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ADAPTING CONSERVATION GOVERNANCE UNDER CLIMATE CHANGE: LESSONS FROM INDIAN COUNTRY

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ADAPTING CONSERVATION GOVERNANCE UNDER CLIMATE CHANGE: LESSONS FROM INDIAN COUNTRY

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Anthropogenic climate change is increasingly causing disruptions to ecological communities upon which Natives have relied for millennia. These disruptions raise existential threats not only to ecosystems but to Native communities. Yet no analysis has carefully explored how climate change is affecting the governance of tribal ecological lands. This Article, by examining the current legal adaptive capacity to manage the effects of ecological change on tribal lands, closes this scholarly and policy gap.

This Article first considers interventions to date, finding them to be lacking in even assessing—let alone addressing—climate risks to tribal ecosystem governance. It then carefully explores how climate change raises distinctive risks and advantages to tribal governance as compared to federal and state approaches. Relying in part on a review

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of publicly available tribal plans, this Article details how tribal adaptation planning to date has fared.

Focusing on climate change and ecological adaptation, this Article delves into the substantive, procedural, and structural aspects of tribal governance. Substantively, tribal governance often tends to be considerably less wedded to conservation goals and strategies that rely on “natural” preservation, and many tribes focus less on maximizing yield in favor of more flexible objectives that may be more congruent with adaptation. Procedurally, like other authorities, many tribal governments could better integrate adaptive management and meaningful public participation into adaptation processes, yet some tribes serve as exemplars for doing so (as well as for integrating traditional ecological knowledge with Western science). Structurally, tribal ecological land governance should not only continue to tap the advantages of decentralized tribal authority but also complement it through more robust (1) federal roles in funding and information dissemination and (2) intergovernmental coordination, assuming other governments will respect tribal sovereignty. This Article concludes by identifying areas where tribal management practices might serve as valuable exemplars for adaptation governance more generally, as well as areas in which additional work would be helpful.

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INTRODUCTION

In the wilderness of Alaska, where snow-covered landscapes stretch as far as the eye can see, a profound ecological drama is unfolding. It is a story that speaks of the intimate bond between the land, its creatures, and the Native peoples who have called it home for millennia. At the heart of this story are herds of caribou, majestic creatures with antlered crowns, whose annual migrations have been a spectacle of nature and a lifeline for the Native communities of Alaska.¹ But as the world warms due to climate change, the Arctic's icy facade begins to crack and melt, causing profound transformation.² The caribou, long attuned to the rhythms of the frozen

¹ Christian Thorsberg, Andrea Medeiros, Kristin Reakoff & Brittany Sweeney, *Caribou and Communities in a Changing Climate*, ArcGIS StoryMaps (Dec. 5, 2023), <https://storymaps.arcgis.com/stories/158c95ff398440e8b875a791e2bec2f8/> [https://perma.cc/2VA2-GPDJ] (“Caribou (*Rangifer tarandus*) have roamed the circumpolar north for hundreds of thousands of years. . . . Alaska Native peoples and other subsistence users depend upon this cyclical movement for annual harvests, relying on caribou for food, clothing, cultural practice, and emotional and spiritual health.”).

² Id. (“[A]s a warming climate changes their habitat—causing seasons to shift, ice to melt at different times of the year, and unpredictable precipitation—the population of many of Alaska’s caribou herds has declined, affecting not only the species, but humans who have lived with and from them since [time] immemorial.”).

tundra, now find their ancient routes disrupted as climate change negatively affects food and habitat.³

For Alaska Natives, this upheaval is nothing short of a crisis. These Native communities have relied on the caribou as a primary source of sustenance, clothing, and cultural significance for countless generations.⁴ Subsistence hunters, who used to be able to rely on caribou for survival, now have to travel as many as 200 miles to find a herd, and one hunter reported not seeing caribou for years.⁵ The caribou, once so abundant and dependable, have become less predictable, and Alaska's Native communities who depend on them are left in uncertainty.⁶ The very essence of their identity, intertwined with the land and the caribou, faces an existential challenge. This harrowing story is but one example of myriad instances across "Indian country"⁷ in which anthropogenic

³ See Elizabeth Manning, *Caribou and Climate Change: The Nelchina Caribou Herd, Lichens and Fire*, Alaska Fish & Wildlife News (Mar. 2008), https://www.adfg.alaska.gov/index.cfm?adfg=wildlifeneews.view_article&articles_id=356 [<https://perma.cc/H73R-6BLP>].

⁴ Thorsberg et al., *supra* note 1; see also *Caribou Stewardship Based on Indigenous Knowledge*, Nat'l Park Serv. (Nov. 24, 2020), <https://www.nps.gov/articles/000/ikcariboustewardship.htm#:~:text=The%20%C3%B1upiat%20have%20relied%20on,hunt%20through%20federal%20subsistence%20management> [<https://perma.cc/UZ7Z-ZSLM>]; Hannah Atkinson, *Mobilizing Indigenous Knowledge Through the Caribou Hunter Success Working Group*, 9 *Land*, Oct. 31, 2020, at 1, 2, <https://www.mdpi.com/2073-445X/9/11/423> [<https://perma.cc/KY4P-USS7>] ("For the Iñupiat of northwest Alaska, caribou is a cultural keystone species. That is, the [Western Arctic Caribou Herd] 'play a unique role in shaping and characterizing the identity of the people who rely on them [and] that become embedded in a people's cultural traditions and narratives, their ceremonies, dances, songs, and discourse.'") (footnotes omitted) (quoting Ann Garibaldi & Nancy Turner, *Cultural Keystone Species: Implications for Ecological Conservation and Restoration*, 9 *Ecology & Soc'y*, no. 3, 2004, at 1, 1, <https://www.ecologyandsociety.org/vol9/iss3/art1/print.pdf> [<https://perma.cc/3ZLT-ZC RQ>])).

⁵ W. Arctic Caribou Herd Working Grp., *Working Group Proposes Large Reduction in Caribou Harvest*, Caribou Trails, Summer 2023, at 1, 1, https://www.adfg.alaska.gov/static/home/library/pdfs/wildlife/caribou_trails/caribou_trails_2023.pdf [<https://perma.cc/467Q-HZ 6M>].

⁶ Thorsberg et al., *supra* note 1.

⁷ 18 U.S.C. § 1151 ("Except as otherwise provided in sections 1154 and 1156 of this title, the term 'Indian country', as used in this chapter, means (a) all land within the limits of any Indian reservation under the jurisdiction of the United States Government, notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation, (b) all dependent Indian communities within the borders of the United States whether within the original or subsequently acquired territory thereof, and whether within or without the limits of a state, and (c) all Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same."). This term originated in the context of the elimination of Natives via war. Roxanne Dunbar-Ortiz, *An Indigenous People's History of the United States* 131–32 (Tenth-Anniversary ed. 2022).

climate change is profoundly affecting species' traditional habitats. Climate-driven species shifts affect both the communities whose lands species previously inhabited and the communities onto whose lands such species have moved (or are attempting to move).

Anthropogenic climate change has induced, and will continue to induce, substantial changes to virtually all ecosystems around the globe. The distributions of plant and animal species are shifting faster than they did historically.⁸ As demonstrated by the story of caribou in Alaska, these stressors are fundamentally changing ecosystems, creating new communities, and raising new challenges for management such as how to deal with “new natives” displacing or otherwise harming “old natives.”⁹ Though climate change is causing stress to and reshaping virtually every feature of human and nonhuman systems in every community, this Article focuses on the long-overlooked but massive effects of climate change on biotic communities—in particular, those located on tribal lands, species or landscapes of cultural or spiritual significance to Native peoples, and/or nonhuman biota potentially subject to tribal governance in the foreseeable future.

As one of the Authors has written extensively about elsewhere, the substantial ecological changes wrought by climate change—and the uncertainty that accompanies these stressors—likely necessitate a rethinking of the substantive goals, procedural mechanisms, and structural institutions of conservation governance worldwide.¹⁰ Substantively, climate change illuminates the tensions between the various conventional objectives of conservation instantiated throughout

⁸ See generally I-Ching Chen, Jane K. Hill, Ralf Ohlemüller, David B. Roy & Chris D. Thomas, Rapid Range Shifts of Species Associated with High Levels of Climate Warming, 333 *Science* 1024 (2011) (demonstrating that species range shifts are occurring at an accelerated rate associated with high levels of climate warming).

⁹ Alejandro E. Camacho & Jason S. McLachlan, Regulatory Fragmentation: An Unexamined Barrier to Species Conservation Under Climate Change, 3 *Frontiers in Climate*, Nov. 22, 2021, at 1, 4, <https://www.frontiersin.org/journals/climate/articles/10.3389/fclim.2021.735608/full> [<https://perma.cc/WXD9-539F>] (“In the novel ecological communities created when ‘new natives’ mix with ‘old natives,’ the difficulty of establishing [lists of prohibited invasive species] will be compounded by ambiguity about the status of ‘new natives’ combined with the difficulty of assessing the acceptable impact of ‘new natives’ in the context of novel ecological communities.”).

¹⁰ Alejandro E. Camacho, De- and Re-Constructing Public Governance for Biodiversity Conservation, 73 *Vand. L. Rev.* 1585, 1589 (2020) [hereinafter Camacho, De- and Re-Constructing]; Alejandro E. Camacho, In the Anthropocene: Adaptive Law, Ecological Health, and Biotechnologies, 15 *Law, Innovation & Tech.* 280, 299–300 (2023) [hereinafter Camacho, In the Anthropocene].

natural resources law.¹¹ Procedurally, climate change also raises fundamental questions about how to effectively cultivate participatory decision-making processes in ways that manage ecological and regulatory uncertainty.¹² Finally, climate change exacerbates existing cross-jurisdictional challenges—for example, transboundary cost externalization, regulatory commons risks, and conflicts between different adopted management strategies.¹³

As detailed in this Article, tribal sovereignty, tribal lands, and Indigenous cultures¹⁴ raise these issues in distinctive and insightful ways. Building on issues and paradoxes we have written about more broadly elsewhere, this Article delves into the intersection of tribes and climate change, with a special emphasis on ecological adaptation. Tribal lands and governance amplify certain challenges that are likely to be experienced elsewhere, in part due to the distinctive vulnerabilities¹⁵ of tribal communities.¹⁶ There is an indisputable and

¹¹ See Camacho, *In the Anthropocene*, supra note 10, at 286, 298–300 (detailing traditional goals of conservation typical in natural resource law and their pitfalls in a changing climate).

¹² Camacho, *De- and Re-Constructing*, supra note 10, at 1613 (“The standard public processes used for implementing public biodiversity management and for regulating private activity have not been well structured to promote learning and manage the substantial uncertainties and evolving character of ecological resources.”).

¹³ See *id.* at 1623–24; see also Camacho, *In the Anthropocene*, supra note 10, at 303 (arguing that current legal frameworks in Western jurisdictions are not designed to manage complex, transboundary issues like climate change); Alejandro E. Camacho & Robert L. Glicksman, *Reorganizing Government: A Functional and Dimensional Framework* 200 (2019) (describing increased cross-jurisdictional challenges raised by climate change, such as interjurisdictional spillovers and conflicts).

¹⁴ A note about the terminology used in this Article. We use the term “tribe” or “tribal” to refer to the 574 federally recognized tribes located within the exterior boundaries of the United States. Indian Entities Recognized by and Eligible to Receive Services from the United States Bureau of Indian Affairs, 89 Fed. Reg. 944 (Jan. 8, 2024). We acknowledge that there are numerous Indigenous groups within the United States that have not been federally recognized for a wide variety of historical and political reasons (e.g., Native Hawaiians). Cohen’s *Handbook of Federal Indian Law* §§ 3.02, 4.07[4][a], [c] (Nell Jessup Newton et al. eds., 2005) (discussing factors contributing to federal recognition of tribes generally and speaking to the situation of Native Hawaiians specifically). Because this Article focuses on federal law and the federal government’s relationship with tribes, however, we will focus our analysis on federally recognized tribes. When we wish to be more inclusive than federally recognized tribes, we will use the term “Indigenous.”

¹⁵ We do not use the term “vulnerabilities” to suggest that tribes are victims, or somehow lesser than other communities impacted by climate change. Rather, we use this term to highlight historical and legal differences that combine to make tribal communities often uniquely vulnerable to the impacts of climate change.

¹⁶ See *infra* Subsection I.B.1.

well-documented history of the taking of vast expanses of indigenous lands with abundant resources, along with active suppression of indigenous peoples' culture and political institutions, entrenched patterns of discrimination against them and outright brutality, all of which figured in the history of the settlement of the country and the building of its economy.¹⁷

These “conditions of disadvantage persist with the continuing effects of a long history of wrongs and past, misguided policies.”¹⁸ The brutal treatment of Indigenous peoples by colonial powers¹⁹ has resulted in the deepened vulnerability²⁰ of the approximately 56.2 million acres of land now held in trust by the federal government for tribes.²¹ In terms of climate change, the cumulative impact of this historic mistreatment has resulted in many tribal communities being placed on less desirable land and, as a result, facing poor economic conditions—factors which lessen tribes' ability to effectively combat the negative impacts of climate change.²²

There are legal and cultural differences that affect the magnitude of this vulnerability. Native cultures and traditions are often tied to the environment and land in a manner that differs from that of the dominant

¹⁷ S. James Anaya, Report of the Special Rapporteur on the Rights of Indigenous Peoples on the Situation of Indigenous Peoples in the United States of America, 32 *Ariz. J. Int'l & Compar. L.* 51, 61 (2015).

¹⁸ *Id.* at 59.

¹⁹ See, e.g., Immigration & Relocation in U.S. History: Native American, Libr. of Cong., <https://www.loc.gov/classroom-materials/immigration/native-american/> [<https://perma.cc/KCK7-QG4L>] (last visited Sept. 6, 2024) (explaining that European settlement in North America triggered “disease, starvation, and bloodshed”).

²⁰ For a discussion of the use of the word “vulnerability,” see Hans-Martin Füssel, Vulnerability: A Generally Applicable Conceptual Framework for Climate Change Research, 17 *Glob. Env't Change* 155, 157–58 (2007) (presenting a framework for understanding the concept of vulnerability through the lens of four different factors: physical, economic, social, and environmental); see also Karen O'Brien, Siri Eriksen, Lynn P. Nygaard & Ane Schjolden, Why Different Interpretations of Vulnerability Matter in Climate Change Discourses, 7 *Climate Pol'y* 73, 74 (2007) (attempting to organize the varying scholarly definitions of “vulnerability” into one “common framework”).

²¹ What Is a Federal Indian Reservation?, U.S. Dep't of the Interior: Bureau of Indian Affs. (Aug. 19, 2017, 2:53 PM), <https://www.bia.gov/faqs/what-federal-indian-reservation> [<https://perma.cc/TUY7-47Y8>].

²² See Justin Farrell et al., Effects of Land Dispossession and Forced Migration on Indigenous Peoples in North America, 374 *Science*, Oct. 29, 2021, at 1, 8, <https://www.sciencemag.org/doi/epdf/10.1126/science.abe4943>.

society.²³ While it is without doubt that each tribal nation has a distinctive relationship with its particular land and environment, it is also true that the common spiritual, medicinal, and cultural connections that tribal communities have with their land differs in kind from the relationship other communities in the United States have with their land.²⁴ Many tribal communities “have a deep relationship with ancestral homelands for sustenance, religious communion and comfort, and to maintain the strength of personal and interfamilial identities. Through language, songs, and ceremonies, tribal people continue to honor sacred springs, ancestral burial places, and other places where ancestral communities remain alive.”²⁵ As a result, for many (but not all) tribal and Indigenous people, culture and spirituality are connected to specific lands. Such connections can provide wisdom about adaptive capacity, but they also can hinder the benefits or even availability of certain adaptive strategies (e.g., making it especially traumatizing to relocate or to be unable to relocate in the face of climate change).

The distinctive legal connections tribes have to specific lands, for instance, restrict the capacity for tribes to accommodate climate change through movement. Many tribes have treaty agreements with the federal government, and the rights emerging from these treaties (such as hunting and fishing rights) are usually tied to a tribe’s traditional homelands.²⁶ In fact, the majority of federal Indian law is connected to the legally defined

²³ We would like to avoid traditional stereotypes of American Indians as “Noble Savages” or “Bloodthirsty Savages.” See Rebecca Tsosie, *Tribal Environmental Policy in an Era of Self-Determination: The Role of Ethics, Economics, and Traditional Ecological Knowledge*, 21 *Vt. L. Rev.* 225, 270 (1996) (“The problems of cross-cultural interpretation and the attempt to define ‘traditional’ indigenous beliefs raise a common issue: the tendency of non-Indians to glorify Native Americans as existing in ‘perfect harmony’ with nature (the ‘Noble Savage’ resurrected) or, on the other hand, denounce them as being as rapacious to the environment as Europeans (the ‘Bloodthirsty Savage’ resurrected).”).

²⁴ Frank Pommersheim, *The Reservation as Place: A South Dakota Essay*, 34 *S.D. L. Rev.* 246, 250 (1989); see also Nat’l Cong. of Am. Indians, *Resolution EWS-06-004: Supporting a National Mandatory Program to Reduce Climate Change Pollution and Promote Renewable Energy*, at 2 (2006 Winter Session), https://archive.ncai.org/attachments/Resolution_KSlvpcMnfSafhsDsxFnQcTDKMclEpNfvEPQFCsLlhonOXXrOOXu_EWS-06-004.pdf [<https://perma.cc/89XA-Z2K3>] (“[C]limate-related changes to the weather, food sources, and local landscapes undermine the social identity and cultural survival of American Indians and Alaska Natives . . .”).

²⁵ Mary Christina Wood & Zachary Welcker, *Tribes as Trustees Again (Part I): The Emerging Tribal Role in the Conservation Trust Movement*, 32 *Harv. Env’t L. Rev.* 373, 381 (2008).

²⁶ Cohen’s *Handbook of Federal Indian Law*, *supra* note 14, § 4.05[1], at 276, § 18.02, at 1122–24.

“status” of land, defined as “Indian country.”²⁷ The fact that much of Indian law and treaty rights are connected to specific parcels of land deepens tribes’ vulnerability to climate change, as a tribe may not easily leave its tribal territory and continue to enjoy the same legal rights elsewhere.

A focus on tribal ecosystem governance in light of climate change is also invaluable given tribes’ distinctive role in advancing climate change adaptation and resource conservation. First, there are approximately 56.2 million acres of land held in trust by the federal government for the benefit of tribes and individual Indians.²⁸ Many areas falling under tribal control can be used for conservation purposes,²⁹ with more Indigenous-managed lands being ecologically intact and serving as a refuge for threatened species.³⁰ Second, because of the sovereign status of these tribes, states and localities have little jurisdictional control over the regulatory activity on these lands.³¹ Adaptation planning therefore is vital for ensuring that effective resource conservation is occurring. Third, in line with the experimentalist benefits of a federal system,³² the innovations being developed by tribes in this space may prove valuable to other sovereigns—such as other tribes, states, and localities—as they look to develop their own climate change adaptation policies. Finally, there are likely to be substantial opportunities for interjurisdictional information sharing and learning; federal, state, and municipal jurisdictions are likely

²⁷ See *supra* note 7.

²⁸ What Is a Federal Indian Reservation?, *supra* note 21.

²⁹ See Background: Sharing Information & Techniques Nationwide, Native Am. Fish & Wildlife Soc’y, <https://www.nafws.org/about/background/> [<https://perma.cc/HEJ2-CMPV>] (last visited Sept. 6, 2024).

³⁰ Cf. Stephen T. Garnett et al., A Spatial Overview of the Global Importance of Indigenous Lands for Conservation, 1 *Nature Sustainability* 369, 370 (2018) (describing the global importance and value of Indigenous-managed lands in conservation goals); Christopher J. O’Byrne et al., The Importance of Indigenous Peoples’ Lands for the Conservation of Terrestrial Mammals, 35 *Conservation Biology* 1002, 1006 (2021) (highlighting the importance of Indigenous lands for the conservation of threatened and endangered mammal species globally).

³¹ *California v. Cabazon Band of Mission Indians*, 480 U.S. 202, 207 (1987) (explaining that states generally do not have the authority to enforce their laws on tribes unless Congress grants them the power). See generally *Worcester v. Georgia*, 31 U.S. (6 Pet.) 515 (1832) (holding that the laws of Georgia generally did not apply to Cherokee territory within the state because of tribal sovereignty and federal preemption).

³² Camacho & Glicksman, *supra* note 13, at 34.

to learn from the experience of tribal authorities in climate adaptation and ecosystem management, and vice versa.³³

Accordingly, a careful and thorough accounting of the distinctive governance challenges raised on tribal lands by climate change is long overdue. Unfortunately, existing academic literature and federal governmental analyses on, and initiatives for, addressing the potential harms from climate change—both the ecological effects on tribal lands, as well as the challenges raised for effective management of tribal lands—remain limited. The scientific analysis of climate effects on vulnerable species, and biota on tribal lands more generally, lags behind that for other lands. More importantly, existing scholarly literature and government analyses insufficiently explore how climate change is likely to stress the governance goals, processes, and institutions that may influence the management of ecological resources on tribal lands.

This Article seeks to begin to fill these gaps in several important ways. The first objective is to bring awareness of the distinctive challenges and opportunities of climate-related conservation on tribal land to the broader scholarly and policy discussion on climate change adaptation in general and ecological adaptation in particular. The character of tribal lands offers important context for (1) assessing the potentially conflicting *substantive* conservation goals of ecosystem governance; (2) working through decisional *processes* about conservation; and (3) managing *structural* governance problems, including regulatory fragmentation and intergovernmental coordination. Second, this Article makes clear that the federal government could and should do substantially more to support tribal governance in the context of preparing for and managing the effects of climate change, particularly related to promoting biodiversity and ecological health. Finally, this Article illuminates various insights for scholars and policymakers, not only in tribal governments engaging in

³³ See generally Morgan Hepler & Elizabeth Ann Kronk Warner, Learning from Tribal Innovations: Lessons in Climate Change Adaptation, 49 Env't L. Rep. 11130 (2019) (discussing how tribal governments can serve as valuable “laboratories” from which other sovereigns can learn); Elizabeth Ann Kronk Warner, Returning to the Tribal Environmental “Laboratory”: An Examination of Environmental Enforcement Techniques in Indian Country, 6 Mich. J. Env't & Admin. L. 341 (2017) (same); Elizabeth Ann Kronk Warner, Justice Brandeis and Indian Country: Lessons from the Tribal Environmental Laboratory, 47 Ariz. St. L.J. 857 (2015) [hereinafter Kronk Warner, Justice Brandeis and Indian Country] (same); Elizabeth Ann Kronk Warner, Tribes as Innovative Environmental “Laboratories,” 86 U. Colo. L. Rev. 789 (2015) [hereinafter Kronk Warner, Tribes as Innovative Environmental “Laboratories”] (same).

adaptation planning but also local, state, and federal jurisdictions. In particular, it offers examples of tribal governments that may be engaging in adaptation strategies about which other authorities can learn important lessons.

