Managing forests for culturally significant plants in traditional Cherokee homelands: emerging platforms

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HIGHLIGHTS

- The Eastern Band of Cherokee Indians contributes to cross-jurisdictional forest research and management affecting culturally significant plants within a Zone of Influence corresponding to boundaries of their traditional homelands.
- Cherokee traditional knowledge that has previously been omitted is now being centred in research and management partnerships for culturally significant plants.
- Community input and Cherokee values guide partnership formation and intent.
- The Culturally Significant Plant Species Initiative provides an example of an Indigenous-led effort for regional dialogue and knowledge co-production.
- A long-term platform approach promotes plant-related research, outreach, habitat restoration, and land management efforts.

SUMMARY

The Eastern Band of Cherokee Indians (EBCI), and the USDA Forest Service are engaged in integrated research and action to manage forests for culturally significant plants within portions of traditional Cherokee homelands. The effort seeks to support EBCI arts, food sovereignty, and cultural practices while promoting coordinated forest stewardship guided by Cherokee knowledge. The focus area includes the Qualla Boundary (EBCI tribal lands); the Pisgah, Nantahala, and Cherokee National Forests; and the Great Smoky Mountains National Park. Examination of synergistic efforts to date suggests an emerging platform for access, sustainable harvesting and improved ecological conditions. Here, a platform is conceived of as long-term institutionalized collaboration across policies, practices, and governance at different scales. Building on approaches to adaptive collaborative management with Indigenous peoples at the landscape level indicates that key features of platform building in this context include responding to Indigenous priorities, fostering cross-boundary relationships, community engagement, and co-producing knowledge.

Keywords: Eastern Band of Cherokee Indians, Indigenous knowledge, co-production, non-timber forest products

Gérer les forêts de plantes d'importance culturelle dans les terres Cherokee natives traditionnelles: plateformes émergeantes

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La Bande orientale des indiens Cherokee (EBCI) et le Service forestier USDA sont engagés dans une recherche intégrée et une action visant à gérer les forêts en portant une attention sérieuse aux plantes culturellement importantes, au sein de portions des terres natives traditionnelles Cherokee. L'effort cherche à soutenir les arts de la EBCI, la souveraineté alimentaire, et les pratiques culturelles, tout en promouvant une gestion forestière coordonnée, guidée par la connaissance Cherokee. Les zones concernées incluent la frontière Qualla (terres tribales de la EBCI), le Pisgah, le Nantahala et les forêts nationales Cherokee, ainsi que le Parc national des Great Smoky Mountains. Un examen des efforts synergiques effectués jusqu'à présent suggère l'émergence d'une plateforme d'accès, une récolte durable, et des conditions écologiques améliorées. Une plateforme est ici conçue comme une collaboration institutionnalisée à long-terme, recouvrant les politiques, les pratiques et la gestion à différents niveaux. Alors que des approches à une gestion collaborative adaptable avec les peuplades autochtones, au niveau du paysage, sont ébauchées, il ressort que les attributs-clé de l'échafaudage de plateformes dans ce contexte incluent une réponse aux priorités indigènes, une favorisation des relations transfrontalières, l'engagement des communautés, et une connaissance de la coproduction.

Gestión de los bosques enfocada a las plantas culturalmente significativas en las tierras tradicionales de los Cherokee: el surgimiento de plataformas

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La Banda Oriental de las Tribus Cherokee (EBCI, por sus siglas en inglés) y el Servicio Forestal del Departamento de Agricultura de los Estados Unidos (USDA, por sus siglas en inglés) están participando en investigación y acción integradas para una gestión de los bosques enfocada hacia las plantas de importancia cultural en zonas de las tierras natales tradicionales de los Cherokee. Esta iniciativa busca apoyar las artes, la soberanía alimentaria y las prácticas culturales de la EBCI, a la vez que el fomento de una corresponsabilidad forestal coordinada y guiada por el conocimiento Cherokee. El área de interés incluye el límite de Qualla (tierras tribales de la EBCI), los bosques nacionales de Pisgah, Nantahala y Cherokee; y el Parque Nacional de las Montañas *Great Smoky*. El estudio de los esfuerzos sinérgicos realizados hasta la fecha sugiere una el surgimiento de una plataforma para el acceso, la explotación sostenible y mejores condiciones ecológicas. El concepto de plataforma se concibe como una colaboración institucionalizada a largo plazo entre políticas, prácticas y gobernanza a diferentes escalas. El trabajo a partir de enfoques de la Gestión Colaborativa y Adaptativa con los pueblos indígenas a nivel de paisaje indica que entre las características clave de la creación de plataformas en este contexto están la respuesta a las prioridades indígenas, el fomento de las relaciones transfronterizas, la participación de la comunidad y la coproducción de conocimientos.

INTRODUCTION

Indigenous peoples around the world have long engaged in harvesting and management actions that have shaped forests in significant ways (Parrotta and Trosper 2012). Connections to forests are integral to many Indigenous peoples' cultures, identities, and spiritual practices (FAO, 2019). They are guided by diverse, complex systems of knowledge and governance (Tengo *et al.* 2014). Indigenous peoples have managed forests to enhance production of plants important to their cultures and livelihoods (Ens *et al*. 2015, Heckenberger *et al*. 2014, Peters 2018). Practices including creating new habitats, selective weeding and planting, and the introduction of new species have shaped many forests and their diversity over time; eliminating or constraining these practices can contribute to adverse socioecological impacts (Deur and Turner 2005, Peters 2018). In some cases, absence of traditional harvest and management practices causes scarcity of widely used species (Anderson 1997, Shebitz 2005). In others, suspension of traditional burning practices increases threats to forest health, including severe wildfire risk (Ansell *et al.* 2020, Long and Lake 2018).

A rich body of Indigenous plant stewardship exists and continues across the United States (U.S.) (e.g. Anderson 2005, Lake *et al*. 2017). However, many Indigenous practices in the U.S. were suppressed, reduced, or prohibited over centuries through systematic processes that removed Tribes from their homelands, or restricted their ability to manage landscapes (e.g. Anderson 2005). Tribes have nonetheless identified myriad ways to assert their sovereignty, set their own culturally based management objectives for plants, recover traditional practices and values, and interface these with science to manage healthy ecosystems (Diver 2016, Trosper 2007). Relations with plants remain integral to the culture, health, and economies of many Tribal peoples in what is now the U.S. (Lake *et al*. 2018b).

Culturally significant plants provide food, medicine, craft materials and economic opportunities. They simultaneously hold spiritual, ceremonial, and cultural meanings. Plants may also be considered biocultural or ecocultural resources, signifying the knowledge, stewardship systems and reciprocal relationships that Indigenous peoples have developed with plants over time (Burger *et al*. 2008, Hanspach *et al*. 2020). Access to culturally significant plants is a central concern for many Tribal communities, particularly in relation to climate change (Dobkins *et al*. 2016, Lake *et al*. 2018a, Panci *et al*. 2018). Yet, typical forest management approaches in the United States do not prioritize species of interest to Tribal and Indigenous peoples or incorporate Indigenous knowledge (Chamberlain *et al*. 2019).

