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MEMORANDUM FOR HEADS OF FEDERAL DEPARTMENTS AND AGENCIES

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SUBJECT: Guidance for Federal Departments and Agencies on Indigenous Knowledge

I. Introduction

The Federal Government recognizes the valuable contributions of the Indigenous Knowledge¹ that Tribal Nations² and Indigenous Peoples³ have gained and passed down from generation to generation and the critical importance of ensuring that Federal departments and agencies' (Agencies) consideration and inclusion of Indigenous Knowledge is guided by respect for the sovereignty and self-determination of Tribal Nations; the Nation-to-Nation relationship between the United States and Tribal Nations and the United States' trust responsibility; and the need for the consent of and honest engagement with Tribal Nations and Indigenous Peoples. The White House Office of Science and Technology Policy (OSTP) and the Council on Environmental Quality (CEQ) issue this guidance to assist Agencies in (1) understanding Indigenous Knowledge, (2) growing and maintaining the mutually beneficial relationships with Tribal Nations and Indigenous Peoples needed to appropriately include Indigenous Knowledge, and (3) considering, including, and applying Indigenous Knowledge in Federal research, policies, and

¹ This guidance generally uses the phrase "Indigenous Knowledge," but recognizes that a variety of terms, including Traditional Ecological Knowledge, Traditional Knowledge, Indigenous Traditional Knowledge, Native Science, and related formulations, which are preferred by different Tribes and Indigenous Peoples. Those terms are used when referencing specific situations in which the relevant Tribes, Indigenous Peoples, or Federal decisionmaker has selected a different term.

² "Tribal Nation" or "Tribe" means an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges as a Federally recognized Tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 U.S.C. § 5130.

³ "Indigenous Peoples" refers to Native Americans, Alaska Natives, Native Hawaiians, Pacific Islanders, and Indigenous Peoples whose ancestors have occupied what is now known as the United States since time immemorial, including members of Tribal Nations.

decision making. This guidance also identifies promising practices—based on agency experience and Tribal and Indigenous input—for collaborating with Tribal Nations and Indigenous Peoples, considering and applying Indigenous Knowledge in implementing statutory and regulatory requirements, and respecting the decisions of Tribal Nations and Indigenous Peoples to engage or decline to participate in Federal processes, on their terms.

Since Indigenous Knowledge is often unique and specific to a Tribe or Indigenous People, and may exist in a variety of forms, Agencies often lack the expertise to appropriately consider and apply Indigenous Knowledge. As a result, consultation and collaboration with Tribal Nations and Indigenous Peoples is critical to ensuring that Indigenous Knowledge is considered and applied in a manner that respects Tribal sovereignty and achieves mutually beneficial outcomes for Tribal and Indigenous communities.

This guidance builds on other recent Federal efforts related to Indigenous Knowledge. Through Executive Order 14072 on *Strengthening the Nation’s Forests, Communities, and Local Economies*, President Biden established a policy to support indigenous traditional ecological knowledge and cultural and subsistence practices in our Nation’s forests. Through Executive Order 14049 on the *White House Initiative on Advancing Educational Equity, Excellence, and Economic Opportunity for Native Americans and Strengthening Tribal Colleges and Universities*, President Biden committed to promoting Indigenous learning through the use of traditional ecological knowledge. Through Executive Order 13990 on *Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis*, President Biden reestablished the Northern Bering Sea Climate Resilience Area and its associated Federal Task Force and Tribal Advisory Council, and recognized the value of traditional knowledge and participation by Alaska Native Tribal governments in decisions affecting the Northern Bering Sea Climate Resilience Area.⁴

Similarly, in the proclamation establishing the Bears Ears National Monument, former President Obama recognized that traditional ecological knowledge “offers critical insight into the historic and scientific significance of the area,” and is itself a resource to be protected.⁵ The proclamation also established a first-of-its-kind commission of Tribal Leaders to provide guidance to the Federal Government to ensure that “management decisions affecting the monument reflect Tribal expertise and traditional and historical knowledge.” When President Biden confirmed and restored the Bears Ears National Monument, he reestablished the Bears Ears Commission and reaffirmed the critical importance of traditional knowledge for managing the monument.

A number of Agencies have also recognized the importance of Indigenous Knowledge for their work. The Departments of Agriculture and the Interior and some of their individual bureaus and services, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the Advisory Council on Historic Preservation have issued agency-specific

⁴ See Appendix A (providing examples of Indigenous Knowledge application and collaboration between the Federal Government and tribes and indigenous peoples).

⁵ Presidential Proclamation 9558, Establishment of the Bears Ears National Monument, 82 Fed. Reg. 1139 (Jan. 5, 2017).

guidance on Indigenous Knowledge.⁶ The Fourth National Climate Assessment, prepared by the U.S. Global Change Research Program, also included Indigenous Knowledge.⁷ A number of Agencies have also co-managed a variety of natural resources with Tribes, and Indigenous Knowledge has shaped those processes as well.⁸ Recent efforts have been taken at the highest levels of the Federal Government to highlight the importance of Indigenous Knowledge to inform Federal decision making, improve outcomes, and foster collaboration with Tribal Nations. However, efforts to include Indigenous Knowledge in Federal work and to collaborate with Tribal Nations and Indigenous Peoples on Indigenous Knowledge have been uneven. This important work is too often dependent on the willingness, capacity, and Agency support of individual Federal employees.

To that end, and in response to the Biden-Harris Administration policies and initiatives referenced above, OSTP and CEQ issued a memorandum on November 15, 2021, recognizing Indigenous Knowledge as one of the many important bodies of knowledge that contributes to the scientific, technical, social, and economic advancements of the United States, and to our collective understanding of the natural world. OSTP and CEQ then convened an Interagency Working Group with representatives from more than 25 Federal departments and agencies.⁹ OSTP and CEQ also sought input from Tribal Nations and Indigenous Peoples through Tribal consultation and listening sessions,¹⁰ and engaged with more than a thousand individuals, organizations, and Tribal Nations.

This guidance builds upon that memorandum and is intended to promote and enable a Government-wide effort to improve the recognition and inclusion of Indigenous Knowledge. It reaffirms that Agencies should recognize and, as appropriate, apply Indigenous Knowledge in decision making, research, and policies across the Federal Government. This guidance is founded on the understanding that multiple lines of evidence or ways of knowing can lead to better-informed decision making. Agencies should use this guidance to develop an approach to Indigenous Knowledge that is appropriate for the contexts and legal frameworks in which they operate, the Tribes and Indigenous Peoples with whom they partner, and the communities that they serve.

⁶ See Appendix B (providing a selection of Federal agency guidance documents on Indigenous Knowledge).

⁷ USGCRP, 2018. *Tribes and Indigenous Peoples*. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment*. D. R. Reidmiller et al., eds. [hereafter “Fourth National Climate Assessment”], pp. 572–603, available at <https://nca2018.globalchange.gov/chapter/15/> (explaining how indigenous peoples can also be affected uniquely and disproportionately by climate change); see also Bharat H. Desai et al., 2021. *Role of Climate Change in Exacerbating Sexual and Gender-Based Violence against Women: A New Challenge for International Law*, Environmental Policy and Law 51, p. 142, available at https://www.un.org/sexualviolenceinconflict/wp-content/uploads/2021/10/report/role-of-climate-change-in-exacerbating-sexual-and-gender-based-violence-against-women-a-new-challenge-for-international-law/epl_2021_51-3_epl-51-3-epl210055_epl-51-epl210055.pdf;

⁸ See Appendix A (providing examples of Indigenous Knowledge application and collaboration between the Federal Government and tribes and indigenous peoples).

⁹ See Appendix D (providing a list of Federal departments and agencies that participated in the IWG).

¹⁰ See OSTP, CEQ (June 27, 2022). Press Release, Readout: OSTP and CEQ Initial Engagement on White House Indigenous Knowledge Effort, <https://www.whitehouse.gov/ostp/news-updates/2022/06/27/readout-ostp-and-ceq-initial-engagement-on-white-house-indigenous-knowledge-effort/> (providing a summary of consultation and engagement activities).

II. Overview of Indigenous Knowledge

This Section provides an overview of Indigenous Knowledge as a system of knowledge and its relationship to other systems of knowledge.

A. Understanding Indigenous Knowledge

Indigenous Knowledge is a body of observations, oral and written knowledge, innovations, practices, and beliefs developed by Tribes and Indigenous Peoples through interaction and experience with the environment.¹¹ It is applied to phenomena across biological, physical, social, cultural, and spiritual systems.¹² Indigenous Knowledge can be developed over millennia, continues to develop, and includes understanding based on evidence acquired through direct contact with the environment and long-term experiences, as well as extensive observations, lessons, and skills passed from generation to generation.¹³ Indigenous Knowledge is developed by Indigenous Peoples including, but not limited to, Tribal Nations, Native Americans, Alaska Natives, and Native Hawaiians. Each Tribe or Indigenous community has its own place-based body of knowledge that may overlap with that of other Tribes.

Indigenous Knowledge is based in ethical foundations often grounded in social, spiritual, cultural, and natural systems that are frequently intertwined and inseparable, offering a holistic perspective. Indigenous Knowledge is inherently heterogeneous due to the cultural, geographic, and socioeconomic differences from which it is derived, and is shaped by the Indigenous Peoples' understanding of their history and the surrounding environment. Indigenous Knowledge is unique to each group of Indigenous Peoples and each may elect to utilize different terminology or express it in different ways. Indigenous Knowledge is deeply connected to the Indigenous Peoples holding that knowledge.

B. Indigenous Knowledge as Evidence

Indigenous Knowledge is a valid form of evidence for inclusion in Federal policy, research and decision making. Indigenous Knowledge and other forms of knowledge do not depend on each other for validation, and each system can support the insights of the other. Indigenous Knowledge and non-Indigenous scientific methodologies share many common features. For example, they: (1) systematically understand and explain ways of knowing; (2) share attributes such as use of systematic observation, innovation, and verification through repetition; (3) are derived from direct contact with the environment and evolve over time in response to new inputs; (4) share the need to make sense of the world and the desire to conduct practical and curiosity-driven investigations; and (5) can use empirical approaches.

Indigenous Knowledge can provide accurate information, valuable insights, and effective practices that complement practices and knowledge derived from other approaches. For example,

¹¹ U.S. Fish & Wildlife Services, (Feb. 2011), *Traditional Ecological Knowledge for Application by Service Scientists*, <https://www.fws.gov/sites/default/files/documents/TEK-Fact-Sheet.pdf>; see also Inuit Circumpolar Council (2022). *Indigenous Knowledge*, <https://www.inuitcircumpolar.com/icc-activities/environment-sustainable-development/Indigenous-knowledge>.

¹² U.S. Fish & Wildlife Services (Feb. 2011), *Traditional Ecological Knowledge for Application by Service Scientists*, <https://www.fws.gov/sites/default/files/documents/TEK-Fact-Sheet.pdf>.

¹³ Id.

at times Indigenous Knowledge holders have observed early and accurate detection of environmental changes, such as interconnected patterns of species, signs of drought, or impacted water quality.¹⁴ Indigenous Knowledge and other forms of knowledge often provide complementary data and information. In some instances, discrepancies or contradictory data and information may arise. These conflicts do not necessarily indicate that the Indigenous Knowledge or other form of knowledge is in error. Rather, such instances should prompt Agencies to consider opening avenues of inquiry and understanding that would otherwise remain unexplored. Multiple ways of knowing or lines of evidence can improve research outcomes and improve decision making.

At times, Western science has been used as a tool to oppress Tribal Nations and Indigenous Peoples. Indigenous Peoples in the United States have experienced significant unethical health research abuses, including the use of genetic data and health records without their knowledge or consent.¹⁵ For example, the pseudoscience embodied in the eugenics movement, with the collaboration of scientists and medical providers, resulted in the forced sterilization of Indigenous women across the Nation.¹⁶ Indigenous Knowledge has also been historically marginalized in scientific communities and excluded from research and academic resources, funding, and other opportunities. Federal decisionmakers have also excluded Indigenous Knowledge from research and policy decisions. This marginalization has resulted from a lack of awareness, unfamiliarity and methodological dogma, and, too often, racism and imperialism.

Some Federal decisionmakers have taken strides to address these historical wrongs and elevate Indigenous Knowledge, but more work remains. This guidance provides considerations and practices to further the important work of ensuring that Agencies appropriately include Indigenous Knowledge, while respectfully working with the Tribes and Indigenous Peoples who hold it.

III. Illustrative List of Federal Statutes where Indigenous Knowledge May be Relevant

Where Federal statutes require Agencies to consider information and make informed decisions, Agencies should consult and collaborate with Tribal Nations and Indigenous Peoples to include Indigenous Knowledge in decision making. The following non-exhaustive list includes examples drawn from environmental and natural resources law, contexts in which Agencies make decisions with Tribal or Indigenous implications, and have opportunities to include Indigenous Knowledge to inform those decisions. Section V of this guidance discusses other Federal statutes focused on vetting the quality of information that may inform Federal decision making in these statutory contexts.

¹⁴ E.g., Fourth National Climate Assessment, 383-84; Karletta Chief et al., (2016). *Engaging Southwestern Tribes in Sustainable Water Resources Topics and Management*, 8 Water 1; George Noongwook et al., (2007). *Traditional Knowledge of the Bowhead Whale (Balaena Mysticus) Around St. Lawrence Island, Alaska*, 60 Arctic 47.

¹⁵ Malcolm B. Bowekaty & Dena S. Davis, (2003). *Cultural Issues in Genetic Research with American Indian and Alaskan Native People*, 25 Ethics & Res. 12; Max Liboiron, (2021). *Decolonizing Geoscience Requires More than Equity and Inclusion*, 14 Nature Geoscience 876; Nanibaa' A. Garrison, (2010). *Genomic Justice for Native Americans: Impacts of the Havasupai Case on Genetic Research*, 38 Am. J. Of Med. Genetics 7; Kim Tallbear (2013). *Native American DNA: Tribal Belonging and the False Promise of Genetic Science*, U Minnesota Press.

¹⁶ Gregory W. Ruteck (2011). *Forced Sterilization of Native Americans: Later Twentieth Century Physician Cooperation with National Eugenic Policies?*, 27 Ethics & Med. 33, 34-35.

*Endangered Species Act.*¹⁷ The Endangered Species Act requires Agencies to use science and evidence to make decisions such as listing and delisting endangered species, developing biological opinions, and designating critical habitat for species protection. Specifically, the Act requires that Secretaries of the Interior and Commerce make critical habitat and listing determinations based on the “best scientific and commercial data available.”¹⁸ In many instances, Tribes and Indigenous Peoples may have relevant information about species locations, behaviors, habitats, and changes over time that can be applied.

*National Environmental Policy Act.*¹⁹ The National Environmental Policy Act (NEPA) requires Agencies to analyze, consider, and disclose the effects of major Federal actions on the human environment. CEQ’s implementing regulations also direct Agencies to “make use of any reliable data sources” in carrying out their responsibilities under NEPA.²⁰ Through the NEPA process, Agencies often engage with affected communities to inform the assessment of environmental effects. Agencies should recognize that Tribes and Indigenous Peoples hold relevant information and perspectives regarding the environment, and Indigenous Knowledge can inform Agencies’ environmental analysis. Tribes and Indigenous communities may have special expertise with respect to environmental and community impacts, informed by Indigenous Knowledge. Tribes can play a key role in the NEPA process as a cooperating or participating agency. Common circumstances in which Indigenous Knowledge may arise include environmental reviews of resource management plans, forest plans, energy resource lease sales, and other Federal authorizations regarding the use of public lands.

