Compilation of Engagement with Indigenous Communities & Experts Associated with TEK in the United States

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List of Abbreviations and Acronyms

ANILCA	Alaska National Interest Lands Conservation Act
BIA	Bureau of Indian Affairs
BOEM	Bureau of Ocean Energy Management
CASC	Climate Adaptation Science Centers
CEC	Commission for Environmental Cooperation
CEPA	Ramsar Convention Programme on communication, capacity building, education, participation and awareness
CSKT	Confederated Salish and Kootenai Tribes
GLIFWC	Great Lakes Indian Fish and Wildlife Commission
DOI	Department of the Interior
EPA	Environmental Protection Agency
ITC	Inter-Tribal Timber Council
LCC	Landscape Conservation Cooperatives
NAFTA	North American Free Trade Agreement
NCAI	National Congress of American Indians
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
ONR	Our Natural Resources
TEK	Traditional Ecological Knowledge
TSGA	Tribal Self-Governance Act
UNDRIP	United Nations Declaration of the Rights of Indigenous Peoples
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Abstract

The purpose of this *Compilation of Engagement with Indigenous Communities & Experts Associated with TEK in the United States* is to assist the Commission for Environmental Cooperation (CEC) and other partners engaging in work that involves TEK. This paper provides an inventory of existing frameworks in the United States that provide mechanisms for the voluntary engagement of indigenous communities and Traditional Ecological Knowledge (TEK) experts. After briefly providing context and background for TEK work in the United States, the report describes existing frameworks at the international, federal, tribal, and state levels. Additionally, representative examples of TEK projects in universities, research/public partnerships, and the private sector are discussed. Appendix A lists Tribes and Indigenous communities engaged in TEK projects in the United States. This United States-focused report is one of three; the two other reports focus on Canada and Mexico respectively. Together, the three reports are a part of the CEC's North American TEK Atlas project.

Executive Summary

This report is one of the first documents to compile a comprehensive inventory of frameworks in the United States that provide mechanisms for the voluntary engagement of Indigenous communities and Indigenous experts associated with TEK, and recognized by the Indigenous community as experts in the context of efforts to protect the environment in the United States. There are many potential ways to define a "framework." For the purpose of this report, this inventory focused on codified laws, regulations, and promulgated policies; official agreements between sovereign nations; and well-established institutions and projects. It does not address or include internal United States agency handbooks, departmental manuals, separate Secretarial or Administrator orders or additional institutional structures within United States governmental agencies and departments that provide guidance on the complexities of tribal engagement with, and TEK inclusion in, their decision-making structures. Finally, it is important to remember that this report focuses on the existence of frameworks rather than the efficacy of their implementation.

The report examines and discusses such frameworks at the international, federal, tribal, and state levels, and provides examples of TEK projects in universities, research/public institution partnerships, and the private sector. The report's focus on environmental management is tied to the mission of the CEC, an intergovernmental organization established pursuant to the North American Agreement on Environmental Cooperation that convenes citizens and experts from governments, nongovernmental organizations, academia and the private sector to seek solutions to protect North America's shared environment while supporting sustainable economic development.

The report was created through a combination of interviews and desk-based research. From November 2018 through February 2019, interviews were conducted with the following TEK practitioners, experts, and federal agency employees: Scott Aikin (National Native American Programs Coordinator, U.S. Fish and Wildlife Service); Keala Carter (Public Lands Specialist, Bears Ears Inter-Tribal Coalition); Ann Marie Chischilly (Executive Director, Institute for Tribal Environmental Professionals); Michael Durglo Jr. (Confederated Salish and Kootenai Tribes, Tribal Historic Preservation Department Head); Danny Gogal (US EPA Office of Environmental Justice); Kim Greenwood (National Park Service, Cultural Anthropologist); Dona Harris (US EPA Office of International and Tribal Affairs); Kirsten Leong (Social Scientist, National Oceanic Atmospheric Administration); Melonee Montano (TEK Outreach Specialist, Great Lakes Indian Fish and Wildlife Commission); and Dr. Daniel Wildcat (Professor, Haskell University).

To complement the information offered by interviewees and to ensure as complete as possible inventory of federal frameworks, a term search for "traditional ecological knowledge" and "traditional knowledge" was conducted for the United States Code, the Code of Federal Regulations, and each federal agency website with responsibility for environmental management. At the state level, for states with numerous tribal reservations, state constitutions and legislation were also searched using the same terms. With regard to the international section, research was conducted specific to the Arctic and instruments focused on shared borders with Canada and Mexico. For the remainder of the sections, particularly at the project level, research focused on numerous reports, papers, webinars, and other sources of information about the application of TEK in the United States, which provided information for the remainder of the topics addressed in the report.

This report was designed around providing an inventory of the existing frameworks in the United States that provide a mechanism for voluntary engagement of Indigenous communities and experts around TEK, as well as representative examples of TEK projects occurring in several different sectors.

Where information was available, the discussion associated with each framework provides some context around whether the framework is *actually serving* as a helpful mechanism for the voluntary engagement of Indigenous communities and experts around TEK. However, in general, that degree of analysis was outside the scope of this inventory

Preface and Acknowledgements

This report is one of the first documents to attempt to compile a comprehensive inventory of frameworks applicable to the United States that provide mechanisms for the voluntary engagement of Indigenous communities and experts associated with TEK.

Acknowledgements are due to the following TEK experts, federal agency employees, and practitioners who participated in interviews for this project: Scott Aikin (National Native American Programs Coordinator, U.S. Fish and Wildlife Service); Keala Carter (Public Lands Specialist, Bears Ears Inter-Tribal Coalition); Ann Marie Chischilly (Executive Director, Institute for Tribal Environmental Professionals); Michael Durglo Jr. (Confederated Salish and Kootenai Tribes, Tribal Historic Preservation Department Head); Danny Gogal (US EPA Office of Environmental Justice); Kim Greenwood (National Park Service, Cultural Anthropologist); Dona Harris (US EPA Office of International and Tribal Affairs); Kirsten Leong (Social Scientist, National Oceanic Atmospheric Administration); Melonee Montano (TEK Outreach Specialist, Great Lakes Indian Fish and Wildlife Commission); and Dr. Daniel Wildcat (Professor, Haskell University). Finally, acknowledgements are also due to the Nomomente Institute for contributions regarding United Nations and international frameworks.

1. Context and Background

This section first provides an overview of the project scope and methodology used to create this report. It then discusses Tribes and fundamental concepts of federal Indian law in the United States. It then turns to the question of defining TEK and proposes a working definition of TEK for the purpose of this report. Finally, challenges facing Tribes, Indigenous communities, and non-tribal partners wishing to engage with TEK around environmental management are discussed.

1.1 Project Scope and Methodology

This report focuses on frameworks and mechanisms for engagement of Indigenous communities around TEK in the context of efforts to protect the environment in the United States. The tailored focus on TEK in the context of environmental efforts is tied to the mission of the CEC. The CEC was established by the governments of Canada, Mexico and the United States through the *North American Agreement on Environmental Cooperation*, the environmental side agreement to the North American Free Trade Agreement (NAFTA). An intergovernmental organization, the CEC brings together citizens and experts from governments, nongovernmental organizations, academia and the business sector to seek solutions to protect North America's shared environment while supporting sustainable economic development. There are many potential ways to define a "framework." This report focused on codified laws, regulations, and promulgated policies; official agreements between sovereign nations; and well-established institutions and projects. It does not address or include internal United States agency handbooks, departmental manuals, separate Secretarial or Administrative orders or additional institutional structures within United States governmental agencies and departments that provide guidance on the complexities of tribal engagement with, and TEK inclusion in, their decision-making structures. Within each section, frameworks are organized alphabetically; for the agreements pertaining to polar bears and the Arctic Circle, organization is by date of adoption.

The report was created through a combination of interviews and desk-based research. From November 2018 through February 2019, interviews were conducted with the following TEK practitioners, experts, and federal agency employees[1]: Scott Aikin (National Native American Programs Coordinator, U.S. Fish and Wildlife Service); Keala Carter (Public Lands Specialist, Bears Ears Inter-Tribal Coalition); Ann Marie Chischilly (Executive Director, Institute for Tribal Environmental Professionals); Michael Durglo Jr. (Confederated Salish and Kootenai Tribes, Tribal Historic Preservation Department Head); Danny Gogal (US EPA Office of Environmental Justice); Kim Greenwood (National Park Service, Cultural Anthropologist); Dona Harris (US EPA Office of International and Tribal Affairs); Kirsten Leong (Social Scientist, National Oceanic Atmospheric Administration); Melonee Montano (TEK Outreach Specialist, Great Lakes Indian Fish and Wildlife Commission); and Dr. Daniel Wildcat (Professor, Haskell University).

To complement the information offered by interviewees and to ensure a compete inventory of federal frameworks, a term search for "traditional ecological knowledge" and "traditional knowledge" was conducted for the United States Code, the Code of Federal Regulations, and each federal agency website with responsibility for environmental management. At the state level, for states with numerous reservations, state constitutions and legislation was also searched using the same terms. With regard to the international section, research was conducted specific to the Arctic and agreements

1 For a list of individuals who were contacted, but who were unable to participate in this project due to scheduling or non-availability, please contact the CEC.

around shared borders with Canada and Mexico. For the remainder of the sections, particularly at the project level, research relied on numerous reports, papers, webinars, and other sources of information about the application of TEK in the United States, which provided information for the remainder of the topics addressed in the report.

Following the drafting of the report, interviewees who provided key information were re-engaged to maintain accountability and to ensure accuracy. The process of interviewing federal employees and completing the verification process was complicated by the federal government shutdown, which occurred from December 22, 2018 to January 25, 2019 – a total of 35 days during the project term.

It is important to note that many of the sections in the report overlap, particularly with regard to TEK projects. For example, while the sections delineate between "university projects" and "research/public institution projects," and "private sector projects," the reality is that many of these efforts are multi-party initiatives that include university partners, tribal partners, public institution partners such as a federal research agency, and even private sector participation. Similarly, there is overlap between federal laws establishing a framework for TEK and the federal agency directives that flow from the implementation of that federal law. Repetition occurs where it is absolutely needed for clarity; however, in general, the report relies on cross-referencing between sections rather than redundancy.

1.2 Indian Tribes and Federal Indian Law in the United States

Since time immemorial, tens of millions of Indigenous peoples inhabited Turtle Island, also known as North America, and governed their complex societies. When European governments arrived with the intent of colonization, their emissaries immediately began government-to-government relations with Tribes – negotiating around trade, culture, war, resources, and diplomacy – and, by doing so, acknowledged the sophisticated and complex tribal governance structures that preceded colonist arrival. (NCAI 2019, 6). Long before the existence of the United States government, the indigenous peoples of Turtle Island have observed, managed, and understood the natural environment and dynamics of the land, plants, animals and ecosystems around them.

Today, there are 573 federally recognized Indian Tribes in the United States. Slightly less than half, (229 to be exact) of these Tribes are located in Alaska and the remainder are located in thirty-five other states. (84 Fed. Reg. 1200). Many of these Tribes' ancestral lands span international jurisdiction; forty tribal nations are within one hundred miles from the Canadian and Mexican borders, and tribal lands share a collective 260 miles of international border (NCAI 2019, 9). There are also numerous Tribes engaged in the lengthy process of petitioning for federal recognition. And today, these Tribes and Indigenous communities still utilize Traditional Ecological Knowledge to understand, track, sustainably manage, and safeguard natural resources – both on-reservation and across traditional ancestral lands that are jurisdictionally outside of modern day reservation boundaries.

Any discussion of TEK in modern day United States must include a brief detour highlighting the unique historical, political, and legal status of federally recognized Indian Tribes in the United States. The United States Supreme Court has affirmed that "Indian tribes within Indian Country are a good deal more than 'private voluntary organizations.' They are unique aggregations possessing attributes of sovereignty over both their members and their territory." *Merrion v. Jicarilla Apache Tribe*, 455 U.S. 130 at 140. (1982) (quoting *United States v. Mazurie,* 419 U.S. 544, 557 (1975)). Treaties, as expressions of the government-to-government relationship between the United States and Indian Tribes, are an explicit recognition of Indian Tribes' inherent sovereign authority. *Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658, 675 (U.S. 1979); *United States v. Winans*, 198 U.S. 371, 380-81 (1905).

From these historical treaty obligations flow the federal trust responsibility, and the laws and policies that promote tribal self-governance and tribal self-determination. The federal trust responsibility is a legal obligation under which the United States "has charged itself with moral obligations of the highest responsibility and trust" toward Indian Tribes (*Seminole Nation v. United States*, 316 U.S. 286, 296-97 (1942)). *Id*. As Tribes have moved toward greater self-governance, the trust responsibility is the foundation for the federal government's support of tribal self-determination and tribal sovereignty today. (Washburn 2017, 200-201).

The trust responsibility arises from a myriad of treaties, statutes, executive orders, and court decisions. As part of that trust responsibility, the federal government is obliged to consult with and consider the interests of Tribes when taking actions that may affect Tribes or their resources. Specifically, under Executive Order 131,175, Federal agencies must provide an accountable process to ensure meaningful input by Tribes in the development of regulations, legislative comments or proposed legislation, and other policy statements or actions that have substantial direct effects on Tribes. (Exec. Order No. 13,175, 65 Fed. Reg. 67,249 (Nov. 6, 2000)). In addition, Executive Order 131,175 requires government-to-government consultation prior to the promulgation of regulations with tribal implications. *Id*. The consultation obligation has supported Tribes in their utilization of TEK in the management of natural resources, both on and off reservation. Indeed, the frameworks and mechanisms regarding TEK that have been set in place at the federal level, discussed in depth in Sections §3 and §4 could be seen as modern day manifestations of treaty obligations.

While the federal trust responsibility has not always been honored, and in fact was often blatantly disregarded, a major turning point occurred in 1975 when Congress passed the *Indian Self-Determination and Education Assistance Act* – a cornerstone of modern federal Indian policy. The *Indian Self-Determination and Education Assistance Act* authorizes Tribes to contract for the administration of federal programs, including those related to environmental health and management. (Washburn 2017, 204). As discussed below, modern Tribes are today seen as an authority around many aspects of governance, and are partnering with states, universities, research institutions, and even the private sector to steward and manage natural resources, and the global climate.

It is important to note that while some states have made significant progress toward establishing their own government-to-government relationships with Indian Tribes. The United States Constitution gives Congress plenary power over Indian Affairs. U.S Const. Article I, Section 8, clause 3. For this reason, among others, the development of laws, policies, regulations, and guidance around TEK is far more advanced at the federal level than at the state level in the United States – a reality that is reflected in the disparate lengths of Sections §3 and §4 as compared to §6.

1.3 Defining Traditional Ecological Knowledge in the United States

In the United States, a number of different terms are used to describe the knowledge systems held by Tribes and Indigenous people. Terms frequently used include Traditional Ecological Knowledge, Traditional Knowledge, Indigenous and Local Knowledge, Indigenous Knowledge, and Local Knowledge.[2] While these terms are sometimes used interchangeably, both scholars and practitioners categorize TEK as a subset of the broader category of Traditional Knowledge, Indigenous Knowledge, Local Knowledge, and/or Indigenous and Local Knowledge. (Dudgeon & Berkes 2003, 76). Narrower than the entirety of the traditional knowledge of Indigenous people, TEK focuses on

2 Where a framework refers specifically to Traditional Knowledge or Indigenous and Local Knowledge rather than TEK, that distinction is noted.

the aspects of Indigenous knowledge that relate to ecological processes or the natural environment. *Id.* A full discussion of these distinctions is beyond the scope of this report.

Throughout the interview process, tribal representatives and TEK practitioners reiterated that the ecological knowledge held by Indigenous communities, whether described as TEK or another term, is both ancient and integral to the existence of Indigenous peoples. As Anishinaabe scholar Dr. Deborah McGregor states:

> "Traditional ecological knowledge involves 'relationships between knowledge, people, and all Creation'…TEK is viewed as the process of participating (a verb) fully and responsibly in such relationships, rather than specifically as the knowledge gained from such experiences. For Aboriginal people, TEK is not just about understanding relationships, it is the relationship with Creation. TEK is something one does." (McGregor 2008, 145-46).

A common theme throughout the conversations with tribal members and in the research and writing produced by tribal members is exactly that – TEK is something that Indigenous peoples do and have done since time immemorial and resists a pithy definition. Recognizing the complexity of defining TEK, noting that there is no official working definition of TEK in the United States, and respecting that TEK manifests uniquely and individually for each Tribe and each practitioner, this report adopts the following definition of TEK, which was put forward by a working group convened by the United States Fish and Wildlife Service (USFWS):

> "Traditional Ecological Knowledge, also called by other names including Indigenous Knowledge or Native Science, (hereafter, TEK) refers to the evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment. This knowledge is specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry. TEK is an accumulating body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (human and non-human) with one another and with the environment. It encompasses the world view of indigenous people which includes ecology, spirituality, human and animal relationships, and more." (Rinkevich, S. et al. 2011, 1).

This definition was chosen for the following reasons: (1) the definition has been "subject matter expert reviewed," which means that the definition went through extensive review over the course of several years, including the review of over twenty science and TEK advisors in the United States Department of the Interior; (2) the definition is based on Fikret Berkes's extensive scholarship on TEK, which forms the basis for a significant amount of TEK definitions in academic research; and (3) the definition was crafted with the intent of being a credible source for consideration across United States federal agencies. (Greenwood 2018).

1.4 Challenges Facing the Use of TEK

The use of TEK in the management of natural and cultural resources and the global climate is increasing every year and expanding into new fields. To illustrate this growth, Dr. Serra Hoagland, Laguna Pueblo tribal member and Forest Service Liaison Officer, conducted a study using the Google Scholar search engine to determine the increase in scientific publications that contain the term "traditional ecological knowledge." In five year intervals from 1975 to 2014, the number of scientific publications increases as follows: 1985-1990, 42 publications; 1990-1995, 307 publications; 1995-2000, 1040 publications; 2000-2005, 2990 publications; 2005-2010, 5770 publications; and 2010-2014, 6660 publications. (Hoagland 2017, 9-10).

One of the reasons for the increased attention to TEK has been due to the growing recognition of the need for both long-term data and holistic solutions to solve climate change. Indeed, some posit that TEK is usually the only source for generational-long data in a region or for a species; as such, it provides unique information that western science frequently cannot match. (Vinyeta & Lynn 2013, 6-8). Additionally, in the words of Dr. Samantha Chisholm Hatfield, Siletz tribal member and TEK expert, TEK meets a need for interdisciplinary and unconventional problem solving:

> "TEK, when applied, has been able to realize information that can clarify climate change research and analyses further, adding to the base knowledge about cycles and anticipated results, explaining certain impacts with an added depth and breadth that has been lacking in western scientific methods sans TEK. In this time of climate change uncertainty, TEK offers a tool that, can be applicable for insightful results, bridging the interdisciplinary gap that has existed within the traditional rigor of conventional scientific research. Unconventional methods are now at the forefront of addressing climate change research, information, analyses, and policy." (Hatfield 2017).

Tribes, Indigenous communities, and non-Indigenous partners wishing to engage in the growing use of TEK for environmental science and management must wrestle with a number of complexities. While not exhaustive, the examples discussed below provide insight into some of the challenges surrounding the use of TEK and the lack of established frameworks.

First is the fact that, in many cases, there is an absence of established protocols and policies for the use of TEK that result in missteps by researchers, strained or broken relationships and misuse of shared information. At the individual tribal and agency level, many efforts have been made to address this issue. For example the Gwich'in Tribal Council led the creation of a protocol document entitled "*Working with Gwich'in Traditional Knowledge in the Gwich'in Settlement Region"* to guide all traditional knowledge research in the Gwich'in Settlement Region (Gwich'in Social and Cultural Institute 2004). The National Park Service (NPS) Inter-Mountain Region has initiated a project, discussed below in Section §4, around identifying "Tribal Research Policies, Processes, and Protocols" to guide NPS and other researchers' work with TEK. (Greenwood 2018). Multiple participants noted the need for more such guidance, and potentially even national legislation that would establish principles for TEK work.

A second challenge is that of colonial mindsets and the bias of science toward western viewpoints and methodologies. To combat this, it is important that academic institutions ensure that colleges and universities focus part of their curricula on TEK, which can be paradigm shifting. (Hatfield 2017).

The issue of considering TEK as "second string" data also has legal implications. Federal laws such as the National Environmental Policy Act (NEPA) mandate the use of ''high quality'' data and data with "professional integrity." (40 CFR 1500.1; 1502.24.) The Data Quality Act requires federal agencies to establish guidelines "ensuring and maximizing the quality, objectivity, utility, and integrity of information . . . disseminated by [the agency]." (Consolidated Appropriations Act of 2018, Pub. L. No. 115-141, 132 Stat. 348 (March 23, 2018)). This latter law also provides teeth by requiring agencies to provide a mechanism allowing for complaints to correct information that does not meet agency guidelines. Federal agency personnel without proper training on TEK may be reluctant to use TEK due to these requirements, fearing that its use would not stand up to challenge. (Ristroph 2012, 102) However, a recent publication arguing for the use of TEK suggests that where TEK is strong, agencies should fear the converse result:

> "any project that ignores traditional and local knowledge and does not utilize local ethnographic experts may not adequately meet the "best data available" standard set forth under NEPA, or the "good and reasonable effort" standard required under Section 800.4 of the NHPA." (Van Tilburg H., et al. 2017, 7).