To accomplish these goals, Part I establishes a foundation upon which to scaffold our arguments by delving into the scant existing literature related to ecological adaptation and climate change in Indian country. Scholars and policymakers have focused on concerns about tribal vulnerabilities and sovereignty, as well as the integration of Indigenous knowledge (“IK”) (i.e., the breadth of Indigenous socioeconomic, cultural, and scientific knowledge) and traditional ecological knowledge (“TEK”) into federal and state processes, but they largely neglect deeper substantive, procedural, and structural governance concerns raised by climate change. Because effective governance is key to adequately addressing the challenges posed by climate change and ecological adaptation, evaluation of tribal governance structures proves incredibly important to any discussion of solutions.

Part II takes a deeper dive into how these different facets of governance are likely to be affected by the impact of climate change on tribal lands. To do so, it relies in part on the first thorough assessment of published and publicly available tribal adaptation plans. First, it considers the conventional strategies and goals of resource conservation, namely laws promoting historical preservation, natural and wilderness preservation, and sustained yield. While some tribal governments face tensions between promoting historical fidelity and managing climate change, others are developing adaptation strategies that are more congruent with promoting biodiversity and long-term ecological health. Additionally, as compared to federal and state resource management laws, tribal governance tends to be less wedded to goals and strategies that rely on “natural” preservation. Finally, many tribes focus less on maximizing yield in favor of more flexible objectives that may be more congruent with ecological adaptation.

In terms of procedural ecosystem governance, this Article emphasizes the need to incorporate adaptability, promote meaningful participation, and better integrate Western science with TEK. We explore, however, how long-established governance frameworks for many tribal governments, and even some tribal adaptation plans, allow for more adaptive and open decision-making. Some adaptation plans also illustrate

how TEK can be effectively combined in resource management with conventional Western scientific data generation and analysis.

Finally, this Article considers the structural configuration of authority among the constellation of institutions affecting the governance of tribal ecological lands. Tribes may suffer under prevailing decentralized, fragmented, and uncoordinated conservation governance, yet there nonetheless are diversity, experimentation, expertise, and legitimacy advantages to decentralized governmental structures—especially in the context of climate change adaptation. As such, it makes sense to maintain decentralized authority but to complement it through more robust federal roles in funding and information collection and dissemination, as well as by better promoting intergovernmental coordination that expands on recent federal efforts to make federal-tribal consultation more robust.³⁴ This Article concludes with a forward-looking agenda for scholars and policymakers interested in enhancing the cross-jurisdictional governance of tribal ecological lands.

I. EXISTING SCHOLARSHIP AND POLICY ON CLIMATE CHANGE'S EFFECTS ON TRIBAL LANDS

A. Scientific Literature on Climate Change's Ecological Effects on Tribal Lands

The existing scientific and government reporting of climate change on tribal lands does not often address the impacts of climate change on conservation and biodiversity per se; instead, it emphasizes human dimensions of vulnerability.³⁵ Peer-reviewed academic literature often frames ecological shifts as a human-centered problem through the context

³⁴ This recommendation assumes that other sovereigns will acknowledge and respect tribal sovereignty.

³⁵ See, e.g., Lesley Jantarasami et al., Tribes and Indigenous Peoples, *in* 2 Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment 572, 574 (Dave Reidmiller et al. eds., 2018), https://nca2018.globalchange.gov/downloads/NCA4_Ch15_Tribes-and-Indigenous-Peoples_Full.pdf [<https://perma.cc/3J32-KNQM>].

of subsistence,³⁶ ecosystem services,³⁷ and environmental hazards.³⁸ Although the literature on the effects of climate change on Indigenous communities is in itself fairly limited, analyses that do exist prioritize climate changes affecting human communities as compared to the loss of ecological biodiversity.³⁹ The implications in this literature for species conservation are typically implicit or neglected.

By contrast, academic study of the impacts of changing climate on biodiversity is disproportionately focused on effects on public lands, potentially establishing a discernible bias in understanding, to the extent that tribal land is distinct from public land.⁴⁰ In some places, Indigenous-managed lands house greater biodiversity than similar public lands,⁴¹ but the literature that includes attempts to characterize the ecology of tribal lands⁴² is limited. Beyond intrinsic concerns about significant gaps in knowledge regarding climatic effects on vital ecological resources, this imbalance has the potential to reinforce historical inequities.

³⁶ See Kathy Lynn et al., *The Impacts of Climate Change on Tribal Traditional Foods*, 120 *Climatic Change* 545, 546 (2013), in *Climate Change and Indigenous Peoples in the United States: Impacts, Experiences and Actions* 37, 38 (Julie Koppel Maldonado, Benedict Colombi & Rajul Pandya eds., 2014).

³⁷ See K. Cozzetto et al., *Climate Change Impacts on the Water Resources of American Indians and Alaska Natives in the U.S.*, in *Climate Change and Indigenous Peoples in the United States: Impacts, Experiences and Actions*, supra note 36, at 61, 66.

³⁸ Farrell et al., supra note 22, at 6.

³⁹ See Jantarasami et al., supra note 35, at 573 (exemplifying how climate change analyses often focus on Indigenous livelihoods, economies, and health, with less emphasis on ecological biodiversity).

⁴⁰ See, e.g., Joseph Ceradini, Douglas Keinath, Ian Abernethy, Mark Andersen & Zach Wallace, *Crossing Boundaries in Conservation: Land Ownership and Habitat Influence the Occupancy of an At-Risk Small Mammal*, *Ecosphere*, Jan. 20, 2021, at 1, 1, <https://esajournal.s.onlinelibrary.wiley.com/doi/epdf/10.1002/ecs2.3324> [https://perma.cc/83TT-H6P8] (“[R]estricting research to public land and omitting private land, as commonly occurs in ecological research, can bias inferences because important drivers of population and community patterns may vary with land ownership.”).

⁴¹ See Richard Schuster, Ryan R. Germain, Joseph R. Bennett, Nicholas J. Reo & Peter Arcese, *Vertebrate Biodiversity on Indigenous-Managed Lands in Australia, Brazil, and Canada Equals That in Protected Areas*, 101 *Env’t Sci. & Pol’y* 1, 1–2 (2019), <https://www.sciencedirect.com/science/article/pii/S1462901119301042> (“Indigenous land management practices have often been shown to result in higher native and rare species richness and less deforestation and land degradation than non-indigenous practices.” (citations omitted)).

⁴² See Garrett W. Meigs et al., *Drought, Wildfire and Forest Transformation: Characterizing Trailing Edge Forests in the Eastern Cascade Range, Washington, USA*, 96 *Forestry* 340, 340, 348, 350 (2023) (documenting the extent of dry, “trailing edge” forest on tribal land and explaining its impact on wildfires).

While the body of literature reporting on the effects of climate change on Indigenous communities is growing,⁴³ there are significantly more opportunities to explore the ecological and biodiversity implications of climate change on tribal lands. One of the most pressing climate concerns for tribal communities is the substantial harm to culturally important, as well as other, vulnerable species—for example, the Alaskan caribou—and the potential need for movement of these species away from reservation lands in order for them to survive.⁴⁴ As climate change introduces new challenges to ecological systems, species will be forced to respond, in some cases relocating to more suitable habitats, perhaps outside of tribal jurisdiction. Worse, such species may not be able either to migrate or survive in their current range. Understanding these stressors and changing habitats will be critical to effectively responding to climate change and increasing the chance of persistence for some species. However, there are few examples in the scientific literature assessing climate change’s effects on these culturally important species on tribal lands.⁴⁵

*B. Existing Literature and Policy on Tribal
Governance Challenges of Climate Change*

As tribal communities across the country face the negative impacts of climate change, exploration of climate solutions at every level of government is critical to developing effective law and policy. Unfortunately, both scholars and policymakers have neglected the need for ecological adaptation strategies on tribal lands. Little “attention has been paid to the exciting work being done by tribes,”⁴⁶ and even less

⁴³ Kathryn Norton-Smith et al., Forest Serv., U.S. Dep’t of Agric., Climate Change and Indigenous Peoples: A Synthesis of Current Impacts and Experiences 96 (2016), https://www.fs.usda.gov/pnw/pubs/pnw_gtr944.pdf [<https://perma.cc/LM9T-WN5B>] (“Literature discussing the impacts of climate change on American Indians and Alaska Natives has increased in the past few years. . . . [A]lthough tribal vulnerability assessments and adaptation plans provide great examples of current impacts experienced by tribes, many of these impacts are absent within the peer-reviewed literature.”).

⁴⁴ *Id.*

⁴⁵ But see, e.g., Tyler K. Mockta, Peter Z. Fulé, Andrew Sánchez Meador, Thora Padilla & Yeon-Su Kim, Sustainability of Culturally Important Teepee Poles on Mescalero Apache Tribal Lands: Characteristics and Climate Change Effects, 430 *Forest Ecology & Mgmt.* 250, 251, 256–57 (2018) (providing an example of scientific literature utilizing TEK and suggesting intervention by assisted migration as a mechanism for adapting to the loss of Douglas-fir tree stands).

⁴⁶ Hepler & Kronk Warner, *supra* note 33, at 11132.

attention has been dedicated to questions specific to ecological conservation on tribal lands. As discussed in this Section, the limited existing climate change adaptation literature focuses primarily on the distinctive vulnerabilities of tribes, the value of integrating IK and TEK into non-tribal decision-making processes, and, to a limited extent, jurisdictional and sovereignty questions. Although these issues are undoubtedly important, existing scholarship and policy largely neglect how climate change challenges deeper considerations for substantive, procedural, and structural tribal ecosystem governance.

1. Distinctive Vulnerabilities and Place-Based Connection to Land

Some scholars and governmental reports have explored the more far-reaching impacts⁴⁷ that are “disproportionately felt in tribal communities”⁴⁸ because they are fundamentally more vulnerable to most stressors, ecological and otherwise.⁴⁹ The distinctive vulnerabilities tribal peoples face manifest in a range of forms. Most tribes have small populations,⁵⁰ and the poverty and unemployment rates of Native people

⁴⁷ See generally Jantarasami et al., *supra* note 35. See *id.* at 582 (explaining how climate change disrupts traditional practices and weakens cultural identity leading to negative mental health outcomes for Indigenous communities); Mahesh R. Gautam, Karletta Chief & William J. Smith, Jr., *Climate Change in Arid Lands and Native American Socioeconomic Vulnerability: The Case of the Pyramid Lake Paiute Tribe*, in *Climate Change and Indigenous Peoples in the United States: Impacts, Experiences and Actions*, *supra* note 36, at 77, 77 (“[Pyramid Lake Paiute Tribe]’s vulnerability to climate change is related to cultural and economic dependence on Pyramid Lake, while external socio-economic vulnerability factors influence adaptive capacity and amplify potential impacts.”).

⁴⁸ *Env’t L. Inst.*, 3 *Law of Environmental Protection* § 24:39, at 779 (Rachel L. Jean-Baptiste, Donald W. Stever & Stanley P. Abramson eds., 2024) [hereinafter *Law of Environmental Protection*]; see also Intergovernmental Panel on Climate Change, *Climate Change 2007: Impacts, Adaptation and Vulnerability* 639 (Martin Parry, Osvaldo Canziani, Jean Palutikof, Paul van der Linden & Clair Hanson eds., 2007), https://www.ipcc.ch/site/assets/uploads/2018/03/ar4_wg2_full_report.pdf [<https://perma.cc/M26U-A9Q7>] (remarking on the disproportionate impact of climate change on Indigenous peoples of North America).

⁴⁹ See, e.g., Justin Farrell et al., *supra* note 22, at 1; Daniel Cordalis & Dean B. Suagee, *The Effects of Climate Change on American Indian and Alaska Native Tribes*, *Nat. Res. & Env’t*, Winter 2008, at 45, 45; Christopher Flavelle & Kalen Goodluck, *Dispossessed, Again: Climate Change Hits Native Americans Especially Hard*, *N.Y. Times* (June 22, 2023), <https://www.nytimes.com/2021/06/27/climate/climate-Native-Americans.html>; Rachel Treisman, *How Loss of Historical Lands Makes Native Americans More Vulnerable to Climate Change*, *NPR* (Nov. 2, 2021, 7:00 AM), <https://www.npr.org/2021/11/02/1051146572/forced-relocation-native-american-tribes-vulnerable-climate-change-risks> [<https://perma.cc/8XVJ-EJX6>].

⁵⁰ See, e.g., Bethany R. Berger, *Intertribal: The Unheralded Element in Indigenous Wildlife Sovereignty*, 48 *Harv. Env’t L. Rev.* 1, 11 (2024).

on Indian reservations are more than double the nationwide averages of the general population.⁵¹ Tribes' present-day lands are, on average, measurably more exposed to climate change risks and hazards, including more extreme heat and less precipitation, than non-tribal lands.⁵² There is also notable "degradation of lands because of heightened fossil fuel and other natural resource extraction activities."⁵³ Nearly half of tribes are already experiencing increased wildfire hazard exposure.⁵⁴ Additionally, tribal lands (and therefore habitats therein) are extensively fragmented and "checkerboarded" in terms of property ownership.⁵⁵ The loss of plant and animal species⁵⁶ resulting from Native land loss and fragmentation has impacted Native peoples' subsistence⁵⁷ and culture.⁵⁸ Rising sea levels and intensifying wildfires contribute to displacement.⁵⁹

Moreover, scholars have documented how tribal members' distinctive connection to place heightens their psychological and existential

⁵¹ See, e.g., Randall K. Q. Akee, Katherine A. Spilde & Jonathan B. Taylor, *The Indian Gaming Regulatory Act and Its Effects on American Indian Economic Development*, J. Econ. Persps., Summer 2015, at 187 tbl.1.

⁵² Farrell et al., *supra* note 22, at 4–5.

⁵³ *Id.* at 7.

⁵⁴ *Id.* at 4–5.

⁵⁵ See Law of Environmental Protection, *supra* note 48, § 24:37, at 776; Mel Neal, Note, *Between a Rock and a Hard Place: The Current Situation of the #LandBack Movement and Indigenous-Imagined Futures*, 13 *Ariz. J. Env't L. & Pol'y* 47, 54 (2022) ("The allotment program led to the dispossession of Indigenous land and opened up their treaty-secured land bases to white settlement, resulting in a checkerboard pattern of landownership within reservation boundaries."); see also Jessica A. Shoemaker, *No Sticks in My Bundle: Rethinking the Indian Land Tenure Problem*, 63 *Kan. L. Rev.* 383, 384–85 (2014) (describing the process by which the federal government forced the division and allotment of previously jointly owned Indigenous lands).

⁵⁶ See *supra* Section I.A; see also Law of Environmental Protection, *supra* note 48, § 24:39, at 780 (observing that salmon populations have declined over the past century "due to dams, loss of habitat, pollution and other factors").

⁵⁷ See, e.g., Lynn et al., *supra* note 36, at 40; M. Stults et al., *Climate Change Vulnerability Assessment and Adaptation Plan: 1854 Ceded Territory Including the Bois Forte, Fond du Lac, and Grand Portage Reservations* 101 (2016), [https://www.1854treatyauthority.org/image/s/ClimateAdaptationPlan_Final-July_2016-optimized\(1\).pdf](https://www.1854treatyauthority.org/image/s/ClimateAdaptationPlan_Final-July_2016-optimized(1).pdf) [<https://perma.cc/G9GR-8458>].

⁵⁸ See, e.g., Garrit Voggeser, Kathy Lynn, John Daigle, Frank K. Lake & Darren Ranco, *Cultural Impacts to Tribes from Climate Change Influences on Forests*, in *Climate Change and Indigenous Peoples in the United States: Impacts, Experiences and Actions*, *supra* note 36, at 107, 108; Law of Environmental Protection, *supra* note 48, § 24:39, at 779–80, 783, 785.

⁵⁹ See, e.g., Law of Environmental Protection, *supra* note 48, § 24:39, at 779–80, 791; Dalia Faheid, *Indigenous Tribes Facing Displacement in Alaska and Louisiana Say the U.S. Is Ignoring Climate Threats*, *Inside Climate News* (Sept. 13, 2021), <https://insideclimatenews.org/news/13092021/indigenous-tribes-alaska-louisiana/>.

vulnerability to climate change. Ecological losses caused by climate change⁶⁰ threaten more than biodiversity and human systems⁶¹—there is an additional layer of spiritual vulnerability⁶² that grows from the fact that for many, “Native American faith is inextricably bound” to a “site-specific” connection to the land perceived as “a sacred, living being.”⁶³ Many Indigenous peoples thus

see climate change as threatening the integrity of their communities’ cohesion, or as altering the existential, personal, and intimate (as opposed to metaphorical or consumptive) relationships with the natural world [They] understand the nature and significance of their

⁶⁰ See *supra* Section I.A.

⁶¹ See, e.g., Hepler & Kronk Warner, *supra* note 33, at 11145 (“[C]limate change poses a threat to every aspect of human existence . . .”).

⁶² See Law of Environmental Protection, *supra* note 48, § 24:39, at 779, 783, 785; Randall S. Abate & Elizabeth Ann Kronk, Commonality Among Unique Indigenous Communities: An Introduction to Climate Change and Its Impacts on Indigenous Peoples, *in* *Climate Change and Indigenous Peoples: The Search for Legal Remedies* 3, 12 (Randall S. Abate & Elizabeth Ann Kronk eds., 2013); see also Environmental Protection, Quinault Indian Nation, <https://www.quinaultindiannation.com/181/Environmental-Protection> [<https://perma.cc/Q238-ENSP>] (last visited Sept. 8, 2024) (explaining that the Quinault people’s “physical, mental, social and spiritual health is directly and uniquely related to the health of the ecosystems of the lands and waters they inhabit”); Samish Prepares for Changing Climate, Samish Indian Nation, <https://www.samishtribe.nsn.us/departments/environment/climate-change> [<https://perma.cc/MS42-RFTM>] (last visited Sept. 8, 2024) (emphasizing how climate change poses a threat to the natural resources and land that are spiritually significant to the Samish community); Yurok Tribe Env’t Program, Climate Change Adaptation Plan for Water & Aquatic Resources 2014–2018, at 1.2 (2018), https://www.yuroktribe.org/_files/ugd/23c897_d77feebfe55b4ba889c57afaac85bba3.pdf [<https://perma.cc/ML5V-HSLM>] (“[Health] is a much broader concept that includes spiritual and emotional as well as physical health and that encompasses the intricate relationships and shared histories that the Yurok have with their waters, lands, and the species within them.”); S. Peterson et al., Shoshone-Bannock Tribes, Climate Change Assessment and Adaption Plan 6 (2017), <https://static1.squarespace.com/static/50c23e29e4b0958e038d6bd6/t/5bc8d77e9140b7e0e8e7e301/1539889050111/Shoshone+Bannock+Tribes+Climate+Change+Assessment+and+Adaptation+Plan+Summary+Report+FINAL-optimized.pdf> [<https://perma.cc/8GZM-3H4T>] (summarizing the potential harm climate change poses to the Snake River Watershed, which has spiritual importance to the Shoshone-Bannock Tribes).

⁶³ *Lyng v. Nw. Indian Cemetery Protective Ass’n*, 485 U.S. 439, 460–61 (1988) (Brennan, J., dissenting); see also Hepler & Kronk Warner, *supra* note 33, at 11146 (describing the close interconnectedness of tribes and their ecosystems that makes environmental health critical to community health); Kronk Warner, Tribes as Innovative Environmental “Laboratories,” *supra* note 33, at 793 (“[E]nvironmental laws may acquire even greater meaning in Indian country, where many tribal communities and individuals maintain a close connection to the land.”); Brigham Daniels, Michalyn Steele & Lisa Grow Sun, Just Environmentalism, 37 *Yale L. & Pol’y Rev.* 1, 8 (2018) (noting that even environmental protection measures can impose negative externalities on vulnerable populations like tribes).

knowledges within political, environmental, cultural, and social systems that differ greatly from those of many scientists.⁶⁴

2. *Valuation and Integration of Indigenous Knowledge*

There is little literature discussing the potential challenges raised by climate change on tribal procedural governance, such as what appropriate government-to-government consultation and the incorporation of IK and TEK looks like in this space. Unlike in other governance contexts,⁶⁵ there has been little discussion of the increased difficulties for tribal decision-making processes likely to arise due to climate change, including how to manage the unprecedented uncertainty accompanying climate change for managing ecological resources on tribal lands. Few have discussed how conventionally used participatory models may be strained by such uncertainty, or the challenges of managing resources in rapidly changing ecological conditions.

Most of the climate change literature that does discuss procedural issues related to tribal communities focuses on the role of tribal knowledge in federal, state, and local decision-making. Though some scholars have explored how to better integrate the role of Indigenous knowledge in federal, state, and local decision-making processes, policy largely lags behind. For example, in recent years, many scholars and policymakers have explored the importance of integrating tribal input and expertise into federal decision-making and planning, and identified that a lack of such integration has led to “major gaps” in critical climate adaptation strategy.⁶⁶ Federal law requires that tribes be consulted on any

⁶⁴ Samantha Chisolm Hatfield, Elizabeth Marino, Kyle Powys Whyte, Kathie D. Dello & Philip W. Mote, *Indian Time: Time, Seasonality, and Culture in Traditional Ecological Knowledge of Climate Change, Ecological Processes*, July 9, 2018, at 1, 2 <https://ecologicalprocesses.springeropen.com/counter/pdf/10.1186/s13717-018-0136-6.pdf> [<https://perma.cc/8TS3-DJQB>].

⁶⁵ See Alejandro E. Camacho, *Adapting Governance to Climate Change: Managing Uncertainty Through a Learning Infrastructure*, 59 *Emory L.J.* 1, 25 (2009) [hereinafter Camacho, *Adapting Governance*] (discussing the challenges raised by climate change to federal agency decision-making, and possible strategies for managing them).

⁶⁶ Nikki Cooley, Karen Cozzetto, Dara Marks-Marino, Rachael Novak & Robert Newman, *Including Indigenous Knowledges (IKs) in Fish, Wildlife, and Plants Climate Adaptation Planning and Actions*, in *Advancing the National Fish, Wildlife, and Plants Climate Adaptation Strategy into a New Decade* 32, 32 (2021), https://www.fishwildlife.org/application/files/4216/1161/3356/Advancing_Strategy_Report_FINAL.pdf [<https://perma.cc/YT9M-R8ZK>]; see also Berger, *supra* note 50, at 38–39 (recounting various Indigenous

decision that will affect them,⁶⁷ but the law does not require that federal actions incorporate the feedback given by tribes through that process.⁶⁸ Additionally, the existing legal procedural structure fails to recognize that tribal wisdom is a critical piece of the larger puzzle because it has inherent worth. The literature is thus dominated by discussions about the value of TEK and IK⁶⁹ and their integration into modern conservation science.⁷⁰

3. Jurisdictional and Sovereignty Questions

Third, from a structural perspective, the literature on climate change adaptation largely fails to fully analyze the role of tribal lands in the complex tapestry of cross-jurisdictional dynamics in the United States. In this regard, the existing literature fails to fully grapple with the existing legal paradigm, where numerous sovereigns within the United States have legal authority over territories impacted by climate change. Most of the

organizations' pushes for greater input on outside regulations and conservation decision-making autonomy).