For certain Tribes, advancing goals around culturally significant plants involves navigating complex relationships with federal agencies. Within the U.S. portions of many Tribal homelands are currently under federal jurisdiction. Federally managed lands contain traditional gathering locations and sacred places (Catton 2016, Spence 1999). Some Tribes retain treaty rights that guarantee access to ceded lands for a variety of traditional purposes, including gathering plants (Dockry *et al*. 2018). Increasing access to plants on federal lands is also a key strategy for climate change adaptation and Tribal food sovereignty (Lynn *et al*. 2013, Voggesser *et al*. 2013). Accordingly, Tribes implement a spectrum of political approaches to negotiate relations with federal agencies that reflect specific histories and political objectives. These may vary from collaborative efforts to a rejection of federal jurisdiction over Tribal lands and resources through assertion of inherent sovereignty (Catton 2016).

The Eastern Band of Cherokee Indians is one Tribe choosing to forge partnerships with federal agencies regarding the stewardship of forest lands and culturally significant plants. The Tribe has defined a Zone of Influence that corresponds to Cherokee historical homelands, that guides where they will seek access and stewardship arrangements with public lands (EBCI 2013). The USDA Forest Service is a central partner because it is one of the largest land managers in the country, overseeing over 193 million acres of forests and grasslands (USDA Forest Service 2020a). The agency's multiple-use mandate facilitates a variety of partnership and co-management

opportunities with Tribes. The National Park Service (NPS) is another federal agency which EBCI and other Tribes engage related to culturally significant plants (e.g. Carroll 2021). In 2016, the National Park Service implemented a system-wide rule change (36 CFR 2.6) that supports plant gathering by members of federally recognized Tribes in park units they are traditionally associated with (Federal Register 2016). Both federal agencies have a trust responsibility to respond to the needs of federally recognized Tribes. Partnerships are also undergirded by shifting agency mandates, and a growing recognition that Tribal values, perspectives and knowledge make positive contributions to land management and research (USDA Forest Service 2015).

From an Eastern Band of Cherokee Indians perspective, engaging federal land managers is an integral aspect of maintaining nation-to-nation relationships held with the U.S. government, and supports vital connections with plants, traditional homelands and landscapes. Yet, collaboration is a choice, often borne out of conflict and uneven power dynamics (Wyatt *et al.* 2019). For EBCI, this includes deep and lasting injustices enacted upon Cherokee peoples by the federal government including forced removal, and more recent exclusion from what are now federal lands (Finger 1991, Lewis 2012). Without diminishing that painful history, the Tribe has chosen collaboration and diplomacy as a path to achieve goals of access, stewardship, and food sovereignty.

This paper focuses on a case study of collaborative efforts between the Eastern Band of Cherokee Indians (EBCI) and federal agencies to research and manage culturally significant plants within a large, historical Indigenous landscape. A suite of synergistic collaborations between EBCI, the Forest Service and National Park Service have recently emerged, prompting the authors to reflect in-process on attributes coalescing to move from short-term partnerships into constructive, longer-term relationships. This work is situated within an emerging body of knowledge examines adaptive and collaborative forest landscape management techniques that integrate traditional and Western scientific knowledges and ways that Tribes and federal natural resource managers can collaborate with mutual benefits (Lake *et al*. 2018a, Mansourian *et al*. 2019, Reo *et al*. 2017). Maintaining and re-instituting Indigenous practices on federally-managed lands, including traditional land-tending and management practices, can help avoid socio-ecological traps – persistent, undesirable states that have resulted from Euro-American colonization due to interactions among actors, institutions, and ecological dynamics (Long and Lake 2018).

The authors are guided by the question: How can research and practice contribute to a long-term platform that enhances opportunities for traditional harvests and management of plants across the present day multi-jurisdictional landscape that constitutes Cherokee homelands? Here, a platform is defined as long-term institutionalized collaboration across policies, practices, and governance at different scales (Grove and Pickett 2019, Jiggins and Röllings 2002). After providing socioecological context and introducing several key initiatives, the authors analyse progress to date based on Grove and Pickett's (2019) platform framework. They extend the framework by identifying elements of platforms specific to their context, and by drawing from several interrelated approaches to adaptive collaborative management with Indigenous peoples at the landscape level. The analytical framework and case study will be useful to state, Indigenous, and other institutions around the globe who seek to develop collaborative relationships to manage natural resources in the traditional homelands of Indigenous people.

PLATFORMS FOR TRIBAL-FEDERAL FOREST LANDSCAPE COLLABORATIONS

Focusing on land system science, Grove and Pickett (2019) propose that long-term platforms can contribute to the formation of durable collaborative programs of knowledge generation and management for landscapes in ways that short-term, discreet projects cannot. Short term projects may produce important findings, though they may be constrained due to lack of funding, truncation of relationship-building, or lack of integration within a larger system. They are therefore limited in the types of questions that may be asked. Because of their more comprehensive structure, platforms offer the ability for synergistic emergence of new opportunities that work toward overarching outcomes. They can provide a foundation for addressing complex issues that require longer time horizons. Platforms have been employed to enhance diverse natural resource settings, including long term ecosystem research in Europe, and agricultural innovation in West Africa (Anglestam *et al.* 2019, Schut *et al.* 2016). Compared to short-term projects, long-term platforms may also offer a space "for the discovery, exploration, and prototyping of science and applications that are not pre-identified and are ill defined" (Grove and Pickett 2019:11).

A long-term platform may therefore be a useful way to conceptualize efforts between EBCI and federal agencies to jointly manage forests across multiple jurisdictions that currently comprise Tribal homelands. These landscapes have multiple centres of power and interests and are places where communication and collaboration can achieve better natural resource management practices and policies (Nepstad 2006, Ostrom 2010). Opportunities exist to work across boundaries at different scales to develop contemporary forest management goals and techniques that benefit Indigenous peoples and their federal partners (Lake *et al*. 2018a, Mansourian *et al.* 2019, Gavin *et al.* 2015). Research and experimentation that include diverse knowledge systems can play a key role in such processes, offering significant conceptual and practical approaches for forest management (Lake *et al*. 2017, Lake *et al.* 2018b).

Grove and Pickett (2019) propose a three-part framework for understanding platform formation: 1) opportunistic activities, 2) desired outcomes and 3) strategic features. Opportunistic activities, described in subsequent sections, include a variety of existing activities, within projects and including planned engagement, that may be leveraged or built upon. Desired outcomes may include both end goals and procedural

items such as increasing timeliness of information, or efficiency of resource use. Strategic features are elements that enhance opportunities for and effectiveness of collaborations. They are integral to platform building as they promote the accomplishment of desired outcomes by fostering connections and synergies between opportunistic activities. The generality of this framework is intended to allow for adaptation to specific contexts. The authors of this paper have identified relevant outcomes and strategic features that as significant for EBCI- federal agency relationships, which are described below.