Finally, an important and complex issue that may challenge the use of TEK in the United States is the publically-available nature of data shared with federal agencies through the Freedom of Information Act (FOIA). The FOIA requires all federal agencies to make certain records available to the public (5 U.S.C. § 552(a) (2019)). Upon receiving a request for agency records, , an agency must make the records "promptly available."(5 U.S.C. § 552(a)(3) (2019)). FOIA mandates disclosure unless information falls within one of nine exemptions – none of which appear to be specifically applicable to communications with a federal agency involving TEK. (Amberson 2012, 964-73). Thus, Tribes who share TEK with federal agencies could risk potential disclosure of the information to the public through a FOIA request even as the federal government works to protect the information. (Amberson 2012, 964). For this reason, some interviewees noted the need for greater protection of the confidentiality of TEK shared with federal agencies.

However, there are confidentiality provisions within specific policy statements and opinions of many federal agencies. For example, the National Historic Preservation Act (NHPA), 54 U.S.C. § 307103, and the Archaeological Resources Protection Act (ARPA), 16 U.S.C. §470, instruct federal agencies and other public officials to withhold sensitive information about cultural resources in certain circumstances. Where the information to be released includes locational data about archaeological sites on public or Indian lands; or constitutes information about the character, use, or ownership of historic properties when such disclosure could result in a significant invasion of privacy, damage to historic property, or impede the use of a traditional religious site by practitioners, federal agencies and other public officials should consider whether Section §9 of ARPA or Section §304 of NHPA apply, and if so, whether exemption 3 of FOIA then exempts that information for release. (ACHP 2019). Additionally, at this time, other agencies and departments, such as DOI's Bureau of Land Management (BLM), utilize specific internal documents to moderate the concern of the public disclosure requirements of FOIA. BLM's Handbook, for example, provides guidance on how sensitive tribal information can be maintained as confidential through the use of FOIA's nine exemptions, and provides that, to the extent permitted by law, the BLM can seek to protect from disclosure information that Tribes have submitted under a claim of protection. (ACHP 2019).

2. International Frameworks for the Engagement of Indigenous Communities Around TEK[3]

There are a number of international frameworks in which the United States participates that provide mechanisms for the engagement of Indigenous communities around TEK. The international frameworks fall into three broad categories: (1) United Nations frameworks and the Ramsar Convention, which is distinct from the United Nations but operates similarly; (2) frameworks specific to North America, most of which are bi-lateral between the United States and Canada; and (3) frameworks related to the management and protection of the Arctic's ecosystems and wildlife. Finally, this Section provides examples of international Indigenous agreements between Tribes in the United States and Canadian First Nations.

3 Where citations to articles and provisions for international frameworks are provided within a sentence, additional citations are omitted to avoid redundancy. Citations for frameworks listed in third-level headings, and secondary frameworks discussed in the narrative can be found in the report bibliography.

2.1 United Nations Frameworks and the Ramsar Convention

United Nations Convention to Combat Desertification

The United States ratified the *United Nations Convention to Combat Desertification* on November 17, 2000. Article 18.2 of the Convention provides the following:

> "Parties shall, according to their respective capabilities, and subject to their respective national legislation and/or policies, protect, promote and use in particular relevant traditional and local technology, knowledge, know-how and practices and, to that end, they undertake to: (a) make inventories of such technology, knowledge, know-how and practices and their potential uses with the participation of local populations, and disseminate such information, where appropriate, in cooperation with relevant intergovernmental and non-governmental organizations."

United Nations Declaration on the Rights of Indigenous Peoples

UNDRIP is an international instrument adopted by the United Nations General Assembly in 2007. UNDRIP is intended to protect collective rights that may not be addressed in other human rights charters, and safeguards individual rights of Indigenous peoples. The United States did not vote in favor of UNDRIP when it was adopted, but expressed support for the Declaration in December 2010. (U.S. Dep't of State 2011).

While not enforceable in the United States, the UNDRIP has impacted domestic thinking and policy developments in the United States. In 2016, DOI and the Environmental Protection Agency began developing training for domestic agencies to enhance awareness of UNDRIP and discuss its relevance to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. (Executive Office of the President 2017, 35). In another example, the United States Attorney General's *Guidelines Stating Principles for Working With Federally Recognized Indian Tribes*, includes the following statement, "[t]he Department of Justice promotes and pursues the objectives of the United Nations Declaration on the Rights of Indigenous Peoples." (Office of the Attorney General 2014, 1; Gogal 2018). Finally, in 2013, the Advisory Council on Historic Preservation formally adopted a plan to support the UNDRIP and subsequently issued guidance for federal agencies on the intersection between articles of the UNDRIP and the regulations implementing Section 106 of the NHPA. ACHP also launched an outreach campaign to raise awareness about the UNDRIP in the United States preservation community, publishing blogs and articles and offering training and presentations about UNDRIP. (ACHP 2019).

Non-governmental entities have also taken steps toward implementation of UNDRIP's principles, including in the United States. The National Congress of American Indians, which has long been engaged in the creation and endorsement of UNDRIP, issued a resolution calling for its implementation in the United States (NCAI 2014). Another example in the philanthropic space, is the International Funders for Indigenous Peoples' creation of a decision-support tool entitled *A Funder's Toolkit: Implementation of the United Nation's Declaration of the Rights of Indigenous Peoples*. The authors note the toolkit "offers a solid starting point, raises key issues for funder reflection, and provides practical tools for a funder to find creative ways to support the implementation of the Declaration through their grantmaking practices and programs." (IFIP 2014, 5). While not tailored specifically to the United States, the creation of this document assists all funders, including those in the United States, to carry forward the principals and ideals of UNDRIP.

International Treaty on Plant Genetic Resources for Food and Agriculture

The United States ratified the *International Treaty on Plant Genetic Resources for Food and Agriculture* in 2016. Pursuant to Article 9.2, Parties should, as appropriate, and subject to its national legislation "take measures to protect and promote Farmers' Rights, including :protection of traditional knowledge relevant to plant genetic resources for food and agriculture."

Ramsar Convention on Wetlands

The Ramsar Convention on Wetlands (Ramsar Convention) provides a framework for voluntary international cooperation for wetland conservation. The United States acceded to the Convention on April 18, 1987, and there are thirty-nine Ramsar sites in the United States as of this writing. (US FWS 2015, 1). While the Ramsar Convention does not reference TEK, subsequent documents flowing from the Convention include direction around the use of TEK for wetland conservation.

The Ramsar Strategic Plan provides a number of strategic goals and associated targets designed to assist in the achievement of that goal. (Ramsar CoP 2015b). The third Strategic Goal addresses "wisely using all wetlands," and the associated Target 10 provides:

> "The traditional knowledge, innovations and practices of indigenous peoples and local communities relevant for the wise use of wetlands and their customary use of wetland resources are documented, respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention, with a full and effective participation of indigenous peoples and local communities at all relevant levels."

In association with the creation of the strategic plan, the Ramsar Convention created the "Programme on communication, capacity building, education, participation and awareness (CEPA) 2016-2024." (Ramsar COP 2015). Similar to the Ramsar strategic plan, the CEPA is designed around goals and associated targets designed to assist in the achievement of the goals, three of which reference TEK. To reach Goal 1 to "[e]nsure leadership to support effective implementation of the Programme by providing institutional mechanisms and establishing and supporting relevant networks," CEPA encourages the use of relationships with organizations possessing TEK. (Ramsar COP 2015). To reach Goal 5, "Develop and support mechanisms to ensure multi-stakeholder participation in wetland management," CEPA encourages "the use of practices and traditional knowledge systems that embody appropriate wetland cultural management by indigenous peoples and local communities recovered, strengthened and encouraged" as a benchmark. Finally Goal 8, "support the development and distribution of education materials that build awareness of ecosystem values and services and the value of wetlands for use in formal education settings, at Ramsar Sites and by all Ramsar actors," suggests realizing this goal by ensuring "cultural and traditional wetland knowledge and practices are incorporated into wetland education materials." (Ramsar COP 2015). Finally, during the 13th Meeting of the Conference of Parties in 2018, the Ramsar Convention of Parties adopted Resolution XIII.15 on *Cultural values and practices of indigenous peoples and local communities and their contribution to climate-change mitigation and adaptation in wetlands,* which contains references to TEK and encourages the conservation, transmission and use of TEK in wetlands protection in the face of climate change. (Ramsar COP 2018).

2.2. International Instruments Specific to North America

1987 Agreement Between the Government of Canada and the Government of the United States of America on the Conservation of the Porcupine Caribou Herd

This Agreement is focused around the conservation of the Porcupine Caribou Herd and its habitat, which migrates between Alaska and Canada. It sets forth a framework for international co-operation and co-ordination to sustainably manage and protect the Porcupine Caribou Herd. Given that it was written in 1987, it is unsurprising that it does not explicitly reference TEK. However, the Agreements acknowledges that rural residents of Alaska and Canada have harvested Porcupine Caribou for customary and traditional uses for generations and states that "these people should participate in the conservation of the Porcupine Caribou Herd and its habitat." The Agreement establishes an International Porcupine Caribou Board that is charged with seeking information from, among others "local communities" and "users of Porcupine Caribou."

Great Lakes Water Quality Agreement (2012)

The Great Lakes Water Quality Agreement is a commitment between the United States and Canada to restore and protect the waters of the Great Lakes. The agreement provides a framework for identifying binational priorities and implementing actions that improve water quality. The agreement sets forth principles to guide the Parties in the implementation of the agreement, including science-based management. The agreement elaborates on this principle by defining science-based management to mean "implementing management decisions, policies and programs that are based on best available science, research and knowledge, as well as traditional ecological knowledge, when available."

The agreement includes ten annexes, each of which focuses on specific issues. Binational teams have been set up to implement the actions required by these Annexes. In Annex 10, Science, Canada and the United States commit to "…contribute to the achievement of the General and Specific Objectives of this Agreement by enhancing the coordination, integration, synthesis, and assessment of science activities. Science, including monitoring, surveillance, observation, research, and modeling, may be supplemented by other bodies of knowledge, such as traditional ecological knowledge."

Protocol between the United States and Canada Amending the 1916 Convention for the Protection of Migratory Birds in Canada and the United States.

The 1916 Convention for the Protection of Migratory Birds in Canada and the United States extends protection to migratory birds in Canada and the United States and provides for the management of migratory bird species through sustainable hunting and conservation. The 1995 Amendments were designed to recognize the actual practices of subsistence hunting by Indigenous peoples in Canada and Alaska. These amendments include a call for the creation of management bodies to ensure an effective and meaningful role for Alaska's Indigenous inhabitants in the conservation of migratory birds. The implementation of the amendments are discussed below in Section §3.

US-Canada Joint Statement of Cooperation on the Georgia Basin and Puget Sound Ecosystem

Signed in 2000, this non-binding statement between the U.S. Environmental Protection Agency (EPA) and Environment and Climate Change Canada (ECCC) is designed to address environmental challenges in the Salish Sea. The Statement puts forward a vison where "the traditional values and knowledge of the Aboriginal people of the Georgia Basin and the indigenous inhabitants of Puget Sound are honored and applied to new challenges." It's introduction also acknowledges the following:

> "The Aboriginal people of the Georgia Basin and the indigenous inhabitants of Puget sound have been stewards of the lands and resources in the Georgia Basin/Puget Sound region since time immemorial. And their knowledge, talents, and energy should be part of the region's future. To preserve and protect the region, we should work closely with representatives of the Aboriginal people of the Georgia Basin and the indigenous inhabitants of Puget Sound in an atmosphere of mutual respect so that their special knowledge and unique perspective can contribute to our common efforts."

The Joint EPA-ECCC Action Plans and Reports that have followed this Agreement include references to TEK. The Joint EPA –ECCC 2005 Health of the Salish Sea Ecosystem Report refers to "sustainable perspectives," which the report notes "is based on TEK," throughout the document. (Environmental Protection Agency n.d.). The Action Plans from 2003 to 2016 included extensive references to TEK and TEK projects. (Environmental Protection Agency n.d.). For reasons that are unclear, the 2017 to 2020 Action Plan does not include a reference to TEK.

2.3 Agreement on the Conservation of Polar Bears and Associated Declarations

The Agreement on the Conservation of Polar Bears was concluded in Oslo, Norway, on 15 November 1973 between the Polar Bear Range States – Canada, Denmark, Norway, Russia, and the United States. While the original agreement does not reference TEK, subsequent declarations and plans flowing from this agreement do incorporate TEK and are discussed below in chronological order.

The Agreement between the Government of the United States of America and the Government of the Russian Federation on the Conservation and Management of the Alaska-Chukotka Polar Bear Population

Entered into force in 2007, the Agreement between the Government of the United States of America and the Government of the Russian Federation on the Conservation and Management of the Alaska-Chukotka Polar Bear Population was designed to further the goals of the 1973 Agreement on the Conservation of Polar Bears. It requires the United States and the Russian Federation to manage and conserve polar bears based on reliable science and to provide for subsistence harvest by Indigenous peoples. The Agreement created the U.S.-Russian Federation Polar Bear Commission, which functions as the bilateral managing authority. Article X requires the parties to the Agreement to involve Indigenous people in the implementation of the agreement and to integrate scientific data and information on the Alaska-Chukotka polar bear population, including harvest information provided by Indigenous people.

Memorandum of Understanding between Environment Canada (now Environment and Climate Change Canada; ECCC) and the United States

Department of the Interior for the Conservation and Management of Shared Polar Bear Populations

In 2008, as part of their responsibilities under the Polar Bear Agreement, Canada and the United States entered into a Memorandum of Understanding (MOU) between Environment and Climate Change Canada and the United States Department of the Interior for the Conservation and Management of Shared Polar Bear Populations to facilitate and enhance coordination, cooperation and development of partnerships around conservation and management of polar bears. The MOU establishes a Bilateral Oversight Group made up of high-level federal government officials, representatives from Canadian and Alaskan Indigenous organizations and state/provincial representatives. Additionally, the two countries recognize the importance of the Inuvialuit–Inupiat Polar Bear Management Agreement for the Southern Beaufort Sea. (Polar Bear Range States 2015, Annex 1).

The Declaration of the Responsible Ministers of the Polar Bear Range States

In 2013, the Declaration of the Responsible Ministers of the Polar Bear Range States reaffirmed the commitment of the Range States to cooperatively work to ensure the survival of the polar bear. In the Declaration of the Responsible Ministers of the Polar Bear Range States, the Range States "Recognize the importance and value of Traditional Ecological Knowledge in informing management decisions and acknowledge the need for the range states to develop a common understanding of what constitutes Traditional Ecological Knowledge and how it should be used in polar bear management decisions. The Range States also declare a commitment to work actively to do the following: "[e]ngage Arctic local people in management decision-making processes and promote the collection and maintenance of Traditional Ecological Knowledge by acknowledging the important role polar bear play in the cultural heritage and subsistence of Arctic indigenous people, as well as the role that they play in the long-term conservation and survival of the polar bear;" and "[e]ncourage the IUCN Polar Bear Specialist Group to determine how to best use Traditional Ecological Knowledge together with scientific approaches and analyses of polar bear population status for more effective decision-making." (Polar Bear Range States 2013).

The Circumpolar Action Plan

Created in September 2015, the Circumpolar Action Plan is a 10-year cooperation plan between the Polar Bear Range States that aims to strengthen their efforts in polar bear conservation. The plan contains many TEK provisions. First, the plan provides for the active participation of Indigenous peoples in polar bear conservation. (Polar Bear Range States 2015a, 40) Second, during creation of the plan, a TEK working group was formed and tasked with all Circumpolar Action Plan actions which are related to Traditional Ecological Knowledge activities. The TEK working group established a Range States definition of TEK and a compendium of existing guidelines for the use of TEK in decision-making. (Polar Bear Range States 2015b, 10-11). The TEK working group also manages the Range States TEK Acquisition Schedule that outlines planned, ongoing and completed TEK studies in each Range State as an ongoing action through the years of the Circumpolar Action Plan. (Polar Bear Range States 2015, Appendix VI).

2.4 The Arctic Council and Associated Agreements

The Arctic Council is an intergovernmental forum whose membership consists of Canada, the Kingdom of Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, the Russian Federation, Sweden and the United States. The Inuit Circumpolar Conference, the Saami

Council, the Gwich'in Council International, the Aleut International Association, the Artic Athabaskan Council, and the Russian Association of Indigenous People of the North, are Permanent Participants to the Arctic Council. Numerous documents pertaining to the Arctic Council reference Indigenous knowledge. The approved language and preferred terminology used across the Artic Council, and in all recent Artic Council ministerial declarations for this Indigenous knowledge is "Traditional and Local Knowledge."

The Declaration on the Establishment of the Arctic Council

The 1996 Declaration on the Establishment of the Arctic Council establishes the Arctic Council recognizes the traditional knowledge of the Indigenous people of the Arctic and their communities and taking note of its importance and that of Arctic science and research to the collective understanding of the circumpolar Arctic." (Arctic Council 1996).

The Kiruna Declaration

The Kiruna Declaration was endorsed by the Arctic Council in 2013. The Kiruna Declaration states that the members "Recognize that the use of traditional and local knowledge is essential to a sustainable future in the Arctic, and decide to develop recommendations to integrate traditional and local knowledge in the work of the Arctic Council." (Arctic Council 2013, 2).

Agreement on Enhancing International Arctic Scientific Cooperation

The 2017 Agreement on Enhancing International Arctic Scientific Cooperation includes local and traditional knowledge in the definition of "scientific activities;" Article IX is entitled "Traditional and local knowledge" and states the following:

> (1) "The Parties shall encourage Participants to utilize, as appropriate, traditional and local knowledge in the planning and conduct of Scientific Activities under this Agreement; (2) The Parties shall encourage communication, as appropriate, between holders of traditional and local knowledge and Participants conducting Scientific Activities under this Agreement and (3)The Parties shall encourage holders of traditional and local knowledge, as appropriate, to participate in Scientific Activities under this Agreement." (Arctic Council 2017).

Fairbanks Declaration

The Arctic Council's 2017 Fairbanks Declaration notes that the Arctic Council "[r]ecognize[s] the importance of scientific assessments and projections to informed decision-making in the Arctic, incorporating as well traditional and local knowledge, and the reliance of Arctic biodiversity and inhabitants on the availability of freshwater, welcome[s] the updated assessment of Snow, Water, Ice and Permafrost in the Arctic, note[s] with concern its findings, and adopt[s] its recommendations." (Arctic Council 2017b).

2.5 International Indigenous Agreements

Inuvialuit- Inupiat Polar Bear Management Agreement in the Southern Beaufort Sea

The Inuvialuit people in Canada and the Inupiat people in Alaska harvest polar bears from the Southern Beaufort Sea subpopulation. Prompted by concerns about the population, the Inuvialuit

Game Council (on behalf of the Inuvialuit in Canada) and the North Slope Borough Fish and Game Management Committee (on behalf of the Inupiat of the North Slope in Alaska) negotiated the MOU to help ensure the health and stability of this subpopulation and maintain a sustained harvest for traditional users. It establishes an Inuvialuit and Inupiat Commission, and Article II commits the Parties "[t]o encourage the collection of adequate scientific, traditional, and technical information in a timely manner to facilitate management decisions. (Inuvialuit- Inupiat Polar Bear Management Agreement in the Southern Beaufort Sea 2000).

Inuvialuit-Inupiat Beaufort Sea Beluga Whale Agreement

The Inuvialuit people in Canada and the Inupiat people in Alaska harvest beluga whales from the Southern Beaufort Sea subpopulation. To integrate the management of the population and share information, the Inuvialuit Game Council (on behalf of the Inuvialuit in Canada) and the North Slope Borough Fish and Game Management Committee (on behalf of the Inupiat of the North Slope in Alaska) established the Inuvialuit and Inupiat Beluga Commission. Agreement Item #5 provides that one of the Commission's duties is to be a forum for the Parties "to exchange information of traditional ecological knowledge, hunting methods and uses of beluga whales." (Inuvialuit-Inupiat Beaufort Sea Beluga Whale Agreement 2000).

Buffalo Treaty

On September 23, 2014, representatives from eleven Native American Tribes and First Nations gathered in Montana to sign The Buffalo: A Treaty of Cooperation, Renewal, and Restoration. (National Park Service 2017). The first intertribal treaty to be signed on the Great Plains in over 150 years, this treaty aimed to establish an international alliance focused on restoring the buffalo to tribal lands. Signatories included the Blackfeet Nation, the Blood Tribe, Siksika Nation, Piikani Nation, the Assiniboine and Gros Ventre Tribes of the Fort Belknap Indian Reservation, the Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation, the Salish and Kootenai Tribes of the Confederated Salish and Kootenai Indian Reservation, and the Tsuu T'ina Nation. The treaty focuses on the restoration of bison on about 6.3 million acres of prairie and grasslands. (National Park Service 2017). Among other provisions, the treaty states the following about the sharing of TEK:

> Realizing that learning is a life-long process, We, collectively, agree to perpetuate knowledge-gathering and knowledge-sharing according to our customs and inherent authorities revolving around BUFFALO that do not violate our traditional ethical standards as a means to expend our knowledge base regarding the environment, wildlife, plant life, water, and the role BUFFALO played in the history, spiritual, economic, and social life of our NATIONS. (The Buffalo: A Treaty of Cooperation, Renewal, and Restoration 2014, Art. 6).

3. General Federal Frameworks for the Engagement of Indigenous Communities Around TEK

There are a notable number of general federal agency policies, directives, and frameworks that explicitly reference the value of TEK, and that have provided a mechanism for federal agencies to engage with Indigenous communities around TEK for environmental efforts. This section is divided into two sub-sections. Subsection §3.1 provides a description of federal laws that do not reference TEK, but that are used by Tribes and Indigenous communities as a mechanisms for engagement around TEK. Subsection §3.2, Federal Laws, Regulations and Executive Actions Referencing TEK, provides an inventory of federal laws and executive agency actions with the force of law that explicitly reference TEK.