⁶⁷ Compulsory consideration of tribal interests is codified by law where projects could affect tribal natural and cultural resources. See, e.g., 54 U.S.C. §§ 306108, 302706(b); 40 C.F.R. § 1501.2(b)(4)(ii) (2023) (requiring tribal consultation as part of the National Environmental Policy Act of 1969 ("NEPA")); Healthy Forests Restoration Act of 2003, 16 U.S.C. §§ 6542(d)(1), 6543(b)(1); Federal Land Assistance, Management, and Enhancement Act of 2009, 43 U.S.C. § 1712(b); EPA, Policy on Consultation with Indian Tribes 3–5 (2023), <https://www.epa.gov/sites/default/files/2013-08/documents/cons-and-coord-with-indian-tribe-s-policy.pdf> [<https://perma.cc/Y3KM-76LX>]; U.S. Dep't of the Interior, Departmental Manual No. 5137, Department of the Interior Policy on Consultation with Indian Tribes 1, 3 (Nov. 30, 2022), https://www.bia.gov/sites/default/files/dup/tcinfo/512-dm-4-final_508.pdf [<https://perma.cc/4AE9-BET5>]; Sec'y of the Interior, U.S. Dep't of the Interior, Order No. 3317, Department of the Interior Policy on Consultation with Indian Tribes 2–3 (2011), <https://www.doi.gov/sites/doi.gov/files/migrated/tribes/upload/SO-3317-Tribal-Consultation-Policy.pdf> [<https://perma.cc/NZ34-QCQE>]; Exec. Order No. 13,175, 3 C.F.R. 304, 306 (2001); Tribal Consultation and Strengthening Nation-to-Nation Relationships, 86 Fed. Reg. 7491, 7491 (Jan. 29, 2021).

⁶⁸ For a discussion of the existing scheme for consultations between the federal government and tribes, see Elizabeth Kronk Warner, *Sovereignty over Box Checking: Effective Tribal Consultation Leading to Consent*, 38 J. Land Use & Env't L. 131, 133–41 (2023).

⁶⁹ See Fikret Berkes, Johan Colding & Carl Folke, *Rediscovery of Traditional Ecological Knowledge as Adaptive Management*, 10 Ecological Applications 1251, 1251 (2000).

⁷⁰ Some scholars distinguish between TEK on its own and TEK integrated into modern science. See, e.g., Berger, *supra* note 50, 39–40 (“‘Indigenous science’ here means something broader than Traditional Ecological Knowledge, although it includes that too. Indigenous science is what emerges when Indigenous people direct the questions that science must address and influence the sources of information used to answer them.”).

existing literature focuses on the roles of states, municipalities, and the federal government, while ignoring the role of tribes.⁷¹

Before this Article summarizes the literature discussing the work being done by tribes as separate sovereign nations, it is helpful to first understand tribal sovereignty. Tribes exist apart from the states and federal government, as they are separate sovereign nations that predate the founding of the United States. Through centuries of interactions between the federal government and tribes, the legal⁷² nature of tribal sovereignty has evolved. Tribes have historically been treated as “domestic dependent nations” in a trust relationship with the federal government⁷³ as their protector.⁷⁴ Tribes are considered “distinct, independent political communities”⁷⁵ with the power to self-govern grounded in original tribal sovereignty.⁷⁶ This sovereignty is unique to tribes⁷⁷—“Indian tribes are neither states, nor part of the federal government, nor subdivisions of either. Rather, they are sovereign political entities possessed of sovereign authority not derived from the

⁷¹ See Hepler & Kronk Warner, *supra* note 33, at 11130 (“Although a vast literature focuses on the efforts of states on climate change, they are not the only sovereigns who are working to address its negative effects.”).

⁷² For purposes of this Article, we focus on the legal contours of tribal sovereignty. We acknowledge, however, that nonlegal aspects of tribal sovereignty exist, such as cultural sovereignty.

⁷³ *Cherokee Nation v. Georgia*, 30 U.S. (5 Pet.) 1, 17 (1831) (recognizing the separateness and sovereignty of tribal nations and setting forth the basis of the federal trust responsibility). But see *United States v. Kagama*, 118 U.S. 375, 384 (1886) (holding that the United States owes Indian tribes a “duty of protection” that thus gives the federal government plenary authority over Indian country).

⁷⁴ *Worcester v. Georgia*, 31 U.S. (6 Pet.) 515, 555 (1832); *Kagama*, 118 U.S. at 384; see also Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 4.01[1][a], at 208, § 5.04[4].

⁷⁵ *Worcester*, 31 U.S. (6 Pet.) at 519; see also *United States v. Lara*, 541 U.S. 193, 204–05 (2004) (affirming the Supreme Court’s “traditional understanding” of each tribe as “a distinct political society, separated from others, capable of managing its own affairs and governing itself” (quoting *Cherokee Nation*, 30 U.S. (5 Pet.) at 16)).

⁷⁶ See, e.g., *United States v. Wheeler*, 435 U.S. 313, 322–24 (1978) (noting that the power to self-govern lies in the “inherent powers of a limited sovereignty which has never been extinguished,” not any delegated powers granted by express acts of Congress (emphasis omitted) (quoting Felix S. Cohen, Handbook of Federal Indian Law 122 (1945))); see also Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 4.01[1][a] (explaining the scope and origin of tribal sovereignty); Hepler & Kronk Warner, *supra* note 33, at 11131 (discussing how tribes have utilized their tribal sovereignty to develop climate change adaptation strategies).

⁷⁷ See Hepler & Kronk Warner, *supra* note 33, at 11136 (“While states also possess inherent sovereignty, tribal inherent sovereignty has a different origin, and, perhaps more importantly to this discussion, is not constrained by the Constitution to the same extent that states are constrained.”).

United States, which they predate.”⁷⁸ To this day, “the constitutional recognition of tribes as sovereigns in a government-to-government relationship with the United States has remained a constant in federal Indian law”⁷⁹ and “[t]ribal sovereignty has never been extinguished.”⁸⁰

Yet, existing discussions of impactful tribal adaptation work often neglect tribal governments.⁸¹ In fact, many tribes have developed regulations and plans on their own, without intergovernmental coordination.⁸² In this regard, because most scholars fail to analyze the innovative work being done by tribes,⁸³ the climate change adaptation literature misses the opportunity to analyze the full range of opportunities for promoting effective interjurisdictional coordination in adaptation.

Some federal policy efforts are emerging that seek to promote interjurisdictional coordination, though they remain limited. Recently, the federal government has begun to consider the need to incorporate tribal concerns into federal climate change adaptation planning,⁸⁴ but action remains nascent if not meager. Additionally, the federal guidance that has been released remains aspirational rather than binding.⁸⁵ For instance,

⁷⁸ *NLRB v. Pueblo of San Juan*, 276 F.3d 1186, 1192 (10th Cir. 2002) (en banc) (footnote omitted) (citing *McClanahan v. Ariz. State Tax Comm’n*, 411 U.S. 164, 172 (1973)).

⁷⁹ Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 4.01[1][a], at 207; see also *Puerto Rico v. Sanchez Valle*, 579 U.S. 59, 71–72, 72 n.5 (2016) (distinguishing between Indian tribes, which are recognized as separate sovereigns for the purposes of the Double Jeopardy Clause, and U.S. territories, which are not).

⁸⁰ Hepler & Kronk Warner, *supra* note 33, at 11131 (citing *Wheeler*, 435 U.S. at 322–23). But see *id.* at 11131 n.17 (“Although this assertion is generally true, it is worth noting that some tribes were ‘terminated’ during the Termination Era of the mid-20th century.” (citing Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 1.06)).

⁸¹ See Cordalis & Suagee, *supra* note 49, at 45 (explaining that many calls to action in response to the negative impacts of climate change do not include tribal governments); Hepler & Kronk Warner, *supra* note 33, at 11130, 11132 (contrasting the vast amount of scholarship surrounding state climate action with the dearth of literature around tribal adaptation plans); Elizabeth Ann Kronk Warner, *Everything Old Is New Again: Enforcing Tribal Treaty Provisions to Protect Climate Change-Threatened Resources*, 94 Neb. L. Rev. 916, 920 (2016) (recognizing and filling a void in scholarship around the use of tribal treaty rights for climate adaptation); Elizabeth Ann Kronk Warner, *Indigenous Adaptation in the Face of Climate Change*, 21 J. Env’t & Sustainability L. 129, 130–31 (2015) (sampling a handful of tribal adaptation plans as a “first step” toward building a scholarly discussion about best practices).

⁸² See Hepler & Kronk Warner, *supra* note 33, at 11131–32.

⁸³ As cited elsewhere, Elizabeth Kronk Warner, one of the Authors of this Article, is one of a handful of scholars who have developed these arguments in any meaningful way.

⁸⁴ See, e.g., Secretary’s Tribal Advisory Committee, U.S. Dep’t of the Interior, <https://www.doi.gov/priorities/strengthening-indian-country/secretary-tribal-advisory-committee> [https://perma.cc/74Y5-2ZU2] (last visited Sept. 8, 2024).

⁸⁵ See *supra* notes 67–68 and accompanying text.

President Biden's 2021 Executive Order No. 14008, "Tackling the Climate Crisis at Home and Abroad," directs federal agencies to focus on environmental justice, climate change mitigation and resilience, and renewable energy projects, and to seek input from Tribal Nations in all aspects of these efforts.⁸⁶ No further requirements for tribal land, adaptation, and consultation are detailed in the Order, aside from the inclusion of tribal officials along with other officials.⁸⁷

These are positive but nonetheless limited steps toward incorporating tribal lands and communities into climate change planning. Few of these efforts focus on managing the climate change effects on ecological conservation on tribal lands. Nor are these effects or potential strategies examined in the existing literature.⁸⁸ This absence constitutes a significant gap in structural considerations related to climate change adaptation.

C. The State of Recorded Tribal Adaptation Planning

In order to combat the threats from climate change to the continuation of traditional cultural practices among Indigenous peoples,⁸⁹ some tribal governments are engaging in climate adaptation planning to increase their adaptive capacity and help reduce the experienced impacts of climate change.⁹⁰ There also is a growing body of research reporting on the objectives of tribal governments in adapting to climate change. Governmental reports,⁹¹ academic papers,⁹² and Indigenous-focused

⁸⁶ Exec. Order No. 14,008, 3 C.F.R. 477, at 481–82 (2022).

⁸⁷ See *id.* at 486, 489.

⁸⁸ See *supra* notes 45–46 and accompanying text.

⁸⁹ See Gloria Tom, Carolynn Begay & Raylene Yazzie, Navajo Nation Dep't of Fish & Wildlife, Climate Adaptation Plan for the Navajo Nation 11 (2018), <https://www.nndfw.org/docs/Climate%20Change%20Adaptation%20Plan.pdf> [<https://perma.cc/ZW8P-V7RA>] ("[M]any tribal members have expressed their concerns for the neglect and loss of traditional practices due to climate stress. Community members articulated on these concerns, and more, during community presentations and climate adaptation workshops.").

⁹⁰ Jessica E. Halofsky, David L. Peterson & Kailey W. Marcinkowski, Climate Change Adaptation in United States Federal Natural Resource Science and Management Agencies: A Synthesis 13–16 (2015), https://downloads.globalchange.gov/adaptation/ASIWG_Synthesis_4.28.15_final.pdf [<https://perma.cc/52DZ-5FTZ>].

⁹¹ See Norton-Smith et al., *supra* note 43, at 81–82; Jantarasami et al., *supra* note 35, at 576–77.

⁹² See, e.g., Jamie Kay Ford & Erick Giles, Climate Change Adaptation in Indian Country: Tribal Regulation of Reservation Lands and Natural Resources, 41 Wm. Mitchell L. Rev. 519, 528 (2015).

consortiums of researchers⁹³ all highlight the ambitions of tribal communities in adapting to climate change. Some scholars have recognized the institutional barriers to adaptation implementation such as inadequate access to funding resources⁹⁴ and legacy effects of federal laws like the Dawes Act and Indian Reorganization Act on land management.⁹⁵

Yet just as for other governments,⁹⁶ the number of publicly available plans being implemented to support effective adaptation remains very low in light of the rapidly adverse effects being wrought due to climate change. Moreover, only a few in the literature (aside from the Authors) have examined any aspect of tribal adaptation planning, the distinctive challenges of such planning, or the lessons other sovereigns can learn from the innovations being developed by tribes.⁹⁷ In addition, even this limited literature largely ignores the significant challenges of managing the ecological effects of climate on tribal lands. For example, the Forest Service's 2016 synthesis report on the climate change impacts for Indigenous communities, which was intended to inform the key messages presented in the National Climate Assessment ("NCA"),⁹⁸ identified twenty-seven tribal climate adaptation plans from the Pacific Northwest Tribal Climate Change Project.⁹⁹ The NCA highlights the steps some tribes have taken to build adaptive capacity, but critically, it focuses

⁹³ See, e.g., Tribal Climate Change Guide: Adaptation Plans, Univ. of Or., <https://tribalclimateguide.uoregon.edu/adaptation-plans> [<https://perma.cc/TY5J-MQA8>] (last visited Sept. 8, 2024); Tribal Profiles, N. Ariz. Univ., <http://www7.nau.edu/itep/main/tcc/Tribes/Index> [<https://perma.cc/QU74-AZ2Y>] (last visited Sept. 8, 2024).

⁹⁴ See Norton-Smith et al., *supra* note 43, at 92.

⁹⁵ See Jantarasami, *supra* note 35, at 578.

⁹⁶ See Magnan et al., United Nations Environment Programme, *Adaptation Gap Report 2022: Too Little, Too Slow: Climate Adaptation Failure Puts World at Risk* 50 (2022), <https://wedocs.unep.org/bitstream/handle/20.500.11822/41078/AGR2022.pdf?sequence=1&isAllowed=y> [<https://perma.cc/FV29-UNAS>].

⁹⁷ See, e.g., Law of Environmental Protection, *supra* note 48, § 24:39(B) ("The U.S. has yet to enact a pervasive regulatory scheme designed to cope with the effects of climate change, although, as discussed elsewhere in this chapter, there are certainly federal programs and laws that may be helpful in addressing climate change. Similar to other sovereign entities located in the United States, tribes too have enacted laws targeting climate change. Given that the federal government has yet to legislate pervasively in this area, the tribes' legal actions related to climate change are enacted under tribal inherent sovereignty and not a delegation of federal authority." (footnotes omitted)); Katherine Florey, *Making It Work: Tribal Innovation, State Reaction, and the Future of Tribes as Regulatory Laboratories*, 92 Wash. L. Rev. 713, 731–32 (2017); Wenona T. Singel, *The First Federalists*, 62 Drake L. Rev. 775, 840–42 (2014).

⁹⁸ See Norton-Smith et al., *supra* note 43, at 1.

⁹⁹ See *id.* at 81.

largely on the direct human health effects and does not specifically assess ecological conservation.¹⁰⁰

Remarkably, the Pacific Northwest Tribal Climate Change Project at the University of Oregon remains one of the only attempts to collect and make publicly available any tribal government documents related to climate change adaptation planning.¹⁰¹ Our synthesis identified sixty-eight documents from the Project that aim to help tribal communities adapt to a changing climate by assessing vulnerabilities and/or building adaptive capacity.¹⁰² This collection of climate adaptation plans is a valuable resource for assessing the public-facing documents of tribal governments. However, it is important to note that the collection may not be exhaustive and could have some biases.¹⁰³ Despite these limitations, the collection remains the best snapshot to date for understanding and assessing the efforts of tribal governments to adapt to climate change.

II. THE POTENTIAL GOVERNANCE CHALLENGES OF CLIMATE CHANGE ON TRIBAL LANDS

Considering the limitations of existing literature assessing climate change's effects on tribal ecological governance and tribal adaptation planning more generally, this Part explores how climate change raises significant challenges to tribal ecosystem governance. Evaluation of tribal ecosystem governance in light of climate change and ecological

¹⁰⁰ See Jantarasami, *supra* note 35, at 573.

¹⁰¹ Tribal Climate Change Guide: Adaptation Plans, *supra* note 93.

¹⁰² The Tribal Climate Change Project's database was last accessed on May 3, 2024. Reviewers of the climate adaptation plans read the documents associated with each submission from tribal entities and determined the presence/absence of considerations for species conservation, the goals proposed by tribes, how the tribe engages with decision-making, and changes to the structural organization that enables change. Particular attention was paid to chapters or sections within the plans dedicated to natural resource management, ecological systems, access to First Foods (i.e., culturally important species), and related topics that might encompass ecological conservation. Reviewers made note of funding sources and authorship of each document. The results from this analysis should be understood to be a limited representation of the wealth of information in each document. Further, assessments of Alaskan village climate adaptation plans should be understood to represent the priorities and specific governance challenges of Alaska Native Villages; the relationship of Alaska Native Corporations to tribal sovereignty and specifically ecological conservation is considerable and beyond the scope of our Article.

¹⁰³ For example, it omits tribal communities that are not federally recognized and are thus ineligible for federal funding. Additionally, the collection only includes public-facing documents and does not account for confidential adaptation planning or tribes that may not have the resources to create a referenceable adaptation plan.

adaptation illuminates valuable lessons for all sovereigns within the United States—tribes, states, and the federal government. Governance can best be understood as having substantive, procedural, and structural facets. As used here, “substantive governance” refers to the underlying goals and strategies of the management regime.¹⁰⁴ “Procedural governance” focuses on the characteristics of the process or processes used to decide among various potential substantive strategies for effectuating regulatory or management goals.¹⁰⁵ “Structural governance” refers to how authority is configured between the institutions charged with engaging in processes for achieving regulatory or management goals.¹⁰⁶ Each of these facets affects the legal system’s adaptive capacity to manage complexity and uncertainty.¹⁰⁷ As argued elsewhere, global climate change raises fundamental questions concerning how, or even if, prevailing Western structural, procedural, and substantive governance can effectively serve to protect and cultivate ecosystems and ecological resources.¹⁰⁸

As explored in this Part, in certain ways tribal governance regimes appear to be subject to similar challenges as other governance regimes for adapting to the current and increasingly convulsive effects of global climate change. Substantively, tribal governments are faced with difficult choices about how to adjust the goals of land management to manage climate change. Procedurally, they also face the challenges of better integrating adaptive management and meaningful public participation into their processes. In terms of structural governance, tribes may suffer under prevailing decentralized, fragmented, and uncoordinated conservation governance.

On the other hand, conservation management in some tribal governance contexts exhibits features that are distinctively favorable for managing uncertainty and adapting to climate change. Though largely overlooked by the climate change adaptation literature until now, this Part identifies how some longstanding features of the governance of tribal ecological lands offer significant advantages for promoting effective

¹⁰⁴ See Alejandro E. Camacho & Robert L. Glicksman, *Legal Adaptive Capacity: How Program Goals and Processes Shape Federal Land Adaptation to Climate Change*, 87 U. Colo. L. Rev. 711, 724–29 (2016) (defining the substantive components of legal adaptive capacity).

¹⁰⁵ See *id.* at 729–34 (defining the procedural components of legal adaptive capacity).

¹⁰⁶ Camacho & Glicksman, *supra* note 13, at 236–37 (distinguishing the structural components of legal adaptive capacity).

¹⁰⁷ See Camacho, *De- and Re-Constructing*, *supra* note 10, at 1626–27.

¹⁰⁸ Camacho, *In the Anthropocene*, *supra* note 10, at 301–03.

ecological adaptation. These include (1) substantive goals that are more congruent with promoting long-term ecological health; (2) processes that value adaptation, participation, and more holistic information gathering and analysis; and (3) decentralized institutions embedded in a larger federal infrastructure, which provides the opportunity to leverage the advantages of different institutions to perform different governance functions. To this end, this Part provides several examples where tribes are utilizing their inherent sovereignty¹⁰⁹ to address the negative effects of climate change in innovative ways.

A. Substantive

Like virtually all other jurisdictions, a fundamental issue that many tribal policymakers may be faced with is how to reconcile short-term economic interests, the preservation of tribal culture and spiritual values that might seek to promote historical fidelity or non-intervention, and the dynamically changing reality of climate change. Most natural resource laws in the United States and internationally focus on promoting some version of historical preservation, natural preservation, or sustained yield, with climate change highlighting the tension between these different objectives, as well as their potential incompatibility with promoting biodiversity and ecological health. In contrast, while many tribes have substantial commitments to promoting historical fidelity, most Indigenous people reject natural preservation's emphasis on untouched nature for the simple reason that they have interacted with natural systems from time immemorial. Finally, the focus on optimizing the yield of natural resources in a sustained yield framework is often augmented by a priority on maintaining a broader network of medicinal, ceremonial, sacred, and food species.

Inevitably, although perhaps disputed by some tribes, the conservation goals on tribal lands are not solely influenced by tribal law but invariably shaped by the network of federal and even state and local laws that affect ecological resources. Moreover, tribal governance practices reveal some of the tensions experienced by other authorities. Yet some forms of tribal resource management illustrate valuable strategies for promoting

¹⁰⁹ *Michigan v. Bay Mills Indian Cmty.*, 572 U.S. 782, 788 (2014) (“Indian tribes are ‘domestic dependent nations’ that exercise ‘inherent sovereign authority’” and are “subject to plenary control by Congress.” (quoting *Okla. Tax Comm’n v. Citizen Band Potawatomi Tribe of Okla.*, 498 U.S. 505, 509 (1991))).

ecological health in an increasingly dynamic world. In this regard, tribes can be valuable “laboratories” of experimentation from which other sovereigns engaged in climate-change-related work can learn.¹¹⁰

1. Historical Preservation

Many federal and state public land and wildlife laws and legal provisions in the United States focus primarily on promoting *historical preservation*.¹¹¹ These provisions typically seek to promote the preservation or restoration of preexisting resources, often tied (explicitly or implicitly) to a particular historical baseline.¹¹² This includes provisions in public land or endangered species statutes, regulations, and guidelines that focus on promoting historically native species,¹¹³ as well

¹¹⁰ For a discussion of the role of tribes as policy “laboratories,” see Elizabeth Kronk Warner & Jensen Lillquist, *Laboratories of the Future: Tribes and Rights of Nature*, 111 *Calif. L. Rev.* 325, 375–79 (2023). See generally Kronk Warner, *Justice Brandeis and Indian Country*, *supra* note 33.

¹¹¹ Camacho, *In the Anthropocene*, *supra* note 10, at 282; see also Robin Kundis Craig, “Stationarity Is Dead”—Long Live Transformation: Five Principles for Climate Change Adaptation Law, 34 *Harv. Env’t L. Rev.* 9, 17 (2010) (“[E]xisting environmental and natural resources laws are preservationist, grounded in the old stationarity framework that no longer reflects ecological realities.”).

¹¹² Camacho, *De- and Re-Constructing*, *supra* note 10, at 1602; Craig, *supra* note 111, at 32 (discussing how current laws seek either to preserve an ecosystem at historical baselines or reverse the human-induced change in the area to reestablish the historical baseline).