Desired Outcomes: Mobilizing Indigenous Knowledge for Indigenous Priorities

A predominant argument for the inclusion of Indigenous knowledge into landscape management is the resulting benefits for the environment and broader populace (Latulippe 2015). However, less attention has been given to creating research and management that explicitly centres Indigenous priorities. Environmental research and partnerships involving Indigenous knowledge may follow extractive models, treating knowledge as another form of data to be collected (Latulippe and Klenk 2020). Reo *et al*. (2017) emphasize the importance of early engagement with Tribes in regional environmental partnerships. This allows for shared problem definition and goal setting, fundamental elements of natural resource management (Ostrom 2010, Robards *et al*. 2018). Similarly, David-Chavez and Gavin (2018) found that research initiated with or by Indigenous communities reported greater engagement throughout the process. A key challenge is to develop shared problem and goals definitions for local level priorities while also accounting for factors influencing these from higher levels, such as climate change, remote drivers of ecosystem health, and policies to address these (Nagendra and Ostrom 2012).

Strategic features

Strategic features of interest for this case study were drawn from a growing body of scholarship that assesses aspects of collaborative forest landscape partnerships and knowledge co-production efforts between Indigenous peoples and federal agencies in the United States and Canada (Bowie 2013, Bussey *et al*. 2016, Dockry *et al*. 2018, MacGregor 2014, Reo *et al*. 2017). Such work aims to recentre Indigenous principles, governance, and knowledge as essential elements of successful collaborative environmental processes (Carroll 2015). Two strategic features were identified: fostering quality relationships and knowledge co-production.

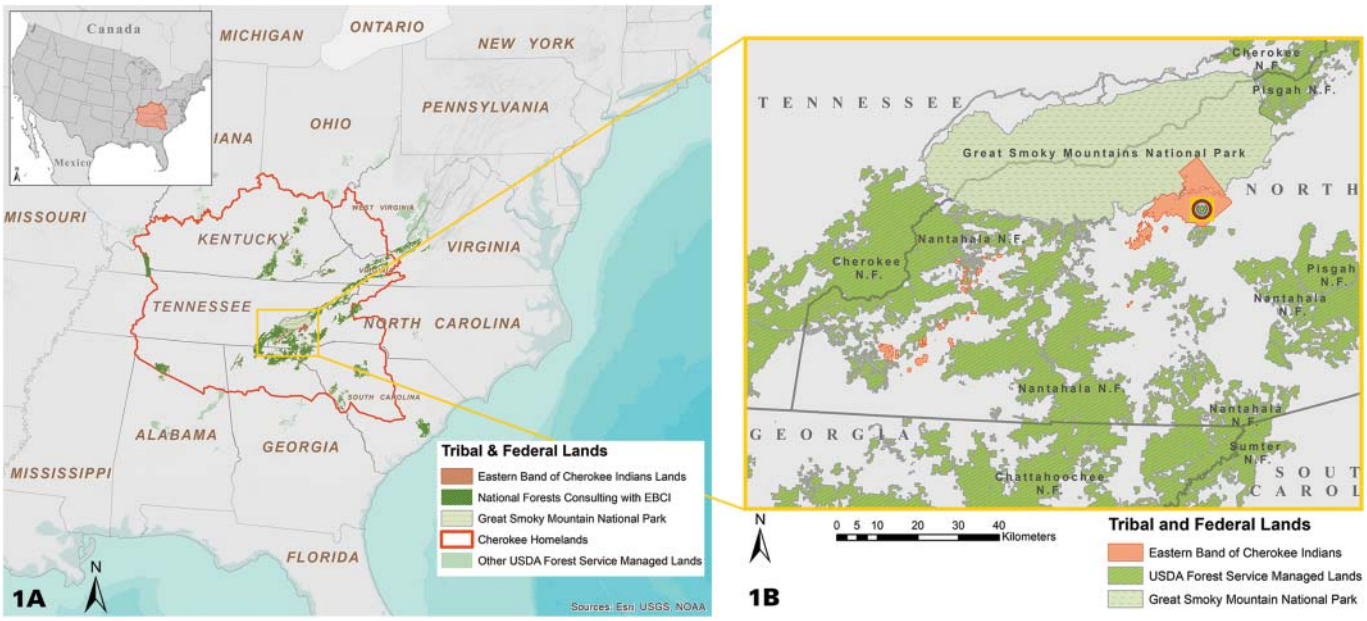
Fostering Quality Relationships. Within many Indigenous communities of North America, a kin-centric approach guides relations between people as well as responsibilities to other living beings (Salmón 2000, Whyte 2018). Ultimately, if partners with different histories, interests, and jurisdictional powers are to work together, accountability, legitimacy, trust, and rules should be jointly established. Federal agencies must operate within their missions and mandate, and Tribal and other governments have obligations to their constituencies; including multiple perspectives up front can help to ensure that polices and management activities are accepted (Bixler *et al.* 2018, Schuttenberg and Guth 2015). Whyte (2018) writes of the importance of quality relations emphasizing trust, reciprocity and redundancy. Recognizing and avoiding power imbalances, giving actors equal voice, and promoting flexibility and adaptability are key to allowing trust, creativity, and shared understanding to develop (Kelly *et al.* 2009). Studies have demonstrated that formal and informal relationship building, are key to facilitating these qualities (Bussey *et al* 2016). This includes promotion of cross-cultural learning, and time spent on the land (Reo *et al.* 2017). Other elements that underscore the capacity for relationships between Indigenous peoples and U.S. federal agencies include funding, appropriate time scales, and employee retention (Dockry *et al*. 2018, Robards *et al*. 2018).

Knowledge co-production. Knowledge co-production is defined here as iterative and collaborative processes involving diverse knowledge systems and actors who share control of problem framing to produce context-specific knowledge (Norström *et al.* 2020, Robards *et al*. 2018). When a diverse array of actors with different interests, experiences, and ontologies come together on a landscape there likely also are unique aspects to the values and perspectives that each hold (Bixler *et al*. 2018). Processes need to be established for sharing, discussing, and co-producing knowledge. To be effective, they should be seen as inclusive, fair, credible, and attentive to uneven power dynamics present in Tribal partnerships (Schuttenberg and Guth 2015). Therefore, providing space for Indigenous leadership, including guiding agendas, co-designing research approaches, activities and outputs is fundamental to co-production capacity (Maclean *et al.* 2021). These processes can create boundary objects, conceptual or physical objects that hold meaning within different knowledge or social systems, and can promote communication across them (Nel *et al.* 2016, Star and Griesemer 1989). Formation of a learning network is one way to sort through and develop knowledge that can influence the decision-making of multiple interdependent actors (Robards *et al.* 2018, Schuttenberg and Guth 2015). These processes occurs over time, and that may build on previously developed partnerships (Kelly *et al*. 2009).

CASE STUDY CONTEXT: EASTERN BAND OF CHEROKEE INDIANS AND SHIFTING SOUTHERN APPALACHIAN LANDSCAPES

The Eastern Band of Cherokee Indians is a sovereign nation located in western North Carolina with over 16 000 currently enrolled members. EBCI is one of three federally recognized Cherokee Tribes whose descendants share common origins. The Cherokee Nation and United Keetoowah Band of Cherokee Indians are located in Oklahoma, a result of forced removal policies. Cherokee are known as ᏣᎳᎩ, or Tsalagi; they refer to themselves as ᎠᏂᏴᏫᏯᏍᏗ, Principal People. Cherokee traditional homelands encompass a vast portion of the Southern Appalachian region (Royce 1884) (Figure 1a).