3.1 General Federal Mechanisms that Provide Opportunities for Engagement Around TEK

Government-to-Government Consultation

Federal agencies are charged with meaningfully engaging with Tribes in the development of regulatory policies that have tribal implications. (Exec. Order No. 13,175, 65 Fed. Reg. 67,249 (Nov. 6, 2000). Since the renewed era of federal-tribal relations beginning in the late 1960s, the federal government increasingly has emphasized the federal government-to-government consultation with Tribes and responsibilities inherent in a government-to-government relationship. (Washburn 2017, 203-206).

Several executive orders have been instrumental in providing guidance around the government-to-government consultation obligation. Executive Order 13175 *Consultation and Coordination with Indian Tribal Governments*, issued by President Clinton in 2000, recognizes tribal rights of self-government and tribal sovereignty, and affirmed and committed the federal government to work with Native American tribal governments on a government-to-government basis. On September 23, 2004, President George W. Bush issued *Executive Memorandum Government-to-Government Relationship with Tribal Governments* recommitting the federal government to work with federally-recognized Native American tribal governments on a government-to-government basis and strongly supporting and respecting tribal sovereignty and self-determination. (Memorandum on Government-to-Government Relationship with Tribal Governments 2004). On November 5, 2009, President Obama issued the *Presidential Memorandum On Tribal Consultation*, which reaffirmed the federal government's commitment to government-to-government consultation and collaboration with Tribes for certain federal actions that have substantial direct effects on Tribes and issued the following directive to the heads of executive departments and agencies:

> "My Administration is committed to regular and meaningful consultation and collaboration with tribal officials in policy decisions that have tribal implications including, as an initial step, through complete and consistent implementation of Executive Order 13175. Accordingly, I hereby direct each agency head to submit to the Director of the Office of Management and Budget (OMB), within 90 days after the date of this memorandum, a detailed plan of actions the agency will take to implement the policies and directives of Executive Order 13175." (74 Fed. Reg. 57,881)

While government-to-government consultation with federally recognized Tribes is not specific to TEK, it is nonetheless a primary mechanism of engagement between Tribes and federal agencies. As a result, Tribes are able to engage with federal agencies and develop good working relationships. In turn, where trust is developed, discussions around TEK may evolve. The TEK-specific mechanisms discussed below may provide other opportunities for federal engagement of Tribes. That said, there are numerous examples of Tribes raising concerns that consultation is not regular or adequate.

The National Environmental Policy Act

In the United States, NEPA is "our basic national charter for protection of the environment." (40 C.F.R. § 1500.1(a)). NEPA directs federal agencies to assess the potential environmental effects of their proposed major actions significantly affecting the human environment and to inform the public about those potential effects.

NEPA has two fundamental purposes: first, to guarantee that agencies take a "hard look" at the consequences of their actions before the actions occur by ensuring that "the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant

environmental impacts," (*Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989)); and second, to ensure that "the relevant information will be made available to the larger audience that may also play a role in both the decision-making process and the implementation of that decision," *id*. at 349. Public disclosure and involvement is a key requirement of NEPA (40 CFR 1506.6). The extent of public involvement is largely dependent on the level of NEPA review being conducted, but almost always includes public review and/or the solicitation of public comments on the proposed decision.

Meaningful coordination with tribal entities, and analysis of a proposed action's potential effect on tribal lands, resources, or areas of historic significance is an important part of federal agency decision-making. The lead agency on NEPA, the Council on Environmental Quality issued regulations calling for the involvement of Tribes that may be affected by a Federal proposal. Additionally, the Council on Environmental Quality issued a memorandum to the heads of federal agencies encouraging more active solicitation of tribal entities for participation as cooperating agencies in NEPA documents. (Council on Environmental Quality 1999).

As discussed above, documents submitted under NEPA are usually subject to request under the United States' Freedom of Information Act. For this reason, as well as others, Tribes and Indigenous communities may not utilize NEPA to provide TEK. Despite these limitations, in some cases, NEPA provides a framework for Tribes and Indigenous communities to submit TEK to guide an environmental decision-making process. Finally, Tribes, for example the Northern Cheyenne Tribe in Montana, have brought legal challenges based on a federal agency's failure to comply with NEPA to protect off-reservation lands critical to TEK from destructive land uses such as coal mining. (Small 2019).

The National Historic Preservation Act

With passage of the NHPA in 1966, Congress determined that the federal government's role is to "provide leadership" for preservation, "contribute to" and "give maximum encouragement" to preservation, and "foster conditions under which our modern society and our historic property can exist in productive harmony. 54 U.S.C. § 300101 et seq. Section 106 of the NHPA requires that federal agencies take into account the effects of projects they carry out, license, or assist on related to historic properties and give the ACHP an opportunity to comment on any such effects. 54 U.S.C. § 306108. The NHPA explicitly requires federal agencies to consult with Indian Tribes and Native Hawaiian organizations (NHOs) during this process when historic properties of religious and cultural significance to them may be affected. 54 U.S.C. § 302706. The ACHP's regulations at 36 C.F.R Part 800 establish how agencies fulfill these responsibilities and include extensive instructions about consultation. The consultation requirements of the NHPA and Section 106 regulations give Indian Tribes and NHOs a unique opportunity to influence federal decision making in regards to the protection and preservation of their sacred places.

While neither the NHPA nor the Section 106 regulations specifically mentions "traditional ecological knowledge" or "traditional knowledge," both impose requirements that necessarily (and in daily practice) call upon traditional knowledge. (ACHP 2019). The regulations require agency officials to acknowledge that Indian Tribes and Native Hawaiian organizations possess special expertise in assessing the eligibility of historic properties that may possess religious and cultural significance to them and require tribal and Native Hawaiian consultation when such properties may be affected by projects that are carried out, licensed, or assisted by federal agencies. (ACHP 2019). Traditional knowledge is a critical factor in identifying and recognizing such properties, so that effects on them can then be properly assessed and negotiations on ways to resolve any adverse effects on them can proceed. This is why the ACHP has explicitly acknowledged traditional knowledge in policies and guidance for federal agencies and reports regarding Section 106 compliance. (ACHP 2019).

Tribal Self-Governance Act

The Tribal Self-Governance Act (TSGA) permits certain Tribes to petition agencies within the Department of the Interior to manage federal programs that are of special geographical, historical, or cultural significance to tribes. (Tribal Self-Governance – Department of the Interior, 25 U.S.C. §5361 et seq. (2019)). Each year, the Interior Department provides a list of federal programs within each agency that could be eligible for tribal management through the TSGA. In 2018, this list included, but was not limited to, gathering baseline subsistence data in Alaska, comprehensive management planning, cultural resource management projects, and ethnographic studies (83 Fed. Reg. 10513-14).

Obtaining an annual funding agreement under the TSGA involves a two-step process. First, a Tribe must be accepted as a self-governance tribe. This requires proof of federal recognition, a completed planning process to assume management over the federal program, official documentation that the tribal government approves the self-governance application, and proof that the Tribe has been financially stable for three years. (25 U.S.C. §§ 458bb (2019). Second, the Tribe must petition the federal agency for management of programs or functions. When funds are available for Tribes to assume management, the Secretary of the Interior publishes notice of the available programs and application deadlines (25 C.F.R.§ 1000.45 (2019). If a Tribe's petition is approved, the federal agency transfers money to the Tribe through an annual funding agreement, which pays for administering the federal program up to the amount that the agency would have spent without tribal involvement. (25 C.F.R.§ 1000.137(c)(1) (2019)). Typically, annual funding agreements must be awarded on a competitive bid basis; however, culturally significant programs are exempt from this requirement and can be awarded directly to Tribes with demonstrated ties to the cultural resources. (25 C.F.R.§ 1000.127-128 (2019)). The TSGA mandates that the federal agency retain ultimate decision-making power over land management.

As of 2018, eleven Tribes have enacted agreements with the NPS, USFWS, the Bureau of Reclamation, the Bureau of Land Management, and the Office of the Special Trustee for American Indians through the TSGA (83 Fed. Reg. 10513). TSGA agreements provide a vehicle for Tribes to bring TEK into their work on federal lands as discussed below in Sections §5.3.

3.2 Federal Laws, Regulations and Executive Actions Explicitly Referencing TEK or Traditional Knowledge

The Alaska National Interest Lands Conservation Act of 1980 and Associated Programs

The Alaska National Interest Lands Conservation Act (ANILCA) is a federal law that provided various degrees of protection for over 100 million acres of land in Alaska, and prioritized subsistence use by rural Alaskans on federal public lands and water over other consumptive uses. (Alaska National Interest Lands Conservation Act, Pub. L. No. 96-487, 94 Stat. 2371-2551 (1980) (codified in part at 16 U.S.C. §§ 3101-3233 (2012)). There are no provisions specific to TEK in ANILCA itself. Rather the law focuses on rural subsistence use. ANILCA "enabl[es] rural residents who have personal knowledge of local conditions and requirements to have a meaningful role in the management of fish and wildlife." (16 U.S.C. § 3111(5) (2019)). The Act also requires the Secretary of the Interior to undertake subsistence use studies that seek data from local residents. (16 U.S.C. § 3122 (2019)). Many programs flowing from ANILCA involve the use of TEK and are discussed below.

In 1990, the federal government assumed management of subsistence on federal public lands from the state of Alaska. Pursuant to authority in ANILCA Title VIII, the Secretaries of Interior and

Agriculture established the Federal Subsistence Management Program and the Federal Subsistence Board. The latter is made up of the Alaska regional directors of the USFWS, NPS, Bureau of Land Management, BIA, and the USFS, as well as three members of the public (two of which must possess personal knowledge of and direct experience with subsistence use in Alaska). The Federal Subsistence Board is delegated responsibility for administering the subsistence taking and uses of fish and wildlife on public lands in Alaska. (Federal Subsistence Management Program n.d.). In 2012, the Federal Subsistence Board issued its Tribal Consultation Policy, which states that, "among the goals of the federal subsistence program is to "[a]cknowledge, respect and use traditional ecological knowledge." (Federal Subsistence Management Board 2012, 2).

The Federal Subsistence Management Program's Fisheries Resource Monitoring Program extensively relies on TEK. Authorized by ANILCA Section 812, the Fisheries Resource Monitoring Program is a multi-million dollar, multidisciplinary fisheries research program that funds projects designed to provide information for federal fisheries management. One third of the multi-million dollar program budget is allocated to studies focused on "harvest monitoring and traditional ecological knowledge." This extends to projects focusing on the collection and analysis of TEK, as well as more standard subsistence harvest assessment projects. (Wheeler & Craver 2005, 15).

The Office of Subsistence Management is a branch of USFWS unique to Alaska that was created to support the Federal Subsistence Board, the Federal Subsistence Regional Advisory Councils, and the Fisheries Resource Monitoring Program. The staff of the Office of Subsistence Management includes fish and wildlife biologists, anthropologists, technical and administrative staff, and liaisons to the Alaska Department of Fish and Game and the Alaska Native community. (Federal Subsistence Management Program 2018b).

Consolidated Appropriations Act of 2018

This law establishes the budget for, among other things, the Department of the Interior, Environment, and Related Agencies Appropriations Act for fiscal year 2018. In the accompanying Committee of Appropriations Report to the Department of the Interior, the following direction is given to USFWS, both in the context of the Alaska-Chukotka Polar Bear Population and in terms of the Endangered Species Act.

> *"*Subsistence Activities.—The Committee is closely monitoring the Service's efforts to implement an agreement between the United States and the Russian Federation on management of the Alaska- Chukotka Polar Bear Population. The Service should seek the most current science on this matter as it works to implement the agreement and should incorporate traditional knowledge from Alaska Natives. The Committee believes successful management of the population can only occur with the engagement of the Alaska Natives and expects the Service to consult with Alaska Native Organizations and other wildlife management organizations with expertise on matters related to subsistence. Subsistence is culturally important and a primary source of Alaska Natives' nutritional needs. The Committee directs the Service to implement a civil-based, co-management regime." (Division G 2018, 14)
>
> "Traditional Knowledge.—The Committee remains concerned that the Service has not fully incorporated traditional Tribal knowledge in its implementation of the Endangered Species Act [ESA]. When appropriate, the Committee expects the Service to make every effort to incorporate traditional knowledge in ESA decisions. The Committee also expects the Service to engage in additional outreach to Tribal governments in circumstances where traditional knowledge may provide valuable information, including for species like the northern sea otter." (Division G 2018, 12)

Global Change Research Act of 1990

With this law, Congress established the United States Global Change Research Program and charged it with developing and coordinating "a comprehensive and integrated United States research program which will assist the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." (Global Change Research Act of 1990, 15 U.S.C. ch. 56A § 2921 et seq. (2012)). The United States Global Change Research Program facilitates collaboration and cooperation across its thirteen Federal member agencies to advance understanding of the changing Earth system and maximize efficiencies in Federal global change research.

The United States Global Change Research Program's work incorporates TEK in several ways. First its strategic plan provides that the United States Global Change Research Program will consider data from a wide range of sources, including "indigenous knowledge from tribal sources." The United States' Climate Resilience Toolkit operates under the United States Global Change Research Program, although it is managed by NOAA. The Climate Resilience Toolkit includes a section focused on TEK designed to assist Tribes and partners as follows:

> "A section focused on Traditional Knowledges and Traditional Ecological Knowledge (TKs/TEK) assists tribes and partners to integrate climate science with more holistic observational skills, technologies, cultural practices, and community values, while cultivating a deep relational understanding of plants and animals as integrated features of a shared, interdependent environment." (U.S. Climate Resilience Toolkit, n.d.)

Executive Order No. 13,689 – Enhancing Coordination of National Efforts in the Arctic

This executive order was issued in 2015 as the United States assumed chairmanship of the Arctic Council and promotes coordination of efforts in the Arctic. Along with establishing an Executive Steering Committee comprised of federal agency officials, it also encourages coordination with the State of Alaska and Alaska Native Tribal Governments. The Executive Order explicitly references traditional knowledge as follows:

> "As a global leader, the United States has the responsibility to strengthen international cooperation to mitigate the greenhouse gas emissions driving climate change, understand more fully and manage more effectively the adverse effects of climate change, protect life and property, develop and manage resources responsibly, enhance the quality of life of Arctic inhabitants, and serve as stewards for valuable and vulnerable ecosystems. In doing so, we must rely on science-based decision-making and respect the value and utility of the traditional knowledge of Alaska Native peoples." (80 F.R. 4191).

Magnuson-Stevens Fishery Conservation and Management Act

Originally enacted in 1976 and subsequently amended, the *Magnuson-Stevens Fishery Conservation and Management Act* is the main law governing marine fisheries management in United States federal waters. The *Magnuson-Stevens Fishery Conservation and Management Act* establishes eight regional fisheries management councils to develop fishery management plans specific to their regions. Council members include state, federal, and tribal representatives, as well as local stakeholders. (16 U.S.C. §1852).

The *Magnuson-Stevens Fishery Conservation and Management Act* incorporates traditional knowledge in its establishment of a pilot program for regionally-based marine education and training programs in the Western Pacific and the Northern Pacific relevant to stewardship of living marine resources. (16 U.S.C. §1855(j)). Specifically the act states that the pilot program should "foster

understanding, practical use of knowledge (including native Hawaiian, Alaskan Native, and other Pacific Islander-based knowledge)"(16 U.S.C. §1855(j)(1)) and charges the program with developing means "by which local and traditional knowledge (including Pacific islander, Native Hawaiian, and Alaskan Native knowledge) can enhance science-based management of fishery resources of the region." (16 U.S.C. §1855(j)(2)(E)).

Marine Mammal Protection Act of 1972

The *Marine Mammal Protection Act* protects all marine mammals within the waters of the United States. The *Marine Mammal Protection Act* makes it illegal to "take" marine mammals without a permit, and established a response program to address stranding and mortality of marine mammals. The *Marine Mammal Protection Act* is managed by NOAA (marine ocean mammals), the USFWS (marine land mammals), and the Animal and Plant Health Inspection Service (captive marine mammals).

The *Marine Mammal Protection Act* incorporates TEK by establishing an Alaska-focused research program and charging the Secretary of Commerce to "utilize, where appropriate, traditional local knowledge and [sic.] contract with a qualified Alaska Native organization to conduct such research." (16 U.S.C. §1380 Sec. 110).

The *Marine Mammal Protection Act* has provisions specific to Alaska that have birthed extensive co-management agreements and the use of TEK. The Act provides, "The Secretary may enter into cooperative agreements with Alaska Native organizations to conserve marine mammals and provide co-management of subsistence use by Alaska Natives." (16 U.S.C. §1388, Section 119). Pursuant to this provision, NOAA and FWS have entered into a significant number of MOUs and MOAs with Alaska Native Tribes around co-management of natural resources in Alaska. NOAA alone has entered into over thirty of these agreements.[4] NOAA's website states, "[t]he best available scientific information, and traditional and contemporary Alaska Native knowledge and wisdom (TKW), are used for decisions regarding Alaska marine mammal co-management, to the extent allowed by law." (NOAA Fisheries n.d.).

Migratory Bird Treaty Act of 1918 and Amendments for Subsistence Use

The *Migratory Bird Treaty Act* was signed into law in 1918, as a domestic prong to the *1916 Convention for the Protection of Migratory Birds in Canada and the United States*. The Migratory Bird Treaty Act's intent was to protect migratory bird populations which were severely depleted by commercial hunting. 16 U.S.C. §§ 703–712 (2019). In the original act, the migratory bird harvest was prohibited between March and September throughout the United States, including Alaska, which deprived Alaska Natives of an important subsistence food source and, in some cases, forced them to hunt illegally to feed their families. (Alaska Dep't of Fish and Game 2018). The act was amended in 1997 to allow for the spring-summer subsistence harvest by rural Alaska residents in an effort led by Alaska Native leaders, and a formal apology was issued. (Alaska Dep't of Fish and Game 2018).

As part of the amendment, the Secretary of Interior issued a set of regulations to implement the Alaska migratory bird subsistence program. (50 C.F.R. Part 92, (2002)). Under these regulations,

4 Representative titles of co-management agreements entered into by NOAA with Alaska Native Tribes include the following: Cooperative Agreements between NOAA and the Alaska Eskimo Whaling Commission to protect the bowhead whale and the Eskimo culture 1998-present, as amended: 2016, 2015, 2014, 2013, 2011, 2008, 2003, 1998; Agreement between the Aleut Community of St. George Island and NMFS for the Steller sea lion and the northern fur seal, 2001; and Agreement between the Ice Seal Committee (ISC) and NMFS for the Co-Management of Alaskan Ice Seal Populations, October 25, 2006. (NOAA Fisheries n.d.)

USFWS established a statewide management body to be known as the Alaska Migratory Bird Co-Management Council, which includes Alaska Native representatives from ten subsistence regions. (50 C.F.R. §92.10) Among the Co-Management Council's responsibilities is to "[d]evelop recommendations for, among other things, law enforcement policies, population and harvest monitoring, education programs, research and use of traditional knowledge, and habitat protection (50 C.F.R. §92.10(c)(3))

The regulations also aimed to promote the participation of subsistence users. To do this, USFWS used an existing State of Alaska framework to establish twelve geographic regions based on common subsistence resource use patterns. Within each region, Fish and Wildlife is charged with establishing partner agreements with at least one partner organization who is willing to coordinate the regional program on behalf of all subsistence hunters in the region. Pursuant to the regulations, the regional partners will "work cooperatively with the USFWS and the Alaska Department of Fish and Game to gather harvest data, numbers of subsistence users, and other management data and traditional knowledge for the benefit of the management bodies." (50 C.F.R. §92.11(b)(6)). Regional partners are also charged with organizing management bodies who are then charged with developing requests and recommendations to the Co-Management Council. The regulations state that "[r]equests and recommendations to the Co-Management Council may involve ...research and use of traditional knowledge, habitat protection, and other concerns related to migratory bird subsistence programs." (50 C.FR. §92.1 (c)(2)).

Proclamation 8031 Establishing Papahanaumokuakea Marine National Monument

Papahānaumokuākea Marine National Monument is the largest contiguous fully protected conservation area under the U.S. flag, and one of the largest marine conservation areas in the world. The monument was established by Presidential Proclamation 8031 on June 15, 2006 to protect an exceptional array of natural and cultural resources. Papahānaumokuākea Marine National Monument has great cultural importance to Native Hawaiians and there are cultural sites found on islands contained within the monument. In recognition of this cultural importance, the monument has a unique management structure; it is administered jointly by the Department of Commerce, the Department of the Interior, the State of Hawai'i, and the Office of Hawaiian Affairs. Of these trustees, the Office of Hawaiian Affairs is responsible for representing the interests of Native Hawaiians, including traditional and customary rights and practices. (Papahānaumokuākea Marine National Monument n.d.).

