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Guidelines for Considering Traditional Knowledges in Climate Change Initiatives

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Climate and Traditional Knowledges Workgroup (CTKW)

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The information presented in this report is believed to be current as of the time of production.
The document is a work in progress. The workgroup anticipates revising it over time.

Version 1.0

September 2014

These Guidelines have been developed by a group of indigenous persons, staff of indigenous governments and organizations, and experts with experience working with issues concerning traditional knowledges.

Workgroup Participants (in alphabetical order):

[Karletta Chief](#), University of Arizona
[Ann Marie Chischilly](#), Institute for Tribal Environmental Professionals
[Patricia Cochran](#), Alaska Native Science Commission
Mike Durglo, Confederated Salish and Kootenai Tribes
[Preston Hardison](#), Tulalip Tribes
Joe Hostler, Yurok Tribe
[Kathy Lynn](#), University of Oregon
[Gary Morishima](#), Quinault Management Center
Don Motanic, Intertribal Timber Council
[Jim St. Arnold](#), Great Lakes Indian Fish and Wildlife Commission
Carson Viles, University of Oregon and Tulalip Tribes
[Garrit Voggesser](#), National Wildlife Federation
[Kyle Powys Whyte](#), Michigan State University
[Daniel Wildcat](#), Haskell Indian Nations University
Sue Wotkyns, Institute for Tribal Environmental Professionals

Federal partners involved with reviewing and commenting on this document:

Monique Fordham, US Geological Survey
Frank Kanawha Lake, USDA Forest Service Pacific Southwest Research Station.

Funding support for workgroup participant's time includes: Individual tribal governments, North Pacific Landscape Conservation Cooperative, USDA Forest Service Pacific Northwest Research Station

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Foreword

This document, *Guidelines for Considering Traditional Knowledges in Climate Change Initiatives*, was originally prepared and submitted to the Department of Interior Advisory Committee on Climate Change and Natural Resource Science (ACCCNRS) in May 2014. An informal tribal workgroup developed this document, and the ACCCNRS tribal representatives, Gary Morishima, Quinault Management Center, and Ann Marie Chischilly, Institute for Tribal Environmental Professionals, coordinated the review and comment process. The collective work and expertise shared through these guidelines builds through a number of initiatives that have been exploring issues related to traditional knowledges and climate change in recent years. These initiatives include the Indigenous Peoples Climate Change Working Group (formerly the American Indian Alaska Native Climate Change Working Group), a grant with the Tulalip Tribes from the North Pacific Landscape Conservation Cooperative, support from the USDA Forest Service Coordinated Climate Change Research Strategy, including the USDA Forest Service Pacific Northwest Research Station and Rocky Mountain Research Station, and sessions during the 2013 National Adaptation Forum.

Purpose of the Guidelines

These guidelines are intended to meet multiple goals. First and foremost, these guidelines are intended to be provisional. They are intended to:

- 1) Increase understanding of the role of and protections for TKs in climate initiatives:
 - Provide foundational information to federal agencies on intergovernmental relationships and science when engaging tribal and indigenous peoples in federal climate change initiatives; and
 - Provide foundational information on the role of traditional knowledges (TKs) in federal climate change initiatives.
- 2) Provide provisional guidance to those engaging in efforts that encompass TKs:
 - Establish principles of engagement with tribes on issues related to TKs; and
 - Establish processes and protocols that govern the sharing and protection of TKs.
- 3) Increase mutually beneficial and ethical interactions between tribes and non-tribal partners:
 - Examine the significance of TKs in relation to climate change and the potential risks to indigenous peoples in the U.S. for sharing TKs in federal and other non-indigenous climate change initiatives;
 - Guide the motivation, character, and intent of collaborative climate initiatives undertaken between government agencies, research scientists, tribal communities and TKs holders;
 - Provide specific measures that federal agencies, researchers, tribes, and TKs holders can follow in conceptualizing, developing, and implementing climate change initiatives involving TKs; and,
 - Promote the use of TKs in climate change initiatives in such a way as to benefit indigenous peoples and promote greater collaboration between federal agencies and tribes and increase tribal representation in federal climate initiatives.

The following table describes the charter of the ACCCNRS and the purpose of the Guidelines, as well as a Primer on Climate Change and Indigenous Peoples, developed by Gary Morishima, Quinault Management Center at the request of the ACCCNRS.

Table 1: Summary of ACCNRS Charter Duties and relational purpose of the TKs Guidelines and Primer on Climate Change and Indigenous Peoples.

Department of Interior Advisory Committee on Climate Change and Natural Resource Science (ACCNRS) Charter Duties	Purpose of the TKs Guidelines and Primer on Climate Change and Indigenous Peoples.
Advising on the contents of a national strategy identifying key science priorities to advance the management of natural resources in the face of climate change.	Primer - inform ACCNRS of unique science needs of tribes & indigenous peoples as governments and managers to advance natural resource management on the landscape and ecosystem.
Advising on the nature, extent, and quality of relations with and engagement of key partners at the regional/CSC level.	Primer —provide foundational information on tribes and Indigenous Peoples to increase awareness and sensitivities regarding governmental structures, treaties, rights, responsibilities, cultural differences regarding human relationships to the environment, traditional knowledges (TKs) and limitations on funding and capacity to participate when engaging individual tribes in climate initiatives Guidelines —provide foundational information and suggested guidance on processes involving federal-tribal engagement on issues related to traditional knowledges
Advising on the nature and effectiveness of mechanisms to ensure the identification of key priorities from management partners and to effectively deliver scientific results in useful forms.	Primer & Guidelines - inform ACCNRS of issues relating to the significance of TKs, scale of scientific information to support tribal decision-making, and the need to employ culturally appropriate protocols for braiding TKs and WS.
Advising on mechanisms that may be employed by the NCCWSC to ensure high standards of scientific quality and integrity in its products, and to review and evaluate the performance of individual CSCs, in advance of opportunities to re-establish expiring agreements.	Guidelines - inform ACCNRS, tribal communities, federal entities, and researchers interested in accessing and employing TKs on tribal perspectives regarding TKs, western science, and decision-making processes.
Coordinating as appropriate with any Federal Advisory Committee established for the DOI Landscape Conservation Cooperatives.	Primer & Guidelines - inform LCCs, CSCs, (and other federal entities).

After a formal review process, the ACCNRS shared the Guidelines informally with the National Climate Change and Wildlife Science Center, Climate Science Centers, and Landscape Conservation Cooperatives across the nation as a reference. Building on the initial dissemination of these Guidelines, the Climate and Traditional Knowledges Workgroup (CTKW) now seeks to more broadly share these Guidelines as a way to foster productive dialogue about bridging TKs in climate change initiatives in a way that honors the ways that TKs can help in understanding and addressing climate impacts, and protects TKs from misuse or misappropriation.

This publication is meant to be an informational resource for tribes, agencies, and organizations across the United States with an interest in understanding TKs in the context of climate change. It is meant to inspire dialogue and questions, and to foster opportunities for indigenous peoples and non-indigenous partners to braid TKs and western science in culturally-appropriate and tribally-led initiatives. The publication establishes firmly that in all possible cases it is tribes who should ultimately decide answers to specific questions about whether English-language words such as “traditional knowledges” are the

best words to use, what knowledges should count as significant to their cultures and communities, and what the terms of sharing or declining to share should be. The information presented in these Guidelines is believed to be current as of the time of production. The Guidelines are a work in progress. The workgroup anticipates revising it over time.

Guidelines for Considering Traditional Knowledges in Climate Change Initiatives

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Executive Summary¹

There is increasing recognition of the significance of how traditional knowledges (TKs) can inform our understanding of the impacts of climate change and strategies for adaptation and mitigation. And yet there are potential risks to indigenous peoples in sharing TKs in federal and other non-indigenous climate change initiatives. We intend the term indigenous peoples to designate the diverse populations in the U.S. who could interact with federal and non-indigenous climate change initiatives in ways that involve TKs, whether in the U.S. they are federally-recognized, state-recognized, or unrecognized. We refer to “indigenous peoples” and “tribes” interchangeably in this document, unless we are talking about a specific group or a specific status related to recognition.

These guidelines are intended to examine the significance of TKs in relation to climate change and the potential risks to indigenous peoples in the U.S. for sharing TKs in federal and other non-indigenous climate change initiatives. Although it is common to refer to "traditional knowledge(s)" as individual pieces of information, this term also refers to traditional “knowledge systems” that are deeply embedded in indigenous ways of life. These guidelines use the phrase "traditional knowledges" deliberately in plural form because knowledges are emergent from the symbiotic relationship of indigenous peoples and places - a nature-culture nexus. Tribes and indigenous peoples use “knowledges” to emphasize that there are diverse forms of traditional knowledge and knowledge systems that must be recognized as unique to each tribe and knowledge holder. These guidelines should be used to inform the development of specific protocols in direct and close consultation with indigenous peoples.

Federal agencies and national climate change initiatives are recognizing the significance of TKs, and are proposing and funding collaborative efforts between indigenous communities and federal and non-indigenous climate change entities in ways that involve TKs. This interaction requires an understanding of how individual tribes and knowledge holders choose to share or not to share TKs.

Principles for Engagement

The guidelines focus on a two principles: “Cause No Harm” and “Free, Prior and Informed Consent.” These principles are described in detail below and are intended to guide the motivation, character and intent of collaborative climate initiatives undertaken by government agencies, research scientists with tribal communities, and TKs holders. Broadly, these principles recognize that each tribal community has its own laws which guide and structure how different facets of TKs are treated by tribal and non-tribal entities, and more broadly regulates interactions between parties. Sharing of TKs is governed by principles and values of an indigenous community, which defines an equitable and productive relationship. Key issues discussed in these two principles include the collective custodianship of TKs, custodianship by knowledge holders, and the secret, sacred, cultural and individual privacy associated with TKs.

¹ This Executive Summary synthesizes the key information from the full report on *Guidelines for Considering Traditional Knowledges in Climate Change Initiatives*. The full report includes detailed information for each of the guidelines, as well as complete citations and an annotated bibliography of relevant sources.

“Cause No Harm²”

The “Cause No Harm” philosophy involves identifying and avoiding risks that could lead to loss of or misappropriation of TKs. Specifically, identify risks to natural and cultural resources in regards to intellectual property interests that may come from sharing TKs.

1. Define the roles and responsibilities of all partners clearly and carefully
2. Define what information will be shared
3. Establish use, ownership and means to interpret or share information at the outset of the project
4. Respect, Trust, Equity and Empowerment

Principles for collaboration between tribes, TK holders, federal agencies and others that are intended to guide collaboration and the creation of mutually beneficial relationships between tribes and TK holders and outside researchers and/or government agencies include integrity, validity, fairness and equity, respect and recognition. Finally, the principles include a discussion of traditional rights, sovereign status of American Indian Tribes, the Nation of Hawai’i and Alaska Native Tribes, the trust obligation of the federal government, the inadequacy of current intellectual property law, and international agreements to protect indigenous peoples and TKs from exploitation.

The principle of "first, do no harm" (principle of *primum non nocere*, principle of non-maleficence) is a core ethical principle in medicine and law, and appears in the ethical guidelines of many professional societies in many other disciplines. A prime directive of the Hippocratic Oath, it is the duty not to cause harm to others through any intervention (a negative duty). This is interpreted as having the duty to ensure that actions benefit everyone involved (a positive duty). Medical procedures, policy interventions, knowledge exchanges and other actions are regarded as being acts of deliberate choice, and choices can have both beneficial and detrimental consequences for which one can be held ethically, morally or legally responsible. The principle is an admonishment to look carefully at potential consequences of decisions to act to ensure that all are made better off, while no one is made worse off. It is closely linked to the principle of beneficence, or the duty to do good, and the principle of due care, all foundations to good stewardship and right relationships.

Free, Prior and Informed Consent

The United Nations Declaration of Rights of Indigenous Peoples (UNDRIP), as well as other intergovernmental organizations and international forums recognize the concept of Free, Prior and Informed Consent (FPIC) as a fundamental right of indigenous peoples when negotiating or entering into agreements with governments, businesses and others. Following is a summary of each of these terms, which are more fully defined in the full Guidelines.

- **Free:** This term ensures procedural fairness in negotiations.
- **Prior:** This term ensures that, procedurally, indigenous peoples should be involved from the beginning. For undisclosed TKs, prior refers to a process to obtain consent before it is accessed.

² This principle references the Canadian International Development Agency (CIDA) Handbook on Project Planning and Indigenous Traditional Knowledge best practices in working with indigenous peoples.

- **Informed:** This term ensures substantive fairness in negotiations. Existing treatments of the meaning of "informed" have emphasized the need to address costs and benefits, risks and opportunities.
- **Consent:** This term ensures that processes for obtaining consent should first affirm the right of indigenous peoples to decline to engage in mobilizing TKs for cooperative projects, and saying "no" should have no legal implications for respecting indigenous rights and interests or fulfilling trust obligations.

Guidelines Considering Traditional Knowledges in Climate Initiatives

These guidelines are intended to provide specific measures that federal agencies, researchers, tribes and TK holders can follow in conceptualizing, developing, and implementing climate change initiatives involving TKs. The actions in these guidelines are not comprehensive, and are not in any way intended to supersede the obligation of federal agencies to consult tribes and TK holders with whom they are collaborating or amend or modify any agreements that may exist between tribal governments and federal entities. These guidelines are intended to promote the use of TKs in climate change initiatives in such a way as to benefit indigenous peoples, promote greater collaboration between federal agencies and tribes, and increase tribal representation in federal climate initiatives. These guidelines are a work in progress.

Summary of Guidelines and Actions

Guideline 1. Understand key concepts and definitions related to TKs.

Terms such as traditional knowledge are coined in non-indigenous academic and policy circles, and often do not fully reflect the ways in which indigenous communities refer to, or think of, their knowledge and lifeways. However, these terms may be helpful in providing agencies and researchers with greater understanding of issues that tribal people are facing regarding their own knowledge systems, climate impacts, and impacts to TKs resulting from climate initiatives.

Actions for agencies and researchers:

- Respect and seek to understand the unique conception each individual tribe has of their own knowledge system(s). Recognize that tribal experts and TK holders are the authorities of their own knowledge systems, and deserve to be treated as such.
- Find out how to follow communication protocols and respectfully identify authorities in order to develop an appropriate approach for working with TK systems in a partner community (e.g. what are common terms used in the community? What types of questions are appropriate for outsiders to ask? Who is a contact person/go-between in the community who will help educate researchers?)
- Be humble and open to getting advice from those who know the communication protocols and how to identify authorities.

Actions for tribes and TK holders:

- If you choose to share information about TKs, clearly articulate conceptions of your knowledge system with the expectation that your people's TKs will be respected and held as valid. Make

personnel and/or resources available to aid researchers and agency staff in educating themselves about your community's approach toward working with non-tribal people on projects involving TK.

Guideline 2. Recognize that indigenous peoples and holders of TKs have a right NOT to participate in federal interactions around TKs.

Indigenous individuals are holders of TKs. It is the right of the individual to withhold sharing information. However, indigenous governments and individual holders of TKs within these communities must work together to decide when it is appropriate to share TKs or bring TKs to non-indigenous initiatives.

Actions for agencies and researchers:

- Respect the right of indigenous governments and/or TK holders to withdraw participation and access to TKs at any time during the collaborative process. Some reasons for withdrawing participation may not be evident to those not operating within a given TK system.
- Explain in a non-biased manner the risks and benefits of sharing or not sharing information in a given climate initiative BEFORE attempting to enter into any partnership with a tribal community. Inform the indigenous government and/or TK holder of risks "on your end," e.g., agency's lack of ability to protect information from FOIA requests.
- Support tribal judgment about when/if to share TKs. Support and back tribal partners as they make decisions about whether/how to share information.

Actions for tribes and TK holders:

- 1) Be explicit about the choice not share TKs with agency or other partners, and your right to not disclose information about your tribe's knowledge systems.
- 2) Find out if the tribe or community has a protocol for accessing and asking about knowledge. If you choose to share information about TKs, make sure that agencies or other partners have conformed to the protocols of your tribe for ethical research, such as review by a tribal council, tribal institutional review board, or cultural committee, among other possible relevant institutions that vary from community to community.

Guideline 3. Understand and communicate risks for indigenous peoples and holders of TKs.

TKs in a climate change context occur in a spectrum from the highly secret and sacred to daily observations of phenomena useful for identifying climate impacts and adaptation actions. The open exchange and co-production of knowledge may be beneficial to all stakeholders and rights holders, and may be desired by indigenous peoples. But exchanges carry risks as well, particularly for indigenous peoples and the nature of their knowledge systems and cultural resources. Currently, there are few protections for indigenous peoples who share TKs with federal partners to ensure that TKs will remain the right and property of indigenous peoples or knowledge holders. There may also be inadequate protections for the resources (e.g., culturally-important species) associated with TKs. Therefore, it is critical that federal agencies, and most importantly TK holders, have a balanced understanding of the risks as well as the benefits of bringing TKs into climate change initiatives.

Actions for agencies and researchers:

- Determine the extent to which TKs involving confidential or sensitive information can be protected from unauthorized public disclosure because of federal mandate (e.g., without express legislative authority, TKs recorded in written or electronic form provided to federal entities are subject to FOIA requests).
- Research your agency/organization's codes and policies regarding the publication or dissemination of TKs gathered for projects.
- Inform tribes/TK holders about potential risks of disclosure. It is the obligation of agency staff and researchers to share information about what risks the project poses "on their end."
- Research existing intellectual property and copyright laws in your country, as they pertain to your research/project results. Will data from the project be subject to appropriation? How will this information be protected?

Actions for tribes and TK holders:

- Identify risks to natural and cultural resources and intellectual property interests.
- Identify potential violations or conflicts related to TKs, risks of overexploitation of resources associated with TKs.
- Clearly state what risks you find acceptable, and what risks are not acceptable/must be avoided. If there are risks to natural and cultural resources because of intellectual property concerns, determine whether the tribe would like to share your TKs.
- Consider recording TKs orally in the indigenous language and storing this information within a tribal entity, such as a Tribal Historic or Cultural Preservation Office in order to preserve confidential or sensitive information.
- Consult your tribal attorney regarding the understanding of potential risks.

Guideline 4. Establish an institutional interface between indigenous peoples, TK holders, and government for clear, transparent and culturally appropriate terms-of-reference, particularly through the development of formal research agreements.

Federal agencies have a trust responsibility to federally-recognized tribes, and must ensure that TKs are brought to climate change initiatives in an ethical, respectful, and protective manner that responds to the needs of each individual tribe. Terms-of-reference are commonly formalized through explicit research agreements that spell out conditions prior to the start of the research, and methods for fairly resolving conflicts are identified once the research has started. Tribes can specify conditions during the FPIC process. Although these processes may differ among tribes, common issues are identified below.

Action for agencies, researchers, tribes and TK holders:

- The Department of Interior should undertake concerted efforts to support the engagement of tribes and indigenous peoples in federal climate-related science investments, including the capacity to access and benefit from the services provided by CSCs, LCCs, and NCCWSC.

- When appropriate and only with the Free, Prior and Informed Consent of indigenous peoples and knowledge holders, decision-makers should consider and utilize western science and TKs.
- Collaborate with project partners to develop pre-determined methods for each step of bringing TK into climate change initiatives. Questions to address might include:
 - What are the appropriate goals and objectives for the project?
 - How will TKs holders be involved as equal partners?
 - How will TKs be identified for the project? Will federal staff request information? Will TK holders offer up information that they feel is relevant?
 - How will TKs be shared within the project team? Who will have access to information?
 - How will TKs be stored for safekeeping? What confidentiality measures will be employed and enforced? Who will oversee these? Who will be responsible in the event that these measures fail?
 - What obligations within the tribal community will accompany the TKs that are involved in the project, if any?
 - Who will enforce these standards? What means will TKs holders redress potential grievances? What are the penalties for the measures failing?

Guideline 5. Provide training for federal agency staff working with indigenous peoples on initiatives involving TKs.

Federal agencies and other non-indigenous entities seeking to work with indigenous peoples and knowledge holders that have access to TKs must adequately train staff that will be interacting with indigenous peoples. This training should include what TKs are, how TKs differ from western science, the risks to indigenous peoples and knowledge users/holders when TKs are shared with non-indigenous entities, and how staff can ensure that they do not place indigenous peoples, TKs, or TK-associated resources at risk. This training should also clarify what legal or other protections may be afforded to TKs under FOIA, related statutes, and applicable federal policy. Federal or other climate efforts should provide funding for training for tribal partners.

Actions for agencies and researchers:

- Provide training on community standards, protocols, and legal rules for all project team members participating in projects related to TKs.
- Allocate resources to train staff about TKs, and ongoing issues regarding the sharing and protection of TKs, and existing models guiding collaborative projects between non-indigenous researchers and holders of TKs.
- Provide funding for tribal partners to train and advise agency staff on how to work with tribes on issues related to TKs.

Actions for TK holders/tribes:

- Train tribal staff and TKs Holders on protocols needed to govern the sharing and protection of TKs.
- Inform and train the Tribal Legal Office of potential project and potential risk.

Guideline 6. Provide specific directions to all agency staff, researchers and non-indigenous entities to ensure that protections for TKs requested by tribes and knowledge holders are upheld.