FIGURE 1 *a.* (*Inset*) *Cherokee homelands, as recognized by land cessions in the Royce Map of 1884. Federally managed National Forests within Cherokee Homelands. These forests and the Great Smoky Mountain National Park conduct nation-to-nation consultations with all three Cherokee Tribes, including EBCI. Consultation includes issues related to culturally significant plants. b. Current EBCI lands in Western North Carolina are in close proximity to the Pisgah, Nantahala, Cherokee, and Sumter National Forests and Great Smoky Mountains National Park. EBCI collaborations focused on culturally significant plants that go beyond consultation are aggregated in this region*



The length of Cherokee presence in the region is uncertain. Human presence in the Southern Appalachians began at least 13 000 years ago, as Pleistocene North American glaciers retreated with corresponding vegetation changes (Anderson *et al.* 2015). Cherokee language affiliation with the northern Iroquois, and traditional stories of arriving from the northwest signify long-held relationships with place. (Fradkin 1990). At the time of European arrival in the 1500's, the Cherokee controlled approximately 40 000 square miles[1] that included settlements along rivers and outlying lands used for hunting and gathering (Altman 2006, Goodwin 1977). Increasing evidence indicates that pre-Columbian landscapes of the Southern Appalachians were anthropogenic, having been transformed through land clearing, farming, and fire (Abrams and Nowacki 2008, Denevan 1992, Hammett 1992). Pre-Columbian land and forest use patterns represented a functional landscape that included farmed areas growing corn, beans, squash, and sunflowers; as well as uncultivated areas that were used for hunting, fishing, and gathering of diverse plant materials for food, medicine, and fuelwood (Goodwin 1977, Hammett 1992). Fire was used to clear forests for farming, manage vegetation around villages to prevent uncontrolled fires, promote more valuable forest vegetation (e.g., nut and fruit bearing trees), and create favourable conditions for hunting (Goodwin 1977, Hammett 1997, Newfont 2012).

After European contact and steep declines of Indigenous populations due to introduced diseases, secondary forests grew up on abandoned fields (Delcourt and Delcourt 2004). These regenerated as late-successional ecosystems and were erroneously seen by Europeans as wilderness (Delcourt and Delcourt 2004). As European settlement proceeded, forests were cleared, extensively logged, or further ecologically modified (for example, by the loss of one of the Southern Appalachian's most important trees, the American chestnut (*Castanea dentata* (Marshall) Borkh.), to an introduced disease, the chestnut blight, *Cryphonectria parasitica* (Murrill) M.E.Barr) (Newfont 2012).

Advancing European presence across the Southeast brought extreme changes for Cherokees, beginning with the fur trade and ending with European settlement of most Cherokee homelands (Altman 2006, Goodwin 1977). Ultimately, this culminated in a federal government program of removal of the Cherokee from their Southern Appalachian homelands to the "Indian Territory", lands west of the Mississippi River in what is today known as Oklahoma over the Trail of Tears, one of the most infamous events affecting Tribes in U.S. history (Finger 1991). Several groups of Cherokee avoided removal and remained in North Carolina, and over time were able to purchase lands that became the 56,000 acres of the Qualla Boundary – the territory controlled by the Eastern Band of Cherokee Indians (Altman 2006,

[1] Encompassing an area that today is represented by most of Kentucky, the Appalachian areas of Tennessee and North Carolina, and portions of Virginia, West Virginia, Georgia, South Carolina, and Alabama (Mooney 1900a, in Altman 2006).

Finger 1991). The Qualla Boundary lies adjacent to the Great Smoky Mountains National Park and Nantahala National Forests (Figure 1c), which were established by the federal government in the early 20th from lands then owned by lumber companies and settlers but were previously Cherokee homelands (Newfont 2012). While the Qualla Boundary is held in trust for the Tribe by the federal government through the Bureau of Indian Affairs, EBCI owns other lands in fee and has a strong and independent presence through its Tribal government and natural resource management program, language and cultural revitalization programmes, and traditional arts and crafts.

Cherokee relations with plants

Biocultural relationships between plants and Cherokee people have developed and adapted over generations (Carroll 2015). They are integral to many aspects of EBCI life, health and culture (Lefler 2009). For millennia, Cherokees have collected an abundance of plants from their forested landscape (Hamel and Chiltoskey 1975). EBCI members have been practicing their inherent right to ensure that these resources are present in their daily lives and to pass these relationships down to generations unborn.

Plants are sentient beings, as explained in the Cherokee term, tsu ye ga, ᏧᏰᏕ, "they are awake". Plants give life, as shared in Cherokee origin stories. The body of the female corn spirit Selu, ᎦᎷ, gave maize, a main source of sustenance, to Cherokee people. In The Origins of Disease and Medicine, Cherokees recognize plants as generous relatives who contribute to the health and safety of Cherokee people (Mooney 2006). Plants are also recognized as members of interconnected socioecological systems (Carrol 2015). For instance, EBCI Beloved Woman, Amanda Swimmer describes biogeochemical interactions between plants and water: "Go to the waters that come from the East. Especially in the Fall of the year. Drink some of that water gently. This is the time when all the plants and trees are sharing their medicine with the Long Man (The creek or water)." (A. Swimmer, personal communication Summer 2011). Plants feed EBCI cultural connections by continuing to give throughout their life cycles, thus defining their ecological relationship to their forested homelands.

CHEROKEE HOMELANDS: A ZONE OF INFLUENCE FOR CROSS-JURISDICTIONAL FOREST MANAGEMENT

EBCI actively promotes and conserves over 100 culturally significant plants across diverse ecosystems on Tribal lands (EcoForesters 2018, Forest Stewards 2019). This includes consideration in management activities, and active restoration projects on Tribal Reserve land (6000 acres of trust lands managed by EBCI). Management is guided by a community input-based resource planning document known as the Legacy Plan (EBCI 2013). Community outreach guided the development of the plan, including a series of forums with elders, youth, and community members, and a community-wide survey gathering perspectives on reservation use and management, resource priorities, and respondents' vision for the future of EBCI lands and natural resources. The Plan identifies plants as important cultural resources that contribute to food sovereignty and cultural identity.

The Legacy Plan also identifies a Zone of Influence whose borders align with Cherokee homelands, as defined by land cessions recorded in the Royce Map of 1884 (Figure 1a). The Zone of Influence recognizes the interconnectedness of EBCI land management decisions on neighbouring landscapes, and similarly the impacts of other jurisdictions on Cherokee interests. Delineating a Zone of Influence generates a framework for working with federal agencies and developing regional partnerships (EBCI 2013). Both the USDA Forest Service and National Park Service were identified as key partners in the Legacy Plan, as they manage significant amounts of land within Cherokee homelands, near or adjacent to the Qualla Boundary (Figure 1b). Emerging partnerships between EBCI, the USDA Forest Service, and National Park Service focused on culturally significant plants are described below. Roles are detailed in Table 1. EBCI also engages in related partnerships with additional federal and state agencies, non-profit organizations, and academic institutions, that are not discussed here.