The proclamation defines "Native Hawaiian Practices" to include traditional knowledge:

> Native Hawaiian Practices means cultural activities conducted for the purposes of perpetuating traditional knowledge, caring for and protecting the environment and strengthening cultural and spiritual connections to the Northwestern Hawaiian Islands that have demonstrable benefits to the Native Hawaiian community. This may include, but is not limited to, the non-commercial use of Monument resources for direct personal consumption while in the Monument. (50 C.F.R. §404.3)

The proclamation also provides special provisions for Native Hawaiian practice permits:

> (e) Additional findings for Native Hawaiian practice permits. In addition to the findings listed in paragraph (d) of this section, a permit to allow Native Hawaiian practices under paragraph (c)(4) of this section, may not be issued unless:...(2) The purpose and intent of the activity are appropriate and deemed necessary by traditional standards in the Native Hawaiian culture (pono), and demonstrate an understanding of, and background in, the traditional practice, and its associated values and protocols;... (4) The activity supports or advances the perpetuation of

> traditional knowledge and ancestral connections of Native Hawaiians to the Northwestern Hawaiian Islands... (50 C.F.R. §404.11(e)(2),(4))

Presidential Proclamation 9588 – Establishing Bears Ears National Monument, as amended by Presidential Proclamation 9681

In July of 2015, leaders from five Tribes [Hopi, Navajo, Zuni, Ute Mountain Ute, and Ute Indian Tribe] in the United States Southwest founded the Bears Ears Inter-Tribal Coalition, representing a historic consortium of sovereign tribal nations united in the effort to conserve the Bears Ears cultural landscape in Southeastern Utah. The five Tribes secured the designation of the Bears Ears National Monument by President Barack Obama on December 26, 2016. The proclamation established a five-tribe Commission that would collaboratively manage the Monument with the Bureau of Land Management and USFS; the Commission consisted of appointed and elected officials from the Hopi Nation, Navajo Nation, Ute Mountain Ute Tribe, the Ute Indian Tribe, and the Zuni Tribe.

The Proclamation took special note of the importance of TEK and included the following provisions:

> "The traditional ecological knowledge amassed by the Native Americans whose ancestors inhabited this region, passed down from generation to generation, offers critical insight into the historic and scientific significance of the area. Such knowledge is, itself, a resource to be protected and used in understanding and managing this landscape sustainably for generations to come." (82 Fed. Reg. 1140)
>
> "...to ensure that management decisions affecting the monument reflect tribal expertise and traditional and historical knowledge, a Bears Ears Commission (Commission) is hereby established to provide guidance and recommendations on the development and implementation of management plans and on management of the monument." (82 Fed. Reg. 1144).
>
> "To that end, in developing or revising the management plan, the Secretaries shall carefully and fully consider integrating the traditional and historical knowledge and special expertise of the Commission or comparable entity." (82 Fed. Reg. 1144).

Commenting on this development Victoria Tauli-Corpuz, United Nations Special Rapporteur on the Rights of Indigenous Peoples, said::

> "One recent example of proactive and laudable government action to protect indigenous sacred and cultural resources is the recent designation of the Bears Ears National Monument. Through its unprecedented model of co-management with local and regional tribes, the land use model adopted for the Bears Ears Monument allows for the continued use of the area for cultural practices for future generations while using indigenous communities' traditional knowledge to protect a unique cultural and ecological landscape for the use and enjoyment of the indigenous peoples concerned, as well as the public." (Tauli-Corpuz 2017).

On December 4, 2017. President Trump issued a proclamation that reduced Bears Ears National Monument by 85 percent. Authority over tribal co-management was narrowed to a portion of the reduced monument and the Commission's make-up altered by the addition of a local county commissioner. (Proclamation No. 9681, 82 Fed. Reg. 58081(Dec. 4, 2017)).

US Code Foreign Relations and Intercourse, International Bureaus Congress, Etc., Respect for Indigenous Peoples, (Pub. L. 95–118, title XVI, §1620, as added Pub. L. 103–306, title V, §526(e), Aug. 23, 1994, 108 Stat. 1633.),22 U.S.C. §262p-4o

This law acts through the Secretary of the Treasury to direct the United States Executive Directors of the international financial institutions and the United States representative to the council of the Global Environment Facility administered by the International Bank for Reconstruction and Development "to use the voice and vote of the United States to bring about the creation and full implementation of policies designed to promote respect for and full protection of the territorial rights, traditional economies, cultural integrity, traditional knowledge, and human rights of indigenous peoples."

4. Individual Federal Department and Agency Frameworks for the Engagement of Indigenous Communities About TEK

In addition to the high-level federal frameworks discussed above, there are a host of frameworks at the level of individual executive departments and agencies within the United States federal government. For background, the United States government is divided into three branches: executive, legislative, and judicial. The fifteen executive departments are the primary units of the executive branch and carry out the laws of the United States. Each executive department contains a network of agencies within it. To provide some organization, this section is organized by first discussing independent federal agencies, which are not housed within an executive department. It then tackles the executive departments that either have department-level and/or agency-level frameworks referencing TEK. Within these sections, frameworks that apply to the department as a whole are first addressed. Then frameworks established by individual agencies within each department are described. A very brief description of the various departments and agencies is also provided for context.

It is important to remember that a lack of a framework specific to TEK does not equate to the lack of a tribal policy – there are numerous executive departments and countless agencies with well-developed tribal policies that simply do not reference TEK and thus were not included in this inventory.

4.1 Independent Federal Agencies

Advisory Council on Historic Preservation

Established by the National Historic Preservation Act of 1966, the ACHP is an independent agency of the United States government that promotes the preservation, enhancement, and productive use of the nation's historic resources, and advises the President and Congress on national historic preservation policy. (ACHP n.d.). The ACHP oversees the Section 106 review process which requires federal agencies to consult with Indian Tribes and NHOs when historic properties of religious and cultural significance to them might be affected by projects carried out, licensed, or assisted by such agencies. The ACHP's policies regarding its relationships with both Indian Tribes and NHOs include acknowledgement of the traditional knowledge that Indigenous peoples bring to the federal historic preservation review process under Section 106, as well as its contribution to the preservation of the nation's cultural heritage. (ACHP 2019). The ACHP has extensive guidance to assist federal agencies in carrying out effective consultation as well as for Indian Tribes and NHOs to assist them in navigating the federal review process. The ACHP has also acknowledged the role of traditional knowledge in special reports and in trainings. (ACHP 2019).

Environmental Protection Agency

The EPA is an independent federal agency whose mission is the protection of human and environmental health. EPA was established on December 2, 1970 to consolidate in one agency a variety of federal research, monitoring, standard-setting and enforcement activities to ensure environmental protection. The EPA has headquarters in Washington, D.C. and regional offices in each of the EPA's ten regions, each of which is served by a Tribal Program Manager (EPA n.d.).

The EPA has integrated TEK into many of its policies and programs. The EPA *Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous People* "encourages, as appropriate and to the extent practicable and permitted by law, the integration of Traditional Ecological Knowledge into the agency's environmental science, and policy decision-making processes to address environmental justice concerns and facilitate program implementation." (EPA 2014, 3). It also acknowledges "confidentiality concerns regarding information on sacred sites, cultural resources, and other traditional knowledge as permitted by law." (EPA 2014, 3).

EPA has also issued memorandums and guidance around the use of TEK in contaminated site clean-up. These documents include the EPA Office of Land and Emergency Management, *Memorandum on Consideration of Tribal Treaty Rights and Traditional Ecological Knowledge in the Superfund Remedial Program,* and EPA Office of Land and Emergency Management, *Memorandum on Considering Traditional Ecological Knowledge (TEK) During the Cleanup Process*. Both of these memorandums states that it is the OLEM's "intention to acknowledge and consider TEK during our cleanup process when the information is freely provided" by Tribe(s). (EPA 2017, 5; EPA 2017b, 3). The memorandums then provide guidance around information-sharing protocols focused on identifying when TEK may be additive for decision-making, being clear about OLEM's use of any TEK shared by Tribes, and outlining other issues for employees to consider when engaging with a Tribe around TEK.

Finally, EPA's research and granting programs also include TEK. EPA's Tribal Science Council's paper *Integration of Traditional Ecological Knowledge (TEK) in Environmental Science, Policy and Decision-Making* put forward recommendations around best practices for including TEK in environmental decision-making. (EPA Tribal Science Council 2011). Similarly, EPA convened a colloquium on the broader topic of integrating ecological assessment and decision-making at EPA. The paper resulting from that gathering, *Integrating Ecological Assessment and Decision-Making at EPA: A Path Forward - Results of a Colloquium in Response to Science Advisory Board and National Research Council Recommendations*, includes guidance around incorporating TEK (EPA 2010). Finally, EPA established the Tribal Environmental Health Research Program in 2000 through the Science To Achieve Results (STAR) grants and fellowships programs. The STAR program has five granting areas – one of which is cultural practices, languages, and traditional ecological knowledge – and has resulted in a number of projects and research initiatives involving TEK. (McOliver et al. 2018).

4.2 Department of Agriculture

The United States Department of Agriculture (USDA) was established in 1862 and, today, is the sixth largest federal agency in the United States with a broad focus on food, agriculture, natural resources, rural development, and nutrition. Among USDA's seven agencies are the United States Forest Service and the Natural Resources Conservation Service. (USDA n.d.).

The USDA's *Department Regulation on Tribal Consultation, Coordination, and Collaboration* provides the following direction to all its agencies:

> "This Departmental Regulation directs the USDA and its agencies to provide Federally recognized Tribes the opportunity for government-to-government consultation and coordination in policy development and program activities which have direct and substantial effects on their Tribe, *thereby ensuring that tribal perspectives on the social, cultural, economic, and ecological aspects of agriculture,* as well as tribal food and natural resource priorities and goals are heard and fully considered in the decision-making processes of the Department and its agencies." (USDA Office of Tribal Relations 2013, 2) (emphasis added).

Additionally, USDA's *Environmental Justice Strategic Plan* includes a goal to "Increase capacity-building within environmental justice communities." (USDA 2015, 11). To support this goal, USDA commits to "[e]stablish at least one U.S. Forest Service Tribal Adaptation Partnership in each Forest Service Region to integrate traditional knowledge with scientific information into actions that build ecological, social, and economic resilience." (USDA 2015, 13).

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS) is focused on the conservation of the United States' soil and water resources. In 2010, NRCS assembled an "NRCS/Native Practices Work Group" to discuss creating a guidebook on Indigenous stewardship and tribal/federal partnerships. (USDA NRCS 2010, 4). This working group consisted of Native Elders/Advisors and of NRCS employees with many years of experience with Tribes and natural resources. The resulting guidebook, "*Indigenous Stewardship Methods and NRCS Conservation Practices"* provides guidance to NRCS employees and to Indigenous cooperators who work with NRCS. (NRCS 2010, 1) The Guidebook drew from the work of the American Indian/Alaska Native Employees Association for NRCS, an organization that advocates both for NRCS services for Indian lands and for the professional advancement of American Indian and Alaska Native employees of NRCS. (NRCS 2010, 5)

NRCS has also produced a number of publications as part of its Indigenous Stewardship Methods work. These include the following series of technical notes: *Traditional Ecological Knowledge: An Important Facet of Natural Resources Conservation*; *Technical Note No. 2 -Indigenous Uses, Management, and Restoration of Oaks of the Far Western United States;* and *The Ozette Prairies of Olympic National Park: Their Former Indigenous Uses and Management.* (NRCS n.d.).

United States Forest Service

Established in 1905, the United States Forest Service (Forest Service) manages and protects 154 national forests and twenty grasslands in forty-three states and Puerto Rico. The agency's mission is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. (USFS n.d.). The Forest Service has been very progressive in its work on TEK and TEK is referenced in numerous policies and directives.

The *2012 Forest Service Planning Rule* defines Native knowledge as follows:

> "A way of knowing or understanding the world, including traditional ecological and social knowledge of the environment derived from multiple generations of indigenous peoples' interactions, observations, and experiences with their ecological systems." (36 C.F.R. §219.19 (2018))

The Planning Rule then directs that "[a]s part of tribal participation and consultation...the responsible official shall request information about native knowledge..." (36 C.F.R. §219.4 (2018))

The Forest Service's directives consist of the Forest Service Manual and Handbooks. These documents organize the Forest Service's policy, practice and procedure, and they serve as the main source of internal management for the agency. The Forest Service *Manual on External Relations*

defines TEK and directs Forest Service employees to ensure that Forest Service officials, programs, and activities "acknowledge and respect traditional knowledge." (USFS 2016b, 28). It also directs that regional tribal relations managers have a responsibility to "[s]eek traditional knowledge that may be relevant to the management of natural and cultural resources." (USFS 2016b, 40). This includes "traditional knowledge that tribal citizens hold about ecosystems that may be helpful in meeting management objectives of both the Forest Service and Tribes." (USFS 2016b, 66).

The Forest Service *Handbook on American Indian and Alaska Native Relations* also includes provisions on TEK. The Handbook states that Forest Service training will enable Forest Service employees to "fairly consider tribal concerns, including traditional ecological knowledge and sacred sites, in Forest Service decision-making." (USFS 2106, 20).

Finally, the Forest Service's *Tribal Relations Strategic Plan for Fiscal Years 2010-2013*, the most recent plan at the time of this writing, sets an objective to "[e]ncourage integration of American Indian and Alaska Native traditional knowledge, wisdom, and practices in agency land management decisions and implementation." (USFS 2009, 5). The associated actions to implement this objective include to "Incorporate, when identified through consultation, American Indian and Alaska Native traditional knowledge in agency planning, projects, and perspectives to support informed decision-making;" to "Showcase American Indian and Alaska Native traditional knowledge; and to "share knowledge with leadership and staff on the appropriate use and protection of traditional ecological knowledge and wisdom." (USFS 2009, 5). Building on this direction, the Forest Service, working through its Research and Development Deputy Area, created the *USDA, Forest Service Research and Development, Tribal Engagement Roadmap,* which focuses on the use of TEK, particularly in the context of fire management. (USFS 2015).

4.3 Department of Commerce

The Department of Commerce is focused on job creation, economic growth, and standards of living in the United States. It also houses the National Oceanic and Atmospheric Administration (NOAA), whose mission is focused on "Science, Service, and Stewardship" of the United States climate, weather, ocean, coastal, and marine resources. Due to an internal political fight during the Nixon Administration, the newly created NOAA was placed in the Department of Commerce rather than the Department of the Interior. (Remarks on Government Reform 2012). For this reason, many Secretarial Orders pertaining to the environment are jointly issued by the Secretaries of Interior and Commerce, solely to ensure that the directives also govern NOAA.

Secretarial Orders Applicable to Commerce

Secretarial Order 3206 *American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act* was issued by the Secretary of the Interior and the Secretary of Commerce. The Order clarifies the responsibilities of the agencies within the Department of the Interior and the Department of Commerce when actions affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights. In terms of TEK, the Order states, "[t]he Departments recognize and respect, and shall consider, the value that tribal traditional knowledge provides to tribal and federal land management decision-making and tribal resource management activities." (Dep'ts of the Interior & Commerce 1997).

Secretarial Order 3225 *Endangered Species Act and Subsistence Uses in Alaska* by the Secretaries of the Interior and Commerce was designed to supplement Secretarial Order No. 3206 by defining the application of Secretarial Order No. 3206 in Alaska and establishing a consultation framework relative to subsistence exemptions found in the Endangered Species Act. With regard to TEK, it

provides for participation of "Alaska Natives in 'research design, data collection and use of traditional knowledge." (Dep'ts of the Interior & Commerce 2001).

National Oceanic and Atmospheric Administration

NOAA describes its mission of "Science, Service, and Stewardship" as follows: "(1) Science – To understand and predict changes in climate, weather, oceans and coasts; (2) Service – To share that knowledge and information with others; and (3) Stewardship – To conserve and manage coastal and marine ecosystems and resources." (NOAA n.d.).

NOAA has high-level policies in place referencing TEK. *NOAA Procedures for Government to Government Consultation with Federally Recognized Indian Tribes and Alaska Native Corporations* contains both a definition of TEK and the acknowledgement that NOAA's scientific and resource management responsibilities can be greatly enriched through the incorporation of TEK. (NOAA 2013). Under the *Marine Mammals Protection Act* and as discussed above in Section §3.2, NOAA is authorized to enter into co-management agreements with Alaska Native Tribes – these agreements form the foundation for much of the Administration's TEK work on the ground. (16 U.S.C. §1388 Section 119) Related to this co-management work, one of NOAA's line offices, the National Marine Fisheries Service, maintains the Alaska Native Traditional Environmental Knowledge Database, a catalog of quotes and paraphrases from published literature, videos, and pre-existing interviews relevant to the management of natural marine resources. (Lazarus and Sepez 2005).

Additionally, NOAA utilizes a complex network of advisory boards and working groups, many of which have guidance around TEK. The Ecosystem Science and Management Working Group of the NOAA Scientific Advisory Board issued a report entitled "*Indigenous and Local Ecological Knowledge and NOAA,*" which offers guiding principles for NOAA around engagement in the conduct of Indigenous and local knowledge research. (Ecosystem Science and Management Working Group of the NOAA Scientific Advisory Board. n.d.). The report also examined existing NOAA policies and protocols around indigenous and local knowledge. In another example, the Marine Protected Areas Federal Advisory Committee, a committee that advises both NOAA and the Department of Interior, prepared a report entitled "*Recommendations for Integrated Management Using a Cultural Landscape Approach in the National MPA System*." (Marine Protected Areas Federal Advisory Committee 2011). This document provides recommendations around applying the Cultural Landscape Approach, which emphasizes cultural relationships to the environment and highlights connections between human behavior and the condition of marine ecosystems over time, to management of the National System of Marine Protected Areas. Among the report's recommendations is to "[d]evelop best practices to bring together all available knowledge of cultural heritage resources, including the incorporation of tribal and indigenous sources." (Marine Protected Areas Federal Advisory Committee 2011, 4).

4.4 Department of Defense

Native American Lands Environmental Mitigation Program

The Department of Defense is responsible for coordinating and supervising all agencies and functions of the United States government concerned directly with national security and the United States Armed Forces. Among its many responsibilities is the Native American Lands Environmental Mitigation Program, which aims to address environmental impacts on Indian lands from former DoD activities with maximum tribal participation. If a site meets the criteria and is selected for admittance to the Native American Lands Environmental Mitigation Program, the Department of Defense enters into Cooperative Agreements with tribal governments to address problems attributable

to past Department of Defense activities. The Department of Defense states that these agreements, among other things, "incorporate TEK into the design for cleanup." The Department of Defense has executed 235 Cooperative Agreements with over fifty-four tribal nations at a total funding level of over $90 million. (DENIX n.d.).

4.5 Department of the Interior

Established in 1849, the Department of Interior (DOI) has a wide range responsibilities, both in the United States and its territories. Among other things, DOI is charged with conserving and managing the United States' natural resources, including fish and wildlife, and cultural heritage for the benefit and enjoyment of the American people; overseeing the development of energy supplies on public lands; managing water in the American west; and honoring the United States' trust responsibilities to Native American and Alaska Native Tribes. (U.S. Department of the Interior. n.d.).

The DOI is led by the Secretary of Interior and houses both a number of offices and the following nine technical bureaus: Bureau of Indian Affairs, Bureau of Land Management, Bureau of Ocean Energy Management, Bureau of Reclamation, Bureau of Safety and Environmental Enforcement, National Park Service, Office of Surface Mining and Reclamation, United States Fish and Wildlife Service, and United States Geological Survey. (U.S. Department of the Interior. n.d.). There are several broad categories of TEK mechanisms applicable to DOI: first are high-level Secretarial Orders, advisory committees, centers, and guidelines that apply to DOI; second are bureau-specific guidance and policies that reference TEK. Both categories are discussed below.

Secretarial Orders Applicable to Interior

Secretarial Order 3206 *American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act* was issued by the Secretary of the Interior and the Secretary of Commerce. The Order clarifies the responsibilities of the agencies within DOI and the Department of Commerce when actions affect, or may affect, Indian lands, tribal trust resources, or the exercise of American Indian tribal rights. In terms of TEK, the Order states, "[t]he Departments recognize and respect, and shall consider, the value that tribal traditional knowledge provides to tribal and federal land management decision-making and tribal resource management activities." (Dep'ts of the Interior & Commerce 1997)

Secretarial Order 3225 *Endangered Species Act and Subsistence Uses in Alaska* by the Secretaries of the Interior and Commerce was designed to supplement Secretarial Order No. 3206 by defining the application of Secretarial Order No. 3206 in Alaska and establishing a consultation framework relative to subsistence exemptions found in the Endangered Species Act. With regard to TEK, it provides for participation of "Alaska Natives in 'research design, data collection and use of traditional knowledge." (Dep'ts of the Interior & Commerce 2001).

Secretarial Order 3342 *Identifying Opportunities for Cooperative and Collaborative Partnerships with Federally Recognized Indian Tribes in the Management of Federal Lands and Resources* is also relevant to TEK. (Dep't of Interior 2016). Secretarial Order 3342 has two main purposes: (1) to encourage collaborative partnerships between DOI agencies and Tribes; and (2) establish a process and provide support to ensure that DOI agencies are evaluating opportunities to establish partnerships with Tribes. The Order makes the following reference to TEK:

> "This Order recognizes that tribes have special geographical, historical, and cultural connections to Federal lands and waters, and that tribes have traditional ecological knowledge and practices regarding resource management that have been handed down through generations. Federal land and resource managers value this traditional knowledge, which

> enhances Federal management decision-making and ensures a continued connection between tribes and Federal lands and waters." (Dep't of Interior 2016).

The Ahtna Cooperative Management Demonstration Project is the first cooperative agreement established under the Secretarial Order 3342. Entered into by DOI and eight Alaska Native Tribes in the Ahtna region of Southeast Alaska, it formalizes a subsistence wildlife management partnership and states DOI's commitment to "incorporating Ahtna traditional ecological knowledge and customary and traditional management practices...into the Department's subsistence wildlife management structure and policies." (Ahtna Inter-Tribal Resource Commission & DOI 2016).