*Marine Mammal Protection Act.*²¹ The Marine Mammal Protection Act (MMPA) establishes a national policy to prevent marine mammal species and population stocks from declining to the point where they cease to be significant functioning parts of healthy and stable ecosystems.²² Section 119 of the MMPA authorizes the Departments of the Interior and Commerce to enter into cooperative agreements with Alaska Native Organizations, to conserve marine mammal populations, and to allow for the co-management of subsistence uses.²³ Through these agreements, Agencies can work with Tribal Nations and Indigenous Peoples to include Indigenous Knowledge in Federal policy decisions regarding conservation and management of marine mammals.

*Magnuson-Stevens Fishery Conservation and Management Act.*²⁴ The Magnuson-Stevens Fishery Conservation and Management Act (MSA) is the primary law governing marine fisheries management in United States Federal waters. Under the MSA, fishery conservation and management measures must, among other things, prevent overfishing while allowing use of and

¹⁷ 16 U.S.C. §§ 1531-44.

¹⁸ 16 U.S.C. §§ 1533(b)(1), (2).

¹⁹ 42 U.S.C. §§ 4321, *et seq.*

²⁰ 40 C.F.R. § 1502.23.

²¹ Pub L. No. 92-522, 86 Stat. 1027 (codified in Title 16 of the U.S. Code).

²² 16 U.S.C. § 1361.

²³ 16 U.S.C. § 1388(a).

²⁴ Pub. L. No. 94-265, 90 Stat. 331 (codified in Title 16 of the U.S. Code).

access to fishery resources.²⁵ These measures must be based upon the best scientific information available., Management measures must also account for the importance of fishery resources to fishing communities and provide for their sustained access to those resources.²⁶ The MSA allows for many sources of information, including Indigenous Knowledge, to be considered in fisheries management through various opportunities for public engagement, including from Indigenous Peoples and Tribes.²⁷ The MSA also establishes eight regional fishery management councils,²⁸ and the National Marine Fisheries Service (NMFS) manages fisheries in coordination with these councils.²⁹ The MSA explicitly reserves a seat for Tribes on one of the eight regional councils, the Pacific Fishery Management Council (Pacific Council).³⁰ Tribal representatives are appointed to the Pacific Council by the Secretary of Commerce from submissions by Tribal governments.³¹

*National Historic Preservation Act.*³² The National Historic Preservation Act (NHPA) acknowledges the importance of preserving our Nation’s diverse heritage and directs Agencies to act as responsible stewards of historic properties, including those of religious and cultural significance to Tribal Nations and Native Hawaiian organizations (NHO). Section 106 of the NHPA establishes a process to ensure that Agencies take into account the effects of projects they carry out, license, or assist on historic properties. This section also requires Agencies to consult with any Tribal Nation or NHO that may attach religious and cultural significance to a property within the undertaking’s area of potential effects. The NHPA directs Agencies to recognize the special expertise of Tribal Nations and NHOs, including Indigenous Knowledge, in the Section 106 process.³³

*Native American Graves Protection and Repatriation Act.*³⁴ The Native American Graves Protection and Repatriation Act (NAGPRA) requires Agencies and institutions that receive Federal funding to repatriate Native American human remains and cultural items to lineal descendants, Indian Tribes, and NHOs.³⁵ Consultation is a critical component for addressing identification, treatment, and return of Native American human remains and cultural items. The

²⁵ 16 U.S.C. § 1801.

²⁶ 16 U.S.C. §§ 1851(a)(1)-(10); *see* Julie Raymond-Yakoubian et al., (2017). *The Incorporation of Traditional Knowledge into Alaska Federal Fisheries Management*, 78 Marine Pol’y 132 (recommending processes for recognition and application of Indigenous Knowledge to western Alaska Federal fisheries management).

²⁷ *E.g.*, 16 U.S.C. § 1852(i)(2) (establishing public fishery council meetings unless subject to limited exceptions); 16 U.S.C. §§ 1854(a)(1)(B), (b)(1)(A) & (c) (requiring public notice and comment for fishery management plans, plan amendments, and regulations).

²⁸ 16 U.S.C. § 1852.

²⁹ 16 U.S.C. § 1852(a)(3) (granting Department of Commerce authority to manage certain highly migratory species fisheries).

³⁰ 16 U.S.C. §§ 1852(a)(1)(F) & (b)(5).

³¹ 16 U.S.C. § 1852(b)(5); *see also* 50 C.F.R. § 600.215(a)(2)(ii).

³² Pub. L. No. 89-665, 80 Stat. 915 (codified in scattered sections of 54 U.S.C.).

³³ 36 C.F.R. § 800.2(c)(2); 36 C.F.R. § 800.4(c)(1); Advisory Council on Historic Preservation, (2021). *Traditional Knowledge and the Section 106 Process: Information for Federal Agencies and Other Participants*; *see also* 54 U.S.C. § 302706 (requiring Federal agencies to consult with Tribes or Native Hawaiian Organizations regarding eligibility of property for the National Register of Historic Places).

³⁴ 25 U.S.C. §§ 3001-3013.

³⁵ 25 U.S.C. §§ 3001(8) & 3005.

law encourages a continuing dialogue between museums or Agencies and Indian Tribes and NHOs, which promotes a greater understanding between those groups.³⁶ NAGPRA expressly specifies forms of Indigenous Knowledge, such as linguistic, folkloric, oral traditional evidence, and tribal expert opinion, as necessary information for determining the affiliation and repatriation of Native American human remains and cultural items.³⁷

IV. Growing and Maintaining Relationships to Support Indigenous Knowledge

Appropriately recognizing, considering, and applying Indigenous Knowledge requires growing and maintaining strong and mutually beneficial relationships between Agencies and Tribes and Indigenous Peoples. Such relationships provide opportunities to identify shared values and goals, build trust and common understanding, and facilitate the exchange of information. These relationships can also help Agencies identify and pursue actions to support Tribes in protecting and enhancing Indigenous Knowledge, develop better approaches to scientific research informed by and inclusive of Indigenous Knowledge, and make better-informed and more effective decisions. These approaches may include pursuing co-management of resources and co-production of knowledge. Agencies should also pursue opportunities to provide direct funding or other support to Tribes and Indigenous Peoples organizations to build capacity to fully participate in and, as appropriate, lead research, initiatives, and other actions that include Indigenous Knowledge.³⁸

In light of the injustice and marginalization of Indigenous Peoples, it is incumbent on Agencies to make sustained efforts to build and maintain trust to support Indigenous Knowledge. Agencies should include the following principles and practices:

1. Acknowledge Historical Context and Past Injustice. Understanding the different experiences of Tribal and Indigenous Peoples is critical for Agencies to work with them and engage effectively with Indigenous Knowledge. Agencies should acknowledge the history of the department or agency they represent, and the Federal Government broadly, when working with Tribes and Indigenous Peoples. Recognizing past injustice, while upholding Tribal treaty and reserved rights, and respecting Tribal and Indigenous communities, cultures, and values will assist Agencies in developing collaborative processes that are more equitable and inclusive of Indigenous Peoples and their knowledge systems.

The genocide and ethnocide of Indigenous Peoples in the United States is well documented.³⁹ Historically, Federal policies have resulted in the separation (both physically and intellectually)

³⁶ *E.g.*, 25 U.S.C. § 3004(b)(1)(B); 25 U.S.C. § 3005.

³⁷ 25 U.S.C. § 3005(a)(4).

³⁸ *E.g.*, National Oceanic and Atmospheric Administration (NOAA) (Aug. 18, 2022). *Pilot project to support Tribal climate resilience in Alaska*, <https://www.noaa.gov/news-release/pilot-project-to-support-tribal-climate-resilience-in-alaska> (NOAA directly funded a climate resilience position at the Alaska Native Tribal Health Consortium to build capacity and coordination of Indigenous-led climate resilience and preparedness); *see generally* Alaska Native Tribal Health Consortium, <https://www.anthc.org>.

³⁹ *See* Roxanne Dunbar-Ortiz, (2015). *An Indigenous Peoples' History of the United States*; Delight E. Satter et al. (2021). *American Indian and Alaska Native Knowledge and Public Health for the Primary Prevention of Missing or Murdered Indigenous Persons*, 69 Dep. Justice J. Fed. Law Prac. 149, <https://pubmed.ncbi.nlm.nih.gov/34734212>;

of Indigenous Peoples from the places they are connected to, severing relationships with lands, waters, and social systems, which are all critical elements of Indigenous Knowledge.⁴⁰ These policies systematically served to assimilate and displace Native people and eradicate Native cultures.⁴¹

Today, Tribes and Indigenous communities continue to experience the impacts of intergenerational trauma resulting from the legacies of these Federal policies.⁴² However, Tribes and Indigenous communities have demonstrated remarkable resiliency in maintaining and continuing to develop Indigenous Knowledge, which has existed since time immemorial and remains strong today.

2. *Practice Early and Sustained Engagement.* When Agencies pursue policies that have Tribal implications, they must engage in regular, meaningful, and robust consultation with Tribal Nations consistent with the agency's Tribal consultation action plan, the Presidential Memorandum on *Tribal Consultation and Strengthening Nation-to-Nation Relationships*,⁴³ and Executive Order 13175 on *Consultation and Coordination with Indian Tribal Governments*.⁴⁴ Consultation is a cornerstone of building and maintaining trust with Tribal Nations. Consultation may also provide opportunities to discuss Indigenous Knowledge with Tribal Nations, and understand from Tribal Nations, how Indigenous Knowledge could inform the Agency's decision-making process. Agencies should not initiate consultation with an assumption that the Tribal Nation will share its knowledge with the agency, but rather with an inclusive process that empowers the Tribal Nation to determine if, and how, Indigenous Knowledge may be included in the agency's process.

Agencies should also consider opportunities to engage with Indigenous Peoples, including Native Hawaiians and other Indigenous Peoples unaffiliated with Federally Recognized Tribes, on Indigenous Knowledge beyond the formal consultation process. Agencies should collaboratively shape these engagement activities and consider, as appropriate, Federal regulations and policies, relevant Tribal regulations and protocols, the context and nature of the proposed Federal action, and any prior efforts to collaborate. These engagement activities may include listening sessions, public meetings, or other outreach with Indigenous communities, Indigenous knowledge holders, Elders, and youth around Indigenous Knowledge in Federal

Bryan Newland (May 2022). *Federal Indian Boarding School Initiative, Investigative Report*, Department of the Interior 102, https://www.bia.gov/sites/default/files/dup/inline-files/bsi_investigative_report_may_2022_508.pdf.

⁴⁰ See Roxanne Dunbar-Ortiz, (2015). *An Indigenous Peoples' History of the United States*; Dina Gilio-Whitaker, (2019). *As Long As the Grass Grows: The Indigenous Fight for Environmental Justice, from Colonization to Standing Rock*; Delight E. Satter et al. (2021). *American Indian and Alaska Native Knowledge and Public Health for the Primary Prevention of Missing or Murdered Indigenous Persons*, 69 Dep. Justice J. Fed. Law Prac. 149, <https://pubmed.ncbi.nlm.nih.gov/34734212/>.

⁴¹ E.g., Bryan Newland, (May 2022). *Federal Indian Boarding School Initiative, Investigative Report*, Department of the Interior 102, https://www.bia.gov/sites/default/files/dup/inlinefiles/bsi_investigative_report_may_2022_508.pdf.

⁴² Delight E. Satter et al., (2021). *American Indian and Alaska Native Knowledge and Public Health for the Primary Prevention of Missing or Murdered Indigenous Persons*, 69 Dep. Justice J. Fed. Law Prac. 149, <https://pubmed.ncbi.nlm.nih.gov/34734212/>.

⁴³ Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships, 86 Fed. Reg. 7,491 (Jan. 29, 2021).

⁴⁴ Exec. Order No. 13,175, 65 Fed. Reg. 67,249 (Nov. 9, 2000).

decision making, policy or research. In designing and carrying out engagement, Agencies must respect the sovereignty of Tribal Nations and conduct outreach through the appropriate forums and with respect for the Nation-to-Nation relationship and the United States' trust responsibilities. Agencies should discuss plans for direct engagement with Tribal Nations or Indigenous Peoples and ensure sustained engagement throughout the development or implementation of the activity. When engaging with Indigenous Knowledge holders who are members of Federally-recognized Tribes, Agencies should be mindful of Tribal sovereignty and recognize that Tribal leaders grant consent for the sharing of Indigenous Knowledge. Agencies should engage only with such individual knowledge holders designated by Tribal leadership.

When Agencies engage with different partners and potential collaborators, including agency contractors, state and local governments, and non-governmental organizations, on Federal policies or actions that may affect Tribes, Agencies should ensure that such collaboration respects Tribal sovereignty and upholds the Federal Government's trust responsibilities. For example, Agencies may collaborate with:

- Tribal Government Agencies and Staff: Agencies should foster relationships with Tribal agencies and staff to discuss Federal policies that have Tribal implications and Indigenous Knowledge and to explore opportunities for collaboration. Agencies must be aware, however, that engagement with Tribal agencies and staff is not a substitute for consultation with Tribal leaders, and only Tribal leaders or their designated representatives can give consent on behalf of a Tribe to the sharing of Indigenous Knowledge with Agencies.
- Inter-Tribal Organizations and Non-profit Organizations: Inter-Tribal organizations and Tribal non-profit organizations are important partners within the domains in which they operate. They can span jurisdictions and serve as clearinghouses of information for Tribal Nations. Urban Indian Organizations also work to address concerns of Indigenous Peoples living in urban areas outside of the boundaries of Tribal Nations who may or may not be members of a Tribe. Agencies must be aware, however, that engagement with Inter-Tribal organizations and Tribal non-profit organizations does not satisfy the obligation to consult with Tribal Nations on a Nation-to-Nation basis, and only Tribal leaders or their designated representatives can consent on behalf of a Tribe to the sharing of Indigenous Knowledge with Agencies.
- Indigenous Knowledge Holders: The Tribal members and Indigenous People who hold Indigenous Knowledge may be Elders, cultural practitioners, and/or spiritual leaders. Agencies must ensure that any engagement with knowledge holders is respectful of Tribal sovereignty and self-governance.
- Local and State Governments: State and local governments also engage with Tribal Nations and Indigenous Peoples and may have policies to guide the consideration of Indigenous Knowledge. Agencies should strive to align policies where possible and to clearly communicate any differences to Tribal Nations and Indigenous Peoples to avoid confusion.
- Academics and Scholars: Academic and scholarly communities can serve as an additional network to create partnerships, co-produce knowledge, and increase collaboration to

include Indigenous Knowledge in Federal contexts. Agencies must ensure that such partnerships are consistent with the Federal trust responsibility to Tribal Nations and is respectful of Tribal sovereignty and self-governance and that academic collaborators also recognize and abide by the principal that consent is required before Indigenous Knowledge can be included in any research.

