconciliation and progressive capacity building. Furthermore, these knowledges and practices provide a unique opportunity to address landscape vulnerability to severe wildfires and rapid climatic changes (Hankins 2024).

Following, we offer some viable approaches to assist this process. While our emphasis is US oriented, similar issues exist across North America and elsewhere,

and these approaches may be similarly applicable in such places.

The right to steward

In North America, Indigenous fire use was never disputed until colonization and associated policies disrupted the cultures and processes of Indigenous fire stewardship. Indigenous stewardship of ancestral places was and is essential to the long-term maintenance, sustainability, and resilience of fire-prone landscapes and the people living in them. For example, the spatial and temporal patterning resulting from Indigenous fire stewardship weakened what would otherwise have been a strong linkage between climate, area burned, and fire severity to provide safe living and foraging conditions in fire-prone landscapes (Taylor et al. 2016; Swetnam et al. 2016; Liebmann et al. 2016; Roos et al. 2022; Povak et al. 2023). As local conditions changed over time, Indigenous fire stewardship practices were similarly adjusted based on indicators used by cultural practitioners to read and actively steward the landscape and live safely with fire (Hankins 2024). As Pyne (2007) aptly stated, “Indigenous peoples traded fires of chance for fires of choice.” To have fires of choice implies one must also have stewardship rights. Just as access to water and air is a basic human right, so too should be the ability to steward the landscape with fire.

Rights contained in Indigenous law

Indigenous stewardship rights have been passed from one generation to the next and are promulgated in traditional stories. These rights, which are fundamental to Indigenous law (Hankins 2024), are likewise foundational to spiritual practices. Indigenous law is rooted in natural law, which affords inherent rights, including active stewardship, with reverence, and respect of nature as a sacred entity (Austin 2009; Black 2010; Redvers et al. 2020; Bombroff 2005). The cited authors outline the universal connections between the rights of nature and the individual and customary rights of Indigenous peoples for use and conservation of nature maintained through stewardship actions. Indigenous legal frameworks thus recognize and follow the laws of nature (Eriksen and Hankins 2014a, 2014b, 2015). Indigenous laws of nature include, but are not limited to, *the law of diversity*: the strength of an ecosystem is dependent upon the health and diversity of species within it; *the law of interdependence*: all species, including humans, are interdependent with each other; *the law of finite resources*: there are limits to growth and carrying capacity at all scales; and *the rights of all living things* to exist and remain in a healthy condition.

Fire is also part of the larger natural law framework—as a primary mechanism for maintaining healthy

ecosystems and habitats. As such, the right to use fire is codified as essential in Indigenous law (Hankins 2024). Indigenous knowledge recognizes that if fire is not used on the landscape for maintenance and to reduce flammability, then devastating fires that threaten people, materials, and habitats are sure to come. This understanding underscores that inaction is not a viable alternative (Hessburg et al. 2021), and that action is foundational to Indigenous fire stewardship. In some landscapes, including dry, moist, cool, and cold ecosystems, Indigenous fire stewardship has been the primary source of ignitions and fire frequency throughout time. Colonization and subsequent policy mandates disrupted this burning (Hessburg and Agee 2003; White 2015), resulting in many of the unintended consequences we face today (Calkin et al. 2015). Without aligning western law and policy with natural law—i.e., the ways that landscapes evolve and thrive with Indigenous peoples—the natural world will continue to suffer.

The right and responsibility to use fire in the landscape is inherent to the Indigenous peoples of North America. However, these rights and responsibilities are not universally applied as they may be locally subject to additional laws or practices as adapted to the geography and customs of individual tribes, bands, and also individual practitioners. For instance, some tribes may have individuals who apply and enforce the fire laws, some may have special society members who oversee the application of fire, and other tribes may have no such designations. While such rights and responsibilities are not enumerated, they are also not relinquished in any treaty; it is unfathomable to many tribes to give up this responsibility. The very premise of recognizing the right to burn derives from unceded rights to “transient resources” by means of established treaties. Stewardship and maintenance of transient resources—such as wildlife, fish, plants, water, air, and fire—are integral to Indigenous lifeways and environmental health. These rights exist in the collective rights of ownership (Moreton-Robinson 2015, 54). Ownership, possession, and property are terms recognized in Indigenous legal and cultural frameworks and have been applied to fire-stewarded areas over deep time. In a legal sense, these terms imply a right to have (i.e., possess), dispossess, and enjoy. The once widely exercised Indigenous right to burn is an inherent right (see Hoffman et al. 2022). However, lack of clarity in US federal law has led to restrictive policies that condemn such actions. Many Indigenous people recognize the personal rights of a burner within the context of a burned area for personal or communal use (e.g., to gather plant materials). Similarly, many Indigenous traditions place responsibility on the burner for the application of fire and its outcomes (you light it, you own it), which underpins a general

awareness of risk and liability (terms largely lacking in Indigenous languages) to ensure application of cautionary principles.