Agencies and research organizations should prepare their staff for interactions with tribes and TK holders to ensure that their staff members are able to carry out their jobs in an ethical and respectful manner, and to promote partnerships between tribes, TK holders and non-indigenous entities. This preparation will promote an iterative process between researchers and tribes, as well as the potential for co-production of knowledge about climate change issues.

Actions for agencies and researchers:

- If the indigenous government or knowledge holder requests protection for TKs that may be shared, agency staff should not write down or electronically record confidential or sensitive information.
- Consult with indigenous governments to develop an appropriate research agreement detailing the nature of the research/ knowledge exchange. Agreements should³:
 - Be developed collaboratively through equal standing.
 - Be based on FPIC and mutually agreed terms, goals and understandings.
 - Acknowledge contributions by TK holders.
- Outline expected risks and benefits.
- Clearly disclose any constraints or limitations regarding the ability to protect sensitive or confidential information before seeking access to TKs. Specify what measures will be taken to protect sensitive or proprietary information (understanding that there are often legal limits, to what protections can be provided by Federal agencies to any information that is submitted to them or that is shared with others, such as under FOIA).
- Use appropriate language when referencing the role and content of TKs in climate change initiatives.
- Consider sharing data and information with indigenous peoples to support indigenous efforts and indigenous use of TKs *without the expectation* that indigenous peoples will share TKs in return.
 - Focus on the value of the beneficial outcomes that come from use of TKs as opposed to a focus on knowledge exchange.
 - Implement the principle of co-protection to the fullest extent possible. Co-protection refers to measures that protect both TKs and their associated tribal trust resources. Any actual exchanges of any particular traditional knowledge should take place in the context of safeguards that take into account legal, economic, cultural and cultural resource issues.
 - Work to establish a long-term relationship with indigenous peoples built on respect, mutual benefit, and extends beyond current understandings of professional obligations.
 - Provide recognition, policy guidance and education for the public and agencies to promote understanding and respect for TKs and associated resources to build a relationship based on

³ See Appendix I of the full report for more detail.

- trust and respect.
- Consider the use of proxies in knowledge sharing. For example, indigenous peoples may share the results or outcomes without sharing sacred knowledge.

Actions for Tribes, TKs holders, federal agencies and researchers:

- Detail how data will be collected and stored and specify rules for access, ownership and control, if any will exist.
- Take special caution in the creation of databases of TKs, which should be only compiled or made available through Free, Prior and Informed Consent. Databases may provide benefits, for example, in bringing together traditional knowledge of past weather patterns to fill in gaps in the scientific record and lead to culturally appropriate solutions. But there are cultural issues and risks as well, for example through loss of control or ownership over the knowledge.

Guideline 7. Recognize the role of multiple knowledge systems.

Agencies and research organizations should recognize the role and interaction of TKs and multiple knowledge systems in climate change research and adaptation and vulnerability assessments. These entities should also recognize multiple knowledge systems may exist within one tribe and among different TKs holders. These knowledge systems may conflict with one another. The agencies and research organizations need to work closely with all parties to ensure that all TKs is protected and credited appropriately.

Actions for federal agencies, researchers, tribes and TKs holders:

- Develop measures of success for projects from multiple perspectives/knowledge systems—define parameters of success from both western science and TKs.
- Ensure that each the contributions of tribal partners are recognized in final products, publications, and efforts to publicize projects.
- Create opportunities for partnerships involving TKs in climate change initiatives only when it is requested by and includes leadership of tribes in the development of these programs.
- Ensure that all collaboration with TK holders occurs according to principles of FPIC.

Actions for Tribes and TKs holders:

- Develop an internal protocol/processes that ensures that all participants in these projects are informed of risks, benefits, and anticipated outcomes.

Guideline 8. Develop guidelines for review of grant proposals that recognize the value of TKs, while ensuring protections for TKs, indigenous peoples, and holders of TKs.

Many federal, state and other grant programs are including criteria in proposal review that recognizes and awards points to applicants that incorporate TKs within their proposals. While this demonstrates awareness of the importance of TKs in climate change initiatives, it may pose a risk to indigenous peoples and knowledge holders who are unaware of potential abuse or misappropriation of TKs.

Actions for federal agencies and grant reviewers:

- The grant and materials produced (e.g., reports, videos) should recognize the sovereign rights of indigenous peoples to control access to, and the use of, their traditional knowledge and the right to give or deny access to it based on their right to FPIC according to their own traditions and processes.
- The grant should, where appropriate, include reference to a human subjects protocol and approval from the appropriate Institutional Review Board.⁴
- The grant should follow the appropriate indigenous research protocols established by individual tribes to guide research involving tribes or knowledge holders.
- Federal grants should not require that all data collected during the grant period be presumed to be under the ownership of the federal government. TKs should not be disclosed without the Free, Prior and Informed Consent of the indigenous government and knowledge holder, even when generated under a grant period funded by the federal government. The grant should clearly articulate that if indigenous peoples and their knowledge holders disclose TKs in written form then TKs would currently be subject to disclosure through FOIA. If funding entails a requirement to disclose based on Federal rules associated with publicly funded research, then alternative sources of funding should be sought for activities related to the collection of TKs if indigenous governments or knowledge holders do not wish TKs to become publicly available.
- The grant should demonstrate that there is substantial tribal leadership and tribal legal representation in the conception and project management of the grant.
- The grant should demonstrate substantial benefits and minimal risks to tribes for the proposed projects.
- Agencies could consider a tiered approach to grants, with an initial disbursement for attempting to obtain FPIC, including tribal consultations and risk and opportunity assessment, with another tier only for projects that have obtained FPIC and meet IRB requirements, where appropriate.

⁴ An institutional review board (IRB) is a committee that has been formally designated by institutions to approve, monitor, and review research that involves humans. The Association for the Accreditation of Human Research Protection Programs, Inc. (AAHRPP) accredits high-quality human research protection programs in order to promote excellent, ethically sound research. Through partnerships with research organizations, researchers, sponsors, and the public, AAHRPP encourages effective, efficient, and innovative systems of protection for human research participants. Agencies should promote the revision of human subjects protocols to accommodate specific tribal issues, for example regarding collective tribal consent.

Abstract

These guidelines have been developed to examine the significance of traditional knowledges in relation to climate change and the potential risks to indigenous peoples in the U.S. for sharing traditional knowledges in federal and other non-indigenous climate change initiatives. These guidelines should be used to inform the development of specific protocols in direct and close consultation with indigenous peoples. Indigenous peoples in the U.S. include federally-recognized tribes, with whom the United States has a Trust responsibility to, state-recognized indigenous peoples (such as state-recognized Tribes and Native Hawaiian Organizations), and unrecognized indigenous peoples and indigenous communities in the U.S. Additionally, federal agencies have government-to-government consultation obligations towards federally-recognized tribes. Each group of indigenous peoples could interact and participate with federal and non-indigenous climate change initiatives in ways that involve TKs. The guidelines are intended to be provisional.

Guidelines for Considering Traditional Knowledges in Climate Change Initiatives

Introduction

The significance of traditional knowledges (abbreviated TKs from now on) is being explored regularly among indigenous peoples, and within regional and national climate change initiatives, including research, assessments, planning and project implementation. Such explorations may take place within indigenous peoples' governments and communities or within organizations such as state, regional and federal agencies or entities such as the Department of Interior's Landscape Conservation Cooperatives and Climate Science Centers. This document provides a set of concepts and guidelines for indigenous and non-indigenous communities and organizations as they explore the significance of TKs in climate initiatives. In this document, we refer to TKs, recognizing that other concepts, such as traditional ecological knowledge, native science, indigenous knowledge, and indigenous knowledge of the environment are commonly used in a diverse range of literatures and settings.

We intend the term indigenous peoples to designate the diverse populations in the U.S. who could interact with federal and non-indigenous climate change initiatives in ways that involve TKs. They include federally-recognized tribes, with whom the United States meets its trust responsibility through a government-to-government relationship, consultation and other legal obligations (Sec. Order 3206, Ex. Order 13175, Pevar 2002). They also include state-recognized indigenous peoples, and unrecognized indigenous peoples in the U.S. In order to ensure that federal agencies and other non-indigenous organizations are aware of all legal obligations that may apply when engaging with indigenous peoples in climate change initiatives, it is important to know whether that group is federally-recognized, state-recognized or unrecognized. In general, we refer to "indigenous peoples" and "tribes" interchangeably in this document, unless we are talking about a specific group or a specific status related to recognition. And yet, a constant theme of this document is the importance of appreciating the diversity of indigenous peoples in the U.S.

Although it is common to refer to "traditional knowledge(s)" as individual pieces of information, this term also refers to traditional "knowledge systems" (TKs) that are deeply embedded in indigenous ways of life. These guidelines use the phrase "traditional knowledges" deliberately in plural form to emphasize that there are diverse forms of traditional knowledge and knowledge systems that must be recognized as unique to each tribe and knowledge holder because knowledges are emergent from the symbiotic relationship of indigenous peoples and places—a nature-culture nexus.

As with all societies, indigenous peoples rely on complex knowledge systems to support the continuance of the ways of life that matter to their communities. These systems often involve interconnected webs of environmental, moral, social, political, and spiritual knowledges. These webs express bonds among humans of different generations who play different roles in their communities, plants and animals, non-human entities (such as spirits), and collectives (such as forest landscapes). Terms like TKs refer to various facets of these knowledge systems. Because many indigenous peoples continue to live their lives closely connected to the earth, TKs are derived from the relationships indigenous peoples have with landscapes, waterscapes, plants, animals, and ecological processes. Indigenous peoples have used TKs to adapt and utilize resources derived from ecosystems of which they are also a part. Indigenous peoples respond to metascale forces such as ecological variations or ecological impacts resulting from political or

economic decisions. TKs will continue to figure crucially in indigenous adaptive governance to current and forecasted climate change.

Given the cross-boundary scale of climate change, indigenous and non-indigenous organizations and entities may wish to collaborate to describe their vulnerability and resilience to climate change, as well as consider mitigation actions and climate change adaptation strategies. Sharing across knowledge systems, between TKs and western climate science, is becoming a more common aspect of these combined efforts. TKs can complement various climate and environmental sciences (e.g. modeling scenarios and species investigations) by providing critical insights into climate change impacts and by helping to inform assessment and adaptation strategies. Likewise, western science can make contributions to TK-based climate change research and adaptation approaches. Despite the potential for collaboration, TKs differ from climate and environmental sciences because of the experiential and philosophical nature of TKs and the methods used to gather, share and apply them. TKs are helping many indigenous peoples in the U.S. to become aware of, understand, prepare for, and adapt to climate impacts. Among federal agencies and other non-indigenous entities, there has been a surge of interest in exploring the role of TKs in climate change initiatives and programs. In particular, agencies are exploring how TKs can assist with understanding the effects of and consequence from extreme

There is no fixed definition of indigenous peoples in international law, and it was not considered to be necessary for the adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), where it remains undefined, only referring to self-identification. As stated in Article 33 of UNDRIP, "Indigenous peoples have the right to determine their own identity or membership in accordance with their customs and traditions." The United Nations system uses general sets of indicators that taken collectively help to identify indigenous peoples. The most used set of indicators is contained in the "Study on the Problem of Discrimination against Indigenous Populations" a massive study undertaken by a Special Rapporteur that was initiated in 1972 (Martínez Cobo 1986).

"Indigenous communities, peoples and nations are those which, having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of the societies now prevailing on those territories, or parts of them. They form at present non-dominant sectors of society and are determined to preserve, develop and transmit to future generations their ancestral territories, and their ethnic identity, as the basis of their continued existence as peoples, in accordance with their own cultural patterns, social institutions and legal system. This historical continuity may consist of the continuation, for an extended period reaching into the present of one or more of the following factors:

- a. Occupation of ancestral lands, or at least of part of them;
- b. Common ancestry with the original occupants of these lands;
- c. Culture in general, or in specific manifestations (such as religion, living under a tribal system, membership of an indigenous community, dress, means of livelihood, lifestyle, etc.);
- d. Language (whether used as the only language, as mother-tongue, as the habitual means of communication at home or in the family, or as the main, preferred, habitual, general or normal language);
- e. Residence on certain parts of the country, or in certain regions of the world;
- f. Other relevant factors.

On an individual basis, an indigenous person is one who belongs to these indigenous populations through self-identification as indigenous (group consciousness) and is recognized and accepted by these populations as one of its members (acceptance by the group). This preserves for these communities the sovereign right and power to decide who belongs to them, without external interference." *See Secretariat of the Permanent Forum on Indigenous Issues 2004 for discussion and relevant working definitions.*

variability of ecological processes and potential magnitude of climate change impacts.

In these combined efforts, non-indigenous collaborators must understand that TKs do not have the same cultural origins of environmental or climate sciences. Hence, TKs are articulated through different cultural and spiritual media. Each indigenous individual and community has its own ways to express and protect TKs in order to fulfill responsibilities to family, community, and environment. TKs are based on intergenerational observation and experience generated by interacting with the environment and passed from generation to generation through indigenous subsistence and ceremonial practices and indigenous languages. Communities of TKs users may express this process differently than may be illustrated by western science. For example, they may describe this process as acquiring TKs through spiritual communication with the Creator, ancestors, spirit beings, sacred places, plants and animals. The methods of sharing, transmitting, and applying TKs differ markedly from those that may be assumed by scientists in their own fields or when entering into collaborative or participatory research with scientists in other fields or communities. Indigenous peoples are often reluctant to share TKs because of concern for risk of abuse or misappropriation. In this sense, sharing involves an expectation of reciprocity, meaning that indigenous communities' own adaptive governance will benefit from the improvements to understanding climate change that may arise from any integration of TKs within climate change programs and initiatives. Examples of such benefits are agency management strategies that result in protection of culturally critical species and ecosystems or increased availability of new information and tools for indigenous communities to use in their assessments and planning.

Non-indigenous collaborators must always respect the fact that TKs are important to indigenous adaptive governance to climate change. This is especially true given President Obama's issuance of Executive Order 13653, which directs federal agencies to act in a manner that increases the resiliency of indigenous governments and communities to climate impacts and to reform policy and infrastructure that pose barriers to tribal resiliency and/or increase vulnerability of tribal communities to climate impacts. Because of the role of TK in evaluating place-based impacts of climate change on communities and in giving long-term insights into climate adaptation, TKs play a critical part in promoting indigenous resiliency to climate impacts. TKs are dimensions of knowledge systems that have guided indigenous communities for millennia and that indigenous peoples fully intend to continue to be guided by into the future.

Purpose of this Document

This document provides a set of guidelines for use by indigenous peoples and by organizations such as state, regional and federal agencies or entities involved in climate-related initiatives. Guidelines are included for: (1) indigenous peoples and holders of TKs to ensure that TKs are protected in future collaborations, (2) agencies and researchers wanting to secure access to and use TKs, and (3) individuals reviewing grant proposals that incorporate TKs.

It is critical that indigenous peoples understand both the benefits and risks involved in sharing TKs or applying TKs to non-indigenous initiatives. It is just as critical for federal agencies and other non-indigenous organizations to understand how to ethically, responsibly, and beneficially incorporate TKs into climate change initiatives. This requires a clear understanding of the meaning of TKs, their value in resource management and stewardship, their possible contributions to climate change initiatives, and

most importantly, the measures that are necessary to avoid the misappropriation and exploitation of sensitive knowledge systems (NCAI Resolution #ABQ-10-086).

Secretarial Order 3289, "Addressing the Impacts of Climate Change on America's Water, Land, and Other Natural and Cultural Resources," establishes the Department of Interior's role in working with federally-recognized tribes through DOI climate change initiatives, including Climate Science Centers (CSCs) and Landscape Conservation Cooperatives (LCCs). The Secretarial Order states that it is important to *"support the use of the best available science, including traditional ecological knowledge, in formulating policy pertaining to climate change."* The United States Federal Government has a unique Trust relationship with federally-recognized tribes in the U.S., which is grounded in the U.S. Constitution, numerous treaties, statutes, federal case law, regulations and executive orders. A core element of this Trust relationship is consultation; under Executive Order 13175, each agency department is required to develop a policy for consultation.⁵ Under these policies, agencies must initiate consultation before taking actions that may have a substantial direct effect on tribal trust resources, tribal cultural practices, or access to traditional areas of cultural or religious importance on federally managed lands, thus ensuring that tribal rights are considered in those initiatives. Federal projects that involve federally recognized tribes and TKs must be conducted through government-to-government relationships,

For example, the Department of Interior has outlined in its policy that it is a sovereign Tribe's right to *"protect tribal cultural heritage and cultural identity expressed both in tangible and intangible forms by developing tribal laws."*⁶ Such forms include TKs. These guidelines are intended to help federal agencies meet not only the trust responsibility to federally recognized tribes, but also the obligations that come from federal recognition, treaties, federal policies, state recognition and the United Nations Declaration of Rights for Indigenous Peoples (UNDRIP). The United States endorsed the UNDRIP in 2010.⁷

Principles for Engagement

The following principles are intended to guide the motivation, character and intent of collaborative climate initiatives undertaken between government agencies, research scientists, tribal communities and TK holders.

Tribal Principles and Laws:

Recognize that each tribal community has its own laws which guide and structure how facets of TKs are treated, and more broadly regulate interactions between parties. Sharing of TKs is governed by community principles and values that define what constitutes an equitable and productive relationship.

⁵ Under Public Law 108-199 as amended by Public Law 108-447, all federal agencies are required to consult with ANCSA Corporations. An example of this is the Department of Interior Policy on Consultation with Alaska Native Claims Settlement Act (ANCSCA) Corporations. http://www.fws.gov/alaska/external/native_american/doi_ancsa_policy.pdf

⁶ Undated Letter from David J. Hayes to the Tulalip Tribes, received September 27, 2011. See also: statement of Donald "Del" Laverdure,, Principal Deputy Assistant Secretary Indian Affairs, U.S. Department of the Interior in U.S. Senate (2011). Setting the Standard: Domestic Policy Implications of the Un Declaration on the Rights of Indigenous Peoples. Hearing before the Committee on Indian Affairs United States Senate One Hundred Twelfth Congress, First Session, June 9, 2011. S. Hrg. 112-174. GPO, Washington, DC.

⁷ Announcement of U.S. Support for the United Nations Declaration on the Rights of Indigenous Peoples Initiatives to Promote the Government-to-Government Relationship & Improve the Lives of Indigenous Peoples <http://www.state.gov/documents/organization/184099.pdf>

These principles and values may align closely with broader frameworks for collaboration, or may be highly unique. Outside researchers and agency staff must be aware of these principles and laws and ensure that they are followed in all research and collaboration activities. While principles and laws are unique and specific to each tribal community, the following points may serve as a starting point for those seeking to work with tribes:

- **Collective custodianship of TKs:** TKs and their associated cultural resources are governed collectively by communities. This does not mean that all members of a community will have access to all TKs, e.g. some TKs held by individuals, families, healers and other groups within a community. However, the rules for who holds different knowledges, the rules under which they may be exchanged, restrictions on their use within and outside communities and other rules are determined by the community collectively.
- **Custodianship by knowledge holders:** Although custodianship differs from Western concepts of property, it is not characterized by the absence of rights, but regulated internally by norms, beliefs and traditions. To deal with the divide between cultural and western legal traditions, some legal scholars have proposed the concept of "limited commons" or "limited common property," which operates as a local commons within a community, but treated as property outside of the community (Chander and Sunder 2004). One fundamental disconnect to be addressed is that custodians of TKs expect those who receive TKs directly or indirectly to show respect and treat it with sensitivity and proper care (Solomon 2004).
- **Secret/sacred/cultural privacy/individual privacy:** TKs occupy a spectrum of beliefs and Practices. At one end, they may be highly secret, sacred or culturally sensitive and held by only one or a few people with rules that strictly proscribe who may use them, how and when they be used, and for what purposes. At the other end, TKs may be widely shared with less restrictive rules on their use. However, even relatively open TKs generally have "stewardship obligations" attached to them that regulate their use. Outsiders are expected to ask about and learn the rules, and respect them, and to avoid or take special measures to protect secret, sacred and highly sensitive TKs, and to only access them with Free, Prior and Informed Consent.

Reciprocity: Principles for Collaboration between Tribes, TK Holders, Federal Agencies and Other Non-Indigenous Entities

The principles below are intended to guide collaboration and the creation of mutually beneficial relationships between tribes and TK holders and outside researchers and/or government agencies.

- **Integrity:** All interactions should be conducted with the utmost good faith, without deception, guile, manipulation or strategy.
- **Validity:** TKs do not need to be validated by western science and may differ from western science in their approach, composition, compatibility with western science, and use.
- **Fairness and Equity:** Nested within reciprocity is the concept that all transactions should be fair and equitable. Although easy to state, this may require some work to identify fairness and equity in multiple dimensions.

- **Respect:** Respect is a core concept that permeates IP consciousness and is deeply nested in a cultural cosmovision in which obligations to show respect extend outwards to one's family, kin, elders, community, ancestors and all one's relations. Those coming into a community are expected to have a basic understanding of and demonstrate respect for the protocols of the community.
- **Recognition:** In Indigenous communities, it is a fundamental principle of respect to give due recognition to those who have contributed to any event, process or outcome. This can include formal ceremonies and gift-giving, and increasingly attribution is given to holders of TKs in any authorized publications through co-authorship (unless guided by confidentiality).