3. Earn and Maintain Trust. Building relationships with Tribes and Indigenous Peoples requires establishing (or rebuilding) and maintaining trust, which may be difficult because of the Federal Government's history of breaking promises to Tribes and policies that served to assimilate, marginalize, and oppress Tribal Nations and Indigenous Peoples. Agencies should proceed with patient and respectful persistence, and honest and transparent communication, to demonstrate that the desire to collaborate with and listen to Tribes and Indigenous Peoples is genuine. Agencies can also build trust by committing agency resources to training staff to develop cultural competency and respect for the traditional values, beliefs, and cultural practices of Tribes and Indigenous Peoples.

4. Respect Different Processes and World Views. Tribes and Indigenous Peoples may use decision-making processes substantially different from those used by Agencies and may approach issues from a different perspective, including considering the effects of current actions on future generations prior to making major decisions affecting their communities. For example, Haudenosaunee Chiefs rely on extensive deliberation and consensus-building to consider the ways in which decisions can impact the wellbeing of the next seven generations.⁴⁵ This Seventh Generation Principle, shared among many Tribes, reflects a holistic understanding of the world and the human place within it, and is embedded in songs and prayers, ceremonies, dances, storytelling, arts and technologies, and language, among other practices and cultural expressions.

Agencies should also be cognizant of the unique connection that many Tribes and Indigenous Peoples have with the lands, waters, plants, and animals within their traditional homelands. Agencies should be cognizant that many Tribes and Indigenous Peoples were forcibly removed from their traditional homelands but still retain cultural connections and interests in these areas. These resources may be necessary to Tribal and community health and wellbeing in ways that Agencies may not fully understand.⁴⁶ Agencies should also understand that Tribes and Indigenous Peoples may carefully guard information about their homelands and cultural connections to them.⁴⁷ Recognizing and respecting divergent processes and world views, and the sensitivity of Tribes about sharing certain information about them, is important for relationship building and understanding how to appropriately engage with Indigenous Knowledge.

5. Recognize Challenges. Agencies should recognize that Tribes and Indigenous Peoples face obstacles to equitable collaboration, including: (1) mistrust or skepticism; (2) lack of funding,

⁴⁵ *Values*, Haudenosaunee Confederacy, <https://www.haudenosauneeconfederacy.com/values>.

⁴⁶ See Symma Finn, Mose Herne, & Dorothy Castille, (2017). *The Value of Traditional Ecological Knowledge for the Environmental Health Sciences and Biomedical Research*, 125(8) *Env't Health Perspectives*, 085006-1, <https://doi.org/10.1289/EHP858>.

⁴⁷ ACHP (May 3, 2021). Traditional Knowledge and the Section 106 Process: Information for Agencies and Other Participants, <https://www.achp.gov/sites/default/files/2021-05/TraditionalKnowledgePaper5-3-21.pdf>.

personnel, and capacity among Tribes and Indigenous Peoples to respond to Federal requests to engage; (3) lack of coordination and communication between Agencies may result in duplicate requests, causing frustration and extra work for Tribes and Indigenous Peoples; (4) changes in political administrations, budgets, and leadership priorities may affect relationship continuity and collaborative efforts; and (5) telecommunications infrastructure and lack of broadband or internet in rural areas. Agencies should consider actions outlined in this guidance to address these challenges as part of their work to implement this guidance and include Indigenous Knowledge in decision making.

6. Consider Co-management and Co-stewardship Structures. Where available, Agencies should consider co-management, collaborative management, and co-stewardship of lands and waters as opportunities to include Tribal Nations, Indigenous Peoples, and Indigenous Knowledge in Federal actions. These approaches bring Tribal Nations directly into Federal decision making and such collaborations may help avoid challenges around and breaches of confidentiality or data, and imbalances in power and resources. While co-management may not be possible in all scenarios, and must be consistent with relevant Federal authorities, several Agencies already have in place co-management or shared governance structures for lands and waters.⁴⁸

7. Pursue Co-Production of Knowledge. Similarly, Federal researchers should look for opportunities to work with Indigenous Knowledge holders to co-produce scientific information and propose solutions to inform decision making. Knowledge co-production is a research framework based on equity and the inclusion of multiple knowledge systems. It requires the full partnership of Tribes and Indigenous Peoples in all aspects of a research endeavor from the outset, including ensuring that Tribal and Indigenous collaborators are compensated for the work that they do and understand up front if funding is unavailable.

Federal scientists working in a knowledge co-production framework must navigate sharing power and decision-making authority with collaborating Tribes and Indigenous Peoples, and be honest and transparent about any limitations on their ability to share such power.⁴⁹ When developing methods and data collection protocols, Federal scientists should consider using Indigenous methodologies and incorporating Indigenous metrics and indicators in order to fully include Indigenous Knowledge in the research results. At the conclusion of the research, the results should be reviewed by the collaborating Tribe or Indigenous Peoples, and shared in ways that are meaningful and useful to them as well as to the broader scientific community.⁵⁰ As

⁴⁸ Department of the Interior, Policy Memorandum 22-03, Fulfilling the National Park Service Trust Responsibility to Indian Tribes, Alaska Natives, and Native Hawaiians in the Stewardship of Federal Lands and Waters (Sept. 13, 2022), available at https://www.nps.gov/subjects/policy/upload/PM_22-03.pdf.

⁴⁹ This may necessitate expanded scientific integrity practices and expectations, such as granting communities more autonomy over research questions, respecting data and Indigenous Peoples and Tribes' decisions, and elevating qualitative data gathering and inclusion of different forms of evidence.

⁵⁰ See, e.g., R.L. Kelly, and Craig M. Lee (co-pis) (September 2017). Final Report to Glacier National Park: Ice Patches as Sources of Archeological and Paleoecological Data in Climate Change Research. RMCESU Cooperative Agreement Number: H1200090004 (IMR), https://files.cfc.umt.edu/cesu/NPS/CU/2010/10_11Lee_GLAC_ice%20patch%20archeo_rpt.pdf.

members of the research team, Tribal or Indigenous collaborators should be co-authors of publications describing the results.

V. Applying Indigenous Knowledge

This section identifies and discusses promising practices that Agencies should consider when working with Tribal Nations and Indigenous Peoples to include Indigenous Knowledge in Federal policy, research, or other decision making.⁵¹ Agencies should be mindful and clear in communicating to Tribal Nations and Indigenous Peoples the specific factual and legal contexts in which they operate, and should consider developing agency-specific policy or guidance or revising existing consultation policies to include processes for including Indigenous Knowledge in decision making.

While this guidance focuses on opportunities for Agencies to appropriately engage with Indigenous Knowledge and intentionally promote opportunities to include Indigenous Knowledge in Federal decision making, there may be circumstances in which Agencies encounter Indigenous Knowledge unexpectedly. In both of these circumstances, to the extent practicable, the agency should consider adopting the following promising practices.

A. Promising Practices to Apply When Considering Indigenous Knowledge in Federal Processes

This section provides promising practices to guide the manner in which Agencies engage with Indigenous Knowledge to ensure that this engagement respects the interests of Tribes and Indigenous Peoples, and considers Indigenous Knowledge where relevant and appropriate in Federal decisions. In implementing these practices, Agencies should be aware that different Tribes and Indigenous Peoples use different terminology to reflect their distinct histories and interests, including Traditional Ecological Knowledge, Traditional Knowledge, Indigenous Traditional Knowledge, and Native Science. Agencies are encouraged to use the term preferred by the communities with which they are engaging and to continue to learn more about the historic, legal, and cultural contexts related to their work with Indigenous Peoples and Indigenous Knowledge.⁵² It is the decision of the Tribal Nation or Indigenous People involved whether their Indigenous Knowledge should be applied in Federal contexts and Agencies should respect this decision.

These promising practices are grounded in a wealth of experience among Tribes, Indigenous Peoples, and Agencies and include:

⁵¹ See Appendix E (providing additional references and resources for promising practices to apply when considering Indigenous Knowledge in Federal processes).

⁵² ACHP (May 3, 2021). Traditional Knowledge and the Section 106 Process: Information for Agencies and Other Participants, <https://www.achp.gov/sites/default/files/2021-05/TraditionalKnowledgePaper5-3-21.pdf> (“Each Indian tribe or NHO may have their own information about a specific place that differs from that of another Tribe or NHO, because each has a unique culture and history. In many cases, different Tribes or NHOs may have different views or beliefs about the same place. The fact that each may hold different traditional knowledge about the same place does not invalidate that knowledge. Additional outreach and consultation may be required for a Federal agency to engage with multiple Tribes to better understand a single place; such additional efforts enrich the process and better inform decision-making.”).

1. Identify Project Areas and Relevant Staff. Agencies should identify those areas where Indigenous Knowledge is most likely to be offered or sought out. These areas should include those of particular interest to Tribes, like land and resource management decisions affecting traditional homelands. While Agencies should remain receptive to engaging with Tribes and Indigenous Peoples on Indigenous Knowledge across all missions, developing a list of key issue areas will help Agencies to most effectively deploy resources to train staff, identify actions that should be subject to the practices described below, and recognize opportunities to collaborate with Tribes. Where resources are available, Agencies should train staff in these project areas to develop and maintain skills and practices relevant to working with Indigenous Knowledge, Tribal Nations, and Indigenous Peoples. Several Tribal organizations and other external Indigenous-led groups have developed guidance documents and trainings for decisionmakers⁵³ and Agencies should look for opportunities for Tribes and Indigenous Peoples to lead and participate in training for Agencies.

2. Plan Ahead and Consider Developing an Indigenous Knowledge Plan. Where an agency identifies a decision-making process or research project in which Indigenous Knowledge may be relevant, the agency should develop an Indigenous Knowledge plan as early as possible. Agencies may need to consult and collaborate with Tribal Nations and Indigenous Peoples initially to determine if, and how, Indigenous Knowledge could be relevant to the agency's decision-making process. The plan should describe engagement between the Federal agency and Tribes and Indigenous Peoples, including early and sustained engagement to ensure that Indigenous Knowledge shared with the agency is considered throughout, consistent with the expectations of the applicable Tribal Nations and Indigenous Peoples. Agencies should develop a schedule and identify resources to support each phase, and should assign staff the appropriate qualifications, experience, and training to participate in the process. Additionally, Agencies should communicate the plan and timelines for engagement so that all parties understand expectations. Planning should also be sensitive to culturally appropriate norms, including meaningful inclusion of youth and Elders, honoring and respecting Indigenous languages, and meeting on Tribes' or Indigenous Peoples' lands. For Federally recognized Tribes, Nation-to-Nation consultation may be the most appropriate venue for engagement.

In developing Indigenous Knowledge plans, Agencies should also be aware that Tribes and Indigenous Peoples may possess Indigenous Knowledge that is sensitive, sacred, or belongs to certain families or clans. To the extent possible, Agencies should identify and adopt mechanisms to address the concerns of Tribes and Indigenous Peoples about privacy or potential threats to natural or cultural resources, or they may fear loss of access or desecration of lands and waters if certain information is shared with others.⁵⁴ Tribal leaders or designated representatives are best

⁵³ E.g., Ellam yua et al., (2022). *A Framework for Co-production of Knowledge in the Context of Arctic Research*, 27 *Ecology and Soc'y* 34, <https://doi.org/10.5751/ES-12960-270134>; Minn. Dep't of Transportation (2022). *Tribal-State Relations Training*, <http://www.dot.state.mn.us/tribaltraining>.

⁵⁴ First Archivist Circle (Apr. 9, 2007). *Protocols for Native American Archival Materials*, <https://www2.nau.edu/libnap-p/protocols.html> ("For Native American communities, the public release of or access to specialized information or knowledge—gathered with and without informed consent—can cause irreparable harm. . . Each community will understand and use the term 'culturally sensitive' differently, although there are

positioned to identify what Indigenous Knowledge is sensitive or sacred, and Agencies should recognize that Indigenous Knowledge freely shared by one community may be closely guarded by another.⁵⁵

Therefore, during the planning process, Agencies should consult with Federal agency legal counsel regarding the agency's obligations under the Freedom of Information Act (FOIA)⁵⁶ and other public disclosure laws, and legal authorities that may apply to inclusion of Indigenous Knowledge.

3. *Conduct Initial Meetings.* Prior to any discussion on sharing Indigenous Knowledge, Agencies should set clear expectations for how the information will be conveyed to the agency and included in the agency's decision-making process. Agencies should discuss and make clear the potential benefits and risks of sharing Indigenous Knowledge, including the potential for public release under FOIA and other public disclosure obligations.⁵⁷ This should be an ongoing discussion and Agencies should account for personnel turnover to ensure any information provided is provided with a full understanding of the implications of FOIA and other public disclosure obligations. Agencies should also collaborate with Tribal Nations and Indigenous Peoples to develop alternative means for information sharing that reduces the risk of disclosure and results in mutually beneficial process for the agency and Tribal Nations and Indigenous Peoples. Agencies should also provide information to Tribes and Indigenous Peoples to facilitate informed decision making as to whether Indigenous Knowledge should be shared with the agency and discuss approaches that may be available to protect Tribal or Indigenous interests. Such information includes a description of the Federal action or policy, relevant legal authorities and any limitations arising from those authorities, and potential impacts to Tribal or Indigenous interests foreseeable to the agency.

An initial meeting should be reciprocal. It is also an opportunity for the Tribe or Indigenous Peoples to identify additional considerations or interests important to them. Together, Agencies, Tribes, and Indigenous Peoples can explore what specific aspect of Indigenous Knowledge could inform or contribute to the Federal policy or action.

broad areas of common agreement for Native Americans about this issue Indigenous Knowledge may need to be protected to prevent against unauthorized use, commercial misuse, cultural misappropriation, or inadvertent disclosure. There have been many cases of misrepresentation and exploitation of sacred and secret information.”).⁵⁵ ACHP (May 3, 2021). Traditional Knowledge and the Section 106 Process: Information for Agencies and Other Participants, <https://www.achp.gov/sites/default/files/2021-05/TraditionalKnowledgePaper5-3-21.pdf> (“Each Indian tribe or NHO may have their own information about a specific place that differs from that of another Tribe or NHO, because each has a unique culture and history. In many cases, different Tribes or NHOs may have different views or beliefs about the same place. The fact that each may hold different traditional knowledge about the same place does not invalidate that knowledge. Additional outreach and consultation may be required for a Federal agency to engage with multiple Tribes to better understand a single place; such additional efforts enrich the process and better inform decision-making.”).

⁵⁶ 5 U.S.C. § 552.

⁵⁷ See U.S. Department of Justice (2022). Risk Management and Tribal Consultation Report, at 4 and 11, https://www.justice.gov/d9/fieldable-panel-panes/basic-panes/attachments/2022/06/08/risk_management_tribal_consultation_final_report_march_2022.pdf.

An initial meeting is also a forum for Agencies to communicate Federal agency legal obligations associated with the application of Indigenous Knowledge with Tribes and Indigenous Peoples, including the potential for public disclosure of Indigenous Knowledge. Tribes and Indigenous Peoples need to understand Federal legal obligations to make informed decisions about whether, when, and how to share information. Federal agency legal obligations should be made clear, including the extent to which the agency will be able to maintain the confidentiality of Indigenous Knowledge if it is shared and what protocols the agency will use to store, share, and access sensitive documents, information, or data. This information should be disclosed by Agencies before Tribes and Indigenous Peoples share Indigenous Knowledge. Any information about the Tribe or Indigenous Peoples' relevant protocols, laws, or resolutions related to the sharing of Indigenous Knowledge should also be discussed by Agencies, Tribes, and Indigenous Peoples. For long-term or more complex projects, Agencies may consider whether a written document could be effective to document agreements about the process and partnership.