To add global context, recognition of Indigenous rights to steward are established in international law. The right to steward is codified in the United Nations Environment Programme (UNEP) Convention on Biological Diversity and the United Nations Declaration of Rights of Indigenous Peoples (UNDRIP). To varying degrees, UNDRIP articles 3, 11, 24, 25, 26, 27, 29, 31, and 36 (S.C. 2021, c.14) directly or indirectly support the Indigenous rights to steward based on self-determination, spiritual, economic, ecological, and cultural traditions. While UNDRIP is non-binding, it provides a framework whereby signatory nations can adopt or integrate the identified rights into formal policies. All North American countries are now signatory to UNDRIP, but only Canada has, to date, taken steps to formally recognize the rights of Indigenous peoples via UNDRIP.

Within the USA, the rights to certain natural materials as transient resources have been established and upheld in many legal cases (e.g., hunting and fishing rights where applicable and water), but there are ongoing struggles to more broadly uphold such rights outside of recognized areas (i.e., outside of so-called Indian Country). The rights to transient resources apply not solely to trust lands, but to ancestral territory, which includes federal and non-federal lands. While it is generally easier to establish mechanisms to enable stewardship on public lands, the broader benefit spans all lands where willing landowners may partner to uplift and value stewardship actions. Mechanisms to enable such stewardship are outlined later in this article.

In some instances, such as the Western Regional Air Partnership recommendations, Indigenous ceremonial or cultural use of fire is supported. Arguably, the right to burn could be afforded by the American Indian Religious Freedom Act (AIRFA) (42 U.S.C. § 1996 et. sec.) to most, if not all, Indigenous fire stewardship due to the spiritual relationship and responsibilities intertwined with burning. On its own, AIRFA addresses several key points noted above, including access to sites and conduct of traditional rites. Many Indigenous entities recognize fire as sacred and as medicine (Norgaard 2014; Lake et al. 2017; Colenbaugh and Hagan 2023). AIRFA also addresses possession of sacred objects, and possession, which under AIRFA, also implies the use of sacred objects similar to the possession and use of feathers.

Within the USA, the proprietary right to burn is codified in federal law relative to Columbia River treaty rights (25 CFR 247.16 and 247.17), but it is not clearly established elsewhere. Cases of civil disobedience have elevated legal claims to hunting and fishing rights,

and courts have recognized rights to other transient resources, but similar claims have not yet occurred with respect to Indigenous fire stewardship to formally extend this right to burn. Meanwhile, with the inevitable return of wildfire and an active and increasingly severe fire regime (Hagmann et al. 2021, and references therein), it is timely and imperative to ask which legal interpretations best achieve landscape resilience? Indigenous law and the laws of nature surely provide a foundational understanding to elevate the rights of Indigenous peoples to steward with fire, and existing science and policies support these rights, but they are not applied to enable scalable action (Table 1).

Scalability requires providing the space and time for cultural practitioners to deeply familiarize themselves with their landscapes and potentially relearn fire stewardship practices that are appropriate there, where that knowledge has faded due to colonial prohibitions. Fire stewardship experience is lacking in recent generations in many tribal communities, but the knowledge persists through story and tradition and can be revitalized. For example, the restoration of Indigenous fire knowledge in riparian ecosystems in California was intentionally revitalized by teaching and application where prior generations were unable to apply that knowledge (Hankins 2013). Such revitalization of fire stewardship resolves an intergenerational knowledge gap created by impacts of colonization. Knowledge recovery and revitalization can occur practitioner to practitioner, where sharing and knowledge exchange across diverse ecosystems and even cultural regions ensues. Ultimately, connecting people to place and enabling the active, on-the-ground interpretation of landscape needs is imperative to addressing landscape resilience (Hankins 2024) and the resilience of the people (Eriksen and Hankins 2014b).