International and US National Legal Principles

Relationships between agencies, researchers and tribal parties should also be informed by international and US law and legal philosophy. Below is a list of legal principles which apply to the use of TKs in climate initiatives:

- **Traditional Rights:** Indigenous people have the continuing right to use their customary and traditional homelands for the perpetuation of themselves and their cultures (UN/ CIDA).
- **Sovereign status of American Indian Tribes, the Nation of Hawai'i and Alaska Native Tribes:** As members indigenous sovereign nations, American Indians, Alaska Natives and Native Hawai'ians retain their inherent powers of self-determination.
 - With regard to TKs, tribes have the right to protect their intangible cultural heritage. The Department of Interior has outlined in its policy that it is a sovereign Tribe's right to protect tribal cultural heritage and cultural identity expressed both in tangible and intangible forms by developing tribal laws.
- **Trust Obligation of Federal Government:** The federal government has a unique Trust relationship with federally-recognized tribes in the U.S. A core element of this Trust relationship is government-to-government consultation. Agencies are obligated to initiate consultation with tribes before taking actions that may have substantial direct effect on tribal rights or interests.
- **Inadequacy of Current Intellectual Property Law:** Current intellectual property and copyright law in the U.S. does little to protect TKs and tribes from appropriation or exploitation. Remedying this situation through legislative action—such as providing exemptions to FOIA requests for sensitive TK information used in climate adaptation planning—is a necessary component of increasing tribal and TK involvement in climate change initiatives.
- **Internationally, attention is focusing on agreements to protect indigenous peoples and TKs from unprincipled exploitation.** The United Nations Convention on Biodiversity and Declaration on the Rights of Indigenous Peoples contain provisions centered on the concept of Free, Prior, and Informed Consent.

Guideline 1. Understand key concepts and definitions related to TKs

What is Traditional Knowledge?

In this document we use the phrase traditional knowledges (TKs) as a generic term that represents certain dimensions or faces (Houde 2007) of dynamic knowledge systems and lifeways that are as diverse as the 566 federally recognized tribes and other, non-federally recognized indigenous peoples in the U.S. TKs broadly refer to indigenous communities' ways of knowing that both guide and result from their community members' close relationships with and responsibilities towards the landscapes, waterscapes, plants, and animals that are vital to the flourishing of indigenous cultures. These ways of knowing and living have been accrued over thousands of years of experience, relationships, and upheld responsibilities towards other living beings and places (Wildcat 2009). English language phrases like "traditional ecological knowledge" are coined in non-indigenous academic and policy circles, and often do not fully reflect the ways in which indigenous communities refer to, or think of, their knowledge and lifeways (McGregor 2005, Williams and Hardison, 2013, Whyte 2013b).

Who are the Holders of TKs?

Indigenous societies are complex. The issue of sharing TKs occurs at the interface of important aspects of this complexity. Holders of TKs are not simply those who have a basic acquaintance with or academic or academic-like awareness or education of the knowledge systems their community has been guided by for millennia. Holders of TKs identify themselves using their own concepts (Ruddle 1993). There are traditional governance structures that existed before present-day tribal governments that may govern sovereignty over knowledge, how knowledge is shared, and who traditional knowledge holders are.

Canadian International Development Agency (CIDA)

CIDA Handbook on Project Planning and Indigenous Traditional Knowledge offers best practices in working with indigenous peoples:

1. **A "Cause No Harm" philosophy:** Projects should benefit the community and TK holders who are involved. Under no circumstances should a project be undertaken which would benefit others at the expense of TK systems, TK holders and/or a tribal community. Every care should be taken to design projects which maximize benefits for participating tribal communities, so that projects increase climate resilience of the community.
2. **Define the roles and responsibilities** of all partners clearly and carefully. Define these roles and responsibilities according to the multiple perspectives of all partners (e.g. from customary law and research protocol format).
3. **Define what information will be shared.**
4. **Establish use, ownership and means to interpret or communicate information** at the outset of the project
5. **Respect, Trust, Equity and Empowerment**
 - **Respect and Trust:** Scientific and TK perspectives should hold each other in high regard, acknowledging the validity of both forms of expertise.
 - **Equity:** No knowledge system is better or worse than the other. Differences in conclusions should be taken as a signal that there may not be enough information at hand, or that the question was posed incorrectly, or that there is some other problem. One knowledge system should not be given precedence, or greater power or influence, than another.
 - **Empowerment:** Ensure that all parties have the capacity to engage in a meaningful dialogue. In many instances, TK holders do not possess the means of a large research institution, or a federal agency. In order to ensure equitable relationships, it may be necessary to empower tribes and/or TK holders materially or by other means.

How are TKs relevant to climate change?

TKs have guided indigenous interactions with the landscape for millennia. In recent decades, scientists, policymakers and others have become increasingly aware of the importance and value of TKs in informing their land management practices and policies, and in addressing gaps in data and information over long periods of time that may help scientists in establishing a baseline of information or variability of ecosystems or species populations. The widespread use of fire as a land-management tool, for example, is one that scientists adopted from indigenous peoples (Huffman 2013, Mason et al. 2012). As climate change advances, there is mounting interest on the part of indigenous and non-indigenous land managers to have TKs form part of climate change initiatives (Parrotta and Agnoletti 2012).

Indigenous peoples confront unique vulnerabilities in the face of climate change, in part because of their close ties to local and regional plants, animals and ecosystems (Maldonado, Pandya and Colombi, eds. 2013; Abate and Kronk 2013; Grossman and Parker 2012, Parrotta and Agnoletti 2012). Many indigenous peoples are proactively preparing for the impacts of climate change by carrying out climate change impact assessments and developing indigenous adaptation plans (Dalton et al. 2013). Making TKs a vital part of these initiatives is critical to many indigenous peoples, as TKs is the basis for many indigenous peoples' adaptive governance capacity. Utilizing TKs also ensures that indigenous adaptation and mitigation strategies will be culturally appropriate and able to address relevant issues. Additionally, among some indigenous peoples and federal land managers, there is interest in how TKs can inform federal climate change initiatives. One area in particular where federal climate change initiatives must interact with indigenous peoples is the downscaling of regional or national climate models and information. Such downscaling efforts are likely to contain a substantial amount of uncertainty in forecasting and predicting impacts that can hinder decision-making within local communities. The validity of such downscaling can be evaluated or validated by involvement of indigenous peoples.

Incorporating TKs into climate change initiatives can strengthen the applicability of these initiatives by making them culturally appropriate and by applying indigenous peoples' knowledges and lifeways to develop effective adaptive strategies. TKs may serve to: define earlier environmental baselines; understand the magnitude and effects of variability of ecological processes; help identify impacts that need to be mitigated; provide observational evidence for modeling projections or help to ground truth models; provide technologies for adapting; and identify culturally appropriate values for protection from direct impacts or from the impacts of adaptation measures themselves (Reidlinger and Berkes 2001; Williams and Hardison 2013). Another important contribution of TKs to climate change is its holistic perspective, which integrates climate change into a broad range of socio-economic, cultural, and ecological issues. Western science is only beginning to recognize the importance of holistic interdisciplinary perspectives. TKs can serve as a model for integrated climate-change research. In addition, indigenous peoples spend more time (and often over broader areas) on the land or sea than do western scientists and therefore are positioned to make and interpret observations (especially of rare events or species) than others less familiar with the region (Cochran et al. 2013).

TKs and western science can be brought together to develop climate change strategies that are dynamic, diverse, and rooted in multiple ways of knowing and evaluating impacts. Indigenous peoples may benefit from bringing TKs into broader regional and/or federal initiatives by seeing their resource

management preferences reflected in non-indigenous plans. Appropriately bringing TKs into these initiatives may also ensure that adverse impacts from both climate change and by climate change adaptation measures or mitigation strategies are avoided. Adaptation may create adverse impacts both through omission (failure to accommodate and protect indigenous values or resources from climate impacts) or commission (adverse impacts of adaptation interventions themselves).

“Free, Prior, and Informed Consent”

UNDRIP, as well as other intergovernmental organizations and international forums recognize the concept of *Free, Prior, and Informed Consent* (FPIC) (For general discussions of the separate terms, from which the following discussion is drawn, see: AFN 2009; Anderson 2011, Battiste, 2008; Fletcher et al., 2011; Gamborg et al. 2012; Grenier 1998; Hand 2012; Hill et al. 2010; Laughlin 2013; Mi'kmaw Ethics Watch, 1999; Stark 2010)

- **Free:** This term ensures procedural fairness in negotiations. It implies indigenous control over decisions related to consent free from force, intimidation, manipulation, inducements, coercion, or other pressure by any government, agency, company, or external entity in a process that is unbiased and neutral as to outcome. Free can also imply indigenous control over the nature and structure of the activities required for securing consent in the first place. Indigenous peoples may have a different understanding than non-indigenous agencies and others about what sorts of activities, from meetings and conferences to intercultural exchanges, must take place for consent or dissent to be legitimate.
- **Prior:** This term ensures that, procedurally, indigenous peoples should be involved from the beginning at the conceptualization phases of collaborative relationships. It means that indigenous peoples must be engaged before alternatives are identified and actions or decisions are made. Prior often also means ensuring that Indigenous peoples have the opportunity to influence the structure of collaboration, cooperation and or any other form of joint action that serves to guide decision-making.
- **Informed:** This term ensures substantive fairness in negotiations. Existing treatments of the meaning of "informed" have emphasized the need to address costs and benefits, risks and opportunities. All relevant information must be made available and provided in language/forms understandable to indigenous peoples and that indigenous peoples must have access to independent information and experts on law and technical issues upon request.
- **Consent:** This term ensures that processes for obtaining consent should first affirm the right of indigenous peoples to decline to engage in mobilizing TKs for cooperative projects, and saying "no" should have no legal implications for respecting indigenous rights and interests or fulfilling trust obligations. It means that Indigenous Peoples have the right to say "yes" or "no" at each stage of the decision making process. Moreover, consent must be associated with the appropriate parties and communities within indigenous peoples, and must include indigenous methods of providing consent (which may be different than western methods of providing consent).

Actions for agencies and researchers:

- Respect and seek to understand the unique conception each individual tribe has of their own knowledge system(s) (Whyte 2013a). Recognize that tribal experts and TK holders are the authorities of their own knowledge systems, and deserve to be treated as such.
- Find out how to follow communication protocols and respectfully identify authorities in order to develop an appropriate approach for working with TK systems in a partner community (e.g. what are common terms used in the community? What types of questions are appropriate for outsiders to ask? Who is a contact person/go-between in the community who will help educate researchers?)
- Be humble and open to getting advice from those who know the communication protocols and how to identify authorities.

Actions for tribes and TK holders:

- If you choose not share TKs with agency or other partners, be explicit about that choice and your right to not disclose information about your tribe's knowledge systems.
- If you choose to share information about TKs, clearly articulate conceptions of your knowledge system with the expectation that your peoples' knowledge will be respected and held as valid. Make personnel and/or resources available to aid researchers and agency staff in educating themselves about your community's approach toward working with non-tribal people on projects involving TK.
 - What are common pitfalls? How can these be avoided?
 - What subjects should be avoided?
 - What is the community's protocol for accessing and asking about knowledge?

Guideline 2. Recognize that indigenous peoples and holders of TKs have a right NOT to participate in federal interactions around TKs.

Indigenous individuals are holders of TKs. It is the right of the individual to withhold sharing information. However, indigenous governments and individual holders of TKs within these communities must work together to decide when it is appropriate to share TKs or bring TKs to non-indigenous initiatives. Agencies must work directly with indigenous governments and the individual holders of TKs when establishing Free, Prior and Informed Consent (FPIC) for the use of TKs. At any time, indigenous governments and/or holders of TKs have the right to withdraw their participation in these processes. Agreement or disagreement may exist between what tribal governments view as collective intellectual property that an individual tribal member shares, versus what the individual may consider to be his or her own intellectual knowledge and experiences that form the property of that information. The fact that indigenous governments and individuals ultimately consider their own adaptive governance needs and other possible risks to their communities or family when they deliberate internally about sharing TKs with others must be kept in mind. Indigenous peoples may be concerned with sharing TKs no matter the scale or methods involved. These concerns may be so paramount that from their points of view, the value of protecting sensitive TKs may override any perceived benefits to climate change science or U.S. federal governments that non-indigenous collaborators might see. For example, these contributing factors may be associated with TKs of ceremonial or sacred sites and associated practices.

Federal managers have a responsibility to explain the risks and benefits of sharing or not sharing information with tribes. Such disclosures may be required from agency mandates, required by policy or a component of ethical considerations (NCAI 2013, Resolution #REN-13-035). This should not take the form of coercion or an attempt to convince knowledge holders to participate, but should be done with the idea of informing knowledge holders of what is at stake. At the same time, it is important to recognize that sharing TKs has the potential to positively influence environmental management and restoration, and tribes should consider benefits as well as risks in deciding whether or not to share TKs.

Actions for agencies and researchers:

- Respect the right of indigenous governments and/or TK holders to withdraw participation and access to TKs at any time during the collaborative process. Some reasons for withdrawing participation may not be evident to those not operating within a given TK system.
- Explain in a non-biased manner the risks and benefits of sharing or not sharing information in a given climate initiative BEFORE attempting to enter into any partnership with a tribal community. Inform the indigenous government and/or TK holder of risks “on your end,” e.g. agency’s lack of ability to protect information from FOIA requests.
- Support tribal judgment about when/if to share TKs. Support and back tribal partners as they make decisions about whether/how to share information.

Actions for tribes and TK holders:

- 3) If you choose not share TKs with agency or other partners, be explicit about that choice and your right to not disclose information about your tribe’s knowledge systems.
- 4) What is the tribe’s/communities protocol for accessing and asking about knowledge? If you choose to share information about TKs, make sure that agencies or other partners have conformed to the protocols of your tribe for ethical research, such as review by a tribal council, tribal institutional review board, or cultural committee, among other possible relevant institutions that vary from community to community.

Guideline 3. Understand and communicate the risks for indigenous peoples and holders of TKs

Currently, there are few protections for indigenous peoples who share TKs with federal partners to ensure that TKs will remain the right and property of indigenous peoples or knowledge holders (NCAI 2013, Resolution #REN-13-035). While there are numerous benefits that can result from bringing TKs into climate change initiatives, it is also critical for indigenous peoples and federal agencies to understand that there are potential risks involved, particularly for indigenous knowledge holders. These risks range from the misappropriation and misuse of the TKs themselves to impacts on the cultural resources associated with them.

TKs involve culturally sensitive information that is proprietary to indigenous communities.

Unfortunately, TKs have often been misappropriated and exploited by non-indigenous entities (see case study 3.5 in Appendix 3). At present, without explicit statutory authority federal partners are not be able to protect Indigenous Peoples and their proprietary knowledge from Freedom of Information Act (FOIA) requests if the information has been formally submitted in written form to the federal government or

electronically recorded. Other challenges are posed by existing legal regimes and the lack of specific legal protections for intangible cultural heritage (Williams and Hardison, 2013). Some scenarios that may pose a risk include:

- Indigenous peoples receiving federal dollars to fund indigenous climate change initiatives that include TKs. The data developed (and submitted to the federal government) during a federally-funded initiative will be deemed public, and can be subject to FOIA requests by non-indigenous entities. FOIA applies to information submitted to the government, however funded, while administrative law applies to TK that has been funded. For example, intellectual property system may classify traditional knowledge as being in the public domain and beyond tribal control or requirements for benefit sharing.
- Indigenous peoples contributing TKs to climate change research that may later be published and disseminated to non-indigenous audiences.
- Non-indigenous researchers using TKs out of context or inappropriately using only parts of a holistic knowledge system.
- TKs that may have been held within a tribe since time immemorial may become subject to fair use and freedom of expression laws once they are made publicly available.
- TKs or related indigenous contributions to past or completed research or management projects (e.g., forestry and tribal resource use) may then be incorporated within climate change assessments or reports without proper attribution.

For each of these risks, some might argue that making TKs “public” poses no explicit “harm” to indigenous peoples. Ethnographic information historically collected and published by ethnologists or anthropologists on their cultures may reflect western bias or unfamiliarity that may not be appropriate for quotation or citation in contemporary presentations, reports or manuscripts. Such information may be sensitive, prejudice, or otherwise not represent tribal knowledge, practice or culture in manners the tribes wish or desire. However, non-indigenous persons and organizations must respect the fact that dissemination of TKs is exploitative even in cases where there may be no ostensible harm. Any dissemination of TKs without consent could bypass or violate the rights of indigenous peoples because the non-indigenous parties are only able to do so because indigenous peoples lack the powers needed to stop non-indigenous researchers and organizations from using TKs inappropriately. In literatures on ethics this is a well-known form of exploitation that is considered to be morally deplorable (Wertheimer 1996; Mayer 2007; Meyers 2004).

Researchers and organizations who obtain access to TKs should not utilize TKs outside the purpose for which the information is shared (e.g., in publications or distribution of the TKs at a later date) without FPIC. Legislation is needed to prevent confidential information from public disclosure.

- Passing legislation that provided statutory confidentiality protections for privileged or sensitive information, including TKs, shared in consultations government-to-government consultations. For example, provide a legislative exemption to the Freedom of Information Act (FOIA) for TKs information to ensure protections from disclosure that is not authorized by the indigenous

government and TKs holder. Such legislation would facilitate collaboration between federally recognized tribes and the federal government.

Actions for agencies and researchers:

- Determine the extent to which TKs involving confidential or sensitive information can be protected from unauthorized public disclosure because of federal mandate (e.g., without express legislative authority, TKs recorded in written or electronic form provided to federal entities are subject to FOIA requests).
- Research your agency/organization's codes and policies regarding the publication or dissemination of TKs gathered for projects.
- Inform tribes/TK holders about potential risks of disclosure. It is the obligation of agency staff and researchers to share information about what risks the project poses "on their end."
- Research existing intellectual property and copyright laws in your country, as they pertain to your research/project results. Will data from the project be subject to appropriation? How will this information be protected?

Actions for tribes and TK holders:

- Identify risks to natural and cultural resources and intellectual property interests.
- Identify potential violations of conflicts related to TKs, risks of overexploitation of resources associated with TKs.
- Clearly state what risks you find acceptable, and what risks are not acceptable/must be avoided. If there are risks to natural and cultural resources because of intellectual property concerns, determine whether the tribe would like to share your TKs.
- To preserve confidential or sensitive information, consider recording TKs orally in native language and housing in a tribal entity, such as a Tribal Historic or Cultural Preservation Office. Ensure that the tribe and knowledge holder grant permission to conduct audio and visual recording related to traditional knowledges.
- Consult your tribal attorney regarding the understanding of potential risks.

Guideline 4. Establish an institutional interface between indigenous peoples, TK holders, and government for clear, transparent and culturally appropriate terms-of-reference, particularly through the development of formal research agreements.

Indigenous peoples must have clear and transparent communication with federal agencies, researchers and other non-indigenous entities that are requesting access to TKs. Federal agencies have a trust responsibility to federally-recognized tribes, and as such must strive to ensure that TKs is brought to climate change initiatives in an ethical, respectful, and protective manner that is pre-determined in conjunction with each individual tribe. It is also critical to ensure that indigenous peoples and TKs holders know the risks involved anytime they are contributing TKs to federal, state, local or other non-indigenous climate change programs.

Action for agencies, researchers, tribes and TK holders:

- The Department of Interior should undertake concerted efforts to support the engagement of tribes and indigenous peoples in federal climate-related science investments, including the capacity to access and benefit from the services provided by CSCs, LCCs, and NCCWSC.
- Both western science and TKs of tribal and indigenous peoples should be fully considered and utilized by decision-makers.
- Collaborate with project partners to develop pre-determined methods for each step of bringing TK into climate change initiatives. Questions to address might include:
 - What are the appropriate goals and objectives for the project?
 - How will TKs holders be involved as equal partners?
 - How will TKs be identified for the project? Will federal staff request information? Will TK holders offer up information that they feel is relevant?
 - How will TKs be shared within the project team? Who will have access to information?
 - How will TKs be stored for safekeeping? What confidentiality measures will be employed and enforced? Who will oversee these? Who will be responsible in the event that these measures fail?
 - What obligations within the tribal community will accompany the TKs that are involved in the project, if any?
 - Who will enforce these standards? What means will TKs holders redress potential grievances? What are the penalties for the measures failing?

Guideline 5. Provide training for federal agency staff working with indigenous peoples on initiatives involving TKs

Federal agencies and other non-indigenous entities seeking to work with indigenous peoples and knowledge holders to access TKs must adequately train staff that will be interacting with indigenous peoples on what TKs are, how TKs differ from western science, the risks to indigenous peoples and knowledge users/holders when TKs are shared with non-indigenous entities, and how staff can ensure that they do not place indigenous peoples, TKs, or TK-associated resources at risk. This training should also clarify what legal or other protections may be afforded to TKs under FOIA, related statutes, and applicable federal policy. This training should also provide specific measures that can be employed to protect privileged or confidential information under FOIA. The following are considerations for what such staff training should involve:

- (1) **Description of TKs.** A description of TKs as dimensions or faces of knowledge systems and lifeways that hold spiritual meaning to indigenous peoples, and that come with important responsibilities to one's indigenous community and one's environment (Lake 2007; Whyte 2013a; McGregor 2005). This has been expressed in a number of different ways by indigenous peoples over the years. One way is to show thankfulness for the "gifts of the Creator," by acting with intergenerational forethought and respect, in order to acknowledge the Ancestors and obligations to future generations. An example of this is through "Seventh Generation thinking." (Cajete 1999;

Martinez nd.). Holders of TKs are to use it to maintain "right relationships" or "relational accountability" with Mother Earth and all their relations in a living cosmos (Martinez nd., Wilson and Wilson 1998).