4. Include Indigenous Knowledge into Federal Decision Making and Research. Agencies should obtain consent from Tribal Nations and Indigenous Peoples prior to including Indigenous Knowledge in Federal policy, research, or decision making. After securing consent to access Indigenous Knowledge, Agencies should ensure that Indigenous Knowledge is appropriately included in the Federal action. Inclusion of Indigenous Knowledge in Federal decision making and research starts with the recognition that Indigenous practices and methodologies underlie Indigenous Knowledge. Accordingly, Indigenous Knowledge should guide metrics and evaluation; Agencies do not need to judge, validate, or evaluate Indigenous Knowledge using other forms of knowledge in order to include Indigenous Knowledge in Federal policy, research, or decision making.

In documenting research and decision making, Agencies should prepare documents that recognize Indigenous Knowledge genealogy and credit ideas, insights, and other forms of Indigenous Knowledge as applied. Additionally, documents should describe how Indigenous Knowledge was applied to reach the final product or decision. When possible and appropriate, Agencies should work with Tribes and Indigenous Peoples to present the decision or research including Indigenous Knowledge in Indigenous voice and style.⁵⁸

Agencies should follow up with Tribes and Indigenous Peoples to describe how Indigenous Knowledge was included in the final Federal action and share outcomes. The nature of subsequent communications will vary. Agencies should recognize the specific context of the Federal action, such as the relationship between the parties, the parties' desires, and the specific characteristics of the final decision or product.

5. Regularly Coordinate with other Agencies to Facilitate Information Sharing. Many Agencies have deep experience in the above promising practices and can serve as resources for other agencies. Interagency information sharing and coordination may enhance practices for including Indigenous Knowledge in Federal processes across the Government.

⁵⁸ See e.g., ACHP (May 3, 2021). Traditional Knowledge and the Section 106 Process: Information for Federal Agencies and Other Participants, which that lists indigenous perspectives of Indigenous Knowledge in their own words, Appendices A and B.

B. Opportunities to Include Indigenous Knowledge in Federal Contexts

Agencies may find Indigenous Knowledge provides valuable insights across various programs and missions. This section provides common contexts in which Agencies may encounter Indigenous Knowledge and specific practices that Agencies should employ when considering whether and how to include Indigenous Knowledge in decision-making processes⁵⁹:

1. Federal Research Design and Implementation. Agencies should respect that Tribes and Indigenous Peoples may have different preferences for their involvement in research and that the same Tribe or Indigenous Peoples may have varying preferences depending on the issue or project. While respecting this diversity of preference, there are promising practices from literature, listening sessions, and researchers' experiences, which should be considered when developing research policy, planning, and implementation.⁶⁰

The following practices based on Indigenous research methodologies may be of particular use to Agencies in this context:⁶¹ Additional references are included in Appendix F.

- **Responsibility:** It is the responsibility of the research team to understand the sociopolitical landscape of a research site and research questions and to follow ethical best practices *whether or not* the research is considered human subject research. Honestly and clearly identify the purpose and motivation for the research.
- **Research Approach:** Select appropriate research methods and parameters for the problem, the cultural context, and weaving together knowledge systems, as well as for the use of data and dissemination of results.
- **Relevance:** When working in or with Indigenous communities, ensure research is relevant to the experiences, perspectives, priorities, and ways of knowing and living in these communities.
- **Representation:** Indigenous communities should lead in the research process by sharing what is important to their community.
- **Respect:** Have respect for Indigenous communities and cultures, multiple ways of knowing, and Indigenous Knowledge holders.
- **Relationship:** Invest time and resources in engagement necessary to understand the issues, concerns, and needs from the perspective of partners. Acknowledge the nature of

⁵⁹ Internationally, the Department of State, in concert with Federal agencies, works to ensure the rights of Indigenous Peoples are protected and respected. When international issues are implicated, it may be appropriate for agencies to coordinate with the Department of State, and ensure that positions and language are consistent with U.S. international commitments. Indigenous Knowledge can make significant contributions to the United States' diplomatic activities and to partner countries' development goals, as well as to broader global health, agriculture, climate stability and food and water security. Federal employees engaged in foreign relations or foreign development programs should invite Indigenous Peoples to be partners in the diplomatic or development process, and strengthen consultations to ensure that Indigenous Knowledge informs agreements, impact analyses, strategies, program design, implementation, and monitoring and evaluation.

⁶⁰ See Ranalda L. Tsosie et al. (2022). *The Six Rs of Indigenous Research*, 33(4) Tribal Coll. J. Of Am. Indian Higher Educ, <https://tribalcollegejournal.org/the-six-rs-of-indigenous-research>.

⁶¹ Id.

relationships (people-to-people and people-to-environment) as they relate to Indigenous Knowledge.

2. *Federal Grants and Other Funding Opportunities.* Agencies should ensure that Indigenous Knowledge is recognized, valued, and included in Federal grant making and other funding opportunities, which can improve the accessibility of funding to Tribes and Indigenous Peoples and facilitate exploration of new lines of research and development. Agencies should review the range of phases of Federal grant making, including solicitation, review and selection, administration, and closeout and reporting. Agencies may provide technical assistance to Tribes and Indigenous Peoples to clearly establish expectations for financial assistance and other funding opportunities. In addition, Agencies should be cognizant of burdensome requirements during pre- and post-selection award phases and collaborate with Tribes and Indigenous Peoples to ensure Federal requirements are achieved through a process that is accessible for Tribes and Indigenous Peoples and allows for Indigenous Knowledge to be included.

In developing Requests for Proposals (RFP), as appropriate, Agencies should account for the following: (1) that the RFP language, frame, and requirements for the research project or funding opportunity do not exclude the potential for Indigenous Knowledge and other forms of evidence to be included; (2) that the RFP language regarding professional qualifications includes Indigenous Knowledge and Indigenous Peoples, who are the experts in their culture and lifeways; and (3) that the RFP language does not unnecessarily treat natural and cultural resources as separate entities or exclude one while including the other. Regarding the latter, Indigenous Peoples' cultural practices are informed by Indigenous Knowledge and frequently incorporate plant and animal communities, mineral sources, landforms, water bodies, and other tangible elements of the natural environment. Thus, Agencies should be aware that certain natural resources are frequently valued as cultural resources by many Indigenous Peoples. For RFPs that include requests for engagement and planning with Tribes and Indigenous Peoples, Agencies should recognize relationship building needs, such as longer timeframes. When appropriate, Tribes and Indigenous Peoples should also be included in the creation of RFPs and Indigenous Knowledge holders should be included in the proposal review process. When possible, Knowledge holders should be appropriately compensated for the participation at rates equal to those of agency and academic scientists and other technical experts.

When funding is awarded, especially through competitive grant processes, Agencies should ensure that the methods, people, and grant assessment process are not biased against proposals that include Indigenous Knowledge. To guard against such biases, Agencies can ensure that Indigenous Knowledge holders are included in funding allocation decisions, and can ensure that merit-based funding decisions involve scoring rubrics that value Indigenous Knowledge on par with other forms of evidence and methods of inquiry. Agencies should also develop evaluation criteria that includes Indigenous methodologies and approaches to ensure that Indigenous Knowledge is not inappropriately disadvantaged in the review process.

Finally, Agencies are encouraged to offer funding for co-production of knowledge whenever feasible, to ensure that Indigenous Knowledge and multiple perspectives are included in all

stages of the research process, and to ensure that research results are relevant to decisions made by Agencies, Tribes, and Indigenous Peoples.⁶²

3. *Federal Rulemaking.* Agencies should consider Indigenous Knowledge in promulgating regulations, issuing guidance, or adopting policies with Tribal or Indigenous implications, consistent with legal authorities. There are a number of opportunities for Indigenous Knowledge to potentially inform Federal rulemaking. Indigenous Knowledge can serve as a source of evidence that explains why a rule is necessary, an approach has been selected, or alternative approaches have been rejected. For example, rules covering species protection and land use could include Indigenous Knowledge to explain why certain protections are necessary.

Additionally, Agencies often prepare a benefit-cost analysis to analyze proposed regulations, which may include intangible or difficult-to-monetize benefits and costs, distributional effects, and an analysis of environmental justice impacts. Indigenous Knowledge also may provide relevant insights in these analyses in describing a particular rule's costs and benefits based on the expertise of Tribes and Indigenous Peoples. The White House Office of Management and Budget (OMB)'s guidance on regulatory analysis⁶³ notes that Agencies should seek out opinions of those who may be affected by regulation or who have special knowledge or insight into the regulatory issues. In addition, Indigenous Knowledge can be a source of original information that Agencies may use to conduct benefit-cost analyses, consistent with OMB's guidance.

For example, many regulatory impact analyses of Federal rules include an analysis of the rule's distributional effects and/or an environmental justice assessment. These analyses discuss how benefits or adverse impacts of the Federal action affect different communities. Indigenous Knowledge may be relevant to include in such analyses. For example, including Indigenous Knowledge may more accurately capture the impact of a rule on culturally or ecologically significant land.

Agencies should also include Indigenous Knowledge as an aspect of best available science. A number of legal standards requiring the consideration of scientific information can also permit the consideration of Indigenous Knowledge. Agencies should consider evaluating the standards applicable to their work to decide whether the consideration of Indigenous Knowledge should be referenced explicitly in agency regulations or policies. Indeed, several Agencies have already included Indigenous Knowledge in their definitions of best available science or expanded their understanding of what can be included as evidence in agency decision making.⁶⁴ For example, the U.S. Forest Service allows "Native knowledge" to be considered during the National Forest System land management planning process.⁶⁵ The National Marine Fisheries Service's (NMFS)

⁶² Ellam yua et al. (2022). *A Framework for Co-production of Knowledge in the Context of Arctic Research*, 27 *Ecology & Soc'y* 34, <https://doi.org/10.5751/ES-12960-270134>; see also discussion *infra* Section 3 (providing additional information and recommendations on co-production of knowledge).

⁶³ OMB Circular A-4, (Sept. 17, 2003). *Regulatory Analysis*, https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/circulars/A4/a-4.pdf.

⁶⁴ NOAA Fisheries & National Ocean Service (2019). *Guidance and Best Practices for Engaging and Incorporating Traditional Ecological Knowledge in Decision-Making*, 3, https://media.fisheries.noaa.gov/dam-migration/traditional_knowledge_in_decision_making_508_compliant.pdf.

⁶⁵ 36 C.F.R. §§ 219.4(a)(3) & 219.19 (defining "Native Knowledge").

efforts around Ecosystem-Based Fisheries Management is another example of Indigenous Knowledge being applied as best available science;⁶⁶ the Alaska Fisheries Science Center produces annual Ecosystem Status Reports informed by local knowledge and observations.⁶⁷

4. *Federal Use of Science and Evidence*. Agencies can also include Indigenous Knowledge in Federal contexts governed by the following evidence and information quality statutes:

- *Foundations for Evidence-Based Policymaking Act of 2018 (Evidence Act)*.⁶⁸ The Evidence Act calls on Agencies to strategically plan and organize evidence building, data management, and data access functions to ensure an integrated and direct connection to data and evidence needs.⁶⁹ As relevant and appropriate, Agencies should include Indigenous Knowledge as a form of evidence and consider Indigenous Knowledge throughout evidence life cycles, including in developing priority questions on agency Learning Agendas, in building evidence through inclusive methodologies, such as community-engaged research, and when using evidence to improve government effectiveness.⁷⁰
- *Information Quality Act*.⁷¹ The Information Quality Act (IQA) is designed to ensure that the Federal Government relies on information of appropriate quality for the decision being made. Under the IQA and OMB's associated guidance documents,⁷² influential information, including Highly Influential Scientific Assessments (HISAs), is required to provide sufficient transparency about data and methods to allow reproducibility of the results.⁷³ Indigenous Knowledge can be relevant to and may be used in HISA

⁶⁶ Nat'l Oceanic & Atmospheric Admin. Fisheries, (June 15, 2022). *Human Integrated Ecosystem Based Fishery Management, Research Strategy 2021-2025: Executive Summary*, <https://www.fisheries.noaa.gov/human-integrated-ecosystem-based-fishery-management-research-strategy-2021-2025-executive-summary>.

⁶⁷ E.g., North Pacific Fishery Management Council (2021). *Ecosystem Status Report 2021, Eastern Bering Sea*, 238-39 (Elizabeth Siddon), <https://apps-afsc.fisheries.noaa.gov/refm/docs/2021/ebsecosys.pdf>.

⁶⁸ Pub. L. No. 115-435, 132 Stat. 5529 (codified in Titles 5 and 44 of the U.S. Code).

⁶⁹ Office of Mgm't & Budget, Exec. Office of the President (June 10, 2019). *OMB Circular M-19-23, Phase 1 Implementation of the Foundations for Evidence-Based Policymaking Act of 2018*, 13, <https://www.whitehouse.gov/wp-content/uploads/2019/07/M-19-23.pdf>; Office of Mgm't & Budget, Exec. Office of the President, *OMB Circular M-21-27*, (June 30, 2021). *Evidence-Based Policymaking: Learning Agendas and Annual Evaluation Plans*, 19, <https://www.whitehouse.gov/wp-content/uploads/2021/06/M-21-27.pdf>.

⁷⁰ See e.g., Melanie Nind (2020). *Inclusive Research: Research Methods*; Melanie Nind (2014). *What is Inclusive Research?*; Kristine Andrews, Jenita Parekh, & Shantai Peckoo (2019). *How to Embed a Racial and Ethnic Equity Perspective in Research: Practical Guidance for the Research Process*, Child Trends, https://www.childtrends.org/wpcontent/uploads/2019/09/racialethnicequityperspective_childtrends_October2019.pdf.

⁷¹ Pub. L. No. 106-554, 114 Stat 2763, § 515 (codified at 44 U.S.C. §§ 3504(d)(1), 3516).

⁷² E.g., OMB, *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*; Republication, 67 Fed. Reg. 8452, (Feb. 22, 2002); OMB, *Final Information Quality Bulletin for Peer Review*, 70 Fed. Reg. 2664, (Jan. 14, 2005); OMB (April 24, 2019). *Memorandum to the Heads of Executive Departments and Agencies, Improving Implementation of the Information Quality Act*, M-19-15.

⁷³ OMB (2001). *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies*, § 3(b)(2); OMB (April 24, 2019). *Memorandum to the Heads of Executive Departments and Agencies, Improving Implementation of the Information Quality Act*, M-19-15.

documents.⁷⁴ As relevant and appropriate, Indigenous Knowledge should be evaluated during review processes to ensure that conclusions are supported by evidence of appropriate quality.⁷⁵

VI. Conclusion

Agencies should apply this guidance as a foundation for Agencies to consult and collaborate with Tribal Nations and Indigenous Peoples on the inclusion of Indigenous Knowledge in Federal decision making and research and consider whether agency-specific policies are appropriate.

In addition, the Appendices that follow provide a wealth of information, operational recommendations, and additional resources to support Agencies in implementing this guidance.