Secretarial Order No. 3289, Amendment No. 1. *Addressing the Impact of Climate Change on America's Water, Land, and Other Natural and Cultural Resources* establishes a department-wide approach for applying scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on Tribes and the natural resources managed by the Department. (Dep't of Interior 2010). This Order established a network that included Climate Adaptation Science Centers (CASC) and Landscape Conservation Cooperatives (LCC), which are discussed below later in this Section as well as Section §8.1. With regard to TEK, the Order states, "the Department will support the use of the best available science, including traditional ecological knowledge, in formulating policy pertaining to climate change." (Dep't of Interior 2010).

Department of the Interior Climate Adaptation Science Centers

Secretarial Order No. 3289, *Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources*, resulted in a nationwide network of eight federal CASCs and twenty-two multi-stakeholder LCCs, discussed below in Section §8.1. (Lynn 2012, 5)

The eight CASCs are federal governmental entities, housed in the Department of the Interior and coordinated through the USGS National Climate Adaptation Science Center that provide scientific information, tools, and techniques that land, water, wildlife, and cultural resource managers and other interested parties can apply to anticipate, monitor, and adapt to climate change impacts. The direction of CASC's projects and research interests is driven by the LCC network.

Secretarial Order No. 3289 establishes that CASC and LCC will apply "scientific tools to increase understanding of climate change and to coordinate an effective response to its impacts on tribes and on the land, water, ocean, fish and wildlife, and cultural heritage resources that the Department manages." (Dep't of Interior 2010). It also states that "the Department will support the use of the best available science, including traditional ecological knowledge, in formulating policy pertaining to climate change." (Dep't of Interior 2010).

Pursuant to this direction, CASCs are "focal points for engaging American Indian Tribes, Alaska Natives and First Nations in collaborative efforts with the Department of the Interior, including those related to TEK." (Lynn 2012, 2). Through a partnership with BIA resulting from the Tribal Climate Resilience Program, Tribal Liaisons have been placed at the CASCs to help identify climate information and research needs of Tribes and Indigenous communities and work with federal partners to address those needs. (Dep't of Interior 2014). See Section §8.1 below for a broader discussion of TEK projects involving CASCs and LCCs.

Bureau of Indian Affairs

Established in 1824, the Bureau of Indian Affairs (BIA) is the oldest agency in the United States Department of the Interior. BIA's mission is to "… enhance the quality of life, to promote economic opportunity, and to carry out the responsibility to protect and improve the trust assets of American Indians, Indian tribes, and Alaska Natives." (BIA n.d.).

BIA has policies and plans in place that are specific to TEK, particularly in the realm of fire management. The website for BIA's Division of Forestry and Wildland Fire Management notes the growing role TEK is playing in modern day fire management:

> "By blending traditional ecological knowledge with a scientific approach, BIA fuels managers are working alongside tribes to restore natural resources and culturally familiar landscapes. While more modern technology and tools have their place, indigenous ecological knowledge is aggressively being reintroduced by tribal elders and community members to help teach and better understand the historic relationship between fire, the environment, and people. Through traditional stories told and performed by tribal elders, fire is being returned to a respected place in land management." (BIA n.d.b).

An on-the-ground example illustrate this work in action. BIA's Division of Forestry and Wildland Fire Management awarded the Confederated Salish and Kootenai Tribes a grant around the Indigenous use of fire in the northern Rocky Mountains. The project aimed both to restore an appreciation for the Salish, Kootenai, and Pend d'Orielle's use of fire, and to improve the public's knowledge of how fire had been used to shape the ecosystems of the Northern Rockies, thus improving land managers' ability to conduct prescribed burns. (White 2007).

BIA's TEK work also relates to climate resilience and adaptation efforts. In 2014, the Department of the Interior announced the dedication of $10 million to a new Tribal Climate Resilience Program. (U.S. Dep't of Interior 2014). As part of this effort, BIA's Tribal Resilience Program provides resources to Tribes to develop science-based information and tools to enable adaptive resource management, as well as the ability to plan for climate resilience. The Tribal Climate Resilience Program provides a suite of resources for tribal resilience, including a toolkit specific to integrating Western Science with TEK. (U.S. Climate Resilience Toolkit, n.d.). The Tribal Climate Resilience Program also resulted in BIA placing tribal climate liaisons at each of the DOI's Climate Adaptation Science Centers. (U.S. Dep't of Interior 2014).

Bureau of Ocean Energy Management

The mission of the Bureau of Ocean Energy Management (BOEM) is to manage development of energy and mineral resources in the United States Outer Continental Shelf in an environmentally and economically responsible way. One of four OCS regions, Alaska OCS encompasses more than one billion acres in the Beaufort Sea, Chukchi Sea, Bering Sea, Cook Inlet, and Gulf of Alaska. (BOEM n.d.). These lease agreements result in development that impact ecosystems in which they take place and the communities who rely on those ecosystems. Pursuant to the Outer Continental Shelf Act, BOEM's Environmental Studies Program develops, funds, and manages rigorous scientific research specifically to inform policy decisions on the development of energy and mineral resources on the OCS. Research supported by the ESP includes physical, biological, economic, and sociocultural disciplines, and over $1 billion has been dedicated to the ESP since its inception in 1973. (BOEM n.d.b).

While there are no official policies in place at the agency level, there are institutional structures in place. For example, since at least 1996, the Alaska OCS Region of the Bureau of Ocean Energy Management has been working toward integrating traditional knowledge in BOEM science and decision-making. (BOEM n.d.b). Today, BOEM utilizes TEK both in designing planning and conducting scientific research through the ESP, and by listening to TEK provided in tribal consultation and public comments around federal agency leasing decisions. (Kendell et al. 2017). BOEM is currently working with the North Slope Borough to develop the study *Traditional Knowledge Implementation: Accessing Arctic Community Panels of Subject Matter Experts*, which will extend BOEM's work to recognize and apply traditional knowledge at all levels of governance. (Kendall et al. 2017, 160).

National Park Service

NPS stewards the United States' national parks and has been engaged with TEK. NPS employees co-lead the informal inter-agency TEK working group, author or advise on multiple TEK reports, and host a nationally and internationally visited website on TEK, which includes applications, issues, and resources. (Greenwood 2018).

Additionally, NPS' Inter-Mountain Region has created an initiative, *Tribal Research Policies, Processes and Protocols Project*, which is developing a database of tribal research policies, processes and protocols, so researchers can comply with tribal processes for TEK research. (Greenwood 2017, 1). As of March 2019, the Inter-Mountain region has contacted and received responses from 114 Tribes about the "Tribal Research Policies, Processes and Protocols Project" and reported that most of the tribes contacted have seen the project as valuable. Of the Tribes contacted, 94 provided permission to post basic information on the website. Only 28 percent already had formal protocols in place; 14 percent were developing formal protocols; 37 percent followed informal protocoals; and the remainder 21 percent did not have protocols in any form. (Greenwood 2019). Based on the level of interest, NPS staff is moving forward with the projects. The Pacific West Region has set aside funding to encourage parks in its region to pursue traditional ecological knowledge projects. This effort is a model for other regions in the National Park Service. Other NPS regional offices have undertaken a variety of projects through the ethnographic studies program that contribute to on-the-ground management of cultural and natural resources. (Greenwood 2019).

In terms of official policies, *NPS Management Policies 2006*, uses the term "traditional knowledge" throughout the document and provides for the consideration of traditional knowledge in resource management. (NPS 2006) The National Park Service issued two fact sheets: *Synopsis of Traditional Ecological Knowledge* and *Western Scientists' Consideration of and Involvement with Traditional Ecological Knowledge* in 2014 with a slight revision in 2016. (Greenwood 2019). The Washington Support Office for the National Park Service's Natural Resource Stewardship and Science Directorate issued *Introduction to Traditional Ecological Knowledge in Wildlife Conservation* in 2016. (Greenwood 2019). In July 2016, the National Park Service issued the final rule for *Gathering of Certain Plants or Plant Parts by Federally Recognized Indian Tribes for Traditional Purposes* that presents an opportunity for future TEK projects for ecosystem stewardship. (Greenwood 2019).

United States Fish and Wildlife Service

The USFWS is the only agency in the federal government whose primary responsibility is management of fish and wildlife for the American public. USFWS enforces federal wildlife laws, protects endangered species, manages migratory birds, restores fisheries, conserves wetlands, and manages the National Wildlife Refuge System's 560 National Wildlife Refuges. (USFWS n.d.).

Similar to the National Park Service, the USFWS has been very engaged with TEK. USFWS employees co-lead the informal inter-agency TEK working group, produced a webinar class entitled "TEK: An Introduction," author or advise on multiple TEK reports, and created the TEK fact sheet – a document that is often referenced as a resource by many federal agencies, particularly for its definition of TEK. (Rinkevich 2011).

USFWS's *Native American Policy, Intergovernmental Affairs Part 510: Working with Native American Tribes* states the following:

> "We will listen to and consider the traditional knowledge, experience, and perspectives of Native American people to manage fish, wildlife, and cultural resources. We will use the best available scientific and commercial data and solicit and consider information, traditional

> knowledge, and expertise of affected tribal governments in policies, agency actions, and determinations that have tribal implications." (USFWS 2016).

Additionally, under the *Marine Mammals Protection Act* and the *Tribal Self-Governance Act*, both discussed above in Section §3.2 and Section §3.1 respectively, USFWS is authorized to enter into co-management agreements – these agreements form the foundation for much of the Administration's TEK work on the ground. USFWS has an ongoing AFAs with the Council of Athabascan Governments for co-management of the Yukon Flats National Wildlife Refuge; this is discussed in greater depth below in Section §5.3. (83 Fed. Reg. 10513).

Another notable on the ground TEK effort occurred in Alaska where USFWS partnered with Iñupiaq elders near the Selawik National Wildlife Refuge in Northwest Alaska to conduct a study on Iñupiaq knowledge of whitefish in northwest Alaska. Whitefish are a prized subsistence resource but one that scientists knew little about. Fifty-seven elders were interviewed and the study resulted in new information about whitefish spawning grounds, ranges, and taxonomy. Results from the study were used to focus future scientific study on key regions, to build new research questions from the foundation of Indigenous knowledge rather than re-inventing the wheel, to amend fishing regulations to better accommodate subsistence use, and to strengthen relationships with Alaska Native Communities. (Georgette n.d., 1).

Another USFWS decision-space that has been drawing on TEK is the listing of endangered species under the Endangered Species Act. For example, as part of the FWS process to determine whether to list polar bears as threatened, USFWS sought expertise in TEK both from Native organizations, individuals with TEK related to climate change and polar bears. (USFWS 2008). Similarly, in the decision not to list the Desert Bald Eagle, USFWS included traditional ecological knowledge from Native American Tribes in the Southwest (White Mountain Apache Tribe, San Carlos Apache Tribe, Tonto Apache Tribe, Yavapai- Apache Nation, Salt River-Pima Maricopa Indian Community, Tohono O'odham Nations, and Fort McDowell Yavapai Nation) in its consideration of threats to the Sonoran Desert Area population of bald eagle. (USFWS 2012).

United States Geological Survey

The United States Geological Survey (USGS) is the sole science agency within the Department of the Interior. Along with its original focus on mapping, the USGS's work includes research of groundwater, ecosystems, environmental health, natural hazards, and climate and land use change. This research provides data to inform policy made by federal decision-makers. (USGS n.d.).

The USGS Office of Tribal Relations (OTR) maintains a Tribal Liaison Team to work with the Bureau to establish policy and coordinate USGS activities. Moreover, the USGS Tribal Relations website states the following:

> "USGS has recognized the importance of Native knowledge and living in harmony with nature as complements to the USGS mission to better understand the Earth. Combining traditional ecological knowledge with empirical studies allows the USGS and Native American governments, organizations, and people to increase their mutual understanding and respect for this land. USGS provides information to tribes as part of our basic mission of providing unbiased scientific information to the Nation, and as part of the Federal Trust Responsibility to tribes. (USGS Office of Tribal Relations n.d.).

USGS's science work tracks with the language on its Tribal Relations website. USGS has engaged in several studies that integrate or even focus entirely on TEK. Representative examples include *Conversing with Pelehonuamea—A workshop combining 1,000+ years of traditional Hawaiian knowledge with 200 years of scientific thought on Kīlauea volcanism*; and *Science partnership*

between U.S. Geological Survey and the Lower Elwha Klallam Tribe—Understanding the Elwha River Dam Removal Project. (USGS Office of Tribal Relations n.d.).

Additionally, the USGS National Climate Adaptation Science Center is the managing entity for the eight regional Department of the Interior CASCs. As discussed above, the Climate Adaptation Science Center is working with Tribes and Indigenous communities to better understand their specific vulnerabilities to climate change and to help them adapt to these impacts. (Lynn 2012, 5-6), as is the Bureau of Reclamation. (Bureau of Reclamation 2018).

5. Tribal-Level Frameworks for the Engagement of Indigenous Communities Around TEK

TEK is an everyday part of the lives of Tribes and Indigenous communities. Even when not officially codified, TEK is likely part of a significant amount of on-reservation natural resource management and stewardship, as well as the foundation for tribal engagement in off-reservation natural resource management issues occurring in ancestral lands.

There are also circumstances and frameworks where TEK is explicitly referenced and utilized in modern-day tribal natural resource management, both on and off reservation. This typically occurs in two main contexts: the first is through inter-tribal entities, including both national-level groups such as NCAI and Inter-Tribal Commissions, and the second is through the work of individual Tribes and Indigenous communities. With regard to the first category, this report focuses specifically on inter-tribal entities with policies, directives, or programs that explicitly reference or include TEK. There are numerous other inter-tribal entities pertinent to natural resource management that may or may not use TEK in their efforts.[5] In terms of individual Tribes, representative examples are provided with descriptions of efforts; for a more comprehensive resource, see Appendix A. Each tribal government has established frameworks that may include the creation of a Tribal Historic Preservation Office (THPO) for the Tribe; some THPOs are leading policy efforts across the US in the area of TEK. (Small 2019).

5.1 National Tribal Entities Engaged with TEK

Inter-Tribal Timber Council

Established in 1976, the Inter-Tribal Timber Council (ITC) is a nonprofit nation-wide consortium of over sixty Indian Tribes, Alaska Native Corporations, and individuals dedicated to improving the management of natural resources of importance to Native American communities. The ITC works cooperatively with the Bureau of Indian Affairs, private industry, and university partners to better manage forests and to advocate for improved policies for tribal forestry, both off and on-reservation. ITC is part of the cooperative effort that resulted in the National Indian Forestry and Wildland Fire Management Program. Other partners include the United States Department of the Interior, Bureau of Indian Affairs Division of Forestry and Wildland Fire Management, and individual tribal

5 Other inter-tribal entities engaged in natural resource management that either were not referenced over the course of project interviews and/or do not explicitly incorporate TEK into their publically-available descriptions of programs or policies include the Alaska Federation of Natives, the Inter-Tribal Buffalo Council, and the National Tribal Air Association. Nothing is this report should be read to say that these organizations do not utilize TEK; TEK is simply not explicitly referenced in the publically available documents reviewed during the creation of this report.

governments. (Inter-Tribal Timber Council n.d.). As noted above in Section §4, BIA's Division of Forestry and Wildland Fire Management actively endorses the use of TEK in fire management.

While the ITC does not explicitly include TEK in its policies or plans, many members of the ITC board participate in TEK workshops and work on initiatives focused on integrating TEK into fire management on their reservations. (Mason 2012, 190). ITC advocates for Indian self-determination and self-governance around on-reservation fire management, as well as tribal involvement in off-reservation fire management through vehicles such as the Tribal Forest Protection Act, the Wildland Fire Resilient Landscapes Program, and the Reserved Treaty Rights Land Program. (Inter-Tribal Timber Council n.d.).

National Congress of American Indians

Founded in 1944, NCAI is the oldest, largest and most representative American Indian and Alaska Native organization. It is a non-profit serving the broad interests of tribal governments and communities by gaining consensus on a constructive vision for the future of Indian Country. All policies and initiatives are driven by the consensus of the membership, and NCAI's positions are established through resolutions that express organizational positions on matters that affect tribal governments and communities. (NCAI n.d.). NCAI has issued two resolutions specific to TEK: (1) Traditional Ecological Knowledge and Climate Change, and (2) Request for Federal Government to Develop Guidance on Recognizing Tribal Sovereign Jurisdiction over Traditional Knowledge. (NCAI 2011; NCAI 2013).

An offshoot of NCAI that has been dormant for several years, but nonetheless has potential for mobilization around TEK is Our Natural Resources (ONR). Open to all Tribes and organizations, ONR is an alliance of tribal natural resource organizations, intertribal organizations, and Tribes committed to develop and advance a national tribal natural resources strategy. ONR's vision is one where "[t]ribal nations are united to manage natural resources and integrate science and traditional knowledge to sustain cultural lifeways, protect the environment and build economies to enhance the well-being of all peoples, now and in the future." ONR's third strategic goal is to "[e]stablish and advance the role of tribal wisdom and beliefs in natural resources research and management." (Our Natural Resources n.d.).

Native American Fish and Wildlife Society

Native American Fish and Wildlife Society is a national Native American non-profit organization that serves as a communication medium for self-determined Native American fish and wildlife managers, and between tribal, federal, and state fish and wildlife management entities. (Native American Fish and Wildlife Society n.d.). For years, NAFWS has integrated a track on TEK into their regional and national conferences agendas, during which Tribes and other researchers have showcased TEK projects. (Greenwood, 2019). Native American Fish and Wildlife Society has been in a leadership transition so its progress has slowed in the last few years, but some noted the potential for the organization to take a leadership role in advancing TEK work in years to come. (e.g. Aikin 2018).

Affiliated Tribes of Northwest Indians

Formed in 1953, the Affiliated Tribes of Northwest Indians is a nonprofit organization representing fifty-seven Northwest tribal governments from Oregon, Idaho, Washington, southeast Alaska, Northern California and Western Montana whose purpose is to represent and advocate for the interests of its member Tribes to national and regional Indian and non-Indian organizations and governments. (ATNI n.d.) Among the Affiliated Tribes of Northwest Indians' programs is a climate change program whose vision is "[p]rovide guidance to the federal government in developing and

implementing administrative and legislative actions related to Indigenous Peoples and climate change." One of the tools in realizing this vision is "exploring the role of traditional knowledges in respectfully and appropriately addressing contemporary environmental change." (ATNI 2018).

Intertribal Agricultural Council and other Agricultural Focused Entities

The Intertribal Agriculture Council was founded in 1987 to pursue and promote the conservation, development and use of agricultural resources for the betterment of Tribes and Indigenous communities in the United States. Today, the Intertribal Agriculture Council is recognized as one of the most respected voices within the Indian community and government circles on agricultural policies and programs in Indian country. (IAC n.d.).

There is a robust number of entities working at the intersection of agriculture, dietary health, and TEK in Indian Country. These include the University of Arkansas School of Law's Indigenous Food and Agriculture Initiative, the Seeds of Native Health Coalition, and the Native Farm Bill Coalition. (Indigenous Food and Agriculture Initiative n.d.; Seeds of Native Health n.d.). While the focus of these entities extends beyond TEK, each of these organizations is working to revitalize TEK as it relates to food, sustainable agricultural practices, and dietary health in Indian Country.

5.2 Inter-Tribal Commissions Engaged with TEK

Another tribal framework for the use of TEK is in the context of inter-tribal commissions formed to manage specific areas or wildlife resources. These commissions typically represent the interests of multiple Tribes who have off-reservation treaty or ancestral use rights in a shared region; are governed by representatives from each of the member Tribes; and are staffed by technical experts who support the Tribes to engage in off-reservation natural resource management issues of common concern. These commissions are drawing on both TEK and western science to inform their work, as discussed in greater detail below.

Great Lakes Indian Fish and Wildlife Commission

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) was formed in 1984 and represents eleven Ojibwe Tribes in Minnesota, Wisconsin, and Michigan who reserved hunting, fishing and gathering rights in the 1836, 1842, and 1854 Treaties with the United States government. Through its board, staff, and standing committees, GLIFWC supports the exercise of treaty rights throughout the treaty ceded territories. (McCammon-Soltis & Stark 2009, 2).

To support its TEK work, GLIFWC employs a permanent TEK Outreach Specialist on staff who works with tribal elders and cultural leaders to gather and integrate TEK into climate change planning documents and other efforts. This has included partnering with the National Park Service to revive the use of cultural fire for forest management in the Apostle Islands National Lakeshore. (Montano 2018). Commenting on the success of the partnership, both for land and relationships, former National Lakeshore Superintendent Bob Krumenaker commented, "this is the best combination of cultural heritage and land management that I can think of." (Rasmussen, Winter 2017/2018).

Another notable effort led by GLIFWC staff is a climate change vulnerability assessment of over sixty species of interest to GLIFWC member Tribes across the ceded territories. (Panci et al. 2018). The assessment integrates TEK and scientific ecological knowledge to examine the vulnerability of those species to climate change. As GLIFWC states in its report:

> "This integration of TEK and SEK will make results of the assessment more useful to our member tribes, strengthen our understanding of how beings/species may respond to climate

> change, and help GLIFWC respond to climate change in accordance with the cultural values of its member tribes." (Panci et al. 2018, 2).