- (2) **Cultural context of TKs.** Many accounts have emphasized the need to record and preserve archives of TKs as well as facilitate their spread, as they are characterized as threatened and endangered (Bates et al. 2009; Maffi and Woodley 2010). Some indigenous writers have also expressed these concerns, but others have emphasized the spiritual origin and nature of these knowledges, such as in the concept of "stewardship obligations" for knowledge (Carpenter et al. 2011). Some elders believe that it is an obligation not to transmit TKs to those without the appropriate qualities to receive TKs and practice the associated responsibilities, even if this leads to the temporary "loss" of the knowledge (Gobin pers. comm. 2000; Solomon 2004). The knowledge is not believed to be permanently lost, but can be re-gifted by the Creator when there are people who are once again adequately prepared.
- (3) **Multi-dimensional nature of TKs.** TKs occur across a wide spectrum. Even among individual knowledge holders within the same indigenous community, are not a single type of knowledge. Although it is common to refer to "traditional knowledge(s)," it should be understood that this condensation always refers to "traditional knowledge systems" (TKs) that are deeply embedded in indigenous ways of life. Some kinds of knowledges may be secret, or highly sacred, and held by one or a few individuals and used in special rituals or ceremonies of a deeply spiritual nature. Other kinds of knowledge may be used in public contexts, but still held by particular individuals, families, clans, as is common for knowledges expressed in songs or stories (Fletcher et al. 2011). A storyteller, may share a story with an audience without transferring and rights to listeners to retell or further share that story. Knowledge may be widely distributed within a tribe, used in gathering, hunting, cooking and other daily activities, and still accompanied by stewardship obligations.
- (4) **Intellectual property.** There are complex property relations associated with different kinds of knowledge and that vary among indigenous peoples. In the preface to this report is an acknowledgement of indigenous sovereignty over their knowledge systems as part of their intangible cultural heritage. This sovereignty of indigenous governments should not be taken to mean that those governments are the owners of TKs, but that they are sovereigns that safeguard and enforce their own indigenous laws and customs that apply to protection, use and dissemination of TKs.
- (5) **Historic and Current Context of TKs.** Much knowledge may not be strictly considered to be "traditional," consisting more of recent knowledge and experience in a local environment,

“. . . what is ‘traditional’ about traditional knowledge is not its antiquity, but the way it is acquired and used. In other words, the social process of learning and sharing knowledge, which is unique to each indigenous culture, lies at the very heart of its ‘traditionality.’ Much of this knowledge is actually quite new, but it has a social meaning, and legal character, entirely unlike the knowledge indigenous peoples acquire from settlers and industrialized societies. This is why we believe that protecting indigenous knowledge necessarily involves the recognition of each peoples’ own laws, and their own processes of discovery and teaching.”
- Four Directions Council 1996.

although its use may still be guided by indigenous traditions (Torri and Hermann 2011: p.52). Examples relevant to climate change include observations of fish and wildlife health and distributions, changes in weather patterns, ocean circulation, sea-ice conditions and hydrology, and changes in fire patterns and drought conditions (Huntington and Noongwook 2013; Trostler et al. 2012; Williams and Hardison 2013).

- (6) **Use of TKs.** TKs also include general predispositions and ways of being and problem solving, emphasizing a holistic, multi-value approach and healing human relationships with the Earth (Rice 2005). Many of these cultural values are important in climate change adaptation, because they lead to resilience in a changing environment, promote risk-spreading and emphasize long-term sustainability, relationships and reciprocity at the expense of single-value optimization, and can significantly motivate coping with climate impacts (Adger et al. 2012).
- (7) **Risks of Sharing TKs.** In addition to what might be thought of as moral hazards associated with sharing TKs, are also risks to cultural resources associated with sharing TKs. TKs are not simply abstract forms of knowledge, but are complex embodiments of durable traditions that are closely associated with indigenous identity, practices, integrity, dignity, subsistence, health, ceremony and other aspects of ways of life. TKs may be related to technologies, practices and natural resources that have significant economic value, and raise questions related to economic misappropriation, exploitation, lack of informed consent, and lack of benefit sharing similar to long-standing concerns regarding misappropriation of TKs associated with bioprospecting (Ruiz and Vernooy 2011; Wynberg et al. 2009). There are also risks associated with non-economic exploitation of resources associated with TKs. Many federally-recognized tribes depend on treaty-reserved rights on non-indigenous federal lands to maintain their ways of life that were secured as the main purpose of the treaties. There is a lack of consistency in the federal system for protecting and ensuring access to these resources, although this is improving (Krakoff 2008). There may be risks in sharing relatively unprotected knowledge associated with relatively unprotected resources, and these should be explicitly considered using risk and opportunity assessments when obtaining Free, Prior and Informed Consent (FPIC).
- (8) **Languages.** Language is especially important to indigenous societies as a means of preserving and transmitting TKs. Oral histories sustain cultural continuity and tradition. Language is a source of indigenous identity with functions relating to sociocultural, socioreligious, and sociopolitical life (Kroskrity and Field 2009; Maffi 2001). Additionally, language is a means of determining historical relationships between human communities and environment. Place names and language often describe local environmental features, historical events of note, and sacred sites that may be important to help interpret the ties between the land and tribal communities and provide information on how the landscape is changing (Afable and Beeler 1996; Basso 1996; Huntington et al. 2005). There is increasing concern that as tribal languages are lost, valuable information and perspectives that are critical to understanding climate change impacts and adaptation are also disappearing.
- (9) **Bridging TKs in Climate Initiatives.** There are a number of models for the involvement of TKs in climate change impact assessment, adaptation and mitigation. One dominant approach is through

scientific-traditional knowledge exchanges (Parrotta and Agnoletti 2012). The more established approach is for traditional knowledge holders to transfer their knowledge to scientists for validation (Mazzocchi 2006). Recent approaches emphasize the co-creation or co-production of knowledge in a more reciprocal system of sharing benefits resulting from the exchange (Davidson-Hunt et al. 2013; Hill et al. 2012; Pohl et al. 2010; Weismann 2010). These approaches may create significant benefits to both scientists and traditional knowledge holders through the generation of new or synthetic knowledge or the transfer of technologies and mutual understanding of one another's values for incorporating into climate change solutions. Knowledge exchanges require careful consideration, as knowledge exchanged outside of indigenous community boundaries will be subject to the rules of non-indigenous legal and social systems (Williams and Hardison 2013). Of particular concern is the potential existence of unbalanced power relationships and misunderstandings that can distort decision making (Gordon 2003; Marshall and Batten 2004). These issues present challenges for protection, control and benefit sharing that should be addressed. Exchanges should be subject to risk and opportunity assessments in order to safeguard against unintended legal, cultural or resource impacts. These exchanges should include obtaining FPIC, and follow all appropriate community protocols, guidelines or agreements (Battiste 2008; Cochran et al., 2008; Ellis and Earley 2006; Fletcher et al. 2011; FNC 2005; Mi'kmaw Ethics Watch, 1999; Piquemal, 2001)

(10) Applications of TKs by Knowledge Holders. An alternative approach to knowledge exchange is to focus on the benefits of the application of TKs by the knowledge holders in a self-governance approach (Smith, 2007; Swiderska et al. 2008; Tsosie, 2013; Williams and Hardison, 2013). Rather than directly exchanging knowledge, indigenous peoples may wish to develop their own plans, protocols and limitations for using traditional knowledge in climate change mitigation and adaptation, and develop proxies and indicators that can be shared with outside agencies and scientists. An example of this is the Ndhoho Itschee Process developed by the Waswanipi Cree in Northern Quebec (Trospen et al. 2012). Communities developed “family maps” that incorporated detailed information on traditional practices and values past, present and desired future land use. Rather than transmit this information directly, the communities transformed these into a map of standard conservation values and shared these with the government and industry for conservation planning. Hill et al. (2012) review of 21 case studies of natural resources management in Australia and concluded that “indigenous-driven co-governance provides better prospects for integration of TKs and western science for sustainability of social-ecological systems” than agency-driven co-governance and agency governance. Decision making in these cases move along the spectrum towards self-management, with decision making vested in “wider networks of families and communities” (Hill et al. 2012). This is similar to the deference to tribal plans in Secretarial Order 3206 on American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act of June 5, 1997. In this Order, the adequacy of tribal plans is evaluated against standards to determine if additional actions are required. (Ohlson et al 2008; Sanders 2007).

While it is clear that indigenous peoples desire to use TKs to address climate change issues, cultural sensitivity, legal safeguards, resource protection, FPIC and other issues need to be incorporated into the

process. Since these knowledges and issues are so diverse and vary according to tribe, type of knowledge and trade-offs between risks and opportunities associated with knowledge exchanges and because of the rights of each indigenous community to oversee its own knowledges, approaches should be flexible and created in collaboration with indigenous peoples and knowledge holders.

Actions for agencies and researchers:

- Provide training on community standards, protocols, and legal rules for all project team members participating in projects related to TKs.
- Allocate resources to train staff about TKs, and ongoing issues regarding the sharing and protection of TKs, and existing models guiding collaborative projects between non-indigenous researchers and holders of TKs.
- Provide funding for tribal partners to train and advise agency staff on how to work with tribes on issues related to TKs.

Actions for TK holders/tribes:

- Train tribal staff on protocols needed to govern the sharing and protection of TKs.
- Inform and train the Tribal Legal Office of potential project and potential risk.

Guideline 6. Provide specific directions to all agency staff, researchers and non-indigenous entities to ensure that protections for TKs requested by tribes and knowledge holders are upheld.

- If the indigenous government or knowledge holder requests protection for TKs that may be shared, agency staff should not write down or electronically record confidential or sensitive information.
- Consult with indigenous governments to develop an appropriate research agreement detailing the nature of the research/ knowledge exchange. Agreements should⁸:
 - Be developed collaboratively through equal standing.
 - Be based on FPIC and mutually agreed terms, goals and understandings.
 - Acknowledge contributions by TK holders.
- Outline expected risks and benefits (FPP 2008, Mi'kmaw Ethics Watch 1999, Gordon 2003).
- Clearly disclose any constraints or limitations regarding the ability to protect sensitive or confidential information before seeking access to TKs. Specify what measures will be taken to protect sensitive or proprietary information (understanding that there are often legal limits, to what protections can be provided by Federal agencies to any information that is submitted to them or that is shared with others, such as under FOIA).
- Use appropriate language when referencing the role and content of TKs in climate change initiatives.
- Consider sharing data and information with indigenous peoples to support indigenous efforts and indigenous use of TKs *without the expectation* that indigenous peoples will share TKs in return.
 - Focus on the value of the beneficial outcomes that come from use of TKs as opposed to a focus on knowledge exchange.
 - Implement the principle of co-protection to the fullest extent possible. Co-protection refers to measures that protect both TKs and their associated tribal trust resources. Any actual exchanges of any particular traditional knowledge should take place in the context of safeguards that take into account legal, economic, cultural and cultural resource issues (Williams and Hardison 2013).
 - Work to establish a long-term relationship with indigenous peoples built on respect, mutual benefit, and extends beyond current understandings of professional obligations (Inuit Tapiriit Kanatami and Nunavut Research Institute 2007; Mason et al. 2012.)
 - Provide recognition, policy guidance and education for the public and agencies to promote understanding and respect for TKs and associated resources to build a relationship based on trust and respect.
 - Consider the use of proxies in knowledge sharing. For example, indigenous peoples may share the results or outcomes without sharing sacred knowledge.

Actions for Tribes, TKs holders, federal agencies and researchers:

- Detail how data will be collected and stored and specify rules for access, ownership and control, if

⁸ See Appendix I of the full report for more detail.

any will exist (Marshall and Batten 2004).

- Special caution should be made in the creation of databases of TKs, which should be only compiled or made available through FPIC (Hardison 2005). Databases may provide benefits, for example, in bringing together traditional knowledge of past weather patterns to fill in gaps in the scientific record and lead to culturally appropriate solutions (Green et al 2010). But there are cultural issues and risks as well, for example through loss of control or ownership over the knowledge.

Guideline 7. Recognize the role of multiple knowledge systems

Agencies and research organizations should recognize the role and interaction of TKs and multiple knowledge systems in climate change research and adaptation and vulnerability assessments. These entities should also recognize multiple knowledge systems may exist within one tribe and among different TKs holders. These knowledge systems may conflict with one another. The agencies and research organizations need to work closely with all parties to ensure that all TKs is protected and credited appropriately.

- Traditional knowledge can help in defining earlier environmental baselines, identifying impacts that need to be mitigated, providing observational evidence for modeling, supplying advanced and fine-scale observations of climate changes (Nakashima et al. 2012), providing technologies for adaptation, and identifying culturally-appropriate values for protection from direct climate impacts or from the impacts of adaptation and mitigation measures themselves.
- Only incorporate TKs in non-indigenous climate change initiatives with the Free, Prior and Informed Consent of indigenous peoples and knowledge holders.
 - The Federal government, in accord with the federal trust responsibility and the United Nations Declaration on the Rights of Indigenous Peoples, must recognize the sovereign rights of indigenous peoples to control access to, and the use of, their traditional knowledge and the right to give or deny access to it based on their right to FPIC according to their own traditions, laws and processes.
- Any scientific data and insights used in climate change assessments and plans should involve traditional knowledge where appropriate, and that traditional knowledge is only to be used with the *Free, Prior and Informed Consent* of the indigenous governments and the TKs holder(s).
 - Methods of assessing vulnerabilities should include consideration of cultural risk and environmental justice, such as analyses developed by some indigenous peoples.⁹ Appendix B includes an annotated bibliography with numerous examples. These methods should integrate hazard and risk assessment and management methods with more specific methods for assessing cultural and community impacts (Adger et al. 2013; Burkett, 2013; Sovacool 2013). President Clinton's Executive Order 12898 establishes goals for federal actions to address environmental justice in minority and low-income populations. Specifically, the order required all federal agencies to "identify and address

⁹ 8 Tribes that are way ahead of the adaptation curve. <http://indiancountrytodaymedianetwork.com/2013/10/15/8-tribes-are-way-ahead-climate-adaptation-curve-151763>

disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.” Under this order, federal agencies and entities such as Climate Science Centers and Landscape Conservation Cooperatives¹⁰ must consider environmental justice issues. Furthermore, policy decisions made without consideration for the disproportionate risks facing indigenous peoples from climate change exacerbates the risks that they may face.

- The determination of needs for scientific data and insights should include a decision process that engages indigenous peoples and their scientific needs they have and should also consider science created by indigenous peoples themselves. Indigenous peoples should also be credited for their contributions to research, publications, and policies if they have given their FPIC to share knowledge.

Actions for federal agencies, researchers, tribes and TK holders:

- Develop measures of success for projects from multiple perspectives/knowledge systems—define parameters of success from both western science and TKs.
- Ensure that each the contributions of tribal partners are recognized in final products, publications and efforts to publicize projects.
- Create opportunities for partnerships involving TKs in climate change initiatives only when it is requested by and includes leadership of tribes in the development of these programs.
- Ensure that all collaboration with TK holders occurs according to principles of FPIC.

Actions for Tribes and TKs holders:

- Develop an internal protocol or process that ensures that all participants in these projects are informed of risks, benefits, and anticipated outcomes.

Guideline 8. Develop guidelines for review of grant proposals that recognize the value of TKs, while ensuring protections for TKs, indigenous peoples, and holders of TKs.

Many federal, state and other grant programs have begun including criteria in proposal review that recognizes and awards points to applicants that incorporate TKs within their proposals. While this demonstrates awareness of the importance of TKs in climate change initiatives, it may pose a risk to indigenous peoples and knowledge holders that are unaware of potential abuse or misappropriation of TKs. Individuals reviewing grant proposals that include TKs should consider the following guidelines:

- The grant should recognize the sovereign rights of indigenous peoples to control access to, and the use of, their traditional knowledge and the right to give or deny access to it based on their right to FPIC according to their own traditions and processes.
- The grant should include reference to a human subjects protocol and approval from the Institutional Review Board.¹¹

¹⁰ Secretarial Order 3289 created the Climate Science Centers and the Landscape Conservation Cooperatives, states that “[c]limate change may disproportionately affect tribes and their lands because they are heavily dependent on their natural resources for economic and cultural identity.”

¹¹ An institutional review board (IRB) is a committee that has been formally designated by institutions to approve, monitor, and review research that involves humans. The Association for the Accreditation of Human Research Protection Programs, Inc. (AAHRPP) accredits high-quality human research protection programs in order to promote excellent, ethically sound research.

- The grant should follow the appropriate indigenous research protocols established by individual tribes to guide research involving tribes or knowledge holders.
- Federal grants should not require that all data collected during the grant period be presumed to be under the ownership of the federal government. TKs should not be disclosed without the Free, Prior and Informed Consent of the indigenous government and knowledge holder, even when generated under a grant period funded by the federal government. The grant should clearly articulate that if indigenous peoples and their knowledge holders disclose TKs in written form then TKs would currently be subject to disclosure through FOIA. If funding entails a requirement to disclose based on Federal rules associated with publicly funded research, then alternative sources of funding should be sought for activities related to the collection of TKs if indigenous governments or knowledge holders do not wish TKs to become publicly available.
- The grant should demonstrate that there is substantial tribal leadership in the conception and project management of the grant.

Actions for federal agencies and grant reviewers:

- The grant and materials produced (e.g., reports, videos) should recognize the sovereign rights of indigenous peoples to control access to, and the use of, their traditional knowledge and the right to give or deny access to it based on their right to FPIC according to their own traditions and processes.
- The grant should, where appropriate, include reference to a human subjects protocol and approval from the Institutional Review Board.¹²
- The grant should follow the appropriate indigenous research protocols established by individual tribes to guide research involving tribes or knowledge holders.
- Federal grants should not require that all data collected during the grant period be presumed to be under the ownership of the federal government. TKs should not be disclosed without the Free, Prior and Informed Consent of the indigenous government and knowledge holder, even when generated under a grant period funded by the federal government. The grant should clearly articulate that if indigenous peoples and their knowledge holders disclose TKs in written form then TKs would currently be subject to disclosure through FOIA. If funding entails a requirement to disclose based on Federal rules associated with publicly funded research, then alternative sources of funding should be sought for activities related to the collection of TKs if indigenous governments or knowledge holders do not wish TKs to become publicly available.
- The grant should demonstrate that there is substantial tribal leadership in the conception and project management of the grant.

Through partnerships with research organizations, researchers, sponsors, and the public, AAHRPP encourages effective, efficient, and innovative systems of protection for human research participants.

¹² An institutional review board (IRB) is a committee that has been formally designated by institutions to approve, monitor, and review research that involves humans. The Association for the Accreditation of Human Research Protection Programs, Inc. (AAHRPP) accredits high-quality human research protection programs in order to promote excellent, ethically sound research. Through partnerships with research organizations, researchers, sponsors, and the public, AAHRPP encourages effective, efficient, and innovative systems of protection for human research participants. Agencies should promote the revision of human subjects protocols to accommodate specific tribal issues, for example regarding collective tribal consent.

- The grant should demonstrate substantial benefits and minimal risks to tribes for the proposed projects.
- Agencies could consider a tiered approach to grants, with an initial disbursement for attempting to obtain FPIC, including tribal consultations and risk and opportunity assessment, with another tier only for projects that have obtained FPIC and meet IRB requirements, where appropriate.

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Appendix 1: Outline of Issues in using Traditional Knowledges in Climate Change Adaptation

These procedures are drawn from references listed at the end of Appendix 1, including a review of several existing traditional knowledges research protocols and guidelines. These are meant to be indicative of elements to include in seeking access to traditional knowledges. In developing an actual agreement, a fundamental principle is that the indigenous communities and knowledge holders must be involved on an equal standing to develop elements of an agreement based on mutually agreed terms.

This appendix presents an outline of principles, concepts, protocols, and guidelines that should be addressed when seeking access to traditional knowledges (TKs).

Understand the Roles of Tribal Governments and Knowledge Holders

Tribal Governments. American Indians, Alaska Natives and Native Hawai'ians are not "stakeholders" in US law and policy, but are indigenous governments with inherent powers of sovereignty and self-determination. Tribal governments establish formalized laws and regulations for their communities. However with TKs, systems of jurisprudence are based on oral traditions that have existed "since time immemorial," and predate the formal, codified and statutory law.

Customary Law: While many tribes in the US have constitutions and formal tribal codes, TKs are still regulated primarily by customary law. This is a critical understanding, as any proposed sharing of TKs will be evaluated in the customary law context. Any perceived transgressions, harms or injuries from exchanges will not be judged against concepts found in external societies, but by the internal traditions, standards and expectations of the community. One of the biggest challenges to access and use of TKs for resource management and adaptation is the potentially large disconnect between the treatment of TKs within and outside of communities. Once TKs cross tribal boundaries, there may be little understanding of and legal and policy support for respecting customary laws. This is especially true where an external legal system does not recognize any binding force of customary law, or where exchange TKs are treated as being in the public domain in which all legal rights are exhausted and IPs lose control (Williams and Hardison 2013). The degree to which this presents a problem may be highly dependent on the type of TK and the things to which the TK is associated.