⁷⁴ See OMB (April 24, 2019). Memorandum to the Heads of Executive Departments and Agencies, Improving Implementation of the Information Quality Act, M-19-15.

⁷⁵ See Appendix C (providing a draft survey on inclusion of Indigenous Knowledge in the National Climate Assessments).

Appendix A. Examples of Indigenous Knowledge Application and Collaboration Between the Federal Government and Tribes and Indigenous Peoples

The below examples illustrate mutually beneficial collaborations that are possible between Agencies and Tribal Nations and Indigenous Peoples. These examples include input from and reflect the perspectives of the Indigenous organizations, individuals, and Agencies involved in these particular efforts.

Indigenous Knowledge Informs Federal Climate Change Research, Policy, and Resilience
Climate change is affecting human and natural environments around the world. Tribes and Indigenous Peoples face disproportionate and unique climate-related risks, as climate change threatens cultural and ceremonial practices, place-based identities, sources of traditional food and medicine, and sovereignty and security. Climate impacts, such as increased frequency and severity of certain extreme weather events, ocean acidification, sea level rise, and changes in the timing of ice melt or spring thaw, disrupt subsistence hunting, gathering, fishing, and traditional agricultural practices by threatening culturally important ecosystems. Indigenous Peoples may have disproportionately high levels of pre-existing health conditions, such as asthma, diabetes, or cardiovascular disease, and many still experience physical and mental health impacts of historical trauma. Climate change exacerbates these health disparities and can create new threats to human health and safety.⁷⁶ For example, recent evidence suggests that Indigenous women and children may bear the brunt of climate-related stressors and economic and food insecurities, and that climate impacts can exacerbate sexual and gender-based violence.⁷⁷

The Federal Government has a key role to play in understanding, mitigating, and adapting to climate-related risks and impacts. Recognizing that Tribes and Indigenous Peoples are often the first to observe or anticipate climate-related changes to ecosystems and the environment, and this knowledge contributes to better understanding, prediction, and adaptation to climate change, the Fourth National Climate Assessment included Indigenous Knowledge in its assessment of the impacts of climate change on the Nation and described the role Indigenous Knowledge systems can play in developing comprehensive climate adaptation strategies.⁷⁸ Further, each of the 10 regional chapters in the Fourth National Climate Assessment includes at least one example of climate impacts or adaptation practices unique to Tribes and Indigenous peoples, many of which are based on Indigenous Knowledge local to that region. Other examples of the application of

⁷⁶ See Fourth National Climate Assessment, 572–603 (explaining how indigenous peoples can also be affected uniquely and disproportionately by climate change); see also Bharat H. Desai et al. (2021). *Role of Climate Change in Exacerbating Sexual and Gender-Based Violence against Women: A New Challenge for International Law*, Environmental Policy and Law 51, p. 142, available at https://www.un.org/sexualviolenceinconflict/wp-content/uploads/2021/10/report/role-of-climate-change-in-exacerbating-sexual-and-gender-based-violence-against-women-a-new-challenge-for-international-law/epl_2021_51-3_epl-51-3-epl210055_epl-51-epl210055.pdf; see also Kristen Vinyeta, Kyle Powys Whyte, & Kathy Lynn (2015). *Climate Change Through an Intersectional Lens: Gendered Vulnerability and Resilience in Indigenous Communities in the United States*. Gen. Tech. Rep. PNW-GTR-923. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 72 p. DOI: 10.2737/PNW-GTR-923.

⁷⁸ See generally, Fourth National Climate Assessment (providing an example, where indigenous knowledge was included in the assessment of the impacts of climate change on the nation and describes the role indigenous knowledge systems can play in developing comprehensive climate adaptation strategies).

Indigenous Knowledge in Federal climate-related decision making include the listing of species under the Endangered Species Act, habitat designation decisions made by USFWS and NOAA, and consideration of Indigenous Knowledge in the Bureau of Indian Affairs' climate resilience investments.

Bears Ears National Monument Co-Management

Bears Ears National Monument has a rich cultural heritage and is sacred to many Tribal Nations who rely on these lands for traditional and ceremonial uses. Recognizing this history and the expertise of Tribal Nations, the Bureau of Land Management (BLM) and U.S. Forest Service (USFS) have entered into a cooperative agreement with five Tribes—the Hopi Tribe, Navajo Nation, Ute Mountain Ute Tribe, Ute Indian Tribe of the Uintah and Ouray Reservation, and the Pueblo of Zuni—to collaborate on the management of the 1.36 million acre monument. This agreement outlines a common vision for managing Bear Ears National Monument and protecting these sacred lands, giving Tribes the opportunity to participate in the management of their ancestral lands. The Tribes are applying their knowledge to a variety of management challenges facing the monument including drought, erosion, and visitation to protect and restore the monument objects and values. Honoring the Nation-to-Nation relationship, this model ensures that Indigenous Knowledge and Tribal perspectives are at the forefront of joint decision-making for the monument.

The Northern Bering Sea Climate Resilience Area

The Inupiat, St. Lawrence Island Yupik, Central Yup'ik and Cup'ik peoples have lived interconnected with marine and coastal ecosystems in the Northern Bering Sea region for millennia. The Northern Bering Sea Climate Resilience Area, established by Executive Order 13754 in 2016 and reinstated by President Biden in 2021 through Executive Order 13990, provides an example of Indigenous values informing policy and the potential for including Traditional Knowledge in decision making.⁷⁹ The Northern Bering Sea Climate Resilience Area provides a model for bridging different value systems coming from Indigenous Knowledge and other forms of knowledge through a framework that includes a Federal Bering Task Force and a Bering Intergovernmental Tribal Advisory Council. The Task Force and Advisory Council are charged with conserving the region's ecosystem, including those natural resources that provide important food security to the people of the region. Tribes, regional Alaska native non-profit organizations, Elders, and Traditional Knowledge holders from across the northern Bering Sea region are working with the Federal Government to address concerns about rapid climate change and the need for solutions that take a whole-of-government approach to build equity into decision making for the Northern Bering Sea region. This process also provides a pathway for Tribal voices that have been historically underserved in decision-making processes.

⁷⁹ Executive Order 13,754: Northern Bering Sea Climate Resilience, 81 Fed. Reg. 90,669 (Dec. 9. 2016); Press Release: Biden-Harris Administration Brings Arctic Policy to the Forefront (Sept. 24, 2021), <https://www.whitehouse.gov/ostp/news-updates/2021/09/24/biden-harris-administration-brings-arctic-policy-to-the-forefront-with-reactivated-steering-committee-new-slate-of-research-commissioners/>.

Sweetgrass Shared Governance in Acadia National Park

In Acadia National Park, the National Park Service is working with citizens of Wabanaki Tribes—the Aroostook Band of Mi'kmaq, the Houlton Band of Maliseets (Wolastogiyik), the Passamaquoddy (Peskotomuhkati) Tribe at Sipayik, the Passamaquoddy Tribe at Indian Township, and the Penobscot Indian Nation—on shared governance and research on sweetgrass harvesting.⁸⁰ Wabanaki people have harvested sweetgrass for generations. Research in Acadia, guided by Indigenous methodologies, reinforces what Wabanaki people have always known: that harvesting sweetgrass through a Wabanaki philosophy enhances sweetgrass abundance. Wabanaki knowledge, and the gatherers who generate this knowledge, are leading National Park Service research and management strategies that will enable restoration of Wabanaki harvesting within Acadia National Park.⁸¹

ACHP Advances Indigenous Knowledge in Policy on Burial Sites, Human Remains, and Funerary Objects

The Advisory Council on Historic Preservation (ACHP) strives to ensure Agencies implement their work in harmony with the National Historic Preservation Act. The ACHP is incorporating Indigenous Knowledge into its updated *Policy Statement on Burial Sites, Human Remains, and Funerary Objects*⁸² to elevate consideration of Indigenous Knowledge in Federal historic preservation decisions. Incorporating Indigenous Knowledge into the policy statement will help Indigenous People elevate their concerns during the Section 106 process, which requires Agencies to consider the effects of projects they carry out, approve, or fund, on historic properties throughout the country. The policy statement was developed through a series of nationwide listening sessions, presentations, and Nation-to-Nation consultation. ACHP policy statements dictate how ACHP staff advise Agencies, state and local preservation officials, Indian Tribes, and Native Hawaiian organizations, among others, regarding the Section 106 process. By updating its *Policy Statement on Burial Sites, Human Remains, and Funerary Objects* the ACHP will advance how Indigenous Knowledge is considered in the Section 106 consultation process in a manner that can positively effectuate Federal decision making around historic preservation in projects all around the country.

⁸⁰ U.S. Forest Service, Southern Research Station (2018). *Traditional Ecological Knowledge Helps Researchers Understand the Effects of Plant Harvesting*, <https://srs.fs.usda.gov/research/2018-research-highlights/highlight.php?Id=traditional-knowledge>.

⁸¹ See e.g., Abbe Museum, (June 1, 2019). *Wabanaki Sweetgrass Harvesting in Acadia National Park*, [Blog], <https://www.abbemuseum.org/blog/2018/6/21/a8ox8s8wxde6nenklfm77gayl60h87>.

⁸² See ACHP (2022). *Updating ACHP's Policy Statement on Burial Sites, Human Remains, and Funerary Objects*, <https://www.achp.gov/treatment-burial-sites>.

USAID Supports Community-led Preservation of Indigenous Genetic Resources

USAID's Feed the Future project, Buena Milpa,⁸³ was a sustainable intensification project that leveraged the potential of the Indigenous Three Sisters method of companion planting.⁸⁴ Through Buena Milpa, USAID's partners worked with mostly Indigenous Mayan farmers in the highlands of Guatemala to set crop improvement priorities based on community needs, conserve and improve agrobiodiversity, and promote other sustainable agriculture techniques. Buena Milpa participated in yearly agrobiodiversity fairs where farmers traded varieties of maize, potatoes, beans, yam, and other crops, and children learned about the importance of protecting and conserving nature as well as native maize varieties.⁸⁵ Buena Milpa leveraged Indigenous Knowledge to improve community resilience and productivity, and it enabled Indigenous People to lead the strategic design and implementation of development programs to meet their needs. Through established community seed banks, the maize genetic resources, which are Indigenous intellectual property, were preserved and maintained within the communities where they originated. These local community seed banks serve as a sustainable base of biodiversity conservation and participative breeding efforts to foster innovation, reduce food insecurity and malnutrition, and increase sustainability of maize-based food systems. Farmers affiliated with the Buena Milpa project participated in a study of the relationship between intercropping and nutritional productivity which found that this style of agriculture is not only more productive than mono-cropped maize in terms of food produced per hectare, but also produces maize that is of higher nutritional value.⁸⁶ Buena Milpa was implemented by the International Maize and Wheat Improvement Center which, like other large seed banks of its kind, makes germplasm

⁸³ See generally CIMMYT (2022). [Webpage]. <https://www.cimmyt.org/projects/buena-milpa/> (providing background information regarding the Buena Milpa Project managed in collaboration with the U.S. Agency for International Development's Feed the Future program).

⁸⁴ See Robin Wall Kimmerer (2013). Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants. The Three Sisters is an example of a story that transmits Indigenous Knowledge across millennia related to feeding a community and thriving in a landscape. The intercropping or companion method of planting corn, beans, and squash together, commonly called the Three Sisters, has been studied and described by scholars in anthropology, history, and agriculture studies for many years. Planted as a triad, the corn stalks offer climbing bean vines support as they reach for sunlight from the earth. The beans pump beneficial nitrogen from the air back into the soil, fertilizing the corn and squash. The squash's broad, spiny leaves protect the bean plants from predatory animals and shade the ground from the heat of the sun. The story offers a tangible example of the application of Indigenous Knowledge in agriculture that was unfamiliar to the colonists arriving on the shores of Massachusetts who knew only straight rows of single species, and thus, wrongly characterized Indigenous agriculture as inefficient farming. In fact, the companion method provides more abundance than monocropping, which is the norm in modern agriculture. The Three Sisters also offer a metaphor for understanding how Indigenous Knowledge and western science may be woven together. This metaphor highlights that, when woven together in a space of ethical and equitable knowledge production, Indigenous Knowledge and western science mutually support each other while retaining their distinct characteristics. In this space, Tribes and Indigenous Peoples and Federal scientists and staff can collaborate to solve problems and answer questions of mutual concern.

⁸⁵ See CIMMYT (November 30, 2015). Press Release, Buena Milpa participates in the lamb and agrobiodiversity fairs in Guatemala, <https://www.cimmyt.org/news/buena-milpa-participates-in-the-lamb-and-agrobiodiversity-fairs-in-guatemala/>.

⁸⁶ Lopez-Ridaura, Santiago, Luis Barba-Escoto, Cristian A. Reyna-Ramirez, Carlos Sum, Natalia Palacios-Rojas and Bruno Gerard (2021). "Maize intercropping in the milpa system. Diversity, extent and importance for nutritional security in the Western Highlands of Guatemala." *Scientific Reports* (2021)11:3696. <https://doi.org/10.1038/s41598-021-82784-2>.

(seed) available for both farmers and Western scientific researchers. In some cases, germplasm developed by smallholder farmers has been the source material for important crop-saving and agronomic improvement technologies deployed by bioscience firms and redistributed to farmers worldwide.⁸⁷ Such collaborative innovations highlight the need to track the provenance of seeds and genetic resources and to respect and reward the intellectual and creative contributions of Indigenous and local peoples on par with that of Western bioscience.

Papahānaumokuākea Marine National Monument

The Papahānaumokuākea Marine National Monument, located in the Northwestern Hawaiian Islands, was established to protect the inextricable link between nature and culture. The legal underpinnings of the monument establish the tangible and intangible ancestral, cultural, and biophysical values of place as equally significant, integral, and important, and require the co-management agencies to cooperate to protect them. The Monument is co-managed by four co-trustee agencies: the Department of Commerce (via NOAA), The Department of the Interior (via USFWS), the State of Hawai'i (via the Hawai'i Department of Land and Natural Resources) and the Office of Hawaiian Affairs.

The Monument, established in 2006, and its predecessor, the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve established in 2000, offers many lessons for place-based and knowledge-based engagement of Indigenous and local communities to achieve effective management that can be applied elsewhere. The success is based on engagement of the knowledge holders and communities from which the knowledge has been generated. Native Hawaiians have consistently led, and continue to lead, the development and governance of the Monument. The Monument's founding management values, principles, and approaches are based both in Native Hawaiian knowledge and practices, and in contemporary conservation and management. The inclusion of Indigenous Peoples at the decision-making table from the start of the process allowed for the successful structure for establishment and management of the Monument.