EBCI-USDA Forest Service research partnerships mobilizing Cherokee traditional knowledge

EBCI's focus on culturally significant plants expanded through the mid-2010s and began to include concern over potential impacts of climate change (Forest Stewards 2018). This led to a Memorandum of Understanding (MOU) signed in 2014 between EBCI, the USDA Forest Service Southern Research Station, the North Carolina Arboretum and the US Geological Survey under the broad umbrella of climate change adaptation. Projects originating from the partnership have initially addressed immediate concerns surrounding loss of availability of plants due to climate change effects, and focus on increasing access to broader landscapes including national park and national forest lands.

A key aspect of the MOU is integration of Cherokee traditional knowledge and Western knowledge systems. Within the MOU, the USDA FS recognizes the importance of diverse forms of knowledge to address climate change and commits to coordinate the development of research that facilitates knowledge integration. By sharing traditional knowledge, EBCI hopes to influence policy around the collection of species, e.g. ramps (ᎤᏩᏐᏅᏯ, *Allium tricoccum* Ait), which may be vulnerable to overharvest from commercial gathering.

Collaboration between the EBCI Department of Natural Resources, a Cherokee community researcher, and the USDA Forest Service Southern Research Station has developed an interdisciplinary approach to co-produce information about culturally significant plants that is grounded in Cherokee traditional knowledge. Respectful research relations with Tribes are reinforced at the national level, as described in the Research and Development Tribal Engagement Roadmap (USDA FS 2015). Roadmap objectives include increasing and advancing Tribal values, knowledge, and perspectives in

TABLE 1 *Actors and their roles in EBCI-federal partnerships regarding culturally significant plants*

ACTOR	TYPE	ROLES
TRIBAL		
Eastern Band of Cherokee Indians (EBCI)	Federally recognized Tribe	Represents EBCI community priorities and questions of interest. Chief responsible for initiating plant gathering requests and signing gathering agreements. Tribal council approves of projects. Provision of funding for activities such as environmental assessments.
EBCI Department of Natural Resources	Tribal Department	Partners in developing and implementing research, coordinating, and leading outreach, cross institutional communication, consulting with federal partners. Engages with community members for project guidance. Co-develops plant gathering protocols, assists in monitoring efforts and guides research efforts toward future gathering agreements.
Community researcher	Tribal member	Facilitates research community-connections. Provides input to developing and enhance research projects. Contributes to data collection, analysis and dissemination of results.
Cherokee plant gatherers and artisans	Tribal members	Define community interest prior to EBCI engagement. Share traditional knowledge and input on plant stewardship. Participate, provide input and guidance to research projects (Interviews, field days, gatherers workshops). Inform plant gathering protocols and participate in gathering programs. Offer management suggestions for plants based on Cherokee knowledge.
Kituwah Preservation and Education Program	Tribal program	Coordinates Cherokee speakers and traditional knowledge holders, participate in land visits and project activities, bring in new participants. Contributes connections between traditional ecological knowledge and Cherokee language.
Cherokee Preservation Foundation	Tribal NGO	Provided funding for sustainability research on plants including sochan and ramps through a grant making program, Revitalization of Traditional Cherokee Artisan Resources
Qualla Arts Cooperative	Native American Cooperative	Coordinates outreach to artisans. Provides meeting space to engage with artisans. A mechanism to share funding with artisans.
FEDERAL		
Great Smoky Mountains National Park (NPS)	National Park Unit	Develops legal and policy processes that allows Tribe access to culturally important resources on their traditional homelands. Set harvesting protocols and determine sustainability in cooperation with Tribe and researchers. Ensure federal laws and policies are met.
USDA Forest Service Southern Research Station	Regional Research Unit	Facilitates overall relationship with EBCI. Collaboratively develops and implements culturally significant plants research with EBCI. Provides funding and resources to support research agreements. Shares findings and plans joint activities with other National Forests and Great Smoky Mountains National Park.
USDA Forest Service, National Forests in North Carolina	Regional Management Unit	Carries out formal nation to nation consultations to understand EBCI needs and seek EBCI input. Makes plant resources available to EBCI and participates in sustainable management. Re-examines policies, programs, and plans. Revising Forest Management Plan to better reflect TEK and tribal interests. Coordinates field trips to engage EBCI plant gatherers.
USDA Forest Service Office of Tribal Relations	National-level Office	Creates policy and administration environment that enables and incentivizes lower-level action. Promotes environment of outreach and trust building with Tribes. Representatives at regional level coordinating a streamlined permitting process for plant gathering.
USDA Forest Service, Region 8 Office	Regional Office	Coordinating a Master Participating Agreement between regional forests, the Southern Research Station, and interested Tribes in the region to facilitate collaborations and resource sharing related to plants.
REGIONAL		
Southern Appalachian Man and the Biosphere Reserve	Regional NGO	Provides institutional home for the Culturally Significant Plant Species Initiative, with diverse groups of agency and other participants already in place (with agreements)

ACRONYMS: NGO= Non-Governmental Organization, NPS= National Park Service, USDA= United States Department of Agriculture

research activities. Collaborative and participatory approaches are promoted to create research of joint interest on topics. Within the Southern Research Station, support for Tribal initiatives has been strengthened through special funding lines, cost-share agreements, hiring of a researcher experienced in working with Tribes and culturally significant plants, and salary support for an EBCI employee to act as a Tribal Liaison for the research station.

Ideas for research were initially informed by EBCI community members' interests in particular species and habitats. EBCI Natural Resources employees gathered this information through visiting community clubs, Cherokee elders groups, Tribal Council meetings and other community functions. They also identified relevant questions and contribute additional interests in specific management approaches. Research approaches were subsequently co-generated by EBCI and Southern Research Station employees. Research proposals are then presented to Tribal Council for approval. Projects that involve working directly with community members also go through EBCI's Cultural and Traditional Knowledge Research Approval Committee, process to ensure that proper protocols, including free, prior, and informed consent and EBCI data ownership are met. Research agreements to date have focused on sustainable harvesting of edible plants, increasing the availability of artisan materials, creating educational modules (Schelhas *et al.* 2018), and understanding the role of prescribed burning in the care of culturally significant plant species. EBCI and USDA Forest Service employees, including the authors of this paper, have conducted fieldwork together for over five years. They also co-present their research to public audiences and at professional meetings. These working relationships have provided space for informal relationship and trust building.

Developing plant gathering agreements with Great Smoky Mountain National Park

Revisions to National Park Service regulations in 2016 provided EBCI a mechanism to engage Great Smoky Mountains National Park regarding Tribal plant gathering. EBCI interest in creating gathering agreements was one impetus for the collaborations described in this paper. Recognizing the importance of regaining access to traditional gathering locations, EBCI was among the first Tribes in the nation to submit a written request, to gather two important spring foods, sochan ((ᎦᏣᏍ, *Rudbeckia lacinata* L.) and ramps. Tribal interest was high because in 2002, concerns around public overharvesting ended a long-standing informal agreement that allowed Cherokees to collect ramps (Lewis 2012).