Rights: All interactions should respect the rights defined by customary law, tribal statutes under tribal sovereignty and self-determination, and rights contained in domestic and ratified international treaties as the "supreme law of the land."

Responsiveness: Traditions and customary law are a mixture of norms that are both fixed and flexible. IPs may refer to "the law" as natural law handed down from the ancestors, or they may refer to the current generation of "lawmen" who apply these basic principles in a flexible way to meet changing community needs and expectations and circumstances. Although the lack of codification is often viewed by outsiders as an impediment, the responsiveness of customary law is not rapid and capricious, and evolves in a way similar to Western statutory law. Traditions applying to TKs are adjusting to meet the challenges of a modern, digital world and the significant cultural shifts occurring within their communities.

Distribution of Benefits: Actions and decisions should benefit the whole community. This does not mean individuals may not benefit, e.g. from remuneration when desired for working with scientists.

Stewardship of TKs: Within tribal communities, TKs are not owned, but are rather entrusted for safekeeping by the community as a whole and by individuals with "stewardship obligations" (Carpenter et al 2009). TKs are generally not treated as "intangible property" separate and apart from "tangible property", but rather treated and managed jointly as knowledge through cultural traditions and practices. These stewardship obligations are generally thought to be bound to the use of TKs as a kind of covenant or servitude that applies even when TKs have been shared. Shared TKs may be expected to be used with respect and within the limits set within traditions (Williams and Hardison, 2013).

Collective Custodianship: TKs and their associated cultural resources are governed collectively by communities. This does not mean that all members of a community will have access to all TKs, e.g. some TKs held by individuals, families, healers and other groups within a community. However, the rules for who holds different knowledges, the rules under which they may be exchanged, restrictions on their use within and outside communities and other rules are set by the collective.

Custodianship by knowledge holders: Although custodianship differs from Western concepts of property, it is not characterized by the absence of rights, but regulated internally by norms, beliefs and traditions. To deal with the divide between cultural and Western legal traditions, some legal scholars have proposed the concept of "limited commons" or "limited common property," which operates as a local commons within a community, but treated as property outside of the community (Chander and Sunder 2004). One fundamental disconnect to be addressed is that custodians of TKs expect those who receive them to show respect and also become proper custodians, and in turn for all future recipients to be proper custodians (Solomon 2004).

Respect Worldviews of Indigenous Communities

Holistic worldview: Indigenous peoples (IPs) view the world holistically, and do not necessarily make the same distinctions as those outside their cultures. Solutions to problems are not viewed in isolation, but rather within the cultural context of the community. When new technologies or knowledges enter a community, they "must reflect and animate the principles, values, and philosophies of Indigenous learning processes and world view." (Native Science Academy 2007).

7th generation thinking: "7 generation thinking" is strictly related to the Gayanashagowa or the Great Law of Peace of the Iroquois/Haudenosaunee (Oneida, Mohawk, Cayuga, Onondaga, the Seneca and Tuscarora) of northeastern North America. Other tribes have different specific traditions, but it is a general belief that in one's actions, one needs to be concerned about bringing them into conformity with the original instructions of the Creator and to ensure no harm to future generations. The planning horizon for the use of TKs reaches long into the past and the future,

and considerations will generally extend beyond narrow considerations related to solving a climate change problem at hand.

Spirituality: Spirituality permeates all indigenous thinking related to TKs. TKs are a fundamental core to indigenous history, ways of life and being, identity and cultural heritage. IPs both receive things from and have obligations to the spirit world, and live in a moral universe. The "separation of church and state" does not generally occur in indigenous societies, and decision making takes spiritual beliefs into account. When applied to external relationships this does not result, as some have suggested, in an imposition of spiritual beliefs. Spirituality forms a basis for decision making that results in rules on how cultural heritage may or may not be used. The rules are being applied, not the underlying beliefs. Failure to recognize and respect the rules can be thought of as an imposing the values of a dominant society on IPs.

Well-being/doing well/living well: This is a common concept widespread among the IPs of the world. It has been expressed as *bien vivir* (Spanish), *sumak kawsay* and *sumaq qamaña* (Quechua-Aymara), and living well. These have a number of qualities, some of the leading ones being:

Doing no harm: Decisions and actions should do no harm to one's community or to "all one's relations," the wider living world to which one has kinship.

Humility, modesty and prudence: Life should not be lived in a greedy, arrogant or disrespectful way. Persons should always be humble, live modestly and take no more from Mother Earth than they need.

Balance/Equilibrium: Balance and equilibrium is approached both through cosmovision and through relationships. In indigenous cosmovisions, actions provoke reactions, and these must be brought into balance in order to ensure social and cosmic harmony. There is often a strong spiritual element in this, as balancing may need to occur in the spirit world. For example, as fish feed people, people have an obligation to feed fish in the spirit world. Applied to relationships, these relate to the "apportionment and distribution of benefits in response to capabilities, needs and contribution of efforts, and in conflict resolution and decisionmaking" (Argumedo 2012).

Respect: Respect is a core concept that permeates IP consciousness and is deeply nested in a cultural cosmovision in which obligations to show respect extend outwards to one's family, kin, elders, community, ancestors and all one's relations. Those coming into a community are expected to have a basic understanding of and demonstrate respect for the protocols of the community.

Recognition: In Indigenous communities, it is a fundamental principle of respect to give due recognition to those who have contributed to any event, process or outcome. This can include formal ceremonies and gift-giving, and increasingly attribution is given to holders of TKs in any authorized publications through co-authorship (unless guided by confidentiality).

Awareness of Cultural Norms For Sharing and Protecting TKs

Secret/sacred/cultural privacy/individual privacy: TKs occupy a spectrum of beliefs and Practices. At one end, they may be highly secret, sacred or culturally sensitive and held by only one or a few people with rules that strictly proscribe who may use them, how and when they be used, and for what purposes. At the other end, TKs may be widely shared with less restrictive rules on their use. However, even relatively open TKs generally have "stewardship obligations" attached to them that regulate their use. Outsiders are expected to ask about and learn the rules, and respect them, and to avoid or take special measures to protect secret, sacred and highly sensitive TKs, and to only access them with Free, Prior and Informed Consent.

Confidentiality: Any TKs or identities of TK holders that are requested to be confidential must be respected and not transferred to third parties.

Reciprocity: Sharing is fundamental within indigenous communities, when it is appropriate under traditions. Some TKs are held by individual, within families or clans, by only males or females, and other arrangement. For those things that are shared, it is expected that the gift should be paid back in equal measure and considered by those involved to be fair and just. No one should feel they are left worse off by the exchange. This is achieved through an understanding that transactions can carry benefits and opportunities as well as risks and burdens, and working with communities and TK holders to find an acceptable balance or equilibrium. Reciprocity also often requires that those approaching IPs make the case that there are collective benefits to those outside their communities, rather than benefitting only the researchers.

Fairness and Equity: Nested within reciprocity is the concept that all transactions should be fair and equitable (F&E). Although easy to state, this may require some work to identify fairness and equity in multiple dimensions. One dimension is the perception of F&E by the holders of TKs and the researchers involved in an exchange, which has been termed "situational fairness" or "micro-justice" (Syme and Nancarrow 2012). Care should be taken not to make assumptions that each side has the same conceptions of F&E, particularly as holders of TKs may be seeking a holistic balance that involves spiritual considerations. Different persons may have different ideas about the nature of the proposed exchange. Another dimension of F&E is "universal fairness" or "macro-justice" (Syme and Nancarrow 2012). As in the considerations under customary law and reciprocity, this may require looking beyond perceptions in an immediate context to look at the wider justice implications of an exchange, e.g. by examining the potential short-term and long term consequences of an exchange. Universal fairness assessments are designed for coping with the "beads for Manhattan" problem and ensure "full spectrum accounting" in transactions. F&E for a number of tribes in the US is guided by "7th generation thinking" or similar concepts that requires F&E to be thought of as projecting into both the past (honoring the ancestors) and the future (honoring future children who will themselves become ancestors).

Empowerment /capacity building: Exchanges should not be approached as a knowledge mining operation and should involve a strong component of community empowerment and capacity building. One of the strengths of social learning, knowledge co-creation and knowledge co-production approaches is that they can provide tools for innovations for coping with

environmental and climate change in a traditional context. Care must be taken to ensure that the exchanges are compatible with indigenous traditions and culture, and promote rather than erode or undermine indigenous ways of life, belief and being. Capacity building includes long-term ability to more effectively self-manage or co-manage lands and waters utilizing TKs and science in complementary ways.

Protection: There are numerous meanings of "protection" when considering TKs, and these can become conflated in discussions about protection. Different goals of protection will mean having different conditions placed on knowledge exchanges. The conditions of custodianship placed on exchanged knowledges may vary according to the type of knowledge, the benefits and risks associated with the exchange, and the kinds of resources to which knowledges are associated.

Some goals of protection:

Loss/Extinction: IPs may be concerned about the loss or extinction of TKs. They may wish to take the path of seeking measures to ensure their continued existence within communities, or may wish to share them widely outside of their communities in order to keep them from disappearing. Many of those outside of communities are highly concerned about the disappearance of TKs, and seek to record, document and store traditional knowledge in databases. This carries with it some significant challenges of custodianship, and may not necessarily reflect the views of the communities themselves. Any documentation and public dissemination must occur in close consultation with and respect for the communities and holders of TKs themselves.

Exclusion: Holders of TKs wish to continue practicing their ways of life, and so do not want external use, such as through the granting of intellectual property rights, to cause them to be excluded from using their knowledges. A number of existing and developing laws and policies recognize this kind of protection.

Exploitation: As in the previous discussion, IPs are concerned that they are not exploited, as happens when TKs are not used with FPIC, without reciprocity or benefit sharing, and are not consistent with their traditions.

Commercial use: IPs may not have concerns regarding non-commercial use, and may not wish their TKs to be commodified or used commercially. It should not be assumed, as in several accounts, that commercial equals bad and non-commercial equals good. Many tribes have commercialized their TKs in various ways, and may seek economic benefits as a form of benefit sharing, which is a right of self-determination.

Inappropriate / defamatory / disrespectful use: Non-commercial uses, such as for research, education and reporting may be acceptable, but they can also be a conduit through which indigenous people lose control over their knowledges. Non-commercial research can be a gateway to commercialization, as for example when a lead to the beneficial uses of a plant found in a journal publication leads to innovations that are patentable. But as importantly, they may lead to non-commercial uses that are inappropriate, defamatory or disrespectful, not in conformance with traditions.

Spiritually or materially harmful use: Protection against exclusion from using one's own knowledge does not ensure respect for custodianship obligations. The concept of non-rivalry that underpins fair use in copyright law illustrates the point. Non-rivalrous goods are those that can be used by others without harming an original property owner. Original ideas can be copied and shared without diminishing the enjoyment of an original holder. This may not be consistent with the beliefs of IPs for some kinds of knowledges. Custodians may have spiritual obligations to ensure the proper use of their TKs, and misuse by others may be believed to generate punishments to them for not being good custodians, and these repercussions may be both spiritual and material (e.g. through causing sickness or bad life outcomes). In this case, use by others is rivalrous (Williams and Hardison 2013). TKs are also associated with so-called material resources (a distinction that may not be clearly held within communities). IPs are concerned that cultural resources associated with TKs are also not harmed.

Holistic protection/Co-protection: Taken together, the discussions suggest that climate change adaptation measures involving TKs should be approached holistically and may take into account issues extending beyond the narrow scope of a particular problem. Some issues may be approached narrowly by IPs, but they may also seek different kinds of protection and seek to ensure that their shared knowledges are used consistent with their worldviews and ways of life. It is also important to consider issues related to co-protection, or the joint protection of TKs and their associated cultural resources as a bundle. Western law often gives special treatment of "intangible property" as separate from the treatment of "real property," and there is a whole realm of abstract content that is protected (movies, phrases, music, written expressions, etc.). TKs are more often associated closely with cultural resources vital to subsistence, livelihoods, ceremonies, spiritual practices and other activities that define the identity and inherent dignity of who they are. These resources are often themselves at risk due to environmental and climate change, population growth, habitat fragmentation and destruction, and a large number of other factors. IPs are concerned that sharing their knowledges, which may be relatively unprotected by law or ethical behavior, can potentially lead to the overexploitation or misappropriation of their cultural resources, which may also be relatively unprotected by law or ethical behavior. It should be recognized that there is a potential asymmetry related to policy failures, which can be summarized in the "life-dinner principle" of ecology: while the fox is only running for her dinner, the hare is running for his life. Traditional knowledge systems and their associated cultural resources are increasingly both at risk, and in using TKs great care must be taken to ensure that neither are put at risk.

Interactions with Indigenous Communities

One mind: Indian Nations attempt to come to one mind, or collective consensus and purpose in their governance, ways of life and decision making. Even though there may be conflicts, communities cultivate patience, respect and accommodation.

Authenticity/integrity: All interactions should be conducted with the utmost good faith, without deception, guile, manipulation or strategy. The presentation of a proposal and any associated information should be genuine and negotiations should be honorable.

Individuals: All interactions should respect individuals and their fundamental equality with all others. Men and women may have different but equal roles, and that relationships and exchanges should address both of their rights and obligations equally.

Diversity: One should fundamentally respect the diversity of knowledges, persons and viewpoints engaged in relationships. Actions should also respect the diversity of all relations. It is often believed that one should have relational awareness and relational accountability to all of Creation and its diversity ("kincentricity": Martinez and Lake n.d.).

Free, Prior and Informed Consent

Free, Prior and Informed Consent: The basic principle of FPIC is discussed in the body of these guidelines, and detailed treatments can be found in Anderson (2011), CCBA (2013), Hill et al. (2010) and UNEP and EDO NSW (2013). Here the focus is on some of the procedural requirements for FPIC.

Preparatory processes: Some activities should occur prior to making proposals. IPs should be contacted at the beginning of a proposal to test for interest, and to guide the development of the proposal. Both sides can begin to identify the legal, policy, social, and other relevant contexts in which the proposal take place. Before starting there should be mutual understanding of the extent and limits of legal protections for any exchanged TKs, and what measures are available to provide potentially required measures for confidentiality, respect for customary laws and cultural values and other principles in the range of values discussed above or provided by communities. Preparatory measures should also address the general community protocols that may exist for approaching communities. Those developing proposals should work with communities to identify local institutions, participatory mechanisms, identify authorities and procedures for negotiation. Careful consideration should be spent on concepts and language involved in negotiations to ensure that participants have reached common understandings, as demonstrated in the discussion of the many meanings of "protect."

Free: This term ensures procedural fairness in negotiations. Although often assumed in the definition of consent, "free" is emphasized here to make protections against distortions explicit. While issues of non-coercion, non-inducement and absence of bias are often discussed, the term also refers to the procedures used in the negotiation process and the time frame in which decisions are made.

Prior: Procedurally, IPs should be involved from the beginning. In regards to TKs, one can refer to those that are publicly available and those that have not yet be shared outside of the communities in which TK holders reside. Although this issue is not settled globally, some jurisdictions do not consider publicly available TKs to be in the public domain, and it is a principle in UNDRIP (Article 31) that IPs have the right to maintain control over TKs that can be affiliated with them. This suggests that for publicly available TKs, consent should be obtained prior to use, while for undisclosed TKs, consent needs to be obtained prior to access.

Informed: This ensures substantive fairness in negotiations. Existing treatments of the meaning of "informed" have emphasized the need to address both costs and benefits, risks and opportunities. The preparatory exercise of collating laws and policies, including relevant Federal

Indian law and policy provides an informed context regarding protections and gaps in protection. The collation of IP values provides a context which can be evaluated against the legal and policy template. Once the values and legal/policy matrices are in place, the opportunities and risks for different kinds of TKs can be evaluated against them. There is little practical experience on this holistic risk and opportunities approach, and it needs to be fleshed out to meet requirements for informed decisions.

Consent: Processes for obtaining consent should first affirm the right of IPs to decline to engage in mobilizing TKs for cooperative projects, and saying "no" should have no legal implications for respecting indigenous rights and interests or fulfilling trust obligations. It is necessary to define the different levels of authority for making decisions associated with different kinds of TKs (e.g. individuals, families, groups), but these should be first referred to communities as a whole (generally tribal governments, village councils) that themselves identify the relevant collectively-defined decision making authority. In some cases, authority may lie above the single community, village or Tribal Nation level, for example if IPs create inter-tribal institutions for dealing with TKs shared among them, as has occurred for natural resources.

In developing formal agreements, consent documents should be constructed along the lines of narrow construction and formal agreements in order to reduce misunderstandings, risks, and conflicts while increasing certainty the long-term success of collaborative relationships.

Benefit Sharing: Project development should be open to multiple forms of benefit sharing. Some IPs may seek monetary payments, but it is also important to address non-economic benefits. The benefits may primarily come from the adaptation benefits themselves, though they may also accrue through capacity building, technology transfers, the revitalization of knowledges or practices education opportunities, and similar paths. Benefits may also be generated for elders and community groups through honorariums and co-authorship. One of the main criteria is that benefits, like relationships, are durable.

Relationships: The decision will need to be made, in consultation with communities, on the nature of proposed relationships. In the past, these have often been very informal, based on personal relationships between researchers and knowledge holders. There are many examples of the benefits and good relations from such informal relationships. There are also many examples of abuse, selfishness, self-serving research and lack of benefits, which has led a growing number of IPs being untrusting and wary of working with researchers. This often needs to be put into context with a long, sad history of removal to reservations, removal from reservations, land thefts, boarding schools, and other failures to respect IPs and their cultural property and heritage. The tragedy of this is that if communities refuse to engage and reveal some of their values, practices and knowledges to adapt to problems largely not of their making, their values are not likely to be reflected in the solutions, and they can be threatened by both the direct impacts on climate change and the impacts of adaptation measures that cause damage to their values. If they do decide to engage, then they may be leaving themselves open to further exploitation and harm to their values and resources by persons who do not respect their values or rights.

To cope with this dilemma, many IPs are moving towards more formal tools. Two informal tools are the use of codes of ethics and guidelines. A common formal approach is to develop contracts of formal agreements, which has been emphasized here. Federally recognized tribes are beginning to develop tribal codes to regulate the use of TKs and support the development of contracting requirements (Riley 2005). Tribal codes increase the recognition of tribal intentions by Federal courts, and are acting to increase the formalization of IP-researcher relationships in the United States.

Communication is key to the sustainability and durability of these relationships, and project should incorporate a clear communication plan with triggers to ensure that IPs are kept informed of emerging issues and changes at an early stage. It is also useful to establish focal points on both side to create a clear line of communication and responsibilities of the focal points to keep others aware and to monitor the status of projects.

Research Products

Knowledge co-creation/co-production: Partnerships are intended to result in product, and these may often be a result of the combination of traditional knowledge and scientific knowledge, referred to as co-creation and co-production. These processes, when performed within the contexts that have been outlined, can result in significant benefits for communities, holders of TKs and scientists. IPs can more effectively solve problems, using TK to inform problems to be solved, and provide insights to scientists. Scientists in turn can to help increase the effectiveness of knowledge that may have been made more unreliable through environmental and climate change and innovations, technologies and insights to IPs as well (Nakashima et al. 2013). Working together, communities can transform relationships into more powerful forms of inquiry that can result on adaptive co-management operating at increasing scales to match the scales of climate-related problems (Berkes 2009). This process works best when all are working as equal and full contributors and in a fully collaborative road. Others have pointed out the risks involved in taking positive value terms like "participation," "dialogue" and "empowerment" for granted without critical analysis: ". . . participation and empowerment may act as a technology of power masking the dominance of certain knowledge interests and forms of knowledge over others . . . and we may romanticize co-production processes and downplay or neglect the tensions, contradictions, dilemmas and power imbalances inherent in all forms of knowledge production and communication" (Phillips et al. 2012). While it is disputable that these qualities are necessarily inherent in all forms of knowledge production, they do exist as significant potential impediments to co-management and the utilization of TKs (Nasaday 2003). These issues may be overcome through equitable and respectful relationships in which IPs and scientists try to come together in one mind to solve some of the most significant challenges of our day.

Validation: Validation is another common issue that can create significant friction and division. One common model has been for scientists to call for the "integration" of TKs with

science through a process in which the holders are expected to transfer their knowledges to researchers who then separate them into the "useful" and "useless" using scientific validation: "While this process may be profitable to science, for traditional knowledge systems the end result is once more dismemberment and fragmentation. Even scientists with the best of intentions may end up accelerating the demise of these other systems of knowledge, by valorising those components that most resemble scientific information and implicitly casting dispersions on other elements that scientists consider to be of the realm of superstition and belief. The end result is the accelerated replacement of the traditional systems with the scientific system" (Nakashima 2000).