Land tenure, access, and opportunity

The ability to steward is contingent on having access to places. Colonization affected stewardship by disrupting the traditional and longstanding connections of people to places. Colonists had starkly different views of those accustomed places including notions of land ownership, settlement and domestication, and severability. These notions subjugated and obliterated traditional notions of place—places where people lived, held ceremonies, traded, traveled through, or married into or out of (Christianson et al. 2022). Where colonization sought to legitimize ownership through removal, treaty, or other mechanisms, the process failed to supplant both the Indigenous stewardship needs and rights.

Land ownership and tenure are complex issues among Indigenous entities. As most Indigenous peoples acknowledge, the people do not own the land, the land

Table 1 Policies that support Indigenous rights to steward landscapes in the USA

Policy	What it implies	Opportunity
Law of the Land (Indigenous)	Fire is a natural process, and the landscape speaks to us of its need to burn	Policy reform at local, state, and federal levels should seek to recognize natural law
Convention on Biodiversity and UNDRIP (International)	Indigenous peoples have the right to steward their ancestral territories	Natural law is the basis of Indigenous stewardship and is applicable to stewardship of ancestral territories. One stewardship activity is the application of fire to the landscape
Indian Self-Determination and Education Assistance Act PL 93–638	Tribes, tribal organizations, and tribal individuals have the right to self-determination and stewardship within ancestral territory	Work with tribes and traditional cultural practitioners to establish stewardship landscapes and prioritization for stewardship and land back
Clean Air Act–Western Regional Air Partnership recommendations	Indigenous fire stewardship can be treated as a natural and unregulated source of emissions with respect to the Regional Haze Rule	Exempt Indigenous fire stewardship from Clean Air Act and utilize Indigenous partnerships to implement fire at meaningful spatial and temporal scales
Traditional Gathering Policy (Federal–Tribal in California)	Seeks to facilitate traditional stewardship techniques on Forest Service and Bureau of Land Management Lands	Agencies actively work with traditional cultural practitioners to establish landscape-scale stewardship

owns the people (Black 2010). This concept embodies the broader notion that the people of the land are intrinsically connected to that land and are responsible for its health and well-being in reciprocity with the land and across generations as community and individually. In contrast, the western concept of land ownership was completely foreign to Indigenous people during settler colonization as it is largely based on individual use and commodification of materials. While there may seemingly be similarity of rights of ownership as stated above (i.e., to have, dispossess, and enjoy), there are considerable cultural differences in how they are perceived and applied. Where some nations entered into treaties ceding territories in exchange for services and goods, many nations were forcibly removed from their ancestral lands. As noted previously, the unenumerated and reserved treaty rights imply the inherent rights to steward, access, and harvest transient resources (see Duthu 2008). Feeble attempts to record Native Title during colonization failed to recognize the specific relationships Indigenous peoples have with their territories and the stories that attend those landscapes, as exemplified by recent map-based ethnographies among various Indigenous entities (e.g., Hunn et al. 2015). These ethnographies illustrate the often-overlapping interest in territory for ceremony, trade, and general stewardship.

Few examples of self-determined and unadulterated stewardship by Indigenous peoples remain within the USA given the myriad conflicts between natural and federal law. One might assume Indigenous peoples can steward on tribal trust lands (e.g., reservations), but these trust lands are federal trust lands and are not to be freely stewarded without federal oversight, and not all Indigenous peoples are recognized by the federal government.

Despite these limitations, numerous existing policies recognize the right of Indigenous entities to steward the land. The Indian Self-determination and Education Assistance Act (PL 93 638) (Table 1), for example, establishes the right of beneficiaries to self-determination. Beneficiaries includes tribes, tribal organizations, and individuals regardless of recognition status. Similarly, self-determination is not limited to lands held in trust for beneficiaries, and all federal agencies have tribal trust responsibilities to uphold, including the proper stewardship of transient resources (e.g., fish, wildlife, plants, fungi, air, water). Broad legal interpretation of trust responsibilities and self-determination have largely been applied where tangible (e.g., fiscal) or intangible (e.g., cultural) impacts can be weighed to further existing statute or other policies such as the Endangered Species Act where impacts to culturally significant and listed wildlife exist (Fine 1986). Despite a well-established record asserting broad interpretation of trust responsibilities, several recent federal court decisions have weakened the extent of responsibilities (e.g., *United States v. Jicarilla Apache Nation*, 564 U. S. 162, 177 (2011)—reduced oversight of trust investments and impeded the ability of tribes to seek relief for mismanagement of trust fund; and *Arizona v. Navajo Nation*, 599 U.S. 555 (2023)—narrowed interpretation of unenumerated water rights despite current need). Self-determination and recognition of sovereign authority implies the rights of an Indigenous entity, at a minimum, to have access to and to steward transient resources.