¹¹³ See, e.g., National Park Service Organic Act, 16 U.S.C. § 1 (“[The] purpose is to conserve the scenery and the natural and historic objects and the wild life therein . . . unimpaired for the enjoyment of future generations.”); 16 U.S.C. § 1532(6) (requiring under the Endangered Species Act that a species be “in danger of extinction throughout all or a significant portion of its range” for the species to be listed as “endangered”); 36 C.F.R. § 219.9 (2023) (stating in the Forest Service’s planning regulations that a key purpose is to “both maintain the diversity of plant and animal communities and [support] the persistence of most native species in the plan area”); Nat’l. Park Serv., U.S. Dept. of the Interior, *Management Policies* §§ 4.4.1.3, 4.4.2 (2006), https://www.nps.gov/subjects/policy/upload/MP_2006.pdf [<https://perma.cc/V5YT-US88>] (defining National Park Service management of “native species”—those species that historically occurred on “lands designated as units of the national park system”—and subjecting them to more regulatory protection); *id.* § 4.4.1 (“The National Park Service will maintain as parts of the natural ecosystems of parks all plants and animals native to park ecosystems.”); *id.* § 4.4.2.5 (“In altered plant communities managed for a specified purpose, plantings will consist of species that are native to the park or that are historically appropriate for the period or event commemorated.”); *id.* § 4.4.2.3 (“The Service will survey for, protect, and strive to recover all species native to national park system units that are listed under the Endangered Species Act. . . . [T]he Service will inventory other native species that are of special management concern to parks . . . and will manage them to maintain their natural distribution and abundance.”); *id.* § 4.4.1.2 (“The Service will strive to protect the full range of genetic types

as provisions or regimes such as invasive species laws that seek to prohibit or restrict non-native species.¹¹⁴

Similarly, some tribal communities have distinctive interests in historical preservation. These interests are linked to core spiritual, cultural, and relational connections to particular species, biotic communities, ecosystems, and/or landscapes.¹¹⁵ For example, during the legal controversy surrounding the Dakota Access Pipeline,¹¹⁶ the Tribes raised historical preservationist claims in favor of securing an emergency injunction to halt construction of the pipeline around the Lake Oahe area. The Tribes argued that an injunction was appropriate because the federal government failed to participate in adequate tribal consultations under the National Historic Preservation Act (“NHPA”) prior to approval of the pipeline near tribal lands: “The Tribe fears that construction of the pipeline . . . will destroy sites of cultural and historical significance [The Tribe asserts] principally that the [Army Corps of

(genotypes) of native plant and animal populations in the parks”); U.S. Fish & Wildlife Serv., Fish & Wildlife Service Manual, 601 FW 3.10(B)(1) (2001) (“The System’s focus is on native species and natural communities such as those found under historic conditions.”); U.S. Fish & Wildlife Serv., Fish & Wildlife Service Manual, 601 FW 1.9(A) (2006) (“The overarching goal of the Refuge System is to conserve a diversity of fish, wildlife, and plants and their habitats . . . with a focus on native species”); U.S. Fish & Wildlife Serv., Fish & Wildlife Service Manual, 701 FW 1.4(A) (1992) (“Natural Diversity: The number and relative abundance of indigenous species which would occur without human interference. . . . The attainment of natural diversity . . . should be an underlying consideration for all habitat and populations management activities.”).

¹¹⁴ Exec. Order No. 13,112, 3 C.F.R. 153, 159–64 (2000); see also Camacho & McLachlan, *supra* note 9, at 1–2 (discussing the effects of such regulatory regimes on species displaced by climate change across jurisdictions).

¹¹⁵ See Adrian Phillips, *The Nature of Cultural Landscapes—A Nature Conservation Perspective*, 23 *Landscape Rsch.* 21, 25–26 (1998) (discussing the Ifugoa people as a case study for ecosystems and their connections with historical preservation).

¹¹⁶ The Standing Rock Sioux and Cheyenne River Sioux Tribes opposed the construction of the Dakota Access Pipeline 0.5 miles north of the Standing Rock Sioux’s territory because of concerns that Pipeline construction would harm cultural and spiritual historic sites, as well as pollute the water relied upon by the Tribes. Kristen A. Carpenter & Angela R. Riley, *Standing Tall: The Sioux’s Battle Against a Dakota Oil Pipeline Is a Galvanizing Social Justice Movement for Native Americans*, *Slate* (Sept. 23, 2016, 1:30 PM), http://www.slate.com/articles/news_and_politics/jurisprudence/2016/09/why_the_sioux_battle_against_the_dakota_access_pipeline_is_such_a_big_deal.html; Ryan Goeckner, Sean M. Daley, Jordyn Gunville & Christine M. Daley, *Cheyenne River Sioux Traditions and Resistance to the Dakota Access Pipeline*, *Religion & Soc’y*, Sept. 2020, at 75, 77–84, <https://www.berghahnjournals.com/view/journals/religion-and-society/11/1/arrs110106.xml?ArticleBodyColorStyles=pdf-4278> [<https://perma.cc/5KZJ-4CEY>] (demonstrating how the opposition to the Dakota Access Pipeline for the Cheyenne River Sioux and other Lakota communities was rooted in cultural and spiritual traditions).

Engineers] flouted its duty to engage in tribal consultations under the National Historic Preservation Act (NHPA) and that irreparable harm will ensue.”¹¹⁷

Unfortunately, climate change is making, and is projected to increasingly make, the maintenance of historical conditions costly and even impossible for many species, biotic communities, ecosystems, and landscapes.¹¹⁸ Moreover, climate change is raising potential conflicts between promoting historical preservation and advancing biodiversity or other conceptions of long-term future ecological health.¹¹⁹ Like other authorities, tribal governments will need to reconcile interests in promoting historical conditions with advancing biodiversity in a changing climate.

Importantly, some tribal governments recognize through their tribal adaptation plans that climate change may require management strategies that reorient away from a primary focus on maintaining historical conditions toward an emphasis on promoting compatibility with foreseeable future ecological conditions.¹²⁰ For at least some of these tribes, the safeguarding of culturally relevant species may be the priority. Yet this goal need not focus on active management strategies that stubbornly try to maintain place-based historical practices regardless of changes in climatic conditions.

One compelling example of this is the Confederated Tribes of the Umatilla Indian Reservation (“CTUIR”), which utilized robust models of habitat suitability to determine that tribal lands are too diminished and will not support all of the ecosystems required to sustain all “First

¹¹⁷ *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng’rs*, 205 F. Supp. 3d 4, 7 (D.D.C. 2016).

¹¹⁸ See Camacho & McLachlan, *supra* note 9, at 1–2 (explaining that as the rate of climate change increases, displacement of species from their historical ranges will increase as well, posing challenges to species management schemes across geographical regions and governmental jurisdictions); Gretta T. Pecl et al., *Biodiversity Redistribution Under Climate Change: Impacts on Ecosystems and Human Well-Being*, 355 *Science* 1389, 1389 (2017) (“Even if greenhouse gas emissions stopped today, the responses required in human systems to adapt to the most serious effects of climate-driven species redistribution would be massive.”).

¹¹⁹ Camacho, *De-and Re-Constructing*, *supra* note 10, at 1601–02.

¹²⁰ See, e.g., Katy Bresette et al., *Great Lakes Indian Fish and Wildlife Comm’n, Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu* 41 (2019), <https://glifwc.org/ClimateChange/TribalAdaptationMenuV1.pdf> [<https://perma.cc/ZY9W-9WAN>] (encouraging the use of new mixes of “local beings” and “non-local beings” that are “expected to do well under future conditions”).

Foods”—native species that sustain subsistence and cultural needs.¹²¹ A key feature of the CTUIR adaptation plan is food sovereignty—securing access for tribal members to the long-term production of, harvest of, and access to First Foods—to support natural resource management and the continuity of cultural traditions.¹²² In recognizing the inability of tribal lands to support historical assemblages of First Foods,¹²³ the plan proposes a multifaceted approach to ensure access to these cultural resources. To facilitate the migration of First Foods, it first proposes modeling and mapping of potential new habitat ranges to be used in long-term management planning, securing future funding, and supplying evidence for regulatory and legal action.¹²⁴ It also suggests using these models to inform future plantings of First Foods in habitats potentially more hospitable under climate change.¹²⁵ It then seeks to enhance existing, and promote new, collaborations with community partners¹²⁶ to facilitate the exercise of treaty rights in the sustainable harvest of First Foods.¹²⁷

An adaptive Indigenous approach to shifting species composition under climate change can extend beyond utilitarian or consumptive goals. The Great Lakes Indian Fish and Wildlife Commission (“GLIFWC”) that represents eleven Ojibwe tribes in the upper Midwest United States, for instance, recognizes species as dynamic and evolving, rather than tethered solely to a historical or traditional past benchmark. Regarding shifts in species assemblages under climate change, GLIFWC proposes measures to “[e]stablish or encourage new mixes of local beings and/or bakaan ingoji ga-ondaadag (non-local beings) expected to do well under future conditions.”¹²⁸ This proactive approach demonstrates the evolution of

¹²¹ Eric Quaempts et al., *Confederated Tribes of the Umatilla Indian Reservation, CTUIR Climate Adaptation Plan 18*, 71–72 (2022), <https://ctuir.org/media/oaqh3v2a/ctuir-cap-final-2022-standard.pdf> [<https://perma.cc/C3UW-99XQ>]; Bryan A. Endress, Eric J. Quaempts & Shawn Steinmetz, *Confederated Tribes of the Umatilla Indian Rsrv. Dep’t of Nat. Res., First Foods Upland Vision 1* (2019), <https://ctuir.org/media/ez1g3wp1/ctuir-dnr-upland-vision-april-2019.pdf> [<https://perma.cc/K9CP-E27X>].

¹²² Quaempts et al., *supra* note 121, at 83–84.

¹²³ See *id.* at 71–72 (discussing the predicted decline in historical habitat suitability of certain First Foods due to climate change).

¹²⁴ *Id.* at 83.

¹²⁵ *Id.* at 88.

¹²⁶ *Id.* at 277–78.

¹²⁷ *Id.* at 89–90.

¹²⁸ Bresette et al., *supra* note 120, at 41.

Indigenous knowledge systems, which can serve to inform adaptive substantive strategies.

2. Natural or Wildness Preservation

Another common fundamental objective of U.S. federal and state conservation laws, *natural or wildness preservation*, is to emphasize preventing or minimizing human intervention in “natural” or wild lands.¹²⁹ Under a changing climate, prioritizing nonintervention can preclude active management strategies that optimize other adaptation objectives. In the United States, the Wilderness Act may be the closest embodiment of natural preservation, with its focus on protecting areas “untrammeled by man.”¹³⁰ However, natural preservation shows up in many public land, invasive species, and endangered species laws and guidelines through provisions that either seek to (1) promote or favor the “natural” movement of organisms, or (2) provide less protections or even restrictions on introduced organisms.¹³¹

The value of natural preservation, conceived as the absence of human intervention, is considered anathema to many Indigenous resource management regimes, a violation of the reciprocity and balance between human and nonhuman relatives prioritized in TEK,¹³² and even a component of the longstanding suppression of Indigenous power.¹³³

¹²⁹ See Alejandro E. Camacho, *Going the Way of the Dodo: De-Extinction, Dualisms, and Reframing Conservation*, 92 Wash. U. L. Rev. 849, 878 (2015) (describing natural-resources legal regimes focusing on avoiding or minimizing human intervention); see also Holly Doremus, *The Endangered Species Act: Static Law Meets Dynamic World*, 32 Wash. U. J.L. & Pol’y 175, 205–06 (2010) (same).

¹³⁰ The Wilderness Act, 16 U.S.C. § 1131(c); see also *id.* § 1131(a) (establishing “wilderness areas” to be “administered for the use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness”).

¹³¹ See Camacho, *De- and Re-Constructing*, *supra* note 10, at 1599–1600; see also The Lacey Act, 16 U.S.C. § 701 (calling for the protection of scarce natural birds and the regulation of foreign ones); Plant Protection Act, 7 U.S.C. §§ 7701, 7712 (providing for the promulgation of regulations designed to prevent the “spread of plant pests or noxious weeds”).

¹³² See Stults et al., *supra* note 57, at 15 (“In the experience of the Ojibwe, natural resources are cultural resources. There is no separation between how the bands manage a resource and how their culture endures: one is dependent on the other.”).

¹³³ See Michael-Shawn Fletcher, Rebecca Hamilton, Wolfram Dressler & Lisa Palmer, *Indigenous Knowledge and the Shackles of Wilderness*, 118 Proc. Nat’l Acad. Scis., Sept. 27, 2021, at 1, 5, <https://www.pnas.org/doi/epub/10.1073/pnas.2022218118> [<https://perma.cc/47YZ-BF94>] (“Despite sustained critique by Indigenous peoples, Indigenous scholars, and various others in the academe and civil society, the continued use of the wilderness moniker in conservation practice serves only to disempower Indigenous and local peoples and to

Many tribes, for centuries, have recognized that humans are inextricably a part of nature.¹³⁴ The myth of the Americas as a pristine untouched wilderness continued throughout history with a settler-colonialist framework, and “[t]he very notion of wilderness suggests that land never belonged to Indigenous peoples in the first place, or that they themselves were part of the landscape.”¹³⁵ This idea continues today in federal laws promoting natural preservation.¹³⁶

In contrast to the prioritization of wilderness common in federal, state, and local regulations, the nature/human duality is absent from every tribal climate adaptation plan we reviewed. Many tribal practices and adaptation plans focus on sustaining a subsistence economy or cultural practices that implicitly and explicitly reject Western conceptions of natural preservation, or at least reimagine “natural” preservation as not coterminous with human nonintervention.

Instead, many tribes implicitly, if not explicitly, accept that active resource management is not per se problematic.¹³⁷ Accordingly, they promote measures that advance traditional sustainable resource management as at least as natural as nonintervention management regimes.¹³⁸ The economies of many Alaskan native communities, for instance, depend on subsistence resources with a secondary cash overlay.¹³⁹ Indeed, certain federal laws such as the Alaska National

deceive non-Indigenous people into the false belief of a transcendent ‘nature’ free from the influence and active intervention of humans.”).

¹³⁴ What Is TEK?, Traditional Ecological Knowledge Lab: Or. State Univ. Coll. of Forestry, <https://tek.forestry.oregonstate.edu/what-tek> [<https://perma.cc/5GXW-RENZ>] (last visited Sept. 16, 2024) (“Intrinsic to TEK is the indigenous world view that humans are part of nature.”).

¹³⁵ Lauren Eichler & David Baumeister, *Settler Colonialism and the US Conservation Movement: Contesting Histories, Indigenizing Futures*, 24 *Ethics, Pol’y & Env’t* 209, 215 (2021).

¹³⁶ See, e.g., *The Wilderness Act*, 16 U.S.C. § 1131(c) (“A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.”).

¹³⁷ See Lucy Diekmann, Lee Panich & Chuck Striplen, *Native American Management and the Legacy of Working Landscapes in California: Western Landscapes Were Working Long Before Europeans Arrived*, 29 *Rangelands* 46, 48 (2007) (discussing the landscape management practices of the Native tribes of California, which involved both human intervention and natural processes).

¹³⁸ See *id.*

¹³⁹ See Emily Murray, Hal Shepherd & Jessica Ryan, *Norton Bay Inter-Tribal Watershed Council, Climate Adaptation and Action Plan for the Norton Bay Watershed, Alaska* 25 (Gwen Griffith, Toby Thaler, Todd Crossett & Ray Rasker eds., 2013), <https://www.cakex.org/sites/>

Interest Lands Conservation Act integrate a priority for subsistence uses on federal land and allow subsistence on national interest lands.¹⁴⁰ Other customary laws—informed by traditional knowledge including seasonality linked to migratory patterns, climate, and the quality of the products in the local area—guide residents’ access to subsistence practices.¹⁴¹

It is worth noting, however, that Indigenous resource management might be either congruent or in tension with the promotion of biodiversity and long-term ecological health.¹⁴² On the one hand, prioritization of certain formulations of biodiversity or ecological conservation may point to the employment of very active management strategies and/or the reshuffling of biota in ways that would notably change historical ecological communities and could thus de-emphasize historically and culturally significant species.¹⁴³ On the other hand, the promotion of biodiversity or long-term ecological health could also be understood as synonymous with cultural and spiritual practices that are promoted by Indigenous resource management. Some have argued that Indigenous peoples, over thousands of years, have developed a system of knowledge that nurtures biodiversity through their harmonious collaboration with ecological processes and their promotion of habitat complexity, resulting in enhanced habitat productivity.¹⁴⁴

default/files/documents/Norton-Bay-Watershed-Climate-Adaptation-Action-Plan_2013-Final_0.pdf [https://perma.cc/3FPN-5P7W] (“The majority of any [of the four] village[s] are not considered ‘employed’ but that does not account for their subsistence livelihood activities dependent upon local fish and wildlife.”).

¹⁴⁰ 16 U.S.C. § 3114.

¹⁴¹ Murray et al., *supra* note 139, at 30.

¹⁴² See Phillips, *supra* note 115, at 26–27 (calling attention to historical instances when Indigenous resource management was damaging to ecological health, including large-scale species extinctions in the Americas and Australia). But see, e.g., David J. Meltzer, *Overkill, Glacial History, and the Extinction of North America’s Ice Age Megafauna*, 117 *Proc. Nat’l Acad. Scis.* 28555, 28556 (2020) (questioning the validity of similar claims).

¹⁴³ One example of how tribes have worked against this trend to emphasize culturally important species is the Northwest Indian Fisheries Commission. See Berger, *supra* note 50, at 15 (“The Commission supports natural resources management for the twenty federally-recognized tribes in what is now western Washington. Founded to support salmon co-management, its mission has expanded . . . more broadly, to protect the habitat of the entire Puget Sound basin and coastal waters.” (footnote omitted)).

¹⁴⁴ See Schuster et al., *supra* note 41, at 4 (“[W]e interpret our results to indicate that Indigenous community land tenure practices may themselves result in higher species richness than random land areas and roughly equivalent species richness to protected areas.”).

3. Sustained Yield

The remaining fundamental goal of Western conservation law focuses on *sustained yield*—the maximization of long-term production of a certain desired species.¹⁴⁵ In the United States, some federal public lands, most notably national forests administered by the United States Forest Service, have been managed with a focus on timber production.¹⁴⁶ Other regulations focus on maintaining wildlife populations for game harvesting.¹⁴⁷

While not necessarily incongruent with certain operationalizations of the concept of ecological health, sustained yield as practiced by federal public land agencies has largely focused on maximizing the yield of a particular desired resource, such as a specific fish or timber species or set of species.¹⁴⁸ In this sense, federal sustained yield approaches could be characterized as tending not to emphasize more comprehensive forms of biodiversity or ecological function.¹⁴⁹ Agencies have implemented these laws to optimize certain consumptive uses, including timber harvesting, grazing, and mineral development.¹⁵⁰ As a result, federal and most state

¹⁴⁵ Camacho, De- and Re-Constructing, *supra* note 10, at 1612; 16 U.S.C. § 531(b) (“‘Sustained yield of the several products and services’ means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land.”)

¹⁴⁶ See 16 U.S.C. §§ 1600–87 (addressing timber and forest management on federal lands in the United States). The Organic Administration Act of 1897, 16 U.S.C. § 475, laid out the initial purposes for which national forests could be established (“[T]o improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States . . .”), and the Multiple-Use Sustained-Yield Act of 1960, 16 U.S.C. § 528, broadened the use objectives of the national forests to include “outdoor recreation, range, timber, watershed, and wildlife and fish purposes.”

¹⁴⁷ See Julie Lurman Joly, National Wildlife Refuges and Intensive Management in Alaska: Another Case for Preemption, 27 Alaska L. Rev. 27, 29 (2010) (“Alaska’s fish and wildlife management program, like most state wildlife programs, is geared toward providing hunting opportunities. . . . The intention of the program is to maintain a ‘sustained yield,’ which the statute defines as ‘the achievement and maintenance in perpetuity of the ability to support a high level of human harvest of game, subject to preferences among beneficial uses, on an annual or periodic basis.’” (emphasis omitted) (quoting Alaska Stat. § 16.05.255 (2008))).

¹⁴⁸ For example, the Magnuson-Stevens Fishery Conservation and Management Act similarly has dual purposes “to conserve and manage the fishery resources found off the coasts of the United States” and “promote domestic commercial and recreational fishing.” 16 U.S.C. § 1801(b)(1), (3).

¹⁴⁹ See Camacho, In the Anthropocene, *supra* note 10, at 283.

¹⁵⁰ E.g., *Sierra Club v. Morton*, 405 U.S. 727, 748 (1972) (Douglas, J., dissenting) (stating that the U.S. Forest Service “has been notorious for its alignment with lumber companies”);

sustained yield laws do not promote overall biodiversity or ecological health due to the narrow concentration on maximizing the continued economic productivity of one or a few resources.

In the face of climate change, sustained yield laws will become increasingly costly, if not impossible, to implement and execute.¹⁵¹ Because sustained yield focuses on the production of a narrow subset of resources, any regulations seeking to promote ecological health and biodiversity will be in contention with these management strategies.¹⁵²

Some tribal approaches similarly focus on maximizing the yield of particular species. For example, the bison management system (“BMS”) focuses on sustained yield.¹⁵³ BMS is a bison herd conservation and management system practiced by certain tribal communities and other public, private, and nongovernmental organizations.¹⁵⁴

On the other hand, many tribal lands involving consumption of resources are not managed to promote sustained yield, at least not as operationalized by federal public land laws.¹⁵⁵ Management rooted in TEK often prioritizes values other than maximal sustained yield. On the Menominee Reservation in Wisconsin, for instance, rather than adopting commercial standards for rotation age that support maximum sustained economic return or maximum sustained yield, the forest managers employ several policies that result in an economically prosperous industry and an ecologically rich forest.¹⁵⁶ These include long rotation ages, selective harvests, and long-term monitoring that have resulted in a forest that is

Kelly Nolen, *Residents at Risk: Wildlife and the Bureau of Land Management’s Planning Process*, 26 *Env’t L.* 771, 775–76 (1996) (describing why certain agencies have given greater weight to grazing and mining industries).

¹⁵¹ Camacho, *In the Anthropocene*, supra note 10, at 283.

¹⁵² Cf. Jan McDonald et al., *Adaptation Pathways for Conservation Law and Policy*, 10 *Wiley Interdisc. Revs.: Climate Change*, Sept. 26, 2018, at 1, 4–7, <https://wires.onlinelibrary.wiley.com/doi/10.1002/wcc.555> (describing how climate change will exacerbate the shortcomings of similar laws and practices in Australia).

¹⁵³ See Jeff M. Martin, Jill Zarestky, David D. Briske & Perry S. Barboza, *Vulnerability Assessment of the Multi-Sector North American Bison *Bison bison* Management System to Climate Change*, 3 *People & Nature* 711, 719 (2021) (explaining BMS and exploring changes needed to be undertaken by BMS in light of climate change in American grasslands).