Multiple Evidence Base (MEB) approach: One way out of this potential impasse is an approach that has been developing at the Swedish Resilience Center (SwedBio) out of an initiative to support the complementary use of TKs and science in the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (Tengö et al. 2013; UNESCO 2013). This approach avoids the "integration" of TKs into a single, science-based system of explanation. Instead "indigenous, local and scientific knowledge systems are viewed to generate equally valid, complementarily and useful evidence for interpreting conditions, change, trajectories, and in some cases causal relationships relevant to the sustainable governance of ecosystems and biodiversity" (UNESCO 2013). In this approach, different knowledge systems develop their own validation criteria, and solutions to problems are crafted through collaborative assessments of independently validated knowledge bases through consensus deliberations. This deliberative approach may help to alleviate the problems of power asymmetries and disparities in developing adaptation strategies.

Cultural preservation and maintenance: The primary focus of collaborative adaptation should be on cultural preservation and maintenance, and products should contribute to this goal.

Publication: Any publications resulting from research must be carefully considered prior to beginning the project to reduce misunderstandings and conflicts. Publication is normal in the course of research, as it allows other researchers to evaluate and validate research results, and communicate to administrators, managers and the public useful knowledge generated through publicly-funded research. Normal as this process is for secular, scientific research, this poses some serious challenges for IPs for the reasons that have been detailed above. IPs may have little objection to the publication of results that improve their situation and help others to adapt and live well. Risks such as the leakage of published TKs into the public domain, the loss of control over its proper uses, the spiritual and material harms that can result from its misuse, and the loss of potential for benefit sharing for providing them all should be evaluated, as well as additional issues identified by IPs.

Specificity vs. generality: Decisions may need to be made regarding the level of detail and specificity in reporting research outcomes. The level of detail can be guided by the conditions set by the holders of TKs, the amount of detail needed to understand and implement the adaptation solution, and levels of risk for different kinds of TKs. Decision may be analogous to the reporting problem in endangered species protection. Because of the high commercial value of some endangered species in illegal markets, conservationists often fuzz the data made available to the public. For example, ecosystem-based adaptation measures involving the maintenance and restoration of traditional burial grounds on Federal lands could avoid revealing their location because of a high risk of looting and vandalism.

Data and research materials ownership and control: Research agreements should address who owns and controls any data, notes, databases and any other material produced in the course of research. It is common in many protocols and agreements to specify that the communities own and control all products directly involving their TKs. Other forms are possible through mixed property regimes. For example, in many publications there are separate copyrights held by authors, photographers and graphics artists, and publications could have different copyrights that can set different conditions for derivative third party uses of a document - certain texts could be under a liberal Creative Commons license, while photographs depicting a traditional practice could require FPIC for reproduction in another article or for reprinting.

Access: Rules may need to be set for determining access to published and unpublished materials. IPs may be willing to share some TKs privately in order to create an adaptation plan, but not wish to have the TK itself made publicly available. They may have no problem with public availability, and long as it conforms to customs. In Australia, for example, some communities have elected to share some TKs, but have set the condition they should not be viewed by youth from their communities, as this would violate customary law. The publications contain pages with large notices warning these youth to skip the passages. In other situations, where publications contain sensitive IP knowledges, libraries in New Zealand and Australia have created special reading rooms where FPIC is required for research access. The books are not inaccessible, but voluntary measures have been found to accommodate indigenous beliefs and values.

Deposit: It should be determined where original materials or copies of materials are deposited. This issue is related to ownership, and many IPs have stipulated that original materials should be deposited with them.

Curation: Arrangements should be made for curation, including preserving, repairing and for digital information, updating. Changes in operating systems, software, digital formats, and decay of media can quickly make some digital data unusable. With digital data there is also the issue of catastrophic failure of storage media. Similar to the deposit issue, in the past it has been common for researchers to create datasets and keep them on personal computers, only to lose them over time or with movement, or fail to arrange

for passing them on following their death. Curation also needs to ensure compliance with the original terms of access to and use of TKs, and failures can lead to unauthorized access. Similar issues can apply to non-digital data.

Amendments and checkpoints:

Reporting: For Federally funded research, there are often public reporting requirements. There are issues that arise when tribes submit reports or information to the Federal government. In a judicial review question, the Supreme Court in *Department of Interior v. Klamath Water Users Protective Assn.*, 532 U.S. 1 (2001) ruled that Tribes are not exempted from FOIA requests, so that any information submitted to the Federal government by tribes can be revealed to citizens requesting access. This can create difficulties when IPs and holders of TKs work with Federal scientists or agencies. Scientists working in universities can be bound to contracts, but Federal researchers and agencies are subject to public laws. Some Federal agencies and funding programs have created policies to create reporting requirements that are respectful of tribal concerns. There are policies, for example, that exempt tribes from having to submit any collected TKs or other sensitive information. These kinds of discretion are not evenly spread through the agencies involved in administering climate change adaptation funds. The issue of alignment of Federal policies regarding TKs should be addressed. In the meantime, the existing policies and relevant laws should be disclosed in any FPIC process.

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Appendix 2: Annotated Bibliography: Examples of Traditional Knowledges in Climate Research

This annotated bibliography is intended to demonstrate the ways that existing is already considering TKs in law, policy and natural resource management. Additionally, this bibliography provides access to research which addresses ongoing issues surrounding the protection and use of TKs, including appropriation of Indigenous cultural and intellectual property, legal and policy hurdles that TK users and holders face in collaborating in an equitable manner with researchers, government agencies and others, and the development of research protocols to ensure just collaboration between TK holders and researchers. This bibliography was created to provide additional resources for agency staff, tribal staff and others to increase understanding of existing issues in research and collaboration with Indigenous people regarding TK and emerging opportunities for the involvement of TK holders and users in climate change initiatives.

- The Annotated Bibliography is available to download online at: <http://climatetkw.wordpress.com/guidelines/annotated-bibliography-2/>.
- For complete scrolling text, visit: <http://climatetkw.wordpress.com/guidelines/annotated-bibliography-2/complete-text-annotated-bibliography/>.

Carson Viles, a researcher with the Pacific Northwest Tribal Climate Change Project at the University of Oregon, developed this annotated bibliography with support from Tulalip Tribes, North Pacific Landscape Conservation Cooperative and the USDA Forest Service Pacific Northwest Research Station.

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Grah and Beaulieu. 2013. The Effect of Climate Change on Glacier Ablation and Baseflow Support in the Nooksack River Basin and Implications on Pacific Salmonid Species Protection and Recovery. 93

Grossman and Parker. 2012. Asserting Native Resilience: Pacific Rim Indigenous Nations Face the Climate Crisis. 94

IPCC. 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. 94

RESOLUTIONS

[NCAI Resolution #PDX-11-036: Increasing Tribal Participation in Climate Adaptation.](#)

Many inter-tribal organizations have taken a strong stance in favor of increased tribal participation in US government climate adaptation efforts. For example, the National Congress of American Indians (NCAI) created a Resolution entitled “Traditional Ecological Knowledge and Climate Change.” In this resolution, the NCAI notes that given the relationship between the federal government and Tribes, the unique threats that climate change poses to Native people, and the value of TEKs held within Native communities, Tribes have a right to be involved in federal climate adaptation planning at all stages. The NCAI urges for the “inclu[sion] of Tribes in all climate change policies, programs and activities from the very start...,” while also noting that it is essential that with increased collaboration comes greater safeguards for Tribal knowledge and increased respect in partnerships. The NCAI notes in their resolution that this issue is especially pertinent given the emphasis of the current administration to support Tribes as they adapt to climate impacts.

NCAI Resolution #PDX-11-036. 2011. [Increasing tribal Participation in Climate Adaptation.](#)

Type of Publication: Policy

Keywords: traditional knowledge, federal climate adaptation, trust responsibility

[NCAI Resolution #REN-13-020: Adopting Guidance Principles to Address the Impacts of Climate Change.](#)

This resolution describes the efforts of the NCAI to evaluate the effectiveness of the Executive Order 13175, and Secretarial Order 3289. The NCAI lays out a plan to collaborate with the Affiliated Tribes of Northwest Indians (ATNI) in order to do so. Furthermore, the NCAI describes plans to create a Tribal Climate Change Task Force, made up of tribal government representatives and others, in order to create and implement a plan of action regarding climate change.

NCAI Resolution #REN-13-020. 2013. [Adopting Guidance Principles to Address the Impacts of Climate Change.](#)

Type of Publication: Resolution

Keywords: climate adaptation planning, policy assessment

[NCAI Resolution #REN-13-035: Request for Federal Government to Develop Guidance on Recognizing Tribal Sovereign Jurisdiction over Traditional Knowledge.](#)

In this resolution, the NCAI describes traditional knowledges (TKs) and the inadequacy of current federal policies and practices with regards to the protection of TKs. The NCAI calls for the federal government to work with tribes to create gain a better understanding in federal agencies about TKs and that federal agencies reform their policies to reflect more respectful and appropriate practices regarding TKs.

NCAI Resolution #REN_13_035. 2013. [Request for Federal Government to Develop Guidance on Recognizing Tribal Sovereign Jurisdiction over Traditional Knowledge.](#)

Type of Publication: Resolution

Keywords: traditional knowledges (TKs), federal policy

POLICY AND LAW

[Abate and Kronk. 2013. Climate Change and Indigenous Peoples: The Search for Legal Remedies.](#)

This book is a collection of essays from legal scholars on issues facing Indigenous peoples regarding climate change. The book focuses on the role that law can play in creating solutions for Indigenous struggles. Contributions

to the book are divided by world region, and cover a diverse range of issues, from tribal water rights in the US to climate issues facing small island states in the Pacific.

Abate, R.S., and E.A. Kronk Eds. 2013. [Climate Change and Indigenous Peoples: The Search for Legal Remedies](#). Edward Elgar Publishing: Northampton, MA.

Type of Publication: Book

Keywords: Climate change, legal remedies, Indigenous peoples

[African Regional Intellectual Property Organization \(ARIPO\). 2010. Swakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore.](#)

This protocol seeks to protect traditional knowledge from exploitation (e.g. commercial appropriation of traditional knowledge) and protect the rights of traditional knowledge holders. The protocols affirm the rights of traditional knowledge owners to keep their knowledge within its traditional context, and to prosecute those who exploit, steal or appropriate this knowledge. The protocol also establishes regulatory functions for ARIPO, which is responsible for maintaining and protecting records of traditional knowledge in their region, and for protecting traditional knowledge and knowledge holders from exploitation. The protocol relies on concepts of free, prior and informed consent, the rights of Indigenous communities to retain control over their knowledge and equitable benefit sharing. The protocol also establishes similar protections for folklore in the region. The protocol also establishes customary law and local courts as a mechanism through which ARIPO will try to resolve disputes.

- Guidelines for tribes and non-tribal governments: These protocols clearly establish the rights of traditional knowledge holders and folklore holders within the member countries of ARIPO, and establish ARIPO as an authority to protect these rights. The protocol takes the form of a legislative document such as a resolution or act, and could serve as a template for other organizations.

African Regional Intellectual Property Organization (ARIPO). 2010. [Swakopmund Protocol on the Protection of Traditional Knowledge and Expressions of Folklore](#).

Type of Publication: Resolution, Protocol, Act

Keywords: traditional knowledge, folklore, Free Prior and Informed Consent, exploitation of traditional knowledge, equitable benefit sharing, protection of traditional knowledge

[Awan, Rachel. 2014. Native American Oral Traditional Evidence in American Courts: Reliable Evidence or Useless Myth?](#)

This article explores traditional use of oral traditional evidence in Native culture, and the subsequent marginalization and inconsistent handling of oral traditional evidence in US courts. The author proposes a rule of evidence for US courts similar to Canadian courts that accommodates aboriginal oral traditional evidence. Central to the debate in US legal circles about the validity of oral history and oral traditional evidence is the reliability of transmitting information from generation to generation. Within US courts, oral traditional evidences are sometimes claimed to be hearsay, as they are passed from person to person. These issues complicate the use of oral traditional evidence, which is frequently amongst the evidence that tribes have in land claims cases, attempts to repatriate sacred materials and remains, to prove status as a sovereign group, and to maintain aboriginal gathering rights. Awan explores past cases in US law that have treated oral evidence both favorably and unfavorably to demonstrate how current treatment of oral evidence is in need of reform.

Awan, Rachel. 2014. [“Native American Oral Traditional Evidence in American Courts: Reliable Evidence or Useless Myth?” Penn State Law Review 118\(3\): 697-727.](#)

Type of Publication: Law Review

Keywords: oral traditional evidence, oral history, US court, hearsay, admissible evidence

Burkett. 2012. Indigenous Environmental Knowledge and Climate Change Adaptation.

Burkett argues that Indigenous Environmental Knowledge (IEK) has enormous potential in increasing adaptive capacity of communities facing climate impacts, but that existing legal and governmental structures limit the potential for IEK to be effectively implemented. Burkett suggests that IEK be incorporated into western law and policy, so that legal structures reflect a worldview that emphasizes adaptive management. This management approach seeks to provide societies with the ability to adapt to changes as they come, as opposed to predicting and controlling possible impacts. Burkett explores how IEK has been, is being, and may continue to be incorporated into climate adaptation efforts (and by extension law and government structures).

- Guidelines for agencies and policymakers: Burkett argues for the incorporation of IEK worldview into legal systems and government policies. Specifically, Burkett notes the value of IEK frameworks that are based on increasing adaptive capacity to climate impacts.

Burkett, Maxine. 2012. "Indigenous Environmental Knowledge and Climate Change Adaptation." In: [Climate Change and Indigenous Peoples The Search for Legal Remedies](#). Eds. Randall S. Abate and Elizabeth Ann Kronk. Edward Elgar Publishing: Northampton, MA.

Type of Publication: Academic Journal

Keywords: adaptive capacity, climate impacts, adaptive management, law, traditional knowledge

Burkett. 2011. The Nation Ex-Situ.

In this article, Burkett describes a dilemma facing small ocean states: the loss of their homelands due to climate impacts. Burkett proposes a legal remedy to this situation that she dubs "Nation Ex-Situ," in which these countries would be supported by the international community in retaining their sovereignty during and after the loss of their physical territory. Burkett notes that this idea is not novel, and provides examples of existing countries and quasi-governmental structures that exist without definite physical territory. More broadly, Burkett argues that the world is entering a post-climate change era in which laws and policies will need to be re-tooled to address unanticipated and new problems. This point is especially prescient given that climate impacts are already having greater-than-anticipated impacts on infrastructure and the environment, and are therefore likely to have major legal and policy impacts in the near future.

*Burkett, Maxine. 2011. "[The Nation Ex-Situ: On climate change, deterritorialized nationhood and the post-climate era](#)." *Climate Law* (2): 345-374.*

Type of Publication: Academic Journal

Keywords: small-ocean states, climate impacts, displacement, post-climate change era, law

Garrott, Sarah. 2014. New Ways to Fulfill Old Promises: Native American Hunting and Fishing Rights and Intangible Cultural Property.

This work explores Native American hunting and fishing rights through the lens of the international law concept of intangible cultural heritage. The article offers historical information on the development of current US law regarding hunting and fishing rights, explores these limitations, and demonstrates why these rights may be better understood as intangible cultural heritage, and explains what benefits this would lend. One area of focus is abrogation of hunting and fishing rights under current US law, and how intangible cultural heritage would form a legal protection that would provide more just and stable access to hunting and fishing rights for Native people. This paper also includes a discussion of how non-binding international law regarding indigenous peoples can have impacts on US laws and policies.

Garrott, Sarah. 2014. "[New Ways to Fulfill Old Promises: Native American Hunting and Fishing Rights and Intangible Cultural Property.](#)" *Oregon Law Review* 92(2): 571-610.

Type of Publication: Law Journal Article

Keywords: intangible cultural heritage, property law, hunting and fishing rights, abrogation, US law

[Hershey, Robert A.; McCormack, Jennifer; Newell, Gillian E. 2014. Mapping Intergenerational Memories \(Part 1\): Proving the Contemporary Truth of the Indigenous Past.](#)

This paper discusses the marginalization of oral history in western courts. Using examples of cases in which Indigenous people used innovative or otherwise successful methods to use oral history as evidence in court, the authors argue Indigenous people today must find media to convey oral history that encourage western law to treat it seriously. The authors note that transforming oral history into other media (especially maps) may not be a just solution in the long term, but that it in the short term it is a necessity for Indigenous people navigating western legal systems. The authors also explore the challenge of transforming oral history into maps while also retaining the integrity of the knowledge and community. The authors present mapping of oral history as a way to validate oral history in western legal systems while also retaining the integrity of oral history, and not fostering a dependence on outside experts or additional evidence to validate said oral history. The authors argue that western judges and others may have difficulty accepting oral history because of the extreme differences in conceptions of space and time that exist between western legal and Indigenous philosophies. Therefore, maps may cause judges to view oral history as more credible, as they are a form more familiar to western law. They argue that maps can give Indigenous communities a way to self-authenticate knowledge without relying on non-Native experts to back the community, and that maps can also function without compromising sacred knowledge or devaluing the integrity of oral histories.

Hershey, Robert A.; McCormack, Jennifer; Newell, Gillian E. 2014. "[Mapping Intergenerational Memories \(Part 1\): Proving the Contemporary Truth of the Indigenous Past.](#)" *Arizona Legal Studies Discussion Paper No. 14-01.*

Type of Publication: Scholarly Article

Keywords: oral history, oral testimony, western law, mapping, intergenerational knowledge

[Kronk and Abate. 2013. International and Domestic Law Dimensions of Climate Justice for Arctic Indigenous Peoples.](#)

Warner and Abate use existing case studies to demonstrate how Arctic Indigenous communities are environmental justice communities. They then use these case studies to compare how Indigenous environmental justice communities are both similar to and different from other environmental justice communities. They note that Indigenous people, like other environmental justice communities, face disproportionate impacts from environmental hazards and climate impacts which disrupt their ability to live healthy lives and adapt to adversity. Conversely, they note that tribal sovereignty creates a unique situation for Indigenous communities, and results in special cases with regards to environmental justice. They draw on two recent examples, the Inuit Circumpolar Council's petition to the Inter-American Commission on Human Rights and the village of Kivalina's lawsuit against several oil, energy and utilities companies, to explore legal issues surrounding sovereignty and environmental justice. The authors also argue that existing dismissal of the above legal case studies should be regarded as unjust because tribal sovereignty was not adequately considered in either case.

Kronk and Abate. 2013. "[International and Domestic Law Dimensions of Climate Justice for Arctic Indigenous Peoples.](#)" *R.G.D. (43): 113-150.*

Type of Publication: Academic Journal, Policy and Law

Keywords: Arctic Indigenous communities, environmental justice, tribal sovereignty, climate impacts

[Maldonado, Julie Koppel; Christine Shearer, Robin Bronen, Kristina Peterson, and Heather Lazrus. 2013. The Impact of Climate Change on Tribal Communities in the US: Displacement, Relocation, and Human Rights.](#)

This study explores the displacement of indigenous communities in response to climate impacts and the human rights implications of these situations, using three case studies, one of the Alaska Native village of Kivalina, one of the Alaska Native village of Newtok, and the other of the Isle de Jean Charles Band of Biloxi-Chitimacha-Choctaw Indians (Louisiana). Issues such as sea level rise and increases in natural disasters are forcing indigenous communities to relocate from their homelands. The authors note that because these communities are not responsible for the impacts now forcing them to relocate, that the impacts they face constitute a human rights crisis. In addition to exploring these case studies, the authors broaden their discussion to include legal and policy implications of climate impact-induced relocations of indigenous people in the US. One concern raised by the authors is that current disaster relief infrastructure is not set up to deal with the rapid changes and impacts associated with climate change. The authors also advocate for a human rights approach to relocation, which emphasizes the rights of people to exist and self-determine, even as they are faced with forced relocation due to climate disasters. This approach may become increasingly important for indigenous people to consider as they face more severe natural disasters and changes in climate (e.g. sea level rise).

- Guidelines for federal managers: This article exposes several limitations with current federal approaches to climate change-related relocations of indigenous communities, and in doing so offers opportunities to improve federal responses to climate disasters and support for indigenous communities.

*Maldonado, Julie Koppel; Christine Shearer, Robin Bronen, Kristina Peterson, and Heather Lazrus. 2013. "[The Impact of Climate Change on Tribal Communities in the US: Displacement, Relocation, and Human Rights.](#)" *Climatic Change* 120: 601-614.*

Type of Publication: Academic Journal

Keywords: Relocation, human rights, disaster, vulnerability, Newtok, Kivalina, Isle de Jean Charles

[Rodriguez-Uribe, Natalia. 2014. Collective Legal Autonomy Concerning Traditional Ecological Knowledge: The Rights of Indigenous Peoples and Their Linkages to Biodiversity Conservation in Colombia and Australia.](#)

This thesis attempts to provide a model for conservation law that optimizes both protection of biodiversity and protection of indigenous human rights. Using examples from Australia and Columbia to explore existing conservation laws and policies, Uribe proposes an alternative model based in the collective autonomy of Indigenous peoples to protect biodiversity. The paper is nearly four hundred pages long, and includes extensive background information about existing international law and policies towards indigenous peoples and biodiversity conservation. Uribe critiques existing biodiversity conservation management for its lack of emphasis on protecting human rights (especially indigenous peoples' rights). Uribe goes on to argue that an approach which recognizes indigenous rights to self-determination and management of landscapes using TEK/TKs has the potential to both maximize conservation benefits while maximizing benefits to indigenous communities.