For federal agency decision-making authorities, recognizing the implications of self-determination can be difficult to navigate. Typically, a federal agency's approach to land tenure, access, and stewardship is framed within perceived legal limitations, which often fail to articulate

how self-determination applies. In this context, decision-making about stewardship by Indigenous entities is placed in a permissive space, whereby an Indigenous entity seeks permission from or in consultation with federal agencies to access or steward ancestral places. In the context of colonial awareness, permissive space is a bizarre approach, much akin to asking a burglar for permission to be present in one's own house. What is needed instead is recognition by federal agencies of Indigenous entities as rightsholders, not stakeholders.

Until self-determination of ancestral lands is achieved, a safe space for Indigenous, private, and public entities who are exploring new models of land tenure and access is in co-management and co-stewardship arrangements with Indigenous entities (Eisenberg et al. 2024; Clark et al. 2024). It is a safe space because it provides an opportunity for dissent in decision-making and action. It also requires "good behavior" on behalf of all participants to work toward a common goal, but it is not an ideal.

Globally, co-management and co-stewardship have been applied to establish meaningful engagement with Indigenous and local peoples who often continue to live and work—often as agency employees—on the land within the boundaries of the co-managed area. Co-management and co-stewardship often involve the delegation or recognition of some level of decision-making authority among the parties involved to achieve a conservation and stewardship outcome (Farrier and Adams 2011; Eriksen and Hankins 2014a; Nowell et al. 2022).

While such arrangements can provide a mechanism for people to maintain a relationship with their ancestral lands, the conflicts in decision-making and resulting actions may still favor non-Indigenous practices. This is especially true where there is no transference of power, authority, or funding from colonial governments. Given a general lack of established Indigenous fire stewardship examples from co-managed or co-stewarded areas within the USA, Kakadu National Park in Australia's Northern Territory is a good case in point. The Park is home to several Indigenous groups (Traditional Owners) and is immediately adjacent to one of the largest freehold Indigenous land areas in Australia. Within the Park, Traditional Owners engage in fire stewardship to minimize late-season fires. However, their practices are largely directed by non-Indigenous personnel who historically used a narrow understanding of Indigenous fire use to limit burning to the early dry season, which has led to an invasion of non-native grasses with associated risks to native biodiversity and cultural values (Petty and Bowman 2007). An imperious approach of this sort should be avoided. Instead, co-management that involves shared decision-making, capacity building, and funding can ensure equal involvement in a power-sharing dynamic.

Toward improved collaboration

Cooperative stewardship arrangements can exist in many forms ranging from effective consultation to co-equal involvement in planning and implementation of actions to federal transfer of decision-making authority. Government to government (i.e., federal to tribal) consultation already exists but is often contentious for Indigenous entities, who strive for greater levels of continuous engagement. To more favorably engage with Indigenous peoples, a deeper commitment by agencies is needed to move from simple irregular consultation to meaningful ongoing engagement.

Co-management is frequently discussed as an opportunity to engage more with Indigenous and local communities in stewardship (Grey and Kuokkanen 2019). However, even where some tribal governments have long histories of co-management alongside federal entities (e.g., the National Park Service with Navajo Nation at Canyon de Chelly), the full breadth of meaningful engagement has not been realized (Sapignoli and Hitchcock 2023). Often the co-management arrangement is limited to specific aspects of stewardship, such as identifying and protecting archaeological resources or natural history interpretation, rather than holistic land stewardship, as described above.

The growing interest in co-management and co-stewardship has led to further consideration of the opportunities broadly available to federal agencies. Most recently, the US Departments of Agriculture (USDA) and Interior (USDI) have engaged in co-stewardship, with an initial joint secretarial order in November 2021 that created arrangements with tribes to co-steward public lands and waters complementary to the interests of Indigenous entities and in a manner consistent with federal trust obligations. This was followed in September 2022 by the USDI releasing guidance on tribal co-stewardship. Most recently, the Solicitor's Office (department's legal office) reported their analysis to support tribal stewardship and co-stewardship (Department of Interior Solicitor 2022; Department of Agriculture Solicitor (2023). Additionally, the Wildland Fire Mitigation and Management Commission (WFMMC) listed co-stewardship as recommendation 29 among their 148 recommendations (WFMMC 2023). Collectively this guidance and these recommendations illustrate a pressing need to improve supporting processes.