Federal Research Engagement to Support Tribal Climate Adaptation Indigenous Fire Stewardship, and Eco-cultural Revitalization

The USDA Forest Service Pacific Southwest Research Station (PSWRS) is a cooperative research partner with the Karuk and other tribes of northwestern California. The Karuk Tribe develops and pursues research partnerships with other Tribal entities, Federal, state, academic, and non-governmental organizations regarding the inclusion of Indigenous Knowledge in the full cycle of research. These partnerships are to guide, inform, and document natural resources management and co-management strategies. The Karuk Tribe initially formed a research

⁸⁷ Muleta, Kebede T., Terry Felderhoff, Noah Winans, Rachel Walstead, Jean Rigaud Charles, J. Scott Armstrong, Sujana Mamidi, Chris Plott, John P. Vogel, Peggy G. Lemaux, Todd C. Mockler, Jane Grimwood, Jeremy Schmutz, Gael Pressoir, and Geoffrey P. Morris. (2022) "The recent evolutionary rescue of a staple crop depended on over half a century of global germplasm exchange." *Science Advances* 8, eabj4633.

collaborative, the Karuk-University of California, Berkeley Collaborative,⁸⁸ and then its own research program, which is now managed by the Karuk Department of Natural Resources' Pikiyav Field Institute. Through the Institute's *Practicing Pikiyav Process for Collaborative Research Projects*,⁸⁹ the Tribe invites, solicits, considers, accepts, approves, directs, and oversees the methods and conditions of the research that involves their Indigenous Knowledge, beliefs, practices and other cultural properties and interests. Research topics have focused on Tribal agroforestry, food security, wildland fire, Indigenous fire stewardship, and climate adaptation as landscape restoration strategies across jurisdictions that cover Karuk Aboriginal Territory and include both natural and social sciences as well as socio-ecological systems that integrate the two. As these research collaborations have evolved, the Tribe is increasingly identifying and conducting research based on its identified stewardship and co-management needs and priorities and collaborating with the USDA Forest Service and other Federal and state agencies, university, and non-governmental organization partners.

PSWRS developed an agreement in 2006 with the Karuk Tribe to support the development of the Karuk Eco-Cultural Resources Management plan,⁹⁰ which lays out a long-term adaptive management strategy for the lands, waters, and cultural/natural resources within and adjacent to Karuk Aboriginal Territory, 95% of which is occupied by the Six Rivers and Klamath National Forests. PSWRS conducts research with the Karuk Tribe and other partners to help fulfill the US Forest Service's trust responsibility towards Federally recognized Tribes. These research products develop, synthesize, and document the Best Available Scientific Information—which includes both Western and Indigenous sciences—for lands, water, and resources management decisions.

In 2013, the Karuk Tribe and U.C. Berkeley, along with the Yurok and Klamath Tribes, scaled up their collaboration, conducting research focused on food security and the ways in which the Tribal community accesses food resources, including traditional foods derived off land concurrent with Tribal and National Forest System jurisdictions.⁹¹ A significant finding was that the Tribal community faces substantial challenges in accessing, securing, and having conditions in place to steward traditional foods.⁹² To enhance their Tribal food security and sovereignty, the Karuk and other Tribes conduct forestry and wildland fire management that foster opportunities

⁸⁸ See generally, Karuk – UC Berkeley Collaborative, [Home Page] (2022), available at <https://nature.berkeley.edu/karuk-collaborative/> (including links to projects, news, publications and other resources).

⁸⁹ Karuk Tribe and University of California at Berkeley, (Oct. 12, 2017). *Practicing Pikiyav: A Guiding Policy for Collaborative Projects and Research Initiatives with the Karuk Tribe*, Karuk-UC Berkeley Collaborative. Berkeley, CA: University of California at Berkeley, https://nature.berkeley.edu/karuk-collaborative/?page_id=165 (noting that as of 2021 the policy is under revision).

⁹⁰ Karuk Tribe Department of Natural Resources, (June 15, 2010), *Eco-Cultural Resources Management Plan*, draft web posting available at https://www.karuk.us/images/docs/dnr/ECRMP_6-15-10_doc.pdf.

⁹¹ Sowerwine, J., Sama-Wojcicki, D., Mucioki, M., Hillman, L., Lake, F. And Friedman, E. (2019). *Enhancing Food Sovereignty: A Five-Year Collaborative Tribal-University Research and Extension Project in California and Oregon*. Journal of Agriculture, Food Systems, and Community Development, 9(B), pp.167-190, https://www.karuk.us/images/docs/hr-files/Tribal%20Constitution%207_19_2008.pdf.

⁹² Karuk Tribe and University of California at Berkeley (2019). Klamath Basin Food System Assessment: Karuk Tribe Data. Karuk-UC Berkeley Collaborative. Berkeley, CA: University of California at Berkeley. <https://nature.berkeley.edu/karuk-collaborative/wp-content/uploads/2019/05/Food-Security-Assessment-Web-5.20.pdf>

for Indigenous fire stewardship and cultural burning.⁹³ Such efforts promote Tribally valued habitats for food, medicinal, fiber, and basketry resources and relations. Tribal-led landscape restoration strategies that promote drought-tolerant and fire-adapted vegetation, coupled with beneficial fire use, are regionally applicable climate adaptation strategies that increase the resistance of socio-cultural and ecological systems, and resilience of local communities and environments to climate-related stressors.⁹⁴ Aspects of these efforts are embodied in the Western Klamath Restoration Partnership, which the Karuk and the U.S. Forest Service co-lead with two other local non-governmental organizations.⁹⁵

Tribal-led Research and Conservation of Eulachon

Coastal Indian Tribes, including the Cowlitz Indian Tribe, have fished and traded for eulachon (*Thaleichthys pacificus*) in tributaries of the Columbia River since time immemorial. NOAA and the Cowlitz Indian Tribe—who initiated the project—applied Tribal oral histories to reconstruct historic distributions of the eulachon.⁹⁶ The Cowlitz Tribal oral histories aided in identifying key spawning habitat, timing of eulachon runs, and run differences between tributaries, and directly informed NOAA’s decision to list a population segment as threatened under the Endangered Species Act.⁹⁷ The project facilitated joint efforts to identify and protect critical habitat, increase abundance of the species, and promote species recovery.⁹⁸

Indigenous Knowledge in the USDA Tribal Climate Adaptation Menu

The Tribal Climate Adaptation Menu, which was developed by a diverse group of collaborators representing USDA and Tribal, academic, InterTribal, and government entities in Minnesota, Wisconsin, and Michigan, provides a framework to integrate Indigenous and Traditional knowledge, culture, language, and history into the climate adaptation planning process.⁹⁹ Developed as part of the Climate Change Response Framework, the Tribal Climate Adaptation Menu is designed to work with the Northern Institute of Applied Climate Science Adaptation

⁹³ Lake, Frank K. (2021). *Indigenous Fire Stewardship: Federal/Tribal Partnerships For Wildland Fire Research and Management*. Fire Management Today. 79(1): 30-39, <https://www.fs.usda.gov/treearch/pubs/62060>.

⁹⁴ Mucioki, M., Sowerwine, J., Sarna-Wojcicki, D., Lake, F.K. and Bourque, S. (2021). *Conceptualizing Indigenous Cultural Ecosystem Services (ICES) and Benefits Under Changing Climate Conditions in the Klamath River Basin and Their Implications For Land Management and Governance*. Journal of Ethnobiology, 41(3), pp. 313-330.

⁹⁵ Lake, F.K., Parrotta, J., Giardina, C.P., Davidson-Hunt, I. And Uprety, Y. (2018). *Integration of Traditional and Western Knowledge In Forest Landscape Restoration*. Forest Landscape Restoration, pp. 198-226; Routledge. Hessburg, P.F., Prichard, S.J., Haggmann, R.K., Povak, N.A. and Lake, F.K. (2021). *Wildfire and Climate Change Adaptation of Western North American Forests: A Case For Intentional Management*. Ecological Applications, 31(8), p.e02432.

⁹⁶ Nathan Reynolds & Marc Romano, (2013). *Traditional Ecological Knowledge: Reconstructing Historical Run Timing and Spawning Distribution of Eulachon through Tribal Oral History*, J. Of NW. Anthropology.

⁹⁷ National Marine Fisheries Services (Sept. 2017). *Recovery Plan for the Southern Distinct Population Segment of Eulachon*, <https://repository.library.noaa.gov/view/noaa/15989>.

⁹⁸ NOAA Fisheries (May 2019). *Guidance and Best Practices for Engaging and Incorporating Traditional Ecological Knowledge in Decision-Making*, <https://www.legislative.noaa.gov/docs/19-065933-Traditional-Knowledge-in-Decision-Making-Documents-Signed.pdf>.

⁹⁹ Tribal Adaptation Menu Team (2019). *Dibaginjigaadeg Anishinaabe Ezhitwaad: A Tribal Climate Adaptation Menu*. Great Lakes Indian Fish and Wildlife Commission, Odanah, Wisconsin, <https://forestadaptation.org/sites/default/files/Tribal%20Climate%20Adaptation%20Menu%2011-2020%20v2.pdf>.

Workbook, and as a stand-alone resource. The Menu is an extensive collection of climate change adaptation actions for forest planning, organized into tiers of general and more specific ideas. The Menu also includes a companion Guiding Principles document, which describes detailed considerations for working with Tribes and Indigenous Peoples. While this first version of the Menu was created based on Ojibwe and Menominee perspectives, languages, concepts, and values, it was intentionally designed to be adaptable to other Indigenous communities, allowing for the incorporation of their language, knowledge, and culture. Primarily developed for the use of Indigenous communities, Tribal natural resource agencies, and their non-Indigenous partners, this Tribal Climate Adaptation Menu may be useful in bridging communication barriers for non-Tribal persons or organizations interested in Indigenous approaches to climate adaptation and the needs and values of Tribal communities.

Including Indigenous Knowledge in Rivercane Restoration

The U.S. Army Corps of Engineers (USACE) Tribal Nations Technical Center of Expertise (TNTCX) has facilitated the formation of a Rivercane Restoration Alliance with support from the USACE Sustainable Rivers Program and The Nature Conservancy. The Alliance is a network of Tribal community members, artisans, academics, and state and Federal land managers with a shared vision of combining Traditional Indigenous Ecological Knowledge and other forms of knowledge to achieve successful rivercane recovery throughout the historic range (mostly within the southeastern United States, ranging from Florida to eastern Texas in the south, parts of the Midwest, and north to New York). In October 2021, nearly 200 of the Alliance members participated in a virtual workshop designed to explore the relationship that the participants have with rivercane, draft conceptual ecological models to educate others, and create a network for rivercane devotees to share information and opportunities. Through the workshop, Tribal communities shared the role rivercane plays in their language and cultural heritage preservation, as well as insights into how the Traditional Knowledge surrounding rivercane and its relationship with the environment has been ignored. The success of this project is directly attributable to co-developing the workshop agenda and strategy with Tribal partners. The Rivercane Restoration Alliance project has provided a model for forming alliances for other culturally significant species. For example, the TNTCX is leading a similar project for tule. The intent is to share the importance of these species, have land managers begin actively managing the species, and provide Tribal partners with access to the species.

Understanding Climate Impacts and Adaptation Around Arctic Rivers

The Arctic Rivers Project is a collaboration between researchers from the U. S. Geological Survey, University of Colorado, Boulder, National Center for Atmospheric Research, Yukon River Inter-Tribal Watershed Council, Institute for Tribal Environmental Professionals at Northern Arizona University, University of Saskatchewan, and University of Waterloo funded by the National Science Foundation's Navigating the New Arctic Program.¹⁰⁰ The goal of the

¹⁰⁰ See generally, University of Colorado, Boulder, (2022). [Website], <https://www.colorado.edu/research/arctic-rivers/about> (providing background information on the National Science Foundation's Navigating the New Arctic Program).

project is to weave together Indigenous Knowledge, monitoring, and the modeling of climate, rivers (flows, temperature, ice), and fish to improve understanding of how Arctic rivers, ice transportation corridors, fish, and communities might be impacted by and adapt to climate change. The project started January 1, 2020 and runs through December 31, 2024. The project team has diverse experience in water quality monitoring, river ice prediction, streamflow, climate change, fish, and Tribal environmental issues. Working with the Yukon River Inter-Tribal Watershed Council, a non-profit group representing 74 Tribes & First Nations dedicated to the preservation of the Yukon River Watershed, USGS developed initial research questions, guided by the executive board of directors and by Tribal and First Nations representatives. The overarching research question is: *How will societally important fish habitat and river-ice transportation corridors along Arctic rivers be impacted by climate change including permafrost degradation, transformed groundwater dynamics, shifts in streamflow, and altered river temperatures?* This question is intentionally broad to allow the research team to co-develop more specific research questions with the project's Indigenous Advisory Council and ultimately the communities that the project team works with. The project will host an Arctic Rivers Summit in Anchorage, Alaska in December 2022 to convene up to 150 Tribal, Indigenous, and First Nation leaders, community members, managers, and knowledge holders, western scientists, Federal, state, and provincial agency representatives, academic partners, non-governmental organizations, and others. This workshop will facilitate discussion of the current and potential future states of Alaskan and Yukon rivers and fish and how we can adapt.

Accelerating Indigenous-Led Climate Adaptation in California Through USGS

Indigenous Peoples and Tribal Nations are on the front lines of climate change, and are also leading in the implementation of adaptation strategies. Traditional, or cultural, burning has been recognized as a robust adaptation strategy, increasing the resilience of ecosystems and the local communities that depend on them for economic and social well-being. Indigenous Peoples have stewarded their ancestral homelands for millennia using cultural burning, which is practiced primarily for maintaining the abundance of culturally-significant plants and animals for food, livelihoods, ceremonial, medicinal, and other purposes. These approaches can be complementary to other ecosystem restoration based on other forms of knowledge, such as thinning and prescribed burning and management treatments, practices that themselves often originate from traditional land stewardship. Across California, Indigenous Peoples continue to steward lands in a variety of jurisdictions, including public domain allotments, private land, homesteads, and other protected lands or conservation covenants.

In collaboration with the North Fork Mono Tribe, the Southwest Climate Adaptation Science Center (SW CASC), a collaborative Federal-university partnership between USGS and seven academic institutions from across the Southwest, affiliated researchers are engaging in a series of multi-stakeholder, hands-on traditional burning efforts that include pre- and post-burn vegetation monitoring to improve understanding of the efficacy of these treatments. They also are assessing the climate vulnerability of Indigenous-stewarded lands in California, while participating in a resilience planning effort with Indigenous agricultural producers. The project seeks to better understand the condition of and climate risks to these lands so that Indigenous Knowledge

systems can be more effectively applied and sustained for future generations. Products from this project include modeling tools to assess climate vulnerability, comprehensive accounting of Indigenous producers across jurisdictions, and resilience planning documents to better support Indigenous land stewards in decision making.

This work fosters Tribal-university-government knowledge exchange, as well as Tribal Nation-to-Nation exchange on environmental stewardship and climate adaptation. Ultimately, the project aims to cultivate a decision and policy-making environment that accelerates Indigenous-led climate adaptation, particularly in the form of cultural burning. The project advances partnerships between the USGS, Southwest CASC and affiliated universities, and Tribal Nations and communities, particularly the North Fork Mono Tribe, while strengthening relationships between Tribal citizens, the public, and state and Agencies in California and across the Southwest.

Indigenous Data Sovereignty and Public Accessibility in the Arctic

The Exchange for Local Observations and Knowledge of the Arctic (ELOKA) is a repository for Indigenous data and Knowledge built upon principles of Indigenous data sovereignty.¹⁰¹ Funded by the National Science Foundation, ELOKA responds to twin imperatives: The Federal mandate to make data collected with Federal dollars public and broadly accessible, and the right of Tribes and Indigenous Peoples to control their own knowledge. ELOKA fosters collaboration between scientists and Indigenous Arctic residents to record, preserve, and share Indigenous Knowledge in ways that are ethical, equitable, and community-driven. An Indigenous Advisory Committee ensures that ELOKA is responsive to community needs for data management and visualization.