¹⁵⁴ *Id.* at 712–13.

¹⁵⁵ Ronald L. Trosper, *Indigenous Influence on Forest Management on the Menominee Indian Reservation*, 249 *Forest Ecology & Mgmt.* 134, 138 (2007).

¹⁵⁶ *Id.* at 134, 136.

larger now than it historically was and one that still supports diverse ecosystems.¹⁵⁷

Further, TEK emphasizes a wide array of sacred, medicinal, and culturally important species, and also the relation of species to each other and to sacred sites.¹⁵⁸ In this context, “sustained yield” takes on a broader ecosystem meaning than in the dominant federal or state land law paradigm. Importantly, then, at least some of these diverse conceptions of “yield” appear to be much more congruent with the adaptive promotion of long-term ecological health in light of climate change.

B. Procedural

1. Prevailing Federal and State Procedural Governance

Conventional federal and state procedural governance—the processes used to effectuate substantive goals and decide among substantive conservation strategies—is problematic. As argued extensively in the climate adaptation literature,¹⁵⁹ there is a need to incorporate adaptive management, meaningful public participation and deliberative decision-making, and a reliance on the best available knowledge, including scientific data and relevant TEK.

First, most decision-making processes are “un-adaptive.”¹⁶⁰ Processes that allow policymakers to make incremental adjustments based on changed circumstances or new information (“back-end” decision-making processes)¹⁶¹ are better able to adjust to the uncertainties of climate change, but most federal and state processes emphasize “front-end” decision-making in the development of management and conservation

¹⁵⁷ Id. at 136 (“A number of indigenous ideas were able to achieve implementation on the Menominee reservation: cutting at a rate consistent with a concept of long term sustainability, maintenance of a large and old growing stock, selection cutting (also known as uneven aged management), long term monitoring, and subordination of a mill’s goals to the goals of forest management. Each of these contribute to sustainable forestry and are based on a land ethic.”).

¹⁵⁸ See Robin Wall Kimmerer, *Weaving Traditional Ecological Knowledge into Biological Education: A Call to Action*, 52 *BioScience* 432, 432–33 (2002); What Is TEK?, *supra* note 134 (giving examples of species emphasized by TEK).

¹⁵⁹ Camacho, *De-and Re-Constructing*, *supra* note 10, at 1635–36; Erika M. Zimmerman, *Valuing Traditional Ecological Knowledge: Incorporating the Experiences of Indigenous People into Global Climate Change Policies*, 13 *N.Y.U. Env’t L.J.* 803, 827 (2005); Camacho, *In the Anthropocene*, *supra* note 10, at 309–10.

¹⁶⁰ Camacho, *Adapting Governance*, *supra* note 65, at 25–26.

¹⁶¹ Robert L. Glicksman & Sidney A. Shapiro, *Improving Regulation Through Incremental Adjustment*, 52 *Kan. L. Rev.* 1179, 1179 (2004).

plans, permitting, and implementation.¹⁶² Most experiments in natural resource governance that have attempted to advance “adaptive management” have failed to incorporate systemic capacities to manage uncertainty—including processes that assemble and disseminate data on the ambient conditions, adopted strategies, and their effectiveness—or to create a “systemic framework for modifying adaptation strategies . . . over time.”¹⁶³ Current “procedural legal adaptive capacity” is especially ill-equipped to manage the “substantial uncertainties” associated with anthropogenic climate change.¹⁶⁴

Second, conventional governance of ecological resources tends to rely on relatively limited public participation and perfunctory integration of diverse perspectives throughout the regulatory and management process.¹⁶⁵ One particularly relevant concern for tribal governments in this vein is the longstanding limitations of tribal consultation in federal and state processes.¹⁶⁶ To be sure, the Biden Administration has taken significant steps to address this weakness, stating that it would prioritize “regular, meaningful, and robust consultation with Tribal Nations.”¹⁶⁷ The Department of the Interior released a plan for improving upon the status quo¹⁶⁸ and subsequently published two documents: one laying out

¹⁶² Robin Kundis Craig & J.B. Ruhl, *Designing Administrative Law for Adaptive Management*, 67 Vand. L. Rev. 1, 4 (2014).

¹⁶³ Camacho, *Adapting Governance*, *supra* note 65, at 60 (criticizing certain aspects of the EPA’s experiments with adaptive management).

¹⁶⁴ Camacho, *De-and Re-Constructing*, *supra* note 10, at 1613.

¹⁶⁵ See Michael Sant’Ambrogio & Glen Staszewski, *Public Engagement with Agency Rulemaking* 18–21 (2018) (discussing the shortcomings of federal notice-and-comment rulemaking).

¹⁶⁶ Elizabeth Kronk Warner, *Sovereignty Over Box Checking: Effective Tribal Consultations Leading to Consent*, 38 J. Land Use & Env’t L. 131, 133–41 (2023) (describing existing problems related to tribal and federal governments consultation).

¹⁶⁷ *Tribal Consultation and Strengthening Nation-to-Nation Relationships*, 86 Fed. Reg. 7491, 7491 (Jan. 29, 2021).

¹⁶⁸ U.S. Dep’t of the Interior, *A Detailed Plan for Improving Interior’s Implementation of E.O. 13175*, at 1 (2021), <https://www.doi.gov/sites/doi.gov/files/detailed-plan-for-improving-interiors-implementation-of-e.o.-13175-omb-submission.pdf> [https://perma.cc/YAQ9-MJHG]. This plan builds on a previous memorandum circulated on April 24, 1994. See generally *Government-to-Government Relations with Native American Tribal Governments*, 59 Fed. Reg. 22951 (May 4, 1994). The 1994 memorandum merely requires departments to consider tribal interests and does not create any rights upon which tribes could press for action. *Id.* Additionally, as with other documents discussed in this Article, the memorandum does not provide any details as to when or how consultations should occur. See *id.* The new Department of the Interior Plan is therefore a substantial improvement over past documents addressing effective tribal consultations, because the memorandum both acknowledges these past problems and indicates that the administration will provide greater clarity moving forward

its tribal consultation policy and establishing a Tribal Advisory Committee¹⁶⁹ and another on its procedures, which include early consultation, a presumption of tribal interest on resource impacts, a recognition that tribal interest may extend into traditional tribal homelands, and a goal of tribal consensus when the federal action impacts core tribal governmental interests.¹⁷⁰ These documents certainly suggest that the federal government is moving in the direction of adequate consultation with tribes, but they only bind one department and only until the next president comes into office. In a report released in August 2024, findings from consultations with tribes engaged in climate adaptation planning suggest that collaboration as well as communication, education, and outreach remain lacking, a barrier to effective tribal climate change adaptation efforts.¹⁷¹

Third, the neglect of, if not resistance to, the integration of community relates to a reliance on a narrow conception of knowledge and expertise. Particularly salient for tribal ecosystem governance is the longstanding critique of federal and state administrative conservation governance for failing to integrate other forms of knowledge, particularly TEK.¹⁷² TEK is “a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.”¹⁷³ Because tribes are “the original stewards of this land, tribes have been responding to historical extremes in the Americas for years,”¹⁷⁴ and thus many tribal communities possess a deep knowledge of the environment of traditional tribal

(which it did with the subsequent Departmental Manuals, see *infra* notes 169, 170). See U.S. Department of the Interior, *supra*, at 1, 7.

¹⁶⁹ U.S. Department of the Interior, *supra* note 67, at 2–3, 5.

¹⁷⁰ U.S. Department of the Interior, Departmental Manual No. 5138, Procedures for Consultation with Indian Tribes 1–2 (Nov. 30, 2022), https://www.doi.gov/sites/doi.gov/files/elips/documents/512-dm-5_2.pdf [<https://perma.cc/TC59-FYLJ>].

¹⁷¹ Ryan Hasert et al., Climate Adaptation Barriers and Needs Experienced by Northwest Coastal Tribes: Key Findings from Tribal Listening Sessions 2–3 (Aug. 2024), https://cig.uw.edu/wp-content/uploads/sites/2/2024/08/Adaptation-Barriers-NW-Coastal-Tribes_2024.pdf [<https://perma.cc/FK7F-PVRC>].

¹⁷² See, e.g., Anthony Moffa, Traditional Ecological Rulemaking, 35 *Stan. Env’t L.J.* 101, 103 (2016) (criticizing the failure of agencies to utilize TEK in policymaking).

¹⁷³ Berkes et al., *supra* note 69, at 1252.

¹⁷⁴ Elizabeth Kronk Warner & Heather Tanana, Heating Up: Climate Change Impacts on Tribal Communities (Part 1), *Env’t L. Inst.* (Aug. 2, 2021), <https://www.eli.org/vibrant-environment-blog/heating-climate-change-impacts-tribal-communities-part-1> [<https://perma.cc/K8Q7-M9U4>].

homelands. TEK is similar to Western science in its foundation in “empirical observation,” “pattern recognition,” and “critical evaluation” that creates a system of understanding “subject to modification as initial facts and assumptions are disproven or improved upon through additional experience or testing, both relying on repetition to validate an assumed fact.”¹⁷⁵ Because it is based on “close observation of small changes and the evolution of practical responses to those changes,” it is inherently a model of adaptive management that “can be expected to become more important as decisionmakers come to grips with the reality of climate change.”¹⁷⁶ TEK “has particular value in determining patterns of climate change for regions in which there are limited instrumental records. It can provide a broader picture of the impacts of climate change by putting scientific changes in the context of a human landscape.”¹⁷⁷

Some policymakers have advocated for integration of TEK into regulatory decision-making related to climate adaptation. Indeed, the Intergovernmental Panel on Climate Change highlighted the value of incorporating IK into adaptation planning,¹⁷⁸ and there is an increasingly pervasive sense that “TEK of the ‘extreme’ or ‘atypical’ can be used to increase predictability of current and future change.”¹⁷⁹ The Bureau of Indian Affairs,¹⁸⁰ Department of the Interior,¹⁸¹ and Department of Agriculture¹⁸² have supported integration of tribal knowledge into federal decision-making.¹⁸³ Despite this recognition, however, federal and state

¹⁷⁵ Kirsten Vinyeta & Kathy Lynn, U.S. Dep’t of Agric., Exploring the Role of Traditional Ecological Knowledge in Climate Change Initiatives 14 (2013), https://www.fs.usda.gov/pnw/pubs/pnw_gtr879.pdf [<https://perma.cc/JZ2R-CMYG>].

¹⁷⁶ Jacqueline P. Hand, Global Climate Change: A Serious Threat to Native American Lands and Culture, 38 Env’t L. Rep. 10329, 10333 (2008); see also Moffa, *supra* note 172, at 109 (suggesting that although policymakers have “been reluctant to fully embrace TEK,” “[t]he current state of the environment suggests that must change”).

¹⁷⁷ Clarence Alexander et al., Linking Indigenous and Scientific Knowledge of Climate Change, 61 BioScience 477, 477 (2011).

¹⁷⁸ Katherine Calvin et al., Intergovernmental Panel on Climate Change, Climate Change 2023: Synthesis Report 89 (Hoesung Lee & José Romero eds., 2023), https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf [<https://perma.cc/RQ4X-EJKP>].

¹⁷⁹ Vinyeta & Lynn, *supra* note 175, at 14.

¹⁸⁰ Jantarasami et al., *supra* note 35, at 588.

¹⁸¹ U.S. Department of the Interior, *supra* note 84.

¹⁸² Vinyeta & Lynn, *supra* note 175, at 13.

¹⁸³ See also Memorandum from Arati Prabhakar & Brenda Mallory, Exec. Off. of the President, to Heads of Fed. Dep’ts & Agencies, Guidance for Federal Departments and Agencies on Indigenous Knowledge 1–2 (Nov. 30, 2022) (recognizing the importance of

policymakers have long “been reluctant to fully embrace TEK as a substantive basis for decisions,”¹⁸⁴ and TEK is only beginning to be included in procedures designed to address the negative impacts of climate change.

2. Tribal Procedural Governance

Considering the rapidity of global climate change and the concomitant extent of uncertainty, some forms of tribal conservation governance exhibit procedural concerns similar to those raised by federal and state governance. However, procedural governance in at least some tribal communities offers different challenges—as well as opportunities—for climate change adaptation.

Undoubtedly, with additional resources, many Indigenous communities could better integrate ambient¹⁸⁵ and compliance monitoring,¹⁸⁶ as well as adaptive management, into their regulatory and management processes. Most governmental authorities tend to neglect monitoring,¹⁸⁷ and this is likely to be particularly acute for authorities with limited resources.¹⁸⁸ Yet some tribal communities have integrated longstanding practices that parallel Western best management

Indigenous knowledge and providing guidance to federal departments and agencies on how to apply it).

¹⁸⁴ Moffa, *supra* note 172, at 109.

¹⁸⁵ See Ambient Monitoring Technology Information Center (AMTIC), EPA (Mar. 6, 2024), <https://www.epa.gov/amtic> [<https://perma.cc/AG7G-5PP9>]; Jana B. Milford, Tribal Authority Under the Clean Air Act: How Is It Working?, 44 Nat. Res. J. 213, 239 (2004) (discussing difficulties tribes face in monitoring and compliance with the Clean Air Act and opportunities for improved information exchange across jurisdictions).

¹⁸⁶ See Tom et al., *supra* note 89, at 17 (“Enforcement and compliance to rules and regulations is lacking across the Navajo Nation because of the vast area of land. Limited resources, including enforcement personnel, leaves community leaders within each chapter the responsibility of enforcing rules and regulations.”). One study found that tribal communities were able to increase compliance with Clean Water Act regulations when tribal authorities were provided jurisdictional primacy over monitoring and enforcement. See Mellie Haider & Manuel P. Teodoro, Environmental Federalism in Indian Country: Sovereignty, Primacy, and Environmental Protection, 49 Pol’y Stud. J. 887, 904 (2021).

¹⁸⁷ Camacho, *Adapting Governance*, *supra* note 65, at 38.

¹⁸⁸ Tribes have identified obstacles to effective climate change adaptation, such as funding, workforce capacity, and technical assistance, that are all intimately tied to a lack of resources. See, e.g., Hasert et al., *supra* note 171, at 2–3.

practices,¹⁸⁹ including adaptive management.¹⁹⁰ Several of the publicly available tribal climate adaptation plans refer to themselves as “living document[s],” and incorporate adaptive management either implicitly or explicitly.¹⁹¹ Several plans require tribes to continually monitor, evaluate, and adjust their strategies in response to changing conditions and emerging knowledge.¹⁹²

Tribal governance also differs in degree, if not in kind, from federal and state processes with regard to the role of community participation. Though of course varying from jurisdiction to jurisdiction,¹⁹³ some tribal governance regimes rely on public participation opportunities that reflect those used in Western communities. Tribal procedural governance may be composed of initial community scoping meetings and opportunities for members of the tribal community to comment on proposed management

¹⁸⁹ See Dean B. Suagee, *Tribal Environmental Policy Acts and the Landscape of Environmental Law*, Nat. Res. & Env’t, Spring 2009, at 12, 12 (discussing tribal efforts to create “Tribal Environmental Policy Acts” which parallel the federal approach in the National Environmental Policy Act).

¹⁹⁰ See Christopher A. Armatas, Tyron J. Venn, Brooke B. McBride, Alan E. Watson & Steve J. Carver, *Opportunities to Utilize Traditional Phenological Knowledge to Support Adaptive Management of Social-Ecological Systems Vulnerable to Changes in Climate and Fire Regimes*, 21 *Ecology & Soc’y*, no. 1, 2016, at 1, 2–3, <https://www.ecologyandsociety.org/vol21/iss1/art16/> [<https://perma.cc/3ZLT-ZCRQ>] (discussing adaptive management and the combination of tribal conservation knowledge).

¹⁹¹ See, e.g., Bresette et al., *supra* note 120, at 16 (describing the commission’s Tribal Climate Adaptation Menu as a “living document”); Melanie Lambrick, *Tired of Being Told to ‘Adapt,’ an Indigenous Community Wrote Its Own Climate Action Plan*, *Grist* (Jan. 26, 2023), <https://grist.org/article/montana-flathead-reservation-indigenous-climate-plan/> [<https://perma.cc/EAD8-Z2UG>] (detailing an interview with a member of the Confederated Salish and Kootenai Tribes who described their Climate Change Strategic Plan as a “living document”); Yakama Nation, *Climate Adaptation Plan for the Territories of the Yakama Nation 3* (2016), <https://www.critfc.org/wp-content/uploads/2016/05/Yakama-Nation-Climate-Adaptation-Plan-.pdf> [<https://perma.cc/VQX3-NVAU>] (describing the plan as a “living document” that “will be revisited and adjusted over time to reflect new information, new understandings, and new priorities”).

¹⁹² See, e.g., Navajo Nation’s Air Pollution Prevention and Control Act, Navajo Nation Code Ann. tit. 4, §§ 1115, 1117 (2010) (providing direction as to how regions are to be originally classified for air pollution monitoring and how areas may be reclassified if conditions change); Navajo Nation Code Ann. tit. 4, §§ 901, 904 (2010) (establishing a Navajo Nation Environmental Policy Act and explicitly requiring that “[a]ll agencies, departments, enterprises and other instrumentalities of the Navajo Nation” review policies and methods for decision-making to be in compliance with the act).

¹⁹³ As there are 574 diverse federally recognized tribes, one obviously cannot generalize a single governmental process. See Indian Entities Recognized by and Eligible to Receive Services from the United States Bureau of Indian Affairs, 89 Fed. Reg. 944 (Jan. 8, 2024).

choices or strategies.¹⁹⁴ Indeed, publicly available tribal climate adaptation plans routinely provide for the integration of comment sessions, community fora, and interviews with elders to identify key areas of concern for tribal members. In some sense, these processes are not dissimilar to the relatively limited and perfunctory public comment processes provided under federal and state administrative procedures.¹⁹⁵ However, many tribes have adopted participatory processes that are more inclusive or deliberative, making concerted attempts to bring the community together to settle disputes.¹⁹⁶ The Confederated Tribes of the Umatilla Indian Reservation's plan, for example, calls for the organization and hosting of community listening sessions to "[d]evelop site or species-specific coordinated plans" for migration protocols of First Food species, as well as a broader program of capacity building for "stakeholder engagement in planning."¹⁹⁷ Many tribal climate adaptation plans also prioritize education and outreach initiatives.¹⁹⁸

¹⁹⁴ See, e.g., Saint Regis Mohawk Tribe Env't Div., Tribal Implementation Plan 8–9 (2004), https://web.archive.org/web/20181029141956/http://www.srmtenv.org/pdf_files/airtip.pdf [<http://perma.cc/6RUF-TTWZ>] (requiring opportunities for public comment on construction proposals which may increase emissions as well as on revisions to the Saint Regis Mohawk Tribe Tribal Implementation Plan of the Clean Air Act). The Plan was subsequently approved by the EPA. 72 Fed. Reg. 69618, 69618 (Dec. 10, 2007) (codified at 40 C.F.R. pt. 49); see also Gila River Indian Community Air Quality Management Program, GRIC Code, tit. 17, ch. 9, at 9 (2008) (requiring public comment and community feedback in the Gila River Indian Community Air Quality Management Program).

¹⁹⁵ Some tribes have adopted regulations incorporating environmental impact analysis similar to that of the federal government's NEPA. For example, six of the twenty-one federally recognized tribes located within the boundaries of Arizona have adopted NEPA-like provisions: the Ak-Chin Indian Community, Fort McDowell Yavapai, Fort Mojave Indian Tribe, Hopi Tribe, Hualapai Tribe, and the Kaibab Band of Paiute Indians. The other fifteen tribes surveyed either did not have EIS provisions, information was not publicly available, or the tribes were unable to respond by the time of publication. See Memorandum from Hailey Winn to Elizabeth Kronk Warner (Oct. 4, 2023) (on file with author) (detailing phone conversations with tribal representatives).

¹⁹⁶ See, e.g., Blackfeet Nation, Blackfeet Climate Change Adaptation Plan 28 (2018), https://bcapwebsite.files.wordpress.com/2018/04/bcap_final_4-11.pdf [<https://perma.cc/VGJ2-LVAZ>] (incorporating into their climate change adaptation plan "quotes and ideas from over 29 different community members of the Blackfeet Nation including Elders, Medicine People, Tribal Council members, educators, those working for tribal and non-tribal programs and agencies, ranchers and other community members, as well as young adults . . . to capture the range of perspectives and . . . let the voices of the people speak for themselves").

¹⁹⁷ Quaempts et al., *supra* note 121, at 88.

¹⁹⁸ See, e.g., Education & Outreach, Gila River Indian Cmty.: Dep't of Env't Quality, <https://www.gricdeq.org/education> [<https://perma.cc/9ZHX-4A8Y>] (last visited Sept. 8, 2024); see also Saint Regis Mohawk Tribe, Climate Change Adaptation Plan for Akwesasne 21, 26 (2013), <https://www.cakex.org/sites/default/files/documents/ClimateChange.pdf> [<https://perma.cc/9ZHX-4A8Y>]

Nonetheless, tribal procedural governance often is characterized by a markedly greater emphasis on community involvement and deliberation compared to federal and state processes. For instance, some of the publicly available tribal climate adaptation plans emphasized the need for a greater level of engagement than conventional Western administrative processes.¹⁹⁹ This includes writing poll results into their documents that demonstrate how many tribal members responded, from what communities, and what their concerns were.²⁰⁰ For at least some tribes, a process that fully integrates the community is consistent with historical norms, as they traditionally governed through the full community rather than individual representatives.²⁰¹

Finally, tribal governance in many communities seeks to accommodate conventional Western scientific approaches with TEK in the regulation and management of ecological resources. Perhaps unsurprisingly, many tribal climate adaptation plans integrate TEK as vital for informing decision-making related to climate adaptation.²⁰² Nearly all of the publicly available plans integrate TEK in adaptation planning across a spectrum from limited discussion to placing it as central to decision-making.²⁰³ Many of the publicly available tribal adaptation plans advocate for a synergistic approach which values both knowledge systems. For example, the Confederated Salish and Kootenai Tribes advocate for the utilization of TEK by non-Indigenous landowners and natural resource

[://perma.cc/B8TW-DA87](https://perma.cc/B8TW-DA87)] (including educational programs to pass down traditional knowledge of plant use and advocating for additional programming on “‘climate-smart’ agricultural practices that make Akwesasne’s farms and gardens more resilient in the face of climate change”); Blackfeet Nation, *supra* note 196, at 101 (describing a strategy to “[e]ngage with school districts” and develop community events to “educate and promote connectivity, climate change, [and] wildlife understanding”).

¹⁹⁹ Sicangu Climate Crisis Working Grp., Rosebud Sioux Tribe, A Climate Adaption Plan for the Sicangu Lakota Oyate 25 (2022), https://www.rosebudsiouxtribe-nsn.gov/files/ugd/ed1fef_53c3d954c1ef4c9d8d8ce441f58cb55c.pdf [<https://perma.cc/CL4U-P8TN>] (demonstrating the involvement of community in adaptation planning); Bresette et al., *supra* note 120, at 12–15 (detailing the importance of community engagement and respecting customary practices when engaging with community members).