The sharing and transfer of decision-making authority presents a unique opportunity to improve and enable timely stewardship actions particularly given growing interest to include IK in stewardship activities. A good entry point for such decision-making authority may be developed through consultation and co-management or co-stewardship processes. Transfer of decision-making

authority is a means to ensure IK is not appropriated (Clark et al. 2024). Successful shared or Transferred decision-making first requires the opportunity to engage and build capacity in decision-making. A challenge to protecting IK in decision-making is how information may be subject to the Freedom of Information Act, which is identified in WFMMC recommendation 113 (WFMMC 2023). Ultimately, the right to steward would be best achieved where Indigenous entities are afforded some level of decision-making authority.

Ways forward

While the incremental efforts to support Indigenous stewardship within existing constructs of policy and land tenure currently benefit some Indigenous entities, to address the impacts of wildfires and climate change, more inclusive Indigenous stewardship policies are needed—particularly those that are Indigenous-led. As noted above, care must be taken to ensure these agreements are developed or co-developed with or by Indigenous entities using Indigenous terms, concepts, and governance models (to be defined in context when used). There are many existing and emerging tools to inform these processes. Different models of land return, conservation agreements, and other opportunities through establishment of Indigenous protected areas, Indigenous land use agreements, and landback are a few key vehicles we discuss below.

Indigenous protected areas

The International Union for the Conservation of Nature offers a variety of conceptual models to conserve areas of interest (Dudley and Stolton 2008). Within the matrix of conservation ownership types, Indigenous and local community conserved areas offer a unique model for governance and stewardship centered on place-based relationships. In the Indigenous context, many of these areas are referred to as Indigenous protected areas (IPAs) or Indigenous protected and conserved areas (IPCAs, Mansuy et al. 2023). A primary method for determining specific connections of Indigenous entities to places draws heavily on map-based ethnography (e.g., Hunn et al. 2015), which can also be used to inform Native Title processes.

Many IPAs have been created in Australia (Tran et al. 2020; Isaac et al. 2024), where Native Title and stewardship of Crown Lands have merged to provide opportunities for Indigenous peoples to maintain or re-establish connections to ancestral lands and waters. In these models, community members live on or near the protected areas and steward them for ecological and livelihood

purposes ranging from sustainable forestry to ecotourism. Ranger programs have been another means of employing community members in their stewardship, research, and monitoring efforts with the support of federal funding, some of which derive from current carbon market investments linked to ecoculturally appropriate fire regimes to maintain frequent fire ecosystem health. Ranger programs allow Indigenous people to manage their ancestral territories using a combination of western science and Indigenous knowledge, working across IPAs, national parks, and private lands, with a focus on environmental and cultural preservation.

Landback

Indigenous peoples have long sought opportunities to maintain a relationship and uphold responsibilities to their ancestral places. In recent years, the growing global awareness of justice, equity, and inclusion issues has raised interest in both recognizing ancestral connections of peoples to place through land acknowledgement, and through re-establishing ties to ancestral places through land returns and related arrangements. “Landback” (Pieratos et al. 2020) poses a unique opportunity to return land or at least enable access otherwise unavailable to Indigenous peoples.

Enabling the return of land or new access arrangements can be pivotal to addressing stewardship shortfalls and improving community well-being (see Hobson-Haggerty et al. 2018). For Indigenous entities, there may be many reasons and mechanisms used to achieve landback initiatives (Dennison 2024; White, 2025). Landback and new access arrangements can play a powerful role in remedying past-wrongs to Indigenous entities, beginning with removal and continuing with ongoing exclusion from the land. Such arrangements also provide a widely needed opportunity to ensure sustainable and resilient futures for the ecosystems contained on those lands. Examples of landback initiatives include the return of lands between the Chippewa National Forest and Leech Lake Band of Ojibwe and efforts to expand co-management and co-stewardship authority to US Forest Service. Prioritized transfer or sale of public lands and excess properties to Indigenous entities are additional opportunities that could be further utilized, particularly to help reduce federal budget impacts.