ELOKA is an example of data infrastructure and capacity building that simultaneously serves the needs of Indigenous communities and Agencies. In partnership with communities, ELOKA creates a variety of products to share and display data, including transcripts of interviews with Alaska Native Elders, audio files, photographs, quantitative environmental data, and Indigenous place names linked to digital maps. The Yup'ik Environmental Knowledge Project, hosted by ELOKA, is a web-based atlas of Indigenous place names from Southwest Alaska.¹⁰² The geolocated names have associated sound files as well as photos, videos, and narratives. Access to the atlas was originally restricted to protect sensitive data, but community representatives voted unanimously to make the data publicly accessible.¹⁰³ ELOKA is built upon a foundation of trust and mutual respect, and demonstrates how Agencies can support open data policies while respecting Indigenous data sovereignty.

¹⁰¹ See generally, ELOKA, University of Colorado, Boulder.2022. [Website], <https://eloka-arctic.org/about-eloka> (providing background information on ELOKA).

¹⁰² ELOKA, University of Colorado, Boulder (2022). Yup'ik Atlas [Mapping Tool], <https://eloka-arctic.org/communities/yupik/atlas/index.html>.

¹⁰³ Noor Johnson, Colleen Strawhacker, and Peter Pulsifer (2022). Data Infrastructures, Indigenous Knowledge, and Environmental Observing in the Arctic. In *The Nature of Data: Infrastructures, Environments, Politics*, edited by Jenny Goldstein and Eric Nost. University of Nebraska Press.

The National Institutes of Health Tribal Health Research Programs

The National Institutes of Health (NIH) Native American Research Centers for Health (NARCH) program supports research projects through awarding of grants directly to Tribes and Tribal organizations, who then can choose to partner with research-intensive academic institutions to conduct health research important to Tribal communities. For more than 20 years, the program has funded Tribally driven research, including on environmental health and climate change, as well as Indigenous student and faculty development with the aim of developing a cadre of scientists actively researching health challenges facing these populations.¹⁰⁴

NIH also funds the Intervention Research to Improve Native American Health (IRINAH) program. The program was created to develop, adapt, and test the effectiveness of health-promotion and disease-prevention interventions in populations. The long-term goal of the program is to reduce mortality and morbidity in Native American communities and provides a forum for discussions on the challenges and opportunities to improve health in Native American populations across the United States. Research conducted with the Blackfeet and Nez Perce Tribes, supported by this program, applied Indigenous Knowledge by exploring the efficacy of woodstove filters and education as interventions to reduce respiratory disease among Tribal Elders. Instead of focusing on avoiding the health risks associated with the burning of poorly seasoned wood, investigators used storytelling to highlight important culturally-based use of fire coupled with public health messaging.¹⁰⁵

Traditional Wisdom Helps Shape CDC Health Promotion and Disease Prevention Programs

Tribal Leaders have expressed that traditional teaching and culturally grounded health promotion are not widely understood by Agencies, and often are not supported with financial and technical resources. To address this concern, Centers for Disease Control and Prevention (CDC) seeks to actively include Indigenous Tribal Ecological Knowledge, or Traditional Wisdom, into all areas of its mission. Below are several successful examples of these efforts. The Native Diabetes Wellness Program Traditional Foods Project¹⁰⁶ was a community-designed program sponsored by the CDC and the Indian Health Service advised by the Tribal Leaders Diabetes Committee,¹⁰⁷ a committee of Tribal Leaders that recommends funding priorities in support of Tribally driven programs to address chronic disease prevention. The Native Diabetes Wellness Program Traditional Foods Project was effective at including traditional approaches, values, education,

¹⁰⁴ See generally, National Institute of General Medical Science (2022). Native American Research Centers for Health (NARCH), [https://nigms.nih.gov/capacity-building/division-for-research-capacity-building/native-american-research-centers-for-health-\(narch\)](https://nigms.nih.gov/capacity-building/division-for-research-capacity-building/native-american-research-centers-for-health-(narch)) (providing background information on the NARCH program).

¹⁰⁵ Ward TJ, Semmens EO, Weiler E, Harrar S, Noonan CW. (2017). Efficacy of Interventions Targeting Household Air Pollution From Residential Woodstoves. *J Expo Sci Environ Epidemiol* 27(1):64–71, PMID: 26555475, <https://doi.org/10.1038/jes.2015.73> (detailing an example of a project under this program).

¹⁰⁶ See generally, Centers for Disease Control and Prevention (Aug. 16, 2021). Traditional Foods: Traditional Food Project, 2008-2014, available at <https://www.cdc.gov/diabetes/ndwp/traditional-foods/index.html> (providing background information on the Native Diabetes Wellness Program Traditional Foods Project).

¹⁰⁷ See generally, Indian Health Service (2022). Tribal Leaders Diabetes Committee, available at <https://www.ihs.gov/sdpi/tldc/> (providing background information on the Tribal Leaders Diabetes Committee).

and experiences in its health promotion in communities.¹⁰⁸ For example, Tribal Leaders suggested creating stories for children about preventing diabetes, since there were few stories. Diabetes had been largely unknown until recent decades, and incorporating traditional knowledge and culture alongside Western medicine led the CDC to develop the children’s Eagle Book Series.¹⁰⁹ The Project ultimately led to significant work by Tribes across the continent to support food sovereignty and reclaim traditional foods.¹¹⁰ One specific example of CDC work with Tribes on this project includes the book *Qaqamiigux*, which offers stories, experiences, recipes, and wisdom shared by Indigenous elders, food preparers, and hunters from the Aleutian and Pribilof Islands Region of Alaska about the use of traditional and local foods, from the land and sea. In another example of CDC inclusion of traditional wisdom, the CDC followed the advice of its Tribal Advisory Committee, which recommended convening a group of knowledgeable cultural advisors to increase understanding of the role of Tribal practices and culturally grounded strategies and activities in health promotion. This advice helped the CDC craft program strategies to reach the desired public health capacity and health outcomes in Indigenous communities and led the CDC to provide grants for Tribal Practices for Wellness in Indian Country.¹¹¹

¹⁰⁸ Satterfield D, Debruyne L, Santos M, Alonso L, Frank M. (2016). Health Promotion and Diabetes Prevention in American Indian and Alaska Native Communities — Traditional Foods Project 2008-2014. *MMWR Suppl*;65place_holder_for_early_release:4–10. DOI: <http://dx.doi.org/10.15585/mmwr.su6501a3external> icon.

¹⁰⁹ Satterfield D, Debruyne L, Dodge Francis C, Allen A. (2014). A Stream is Always Giving Life: Communities Reclaim Traditional Ways to Prevent Diabetes and Promote Health. *Am Indian Culture Research J.*, 38:157–90; *see generally*, Centers for Disease Control and Prevention (Aug. 3, 2021). Native Diabetes Wellness Program, Eagle Books, available at <https://www.cdc.gov/diabetes/ndwp/eagle-books/index.html> (providing background information on Eagle Books).

¹¹⁰ *See generally*, Centers for Disease Control and Prevention (Aug. 16, 2021). Traditional Foods: Traditional Food Project, 2008-2014, available at <https://www.cdc.gov/diabetes/ndwp/traditional-foods/index.html> (providing background information on the Native Diabetes Wellness Program Traditional Foods Project).

¹¹¹ *See e.g.*, Centers for Disease Control (2022). Tribal Practices for Wellness in Indian Country Notice of Funding Opportunity – CDC – RFA – DP22-2201, <https://www.cdc.gov/healthytribes/tpwic/funding-opportunities/TPWIC-NOFO-2201.htm>.

Appendix B: Select Federal Agency Guidance Documents on Indigenous Knowledge

Agency	Title
U.S. Department of Agriculture	<p>Indigenous Stewardship Methods and NRCS Conservation Practices (2010) https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/plantsanimals/plants/?cid=stelprdb1045246</p> <p>Traditional Ecological Knowledge: An Important Facet of Natural Resources Conservation (2004) https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1045244.pdf</p>
U.S. Forest Service	<p>Traditional and Local Ecological Knowledge About Forest Biodiversity in the Pacific Northwest (2008) https://www.fs.usda.gov/treesearch/pubs/29926</p> <p>Exploring the Role of Traditional Ecological Knowledge in Climate Change Initiatives (2013) https://www.fs.fed.us/pnw/pubs/pnw_gtr879.pdf</p>
Department of the Interior	<p>Guidelines for Considering Traditional Knowledges in Climate Change Initiatives (2014) https://toolkit.climate.gov/tool/guidelines-considering-traditional-knowledges-climate-change-initiatives</p>
Bureau of Ocean Energy Management	<p>Traditional Knowledge webpage and infographic https://www.boem.gov/about-boem/traditional-knowledge</p>
National Park Service	<p>Introduction to Traditional Ecological Knowledge in Wildlife Conservation (2016) https://irma.nps.gov/DataStore/DownloadFile/554622</p>
U.S. Fish and Wildlife Service	<p>Traditional Ecological Knowledge for Application by Service Scientists (2011) https://www.fws.gov/media/traditional-ecological-knowledge-fact-sheet</p>
National Oceanic and Atmospheric Administration	<p>Engaging and Incorporating Traditional Ecological Knowledge in Decision-Making (2019) https://media.fisheries.noaa.gov/dam-migration/traditional_knowledge_in_decision_making_508_compliant.pdf</p> <p>Traditional & Local Knowledge: A vision for the Sea Grant Network (2018) https://seagrant.noaa.gov/Portals/1/Network%20Visioing/Traditional%26Local_110118.pdf</p>

<p>U.S. Environmental Protection Agency</p>	<p>Considering Traditional Ecological Knowledge (TEK) During the Cleanup Process (2017) https://www.epa.gov/tribal-lands/considering-traditional-ecological-knowledge-tek-during-cleanup-process</p> <p>Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples (2014) https://www.epa.gov/environmentaljustice/epa-policy-environmental-justice-working-Federally-recognized-tribes-and</p>
<p>Advisory Council on Historic Preservation</p>	<p>Traditional Knowledge and the Section 106 Process: Information for Agencies and Other Participants (2021) https://www.achp.gov/sites/default/files/2021-05/TraditionalKnowledgePaper5-3-21.pdf</p> <p>The Advisory Council on Historic Preservation's Statement On Its Trust Responsibility https://www.achp.gov/sites/default/files/2018-06/TheACHPsStatementOnItsTrustResponsibility.pdf</p> <p>Consultation with Native Hawaiian Organizations In The Section 106 Review Process: A Handbook https://www.achp.gov/sites/default/files/2021-06/ConsultationwithIndianTribesHandbook6-11-21Final.pdf</p>

Appendix C. Example of Approach to Indigenous Knowledge as Source Materials in Highly Influential Scientific Assessments Under the Information Quality Act

The Information Quality Act (IQA) requires Agencies to verify that data and information used in Federal products and reports are of a sufficient quality for the purposes they are being used, with quality defined as utility, transparency, objectivity, and integrity. This includes the requirement for information to demonstrate a capability of being reproduced by independent assessment or analysis using similar methods. The Office of Management and Budget (OMB) requires that products that are characterized as Influential Scientific Information (ISI) or Highly Influential Scientific Assessments (HISA) are consistent with more specific standards of peer review and reproducibility, including full documentation and public transparency into their development process. When a HISA draws conclusions that are based on the synthesis of evidence (including Indigenous Knowledge), all evidence presented should have qualities that are consistent with the principles of the Information Quality Act and OMB’s associated guidance.¹¹²

The draft survey provided below is an example of how one Federal program seeks to ensure that Indigenous Knowledge can be considered consistent with the IQA. The survey was developed by the U.S. Global Change Research Program as an update to guidance for the authors of the National Climate Assessment. An author considering Indigenous Knowledge will answer the questions on the survey. If the answer to each survey item is “yes,” the Indigenous Knowledge may be considered as a source of information for the National Climate Assessment.

Indigenous Knowledge Information Quality Act Checklist

Transparency & Traceability

Relationality

- Ability to substantiate that the information is part of a relationship or kinship of people across generations interconnected to social, spiritual, cultural, and natural environmental or ecological systems
- The information is tied to a specific location or a specific type of habitat, environmental media, or biological species

Clarity

- Theories, scope, approach, methods, and context is clearly described and any differences in outcomes from those developed using other approaches are discussed, including assumptions and limitations

Objectivity

Context

- The information is understood and applied in a way that is respectful to and consistent

¹¹² OMB (2001). Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies, § 3(b)(2) (2001); OMB (Apr. 24, 2019). Circular M-19-15, Improving Implementation of the Information Quality Act, <https://www.cdo.gov/assets/documents/OMB-Improving-Implementation-of-Info-Quality-Act-M-19-15.pdf>.

with the cultural, spiritual, and environmental context of the Indigenous Peoples who own it

- The knowledge is used or applied in the assessment in an objective, accurate, clear, complete, and unbiased manner
- There was meaningful engagement, communication, collaboration, or co-production between the assessment author and the knowledge holder(s)

Valuation

- The inherent use and value of the information and expertise of the knowledge holders, including lived experience, is retained and respected
- Language and names within the information, in which Indigenous Knowledge and values may be nested, are preserved
- The Indigenous Knowledge is considered through an Indigenous lens, voice, or style and weaved together with other forms of evidence without converting or forcing the knowledge into non-Indigenous frameworks

Purpose

- The original purpose for creation of this information is understood, considered, and respected when used in the assessment
- The interpretation of the information is consistent with the intent

Integrity & Security

Consent

- Information owners granted free, prior, informed consent for including this information in assessment, and maintain control over collection, ownership, and use of data derived from sources
- Reference in the assessment is free of any culturally sensitive information that the knowledge holders do not want made public, including consideration of how documentation may be subject to or released under the Freedom of Information Act

Respect

- The author made clear how the information will be protected to prevent against unauthorized use, cultural misappropriation, or inadvertent disclosure, including how data and knowledge sovereignty and governance are being respected and not disclosed in contexts outside the assessment

Reproducibility

Continuity

- Ability to substantiate that the information consists of repeated observations or understandings built and maintained over time and shared or passed down through generations while maintaining continuous formats (e.g., oral, written, song, dance, visual formats, etc.)

Validation

- Practices for ensuring quality control and validation are appropriate to the nature of the source information, as determined by the Indigenous knowledge holders from which the information comes, such as through iterative, equitable dialogue on the

interpretation of findings by community members, co-researchers, or collective knowledge systems



Appendix D: Federal Departments and Agencies Contributing to the Interagency Working Group on Indigenous Knowledge

- Department of Agriculture
 - U.S. Forest Service
- Department of Commerce
 - National Oceanic and Atmospheric Administration
- Department of Defense
 - Army Corps of Engineers
- Department of Education
- Department of Energy
- Department of Health and Human Services
 - Centers for Disease Control and Prevention
 - National Institutes of Health
 - Indian Health Service
- Department of Homeland Security
 - Federal Emergency Management Agency
- Department of Housing and Urban Development
- Department of the Interior
 - Bureau of Indian Affairs
 - U.S. Fish and Wildlife Service
 - U.S. Geological Survey
 - National Park Service
- Department of Justice
- Department of Labor
- Department of State
- Department of Transportation
- Department of Veterans Affairs
- U.S. Agency for International Development
- U.S. Environmental Protection Agency
- Advisory Council on Historic Preservation
- National Archives and Records Administration
- National Science Foundation
- Smithsonian Institution
- White House
 - Office of Management and Budget
 - Domestic Policy Council
 - Office of Domestic Climate Policy
 - White House Council on Native American Affairs

Appendix E: Additional References and Resources for Promising Practices to Apply When Considering Indigenous Knowledge in Federal Processes

This appendix was developed with input from the Interagency Working Group on Indigenous Knowledge and provides additional resources and examples of how Agencies have partnered with Tribes to apply promising practices consistent with this guidance to include Indigenous Knowledge in Federal decision making. This Appendix is not intended to be an exhaustive list, but rather provide additional resources and examples for Agencies to consider when implementing the guidance.