²⁰⁰ Sicangu Climate Crisis Working Group, *supra* note 199, at 28–29.

²⁰¹ See Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 4.04[1], at 249 (explaining, for example, that many traditional Pueblo leaders would wait to act until “consensus was reached within the village”).

²⁰² See generally Hatfield et al., *supra* note 64 (analyzing TEK adaptations to climate change among the Confederated Salish Kootenai Tribes, the Confederated Tribes of Siletz Indians, the Paiute Shiwits Band, the Duckwater Shoshone, and the Quinault Indian Nation).

²⁰³ See, e.g., Saint Regis Mohawk Tribe, *supra* note 198, at 23; Blackfeet Nation, *supra* note 196, at 51.

managers.²⁰⁴ As a mechanism for addressing concerns that the application of TEK by non-Indigenous managers could serve to disempower Indigenous people, the authors of the Tribal Adaptation Menu include models for the exchange of traditional knowledge that emphasize principles of data sovereignty and free, prior, and informed consent.²⁰⁵

At the same time, tribal climate adaptation plans routinely include robust conventional scientific bases for engaging in substantial climate adaptation strategies.²⁰⁶ For instance, many adaptation plans deferred to best available science in the context of invasive species management.²⁰⁷ Many tribes identified tools created by state or federal agencies as best management practices for invasive species management and removal, especially when tribes must balance ecological impact with resource limitation.²⁰⁸ In fact, some tribes have identified the lack of conventional technical assistance and a workforce with appropriate scientific training as an obstacle to effective climate change adaptation planning.²⁰⁹

While more work exploring how to effectively integrate modern conservation science and TEK in natural resource decision-making processes is undoubtedly possible, at least some Native governments have successfully integrated Western science and TEK to the benefit of species being negatively affected by climate change. For example, First Nations in Canada, such as the Haida and Nuu-chah-nulth, have collaborated with

²⁰⁴ Confederated Salish & Kootenai Tribes of the Flathead Rsr., Climate Change Strategic Plan 27 (2016), <http://csktclimate.org/downloads/Climate%20Change%20Strategic%20Plan/CSKT%20Climate%20Change%20Adaptation%20Plan%204.14.16.pdf> [<https://perma.cc/636B-HBXV>] (“This summary is created as a guidance document to highlight the importance of Traditional Ecological Knowledge (TEK) in institutional science with the purpose of incorporating TEK as a resource tool for any and all agencies in natural resource management.”).

²⁰⁵ Bresette et al., *supra* note 120, at 10–15.

²⁰⁶ See generally Cent. Council of the Tlingit & Haida Indian Tribes of Alaska, Climate Change Adaptation Plan (2019), www.ccthita.org/services/community/environmental/documents/t&HClimateChangeAdaptationPlan.pdf [<https://perma.cc/BXG6-WM7W>] (analyzing data regarding changing climate conditions in order to identify and prioritize key areas of concern).

²⁰⁷ See, e.g., Bresette et al., *supra* note 120, at 30 (suggesting biological control methods for balancing the effects of *bakaan ingojiga-ondaadag* (non-local beings)).

²⁰⁸ See, e.g., K. Janes et al., Sierra Streams Inst., Bear River Watershed Restoration Plan 2018, at 40 (2018), <https://www.usbr.gov/watersmart/cwmp/docs/plans/SierraStreamsInstitut eWRP.pdf> [<https://perma.cc/976B-M8HH>] (“Restoration efforts are often limited by time and funding; therefore, the focus of invasive species control in the Bear River watershed should be on those posing the greatest threat to native ecosystems.”); see also Quaempts et al., *supra* note 121, at 84.

²⁰⁹ Hasert et al., *supra* note 171, at 2–3.

scientists and government agencies to monitor and manage fish populations.²¹⁰ The goal of these collaborations is to increase access to fisheries resources, improve resource management decisions using TEK, and build the capacity of Nations to act as resource managers.²¹¹

C. Structural

In addition to considering the substantive goals and strategies as well as the decisional processes, conservation governance also consists of the configuration of authority among institutions. This structural allocation of authority can be understood as involving three dimensions of authority: the extent to which government authority is (1) more or less centralized, (2) more or less overlapping, and (3) more or less coordinated.²¹² Each and every allocation of authority at least implicitly raises distinct policy tradeoffs along each of these different dimensions of authority.²¹³ In addition, different forms of coordination (such as mere communication, opportunities to comment, harmonization, and hierarchical coordination) can have different tradeoffs.²¹⁴ Moreover, each and every allocation of authority can be understood as involving jurisdiction over not only a substantive problem or resource (e.g., endangered species, wilderness) but also over a particular government function or set of functions (e.g., planning, information distribution, analysis of information, standard setting, implementation, and enforcement of those standards).²¹⁵ Together, these dimensional and functional facets of structural governance may be useful for mapping, understanding, and assessing existing authority across institutions.²¹⁶ In addition, this framework

²¹⁰ See, e.g., Fisheries (Uu-a-thluk), Nuu-chah-nulth Tribal Council, <https://nuuchahnulth.org/fisheries-uu-thluk> [<https://perma.cc/55XJ-V9PN>] (last visited Sept. 8, 2024); Russ Jones, Melissa Poe & Tayler Brown, Haida Marine Traditional Knowledge Summary: *iinang*—Herring 1 (2020), <https://repository.library.noaa.gov/view/noaa/39209> [<https://perma.cc/NS4V-W8FW>].

²¹¹ See Uu-a-thluk, Uu-a-thluk Strategic Plan: Building on Our Successes 2018–2023, at 7–11 (2018), <https://uuathluk.ca/wp-content/uploads/2018/03/Uu-a-thluk-Strategic-Plan-2018-2023.pdf> [<https://perma.cc/5JDU-APBS>].

²¹² See Camacho & Glicksman, *supra* note 13, at 32–49.

²¹³ *Id.* at 50 fig.2.5 (summarizing the different justifications for allocating authority at different ends of each dimension).

²¹⁴ See Jody Freeman & Jim Rossi, Agency Coordination in Shared Regulatory Space, 125 Harv. L. Rev. 1131, 1156 (2012).

²¹⁵ See Camacho & Glicksman, *supra* note 13, at 25, 26 fig.1.2 (listing categories of functional jurisdiction).

²¹⁶ See *id.* at 3; Freeman & Rossi, *supra* note 214, at 1137–38.

provides a method for identifying and adopting alternative configurations of authority that might be more effective at achieving identified management or regulatory objectives.²¹⁷

1. Tribes May Suffer Acutely Under Prevailing Conservation Governance

First, conservation governance in the United States is largely *decentralized*.²¹⁸ Much of ecological conservation is governed by municipal governments, state wildlife management agencies, various state land agencies, and tribal governments.²¹⁹ There is undoubtedly a more centralized federal presence, but even that is decentralized among various different agencies charged with invasive species management, endangered species management, and different forms of federal land management.²²⁰

As for the second dimension of the structural allocation of authority, conservation governance is a fragmented hodgepodge of at times

²¹⁷ Camacho & Glicksman, *supra* note 13, at 3.

²¹⁸ See Camacho, *De- and Re-Constructing*, *supra* note 10, at 1619 (describing the decentralized regulation of ecological resources, including land); see also Jacqueline Peel, Lee Godden & Rodney J. Keenan, *Climate Change Law in an Era of Multi-Level Governance*, 1 *Transnat'l Env't L.* 245, 275–76 (2012) (“In the adaptation context, the trend towards decentralized regulation has been justified as a response to the localized nature of adaptation challenges. . . . In federal countries that have been slow to take national action to address climate change, such as the US, particular states have taken the lead in developing climate change law and policy.”).

²¹⁹ See Kevin Gover & James B. Cooney, *Cooperation Between Tribes and States in Protecting the Environment*, *Nat. Res. & Env't*, Winter 1996, at 35, 35 (discussing the role of state and tribal entities in conservation and resource management); A. Dan Tarlock, *Local Government Protection of Biodiversity: What Is Its Niche?*, 60 *U. Chi. L. Rev.* 555, 561–62 (1993) (describing local governments’ substantial authority over species management); Daniel Press, Daniel F. Doak & Paul Steinberg, *The Role of Local Government in the Conservation of Rare Species*, 10 *Conservation Biology* 1538, 1546–47 (1996) (exploring local government capacity to implement species management mechanisms).

²²⁰ See Camacho, *De- and Re-Constructing*, *supra* note 10, at 1619 (“Even just a focus on federal land management shows decentralized authority over different lands by the USFS, BLM, NPS, and FWS, among others. In addition, each state has at least one land agency that manages actions on its respective state-owned land. . . . Baseline management authority of ecological resources in this largely place-based patchwork is fairly decentralized. . . .” (footnote omitted)); see also 16 U.S.C. § 1532(15) (defining Secretary); *id.* § 1533(d) (describing the duties of the Secretary to promulgate protective regulations); *id.* § 1538(a)(1)(G), (2)(E) (prohibiting the violation of regulations promulgated by the Secretary); 50 C.F.R. § 402.01(b) (2023) (“The U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS) share responsibilities for administering the [Endangered Species] Act.”).

overlapping and at times *distinct* authority.²²¹ Much of the aforementioned governmental authority at the local, state, tribal, and federal levels is overlapping.²²² For instance, tribal authority sometimes overlaps with that of various federal, state, and local wildlife management and land management agencies, including those authorized to advance endangered species protection.²²³ Yet tribes also exert fairly autonomous sovereign authority over other parts of wildlife management. A variety of federal laws²²⁴ and treaties²²⁵ recognize tribal sovereignty over wildlife.

²²¹ See Victor B. Flatt, *Adapting Laws for a Changing World: A Systematic Approach to Climate Change Adaptation*, 64 Fla. L. Rev. 269, 272 (2012) (“Institutionally, there is fragmented authority to manage natural resources. For example, a policy response to water availability changes may be difficult to accomplish because water resources management can be controlled by multiple federal agencies, such as the Environmental Protection Agency, the Fish and Wildlife Service, and the Army Corps of Engineers, as well as state and local governments.” (footnotes omitted)); see also 33 U.S.C. § 1251(d) (delegating authority to the federal Environmental Protection Agency to administer clean water regulations); Water Resources Development Act of 1976, Pub. L. No. 94-587, 90 Stat. 2917 (authorizing the Army Corps of Engineers to undertake water resources development projects across the United States); Anadromous Fish Conservation Act, 16 U.S.C. § 757(a) (authorizing the Secretary of the Interior to enter into cooperative agreements with the States and other non-federal interests for the conservation, development, and enhancement of anadromous fish, including those in the Great Lakes).

²²² Endangered species protections involve overlapping authority. See Camacho, De- and Re-Constructing, *supra* note 10, at 1620 (“Many states also have promulgated endangered species statutes that follow the general template of the federal ESA, though there are differences in the activities prohibited and allowed without a permit. This authority, administered by state wildlife agencies, overlaps with federal wildlife regulatory authority, as well as state and federal lands management.” (footnotes omitted)); see also Alejandro E. Camacho, Michael Robinson-Dorn, Asena Cansu Yildiz & Tara Teegarden, *Assessing State Laws and Resources for Endangered Species Protection*, 47 Env’t L. Rep. 10837, 10838, 10841 (2017) (comparing federal and state protections for endangered species).

²²³ See U.S. Dep’t of Interior, Secretarial Order: American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act 3–10 (June 5, 1997) [hereinafter Secretarial Order] (describing the overlap and coordination of authority between federal government agencies and tribes in endangered species conservation efforts).

²²⁴ See, e.g., 18 U.S.C. § 1165 (“Whoever, without lawful authority or permission, willfully and knowingly goes upon any land that belongs to any Indian or Indian tribe, band, or group and either are held by the United States in trust or are subject to a restriction against alienation imposed by the United States, or upon any lands of the United States that are reserved for Indian use, for the purpose of hunting, trapping, or fishing thereon, or for the removal of game, peltries, or fish therefrom, shall be fined under this title or imprisoned not more than ninety days, or both, and all game, fish, and peltries in his possession shall be forfeited.”).

²²⁵ See George Cameron Coggins & William Modrcin, *Native American Indians and Federal Wildlife Law*, 31 Stan. L. Rev. 375, 375–76 (1979) (describing how many tribes retain treaty rights for their members to hunt and fish on certain lands, and because “Indian treaties are federal law, the supremacy clause prevents the states from enacting wildlife laws that override treaty rights”); see also Mary Christina Wood, *The Tribal Property Right to Wildlife*

For example, the Makah Tribe reserved the right to harvest whales when it ceded its lands to the U.S. government in the 1855 Treaty of Neah Bay, and it “is the only tribe in the United States with explicitly protected rights to harvest marine mammals.”²²⁶ As a further example of tribal “exceptionalism” under federal law, tribes may choose to administer the federal environmental programs and standards through tribes-as-states (“TAS”) mechanisms.²²⁷ The TAS provisions of major federal environmental statutes, such as the Clean Water Act, allow tribes to act as states for the purpose of implementing the statute under the cooperative federalism scheme.²²⁸ Accordingly, tribes with TAS authority may find themselves acting to implement federal environmental standards in ways that accord with their tribal norms and customs.²²⁹

As detailed in the literature, this configuration of partially overlapping and partially distinct authority can lead to regulatory gaps, redundancies, and conflict.²³⁰ This fragmented system can be particularly harmful for biodiversity and ecosystems in tribal communities suffering from disproportionately acute access and resource limitations.²³¹ This is likely

Capital (Part I): Applying Principles of Sovereignty to Protect Imperiled Wildlife Populations, 37 Idaho L. Rev. 1, 76–77 (2000) (describing the federal trust relationship, how “[t]he federal government regularly acts as a trustee to protect tribal interests in natural resources,” and how the federal government’s authority to act as a trustee is derived from the “inter-sovereign relationship between the federal government and tribes”).

²²⁶ See Jonathan Scordino, Patrick Gearin, Merrill Gosh, Jeff Harris, Ambeer Klimek & John Calambokidis, Gray Whale Research in the Usual and Accustomed Fishing Grounds of the Makah Tribe 2 (2014), https://www.researchgate.net/profile/John-Calambokidis/publication/267684707_Gray_Whale_Research_in_the_Usual_and_Accustomed_Fishing_Grounds_of_the_Makah_Tribe/links/54a348490cf267bdb90430ce/Gray-Whale-Research-in-the-Usual-and-Accustomed-Fishing-Grounds-of-the-Makah-Tribe.pdf?_tp=eyJjb250ZXh0Ljlp7lmZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19 [https://perma.cc/RPD4-6V4K].

²²⁷ See Judith V. Royster, Michael C. Blumm & Elizabeth Ann Kronk, Native American Natural Resources Law 227–28 (2013).

²²⁸ *Id.*

²²⁹ For a discussion of TAS status in Indian country, see Kronk Warner, Tribes as Innovative Experimental “Laboratories,” *supra* note 33, at 844 (“In the context of tribal environmental laws adopted as a result of TAS status, tribes utilize the federal environmental laws as an initial starting point and then adapt such laws to incorporate tribal norms and values.”).

²³⁰ See Camacho & Glicksman, *supra* note 13, at 89–90; see also Freeman & Rossi, *supra* note 214, at 1134–35 (arguing that “fragmented and overlapping delegations of power to administrative agencies . . . produce redundancy, inefficiency, and gaps”).

²³¹ See, e.g., Margaret Hiza Redsteer et al., Unique Challenges Facing Southwestern Tribes, in *Assessment of Climate Change in the Southwest United States: A Report Prepared for the National Climate Assessment* 385, 386, 394–95 (Gregg Garfin et al. eds., 2013), https://swcca.r.arizona.edu/sites/default/files/2022-05/ACCSWUS_Ch17.pdf [https://perma.cc/ZYJ9-K7

to be particularly acute for the many tribes that are not federally recognized.²³²

Some tribes have raised concerns about the threat to tribal sovereignty presented by federal conservation laws such as the Endangered Species Act (“ESA”).²³³ Others assert that the federal application of the ESA in ways that preempt tribal management practices can serve to harm long-term ecological health rather than protect it. The Karuk Tribe’s draft Eco-Cultural Resources Management Plan, for instance, outlines the constellation of authority that influences how the Tribe manages land, natural, and cultural resources, including not only Indigenous rules and customs but also relevant federal statutes and executive orders.²³⁴ The Karuk Tribe laments that federal agency interpretations may have formally complied with federal laws such as the ESA but not their underlying goals, causing friction between federal and tribal governments.²³⁵ In particular, they reference the ESA process for conservation of the Northern Spotted Owl, asserting that the existing process fails to protect habitat connectivity and problematically prevents forest management activities that could reduce high intensity fires.²³⁶ In this sense, federal preemption may fail to leverage the expertise, diversity, and experimentation benefits of more localized tribal governance.

Third, existing governance in the United States also at best relies on limited interjurisdictional *coordination* across and within scales of

HW] (describing how resources for Southwestern Tribes are “already stretched to the limit” to address unique climate adaptation challenges, including water scarcity, “cultural and religious impacts,” and vulnerability to weather changes due to the location of most reservation lands).

²³² Cf. Rebecca M. Mitchell, *People of the Outside: The Environmental Impact of Federal Recognition of American Indian Nations*, 42 B.C. Env’t Affs. L. Rev. 507 (2015) (comparing the relative capacity of a federally recognized tribe (the Forest County Potawatomi Community) and a non-federally recognized tribe (the Duwamish) to advance their regions’ air and water quality); id. at 507 (“As long as the Bureau of Indian Affairs’ criteria for federal recognition continue to be arbitrarily and haphazardly enforced, unrecognized tribes like the Duwamish will continue to lack the power to address the environmental issues in their tribal region, in contravention of their fundamental beliefs and way of life.”).

²³³ See Steven K. Albert, *American Indian Perspectives on the Endangered Species Act*, 9 Buff. Env’t L.J. 175, 175–76 (2002) (“Over the years, there has been considerable debate, not always amicable, over the respective roles of the federal government and Tribes concerning endangered species management. Many Tribes view the Endangered Species Act (ESA), and its implementation on tribal lands, as a direct affront to tribal sovereignty.”).

²³⁴ Karuk Tribe Dep’t of Nat. Res., *Eco-Cultural Resources Management Plan 11–20* (2010) www.karuk.us/images/docs/dnr/ECRMP_6-15-10_doc.pdf [https://perma.cc/82ND-GWK8].

²³⁵ See id. at 13–14.

²³⁶ Id. at 14.

governmental authority.²³⁷ Certain federal laws and practices, such as the ESA, have been used to coordinate not only federal agencies but also the federal government and tribes.²³⁸ Yet most conservation management authority in the United States, whether more overlapping or distinct, remains largely uncoordinated.²³⁹

To be sure, some tribal governments may experience understandable reticence toward coordination with other governmental authorities in developing and implementing large-scale adaptation strategies. For example, the Sicangu Climate Crisis Working Group forecasts tensions related to water scarcity and advocates for expanding tribal control over water to ensure safe, clean, and reliable water for the Sicangu Lakota Oyate.²⁴⁰ These tensions underscore the obvious potential for conflict between sovereign governments over limited resources and the importance of attending to longstanding claims for restoration by tribal governments. Yet robust self-determination is not inconsistent with the development of mechanisms that promote coordination and even collaboration between governments.²⁴¹

²³⁷ Camacho, De- and Re-Constructing, *supra* note 10, at 1626–27.

²³⁸ See Secretarial Order, *supra* note 223, at 3 (“Except when determined necessary for investigative or prosecutorial law enforcement activities, or when otherwise provided in a federal-tribal agreement, the Departments, to the maximum extent practicable, shall obtain permission from tribes before knowingly entering Indian reservations and tribally-owned fee lands for purposes of ESA-related activities, and shall communicate as necessary with the appropriate tribal officials.”).

²³⁹ See, e.g., Freeman & Rossi, *supra* note 214, at 1148–49 (describing the potential challenges generated when the Fish and Wildlife Service has to attempt to coordinate with the Bureau of Land Management, the National Park Service, and Immigration and Customs Enforcement, all agencies which have “different and potentially incompatible primary missions,” to implement endangered species protections in border territories); see also R. Edward Grumbine, What Is Ecosystem Management?, 8 *Conservation Biology* 27, 29 (1994) (“Ecosystem management has not been uniformly defined or consistently applied by federal or state management agencies.”).

²⁴⁰ Sicangu Climate Crisis Working Group, *supra* note 199, at 40 (“The Sicangu Lakota Oyate’s access to Missouri River water is currently guaranteed by Congressional action. However, as climate change proceeds, and some areas of the country become less habitable, pressure on those with resources could increase. Several of these actions could bring the Rosebud Sioux Tribe into engagement with the US Congress as well as state and federal courts. For example, the Rosebud Sioux Tribe could implement the Tribal Water Code thereby asserting inherent sovereignty rights over water and challenging state primacy, and vigilantly guarding Missouri River access.”).

²⁴¹ See, e.g., *id.* at 43 (stating that a key goal of the Sicangu Climate Center would be to “[e]ventually cover and help unite all Oceti Sakowin Oyate lands, including the Black Hills”).

Indeed, tribes regularly identify problems from insufficient intergovernmental coordination in their adopted adaptation plans.²⁴² The Karuk Tribe, for instance, identifies in its adaptation plan genuine costs of failing to coordinate across jurisdictions:

In the absence of an overarching legal framework at the federal level, tribes face potential loss of acknowledgement of their jurisdiction if they are excluded from or cannot keep up with the multiple and rapidly changing dynamics between federal and local actors. Awareness and emphasis on federal tribal trust responsibilities—frequently overlooked in the best of times—are further lost in the midst of this new rapidly shifting policy terrain where the sense of crisis may be further impetus for their negation.²⁴³

A particularly significant coordination issue is how existing natural resource governance in the United States lacks an effective infrastructure for interjurisdictional learning.²⁴⁴ In other words, there is no “centralized or coordinated” (or even uncoordinated) “framework” for the generation, collection, and dissemination of information about, for instance, ambient ecological conditions, potential ecological effects, and management strategies and their effectiveness.²⁴⁵ This is most starkly evidenced by the fact that the closest thing to such an infrastructure for tribal adaptation planning may be the Tribal Climate Change Guide at the University of Oregon, which merely serves as a limited repository of some adaptation-related documents.²⁴⁶ A comprehensive learning infrastructure that prioritizes, funds, and incentivizes the generation, collection, and dissemination of information for policymakers may be key to leveraging the core expertise, diversity, and experimentation advantages of decentralized adaptation planning.²⁴⁷

²⁴² Hasert et al., *supra* note 171, at 2–3.

²⁴³ Kari Marie Norgaard et al., Karuk Tribe Dep’t of Nat. Res., Karuk Climate Adaptation Plan 204 (2019), https://www.karuk.us/images/docs/dnr/FINAL%20KARUK%20CLIMATE%20ADAPTATION%20PLAN_July2019.pdf [<https://perma.cc/5C3M-2DJC>].

²⁴⁴ Camacho, De- and Re-Constructing, *supra* note 10, at 1626–28 (describing the “lack of centralized or coordinated framework for generating, disseminating, or analyzing information about adopted management strategies” or “the efficacy of programs and government institutions”).