Today, many lands are under the management of absentee owners and ongoing stewardship is lacking or absent, and subsequently characteristics including cultural and conservation values often deteriorate (Jones et al. 2025). Active stewardship is necessary for maintenance of these values. For example, the establishment of US wilderness

areas to protect untrammelled natural conditions neglected the recognition of Indigenous fire stewardship in shaping and maintaining those natural and historical conditions (Boerigter et al. 2024). Indigenous stewardship and interventions pose a unique opportunity to address the impacts of climate change and rapidly changing wildfire regimes (Hankins 2024). Furthermore, Indigenous and local peoples are more likely to be invested as stewards in perpetuity.

To be most successful, landback efforts should consider the broader connections of people to places, for there may be several Indigenous entities with ancestral ties to particular places (Hankins 2024). In the Australian Native Title process, there is recognition of tiered connections to place (Sutton 2003), which may be useful in identifying and prioritizing relationships to place. The first tier can be Indigenous entities whose ancestors traditionally lived in that places. The second tier can include Indigenous entities whose ancestral connections to that place are through sacred sites, story, or ceremony. The third tier can include entities whose ancestral connections to that place are through traditional gathering access, trade, travel, or similar activities. This sort of process would require a participatory framework for identifying Indigenous entities, completing map-based ethnographies, finding common ground, and creating a constructive process for resolving dissent.

While landback arrangements face steep political, social, and legal learning curves (Hankins 2024), there is a persistent interest among Indigenous entities to ensure the conservation and stewardship of ancestral places occurs (White, 2025). The value of many culturally significant sites is both ecological and cultural, where Indigenous involvement in guiding acquisition and transfer processes is essential. Where capacity may not currently exist to transfer all intended acquisitions, partnership opportunities can be used in the interim. For example, partnerships with Indigenous-led or co-led conservation efforts or similarly aligned organizations can provide accommodating administrative, fiscal, or stewardship oversight. Ultimately, we contend that progress toward returning lands to Indigenous ownership and stewardship and new access arrangements are central tenets of a better way forward.

Indigenous land use agreements

Outright title exchange is not always desirable; in some cases, other agreements are more suitable to the needs of all entities. The Indigenous Land Use Agreement (ILUA) process, also utilized in Australia, provides an opportunity to recognize Indigenous peoples' Native Title interests, interest holders, and interests or activities of other

entities, such as federal agencies to conduct operations on those lands. The agreement is voluntary between parties and formalizes a process for engaged entities who remain agreeable through the process and for specific land uses. Likewise, the use of conservation easements, covenants, and similar instruments for access and stewardship is growing in the USA, providing a mechanism for tribes to hold perpetual use or access rights over certain lands without an underlying transfer in ownership (Middleton Manning et al. 2023; White, 2025). Memoranda of agreement (MOA) or understanding (MOU) have similarly been used by some Indigenous entities to maintain access to ancestral public or private lands. For instance, author Hankins utilized a simple MOA to ensure access for plant material gathering and fire stewardship for affiliated families on ancestral land managed by the Natural Resource Conservation Service. However, the power of such agreements is often limited and can be revoked.

Indigenous-led planning and prioritization

Across all public and private lands, there is an opportunity to provide meaningful engagement for Indigenous peoples in planning and decision-making (UNEP (2022); Hankins 2024). As noted above, government to government consultation is already a requirement in some settings. However, the consultation process is fraught with issues of tribal government capacity to engage due to factors including limited staffing and financial support. Adequate financial support of the consultation process is needed to ensure that the essential parties and knowledge systems are included.

Also important is the need to expand capacity to engage in meaningful, long-term consultations. A needed shift in practice is to engage Indigenous entities in planning and prioritization of projects, maintenance, and overall stewardship actions. For example, the US Forest Service's planning for potential operational delineation units (PODS), a landscape-scale planning process to preemptively identify topographic and edaphic control features in the event of a wildfire (Thompson et al. 2022), could be greatly enhanced by including Indigenous leadership in developing plans. Specifically, plans could be based in ecocultural objectives within PODS to minimize damage or loss through integration of Indigenous knowledge of heritage sites, local phenomena (e.g., seasonal and diurnal wind patterns), and other forms of knowledge that can beneficially influence outcomes of stewardship actions.