Northwest Inter-Tribal Fish Commissions: The Columbia River Inter-Tribal Fish Commission and The Northwest Indian Fisheries Commission

The Northwest Indian Fisheries Commission (NWIFC) and the Columbia River Inter-Tribal Fish Commission (CRITFIC) are two of the most developed inter-tribal commissions in the United States. Founded in 1977, CRITFIC's member Tribes are the Nez Perce Tribe, the Confederated Tribes of the Yakama, the Confederated Tribes of the Umatilla, and the Confederated Tribes of Warm Springs. (CRITFIC n.d.) The Northwest Indian Fisheries Commission serves the following twenty tribes in western Washington: Lummi, Nooksack, Swinomish, Upper Skagit, Sauk-Suiattle, Stillaguamish, Tulalip, Muckleshoot, Puyallup, Nisqually, Squaxin Island, Skokomish, Suquamish, Port Gamble S'Klallam, Jamestown S'Klallam, Lower Elwha Klallam, Makah, Quileute, Quinault, and Hoh. (NWIFC n.d.).

Both Commissions formed as coordinating bodies after their member Tribes had successfully invoked treaty fishing rights and obtained court ordered co-management. (Goodman 2000). Today, these two commissions support their member Tribes as they work with the state and federal government to co-manage the Pacific Northwest fishery resource through shared science. For example, the NWIFC oversees highly technical programs ranging from genetic data monitoring to water quality monitoring to inventory of fish populations. (NWIFC n.d.). This technical work manifests as management on-the-ground; each year, the treaty Tribes, Washington State, and federal agencies agree on salmon fishing seasons and on hatchery production objectives in Puget Sound, the Columbia River, and the Washington Coast.

The work of both Commissions involves TEK. CRITFC drew on TEK to develop Wy-Kan-Ush-Mi Wa-Kish-Wit (Spirit of the Salmon), a 25-year comprehensive fisheries restoration plan. A guiding principle of this work was to leverage TEK to modernize and better inform fisheries management decisions within the Columbia River Basin. (Penney Z. et al., 2015). The plan is based on TEK as follows:

> "Traditional ecological knowledge informs management and restoration decisions by 1) providing pre-European baselines of natural conditions, 2) providing a holistic and adaptive framework for the management of anadromous fish, and 3) recognizing the importance of place and its relationship to the human communities that depend on it. The tribes' guiding principles from Wy-Kan-Ush-Mi Wa-Kish-Wit has helped halt salmon declines and reshape management within the Columbia River basin." (Penney, Z. et al., 2015).

TEK work in the NWIFC is driven by its member Tribes, many of whom are TEK and climate change leaders. For example, the Tulalip Tribe led efforts to create "Tribal Recommendations on a Traditional Knowledge Management Framework for the North Pacific Landscape Conservation Cooperative." NWIFC served as a project collaborator, and participation included the twenty-one member tribal governments of the Northwest Indian Fisheries Commission. (Williams 2015).

Kuskokwim and Yukon River Inter-Tribal Fish Commissions[6]

On the Kuskokwim and Yukon Rivers of Alaska, Chinook salmon stocks are a keystone for the cultural, physical, psychological, and economic health of the tribal people who live along these rivers. Chinook salmon stocks are in serious decline, resulting in closed commercial fisheries and the restriction of subsistence fisheries. Responding to this challenge, the Association of Village Council Presidents and the Tanana Chiefs Conference were directed by their respective member Tribes to create an Inter-Tribal Fish Commission for the Yukon River and an Inter-Tribal Fish Commission for the Kuskokwim River. (NCAI 2013b).

On May 5th, 2015, thirty-three sovereign Tribes in Alaska officially established the Kuskokwim River Inter-Tribal Fish Commission for the purpose of developing one management system on the Kuskokwim River to rebuild their fisheries, particularly the declining Chinook salmon, to preserve and support their way of life including nutritional, economical, and cultural needs. Almost exactly a year later, the Kuskokwim River Inter-Tribal Fish Commission entered into a MOU with USFWS Alaska Region to formalize a fishery management partnership. (Memorandum of Understanding Between United States Department of the Interior U.S. Fish and Wildlife Service Alaska Region and Kuskokwim River Inter-Tribal Fish Commission, 2016). In the MOU, the Kuskokwim River Inter-Tribal Fish Commission agrees to "provide all relevant data and information to the Service at the earliest practicable time before consultation, including local and traditional observations and knowledge and regional customary and traditional fishing practices." (MOU at 3) The MOU also provides that USFWS and the Kuskokwim River Inter-Tribal Fish Commission will "contribute to and support a Technical Advisory Body that consists of fisheries biologists/scientists, social scientists, and traditional knowledge experts." (MOU at 4) Finally, the parties mutually agree to "facilitate development of a unified management strategy that is informed by traditional ways of knowing and science that is biologically, environmentally and culturally sound." (MOU at 4).

The Yukon River Inter-Tribal Fish Commission was formed in 2014 to seek an equal and shared responsibility in the management of Yukon River fishery resources. Among the purposes of the Yukon River Inter-Tribal Fish Commission is to "establish a comprehensive management plan and program, which includes allocation, based upon Indigenous knowledge systems and scientific principles." (Tanana Chiefs Conference n.d.). To date, thirty federally recognized Tribes and First Nations along the Yukon River have ratified the Fish Commission's constitution, from Alakanuk at the mouth to Mayo in Yukon Territory. The Fish Commission is working to gain full membership of all Yukon River Tribes, and instated a voluntary moratorium and reduced harvests that allowed escapement goals to be achieved for the first time in years. (Tanana Chiefs Conference n.d.).

Bears-Ears Inter-Tribal Coalition

For a description of the Presidential proclamations establishing and amending Bears Ears National Monument and the references to TEK therein, please see Section §3.2. While engaging in litigation to restore the original boundaries established by the original proclamation, the five Tribes of the Bears Ears Coalition – Navajo, Hopi, Ute Mountain Ute, Ute Indian Tribe, and Zuni – are engaging around land management of the Bears Ears region. This work includes TEK through the establishment of a "Cultural Resource Subcommittee" comprised of Tribal Historic Preservation Officers and cultural leaders from each of the five Tribes. The subcommittee's main focus is creating a comprehensive

[6] For an example of an Alaskan Inter-Tribal Commission that uses TEK in the management of big-game and landscapes rather than the fishery resource, please see the Ahtna Inter-Tribal Resource Commission. The Ahtna Inter-Tribal Resource Commission is briefly described in Section §4.5 and Table 2.

tribal land management plan for the full 1.9 million-acre Bears Ears Cultural Landscape in Southeastern Utah. The release date of this document is anticipated for 2020 or 2021, and TEK will play a significant role in its formation. (Carter 2019).

5.3 Case Studies of Individual Tribes, Inter-Tribal Councils, and Indigenous Communities Engaged with TEK

There are countless examples of ways that the 573 federally recognized Tribes and numerous additional Indigenous communities in the United States are engaging with TEK to inform environmental management. To illustrate examples of how individual Tribes, inter-tribal councils, and Indigenous communities are engaging with TEK in environmental management, this section provides three case studies: (1) The Confederated Salish and Kootenai Tribes (CSKT)[7], a federally recognized Tribe utilizing TEK for on-reservation natural resource work; (2) the Council of Athabascan Tribal Governments, a multi-tribal council in Alaska engaged in a co-management initiative incorporating TEK; and (3) the Maidu Summit Consortium, a non-federally recognized Indigenous community using TEK to restore ancestral lands.

Confederated Salish and Kootenai Tribes

The CSKT – the Bitterroot Salish, the Pend d'Oreille, and the Ksanka (Ktunaxa) Band of Kootenai – have broken new ground multiple times in the field of natural resource management and the use of TEK. Located in modern-day Montana, the current Flathead Reservation consists of 1,250,000 acres and CSKT has approximately 7,900 tribal members. Part of CSKT's governance philosophy has been to increase tribal autonomy through contracting to assume responsibility for federal programs, as well as to fully exercise sovereignty on-reservation. (Upton 2014, 57-60). An example of the latter occurred in 1982 when CSKT approved Ordinance 79A establishing the 90,000 Mission Mountains Tribal Wilderness – the first time a Tribe had designated a tribal wilderness and supported it with personnel. (CSKT 2005). The Ordinance states:

> "Wilderness has played a paramount role in shaping the character of the people and the culture of the Salish and Kootenai Tribes; it is the essence of traditional Indian religion and has served the Indian people of these Tribes as a place to hunt, as a place to gather medicinal herbs and roots, as a vision seeking ground, as a sanctuary, and in countless other ways for thousands of years. Because maintaining an enduring resource of wilderness is vitally important to the people of the Confederated Salish and Kootenai Tribes and the perpetuation of their culture, there is hereby established a Mission Mountains Tribal Wilderness Area and this area, described herein, shall be administered to protect and preserve wilderness values." (CSKT 2005, 11).

7 The decision to profile CSKT as a case-study was based not only on the Tribe's extensive TEK efforts, but also on interviewee availability, guidance from the CEC TEK Expert Group, and the depth of existing published research on CSKT TEK efforts. Any number of other Tribes from across the United States could have been profiled for this case-study; Appendix A provides a more complete list of Tribes working with TEK projects.

Next the CSKT have been working for decades with the DOI and the USFWS to collaboratively manage the Bison and land in the National Bison Range in Montana. (Upton 2012). Through Annual Funding Agreements, CSKT worked toward assuming responsibility over the annual Bison Round-up, migratory non-game bird surveys, vegetation monitoring, geographic information system mapping, wildfire suppression, and prescribed burning. (USFWS 2012, 6). Series of legal challenges have vacated the agreements and prompted rounds of re-negotiation. (Upton 2012).

In the fall of 2015, the CSKT became the first Tribe in the United States to own and operate a major hydroelectric facility –Salish Kootenai Dam (Sèliš Ksanka Qlispè Dam), formerly known as the Kerr Dam, on the Flathead River near Polson, Montana. (U.S. Dep't of Energy 2015). As CSKT tribal member and project lead Brian Lipscomb stated, "For the first time in 80 years, we have control over our own resources. Flathead Lake and Flathead River are the lifeblood of our people." (U.S. Dep't of Energy 2015). The management of the dam provides for the ability to manage fisheries, wildlife resources, and riparian areas, including the incorporation of TEK in those decisions. (Small, 2019).

Finally, CSKT has created a Climate Change Strategic Plan for the CSKT reservation that addresses climate impacts and vulnerability to nine categories of tribal life: forestry, land, fish, wildlife, water, air, infrastructure, people, and culture. (CSKT 2013). The Strategic Plan draws heavily on the knowledge of tribal elders to ensure that Traditional Ecological Knowledge is integrated into adaptation planning by the Tribe, and that cultural priorities inform all aspects of the plan. The Plan states that the Tribes "understand that there is a direct relationship among everything in the natural environment. As such, Traditional Ecological Knowledge is not only incorporating tribal traditions and culture, but it is applying Salish, Pend d'Oreille, and Kootenai world views into decision-making." (CSKT 2013, 28). Importantly, all CSKT's natural resource work described above incorporates elder wisdom, including the oversight of elder groups from each of the three bands around proposed projects impacting CSKT, in natural resource decision-making. (Durglo 2018).

Council of Athabascan Tribal Governments

The Council of Athabascan Tribal Governments is a consortium that represents the tribal governments of Arctic Village, Beaver, Birch Creek, Canyon Village, Chalkyitsik, Circle, Gwichyaa Zhee Gwich'in Tribal Government of Fort Yukon, Rampart, Stevens Village, and Venetie. The Council of Athabascan Tribal Governments has leveraged self-governance policies to empower its members with skills and tools to utilize TEK and scientific ecological knowledge to manage resources in the Yukon Flats National Wildlife Refuge in the interior of Alaska, as well as other parts of Yukon Flats. The underlying philosophy behind these efforts is as follows: "if Tribal Governments within the Yukon Flats do not practice self-governance in fish and wildlife management, regulation, and decision-making there will be continued loss to the subsistence economy, the traditional Athabascan way of life, food security, and self-sufficiency." The Council of Athabascan Tribal Governments is a listed partner in the Yukon River Inter-Tribal Fish Commission discussed above, and has worked with TEK in other management activities. (Council of Athabascan Tribal Governments n.d.).

A particularly notable effort began in 2004 when the Council of Athabascan Tribal Governments became the first tribal entity in the United States to negotiate an Annual Funding Agreement for tribal members and staff to assume responsibility for management activities in the Yukon Flats National Wildlife Refuge, the third largest conservation unit in the National Wildlife Refuge System. (Upton 2012, 109-110) The Annual Funding Agreement has been ongoing since 2004 and provides that the Council of Athabascan Tribal Governments will engage in wildlife harvest data collection; Yukon Flats moose management, including estimating moose populations; and establishing the Yukon Flats Moose Management Steering Committee to enhance outreach efforts and increase communications with local residents regarding Yukon Flats National Wildlife Refuge moose management activities.

Unfortunately, funding has not increased over the years, which has created a gap between resources and need. (Council of Athabascan Tribal Governments n.d.).

Maidu Summit Consortium & Conservancy

The Maidu Summit Consortium & Conservancy is a non-profit group representing nine member organizations of the Maidu Indians of Lassen and Plumas Counties in efforts to reacquire ancestral lands in the California Sierra Nevada and steward those lands using TEK. The member organizations are the Greenville Rancheria, Maidu Cultural Development Group, Maiduk Weye, Mountain Maidu Historical Preservation Association, Roundhouse Council, Susanville Indian Rancheria, Tasmam Koyom Foundation, Tsi-Akim Maidu, and the United Maidu Nation. Prior to the incorporation of the Maidu Summit Consortium & Conservancy, the Maidu Cultural and Development group was awarded a National Pilot Stewardship Project from the USFS in 1998 – this project was unique because it was the only one awarded to a non-federally recognized Native American group and because it was the only one using TEK to steward the land. (Pinchot Institute for Conservation 2002). Another larger stewardship contract in the Plumas National Forest was awarded in 2004. (Maidu Summit Consortium 2010, 10).

The most notable achievement of the Maidu Summit Consortium & Conservancy has been the return of their ancestral lands in the Humbug Valley. Under Pacific Gas & Electric Co.'s 2003 bankruptcy agreement, 140,000 acres of land were designated for conservation and a stewardship board was created to assign new ownership. In 2013, the Maidu Summit Consortium & Conservancy received a recommendation that title to a 2,325-acre parcel of ancestral Maidu land in the Humbug Valley, a verdant valley with running streams, should be held by the Maidu in perpetuity; the land transfer was completed in June of 2018. (Peterson, 2018). The Maidu Summit Consortium & Conservancy is now working on a plan to steward the land with TEK, and transfer knowledge to Maidu youth through summer TEK programs and other efforts.

6. State-Level Frameworks for the Engagement of Indigenous Communities Around TEK

The discussions of Hawaii and Alaska below, provide notable exceptions to the general rule that state law in the United States does not recognize, reference, or include TEK. Both Hawaii and Alaska came into the United States later than the Lower 48, and federal Indian law in both states developed differently, rendering a different need for state-level frameworks. In particular, it is important to recognize that while the trust relationship applies to Native Hawaiians, unlike many federal Indian Tribes, there is no formally-recognized Hawaiian government with which a U.S. government agency can engage or consult at this time. In 2016, the U.S. Department of the Interior finalized rulemaking for a procedure to reestablish a "Government-to-Government Relationship" with the Native Hawaiian people in conjunction with reestablishing a Native Hawaiian governing entity. (81 Fed. Reg. 71278).

This section first provides a detailed discussion of frameworks in Hawaii and Alaska, and then provides a brief description of ways that states in the Lower 48 that lack an explicit framework referencing TEK are nonetheless engaging in TEK-related work.

6.1 Hawaii

Hawaii is unique in the United States, both in terms of its geography and its incorporation of Native Hawaiian customary and traditional knowledge into state statutory law. The Hawaiian Archipelago, made of the eight main islands of the State of Hawaii and the Northwestern Hawaiian Islands, is

located 2,000 miles from the nearest land mass. In the relative isolation necessitated by this geography, Native Hawaiians have regulated their society and subsistence economy through complex custom and traditional usage since time immemorial. (Mackenzie 2010, 1). These usages were recognized and incorporated into Hawaii statutory law beginning around 1839 and, today, there is a rich body of Hawaii state law that elevates the role of traditional knowledge in natural resource management. (Mackenzie 2010, 1). A complete explanation of Hawaiian history, the unique legal status of Native Hawaiians, and all aspects of Hawaiian law is beyond the scope of this report. Rather, this report provides representative examples of ways that Hawaiian state law incorporates traditional knowledge into natural resource management.

The Hawaiian Constitution was amended in 1978 to recognize the traditional and customary uses of Native Hawaiians. Article XII, Section 7 provides the following:

> "The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights." Haw. Const. art. XII, § 7.

The reference in the Constitution to "ahupua'a" tenants is important to understand in the context of TEK in Hawaii. Ahupua'a is a watershed-based management system that created regions running from mountain to sea. Within each Ahupua'a were highly specialized, sophisticated, and symbiotic sustainable farming techniques, such as fishponds (loko i'a) and upstream taro (kalo) gardens that ensured sources of food. The complimentary and sustainable nature of management within an ahupua'a is truly amazing; for example, the fishponds that feed the people of the ahupua'a also function as a place for non-point source sedimentation that slows down water flow and allows recharge of the water table below the soil. (Hawaii Coastal Zone Management Program 2008, 19-20). In sum, the Hawaiian Constitution's recognition of the rights traditionally exercised by Ahupua'a tenants provides for the incorporation of TEK developed by many generations – such as the ongoing restoration of fishponds occurring today.

Another example of Hawaii's incorporation of TEK can be found in the makeup of its boards and commissions responsible for many aspects of natural resource management. These boards include the following: Board of Land and Natural Resources; Commission on Water Resource Management; Endangered Species Recovery Commission; Game Management Advisory Commission; Hawaii Historic Places Review Board; Legacy Land Conservation Commission; and Natural Area Reserves System Commission. In the statutes that establish each of these boards and their makeups, provisions mandate the inclusion of a person with a background in Native Hawaiian traditional and customary practices. The exact wording varies from more standard, such as "one member shall be a person possessing a background in native Hawaiian traditional and customary practices" to very specific. An example of the latter is found in the statute creating the Board of Land and Natural Resources, which mandates that one member

> "shall have demonstrated expertise in native Hawaiian traditional and customary practices...to ensure assistance to the board to better administer the public lands and resources with respect to native Hawaiian issues and concerns, the public land trust obligations, and the recognition of native Hawaiian cultural values that are intrinsically tied to the aina." (Haw. Rev. Stat. §171-4).

Hawaii goes beyond simply adding a non-majority member to natural resource management boards by creating an advisory committee focused on Native Hawaiian tradition and custom. The Aha Moku Advisory Committee is charged to advise the Board of Land and Natural Resources through the lens of the Aha Moku System, a system of best practices that is based upon the Indigenous resource management practices of the moku (a larger region comprised of several Ahupua'a). Among the Aha Moku Advisory Committee's responsibilities is to provide advice on integrating Indigenous resource

management practices with western management practices; fostering the understanding and practical use of Native Hawaiian resource knowledge, methodology, and expertise; and identifying a comprehensive set of Indigenous practices for natural resource management. (Haw. Rev. Stat. §171-4.5.)

Other examples of the integration of TEK in Hawaiian state law can be found in the arena of climate change and water management. Hawaii's *Climate Change Adaptation Priority Guidelines* includes direction that climate change planning should "[c]onsider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change." (Haw. Rev. Stat. §226-109) Turning to water, taro (kalo) is a staple food for the Hawaiian community and a key part of the Hawaiian creation story, where Hawaiians and kalo are siblings. Taro requires a constant source of fresh flowing water to grow without disease and, as a result, the ancient customs that managed water to meet this need form the basis for modern Hawaiian water law and the *Hawaii Water Code* contains specific provisions protecting traditional and customary uses and rights. The *Hawaii Water Code* ensures that "traditional and customary rights of ahupuaa tenants ... shall not be abridged or denied" in implementing its provisions. It also states:

> "that such traditional and customary rights shall include, but not be limited to, the cultivation or propagation of taro on one's own kuleana and the gathering of hihiwai, opae, o'opu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural, and religious purposes." Native Hawaiian water rights. (Haw. Rev. Stat. §174C-101).

Finally, TEK is playing a growing role in fishery and ocean management efforts in Hawaii. Many state, federal, local, and Native Hawaiian government agencies and authorities participate in the management of ocean and coastal resources. At the state level, the *Hawaii Ocean Resources Management Plan* is a statewide plan prepared in concert with dozens of federal, local, and Native entities, that sets forth the State's ocean and coastal management priorities. The *Hawaii Ocean Resources Management Plan* makes a goal of "improv[ing] the health of coastal and ocean resources for sustainable traditional, subsistence, recreational, and commercial uses." (Hawaii Coastal Zone Management Program and NOAA 2013, 38). Among the actions to accomplish the goal are to "establish and institutionalize approaches to restoration of ancient Hawaiian coastal fishponds and salt ponds. (Hawaii Coastal Zone Management Program and NOAA 2013, 38).

Additionally, a recent administrative rule established the "Hā'ena Community-Based Subsistence Fishing Area." (Hawaii Admin. Rules Chapter 13-60.8 (2018)). The purpose of this area is to sustainably support the consumptive needs of the Hā'ena ahupua'a through culturally-rooted community-based management. The rule requires that inhabitants of the Hā'ena ahupua'a must be consulted in the creation of a management plan, and that the management plan must provide "processes for community-based monitoring and evaluation of the area." Finally the rule directs for the consideration of whether this new model should be expanded to other ahupua'as in Hawaii. (Hawaii Admin. Rules Chapter 13-60.8 (2018)).