In 2019, EBCI signed a historic agreement with Great Smoky Mountains National Park, allowing community members to harvest sochan (process detailed in Dunlavey *et al. In Review*). Plant gathering agreements require an environmental assessment demonstrating that proposed gathering activities have no significant impact on park resources. Environmental assessments use existing literature to assess potential impacts of gathering activities. However, little research has been done on plants of importance to EBCI, and that which exists often does not take Cherokee knowledge and gathering practices into account. Therefore, EBCI engaged in novel research that incorporated Cherokee sochan harvesting practices. That study found that found that Cherokee leaf harvesting techniques did not cause plant mortality and resulted in an increase in sochan stems, flowering and fruiting (McCoy *et al*. 2018 as cited in GRSM 2018). An environmental assessment of proposed gathering activities found that sochan harvesting would have no significant impact to park resources (GRSM 2018). A similar process is currently underway for ramps, based on research being co-produced by EBCI and the USDA Forest Service (Box 1).

EBCI and National Forest engagement

All three Cherokee Tribes engage in Tribal consultation with nine National Forests situated within Cherokee Homelands (Figure 1a). Consultations typically serve to engage Tribes about proposed projects that may affect traditional cultural locations and properties. They are mandated by the USDA Forest Service to meet the requirements of the American Indian Freedom of Religion Act, the Archaeological Resources

Box 1. Ramps, ᏅᏩᏓᏁᏤ, *Allium tricoccum* Ait.

Ramps are a species of shared interest for EBCI, the USDA Forest Service, and the National Park Service. The Tribe wants to promote species conservation and ensure gathering access. Several National Forests are interested in sustainable harvest and management approaches for public lands, and the Great Smoky Mountain National Park requires additional information about ramp harvesting to support Cherokee plant gathering agreements. Rather than duplicate efforts, EBCI is currently engaged in research with the Southern Research Station that seeks to inform these interrelated efforts. Approaches include a series of participatory experiments guided by Cherokee traditional knowledge to understand the effects of different harvest techniques and intensities on ramps: Cherokees employ distinct ramp harvesting methods that can inform sustainability. A fuller understanding of Cherokee practice, knowledge, and cultural values are gained through community interviews, workshops, and shared field days. Results of this work to date are shared with botanists and planners from National Forests and GRSM, to inform their planning processes. Shared discussions are also leading to new approaches for monitoring ramps on Park Service lands.

Ramps cooked with eggs

Protection Act, the National Environmental Protection Act, the National Historic Preservation Act, and the Native American Graves Protection and Repatriation Act (USDA Forest Service 2019). Consultation is typically carried out through a Tribal Historic Preservation Officer focused on cultural resources.

However, EBCI has emphasized that natural resources are also cultural resources. Accordingly, consultation has expanded to include EBCI Natural Resources staff to voice the Tribe's interests regarding plant gathering. Over 10 years ago, consultation brought together EBCI members and the National Forests in North Carolina to address concerns about gathering, which resulted in the development of a harvest permit to be used in the Nantahala National Forest. The permit included a list of species of interest created by EBCI, that Tribal members could carry while harvesting plants. The result was the development of a system that raised trust levels of all parties and documented important plant species for future considerations.

EBCI collaborations regarding culturally significant plants have moved beyond a regulatory focus with National Forests in closest proximity to the Qualla Boundary: the Pisgah, Nantahala and Cherokee. These collaborations actively seek to restore or enhance availability of plants important to EBCI, such as the restoration of an 8-acre rivercane brake. Cherokee knowledge and interests are also being integrated into current Forest Plan revisions for the Pisgah and Nantahala National Forests. This would further formalize nascent plant-based initiatives, such as identifying areas for participatory research, management and monitoring of culturally significant trees and plants.

Points of interaction

Culturally significant plant species initiative (CSPSI)

Many of the actors in the above initiatives have now come together under the formal umbrella of the Culturally Significant Plant Species Initiative (CSPSI). CSPSI is a regional partnership whose mission is "To collaboratively promote the sustainability, management, and conservation of culturally significant plant species within the Southern Appalachian region through restoration, education, and research" (CSPSI 2018). The initiative was developed over the course of several years between EBCI and a cohort of federal agencies, universities, educational and environmental non-profit organizations, and other partners, under the Southern Appalachian Man and the Biosphere (SAMAB) Consortium. For over three decades, SAMAB has fostered regional partnerships to focus on landscape-scale environmental issues. Participating organizations have already formally agreed to work together through a Memorandum of Understanding. SAMAB's existing structure therefore provided an opportunity for EBCI to connect with multiple institutions.

CSPSI is co-led by Cherokee and USDA Forest Service representatives. The EBCI Forest Specialist serves as co-chair, and the Conservation Outreach Coordinator co-leads the outreach and education working group. CSPSI members, including Cherokee plant gatherers and artisans, developed a charter document to formalize the goals and principles of the initiative, and distinguish it from other SAMAB programs. The charter, written in English and Cherokee, iterates a need to include Cherokee traditional knowledge and includes specifications around how that knowledge may be applied and shared (CSPSI 2018).

United around Cherokee culturally significant plants, members share their work, consider joint efforts and identify information needs through biannual meetings (Figure 2). The opportunity to have both formal and informal interactions creates space for innovative discussions involving multiple stakeholders and has laid the groundwork for productive actions. For instance, discussions highlighted the need to create mechanisms enabling joint work between EBCI, USDA Forest Service research scientists and specific National Forest Units; this has led to the development of a Master Participating Agreement that will facilitate the sharing of resources. Initial outcomes that have emerged from CSPSI meetings also include the formation of community listening sessions and information-sharing field trips between National Forest botanists and Cherokee artisans interested in enhancing management for plants including white oak (ᏔᎳ, *Quercus alba* L.) (Box 2).

Community engagement

The authors of this paper work closely with partners within the EBCI government and community, including schools, artisan groups, and elders' groups, to identify outcomes of collaboration. The Kituwah Preservation and Education Program (KPEP), an EBCI program that promotes Cherokee language fluency and cultural awareness in the EBCI community, has been a key participant in multiple initiatives. Students, teachers, and elders in KPEP programs have participated in a series of field days at EBCI's Community Forest, and several KPEP adult language learners have incorporated sochan gathering in the National Park into their cultural education activities. KPEP has also played a core role in organizing a series of gatherer field days on National Forest lands, which were planned for spring 2020 but delayed due to the COVID-19 pandemic. The first event was held in January 2020 in Cherokee, N.C. and brought together artisans, KPEP participants, and EBCI and Forest Service staff (Figure 2). EBCI-Forest Service collaborations are also highlighted on the EBCI Natural Resources website and in outreach efforts conducted by EBCI Natural Resources staff, at events including elementary school science education nights and workshops, community club meetings, and the annual Cherokee Indian Fair.

SYNTHESIS

The collaborations described above are ongoing and provide opportunities for reflection and exploration of how EBCI – federal agency interactions may be transitioning from shorter term projects into a longer-term platform that is more suited to responding to complex, interrelated issues. Below, the authors expand Grove and Pickett's platform framework to

Box 2. White Oak, ᏔᎳ, *Quercus alba* L.