Rodriguez-Uribe, Natalia. 2014. [Collective Legal Autonomy Concerning Traditional Ecological Knowledge: The Rights of Indigenous Peoples and Their Linkages to Biodiversity Conservation in Colombia and Australia.](#) Thesis presented to Macquarie University Law School: Sydney, Australia.

Type of Publication: Thesis

Keywords: conservation, fortress conservation, self-determination, traditional ecological knowledge (TEK), traditional knowledges (TKs), collective legal autonomy, community-based conservation (CBD)

[Tulalip Tribes. Intangible Cultural Heritage Protection Act.](#)

This draft act of the Tulalip Tribe is intended to protect the cultural heritage of the Tribe. The Act calls for Tulalip customary and traditional law to be applied to Tulalip cultural heritage. The basis of the act is that the Tribe retains its sovereignty and that current US intellectual property law has been imposed upon tribes without proper

consideration of tribal laws regarding intellectual and cultural property. The act includes protocols for conducting research in collaboration with the Tulalip Tribe, or on Tulalip land, measures to protect Tulalip arts, measures to prevent wrongful or exploitative copyrights of Tulalip cultural property, and measures to ensure that tribal heritage is not alienated from tribal business.

- Guidelines for tribes: This document provides a template for other tribes seeking to strengthen the protection of TK and cultural heritage.

Tulalip Tribes. Intangible Cultural Heritage Protection Act.

Type of Publication: Legislative document

Keywords: cultural heritage, intellectual property law, copyright, research protocol, traditional arts, Tulalip Tribe

[UN Human Rights Committee. Concluding observations on the fourth report of the United States of America.](#)

Following the “Fourth Periodic Report of the United States of America to the United Nations Committee on Human Rights Concerning the International Covenant on Civil and Political Rights,” the Committee created concluding remarks that offer recommendations and suggestions to the US government. These recommendations target areas of human rights abuses that still exist in US law and society, and recommend actions to remedy these abuses. Indigenous peoples are mentioned several times in the concluding observations, including a call to end high rates of domestic violence against American Indian and Alaska Native women. Most relevant to a discussion of traditional knowledges (TKs) is the final section addressing the rights of Indigenous peoples. In this section, the committee expresses concern over the desecration of sacred sites and the impacts to wellbeing and culture that the loss of sacred sites has on Indigenous people. Furthermore, they recommend that the US work harder to ensure that Indigenous people are consulted on all projects and development that may impact sacred sites, using the process of free, prior and informed consent (FPIC).

- Guidelines for policy and law-makers: This document is intended primarily to point out existing or continuing human rights abuses in the US, with an eye for legislative and legal solutions. The report recommends that US state actors remedy these abuses by reforming their laws to be in compliance with the International Covenant on Civil and Political Rights.

UN Human Rights Committee. [Concluding observations on the fourth report of the United States of America.](#)

Type of Publication: Technical Report

Keywords: Human rights, sacred sites, Free Prior and Informed Consent (FPIC), civil rights

[Williams, Terry and Hardison, Preston. 2013. Policy Maker White Paper on Traditional Knowledge Governance.](#)

This paper describes the need for governance around and increased legal protections for TK, describes how current laws fail to protect TK, and discusses opportunities to better the relationship between western science and TKs. Given that tribes are facing significant impacts from climate, and that little of the responsibility for these impacts falls on tribes, issues of TK and climate impacts are also an issue of justice. The authors propose that TKs should be governed by tribes, according to each tribe’s legal system and customary laws, in order to ensure protection of TKs, and appropriate use of TKs in natural resource management. This is especially important given the historical context in the US, in which indigenous knowledge and knowledge-holders have been habitually mistreated. The authors argue that because current collaboration between TK holders and outside researchers/policymakers is occurring without formal guidance, there are issues surrounding ownership of knowledge produced through collaborative efforts, consent of access, knowledge exchange and ownership. The authors describe some common

aspects of TKs in order to explain why traditional governance and recognition of tribal customary laws are vital for fair and justice collaboration between tribes and others.

- Guidelines for TK holders and policymakers: This document provides a thorough and succinct summary of issues facing tribes as they attempt to protect and advocate for TKs. The authors call for increased recognition of tribes' rights to regulate and manage their own knowledge systems is an important step in creating mutually beneficial relationships between tribes and non-tribal resource managers and policymakers.

Williams, Terry and Hardison, Preston. 2013. [Policy Maker White Paper on Traditional Knowledge Governance.](#)

Type of Publication: White Paper

Keywords: traditional knowledges (TKs), traditional governance, knowledge co-creation, intellectual property rights, customary law, Freedom of Information Act (FOIA), Free Prior and Informed Consent (FPIC)

[Wolfley, Jeanette. 2014. Tribal Environmental Programs: Providing Fair and Meaningful Involvement.](#)

This paper explores impacts to public and stakeholders that may result from tribal environmental laws and regulations and posits that tribal institutions are best suited to articulate a fair process for public participation according to tribal cultural and social norms (390-2). This article includes a discussion of the development of federal law recognizing tribal environmental regulations, and ongoing legal disputes about current tribal environmental regulatory actions (393-9). The article argues that public participation and due process, when tribally-led, have the potential to 1) promote good governance, 2) respect community member interests and 3) protect and promote tribal sovereignty (399-409). Wolfley also cautions against using federal or state court concepts of meaningful involvement and fair treatment, as these due process principles may translate poorly into a tribal context. Instead, this article advocates for tribes to develop their own definitions, based on tribal values and laws, including customary and traditional laws (411-413). Wolfley includes examples of existing definitions of due process developed by tribal courts and others (411-412). This article also explores how existing legislation has shaped and defined tribal due process (414-421). Finally, the article explores types of processes for establishing public participation and due process, providing case studies of existing tribal processes (422-437).

*Wolfley, Jeanette. 2014. "[Tribal Environmental Programs: Providing Fair and Meaningful Involvement.](#)" *Journal of Environmental Law and Litigation* 29: 389-442.*

Type of Publication: Academic Journal

Keywords: Due process, public participation, oral tradition, environmental regulation, tribal court, federal environmental regulations, US Environmental Protection Agency, tribal law, customary law

PROTOCOLS

[Akwasasne Task Force on the Environment. 1996. Protocol for Review of Environmental and Scientific Research Proposals.](#)

The Akwasasne Task Force on the Environment (ATFE) has developed a review board to ensure that research projects involving tribal members are done so in a way that benefits the community and does not misrepresent their community. This website details the principles behind the ATFE, and provides a complete guide for researchers seeking to do research in the community. Ideas included in the protocol for research review are FPIC, mutual benefit and respect, and an emphasis on drawing from Akwasasne values and principles to guide all work, research and review.

- Guidelines for tribes/TEK holders: This website provides a template for tribes to create an internal research and review board. The protocol detailed by the ATFE offers an example of how a tribe can ensure that outside research benefits the tribe, does not exploit tribal members. Additionally, the protocol provides a template that ensures that power over research and research products stays within the tribal

community

- Guidelines for researchers: The protocol developed by the ATFE was created to ensure that benefits of research are afforded to the tribal community. This protocol also ensures a productive and mutually beneficial relationship between researchers and the tribal community. Included in the protocol are larger guidelines about ethical research practices (e.g. cultural sensitivity training, hiring preference to tribal members, embodying community values in research, working with the community from the inception of the research project, giving communities ample time to review).

Akwesasne Task Force on the Environment. 1996. [Protocol for Review of Environmental and Scientific Research Proposals](#).

Type of Publication: Protocol

Keywords: Research protocols, Akwesasne, research protocol template, cultural sensitivity, community-led research

[Alberta Mental Health Board. 2006. Aboriginal Research Protocols: Healthy Aboriginal People in Healthy Communities.](#)

This document is the result of collaboration amongst several Canadian health boards and First Nations community members and leaders. The document provides protocols for conducting research on mental health in First Nations communities. These protocols emphasize the importance of considering family in mental health and acknowledging the role of elders in First Nations communities. Furthermore, the protocols note that research must be made available to community members in their local language, whether or not that language is English. The protocols also offer the insights of two elders, who give perspective into what mental health means in First Nations communities. This document also provides an annotated bibliography on research protocols for Aboriginal peoples.

- Guidelines and best practices for researchers: A critical point made by this document is that there are a diversity of experiences and ways to view reality, and that researchers must have the capacity to work with and respect these multiple worldviews. This fact holds true on many scales (e.g. between researchers and Indigenous community, within an Indigenous community, between two individuals, etc.)

Alberta Mental Health Board. 2006. [Aboriginal Research Protocols: Healthy Aboriginal People in Healthy Communities](#). Edmonton: Alberta, Canada.

Type of Publication: Protocol

Keywords: research, First Nations, mental health, elders, Native language

[American Indian Law Center. 1999. Model Tribal Research Code.](#)

This document provides guidance for tribes and tribal organizations to develop research codes/protocols for outside parties seeking to work with Native peoples. It also provides a list of grievances that Native peoples may have towards researchers due to past and ongoing abuses (1-2). The document also explains existing federal and state regulations surrounding research, including those designed specifically for Native people (such as Indian Health Services' IRB process). The authors provide guidance about how to use this document, as a template and starting place for discussions around developing one's own research code, and caution against adopting or rejecting the document wholesale. The model code that is provided is highly detailed (e.g. and provides information about how to develop codes) and provides step-by-step guidance about common features of research codes. In addition to a complete model code, the authors explain each section of the model code, and highlight potential points of concern for tribes as they develop their own codes.

American Indian Law Center. 1999. [Model Tribal Research Code](#). American Indian Law Center: New Mexico.

Types of Publication: Protocol, code

Keywords: Protocol, research, code, ethics, law, Institutional Review Board (IRB), intellectual freedom

[Australian Institute of Aboriginal and Torres Strait Islander Studies \(AIATSIS\). 2012. Guidelines for Ethical Research in Australian Indigenous Studies.](#)

This document identifies fourteen principles to guide research that occurs in collaboration with indigenous Australian and Torres Strait peoples. Two noteworthy aspects of the document are the recognition that indigenous research participants are also researchers and deserve to be viewed and treated as equals to researchers, the recognition that research protocols are a human rights issue in addition to an ethical issue. For each principle found within the document, the authors also provide guidance about how to apply the principle to research. For example, principle 4 reads “rights in the traditional knowledge and traditional cultural expressions of Indigenous people must be respected, protected and maintained,” (3) and the authors offer that in order to apply this principle one should “discuss co-ownership of intellectual property, including co-authorship of published and recorded works and performances...” (4). The authors also discuss Free, Prior and Informed Consent as a prerequisite for ethical research. Additionally, the guidelines include a requirement that researchers conduct research that takes into account Indigenous languages, customary laws and traditions. One additional point of emphasis is the importance of incorporating flexibility and change into research, as responsibilities to negotiate and consult indigenous people are ongoing before, during and after research. The principles are too numerous to be listed here, but all fourteen provide valuable insights into conducting ethical research.

- Guidelines for researchers: While this document was designed specifically for researchers operating under AIATSIS, many of the guidelines are directly applicable to other researchers working with Indigenous peoples. The emphasis on partnership, the importance of FPIC, the risks facing TK in research situations, and the equal standing between researchers and indigenous people are all lessons that can be applied to research protocols in a North American context.

Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS). 2012. [Guidelines for Ethical Research in Australian Indigenous Studies.](#)

Type of Publication: Protocol

Keywords: research protocol, traditional knowledges (TKs), co-production, intellectual property, ethics

[Boles et al. 2008. Report: Taskforce to Review Protocols for Native American Archival Materials.](#)

This document is a record of a meeting of the Society of American Archivists (SAA) discussing whether to adopt guidelines for archivists suggested by the SAA’s Native American Roundtable. These guidelines are included in the appendices (31). The meeting notes include an appendix of the recommendations offered by the Native American Roundtable, as well as notes of the arguments of both those opposed and in favor of adopting the guidelines. Within the recommendations are several guidelines for federal managers and archivists.

- Guidelines for federal managers/archivists: Recommendations include greater consultation with tribes, restricting public access to culturally sensitive material, consideration of cultural and intellectual property rights and repatriation of culturally important items (see Appendix 2).

Boles, Frank, David George-Shongo and Christine Weideman. 2008. "[Report: Taskforce to Review Protocols for Native American Archival Materials.](#)" Society of American Archivists Council Meeting, February 7-10, 2008.

Type of Publication: Protocol

Keywords: Society of American Archivists (SAA), consultation, culturally sensitive material, repatriation

[Canadian International Development Agency \(CIDA\). n.d. Handbook of CIDA Project Planning and Indigenous Traditional Knowledge.](#)

This document was intended to inform the Canadian International Development Agency (CIDA) when implementing international projects affecting Indigenous people and traditional knowledge. The document emphasizes that it is not intended as a field guide or set of hard guidelines, but instead as a marker for checking that indigenous peoples and their knowledge are being respected during CIDA projects. The document has a broad scope, including definitions of traditional knowledge and Indigenous people, case studies of successful

collaborations between Indigenous peoples and CIDA, discussion of traditional knowledge holders in Indigenous communities (e.g. gender differences, the role of elders), the difference between local and Indigenous knowledge systems, best practices for “acquiring” traditional knowledge for projects, the importance of financial and decision-making empowerment of Indigenous peoples, discussion of intellectual property rights, traditional rights to resources. For each topic discussed in the report, the authors offer a value, recommendation or guideline for carrying out CIDA projects. Some notable recommendations include allowing for protection/non-disclosure of sensitive traditional knowledge, involving Indigenous people in decided whether or not a development project should proceed and transferring benefits and value-added outcomes to Indigenous communities. The document includes a great deal of relevant information. However, this information is not easily accessible. The report is organized loosely, making it difficult to find particular guidelines or recommendations. The recommendations cover, amongst others, issues of intellectual property rights, Indigenous title to homeland, meaningful Indigenous involvement in project development, locally appropriate negotiation/collaboration/planning techniques, relationship-building between Indigenous people and the project team, and protocols for gathering and protecting traditional knowledge. The report offers appendices including a comparison of traditional knowledge and western scientific knowledge, and bibliographies of useful resources and Indigenous knowledge organizations. Of particular note is appendix 6, which plainly states a list of best practices for planning with traditional knowledge—this appendix summarizes the report in an organized manner.

- Guidelines for planners: These guidelines, and especially the list found in appendix 6, offer recommendations to guide projects working with Indigenous people. These guidelines are aimed at promoting meaningful Indigenous involvement, and consideration and care in international aid planning.

Canadian International Development Agency (CIDA). n.d. [Handbook of CIDA Project Planning and Indigenous Traditional Knowledge](#).

Type of Publication: Technical Report, Protocol

Keywords: traditional knowledges (TKs), international development, intellectual property rights, collaborative project planning, traditional rights, Indigenous languages,

Canadian International Development Agency. n.d. General Guidelines.

These guidelines were created for government officials, NGOs and others who may be working with Indigenous communities. CIDA provides seven guidelines for working with Indigenous people. The authors address each guideline in a subsection of the report. The seven guidelines are 1) locate and identify Indigenous people in the area of your project, 2) respect the traditional rights of Indigenous people, 3) plan for sustainability, protect the long-term, 4) understand the nature of Indigenous knowledge before attempting to collect or use it (this step advocates strongly for bringing Indigenous knowledge holders into all stages of project planning), 5) build on the strengths of Indigenous knowledge, 6) include Indigenous knowledge and peoples from the very beginning, 7) acquire Indigenous knowledge on the basis of trust, respect, equity and empowerment. This document also discusses complications of current intellectual property laws when applied to traditional knowledge. The guidelines investigate legal approaches—use of international law, “soft” law, and other approaches to aid in protecting Indigenous knowledge—to protecting Indigenous knowledge when there are inadequate local laws or legislation to protect Indigenous peoples. Within guideline seven is a five-point strategy for acquiring traditional knowledge and partnering with Indigenous people. These five points emphasize the importance of partnership, and mutual benefits.

- Guidelines for agency staff and researchers: This document clearly lays out seven guidelines for those working with Indigenous communities.

Canadian International Development Agency. n.d. [General Guidelines](#).

Type of Publication: Guideline, Protocol

Keywords: traditional knowledge, traditional rights, international development, intellectual property, collaborative project planning, Indigenous language, co-management, participatory action research

[Carjuzaa et al. 2010. The Give Away Spirit: Reaching a shared vision of ethical indigenous research relationships.](#)

This document describes the historical and ongoing marginalization of Indigenous people by western research. It does on to explore some solutions being explored in the academic community to create more equitable research practices. From there, the authors present their own ideas, which build upon previous work by Kirkness and Barnhardt's 1991 article "First nations and higher education: The four Rs—respect, relevance, reciprocity, responsibility," by adding a fifth dimension "relationality" to ethical research guidelines. The authors argue that only by meaningfully changing research paradigms to reflect the values of Indigenous communities can more equitable relationships be established.

- Guidelines for tribes and researchers: This document offers a viewpoint which can guide the development of a mutually-beneficial relationship between tribes and researchers. It also provides an overview and critique of several existing ideas around collaboration.

*Carjuzaa, Jioanna; Fenimore-Smith, Kay. 2010. [The Give Away Spirit: Reaching a shared vision of ethical indigenous research relationships](#). *Journal of Educational Controversy* 5(2).*

Type of Publication: Protocol

Keywords: Marginalization, Indigenous people, research practices, equitable research, ethics

[Cochran, Patricia Longley. n.d. Alaska Native Science Commission Research Ethics Sample MOA.](#)

This sample MOA provides research ethics protocols for scientists and researchers working with Alaska Native communities. Points emphasized by the MOA include practicing informed consent, providing financial support so that local communities can create an oversight committee, use of Native language when English is a second language, involvement of Native people in research as staff/researchers, protection of sacred/private knowledge, acknowledgement and partnership with Native community, providing copies of deliverables to local libraries/archives. The sample MOA also includes a template for communities to borrow from. This template provides structure, as well as principles to guide research, and obligations that researchers and community members should follow. These principles and obligations emphasize the importance of co-equal partnership, benefits to the community and no-harm research practices. This sample MOA provides succinct and dense material with an emphasis on conducting research that benefits Native communities without compromising community self-determination or sacred knowledge. The sample MOA also includes a potential operating procedure for gathering, storing and caring for data, and for making contact with potential research-partner communities.

Cochran, Patricia Longley. n.d. [Alaska Native Science Commission Research Ethics Sample MOA](#). University of Alaska - Anchorage - Institute of Social and Economic Research (ISER) - Alaska Native Science Commission (ANSC), Anchorage, Alaska.

Type of Publication: Protocol, Sample Memorandum of Agreement

Keywords: informed consent, research, Native language, principles, protocol, MOA

[Cochran, Patricia Longley. n.d. Ethical Guidelines for use of Traditional Knowledge in Research & Science.](#)

This document provides guidelines to researchers and reviewers working with Alaska Native communities and research derived from work with these communities. Central themes to the guidelines are cultural competence, informed consent and community involvement. The guidelines also encourage the general public to exercise good judgment in deciding whether a research project is appropriate or culturally sensitive. The document encourages Native communities to establish working groups in order to advocate for themselves, their elders and their knowledge systems by evaluating research projects. Lastly, the document provides guidelines for Native elders who may be involved in research projects.

Cochran, Patricia Longley. n.d. [*Ethical Guidelines for use of Traditional Knowledge in Research & Science*](#). University of Alaska - Anchorage - Institute of Social and Economic Research (ISER) - Alaska Native Science Commission (ANSC), Anchorage, Alaska.

Type of Publication: Guidelines

Keywords: research, guidelines, elders, traditional ways, authorization, cultural responsiveness

[Colchester et al. 2007. Making FPIC—Free, Prior and Informed Consent—Work: Challenges and Prospects for Indigenous People.](#)

This document offers a summary of work by Indigenous people and supportive organizations to ensure that FPIC is being applied. The report uses case studies and draws from Indigenous peoples' experiences to discuss experiences applying FPIC in Suriname, Guyana, Peninsular Malaysia, Peru, Indonesia, Papua New Guinea and the Philippines. Notably, this document explores the issue of verifying that FPIC has been obtained (14), e.g. by asking what organizations should be empowered to determine if Indigenous people are supplying FPIC. Learning on insights gained from a 2007 workshop hosted by the Forest Peoples Programme, this report also offers thoughts about how Indigenous people can use the FPIC process to ensure their ability to self-determine. This document also discusses the role that language(s) play in the FPIC process, including the importance of using Indigenous language in discussions, and the potential for abuse of the FPIC process by intentionally not using languages intelligible to local Indigenous people.

- Guidelines for tribes/TK holders/Indigenous peoples: Free means that indigenous methods/institutions for decision-making are respected (5); a central question is: how can indigenous people integrate FPIC into their decision-making processes (6); this report includes a set of recommendations by Indigenous workshop participants to ensure successful outcomes in asserting Indigenous peoples' rights to FPIC (21).
- Guidelines for agencies and managers: Indigenous decision-making processes are often substantially different than colonial governmental structures. Therefore, understanding the appropriate people to contact and process to undertake to gain FPIC must be done with an understanding of Indigenous decision-making process (6-8).