Planning Ahead

- Traditional & Local Knowledge: A vision for the Sea Grant Network. August 31, 2018, 31pp. https://seagrants.noaa.gov/Portals/1/Network%20Visioning/Traditional%26Local_110118.pdf
- The BIA Tribal Resilience Program in 2021 planned for feedback from Tribes and Indigenous Peoples that included partners that have relationships in the climate space. They also included culturally important practices in the agenda, such as an Elder opening. <https://www.bia.gov/news/tribal-listening-sessions-climate-discretionary-grants>

Engaging Youth and Elders

- Inuit Circumpolar Council Alaska. 2019. The Role of Providing-Inuit Management Practices: Youth, Elders, Active Hunters and Gatherers Workshop Report, Anchorage, AK. <https://iccalaska.org/wp-icc/wp-content/uploads/2022/03/YEAH-Workshop-Report.pdf>
- Alaska Native Knowledge Network. 2000. Guidelines for Respecting Cultural Knowledge. Assembly of Alaska Native Educators, adopted February 1, 2000, Anchorage, AK. <http://ankn.uaf.edu/publications/knowledge.html>
- Inuit Circumpolar Council Alaska. 2019. The Role of Providing-Inuit Management Practices: Youth, Elders, Active Hunters and Gatherers Workshop Report, Anchorage, AK. <https://iccalaska.org/wp-icc/wp-content/uploads/2022/03/YEAH-Workshop-Report.pdf>

Including Indigenous Knowledge in Federal Decision Making

- EPA. 2012. Environmental Justice Analysis in support of the National Pollutant Discharge Elimination System (NPDES) General permits for Oil and Gas Exploration on the Outer Continental Shelf and Contiguous State waters in the Beaufort Sea, Alaska and oil and gas exploration facilities on the Outer Continental Shelf in the Chukchi Sea, Alaska. EPA, Region 10, Alaska Operations Office. Final October 2012. 52pp.
- In 2019, USFS executed an Integrated Fire Management Memorandum of Understanding (MOU) with the Karuk Tribe and BIA to document cooperation between the parties concerning wildland fire incidents and clearly define roles and responsibilities. This MOU demonstrates how Agencies can integrate Indigenous Knowledge into fire

management strategies to better protect tribal values.

https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd637505.pdf.

- USFWS hosted a two-day workshop with Indigenous Knowledge holders during the ESA process for walrus. This knowledge was included within a Bayesian Belief Network model that analyzed the various relationships between walruses and factors that influenced their growth and abundance. Gregor, R., C. Beaudrie, and N. Kaechele. Appendix D. Alaskan Native Ecological Knowledge Workshop Report in MacCracken, J.G, et. al. 2017. Final species status assessment for the Pacific walrus (*Odobenus rosmarus divergens*), May 2017 (Version 1.0). USFWS Anchorage, Alaska. pages 251-275. <https://polarbearsience.files.wordpress.com/2019/04/maccracken-et-al-2017-walrus-species-status-assessment-final-usfws-may-2017.pdf>
- The BIA Tribal Resilience Program hosts a yearly camp focused on building capacity for Tribes and Indigenous Peoples by bringing youth from around the country together to learn and share about practices and approaches for resilience planning that includes both western science and Indigenous Knowledge. <https://www.bia.gov/bia/ots/tribal-resilience-program/youth>

Considering Shared Management Structures

- U.S. Department of the Interior Secretarial Order No. 3342 https://www.doi.gov/sites/doi.gov/files/uploads/so3342_partnerships.pdf
- Washburn, K.K. 2022. Facilitating Tribal co-management of Federal public lands. Wisconsin Law Review 263:263-328 <https://wlr.law.wisc.edu/wp-content/uploads/sites/1263/2022/04/14-Washburn-Camera-Ready.pdf>
- Papahānaumokuākea Marine National Monument (see Appendix D)
- Inuit Circumpolar Council-Alaska.2020. Food Sovereignty and Self-Governance: Inuit Role in Managing Arctic Marine Resources, Anchorage, AK. <https://www.inuitcircumpolar.com/project/food-sovereignty-and-self-governance-inuit-role-in-managing-arctic-marine-resources/>
- Cape Breton University, <http://www.integrativescience.ca/Principles/TwoEyedSeeing/> ; Bartlett, C., M. Marshall, and A. Marshall. 2012. Two-eyed seeing and other lessons learned within a co-learning journey of bringing together Indigenous and mainstream knowledges and ways of knowing. Journal of Environmental Studies and Sciences 2:331-
- Ellam Yua, J. Raymond-Yakoubian, R. Aluaq Daniel. and C. Behe. 2022. A framework for co-production of knowledge in the context of Arctic research. Ecology and Society 27(1):34. <https://doi.org/10.5751/ES-12960-270134>
- Kutz, S., and M. Tomaselli. 2019. “Two-eyed seeing” supports wildlife health: bridging Indigenous and scientific knowledge improves wildlife surveillance and fosters reconciliation. Science 364(6446):1135-1137. <https://doi.org/10.1126/science.aau6170>
- Tribal-led Research and Conservation of Eulachon (see Appendix D)

Recognizing Indigenous Methodologies

- L.D. Harris and J. Wasilewski, Indigeneity, an alternative worldview: Four R's (relationship, responsibility, reciprocity, redistribution) vs Two P's (power and profit), *Systems Research and Behavioral Science*, 21(5), pp. 498-503.
- Smith, L.T., 2021. *Decolonizing methodologies: Research and indigenous peoples*. Bloomsbury Publishing.
- Wilson, S., 2008. *Research is ceremony: Indigenous research methods*. Fernwood Publishing
- Whyte, K.P., Brewer, J.P. & Johnson, J.T. 2016. Weaving Indigenous science, protocols and sustainability science. *Sustainability Science*. 11, 25–32.
- Haring, C. P., Altmann, G. L., Suedel, B. C., & Brown, S. W. (2021). Using Engineering With Nature®(EWN®) principles to manage erosion of watersheds damaged by large-scale wildfires. *Integrated Environmental Assessment and Management*, 17(6), 1194-1202. <https://setac.onlinelibrary.wiley.com/doi/full/10.1002/ieam.4453>

Honoring Indigenous Languages

- Ayaprun Elitnaurvik, Bethel, Alaska is an example of a Yup'ik immersion school that meets state and Federal requirements for education and provides the education that includes Yupiit Piciryarait. Western approaches and Yup'ik ways of being are included across the K-8 learning environment. https://ayaprun.lksd.org/about/ayaprun_elitnaurvik
- Departments of the Interior, Education, and Health and Human Services launch multi-agency initiative to protect and preserve Native languages, aligning efforts for language preservation programs. <https://nativelanguagesummit.org>
- Memorandum of Agreement on Native Languages, signed November 10, 2021, <https://www.doi.gov/sites/doi.gov/files/native-american-language-moa-11-15-2021.pdf>
- Name changes reflected in the Geographic Names System, some recent examples include changing McKinley to Denali and Wade Hampton County to Kusilvak County, and Barrow to Utqiagvik <https://edits.nationalmap.gov/apps/gaz-domestic/public/summary/1414314>

Applying Indigenous Voice and Style

- Younging, G. 2018. *Elements of Indigenous Style: A Guide for Writing By and About Indigenous Peoples*. Brush Education Inc. 151pp.
- ACHP style guide
- Field Museum in Chicago exhibit “Native Truths: Our Voices, Our Stories” co-created through contribution of many knowledge systems taking a collaborative approach. *Indian Country Today report: Indian Country Today report:* <https://indiancountrytoday.com/news/native-truths-our-voices-our-stories-exhibition-opens>

Citing Indigenous Knowledge

- Jantarasami, L.C., R. Novak, R. Delgado, E. Marino, S. McNeeley, C. Narducci, J. Raymond-Yakoubian, L. Singletary, and K. Powys Whyte, 2018: *Tribes and Indigenous*

Peoples. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 572–603. doi: 10.7930/NCA4.2018.CH15

- MacLeod, Lorisia. 2021. “More Than Personal Communication: Templates For Citing Indigenous Elders and Knowledge Keepers”. *KULA: Knowledge Creation, Dissemination, and Preservation Studies* 5 (1). <https://doi.org/10.18357/kula.13>
- Kornei, K. (2021), Academic citations evolve to include Indigenous oral teachings, *Eos*, 102, <https://doi.org/10.1029/2021EO210595>. Published on 9 November 2021.

Building Capacity and Providing Direct Funding to Tribes and Indigenous Organizations

- Kawerak, Inc. (2021) *Knowledge & Research Sovereignty Workshop May 18-21, 2021 Workshop Report*. Prepared by Sandhill.Culture.Craft and Kawerak Inc. Social Science Program. Nome, Alaska.
- In August 2022, the National Oceanic and Atmospheric Administration (NOAA) awarded a grant to the Alaska Native Tribal Health Consortium and jointly launched a pilot project to support Alaska Native communities’ resilience to climate change. This effort demonstrates how Agencies can include expertise from Tribes and Indigenous Peoples in developing effective approaches to address burdens on tribal communities. <https://www.noaa.gov/news-release/pilot-project-to-support-tribal-climate-resilience-in-alaska>

Appendix F: Additional Resources for Considering Indigenous Knowledge in Federal Research Design and Implementation Contexts

Although a non-exhaustive list, the following resources may guide Federal researchers as they work to establish relationships with Tribes and Indigenous Peoples, acknowledging that each Tribe and research situation is unique. Many of these resources relate to *The Six Rs of Indigenous Research*, which are based on Indigenous Research Methodologies.¹¹³

Responsibility

It is the responsibility of the research team to understand the socio-political landscape of a research site and research question and to follow ethical best practices, whether or not the research is considered human subjects research.

- Wong et al., Towards Reconciliation: 10 Calls to Action to Natural Scientists Working in Canada, 5(1) FACETS 769–783 (2020), <https://doi.org/10.1139/facets-2020-0005>.
- Kūlana Noi‘i Working Group, Kūlana Noi‘i, 2 UNIV. OF HAW. SEA GRANT COLL. PROGRAM (2021), https://seagrant.soest.hawaii.edu/wp-content/uploads/2021/09/Kulana-Noii-2.0_LowRes.pdf; Wong et al., *supra* note 104.
- Nicole S. Khun, Myra Parker, & Clarita Lefthand-Begay, Indigenous Research Ethics Requirements: An Examination of Six Tribal Institutional Review Board Applications and Processes in the United States, 15(4) J. OF EMPIRICAL RSCH. ON HUM. RSCH. ETHICS, 279 (2020).

Research Approach

Select appropriate research methods and parameters for the problem, the cultural context, and weaving together knowledge systems, as well as for the use of data and dissemination of results.

- Jennifer Sepez, Introduction to Traditional Environmental Knowledge in Federal Natural Resource Management Agencies, 27(1) PRACTICING ANTHROPOLOGY 2 (2005), <https://doi.org/10.17730/praa.27.1.01m318334845k392>.
- Kūlana Noi‘i Working Group, *supra* note 105.
- STACC Working Grp., Status of Tribes and Climate Change Report, INST. FOR TRIBAL ENV'T PROS., [D. Marks-Marino ed. 2021), <http://nau.edu/stacc2021>.
- Nicholas-Figueroa, Linda & Wall, Daniel & Muelken, Mary & Duffy, Lawrence, 2017. Implementing Indigenous Knowledge in Western Science Education Systems and Scientific Research on Alaska's North Slope. *International Journal of Education*. 9(4):15. DOI:10.5296/ije.v9i4.12148.

Relevance

When working in or with Tribes and Indigenous communities, ensure research is relevant to the experiences, perspectives, priorities, and ways of knowing, and living in the community.

- U.S. Interagency Arctic Rsch. Pol'y Comm., Principles for Conducting Research in the Arctic, (2018),

¹¹³ Tsosie et al., *supra* note 59.

https://www.iarpccollaborations.org/uploads/cms/documents/principles_for_conducting_research_in_the_arctic_final_2018.pdf.

Representation

Empower Indigenous Peoples communities should lead in the research process by sharing to identify and share what is important to their people and contribute to the research process.

Community.

- Wong et al., supra note 104.

Respect

Have respect for Indigenous Peoples communities and cultures, multiple ways of knowing, and Indigenous knowledge holders.

- Interagency Artic Rsch. Policy Comm., Principles for Conducting Research in the Arctic (2018), https://www.iarpccollaborations.org/uploads/cms/documents/principles_for_conducting_research_in_the_arctic_final_2018.pdf [hereinafter "IARPC"].
- Climate & Traditional Knowledges Workgroup, Guidelines of Considering Traditional Knowledges in Climate Change Initiatives (2014), <https://toolkit.climate.gov/tool/guidelines-considering-traditional-knowledges-climate-change-initiatives>.
- Wong et al., supra note 104.
- IARPC, supra note 113; Kūlana Noi'i Working Group, supra note 105.
- Saima May Sidik, Weaving Indigenous Knowledge into the Scientific Method Nature NATURE (Jan 11, 2022), <https://www.nature.com/articles/d41586-022-00029-2>; Kūlana Noi'i Working Group, supra note 105.

Relationship

Invest time and resources in engagement necessary to understand the issues, concerns, and needs from the perspective of partners. Acknowledge the relationality nature of relationships (people-to-people and people-to-environment) as they relate to Indigenous Knowledge. Honestly and clearly identify the purpose and motivation of the research.

- IARPC, supra note 113.
- Kristen A. Goodrich, et al., Who are Boundary Spanners and how can we Support Them in Making Knowledge More Actionable in Sustainability Fields?, 42 ENV'L SUSTAINABILITY 45 (2020), <https://doi.org/10.1016/j.cosust.2020.01.001>.

Knowledge sharing and data dissemination

Establish and follow clear guidelines and expectations of knowledge sharing and data dissemination that take into consideration Tribal and Indigenous Peoples' data and knowledge sovereignty, as well as Federal policies related to data releases, publications, and funding.

- Mark D. Wilkinson, et al. The FAIR Guiding Principles for Scientific Data Management and Stewardship, 3 SCI. DATA 160018 (2016), <https://doi.org/10.1038/sdata.2016.18>; Carroll et al., supra note 13.
- IARPC, supra note 113.
- Inuit Circumpolar Couns., supra note 3.
- Kūlana Noi'i Working Group, supra note 105.

Reciprocity

Establish practices that allow both Tribes and Indigenous Peoples and the scientific community to benefit from the research.

- ICC, 2022
- Kūlana Noi'i Working Group, supra note 105.