White oak is another species that reflects collaboration and coordination. Addressing white oak regeneration and retention declined in the Southeastern U.S. is a focus of Forest Service research and management. White oak is also an important basketry species, reported to be highly used in artisan interviews conducted by EBCI and the Southern Research Station. Interviews highlighted that basket-quality oaks, which have specific traits, had grown scarce on EBCI lands and were typically harvested by permit on National Forest lands. Responding to these findings, EBCI coordinated several community workshops and field days, in which EBCI artisans could interact directly with Forest Service ecologists and researchers. These formats allowed a diversity of community perspectives to be shared and gave artisans opportunities to directly provide guidance on preferred conditions and tree characteristics for management of basket-quality white oak. Resulting learning parlayed directly into recognizing opportunities to locate and manage white oak specifically for basketry in the Pisgah-Nantahala Forest Plan revision. Because the permit process to gather white oak on the National Forests was poorly understood, white oak also provided an opening for discussions between EBCI and the Forest Service to improve permit processes on National Forests for Tribal members. This work also led to a new oak management focus for a community forest recently acquired by EBCI. A goal is to release oak species, focusing on creating conditions to produce basket-quality white oak, guided by Cherokee artisan's knowledge. White oak has a complex relationship with fire (Abrams 2003, Schweitzer *et al.* 2019), and therefore provides a key focal species for experiments with traditional Cherokee forest management. Findings of research carried out on EBCI lands will further inform National Forest management options.

White Oak basket made by Cherokee artisan Betty Maney

FIGURE 2 *Clockwise from left. EBCI artisans Moses Oocumma (l) and Butch Goings (r) assess a white oak tree for basketry during a learning workshop; EBCI Forest Specialist Tommy Cabe conducting traditional knowledge research on ramps, an important spring food; a Culturally Significant Plant Species Initiative meeting brings together diverse participants to focus on research, management, and outreach for culturally significant plants*

examine how desired outcomes, in this case focusing on Indigenous priorities for plants, may be achieved by developing synergies in existing project activities through implementing strategic features of relationship building and knowledge co-production (Figure 3).

Responding to Indigenous Priorities: tangible outcomes are motivating

Initiatives described in this case study suggest that broad collaborations can find relevance through grounding in immediate concerns of Tribal communities. Each initiative works towards addressing EBCI priorities of access to and management of plants. The establishment of the sochan gathering agreement with Great Smoky Mountains National Park and ongoing efforts to increase access to additional plant species on both national park and national forest lands is a tangible outcome that addresses a stated community need (EBCI 2013).

Benefits of partnerships to EBCI also include a broader regional role in setting priorities for the conservation, management, and research of culturally important plants in the Zone of Influence, as exemplified by the Culturally Significant Plant Species Initiative. Through these focused projects, partners have forged interpersonal relationships, built trust, and created opportunities to produce results and demonstrate mutual benefits**.** Tangible outcomes include the sochan plant gathering agreement and educational modules featuring culturally significant plants and trees. Other outcomes of importance to Tribal members are still in process (e.g., ramps, white oak on forest lands, permit streamlining and clarification).

FIGURE 3 *An emerging platform to address Eastern Band of Cherokee Indians priorities, expanding on Grove and Pickett's framework elements of opportunistic activities, strategic features, and desired outcomes. Platform formation involves relationship building, Indigenous co-leadership, and knowledge co-production. Within planned and intentional engagement, much of the action takes place opportunistically. Figure adapted from Grove and Pickett 2019*

The immediate EBCI priorities of food sovereignty, increased presence on traditional homelands, and participation in management of those lands drive their engagement. But long-term processes are also being created as research and practice occur in the context of ongoing socio-ecological restoration.

Creating quality relationships

Implementing forest management collaborations with Indigenous peoples is a long-term process of engagement, discussion, experimentation, and trust building (Dockry *et al*. 2018). Aligning research with Indigenous worldviews can begin a complex and forward-looking process of reconciliation (Wilson *et al*. 2019). For EBCI, establishing respectful and harmonious connections is reinforced through Cherokee cultural values. USDA Forest Service and National Park Service collaborators are committed to inclusive processes that uphold federal law and trust responsibilities (e.g. USDA Forest Service 2015).

Dockry *et al.* (2018) identified upholding formal and informal relationships as key partnership building strategies between Tribes and the USDA Forest Service, and formalizing relationships is important to EBCI collaborations (Table 2). For the Tribe and their collaborators, research agreements, Memorandums of Understanding and similar structures create a foundation of accountability and provide opportunities to jointly set goals. For federal agencies, these actions are enabled through national-level guidance, planning documents, and legislation. Mechanisms for sharing funding, resources and technical training, such as cost share agreements reinforce partner commitments. Similarly, codifying relationships within long-term planning documents, such as a National Forest Plan establish protocols and processes for long term engagement. This institutional memory can be a useful counter to inevitable agency staff turnover, which is often disruptive to the sharing and integration of traditional knowledge (Bussey *et al.* 2016). At the same time, informal and interpersonal relationships are fostered through a variety of shared activities, including field work, field trips, meetings, and participation in cultural events, including sharing food.

Co-produce research that holds currency within multiple knowledge systems

International scholarship emphasizes that management of socioecological systems is enhanced through the integration

TABLE 2 *Formal mechanisms fostering EBCI-federal collaborations, and opportunities for relationship building and knowledge co-production. While listed by initiative, certain activities, such as workshops and field days, are coordinated to involve multiple actors. Acronyms: USDA=United States Department of Agriculture*

Initiative	Formal mechanisms for relationship building	Opportunities for co-production of knowledge and informal relationship building
Eastern Band of Cherokee Indians-Great Smoky Mountain National Park Plant Gathering	- EBCI Legacy Plan - Federal rule 36 CFR § 2.6 - Gathering request letter from the Tribe to the Park. - Environmental Assessment & Finding of No Significant Impact - Gathering Agreement - Special Use Permit (NPS) & associated individual gathering permits (issued by Tribe)	- Research and management assessments. - Policies and rule setting. - Gatherer Information Sessions - Gatherer harvest reports - Revision of gathering agreements, based on community input - End of gathering season debriefing and findings - (in the future): co-monitoring
Eastern Band of Cherokee Indians-USDA Forest Service Research Partnerships mobilizing Cherokee knowledge	- EBCI Legacy Plan - USDA Forest Service Research Tribal Engagement Roadmap - Memorandum of Understanding - Challenge Cost Share Agreement - Tribal Council Approval - Tribal Cultural and Traditional Knowledge Research Approval Committee - EBCI staff member employed by Forest Service as Research Station Tribal Liaison through an Intergovernmental Personnel Act Agreement	- Development of collaborative research efforts and research objectives. - Co-design, implementation and analysis of research - Shared fieldwork - Considering findings with community members - Co-writing/co-publishing/ and disseminating research results through varied media, including audiovisual - EBCI Artisan's workshops and field days to promote shared learning - Discussing ways forward that further community inclusion and leadership
Eastern Band of Cherokee Indians-National Forest Engagement	- EBCI Legacy Plan - Federally mandated nation-to-nation consultation - Tribal Forest Protection Act - Federal-Tribal policies - National Forest Plan Revisions	- EBCI Artisan's workshops and field days to promote shared learning - Development of new collaboratively developed policies and management approaches. - Revision of Pisgah and Nantahala Forest Plans to include Cherokee knowledge and priorities.
Culturally Significant Plant Species Initiative (CSPSI)	- CSPSI charter - Southern Appalachian Man and the Biosphere multi-agency Memorandum of Understanding - Institutional legitimacy	- Writing of the CSPSI charter - Opportunity for discussions, information sharing, and development of new initiatives. - Bi-annual meetings - EBCI Artisan's workshops and field days to promote shared learning