Similarly, planning for and implementation of prescribed, cultural, or other beneficial fire or stewardship actions would benefit from Indigenous leadership

in planning and prioritization of treatment areas. One example is in the development of Strategic Fire Zones (North et al. 2024). Transgenerational place-specific knowledge of Indigenous peoples offers a deep understanding of places through time and is invaluable to stewarding for long-term climate resilience. For instance, knowledge of fire-influencing factors within specific geographies can enhance prioritization of areas for burning or other stewardship under certain conditions. This includes, for example, recognizing the conditions to achieve specific burn objectives within a given plant community, or seasonal or daily wind or seasonal sunrise positions at a specific location.

Indigenous-led planning, prioritization, and practices are distinctive in comparison with many western approaches (Hankins 2024). For example, in the case of Indigenous fire stewardship, the protection, restoration, and maintenance of traditional cultural properties and traditional cultural landscapes are emphasized (Zahara 2020). Here, the recognition of shared territorial interests in ancestral places will benefit from partnerships through Indigenous-led and intertribal organizations. Such efforts will often benefit broader conservation efforts (Hoffman et al. 2021) by synergistically identifying sites of ecological and cultural significance (Gorenflo et al. 2012; Loh and Harmon 2014; Hankins 2018, 2024). Where specific knowledge or capacity is lacking, initiatives to engage with broader networks of Indigenous practitioners, such as the Indigenous Peoples Burning Network or Indigenous Stewardship Network, could accelerate knowledge sharing and capacity building. Such networks can help fill knowledge gaps and revitalize cultural practices through mentorship and training as needed.

Key recommendations

While numerous policies support the premise of Indigenous fire stewardship, there are clear obstacles to its use by Indigenous entities, as informed by the knowledge systems within their ancestral places. Specific changes to federal policy are needed, which would help alleviate current limitations to implementing Indigenous fire stewardship. We bring forward policy recommendations drafted by the Wildland Fire Mitigation and Management Commission (the Commission; WFMMC 2023) that, if modified, can address the current wildfire crisis. Of the Commission's 148 policy recommendations, 22 involve significant tribal or Indigenous components drawing, in part, from recommendations developed from earlier drafts of this manuscript, which was used as input for the Commission. Yet, none of the Commission's recommendations recognizes the Indigenous law of the land or Indigenous stewardship rights beyond the current constructs of federal policy. Hence, our resulting

recommendations (below) are centered on Indigenous stewardship rights with an emphasis on concrete ways of removing obstructions to burning. The supplemental online material highlights key alignments between our recommendations and those of the Commission. Recommendations herein are coarsely described; recognizing finer and more prescriptive details would require broader engagement as is typical for policy development.

Recommendations for advancing Indigenous fire stewardship

1. As a tribal trust responsibility to all beneficiaries, formally recognize the Indigenous right to steward transient wildlife, fish, plants, water, and air resources. This right includes, but is not limited to, the right to burn as an unceded right publicly supported by the US backing of the UNDRIP.
2. Develop equitable means that enable the Indigenous right to stewardship based on community recognition of Indigenous entities, or other criteria established by Indigenous entities for this specific purpose, rather than the status of federal recognition.
3. Require federal agencies to develop sound mechanisms that accommodate the Indigenous right to steward on the lands the agencies manage.
4. Develop supporting mechanisms and funding through other agency programs and decision-making authorities for stewardship activities on non-federal lands (e.g., state and private forestry, Environmental Quality Incentives Program).
5. Eliminate the requirements of Bureau of Indian Affairs approval for fire stewardship activities and fire qualifications (including the approval of burn plans and the imposition of federal qualification requirements) on tribal trust lands.
6. Create a federal mechanism for enabling "land-back" via public land and private land incentives to Indigenous entities. Given potential overlapping tribal interests, the mechanism might best include a participatory framework for identifying entities, map-based ethnographies, means to find common ground, and a process for establishing co-ownership or co-stewardship agreements among Indigenous entities sharing a historical and cultural relationship with the lands.
7. Engage Indigenous leadership from Indigenous entities in US federal agency and other decision-making and planning around stewardship activities beyond typical consultation.
8. Recognize that the training, experience, and/or certifications of Indigenous fire stewardship and

traditional cultural practitioners are on-par with and often better than wildland fire qualifications within the National Wildfire Coordinating Group to support an “all hands” approach that is respectful of self-determination.

- 9. Establish Indigenous fire stewardship training pathways, which are Indigenous developed and led.
- 10. Recognize Indigenous fire stewardship as part of baseline conditions for Clean Air Act purposes (NAAQS + Regional Haze, Clark et al. 2024). Prohibit state attempts to regulate more stringent conditions via the NAAQS.