²⁴⁵ See *id.*

²⁴⁶ Tribal Climate Change Guide: Adaptation Plans, *supra* note 93.

²⁴⁷ Camacho, De- and Re-Constructing, *supra* note 10, at 1627 (“[O]pportunities for learning are wasted if there is no centralized or coordinated infrastructure for gathering and sharing such information more broadly.”).

The absence of an infrastructure for interjurisdictional learning through the coordination of information generation, collection, and dissemination was specifically mentioned in a number of tribal adaptation plans.²⁴⁸ In particular, some plans articulated the need for a data-sharing platform between Indigenous communities.²⁴⁹ Having a centralized or even just a coordinated platform for interjurisdictional learning would facilitate, if not encourage, collaboration between tribal, state, federal, and municipal governments and agencies. But it also would provide opportunities for governments to learn from the experiences of others about the efficacy of a much broader range of adaptation strategies in a wide range of contexts than any individual institution would learn on its own.

Critically, any coordinated effort will have to address the thorny issue of tribal data sovereignty.²⁵⁰ Tribes increasingly insist that detailed information about their land must stay within the control of the tribe.²⁵¹

²⁴⁸ E.g., Sicangu Climate Crisis Working Group, *supra* note 199, at 42 (“Federal and state government agencies compile and control an enormous amount of information about the Sicangu Lakota, and the Oyate often has to petition the agencies for access. Such data and information are scattered and unconnected, which often requires work to stitch together various information from different jurisdictions. This is especially true of county-level information, as the Rosebud Sioux Reservation lies within five counties.”); see also Michael Brubaker, James Berner, Jacob Bell, John Warren & Alicia Rolin, Alaska Native Tribal Health Consortium Ctr. for Climate and Health, *Climate Change in Point Hope, Alaska: Strategies for Community Health 10* (Aug. 2010), https://anthc.org/wp-content/uploads/2016/01/CC_H_AR_082010_Climate-Change-in-Point-Hope.pdf [<https://perma.cc/SEK6-FMG2>] (“Collaboration on a local observer program could provide a method of combining scientific measurements and traditional [ecological] knowledge for improved forecasting and climate change measures.”).

²⁴⁹ See, e.g., Brubaker, *supra* note 248, at 31 (calling for the establishment of a “community climate office” to “expand dialogue with other parts of Alaska and other Arctic regions experiencing similar climate impacts”); Quaempts et al., *supra* note 121, at 25 (“Tribes (especially those with federal recognition and a reservation land base like CTUIR) have the unique right to self-determination of their Nations, which includes the ability to set and enforce certain regulations. Information collection and analysis that centers Indigenous knowledge is essential to the maintenance of this ability. Working with other partners and Tribes can also support and expand this ability for the benefit of the CTUIR community and surrounding region.”). See generally Hepler & Kronk Warner, *supra* note 33 (discussing trends in tribal adaptation plans).

²⁵⁰ See, e.g., Bhiemie Williamson, Sam Provost & Cassandra Price, *Operationalising Indigenous Data Sovereignty in Environmental Research and Governance*, 2 *Env’t & Planning F* 281, 283–84 (2022) (discussing the development of “Indigenous data sovereignty” as a “response to poor data practices by governments, government agencies, researchers and research institutions” and the failure of these entities to collect “data that is valued by Indigenous peoples”).

²⁵¹ Raymond Lovett et al., *Good Data Practices for Indigenous Data Sovereignty and Governance*, in *Good Data* 26, 26 (Angela Daly, S. Kate Devitt & Monique Mann eds., 2019).

Further, much Indigenous knowledge about species and the land is linked to traditional, often sacred, information that tribes may not share with outsiders.²⁵² Once data sovereignty is acknowledged and safeguarded, many tribes may be willing to work in an integrated way with other institutions and jurisdictions.

2. Climate Change Exacerbates Existing Structural Conservation Governance Problems

Climate change undoubtedly tests the structural legal adaptive capacity in the United States. Though it has some advantages, the largely decentralized, fragmented, and uncoordinated legal infrastructure for managing and advancing conservation in the United States is not well constructed for managing the large-scale, cross-jurisdictional migration of biota exacerbated by global climate change.²⁵³ For instance, the “fragmented” “management and conservation of species is presently built on regulatory classification schemes that focus on the historical and/or existing ranges of species,” and emphasize protections for “native” species over “invasive” species.²⁵⁴ As climate change pushes species to occupy areas outside of their historical ranges, these classifications may be frustrated. A protected species in one jurisdiction may relocate to a region where it is considered a threat.²⁵⁵ Regulatory fragmentation in species conservation may also stand as a barrier to human-assisted species relocation, a process that may be necessary to the survival of certain species at risk of being outpaced by climate change.²⁵⁶ Some jurisdictions provide fewer protections and more regulatory resistance against human-introduced species.²⁵⁷ As a result, “active management intended to preserve a species might paradoxically lead to lowered protective status for that species.”²⁵⁸

²⁵² See, e.g., Coeur d’Alene Tribe of Idaho & the Univ. of Idaho, Protocol and Best Practice for the Research on and Public Distribution of Information from Projects Involving Indigenous Peoples 4 (2015), https://www.sqigwts.org/sites/default/files/Protocol%20Final%20Sqigwts%2010-30-15_0.pdf [<https://perma.cc/VRC3-PWUF>] (explaining that it is necessary to “[r]ecognize and honor that some knowledge and practice may be deemed too culturally sensitive to be shared publically”).

²⁵³ See Camacho & McLachlan, *supra* note 9, at 4–5.

²⁵⁴ *Id.* at 2.

²⁵⁵ *Id.* at 2–3.

²⁵⁶ *Id.* at 3–4.

²⁵⁷ *Id.* at 3.

²⁵⁸ *Id.*

3. *Tailoring Governance to Tap Distinctive Advantages of Tribes and Other Authorities*

Effective structural governance adaptation for climate change seeks to promote or enhance tribal sovereignty, not restrict it. As detailed in *Reorganizing Government*, policymakers and scholars at a minimum need to disaggregate the extent of centralization, coordination, and overlap in understanding existing allocations of authority.²⁵⁹ Different scales of authority have distinct advantages and disadvantages. More centralized allocations, for instance, can be particularly valuable at spreading costs, internalizing cross-border externalities, and promoting more uniform rules.²⁶⁰ Yet decentralized authority can leverage localized expertise, allow for diverse approaches tailored to particularized contexts, and provide opportunities for regulatory or management experimentation.²⁶¹ Similarly, the regulatory redundancy offered by overlapping authority can have the potential advantages of providing a regulatory safety net, institutionalizing resistance to agency capture, and combatting regulatory arbitrage.²⁶² Meanwhile, more distinct allocations can help “minimize compliance or agency administrative costs,” “limit the risk of conflicting regulation,” reduce the risk of overregulation, and lower regulatory commons risks.²⁶³ Coordinating authority can help regulators pool resources or expertise, reduce the potential for agency shirking or free-riding, help promote harmonization, and reduce risks of a race to the bottom.²⁶⁴ On the other hand, more independent authority has the advantages of serving to cut administrative costs from coordination,

²⁵⁹ Camacho & Glicksman, *supra* note 13, at 31–32, 52.

²⁶⁰ See Camacho, De- and Re-Constructing, *supra* note 10, at 1623; see also Freeman & Rossi, *supra* note 214, at 1150–51.

²⁶¹ Camacho, De- and Re-Constructing, *supra* note 10, at 1623.

²⁶² *Id.* at 1623–24; see also Freeman & Rossi, *supra* note 214, at 1186 (discussing how “greater coordination” across agencies with overlapping responsibilities can mitigate the risk of arbitrage or regulatory capture).

²⁶³ See Camacho, De- and Re-Constructing, *supra* note 10, at 1623–24; see also Freeman & Rossi, *supra* note 214, at 1182 (“[W]hile costs may rise in the short term, greater coordination could lower net transaction costs over time by enabling agencies to deal early on with problems that could later become more costly or intractable, including conflicting interpretations of legal requirements, vaguely specified program elements, and incompatible compliance requirements.”).

²⁶⁴ See Camacho, De- and Re-Constructing, *supra* note 10, at 1624; see also Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. Rev. 1495, 1555 (1999) (discussing how a lack of coordination among nations “at the global scale” risks “free riding, holdouts, and inefficient spending of limited resources”).

minimize opportunities for regulatory groupthink or collusion, promote any regulator competition benefits, and can reduce the risk of government inaction.²⁶⁵

Too often, policymakers and scholars conflate these different dimensions and/or the tradeoffs of allocating authority along these dimensions.²⁶⁶ They also fail to appreciate that the tradeoffs of allocating authority along each of these three dimensions will likely vary by governmental function.²⁶⁷ The tradeoffs of allocating more or less centralized authority are likely to differ for governmental funding, for instance, as compared to enforcement. By failing to make these distinctions, policymakers may develop structural configurations that are poorly designed to achieve identified regulatory or management goals.²⁶⁸ Relatedly, by tailoring allocations of authority along each of the three dimensions and differentiating allocations functionally, policymakers are more likely to be able to leverage public institutions in ways that tap their relative advantages and minimize their limitations.²⁶⁹

i. A Federal Opportunity to Promote Tribal Autonomy

Accordingly, effective structural adaptation strategies in the context of climate change are likely to involve tailored adjustments of authority to take advantage of different scales of governance. In terms of the extent of centralization, as conservation adaptation is directed at managing the effects of climate change on species and habitat ranges, assessments of adaptation strategies will typically involve substantial uncertainty, as well as contextual benefits and risks that are most acutely experienced at the local level.²⁷⁰ As such, in contrast with geoengineering²⁷¹ and climate mitigation governance (which focuses on reducing greenhouse gas emissions), climate adaptation (which focuses on preparing or managing the effects of climate change) will often benefit from the maintenance of primarily decentralized authority, particularly for planning, implementation, and information analysis functions.²⁷² Doing so can

²⁶⁵ Camacho & Glicksman, *supra* note 13, at 46–49.

²⁶⁶ Camacho, *De- and Re-Constructing*, *supra* note 10, at 1618.

²⁶⁷ *Id.*

²⁶⁸ See *id.* at 1634–35.

²⁶⁹ See *id.*

²⁷⁰ See *id.*

²⁷¹ Camacho & Glicksman, *supra* note 13, at 218.

²⁷² See Camacho, *De- and Re-Constructing*, *supra* note 10, at 1623.

better leverage the knowledge of tribal and other localized governments, as well as the diversity and experimentation benefits of decentralization.²⁷³

Nonetheless, strategic reallocations toward involvement of more centralized authority over limited governmental functions for which economies of scale, uniformity, and/or transboundary cost internalization are especially salient might serve to complement the otherwise decentralized structure. Establishing more federal funding and an information dissemination infrastructure, for instance, might effectively leverage economies of scale and promote uniformity advantages without compromising the broader advantages of a decentralized system, assuming a respect for tribal sovereignty.²⁷⁴ Concerns regarding interjurisdictional conflict over barriers to the migration of vulnerable species (or the spillover of invasive species across jurisdictions) suggest the need for federal involvement in planning and even implementation of adaptation strategies, even if just as a coordinating body.²⁷⁵ Because the federal government can assert itself over both states and tribes,²⁷⁶ federal intervention may be helpful to ensure that state or tribal jurisdictions do not erect barriers to effective species migration. Of course, any such federal intervention would need to comply with principles of tribal sovereignty and the federal trust relationship.

Particularly on funding, substantial increases in federal financial commitments in tribal conservation are vital for successful ecological

²⁷³ See *id.*

²⁷⁴ See Camacho & McLachlan, *supra* note 9, at 7; see also Freeman & Rossi, *supra* note 214, at 1210 (describing the benefits of enhanced interagency coordination including “improv[ing] the overall quality of decisionmaking by introducing multiple perspectives and specialized knowledge and structuring opportunities for agencies to test their information and ideas”).

²⁷⁵ Camacho, *De- and Re-Constructing*, *supra* note 10, at 1636–37.

²⁷⁶ While the U.S. Constitution does not apply to Indian country, the U.S. Supreme Court has held that the federal government has plenary authority over tribes. *United States v. Kagama*, 118 U.S. 375, 379–81, 383–84 (1886); *Santa Clara Pueblo v. Martinez*, 436 U.S. 49, 56 (1978) (“As separate sovereigns preexisting the Constitution, tribes have historically been regarded as unconstrained by those constitutional provisions framed specifically as limitations on federal or state authority.”).

adaptation.²⁷⁷ To date, federal law fails to provide tribes most of the resources available to states for funding wildlife management.²⁷⁸

Each year, the federal government gives states hundreds of millions of dollars collected in excise taxes on fishing and hunting gear. Tribes receive none of that money. Nor do tribes receive funds through the State Wildlife Grant Program, which distributes about a million dollars per state each year based on land area and population. The Tribal Wildlife Grant program, in contrast, is a competitive program awarding in total about \$9,000 per tribe per year, although several tribes manage land areas larger than many states. While some tribes have been able to generate funding through issuing their own hunting and fishing licenses, judicial restrictions on tribal regulatory jurisdiction make this impossible in many places. The resulting lack of “annual, sustainable funding” undermines tribes’ “ability to recruit and retain professional staff.”²⁷⁹

Moreover, while the federal government offers funding to local communities coping with climate change effects, tribal communities typically have been “less able to access [these resources] than other Americans.”²⁸⁰ “Individual households on Native lands are also less likely to get federal help girding for disasters. Of the 59,303 properties that have received FEMA grants since 1998 to prepare for disasters, just 48 were on tribal lands.”²⁸¹ In light of the substantial lack of resources for tribal human adaptation strategies such as relocation due to coastal erosion / sea level rise,²⁸² the absence of resources for ecological conservation is likely to be particularly acute.

²⁷⁷ Although beyond the scope of this Article, under certain circumstances the federal government may owe tribes a legal duty to assist where it has promised to do so under the federal trust responsibility. See Elizabeth Kronk Warner, Kathy Lynn & Kyle Whyte, *Changing Consultation*, 54 U.C. Davis L. Rev. 1127, 1138–39 (2020).

²⁷⁸ Berger, *supra* note 50, at 11.

²⁷⁹ *Id.* at 11–12 (footnotes omitted) (quoting Julie Thorstenson, *Diversity and Complexity of Tribal Fish and Wildlife Programs*, in *Wildlife Stewardship on Tribal Lands: Our Place Is in Our Soul* 12, 15 (Serra J. Hoagland & Steven Albert eds., 2023)).

²⁸⁰ Flavelle & Goodluck, *supra* note 49 (“‘We’re the most disproportionately impacted by climate, but we’re the very least funded,’ said Ann Marie Chischilly, executive director of the Institute for Tribal Environmental Professionals at Northern Arizona University.”).

²⁸¹ *Id.* (current through June 22, 2023).

²⁸² See Div. of Cmty. & Reg’l Affs., Alaska Dep’t of Com., Cmty. & Econ. Dev., *Relocation Report: Newtok to Mertarvik 2*, 8–9 (2011), https://www.commerce.alaska.gov/web/Portals/4/pub/Mertarvik_Relocation_Report_final.pdf [<https://perma.cc/GTR4-PCNG>] (identifying lack of infrastructure for climate refugees and strain on tribal organizations to find adequate

One of the most glaring barriers to tribal adaptation plan implementation is access to funding.²⁸³ Tribal climate adaptation plans contain projects that are ready to be enacted but often lack the necessary resources. In one plan, the authors recognized this disconnect and highlighted that, until recently, the federal government viewed implementation as a tribal responsibility.²⁸⁴ However, one limited but encouraging change to the federal Tribal Climate Resilience Annual Award solicitation introduced the implementation of climate adaptation and managed relocation plans as fundable categories for 2022.²⁸⁵ In late 2023, the Biden Administration also instituted a general federal process, in consultation with tribal governments, for identifying and recommending changes to address shortfalls in federal funding, linking these to the presidential budget process, and ordering federal agencies to streamline federal funding and support programs for tribal governments.²⁸⁶ Nonetheless, a considerably greater and more sustained federal commitment to funding will be needed to begin to promote effective ecological adaptation on tribal and other lands over the next several decades.

funding opportunities for tribal community relocation due to coastal erosion and sea level rise).

²⁸³ See Jantarasami et al., *supra* note 35, at 578 (“Funding limitations are often identified as a barrier to the planning or implementation of climate adaptation or mitigation actions, which suggests that increased economic revenues could create opportunities for tribes to choose to pursue climate actions.” (footnote omitted)).

²⁸⁴ Ute Mountain Ute Tribe, *Núchiú Ute Mountain Ute Tribe Climate Action Plan 47* (2020), <https://www.utemountainuteenvironmental.org/sites/umep/assets/PDF/UteMountainUteClimateActionPlan2020%202.pdf> [<https://perma.cc/5LUQ-LPQG>] (“The BIA Tribal Resilience Funding, which awarded the money for the UMU Tribe Vulnerability Assessment and this Climate Action Plan, does not fund the implementation of projects. It considers implementation of the Climate Action Plan to be the Tribe’s responsibility.”).

²⁸⁵ Branch of Tribal Climate Resilience, Bureau of Indian Affs., BIA TCR Annual Awards Program 2022 Frequently Asked Questions (FAQs), at 4 (2022), https://www.bia.gov/sites/default/files/dup/inline-files/awards_faq_2022_508.pdf [<https://perma.cc/2GQ7-A9VP>] (“Categories 10–13 are new additions for 2022—these Categories allow for Implementation Projects, Community-led Relocation Coordinators, and International ITEK Virtual Exchange.”).

²⁸⁶ Reforming Federal Funding and Support for Tribal Nations to Better Embrace Our Trust Responsibilities and Promote the Next Era of Tribal Self-Determination, 88 Fed. Reg. 86021 (Dec. 6, 2023).

ii. Largely Overlapping Authority with Distinct Federal and Tribal Roles

Of course, increased federal involvement in adaptation governance need not be at the expense of tribal or state authority. In limited instances, perhaps for information dissemination, minimizing inefficiencies by fully allocating distinct adaptation authority to the federal government may provide more advantages than any redundancy advantages of overlapping authority.²⁸⁷ This might take the form of a comprehensive, publicly accessible clearinghouse on, inter alia, vulnerability assessments, climate effects, modeling tools, adaptation strategies, and monitoring reports. Such an integrated clearinghouse would depend on resolving issues of data sovereignty.²⁸⁸ Complementarily, maintaining existing distinct tribal governmental authority over adaptation implementation may provide more advantages than any redundancy advantages of allowing for overlapping federal authority.²⁸⁹

However, for many functions, like planning, implementation, and enforcement, providing for some overlapping authority between tribal and federal governments in ecological adaptation might be a more effective accommodation of the economies of scale and uniformity advantages of centralization without sacrificing all the expertise, diversity, and experimentation advantages arising from decentralized authority. This reliance on the safety net of regulatory redundancies—increasing the chance that at least one authority addresses a climate-related problem—might make particular sense in light of the uncertainty and prospective irreversibility of harm to ecological resources that is

²⁸⁷ See, e.g., Camacho & McLachlan, *supra* note 9, at 7; cf. Rosina Bierbaum et al., A Comprehensive Review of Climate Adaptation in the United States: More than Before, but Less than Needed, 18 *Mitigation & Adaptation Strategies Glob. Change* 361, 369 (2013) (describing how federal agencies will be “particularly instrumental in facilitating climate adaptation” by disseminating information and best practices).

²⁸⁸ See *supra* note 250 and accompanying text.

²⁸⁹ Cf. Wood & Welcker, *supra* note 25, at 375 (advocating for an increased tribal conservation trust rule over aboriginal lands, stating, “By reclaiming a significant degree of sovereignty over natural lands, tribes can help arrest the hemorrhaging of natural systems brought about by federal and state trustee mismanagement of these assets”). Wood and Welcker also describe some of the advantages of tribal management, including site-specific expertise drawing on thousands of years of TEK, deep cultural and spiritual stewardship values, affirmative manipulation of natural conditions to produce resource abundance while promoting restoration, and system-based approaches that prioritize the health of the overall ecosystem. See *id.* at 377–86.

accompanying climate change.²⁹⁰ Yet even in these contexts, having overlapping authority but primacy to one institution (such as enforcement by tribal governments) may accommodate concerns regarding inefficiency and regulatory inaction²⁹¹ while leveraging both the redundancy advantages of overlap and the diversity and experimentation advantages of decentralization.

This type of overlapping jurisdiction is not unheard of in Indian country. For example, in criminal contexts, the federal government and tribes may both have authority over adjudication of a crime. Depending on the type of crime committed, the federal government may have criminal jurisdiction under the Major Crimes Act,²⁹² while the tribe possesses jurisdiction by virtue of its inherent sovereignty.²⁹³

iii. Tailored Coordination That Enhances Sovereignty

Finally, interjurisdictional coordination of adaptation, perhaps through mandates for harmonization between state and tribal sovereigns, might provide substantial advantages in managing cross-jurisdictional effects. As in other contexts,²⁹⁴ there is insufficient intergovernmental coordination directed at promoting effective ecological adaptation on tribal and adjacent lands.²⁹⁵ Intergovernmental coordination is particularly helpful in Indian country where multiple sovereigns may have civil regulatory authority within tribal territories. Tribal, federal, and

²⁹⁰ See Freeman & Rossi, *supra* note 214, at 1138–39, 1142 (describing the benefits of regulatory redundancies, including “insurance against a single agency’s failure,” reducing monitoring costs, and allowing the utilization of multiple agencies’ expertise to address complex issues).

²⁹¹ See William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 Iowa L. Rev. 1, 1, 23 (2003) (describing phenomenon of a “regulatory commons,” in which regulatory inaction occurs when there is coequal agency authority).

²⁹² 18 U.S.C. § 1153.

²⁹³ See generally *United States v. Wheeler*, 435 U.S. 313 (1978) (holding that both the federal government and tribal government can prosecute an individual because they are two separate sovereigns).

²⁹⁴ See Jeremy Rayner, Kathleen McNutt & Adam Wellstead, *Dispersed Capacity and Weak Coordination: The Challenge of Climate Change Adaptation in Canada’s Forest Policy Sector*, 30 Rev. Pol’y Rsch. 66, 70 (2013) (detailing poor intergovernmental coordination in forest management as a barrier to effective climate adaptation); Camacho, *Adapting Governance*, *supra* note 65, at 30–36 (discussing the weakness of place-based intergovernmental coordination mechanisms).

²⁹⁵ Cf. Bierbaum et al., *supra* note 287, at 393 (describing that research is needed to better understand how tribal groups “can be supported in reducing vulnerability and building adaptive capacity”).

state governments may all have regulatory authority in Indian country depending on the subject matter. It is common for confusion and uncertainty to arise in these circumstances. As mentioned above, tribes possess inherent authority over tribal lands, and tribal court authority has repeatedly been affirmed as to people and property interests.²⁹⁶ Tribal sovereignty persists unless it has been divested by Congress or the federal courts find implicit divestiture.²⁹⁷ Accordingly, in the realm of environmental law, tribes possess the capacity to regulate unless they have been divested.