of multiple knowledge systems and worldviews (Ens *et al.* 2017, Sterling *et al.* 2017, Tengö *et al.* 2014). EBCI partnerships emerged through co-inquiry and commitments to generate knowledge that is relevant both to the Tribe and its federal partners. While recognizing systemic power imbalances inherent in government-Tribal relations, Schuttenberg and Guth (2015) emphasize the need to create a space where actors are given equal voice in order for trust and understanding to develop. Goal setting by EBCI ensures direct relevance of potential outcomes, strengthening interest and commitment to collaboration (EBCI 2013). Being able to participate from a strong cultural position also allows EBCI to set inclusive terms for their work and knowledge mobilization. In this way, science is guided by community input that reflects long socioecological engagement with Cherokee homelands.

Opportunities for knowledge co-production have emerged as relationships and processes develop (Table 2). Formal mechanisms of relationship building also represent the development of boundary objects that increase legitimacy and trust (Schuttenberg and Guth 2015). These include iteratively generated research agreements, plant gathering agreements, the CSPSI charter; and collaboratively identifying plant management objectives for public and Tribal lands. Legitimacy is further enhanced for federal agencies through policy mandates at the national level. As trust develops, knowledge is further co-generated through growing community engagement. Community members are knowledge holders, and their participation is essential to build credibility of activities including listening sessions and field trips. These efforts are currently works in progress, but in initial stages, adequate time is necessary for robust co-production to develop (Robards *et al.* 2018).

Emergence of a platform for culturally significant plants

Culturally significant plants provide points of engagement for EBCI into forest management within traditional Cherokee homelands. Collaboration creates a network of agencies and practitioners who are committed to mutual learning and action around EBCI interests and community needs, critical to the emergence of a long-term platform. Though each research and management component of this approach is distinct, the sum of all initiatives is greater than the parts, bringing momentum and synergy to create novel possibilities for future collaboration to benefit both people and ecosystems.

Through collaboration, EBCI has developed a multifaceted approach to culturally significant plants that includes research, land management, and outreach. Through sharing of data, research findings, and monitoring approaches, each of these facets supports and enhances the effectiveness of the others. Focal species including ramps (Box 1) and white oak (Box 2) demonstrate how interrelated efforts advance EBCI goals of increasing access to plants, promoting food sovereignty, protecting resources for future generations, and sharing knowledge that can benefit management and conservation across landscapes.

Interactions between EBCI, the USDA Forest Service and the National Park Service are well suited to a platform approach because of their long-term commitments and mandates, and because of the complexity of questions being addressed. If platform formation is to advance however, there are important areas for growth and development. A growing platform requires structures that are nimble enough to respond to new challenges and priorities. The CSPSI initiative is beginning to fill a distinct role in platform creation by providing a nexus for EBCI to coordinate with partners based on shared interests around culturally significant plants. Notably, it is co-led by EBCI and grounded in Cherokee knowledge. The initiative formalizes collaborations in a structure that is flexible enough to accommodate creative energy and respond to new priorities. As in other forest management collaborations, space for dialogue outside the confines of specific projects promotes relationship building and enables holistic approaches to emerge (Bussey *et al.* 2016).

Compared to short-term projects, platforms are characterized by increased complexity and longer time horizons. Within EBCI, support and engagement for collaborations takes time. It develops at different levels, including Tribal government, including council and departments, and Tribal members and users of plants (Table 1). Engagement originates from community-identified priorities that emerged in planning documents such as the Legacy Plan. Tribal government plays important roles by advancing formal partnerships and allocating funding for activities such as environmental assessments, as well as enabling the EBCI department of Natural Resources to allocate staff time to related projects. By coordinating interrelated efforts and increasing communication, a platform approach presents a respectful and efficient use of Tribal time and capacity.

The pace of platform formation also aligns with the creation of opportunities to interact with community meaningfully. Initiatives described here are informed by the knowledge of plant gatherers and artisans, and include a spectrum of community engagement, ranging from interview participants to collaborative partners. Similar to Carroll's (2015) findings with the Cherokee Nation, respectfully engaging Tribal plant gatherers, Cherokee language speakers, and other community members begins a process that can ultimately lead to novel participatory approaches to collaboration and governance. Traditional knowledge and uses are not always easily shared or explained, and field days and gatherer groups can gradually bring these out (Costanza *et al.* 2017). Opportunities for further engagement are a priority for the future, and it has taken several years of collaboration and trust building around culturally significant plants to get to a point where deeper community engagement is welcome and appropriate. Ad hoc engagement with existing artisan groups and formation of new user groups is a step towards formal engagement structures with knowledge holders. Ways forward may include elder or gatherer advisory groups, and greater leadership roles for community members.

CONCLUSIONS

The Eastern Band of Cherokee Indians, in collaboration with the USDA Forest Service, National Park Service, and other partners offer an example in a growing body of research and practice that co-produces knowledge to advance both federal and Tribal interests in forest management. Culturally significant plants offer a nexus for engagement that is transitioning from discrete projects to a long term, interrelated platform that operates over longer time spans. A platform approach balances diverse knowledges, integrates across scales from local artisans to government agencies, and promotes research and experimentation to meet mutually held goals. It allows opportunities for collaborations to be built locally, manager to manager, while being facilitated by top-down change. Relationships between EBCI and federal agencies include recent and historic conflicts, yet the Tribe had chosen collaboration as the most effective path to achieve their goals. While applying a platform approach may not be possible in highly conflictual situations, it can create structures to maintain relationships and address future conflicts. Processes highlighted here include larger policy engagements, good-faith efforts, and the incremental, concrete advances that come out of them. Such efforts are the process of platform formation.

A focus on culturally significant plants underscores the important contributions of Tribes to cross-jurisdictional land management while meeting Tribal priorities (Charnley *et al.* 2007, Emery *et al.* 2014). Growing relationships between EBCI and their federal partners reflect broader trends within the U.S. and internationally (Ens *et al.* 2015, Lake *et al.* 2018b). Examples described in this paper highlight how Tribes and federal land management agencies can collaboratively: set management objectives for culturally significant species and communities; explore sustainable harvest methods guided by traditional knowledge; develop administrative procedures and policies to permit and facilitate sustainable

harvests; experiment with traditional practices for forest restoration, including traditional burning and harvesting practices; and establish a coordinating mechanism for agencies and entities involved. As collaborations progress, further research and management engagement on traditional Cherokee homelands has potential to advance processes of access to traditional plants and forest management to replace past contentious relationships with more collaborative forms of engagement.

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