Since it is unlikely federal policy reform will immediately resolve Indigenous stewardship rights, some interim opportunities to phase-in Indigenous fire stewardship could include:

- 1. Expanding the ability of the federal government to enter into co-management agreements with Indigenous entities. Within such agreements, Indigenous entities would be granted authority to hold final decision-making power, with the support and consultation of agencies. Agreements would codify a rebuttable presumption that Indigenous entities can conduct proposed stewardship activities, which federal agencies may attach conditions to but not unilaterally deny. Agreements would be accompanied by adequate funding and staffing to agencies to ensure effective and timely cooperation.
- 2. Create Indigenous protected areas or Indigenous protected and conserved areas on public lands, wherein Indigenous entities could maintain or re-establish connections to their ancestral lands and

waters as traditional cultural landscapes. Indigenous entities would have the right to decision-making without federal interference, but with financial support either from land revenues (i.e., from sustainable use) or in the form of federal payments.

Collectively, these recommendations would significantly advance Indigenous fire stewardship, affirm Indigenous rights, maintain Indigenous knowledge and lifeway practices, and provide a greater public benefit in fire-prone regions. While these recommendations do not identify research needs specifically, there is ample opportunity to further the collective knowledge of Indigenous fire stewardship, particularly related to climate change, invasive species, and other changes to eco-cultural systems through Indigenous-led research and monitoring efforts. Prioritizing and dedicating support for such efforts may engage broad partnerships across institutions, including Indigenous entities, academic institutions, agencies, and non-governmental organizations that would facilitate such research and monitoring. Furthermore, sustained funding through philanthropy, block grants, dedicated budget allocations, contracts, cost-recovery mechanisms, or other instruments for Indigenous entities focused on related stewardship monitoring, philanthropy, and contracts are some approaches that could enable such activities. Specific opportunities should be identified by Indigenous-led efforts.

Conclusion

Addressing the wildfire and climate crisis provides many timely opportunities for engaging with Indigenous peoples. While Indigenous stewardship is aligned with natural law in varied seasonal applications, the right to

Table 2 Indigenous, wildfire, and prescribed fire themes highlighted in this manuscript

	Indigenous	Agency/public
Law	Traditional law based on natural law (i.e., wildfire damage can be reduced if people proactively use fire)	Law is frequently counter to natural law (i.e., it is legally prohibitive to use fire)
Objective(s)	Many diverse reasons (e.g., create smoke to bring rain, cool stream waters, maintain spring flow, ceremony) Seasonally set for objectives	Relatively few (e.g., hazard reduction or wildlife habitat improvement) Based on models and staffing
Outcome(s)	Subsistence ability Species and habitat heterogeneity Nuanced response based on objectives	Black acres Less heterogeneity (stair-step rather than fuzzy edges)
Right to burn	Ancestral responsibility and obligation Specialized knowledge and leadership Acquired via intergenerational learning Ecological and cultural basis to burn	Certification or standards-based (e.g., NWCG, NFPA) Little career continuity No requirement for ecological or cultural awareness to burn
Relative cost and reason	Low-moderate Family/community-based and local	Moderate-high Personnel, equipment, travel to sites

steward similarly passes through seasons and generations connected to ancestral places. Recognizing Indigenous rights to steward would open pathways to correct the fire deficit in many fire-prone landscapes where Indigenous stewardship has maintained fire and climate resilience for millennia. The right to steward may occur through a variety of mechanisms spanning land use agreements, regulatory realignment (Clark et al. 2024), Indigenous-led and co-led planning and prioritization, knowledge sharing, and joint learning, research, and monitoring opportunities. The ultimate outcome is an Indigenous-centered approach to wildland stewardship that benefits ecosystems and communities, as summarized in Table 2.

Supplementary Information

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Supplementary Material 1

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Authors' contributions

DLH and CE developed the idea of Indigenous right to steward; DLH, SC, and SLS outlined the organization and structure of the manuscript drawing from workshop discussions with the author team; DLH, ACC, CD, CM, JW, and MC provided input specific to Indigenous elements; DLH developed tables and PF provided formatting suggestions. All authors made substantial contributions in drafting the manuscript, providing extensive editorial input, and citations during manuscript preparation and revision. All authors read and approved the final manuscript.

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