6.2 Alaska

Alaska is a truly unique state. It is the largest state in the United States by a large margin; at 571,641 square miles, it is more than twice the size of Texas, the second largest state. Its location, with lands extending into the Arctic Circle, makes the United States one of eight Arctic States and part of the Arctic Governance framework – a complex arrangement of international agreements, domestic federal and state law, and policies. Moreover, Alaska's shared border with Canada brings an additional international component to the management of Alaska's natural resources. Finally, Alaska in general and the Arctic in particular are climate change hot-spots, areas where the impacts of climate change are being experienced at a significantly higher rate than average. (ACIA 2004, 8).

Within this unique environment, Native people have lived a traditional subsistence lifestyle for thousands of years and learned to thrive in the coldest and harshest conditions in the world. (Ristroph 2012, 107-08). Today, there are 229 federally recognized Tribes in Alaska, the highest number of any single state. (NCAI 2019). Many of these Tribes' ancestral territories extend across the Canadian-United States borders, and there is a significant amount of cross-border collaboration and co-management of natural resources and wildlife among Indigenous Tribes in Canada and the United States. The lives of Alaska's Native peoples are interwoven with the land, wildlife, and ecosystems of Alaska.

Given the extent and breadth of tribal knowledge and experience with natural resource management, it should come as little surprise that state law and policy in Alaska references and incorporates TEK into natural resource management. Unfortunately, a complete exploration of Alaskan history and the unique legal developments of Alaskan law as it pertains to Native Alaskans is beyond the scope of this report. Instead, this report provides examples of how Alaskan state law[8] incorporates traditional knowledge into natural resource management.

Alaska's *Declaration of State Arctic Policy* includes a section specific to Arctic Indigenous Peoples. It includes a goal to "value and strengthen the resilience of communities and respect and integrate the culture, language, and knowledge of Arctic peoples" by, among other things, employing "integrated, strategic planning that considers scientific, local, and traditional knowledge" and encouraging "more effective integration of local and traditional knowledge into conventional science and research." (Alaska Stat. § 44.99.105). In another example, the State legislature passed *An Act Establishing the Alaska Native Language Preservation and Advisory Council and Relating to the Preservation, Restoration, and Revitalization of Alaska Native Languages*. That act notes that "Alaska Native languages are the foundation of cultures and are vital in maintaining traditional knowledge and understanding." (Alaska Stat. § 44.33.520).

The Alaska Department of Fish and Game is the place where the State engages with TEK both with the most regularity and with the greatest depth. The Alaska Department of Fish and Game has a department specific to subsistence, which works with communities to investigate and document the many traditions and practices of how Alaskans use wild resources. (Alaska Department of Fish and Game n.d.). A term search in the Department's archives of technical papers and reports resulted in 810 hits for Traditional Knowledge and 410 hits for "Traditional Ecological Knowledge," indicating the extent to which TEK is utilized in the Department's activities. To provide a glimpse of the highly technical nature of this work, one technical report pulled up in the search is entitled *Traditional Ecological Knowledge and Contemporary Subsistence Harvest of Non-Salmon Fish in the Koyukuk River Drainage, Alaska,* and another is T*raditional Ecological Knowledge of the Mulchatna Caribou Herd: Phenology, Habitat Change, Subsistence Use, and Related Species Interactions in Game Management Units 9B-C, 17, 18, and 19A-C, Alaska.* (Alaska Department of Fish and Game n.d.). The Department also maintains an online database known as the Community Subsistence Information System (CSIS), which is the repository of Alaska community harvest information collected by our staff over time. Next, the Alaska Department of Fish and Game has produced a guidance document for TEK work entitled, *Traditional Ecological Knowledge Handbook: A Training Manual and Reference Guide For Designing, Conducting, and Participating in Research Projects Using Traditional Ecological Knowledge*. (Miraglia 1998).

8 For a summary of international frameworks that integrate TEK with regard to the Arctic, polar bears, porcupine caribou, and fisheries management in Alaska, see Section 2. Federal agency projects, co-management initiatives, and policies specific to Alaska are addressed in Section 3.

Finally, the Alaska Department of Fish and Game regularly engages in multi-agency partnerships with federal agencies and Native Alaskan entities. Two representative examples of these partnerships follow: first is on the Kuskokwim River where the USFWS Yukon Delta National Wildlife Refuge works during the fishing season with the Kuskokwim River Inter-Tribal Fish Commission and the Department to manage fish runs; a second is around moose Management near the village of Quinhagak where the Department, USFWS and the community of Quinhagak have created and are now implementing a moose management plan for the Kanektok River drainage. (USFS 2015b).

6.3 States in the Lower 48

As to the remainder of the states in the Lower 48, even states with a significant number of federally recognized Indian Tribes such as Washington, Oregon, Montana, Wisconsin, New Mexico, California, and Arizona do not have state-level laws or policies in place that reference or incorporate TEK. As noted above in Sections §1.2 and §3, the federal trust relationship is exclusive between Tribes and the federal government. Thus, there is not a legal impetus driving states to elevate TEK in state laws or policies. Additionally, particularly in years past, there has been a history of hostility between states and Tribes around the realization of treaty rights that may have stifled the development of forward-looking Indian policy at the state level.

That is not to say that state institutions and departments are entirely absent from initiatives that involve TEK. State participation can be found in LCCs, and CASCs and other research partnerships discussed below in Section §8.1. As discussed extensively above, states also work with Tribes and tribal Commissions in multi-partnership efforts around the management of shared resources such as salmon, fire restoration efforts, and the management of the Great Lakes. Finally, one contemporary political trend worth noting is that Indian peoples from states with significant Indian populations are being elected in record numbers to State Legislatures. For example, the Montana Indian Legislative Caucus consists of three Senators and eight House members elected in 2018. They are drafting new laws and policies designed to integrate TEK into state laws and policies. (Small 2019).

7. Examples of University Projects Involving TEK

Colleges and universities are highly engaged in projects involving TEK, particularly in regions with many Tribes. A comprehensive list of all such projects is beyond the scope of the narrative report, but a more complete list of such partnerships can be found in Appendix A. Rather, this section focuses on TEK developments in two main realms: (1) tribal colleges and universities, and (2) non-tribal colleges and universities who have partnered with Tribes to utilize TEK to address environmental problems. Along with describing relevant projects, space is taken to summarize how TEK-specific coursework is a part of curriculums in tribal colleges and universities across the United States, and why this new development is important for science as a whole.

7.1 Tribal Colleges and Universities

Professor Robin Wall Kimmerer succinctly explains that “tribal colleges can lead the way in integrating traditional ecological knowledge and scientific ecological knowledge.” (Kimmerer 2002, 436). The multi-faceted importance of this work is hard to overstate; as of 2015, American Indians and Alaska Natives make up only 0.2% of the science and engineering workforce (NSF et. al. 2018, Table 3-19). By providing opportunities for Native people to experience science, as well as other subjects, in a de-colonized setting, tribal colleges and universities break down barriers and open science and education to a greater number of Native participants. Additionally, growing attention is

being paid to the importance of "indigenizing science" and the unique role it might have in meeting the holistic challenges, such as climate change, that our ecosystems face today. Dr. Daniel Wildcat, Euchee member of the Muscogee Nation of Oklahoma and Director of Haskell Environmental Research Studies Center at Haskell Indian Nations University, expresses this need:

> "The reductionist view of science cannot answer the fundamental, critical problems we have in the world today. We American Indians will do science our way. We need to bring Native people into science because of what they can bring to Western science. We need to reunite reason and spirit ...and address the gap between knowing and doing." (Lambert 2003).

Spread across the United States, thirty-five tribal colleges and universities are on the cutting edge of incorporating TEK into university courses. Indeed, TEK in the tribal colleges and universities is integrated throughout the curriculum, ranging from tribal language and culture classes to tribal ethnobotany classes. (Small, 2019). In Alaska, the North Slope Borough incorporated Iñupiat educational philosophies into the educational system and, in partnership with the University of Alaska Fairbanks, established Iḷisaġvik College; the only tribal college in Alaska, Iḷisaġvik broadens science and engineering education on the North Slope with courses that include both TEK and Western science. (Iḷisaġvik n.d) At Northwest Indian College in Bellingham, Washington, the Native Environmental Science major features a place-based, experiential, and culturally-grounded curriculum that integrates Indigenous Knowledge Systems and innovative scientific methods, technology, and tools. (Northwest Indian College n.d.). Haskell Indian Nations College offers an ethnobiology course whose purpose is "to preserve the unique knowledge and varied cultural traditions relating to the life sciences that are possessed by Indigenous peoples of the Americas." (Haskell Indians Nation College 2018). The tribal colleges that are subject to the examples provided in each section each drew on guidance from nearby Tribes, Tribal Councils, and elders to create the described curriculums. Of note, the American Indian Higher Education Consortium (AIHEC) is the collective spirit and unifying voice of the 38 tribally and federally chartered institutions. AIHEC is governed by the presidents of the tribal colleges and universities and is celebrating forty-five years of success. (Small, 2019).

7.2 Non-Tribal Colleges and Universities

Important TEK projects and partnerships are also occurring in non-tribal colleges and universities. This takes the form of centers focused on TEK and partnerships with regional Tribes. For example, the University of Alaska, Fairbanks is a research partner with Alaska Tribes for an extensive amount of studies and initiatives involving TEK. At the University of Washington, Tacoma, the Puyallup Tribe made a quarter million-dollar donation to launch a collaboration that "aims to infuse Native ways of knowing into UW Tacoma teaching, learning and research." (University of Washington, Tacoma 2015). The University of Oregon launched an Indigenous Traditional Ecological Knowledge Initiative in fall 2017 under the leadership of Dr. Michelle Jacobs, Yakama tribal member and Professor of Indigenous Studies at University of Oregon. In the first year, this initiative brought together more than seventeen projects involving TEK at the University of Oregon, hired a Native facilitator, and established the following vision for the initiative:

> "We are gathering existing teaching and research strengths in order to make visible the important Indigenous Traditional Ecological Knowledge projects taking place at UO. We are committed to building a collaborative Indigenous Traditional Ecological Knowledge research project that is done with care, respect, reciprocity, and in support of Indigenous self-determination in order to serve as a model of Indigenous research methodology in action." (Jacob and Blackhorn 2018).

Many of these efforts involve stakeholders other than Tribal and academic partners. The University of Wisconsin Extension program partnered with GLIFWC and the Apostle Islands National Lakeshore to launch G-WOW (Gikinoo'wizhiwe Onji Waaban/Guiding for Tomorrow), a web-based learning curriculum focused on using TEK, western science, and place-based evidence to show how climate change is affecting the traditional lifeways of Lake Superior Ojibwe. G-WOW also includes professional development institutes and an interactive learning center at the Northern Great Lakes Visitor Center in Wisconsin. (G-WOW n.d.). In the Northwest, the Karuk Tribe and UC Berkeley have partnered to establish the "Karuk-UC Berkeley Collaborative" whose mission is "to foster synergistic collaborations between the Karuk Tribe and UC Berkeley... to enhance the eco-cultural revitalization of the people and landscapes within Karuk ancestral lands and territories." The Collaborative brings academic, tribal, and federal partners together to around a suite of projects involving food security, salmon restoration, climate change adaptation, and youth engagement. (Karuk-UC Berkeley Collaborative n.d.).

Finally, under the leadership of Robin Wall Kimmerer, the State University of New York's Center for Native People and the Environment aims to "draw on the wisdom of both indigenous and scientific knowledge in support of our shared goals of environmental sustainability." SUNY's Center for Native People and the Environment includes a focus on opening the door to research collaborations and partnerships with Native American Tribes, tribal colleges, and communities to address environmental problems. Examples of these collaborations include a collaboration with Salish Kootenai Tribal College and Hopa Mountain Native Science Fellows that draws from and integrates western science and TEK, both in the landscapes of upstate New York and western Montana. In another example, in partnership with the College of Menominee Nation (and Menominee Tribal Enterprises), the Center created a Forest Ecology Summer Institute and Research Exchange Program, which is designed to build capacity for developing forest ecology and stewardship curriculum at the College of Menominee Nation and generate new educational and forest stewardship approaches. (SUNY n.d.).

8. Examples of Research/ Public Institution and Private Sector Projects Involving TEK

There are many examples of projects involving TEK occurring in the fields of climate change and natural resource management. Many such projects occur within the frameworks of Landscape Conservation Cooperatives (LCCs). This report first describes LCC framework and then provides examples of representative projects involving TEK. To provide a more granular example, the report then focuses on the Local Environmental Observer Network, a climate change tool that relies on TEK. Next, the report provides examples of research and public institution projects involving TEK occurring outside the realm of LCCs. Finally, the report turns to examples of private sector partnerships that integrate TEK.

8.1 Research/Public Institution Projects

Guidelines for Considering Traditional Knowledges in Climate Change Initiatives

The *Guidelines for Considering Traditional Knowledges in Climate Change Initiatives* were originally prepared and submitted to the Advisory Committee on Climate Change and Natural Resource Science in May 2014. (Climate and Traditional Knowledge Workgroup 2014). Developed by an informal working group steeped in TEK and formally coordinated by Advisory Committee on Climate Change and Natural Resource Science members Gary Morishima, Quinalt Management

Center, and Ann-Marie Chischilly, Institute of Tribal Environmental Professionals, these guidelines draw on the collective experience of a number of initiatives exploring issues related to traditional knowledges and climate change to offer best practices for using traditional knowledges in climate change work. (Chischilly 2019).

The guidelines are provisional and are intended to serve as an informational resource for Tribes, agencies, and organizations across the United States interested in understanding traditional knowledges in the context of climate change. As such they both examine the significance of traditional knowledges in relation to climate change and the potential risks to Tribes and Indigenous people of sharing their knowledge in federal and other non-indigenous climate change initiatives. (Climate and Traditional Knowledge Workgroup. 2014). While helpful for multiple audiences, the guidelines were specifically intended to assist guide partnership development between Tribes/Indigenous groups and the Department of the Interior's National Climate Adaptation Science Center, Climate Adaptation Science Centers (CASCs), and Landscape Conservation Cooperatives (LCC). (Climate and Traditional Knowledge Workgroup. 2014; Chischilly 2019).

Landscape Conservation Cooperatives

The most significant number of projects involving TEK in the research/public institution space occur in the context of LCCs. The LCCs and Climate Adaptation Science Centers (CASCs), discussed above in Section §4, are designed to be complimentary networks. The LCCs are multi-stakeholder, landscape-scale, applied conservation science partnerships that consist of Federal, State, Tribal, international, local, and private stakeholders. LCCs support on-the-ground conservation and produce and disseminate applied science for resource management decision-makers. (Lynn 2012, 2). The framework establishing the multi-party LCCs is based on Secretarial Order No. 3289 and intertwined with federal CASCs.

As would be expected given Secretarial Order No. 3289's specific direction on work with Tribes and TEK, the LCC network works extensively with TEK and Tribes. The current LCC Network Strategic Plan sets a goal that "Natural and cultural resources are conserved at large landscape and seascape scales, guided by the collaborative application of science, experience, and cultural or traditional ecological knowledge and the generation of new conservation knowledge." A Strategic Plan Objective is for the LCC Network to:

> "Promote collaborative production of science and research — including human dimensions — as well as the use of experience and indigenous and traditional ecological knowledge among LCCs, Climate Science Centers (CSCs), and other interested parties; use these to inform resource management decisions, educate local communities, and address shared needs." (Landscape Conservation Cooperatives 2014, 10).

Additionally, the LCC network has an extensive docket of projects focused on TEK as a tool to inform conservation strategy and increase cultural resiliency and adaptation. It is important to note that only around half of the twenty-two LCC are engaged in TEK projects; TEK projects are concentrated in the Pacific region [North Pacific LCC, Pacific Islands LCC, California, Great Northern] and the Alaska region [Aleutian and Bering Sea Islands LCC, Arctic LCC, Western Alaska LCC], as well as in the Great Basin LCC. A comprehensive summary of the eighty-one LCC projects involving TEK is beyond the scope of this report; however, a list of representative examples is provided below. (LCC 2018).

- Pacific Islands LCC - Learning from Traditional Ecological Knowledge to understand Climate Change Impacts and Preserve Key Cultural and Natural Resources in Ka'upulehu, Hawaii

- North Pacific LCC -Utilizing Yurok traditional ecological knowledge to inform climate change priorities
- North Pacific LCC - Preserving Tribal Self-Determination and Knowledge Sovereignty While Expanding Use of Tribal Knowledge and Management in Off Reservation Lands in the Face of Climate Change (Karuk Tribe)
- Great Northern LCC - Connecting Tribal and First Nation Adaptive Management and Climate Related Activities in the Crown of the Continent
- Great Basin LCC – Using Narrative Stories to Understand Traditional Ecological Knowledge in the Great Basin
- Arctic LCC – A Sense of Place: Inupiat Knowledge of the Coast Using Aerial Imagery
- Western Alaska LCC – Yukon-Kuskokwim Delta Berry Outlook: Identifying Berry Vulnerability to Climate and Landscape Change Using Local Knowledge and Other Ecological Data
- Upper Midwest and Great Lakes LCC: Manajiwin: Respecting tribes, First nations and cultural resources in cooperative landscape and climate change decision-making.

The Local Environmental Observer Network

The Local Environmental Observer (LEO) Network is an example of a multi-party TEK research initiative. The LEO Network is a climate change adaptation tool that utilizes a network of local experts who collect observations about unusual environmental events. Originating in Alaska, this network has participants in more than one-hundred communities in Alaska and Canada, and LEO is expanding into the lower 48 states. Typically, members of the network are employed by tribal and First Nations governments and/or organizations. These members use TEK, western science, and web-based Google Maps™ to record and share observations on unusual environmental conditions. An editorial board reviews and selects submissions to share on the live map, and network members may be selected to be consulted as a local expert based on the data shared. The LEO Network is based at the Center for Climate and Health at the Alaska Native Tribal Health Consortium. Supporting partners include the U.S. Environmental Protection Agency, the U.S. Indian Health Service, and the Western and Arctic LCC. A private sector entity, Resource Data Inc., developed a LEO app, and assisted with improving the network's data management and analytics. (LEO Network n.d.).

Other TEK Research Projects

Examples of other TEK research projects can be found in the area of museum and educational partnerships. In Colorado, the Ute Tribes of Colorado and Utah, History Colorado (a hybrid 501(c)(3) and Colorado State agency), the Dominguez Archeological Group, and academic partners from the Universities of Colorado and Kansas are collaborating to explore the integration of Ute TEK with Western science, technology, engineering and math. The recipient of over $2.2 million from the National Science Foundation's Advancing Informal STEM Learning program, the project will engage 128,000 STEM learners, educators, and experts across Colorado and Utah in the following activities: cutting-edge archaeological and ethnobotanical field work; interactive exhibits and videos; public programs for families and adults; statewide K-12 education outreach programs, digital badges, and teacher training; and findings for museums, Tribes, and scientists. (History Colorado, 2016).

In another example, the Oregon Museum of Science and Industry, the Indigenous Education Institute, The National Museum of the American Indian, the Tramastklikt Cultural Institute, the Confederated Tribes of the Umatilla Indian Reservation, the Hibub Cultural Center and Natural History Preserve of the Tulalip Tribes will work collaboratively on a project entitled "Generations of Knowledge: Traditional Ecological Knowledge and Environmental Science." Taking place over five years, this project involves the creation of a traveling exhibit, an online exhibit, and a suite of resources for the

professionals involved in the project. Overall, the project's goal is to add to the knowledge base on strategies that can be employed to communicate and promote TEK and western science as complementary and valuable way of understanding and caring for the natural world. (Rosino et al. 2012).

The multi-dimensional partnerships developed by the Amah Mutson Tribal Band provide an example pertinent to a non-federally recognized Tribe. The Amah Mutsun Tribal Band are the Indigenous peoples of south-San Francisco and north-Monterey Bay area. In 2005 the Amah Mutsun Tribal Council decided that it was time for their people to re-engage in the stewardship of the lands and waters of the Amah Mutsun ancestral lands, and formally established the Amah Mutson Land Trust in 2013 as the vehicle to conduct this work. (Amah Mutson Land Trust n.d.). The Amah Mutson Land Trust has developed extensive partnerships with public and private landowners, state and local agencies, and educational institutions. For example, the Amah Mutson Land Trust partnered with the California State Coastal Conservancy and California State parks in a Coastal Stewardship Program for Native youth designed to provide culturally relevant environmental education to future Native American stewards. (Amah Mutson Land Trust n.d.). In another example, the University of Santa Cruz Arboretum & Botanic Garden has collaborated with the Amah Mutsun Tribal Band to create the Amah Mutsun Relearning Program, which assists the Tribe in their efforts of cultural revitalization, relearning of dormant cultural knowledge. (UC Santa Cruz UC Santa Cruz Arboretum and Botanical Garden. n.d.).

8.2 Private Sector Projects

Philanthropy

Some successful private sector partnerships have developed in the philanthropic world – several Native-led or Native-advised foundations have focused on uplifting TEK through grant funding that have established genuine partnerships with Indigenous communities. However, it is important to note that the scope of philanthropy funding often does not extend to tribal governments because they are not 501(c)(3) non-profit organizations. Even where tribally-led non-profits are present on a reservation, there may a need for an intermediary non-tribal fiscal sponsor based in an urban area, which can create challenging power dynamics within tribal homelands. (Small 2019).