In 1981, the U.S. Supreme Court held in *Montana v. United States* that tribal governments no longer had the authority to regulate non-Indians on non-Indian land within Indian country, unless one of two exceptions applied.²⁹⁸ The Court explained that the tribal government could only regulate where, first, a consensual agreement existed—such as where the non-Indian agreed to the regulation.²⁹⁹ Alternatively, the Court recognized that “[a] tribe may also retain inherent power to exercise civil authority over the conduct of non-Indians on fee lands within its reservation when that conduct threatens or has some direct effect on the political integrity, the economic security, or the health or welfare of the tribe.”³⁰⁰

However, tribes are not the only regulatory actors within Indian country. Federal statutes of general applicability have been applied to Indian country.³⁰¹ As a result, tribal governments may not use their inherent sovereignty in a way that conflicts with federal environmental statutes of general applicability. Several of these statutes have “Treatment as States” (“TAS”) provisions.³⁰² As the title suggests, tribal governments that have TAS status may therefore act like states and enact certain provisions in a cooperative federalism format. For example, under Section 303 of the Clean Water Act, tribes with TAS may establish the

²⁹⁶ See, e.g., *Santa Clara Pueblo v. Martinez*, 436 U.S. 49, 65 (1978).

²⁹⁷ Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 4.01[1][b], at 210 (“Tribes have plenary power and exclusive power over their members and their territory subject only to limitations imposed by federal law.”).

²⁹⁸ 450 U.S. 544, 565–67 (1981).

²⁹⁹ *Id.* at 565.

³⁰⁰ *Id.* at 566.

³⁰¹ *Donovan v. Coeur d’Alene Tribal Farm*, 751 F.2d 1113, 1115–16 (9th Cir. 1985) (explaining that federal laws of general applicability apply to tribes unless it is clear that Congress did not intend for them to apply to tribes).

³⁰² 42 U.S.C. § 7601(d) (Clean Air Act); 33 U.S.C. § 1377(e) (Clean Water Act).

designated water criteria for waters falling within their territories.³⁰³ Accordingly, the TAS provisions allow tribes to express their tribal environmental ethics through the federal environmental provisions. Yet TAS provisions are relatively limited and tribal governments must still comply with the federal mandates. If a tribe does not have TAS status (and most do not³⁰⁴), the EPA regulates within Indian country (except for Oklahoma, as explained below).³⁰⁵ Additionally, the federal government often has a role to play in Indian country as it holds land in naked fee simple for the benefit of tribes (i.e., land held in “trust”).³⁰⁶

Most states have limited environmental regulatory authority in Indian country.³⁰⁷ One significant exception is Oklahoma. Following the U.S. Supreme Court’s decision in *McGirt v. Oklahoma*, where the Court found that the Muscogee (Creek) Reservation had not been withdrawn by Congress,³⁰⁸ Oklahoma Governor Stitt applied for and the Trump Administration approved a request to allow Oklahoma environmental regulatory control in Indian country.³⁰⁹ But, in many other contexts, the courts have limited the intrusion of state environmental regulatory authority.³¹⁰

In light of this potential “checkerboard” of regulation by different sovereigns, federal policymakers and scholars have long called for

³⁰³ Clean Water Act § 303, 33 U.S.C. § 1313(c) (granting states standard-setting authority); 33 U.S.C. § 1377(e) (allowing treatment of tribes as States for the purposes of 33 U.S.C. § 1313).

³⁰⁴ Kronk Warner, Tribes as Innovative Environmental “Laboratories,” *supra* note 33, at 810–11.

³⁰⁵ See Robin Kundis Craig, Borders and Discharges: Regulation of Tribal Activities Under the Clean Water Act in States with NPDES Program Authority, 16 UCLA J. Env’t L. & Pol’y 1, 4, 9–13 (1997–1998) (explaining Clean Water Act’s statutory and regulatory sections granting EPA authority over Tribes).

³⁰⁶ Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 5.01[1], at 392.

³⁰⁷ *California v. Cabazon Band of Mission Indians*, 480 U.S. 202, 207 (1987) (explaining that states generally do not have the authority to enforce their laws on tribes unless Congress grants them the power). See generally *Worcester v. Georgia*, 31 U.S. (6 Pet.) 515 (1832) (holding that the laws of Georgia generally did not apply to Cherokee territory within the state because of tribal sovereignty and federal preemption).

³⁰⁸ *McGirt v. Oklahoma*, 140 S. Ct. 2452, 2482 (2020).

³⁰⁹ Sean Murphy, EPA Grants Stitt Request for State Oversight on Tribal Lands, Associated Press (Oct. 5, 2020, 7:01 PM), <https://apnews.com/article/754444e8b4887f4045c4604248142665> [<https://perma.cc/BSC9-ES7Q>].

³¹⁰ See *supra* note 31 (explaining that state laws generally do not apply in Indian country); Cohen’s Handbook of Federal Indian Law, *supra* note 14, § 6.01[1], at 499 (“Congress’s plenary authority over Indian affairs and the tradition of tribal autonomy in Indian country combine to preempt the operation of state law.”).

increased coordination to reduce the effects of fragmentation and promote information sharing.³¹¹ And some federal efforts have been developed for promoting interjurisdictional collaboration on information generation, dissemination, and planning.³¹² Despite these additional coordination mechanisms, existing governmental efforts largely neglect the role of tribal lands and governments in promoting effective ecological adaptation.

To be sure, a few ad hoc coordination mechanisms have been proposed or developed between tribal governments and either stakeholders or other public authorities. The Norton Bay Watershed Climate Adaptation and Action Plan, for example, identified eleven stakeholder categories “related to management of water resources within the Norton Bay Watershed” and recommended collaboration with these stakeholders in drafting adaptation policy.³¹³ Similarly, the Confederated Tribes of the Umatilla Indian Reservation (“CTUIR”) proposes active collaboration with public and private interests in surrounding areas to secure First Food harvest access for tribal members.³¹⁴ The CTUIR example is consistent with a trend of tribal climate adaptation plans calling for increased coordination between sovereigns.³¹⁵ Additionally, “several tribal adaptation plans call for collaboration between tribes, organizations, and disciplines to efficiently implement climate change adaptation

³¹¹ The White House Council on Env’t Quality, Progress Report of the Interagency Climate Change Adaptation Task Force: Recommended Actions in Support of a National Climate Change Adaptation Strategy 11, 26 (2010), <https://www.epa.gov/sites/default/files/2015-12/documents/interagency-climate-change-adaptation-progress-report.pdf> [<https://perma.cc/RZL5-ZFG2>]; Ryan Plummer, Can Adaptive Comanagement Help to Address the Challenges of Climate Change Adaptation?, 18 Ecology & Soc’y, no. 4, 2013, at 1, 2–3, <https://ecologyandsociety.org/vol18/iss4/art2/ES-2013-5699.pdf> [<https://perma.cc/PW88-7KLD>]; Alice Kaswan, Climate Adaption and Land Use Governance: The Vertical Axis, 39 Colum. J. Env’t L. 390, 437, 461 (2014); Hasert et al., *supra* note 171, at 2–3.

³¹² See, e.g., Global Change Research Act of 1990, 15 U.S.C. §§ 2921–61 (creating the U.S. Global Change Research Program, a federally funded climate research effort sponsored by over a dozen federal agencies); The White House Council on Environmental Quality, *supra* note 311, at 19–20 (detailing the now-disbanded Interagency Climate Change Adaptation Task Force, which served as a venue for federal agencies to communicate, brainstorm, and develop recommendations for the president on potential federal adaptation strategies); President Biden’s Historic Climate Agenda, White House, <https://www.whitehouse.gov/climate/> [<https://perma.cc/RR3H-7FFX>] (last visited Sept. 8, 2024) (describing the Biden Administration’s climate initiatives and listing the cross-agency membership of the National Climate Task Force).

³¹³ Norton Bay Inter-Tribal Watershed Council, *supra* note 139, at 64, 90–95.

³¹⁴ Quaempts et al., *supra* note 121, at 88–89.

³¹⁵ Hepler & Kronk Warner, *supra* note 33, at 11147.

policies.”³¹⁶ Tribes form partnerships with various governments (including federal agencies, state governments, and other tribes), universities, and professionals in specialties including biology, fire sciences, anthropology, and ecology. Such partnerships may be helpful to tribes because collaborative efforts provide a greater level of expertise and resources. As a result of more expertise and resources, adaptation strategies may be more effective. For example:

[The Menominee Indian Tribe] maintains an open-door policy of technical exchange with experts, resulting in cutting-edge forestry practices and new collaborations, including . . . [with] the Northern Institute of Applied Climate Science, and the U.S. Forest Service to reforest areas affected by oak wilt in a way that improved the forest’s ability to adapt to changing climate conditions.³¹⁷

Similarly, the Norton Bay Climate Adaptation and Action Plan calls for increased coordination through government-to-government collaboration:

The establishment of tribal environmental sovereignty and a government-to-government relationship with these federal agencies could redefine the trust relationship between native tribes and the federal government throughout the state in a manner that will, not only, strengthen tribal governments and their ability to protect subsistence resources and the health and welfare of their memberships, but will improve the integrity of tribal governing bodies and their economic, social political and jurisdictional base.³¹⁸

Yet, specific to ecological adaptation, the potential to promote more comprehensive and effective coordination on issues of both invasive and endangered species migration remains largely untapped. Indeed, some tribes call for coordination across scales of authority in their adaptation

³¹⁶ Id. States, too, have called for collaboration in their adaptation plans. See, e.g., State of Or., The Oregon Climate Change Adaptation Framework, at vi (2010), https://drought.unl.edu/archive/plans/Climate/state/OR_2010.pdf [<https://perma.cc/YA32-YQNL>] (“This framework is only an initial step; it by no means completes the work needed to fully implement these recommendations. Considerable work will be needed, especially in collaboration with Oregonians, local governments, Native American tribal governments, and federal agencies, to fully address climate risks to Oregon.”).

³¹⁷ Am. Soc’y of Adaptation Pros., Snapshot: Climate-Informed Reforestation on Menominee Indian Reservation 1 (2017), <https://adaptationprofessionals.org/wp-content/uploads/2020/01/MTE-Snapshot-8-10-17.pdf> [<https://perma.cc/ZUA4-LMQL>].

³¹⁸ Norton Bay Inter-Tribal Watershed Council, *supra* note 139, at 97.

plans.³¹⁹ Some tribes suggest that tribal governments are willing partners waiting for others to coordinate in good faith.³²⁰ Most tribal adaptation plans articulate the need for collaboration in adaptation actions with neighboring federal, state, and other tribal governments, as well as non-governmental organizations.³²¹ Some specifically tie particular management strategies to potential collaborations,³²² though others just reference prior collaborations and/or the need for future collaborations.³²³ The Karuk Tribe Climate Adaptation Plan emphasizes the value of collaborative decision-making to reach a heightened level of ecosystem restoration.³²⁴ They report, however, that communication from federal agencies like the U.S. Forest Service has been limited to “we have notified the Tribe and we have fulfilled our legal obligation.”³²⁵ In many cases, tribal governments are calling for federal, state, and county governments to be actively receptive in planning, policy making, and management activities.³²⁶

Though largely untapped for promoting climate change adaptation, federal and tribal governments have entered into co-management agreements that have the potential to lay the groundwork for collaborative management of ecological and cultural resources and thus better advance

³¹⁹ See, e.g., Yakama Nation, Climate Action Plan for the Territories of the Yakama Nation 16 (2019), https://www.critfc.org/wp-content/uploads/2021/05/YakamaNationCAP_2019-03-29.pdf [<https://perma.cc/R2F7-SXD9>]; see also Saint Regis Mohawk Tribe, *supra* note 198, at 19 (“The Saint Regis Mohawk Tribe has built partnerships with a number of groups in its efforts to restore its fisheries, such as the U.S. Geological Survey and the U.S. Fish and Wildlife Service. Such collaborative efforts have great potential to effectively restore the Tribe’s fish populations and render them more resilient to the impacts of climate change.”).

³²⁰ See, e.g., Division of Community and Regional Affairs, *supra* note 282, at ii (“While the agencies and individuals working on this project have done a remarkable job of coordinating their efforts, this success is more testimony to skills at sidestepping bureaucratic constraints than evidence of a well-organized government structure.”).

³²¹ See, e.g., Saint Regis Mohawk Tribe, *supra* note 198, at 19.

³²² E.g., Central Council of the Tlingit and Haida Indian Tribes of Alaska, *supra* note 206, at 28, 30, 32, 34–41 (providing a table listing necessary partnerships with different levels of government for each species conservation strategy in the plan); Janes et al., *supra* note 208 (listing “[p]otential [p]roject [p]artners” for various restoration efforts).

³²³ See, e.g., Inuit Tapiriit Kanatami, National Inuit Climate Change Strategy 28 (2019), https://www.itk.ca/wp-content/uploads/2019/06/ITK_Climate-Change-Strategy_English.pdf [<https://perma.cc/JQ49-CTRB>]; Erica Lujan et al., Adapting to Climate Change in the Middle Kuskokwim 50 (2021), <https://anthc.org/wp-content/uploads/2021/06/Middle-Kuskokwim-A-daptation-Plan.pdf> [<https://perma.cc/QKA2-PQHD>].

³²⁴ Norgaard et al., *supra* note 243, at 204, 207.

³²⁵ Karuk Tribe Department of Natural Resources, *supra* note 234, at 6–7.

³²⁶ *Id.* at 7.

conservation through mutual understanding and respect.³²⁷ In particular, the National Oceanic and Atmospheric Administration (“NOAA”) has developed a number of collaborative co-management agreements that put Indigenous management at the forefront of Alaskan fisheries.³²⁸ These agreements typically seek to promote monitoring, research, conservation, and subsistence use related to marine mammals by (1) delineating responsibilities for each party and (2) relying on a co-management council with equal federal and tribal representation that seeks to promote collaborative and adaptive decision-making.³²⁹ A report by the Marine Mammal Commission on these agreements, however, revealed that a number of these agreements were hamstrung due to limited federal agency trust, capacity-building, and funding,³³⁰ with looming climate change raising even further threats to subsistence use.³³¹ The U.S. Government Accountability Office also determined that some federal agencies lack the infrastructure for working with tribal governments on natural or cultural resource management.³³² The establishment and implementation of effective, collaborative, and adaptive long-term co-management agreements may be vital for managing ecological resources

³²⁷ See Kevin K. Washburn, *Facilitating Tribal Co-Management of Federal Public Lands*, 2022 *Wis. L. Rev.* 263, 268–69.

³²⁸ *Co-Management of Marine Mammals in Alaska*, NOAA Fisheries (Feb. 14, 2023), <https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/co-management-marine-mammals-alaska> [<https://perma.cc/NCB2-D7CF>].

³²⁹ See, e.g., The St. Paul Island Co-Management Council, *Co-Management Plan for Subsistence Use of Marine Mammals on St. Paul Island, Alaska*, at 2, 8–10 (2020), <https://media.fisheries.noaa.gov/2021-01/Co-Management-Plan-Subsistence-St-Paul-122220.pdf?null> [<https://perma.cc/B2KU-RXDG>]; *Cooperative Agreement Between the National Oceanic and Atmospheric Administration and the Alaska Eskimo Whaling Commission 2–7* (2019), <https://media.fisheries.noaa.gov/dam-migration/aewc-cooperative-agreement-0819.pdf> [<https://perma.cc/6ZDP-MXC2>].

³³⁰ There has been reluctance from federal agencies to allocate limited budgetary resources to support co-management agreements. Washburn, *supra* note 327, at 300–05; see also *id.* at 287 (reporting that tribes have been able to utilize federal funding more efficiently than federal agencies). Some have suggested specific legislation to direct federal agencies on how to accommodate these funding opportunities. Mariel J. Murray, *Cong. Rsch. Serv.*, R47563, *Tribal Co-Management of Federal Lands: Overview and Selected Issues for Congress 28–29* (2023), <https://crsreports.congress.gov/product/pdf/R/R47563> [<https://perma.cc/5C6S-PG83>].

³³¹ Marine Mammal Comm’n, *Review of Co-Management Efforts in Alaska 13–14* (2008), https://www.mmc.gov/wp-content/uploads/mmc_comgmt.pdf [<https://perma.cc/DL2E-PXFQ>].

³³² U.S. Gov’t Accountability Off., *GAO-19-22, Tribal Consultation: Additional Federal Actions Needed for Infrastructure Projects 55–56* (2019), <https://www.gao.gov/assets/d1922.pdf> [<https://perma.cc/8FK6-L4JQ>].

that are both threatened by climate change and likely to implicate tribal and federal authority. Indeed, independent of climate change adaptation planning, some have called for legislative action that requires a greater role for tribes in the administration of federal funds.³³³

Ultimately, the tradeoffs of more independent versus coordinated authority are likely to point to coordination, especially for certain governmental functions. In particular, an increased role for the federal government in coordinating the generation, collection, and dissemination of information and resources seems appropriate. There may be opportunities for intertribal organizations to play a similar role. Intertribal organizations may be able to realize the benefits of uniform coordination and the creation of repositories, while avoiding historical mistrust that exists between many tribes and other sovereigns.

Additionally, promoting or even mandating communication and cooperation over adaptation planning and standard setting may be valuable for limiting conflicting and counterproductive wildlife management strategies.³³⁴ For implementation and enforcement, coordination might include each authority agreeing to bind itself to implementing and/or enforcing the mutually agreed upon plans or standards. Inevitably, the coordination mechanisms will be contextual; our key points are that (1) coordination can take many forms, each with different tradeoffs and (2) that establishing or even requiring coordination may be more valuable for certain governmental functions but less so for others.

To this point, it is important to also acknowledge that wholesale coordination of every governmental function involved in ecological conservation is neither likely to be necessary nor worthwhile. In some circumstances, close coordination among agencies with intersecting jurisdictions might create unnecessary regulatory costs, vulnerabilities to groupthink, or lax interjurisdictional accountability as agencies adopt a more cooperative relationship with other regulators.³³⁵ In particular, the

³³³ The 30th Anniversary of Tribal Self-Governance: Successes in Self-Governance and an Outlook for the Next 30 Years: Hearing Before the S. Comm. on Indian Affs., 115th Cong. 2, 6 (2018) (statement of Melanie Benjamin, Chief Executive, Mille Lacs Tribe of Ojibwe).

³³⁴ See Bierbaum et al., *supra* note 287, at 392–93 (recommending fostering coordination and communication in environmental governance to better share knowledge across fragmented governing structures and stakeholders).

³³⁵ See Catrien Termeer et al., *Governance Arrangements for Adaptation to Climate Change*, Oxford Rsch. Encyc. of Climate Sci., Oct. 26, 2017, at 1, 13, <https://oxfordre.com/climate/science/display/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-601>

advantages of close cooperation are likely to be less evident for governmental functions such as information analysis, permitting, or even implementation.³³⁶ As such, tribal sovereignty over such governmental functions is likely to be particularly worthwhile.

CONCLUSION

In countless traditional Indigenous territories, species like the Alaskan caribou are already experiencing the harsh pressures of anthropogenic climate change, and the resulting existential threats to the communities who have relied on such species for cultural and subsistence purposes are likely only to increase in the coming decades. Indeed, across the world, climate change is already having significant effects on virtually every ecosystem, bringing increasingly volatile ecological changes and substantial uncertainty. These changes and uncertainty necessitate rethinking the goals, processes, and structures of conservation governance. Climate change illuminates the tensions between the various established Western objectives of conservation; raises fundamental questions about how to effectively cultivate participatory decision-making processes in ways that manage ecological and regulatory uncertainty; and exacerbates existing cross-jurisdictional challenges, such as transboundary cost externalization, regulatory commons risks, and conflicting management strategies.

This Article examines how these various fundamental stressors manifest in Indian country. In particular, we demonstrate the value of exploring the substantive, procedural, and structural aspects of governance. Yet we also recognize that this Article is merely an initial platform for advancing natural resource adaptation policy and scholarly research related to each of these components of governance.

Even with recognition of these distinctive aspects of tribal structural, substantive, and procedural governance, scholars and policymakers will need to wrestle with several more advanced, yet nonetheless fundamental, questions. From a procedural perspective, for instance, participatory mechanisms vary greatly among tribes, yet tribal commitments to more deliberative and adaptive processes are worth exploring, particularly to assess their effectiveness at accommodating the uncertainty posed by

?rskey=fu6lOD&result=2 (“[P]olicymakers must not try to connect everything to everything.”).

³³⁶ Camacho & Glicksman, *supra* note 13, at 74.

climate change. Though commitment to adaptive, deliberative decision-making is vital, developing effective mechanisms that achieve meaningful deliberation is far from easy. In addition, some tribal climate adaptation planning is likely to serve as valuable exemplar studies for accommodating TEK with Western science in decision-making—as well as for investigating the challenges (and perhaps limitations) of both TEK and Western science in managing the unprecedented uncertainty from climate change.

In terms of substantive goals and strategies, the tension of reconciling natural preservation with adaptive management is typically much less as compared to federal and state governance, with tribes appearing to uniformly consider active management to be a longstanding, acceptable, and indeed *natural* approach to species management. Yet tribes still will need to grapple internally—and in any collaborations with other institutions—with developing specific forward-looking guidance for managing the increasing climatic pressures. This includes moving away from historical preservation of longstanding ecological communities and accepting, embracing, and perhaps even actively promoting new species assemblages.³³⁷ Additionally, scholars as well as federal, state, and tribal officials may find it valuable to explore the many possible diverse approaches to “sustained yield” goals, including those that might more fully embrace broader conceptions more congruent with long-term ecological health.

In terms of structural governance, while tribes have long suffered under prevailing decentralized, fragmented, and uncoordinated conservation governance, there are advantages to (and thus opportunities from) vesting authority in decentralized institutions. This is especially the case in the context of climate change adaptation, with typically localized effects and expertise and the opportunity for experimentation and intergovernmental learning. As illustrated in this Article, tribal governments in particular are capable of developing creative solutions unavailable to jurisdictions that are more bureaucratically constrained. Considering the landscape-scale harm anticipated by climate change, intergovernmental learning and communication may be vital to protect biodiversity and ecological function. Yet such opportunities are too often not realized. A key

³³⁷ See generally Alejandro E. Camacho, *Assisted Migration: Redefining Nature and Natural Resource Law Under Climate Change*, 27 *Yale J. on Regul.* 171 (2010) (exploring the legal and ethical implications of moving species outside their native range to manage climate change).

challenge worth exploring is how tribes and neighboring land managers can share insights from Indigenous cultural practices and other strategies in a way that respects tribal prioritization of data sovereignty and privacy of cultural knowledge. Moreover, through funding and robust consultation and coordination that clearly acknowledge tribal sovereignty, there is the potential for the federal government or intergovernmental organizations to lead the development of such a learning infrastructure. Much more work is required by policymakers in every jurisdiction to make this happen, and scholarship studying emerging experiments in intergovernmental learning between tribes and other governments is vital. While these challenges may be daunting, the future of tribal communities—and indeed, all biotic communities—may depend on it.