The Christensen Fund, the NoVo Foundation, and the Lannan Foundation all stand out as examples of funders focused on supporting the use of TEK. The Christensen Fund is an international foundation focused around the preservation of biocultural diversity, which it defines as "the rich but neglected adaptive interweave of people and place, culture and ecology." (The Christensen Fund n.d.). Grantmaking to Indigenous Peoples across the globe, The Christensen Fund has recently shifted its focus to a thematic grantmaking approach informed by the UNDRIP and the Convention on Biological Diversity. The Lannan Foundation and the NoVo Foundation both focus on uplifting TEK work. Among other things, Lannan "supports organizations that exist to revive or perpetuate traditional Native belief systems, traditional cultural practices, and traditional knowledge." Lannan's efforts include providing funding and technical support for land acquisition that have resulted in Native people acquiring "more than 7,000 acres of land for the preservation of traditional ceremonial grounds, as well as for cultural and ecological conservation projects." (Lannan Foundation n.d.). Last, but not least, the NoVo Foundation's Indigenous funding initiatives "seek[] to help restore and strengthen indigenous knowledge and life-ways as potentially transformative in addressing some of the world's—and similarly, some of Indigenous communities'—most pressing problems." (NoVo Foundation n.d.).

Non-Profit Groups

Another category of private sector partners, one that often overlaps with philanthropy, are non-governmental organizations. For a discussion of Native-led organizations advancing initiatives with TEK, please refer to Section §5.1. Many non-tribal NGOs that were traditionally focused on a western-model of conservation efforts have been working to establish partnerships or initiatives focused on TEK.

This change can be seen in major NGOs at the national level. The Ecological Society of America, the largest nonpartisan, nonprofit organization of scientists in the United States, established a Traditional Ecological Knowledge Section in 2002. This Section was established to promote the respectful use of traditional ecological knowledge in ecological research; encourage education in traditional ecological knowledge; stimulate research that incorporates the traditional knowledge; and increase Indigenous participation in the Ecological Society of America. (The Ecological Society of America n.d.). The Wildlife Society, an international network of nearly 10,000 leaders in wildlife science, management and conservation, initiated a Native Peoples Wildlife Management Working Group. Today that group has over 100 members and provides a forum for The Wildlife Society members to share information around issues related to Tribes, including TEK. (The Wildlife Society n.d.)

To provide a more regional example, the Grand Canyon Trust, a conservation organization long focused on the protection of the Grand Canyon and greater Colorado Plateau has leaned into the opportunity to respectfully partner with regional Tribes. To this end, the Grand Canyon Trust facilitates the "Colorado Plateau Inter-Tribal Conversations," a yearly gathering that revives ancient inter-tribal networks by creating a space for elders and cultural leaders from the eleven Tribes on the Colorado Plateau to share ideas, develop initiatives, and strengthen tribal voices in local conservation. Additionally, the Grand Canyon Trust also reframed its traditional public lands work as a "Cultural Landscapes" program that partners with regional Tribes to, among other things, integrate TEK into public lands management. (Grand Canyon Trust n.d.).

Environmental Planning & Landscape Restoration Firms

Another category of private sector partners engaged with TEK are private firms who utilize TEK in their work for and with Tribes. For example, TEK was used in the landscape restoration and design work that accompanied a widening of Highway 93, a major highway that bisects the Flathead Reservation of the Confederated Salish and Kootenai Tribes in Montana. The primary design team included landscape architects Jones & Jones, engineers Skillings-Connolly, Inc., and CSKT tribal resource agencies and cultural committees. The final design plan included restoration of sixteen different native plant communities, several wetland and riparian areas, and, most critically, the construction of nearly fifty wildlife crossings throughout the corridor length. The location and individual design of each wildlife crossing were informed by tribal wildlife data, traditional ecological knowledge, and independent scientific and design input. (Senos et al. 2006, 408).

Indigenous Beauty Products

A final interesting example of TEK being integrated in the private sector occurs around natural beauty products that utilize traditional Indigenous ingredients. ArXotica Indigenous Beauty Products was started in 2006 by the Sparck sisters, Alaskan Native triplets from Chevak, a Cup'ik community in Western Alaska. Based in Bethel, Alaska, the sisters started the business with encouragement from tribal leaders and seed funding from the Alaska Federation of Natives' Alaska Marketplace program. To create their products, the Sparck sisters collaborated with elders and others that had the traditional ecological knowledge to identify herbs, grasses, berries and roots that could be used in their products. (Office of Indian Energy and Economic Development 2010).

9. Conclusion

The goal of this report was to provide an inventory of the existing frameworks in the United States that provide a mechanism for voluntary engagement of Indigenous communities and experts around TEK, as well as representative examples of TEK projects occurring in several different sectors. It is important to note that this report focuses on the existence of frameworks rather than the efficacy of their implementation, including whether the frameworks are funded or unfunded mandates.

Appendix A: List of Tribes and Indigenous communities that have engaged TEK as part of universities or other public or research institutions or private-sector partner consultations

Appendix A is comprised of two tables: Table 1 provides a list of Tribes and Indigenous communities that have engaged TEK as part of university or other public or research institutions or private-sector consultations in the Lower 48; Table 2 provides a list pertinent to such projects in Alaska.

Table 1 – List of indigenous and local communities that have engaged TEK in the Lower 48.

Tribe or Indigenous Community	Region	Link	Name of Partner[s]
Karuk	No. Cal.	https://lccnetwork.org/project/preserving-tribal-self-determination-and-knowledge-sovereignty-while-expanding-use-tribal https://toolkit.climate.gov/case-studies/karuk's-innate-relationship-fire-adapting-climate-change-klamath https://lccnetwork.org/project/klamath-basin-traditional-ecological-knowledge-and-climate-change-science-internship	North Pacific LCC; BIA Tribal Climate Resilience Program
Yurok	No. Cal.	http://www.northpacificlcc.org/utilizing-yurok-traditional-ecological-knowledge-to-inform-climate-change-priorities https://lccnetwork.org/project/klamath-basin-traditional-ecological-knowledge-and-climate-change-science-internship	North Pacific LCC, USGS, USFS
Amah Mutson Tribal Band	No. Cal.	https://arboretum.ucsc.edu/education/relearning-program/	University of Santa Cruz Arboretum and Botanical Gardens
Maidu Tribes	No. Cal.	https://www.frlt.org/experience-land/maidu-stewardship	Feather River Land Trust
Nez Perce	Pac. N.W.	https://lccnetwork.org/project/climate-adaptation-planning-nez-perce-fisheries;	CRITFC member tribes, Great Northern LCC.

		see also https://plan.critfc.org/	
Confederated Tribes of the Yakama	Pac. N.W.	https://plan.critfc.org/	CRITFIC member tribes
Confederated Tribes of the Umatilla	Pac. N.W.	https://plan.critfc.org/	CRITFIC member tribes
Confederated Tribes of Warm Springs.	Pac. N.W.	https://plan.critfc.org/	CRITFIC member tribes
Lummi	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework https://toolkit.climate.gov/case-studies/how-vulnerable-are-salmon-changing-climate	NWIFC member tribes, North Pacific LCC, EPA Region 10, Washington Dep't of Ecology.
Nooksack	Pac. N.W.	https://cpb-us-e1.wpmucdn.com/blogs.uoregon.edu/dist/c/389/files/2010/11/Nooksack_Rivers-and-Glaciers_Profile_7-24-2014-2cpunfl.pdf https://toolkit.climate.gov/case-studies/how-vulnerable-are-salmon-changing-climate https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes, North Pacific LCC, EPA Region 10, Washington Dep't of Ecology.
Swinomish	Pac. N.W.	http://www.northpacificlcc.org/correlation-and-climate-sensitivity-of-human-health-and-environmental-indicators-in-the-salish-sea https://toolkit.climate.gov/case-studies/swinomish-indian-tribal-community-prepares-climate-change-impacts	NWIFC member, North Pacific LCC. Northwest Climate Science Center, USGS. Skagit River System Cooperative
Upper Skagit	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member, North Pacific LCC

Sauk-Suiattle	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member, North Pacific LCC
Stillaguimish	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member, North Pacific LCC
Tulalip	Pac. N.W.	https://toolkit.climate.gov/case-studies/tulalip-tribes-saving-their-sacred-salmon https://www.qwuloolt.org/AboutUs/People https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	Extensive partnerships at federal, state, local, and academic levels. Full roster of partners available through links.
Muckleshoot	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member, North Pacific LCC
Puyallup	Pac. N.W.	https://toolkit.climate.gov/case-studies/our-spirits-remain-tied-land https://www.tacoma.uw.edu/news/article/tapping-ancient-wisdom-innovations-learning https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; North Pacific LCC, UW-Tacoma; Cascadia Consulting group,
Nisqually	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes, North Pacific LCC.
Squaxin Island	Pac. N.W.	https://wsg.washington.edu/ideas-bloom-in-the-squaxin-island-tribal-garden/ https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	University of Washington, NOAA, National Institute of Health.
Skokomish	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; North Pacific LCC

Suquamish	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; North Pacific LCC
Port Gamble S'Klallam	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; active in TEK projects
Jamestown S'Klallam	Pac. N.W.	https://toolkit.climate.gov/case-studies/jamestown-s'klallam-tribe-plans-change-olympic-peninsula https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; North Pacific LCC, EPA, NOAA, University of Washington, Adaptation International Consulting
Lower Elwha Klallam	Pac. N.W.	https://www.usgs.gov/center-news/usgs-partnership-lower-elwha-klallam-tribe-featured-new-fact-sheet-elwha-river-dam?qt-news_science_products=3 - qt-news_science_products https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; USGS, active in Elwha River Restoration Partnership [includes university, research, and federal and state agencies.
Makah	Pac. N.W.	https://www.energy.gov/sites/prod/files/2017/11/f46/45-makah.pdf https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; North Pacific LCC, BIA, DOE.
Quileute	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; North Pacific LCC
Quinalt	Pac. N.W.	http://qlandandwater.org/culture/traditional-ecological-knowledge/ https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes; TEK Department within the Tribe.

Hoh	Pac. N.W.	https://lccnetwork.org/project/gathering-our-thoughts-tribal-recommendations-traditional-knowledge-management-framework	NWIFC member tribes, North Pacific LCC.
Fond du Lac	Great Lakes Region	https://www.epa.gov/sites/production/files/ 2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK. html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Danbury	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Red Cliff	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Bad River	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Bay Mills	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Mille Lacs	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.

Lac du Flambeau	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Lac Vieux Desert	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Mole Lake/Sokaogon	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Keweenaw Bay	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Lac Courte Oreilles	Great Lakes Region	https://www.epa.gov/sites/production/files/2016-12/documents/glfiwc-environmental-monitoring-presentation.pdf http://www.glifwc.org/ClimateChange/TEK.html	GLIFWIC Member Tribes, EPA, other partners depending on the issue.
Menominee Tribes	Great Lakes Region	https://www.esf.edu/nativepeoples/projects.htm https://www.fs.fed.us/research/docs/tribal-engagement/consultation/roadmap.pdf[pages 11, 13] https://toolkit.climate.gov/case-studies/college-menominee-nations-sustainable-development-institute-builds-capacity-tribal	USFS, around Center for First Americans Forestlands; SUNY New York. Multiple federal, state, and university partners listed in toolkit link

Navajo	Southwest	https://ehp.niehs.nih.gov/doi/full/10.1289/EHP2391 https://bearsearscoalition.org/ https://toolkit.climate.gov/case-studies/navajo-nation-hotter-drier-climate-puts-sand-dunes-move	Bears Ears Inter-Tribal Coalition member tribes; NIH, USGS, Northern Arizona University, USFS, BLM
Hopi	Southwest	https://bearsearscoalition.org/ https://www.unce.unr.edu/publications/files/ag/2014/cm1402.pdf	Bears Ears Inter-Tribal Coalition member tribes; ongoing work around dryland farming and spring restoration, USFS, BLM
Zuni	Southwest	https://bearsearscoalition.org/	Bears Ears Inter-Tribal Coalition member; extensive undocumented TEK work around dryland farming etc.
Ute Mountain Ute	Southwest	https://bearsearscoalition.org/ https://www.nsf.gov/awardsearch/showAward? AWD_ID=1612311	Bears Ears Inter-Tribal Coalition member, extensive TEK work with other Ute Tribes, NSF, History Colorado
Ute Indian Tribes	Southwest	https://bearsearscoalition.org https://www.nsf.gov/awardsearch/showAward?AWD_ID=1612311 https://hpsfaa.wildapricot.org/Resources/Documents/AppliedAnthropologist-2012/No. 1/Chapoose et al_2012_32(1)_2-11.pdf	Bears Ears Inter-Tribal Coalition member Tribes, Tri-Ute Tribes, NSF, History Colorado
Southern Ute	Southwest	https://www.nsf.gov/awardsearch/showAward?AWD_ID=1612311	Tri-Ute Tribes, NSF, History Colorado
Confederated Salish and Kootenai Tribes	Northern Rockies	http://www.csktribes.org/CSKTClimatePlan.pdfh http://www7.nau.edu/itep/main/tcc/Tribes/pn_cskt https://treesource.org/news/management-and-policy/native-american-fire-use/ https://toolkit.climate.gov/case-studies/confederated-salish-and-kootenai-tribes-applying-values-taught-our-ancestors	Extensive, ongoing TEK work across natural resource issues on and off-reservation. Partners includet he Great Northern LCC. the Kresge Foundation, the Roundtable of the Crown Continent Adaptive Management Initiative For full partnership list, see links.

Blackfeet Tribe	Northern Rockies	https://lccnetwork.org/project/connecting-tribal-and-first-nation-adaptive-management-and-climate-related-activities-crown - ?page=0	Great Northern LCC
Walker River Paiute Tribe	Great Basin	https://greatbasinlcc.org/project/walker-river-paiute-tribe-tek-project	Great Basin LCC
Pyramid Lake Paiute Tribe	Great Basin	https://www.swcasc.arizona.edu/projects/pyramid-lake-paiute-tribe https://greatbasinlcc.org/project/using-narrative-stories-to-understand-traditional-ecological-knowledge-in-the-great-basin	Great Basin LCC, University of Arizona
Burns Paiute	Great Basin	https://toolkit.climate.gov/case-studies/moving-forward-together-building-tribal-resiliency-and-partnerships	Adaptation International, University of Washington, Oregon State University, Oregon Climate Change Research Center, Pacific Northwest Tribal Climate Change Network, BIA, EPA.
Fort McDermitt Paiute-Shoshone	Great Basin	https://toolkit.climate.gov/case-studies/moving-forward-together-building-tribal-resiliency-and-partnerships https://greatbasinlcc.org/project/understanding-native-cultural-dimensions-of-climate-change-in-the-great-basin	Great Basin LCC, Adaptation International, University of Washington, Oregon State University, Oregon Climate Change Research Center, Pacific Northwest Tribal Climate Change Network, BIA, EPA.
Shoshone Bannock Tribes of Fort Hall	Great Basin	https://toolkit.climate.gov/case-studies/moving-forward-together-building-tribal-resiliency-and-partnerships	Adaptation International, University of Washington, Oregon State University, Oregon Climate Change Research Center, Pacific Northwest Tribal Climate Change Network, BIA, EPA.
Shoshone Paiute Tribes	Great Basin	https://toolkit.climate.gov/case-studies/moving-forward-together-building-tribal-resiliency-and-partnerships	Adaptation International, University of Washington, Oregon State University, Oregon Climate Change Research Center, Pacific Northwest Tribal

			Climate Change Network, BIA, EPA.

Table 2. List of indigenous and local communities that have engaged TEK in Alaska

Tribe, Indigenous Community, Council, Committee or Commission	Member Tribes of Council, Commission, or Committee	Region	Link	Partners
Ahtna Inter-Tribal Resource Commission	Native Village of Cantwell; Mentasta Traditional Council; Cheesh-Na Tribe; the Native Village of Gakona; Gulkana Village; the Native Village of Tazlina; the Native Village of Kluti-Kaah; the Native Village of Chitina;, Ahtna, Incorporated and the Chitina Native Corporation	Southeast Alaska	https://www.doi.gov/sites/doi.gov/files/uploads/ ahtna_doi_moa _with_signature_pages_final.pdf	DOI
Alaska Beluga Whale Committee	The membership of the ABWC is made up of representatives from approximately thirty communities that harvest belugas in the following	Western and Northern Alaska	http://www.north-slope.org/departments/wildlife-management/co-management-organizations/alaska-beluga-whale-committee - CommMembersDocs	NOAA

	regions: North Slope, Chukchi Sea, Kotzebue Sound, Norton Sound, Yukon Delta, Kuskokwim, and Bristol Bay.			
Alaska Eskimo Whaling Commission	The members of Alaska Eskimo Whaling Commission are the registered whaling captains and their crew members of the eleven whaling communities of the Arctic Alaska coast: Gambell, Savoonga, Wales, Little Diomede, Kivalina, Point Hope, Point Lay, Wainwright, Barrow, Nuiqsut, and Kaktovik.	Arctic Alaska Coast	http://www.aewc-alaska.com/our-work.html	NOAA
Alaska Nannut Co-management Council	Brevig Mission, Gambell, Kaktovik, King Island, Kivalina, Kotzebue, Little Diomede, Nuiqsut, Point Hope, Point Lay,	Alaska	https://www.fws.gov/alaska/fisheries/mmm/polarbear/pdf/fws_pb_annual_report_2017.pdf [see pages 12-13]	FWS

	Savoonga, Shismaref, Utqiaġvik, Wainwright and Wales.			
Alaska Native Harbor Seal Commission	Akhiok Tribal Council; Akutan Traditional Council; Aleknagik Traditional Council; Aleutian Pribilof Islands Association; Bristol Bay Native Association; Chenega Bay IRA Council; Cook Inlet Marine Mammal Council; Kenaitze Indian Tribe; Native Village of Atka; Native Village of Chignik Lake; Native Village of Eyak; Native Village of Nanwalek; Native Village of Old Harbor; Native Village of Ouzinkie; Native Village of Port	Southeast Alaska, Chugach, Cook Inlet, Kodiak, Aleutian Islands, and Bristol Bay.	https://www.fisheries.noaa.gov/alaska/marine-mammal-protection/co-management-marine-mammals-alaska - alaska-native-harbor-seal-commission	NOAA

	Graham; Tribe of Unalaska; Qutekcak Native Tribe; Seldovia Village Tribe; Tatitlek Village IRA Council; Unga Tribal Council; Valdez Native Tribe; Yakutat Tlingit Tribe			
Aleut Marine Mammal Commission	Akutan Traditional Council; Atka IRA Council; Belkofski Village Council; False Pass Tribal Council; King Cove: Agduudax Tribe of King Cove; Nelson Lagoon Tribal Council; Nikolski Tribal Council; Sanak/Pauloff Harbor Tribe; Sand Point: Qagan Tayagungin Tribe; Unalaska: Qawalangin Tribe; Unga Tribe.	Aleutian Region, AK	http://www.aleutmarinemammal.org/2018actionplan.pdf	NOAA
Community of Quinhagak	N/A	Central Alaska	https://www.fws.gov/alaska/external/native_american/Living_Working_Together_10-06-15b.pdf	USFWS

Council of Athabascan Tribal Governments	A consortium of ten Gwich'in and Koyukon Athabascan tribes: villages of Arctic Village, Beaver, Birch Creek, Canyon Village, Chalkyitsik, Circle, Fort Yukon, Rampart, Stevens Village and Venetie	Yukon Flats, Arctic AK	*https://www.tribalselfgov.org/wp-content/uploads/.../CATG-SG-NR-Presentation.pptx*	USFWS,
Eskimo Walrus Commission	Gambell, Savoonga, Wales, Shismaref, Diomede, King Island, Nome, Barrow, Wainwright, Togiak, Kwigillingok, Mekoryuk, Kotzebue, Brevig Mission, Kivalina, Stebbins, Unalakleet, Point Hope, Point Lay,	From Barrow to Bristol Bay.	https://eskimowalruscommission.org/	FWS
Gwich'in	Arctic Village, Beaver, Birch Creek, Canyon Village, Chalkyitsik, Circle, Fort Yukon, and Venetie	Yukon, NE Alaska	http://www.grrb.nt.ca/traditionalknowledge.htm	U of Ak, other collaborators
Ice Seal Committee	Bristol Bay Native Association (Bristol Bay),	Western and Northern	http://www.north-slope.org/departments/wildlife-management/co-management-	NOAA

	Association of Village Council Presidents (Yukon-Kuskokwim Delta), Kawerak, Inc. (Bering Straits), Maniilaq Association (Northwest Arctic) and the North Slope Borough (Arctic Slope).	Alaska	organizations/ice-seal-committee	
Iñupiaq	Barrow, Nuiqsut, Wainwright, Atqasuk and Kaktovik	NW Alaska	https://www.fws.gov/alaska/ fisheries/ mmm/polarbear/pdf/ I-I%20Agreemnt% 20signed%20March%202000.pdf http://fishfp.sasktelwebhosting.com/ publications/Inuvialuit_Inupiat_Beluga agreement.pdf	International agreements with Iñupiaq in Canada around Polar Bears and Beluga Whales
Kuskokwim River Inter-Tribal Fish Commission	33 Tribes along the Kuskokwim River	Kuskokwim River AK	http://napaimute.org/wp-content/uploads/2016/05/KRITFC-DOI-USFWS-MOU.pdf	FWS
Traditional Council of St George Island	Aleut (Unangan) community of St. George Island	St. George Island, AK	https://www.fisheries.noaa.gov/ alaska/ marine-mammal-protection/co-management-marine-mammals-alaska - traditional- council-of-st.-george-island	NOAA
Tribal Government of St. Paul	Aleut (Unangan) community of St. Paul Island	St. Paul Island AK.	https://www.fisheries.noaa.gov/ alaska/ marine-mammal-protection/co-management-marine-mammals-alaska - tribal-government-of-st.-paul	NOAA
Yukon River Inter-Tribal Fish Commission	Recently formed in 2016, membership at 30 Tribes and First Nations and growing.	Yukon River AK.	https://www.tananachiefs.org/yritfc/	

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