Colchester, Marcus and Maurizio Farhan Ferrari. Forest Peoples Programme. 2007. [Making FPIC—Free, Prior and Informed Consent—Work: Challenges and Prospects for Indigenous People.](#)

Type of Publication: Protocol, Case Study

Keywords: Free, Prior and Informed Consent (FPIC), Forest Peoples Programme, language, management, development

[Convention on Biological Diversity. 2011. Tkarihwaí:ri: Code of Ethical Conduct to Ensure Respect for Cultural and Intellectual Heritage of Indigenous and Local Communities.](#)

This document details a Code of Ethics that represents a new, collaborative paradigm for researchers and others who are working with Indigenous peoples, or on their land. The guidelines are international in scope, and represent a collaborative effort between members of the Convention on Biological Diversity, a UN program.

- Guidelines for federal and other managers: Some keys included in the Code are: respect for intellectual property rights of Indigenous communities, full disclosure and informed consent (Free, Prior and Informed Consent), respect for Indigenous communities' right and responsibilities to protect collective and individual knowledge, shared benefits from research (9-13). This document also includes methods for researchers and others (14-15).

Convention on Biological Diversity. 2011. [Tkarihwaí:ri: Code of Ethical Conduct to Ensure Respect for Cultural and Intellectual Heritage of Indigenous and Local Communities.](#)

Type of Publication: Protocol

Keywords: Research, code of ethics, Indigenous peoples, Convention on Biological Diversity, Free Prior and Informed Consent (FPIC), shared benefits

[Dena Kayeh Institute. 2010. Traditional Knowledge Protocol.](#)

This document is a template for First Nations who are entering into agreements to collaborate which may involve disclosing TK. The document has empty spaces for readers to fill in information about their First Nations community. This template also includes advice/suggestions on how to ensure that effective use of the document (i.e. that the First Nations community ensures adequate protection and forms a good working relationship with the outside party). This template suggests a particular model that includes a research review council made up of elders who oversee research, while power to approve or deny research is reserved for First Nation government/leadership (i.e. council or chiefs).

- Guidelines for tribes/TEK holders: One important protection highlighted by this template is that all agreements with outside parties should include very specific parameters about what research is being conducted, why, and what access researchers are being granted. This document provides an entire template that follows a specific model (developed by the authors).

Dena Kayeh Institute. 2010. [Traditional Knowledge Protocol.](#)

Type of Publication: Protocol

Keywords: traditional knowledge, research protocol template, protection of TK, research ethics

[First Archivist Circle. 2007. Protocols for Native American Archival Materials.](#)

The authors of these protocols are a group of both Native and non-Native archivists, librarians and others who composed these protocols in an effort to provide best practices for non-tribal organizations who are working with Native American archival material. These protocols build upon several other protocols. The emphasis of these protocols is on building reciprocity and respect, and on consulting with Native communities. The protocols address a diverse range of issues, including issues of repatriation of materials, culturally sensitive materials, accessibility and use, Native American intellectual property rights and awareness of Native issues within archival professions. For each issue highlighted in the protocols, the authors provide guidelines for action. This document provides active assistance to aid archivists who are seeking to create more just relationships with Native communities. It also provides guidelines for tribes, to help ensure that they are taking an active role in advocating for and creating stronger and more productive relationships between Native communities and archives.

- Guidelines for Archivists and Native communities: These protocols present several issues for consideration (e.g. culturally sensitive materials in archives). For each issue, they offer guidelines for both archivists and Native communities, with the aim of creating respect, reciprocal relationships, and culturally appropriate management of archived materials.

First Archivist Circle. 2007. [Protocols for Native American Archival Materials.](#)

Type of Publication: Protocol

Keywords: Archive, traditional knowledges (TKs), repatriation, intellectual property, communal property, sovereignty, culturally sensitive materials

[First Nations Centre. 2007. Considerations and Templates for Ethical Research Practices.](#)

This document is designed to provide guidance to First Nations communities who decide to allow research in their communities, in order to ensure that this research benefits the community and is conducted ethically. The document lays out guidelines for developing a code of ethics to guide research. One item of note is the distinction the authors make between informed individual and informed community consent. The document provides input

about what effective codes of ethics will include, and also information about how to ensure that the process of developing a code of ethics is done in a way that is positive for a community and supports community participation and Indigenous autonomy. The document describes tools such as participatory research, collaborative research agreements and data-sharing protocol and how to utilize these tools to create an ethical research protocol. The majority of the document is made up of templates for 1) a research code of ethics, 2) collaborative research agreement and 3) data-sharing protocol.

- Guidelines and best practices for federal managers and TEK holders/users: This document provides an extensive set of templates which are intended to help Indigenous communities and outside researchers to establish an equitable relationship. Both the explanatory information within the report and the templates themselves describe the advantages of adopting an alternative research framework that emphasizes the rights to respect and self-determination that Indigenous people have.

First Nations Centre. 2007. [Considerations and Templates for Ethical Research Practices](#). Ottawa: National Aboriginal Health Organization.

Type of Publication: Guide

Keywords: research protocols, First Nations, research protocol development, ethics, collaborative research

[First Nations Centre. 2005. Ownership, Control, Access, and Possession \(OCAP\) or Self-Determination Applied to Research.](#)

This document offers a framework for ensuring that First Nations retain their capacity to practice self-determination in research situations. This framework centers of OCAP (as per title), which are four principles/rights that First Nations communities have over their own knowledge and research materials. This document also includes an analysis of how past and present research methods have failed to treat Indigenous people equitably, as well as an analysis of how researchers and have tried to correct past wrongs towards Indigenous communities by adopting a variety of protocols (some deemed more effective than others by this report). The OCAP document identifies these research protocols as a form of self-regulation by researchers, as they are non-binding and do not give regulatory power to Indigenous communities to enforce research protocols. The document goes on to explore other limitations with existing protocols. This document calls for a re-evaluation of who is playing what role in research, and advocates for Indigenous people to establish themselves as gatekeepers and regulators of research pertaining to their communities.

- Guidelines and best practices for tribes/TEK holders: OCAP process provides specific guidelines, as well as an alternative framework for approaching research. This framework centers on ensuring that meaningful power and ability to control research processes is vested in the community.

First Nations Centre. 2005. [Ownership, Control, Access, and Possession \(OCAP\) or Self-Determination Applied to Research.](#)

Type of Publication: Guideline, Protocol

Keywords: Research, self-determination, regulation, indigenous research

[Fish and Wildlife Service. 2013. Traditional Ecological Knowledge - Basic FWS Information.](#)

This website includes reference information for Fish and Wildlife Service (FWS) agency staff and scientists working with TK. The reference materials on the website include information that introduces TK, a comparison of western science and TK, information about how to integrate TK into the FWS as well as an introductory reference sheet designed to introduce FWS scientists to TK and common issues surrounding TK. One major focus of the webpage is on providing guidelines to agency staff as they work with and gather TK in collaboration with tribes.

Fact Sheet—Traditional Ecological Knowledge for Application by Service Scientists:

- Guidelines for agencies gathering and using TK:
 - Includes guidelines on how to ethnographically gather TK information.
 - The description provides no explanation of how to guarantee that tribal interests are protected beyond cautioning that use of TK can have unintended consequences.
 - Guidelines do recommend consulting with FWS tribal liaison to ensure that TK is properly gathered.
- Use of TK:
 - Explains how TK is useful in identifying climate impacts because of capacity to note subtle changes.

Powerpoint—Traditional Ecological Knowledge: An Introduction

- Guidelines and best practices for agencies:
 - Use of Memorandums of Understanding
 - Contact with tribal council
 - Following tribal research protocols
 - Advocates for ethnographic collection of information
 - This presentation argues that gathering ethnographic information does not constitute an act of government-to-government consultation.

Fish and Wildlife Service. 2013. "[Traditional Ecological Knowledge - Basic FWS Information.](#)" Last modified August 6.

Type of Publication: Protocol

Keywords: traditional knowledge, western science, management, Forest Service

Gwich'in Social & Cultural Institute. 2004. Traditional Knowledge Policy.

This document details the policy adopted by the Gwich'in Tribal Council regarding traditional knowledge (TK). The document sets parameters for the Gwich'in Tribal Council and other official/tribal organizations to follow regarding TK. This document also includes principles that guide said traditional knowledge policy. These principles include ensuring benefits to Gwich'in people and progeny, and ensuring that TK is shared in manner that allows for control and influence over TK to remain in Gwich'in peoples' hands. This document lays out explicit and clear guidelines for Gwich'in organizations who are collaborating on and reviewing research involving Gwich'in peoples. Also included in the document is a form for researchers who are requesting for permission to work on Gwich'in land, or with Gwich'in TK. Finally, the document includes an appendix on what constitutes ethical research, and another appendix regarding research guidelines for Gwich'in TK. One important point discussed in the document is the importance of considering Gwich'in language in conducting research.

- Guidelines and best practices for tribes/TK holders: Document provides a template for tribes and others who are seeking to formalize a process for ensuring that TK is used and protected in an effective manner. Document also provides a "cheat sheet" for what constitutes informed consent.
- Guidelines for researchers and others: Guidelines for what constitutes informed consent have the potential to aid researchers and other non-tribal parties as they seek to collaborate with tribes. Clear requirements for conducting research with Gwich'in people provide a template for any researchers working in Indigenous communities.

Gwich'in Social & Cultural Institute. 2004. "Traditional Knowledge Policy."

<http://www.gwichin.ca/TheGwichin/GTCTKPolicy.pdf#10.pdf>. (November 15, 2013).

Type of Publication: Protocols, Policy and Law

Keywords: Gwich'in, Indigenous policy, traditional knowledge, research protocol, Native language

[Holcombe, Sarah et al. 2009. Indigenous Ecological Knowledge and Natural Resources in the Northern Territory: Guidelines for Indigenous Ecological Knowledge Management \(including archiving and repatriation\).](#)

This report is part of a broader series of reports intended to inform natural resource managers in Northern Australia of their responsibilities towards Indigenous intellectual property rights, and to develop guiding principles and practices to promote respect of these rights. These guidelines are designed to protect Indigenous peoples' rights to protect and manage their own TK, and to ensure that outside managers, researchers and government agencies actively recognize and support the rights of Indigenous people. Some information within the report is highly specific to Indigenous peoples in Australia, e.g. specific cultural practices for establishing who has responsibility to manage certain land. This report advocates for the development of research and archiving procedures that are embodied in local communities, as to support intergenerational knowledge transmission (4, 9). This report advocates for free, prior and informed consent (FPIC) and benefit-sharing as foundations for interactions with Indigenous Ecological Knowledge (IEK) (5, 11-13). This report bases its approach in the acknowledgement that Indigenous communities already have established protocols for handling and interacting with IEK, and that all research should understand, respect and follow these protocols (7, 11). In addition to discussing archiving, the report offers guidance for repatriation of materials/knowledge (18-19). The report also discusses issues of IEK protection and access when housed in databases, registers and archives (9-10, 14-15), advocating for the creation of institutions that are modeled after Indigenous conceptions of IEK protection and knowledge transfer. The report also addresses copyright, authorship and intellectual property law (16-17). Finally, the report includes case studies of successful archives, registers and databases (20-28).

Holcombe, Sarah et al. 2009. [Guidelines for Indigenous Ecological Knowledge Management \(including archiving and repatriation\)](#). Report commissioned by Northern Territories Natural Resources Management Board.

Type of Publication: Technical Report, Guideline Document

Keywords: Traditional knowledges (TKs), Indigenous Ecological Knowledge (IEK), Indigenous Knowledge (IK), land management, natural resource management, Indigenous Cultural and Intellectual Property (ICIP), archiving, repatriation, intergenerational knowledge transfer, research protocol, research ethic, Free Prior and Informed Consent (FPIC)

[Houde, Nicholas. 2007. The six faces of traditional ecological knowledge: Challenges and opportunities for Canadian co-management arrangements.](#)

This article explores opportunities for greater involvement of Indigenous people in management and stewardship by examining TEK, First Nations and Canadian law and natural resource policy. By explaining TEK using a six part model which discusses both the management practices and spiritual beliefs held within TEK systems, Houde gives a detailed summary of opportunities and challenges for collaboration. At the same time, he provides a nuanced definition of TEK. Houde advocates for co-management in order to facilitate equitable solutions which more effectively protect and enhance ecosystems while achieving more just results for Indigenous peoples.

- Guidelines for federal managers and others: Houde's treatment of TEK expands on many existing policies and ideas of TEK, which emphasize only how TEK can benefit land management. Houde brings to light some of the conflicts that exist for Indigenous people in deciding what, how and whether to share TEK.

*Houde, Nicholas. 2007. ["The six faces of traditional ecological knowledge: Challenges and opportunities for Canadian co-management arrangements."](#) *Ecology and Society* 12(2). doi:34.*

Type of Publication: Academic Journal

Keywords: traditional knowledge, Canadian law, First Nations, management practices

[Inuit Tapiriit Kanatami and Nunavut Research Institute. 2007. Negotiating Research Relationships with Inuit Communities: A Guide for Researchers.](#)

This report offers a guide to researchers who are working with Inuit people. It addresses common concerns that Inuit community members have about research, and offers guidelines for researchers to ensure that research is conducted in a mutually beneficial, respectful and productive manner. The guide provides information about major concerns within Inuit communities surrounding research, lists advantages of participatory research, and gives a step-by-step template for researchers as they work with Inuit communities. The report also includes appendices with extensive information about appropriate agencies and organizations to contact regarding research protocols and permitting.

- Risks for indigenous peoples associated with research: Information may be used without TK-holders being properly consulted first. TK-holders may lose control of knowledge they have shared when researchers leave (i.e. TK-holders have no way to ensure what researchers do with the knowledge they have gathered). Knowledge can be appropriated and/or researchers can take credit for Inuit knowledge. Local expertise may be marginalized or overlooked in favor of peer-reviewed literature.
- Guidelines for researchers: The report recommends that researchers are forthright with Inuit communities. This includes collaborating to agree on a clear set of expectations about how data will be controlled, what research will be used for, how the community will be involved and how participants will be compensated. The report also offers a start-to-finish template for researchers to consider as they propose and carry out research in collaboration with Inuit communities.

Inuit Tapiriit Kanatami and Nunavut Research Institute. 2007. "[Negotiating Research Relationships with Inuit Communities: A Guide for Researchers.](#)" Eds. Scot Nickels, Jamal Shirley, and Gita Laidler. Inuit Tapiriit Kanatami and Nunavut Research Institute: Ottawa and Iqaluit.

Type of Publication: Protocol

Keywords: Inuit, research protocol, participatory research

[IPBES Proposed Procedures for Working with ILK.](#)

This document lays out objectives for conducting assessments for working with indigenous and local knowledge (ILK), with the intent of increasing collaboration between science and ILK and for creating greater integrating of ILK into IPBES' work. The document emphasizes that during assessments, free prior and informed consent (FPIC), as well as other protocols must be followed to ensure ethical and mutually beneficial research/assessments are conducted. This document details procedures and guidelines that each assessment will follow, including co-production of knowledge and the cultivation of respectful relationships between outside researchers and ILK holders.

IPBES. [Proposed Procedures for Working with ILK.](#)

Type of Publication: Procedures/Protocols, Policy

Keywords: indigenous and local knowledge (ILK), traditional knowledges (TKs), assessment, Free Prior and Informed Consent (FPIC), ethical research

[Mason et al. 2012. Listening and learning from traditional knowledge and Western science: a dialogue on contemporary challenges of forest health and wildfire.](#)

This article is the result of a workshop conducted on the Flathead Indian Reservation of the Confederated Salish Kootenai Tribes; workshop participants collaborated to author this article. The workshop brought together tribal elders, native and nonnative scientists, forest managers and academics to explore how to integrate TK and Native stewardship practices into existing western land management in order to better care for forest health, and in order to address wildfires. This article offers recommendations for increasing collaboration between western science and TK. The authors argue that effective collaboration will require "enduring commitments to knowledge sharing that extend beyond the usual boundaries of professional training and cultural orientation..." so that lasting, respectful

and mutually beneficial partnerships between native and nonnative land managers can exist. The article includes a list of recommendations for increasing collaboration between TK and SEK. Some of these recommendations are: collaborative development of conduct of relationship between tribes and agencies at a local level, creation of a national program for SEK/TK integration, workshops and other opportunities to increase face time between scientists, tribal leaders, agency staff, etc.

- Guidelines and best practices for tribes: Elders spoke about historical marginalization and appropriation of TK and how this has informed a cautious approach to collaboration for TK holders. They also discussed how because of the sacred nature of knowledge being shared, it is vital that respectful exchanges occur. Elders also related the difficulties in translating knowledge/putting into terms that are easily understood by a western scientific viewpoint (18). Native students and tribal foresters spoke about the importance of receiving support as they attempt to bring TK in tribal management practices, and how much they appreciated the support of elders in the community (189).
- Guidelines and best practices for agencies: The ITC spoke about overcoming assumptions that SEK was the “best” knowledge type and how valuing TK through organizations such as LCCs has positive potential for agencies (190-1). Agency personnel advocated that agencies and others reach out to tribal knowledge holders to demonstrate that they working to change institutional arrogance, and to build face-to-face relationships based in mutual respect and a value for both parties’ priorities (191).

Mason L, White G, Morishima G, Alvarado E, Andrew L, Clark F, Durglo M, Durglo J, Eneas J, Erickson J. 2012.

[“Listening and learning from traditional knowledge and Western science: a dialogue on contemporary challenges of forest health and wildfire.”](#) *Journal of Forestry* 110:187–193.

<http://www.bia.gov/cs/groups/xnifc/documents/text/idc-018689.pdf>.

Type of Publication: Academic Journal

Keywords: traditional knowledge, scientific ecological knowledge (SEK), collaboration, land management, stewardship practices

[McKenzie Valley Review Board. 2005. Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment.](#)

This document explores how to integrate TK into existing environmental impact assessments (EIAs) in the McKenzie Valley region of Canada. It outlines how TEK is to be integrated into existing EIA structures to ensure that Indigenous people are being represented, and to improve the EIA process. The document argues that integrating TK when developing EIAs will result in more representative and just EIAs, and also increase the effectiveness and scope of the EIAs. The document also provides information about how to collaborate with TK-holders, as well as when and how to approach communities about sharing information.

- Benefits and risks of sharing/TEK: Benefits of sharing TK center on having a voice in developing EIAs. By collaborating with U.S. policymakers and land managers, TEK-holders have an opportunity to ensure that their voices and concerns are heard.
- Guidelines and best practices for federal managers: Co-equal collaboration between communities and researchers.

McKenzie Valley Review Board. 2005. [Guidelines for Incorporating Traditional Knowledge in Environmental Impact Assessment.](#)

Type of Publication: Protocol

Keywords: traditional knowledge, environmental impact assessments (EIAs), collaboration

[Management of Social Transformations Programme \(MOST\) and Centre for International Research and Advisory Networks \(CIRAN\). 2002. Best Practices on Indigenous Knowledge.](#)

This list of case studies highlights the use of indigenous knowledge (IK) in development projects developed with the intent of applying IK to efforts to reduce global poverty and promote development. The document offers a

definition for IK, as well as a justification for the merits of including IK in development projects. The website offers useful examples of collaboration between western science and IK. At the same time, the database includes some problematic language and assumptions regarding IK and indigenous peoples.

Management of Social Transformations Programme (MOST) and Centre for International Research and Advisory Networks (CIRAN). 2002. [Best Practices on Indigenous Knowledge](#).

Type of Publication: Database

Keywords: Indigenous peoples, traditional knowledges (TKs)

[Mi'kmaw Ethics Watch. 1999. Research Principles and Protocols.](#)

The Mi'kmaw Ethics Watch created research protocols in order to ensure that Mi'kmaw people are guaranteed ownership of all research and materials associated with that research, and to ensure that research in Mi'kmaw country benefits the community, and is conducted in an ethical and appropriate manner. The protocols laid out by the Mi'kmaw Ethics Watch can serve as a template to other Indigenous communities seeking to establish research protocols. One contribution of this document to ongoing issues surrounding protection of TK and community empowerment is the document's discussion of internal community methods for determining ownership of knowledge and for handling disputes about ownership and use of TK. The document discusses how Mi'kmaw people have ownership to knowledge based on individual, family, clan, societies and associations. Therefore, internal/tribal mechanisms for determining how to regulate and protect TK are necessary—this model for protecting TK keeps power in tribal infrastructure. This document also provides information about how to ensure that research materials are available in the languages of participating communities, and that all research is conducted in a manner that is respectful of Indigenous languages.

- Guidelines and best practices for Tribes/TK holders: These protocols offer a template for other Tribes. These protocols emphasize the rights of Indigenous people to retain control over research materials and to act as partners, not subjects, in research. Given ongoing issues around dissemination and appropriation of TK, this emphasis may be highly applicable for tribal communities.

Mi'kmaw Ethics Watch. 1999. [Research Principles and Protocols](#).

Type of Publication: Protocol

Keywords: Mi'kwaw, research protocol, traditional knowledge, ethics, protection of TK, Native language

[Nakata, NM, V Nakata, A Byrne, J McKeough, G Gardiner, and J Gibson. 2008. Australian Indigenous Digital Connections: First Generation Issues.](#)

This report is an attempt to better understand the challenges surrounding digitization of library archives and indigenous peoples'. While digitization of archived material has become increasingly streamlined, issues pertaining to indigenous Australians have received little formal analysis. Issues such as appropriateness of digitizing certain materials, ramifications of making materials more readily available, handling of archived materials, and the protocols around digitization are all examined in this study. The authors interviewed both library and archival staff, and indigenous professionals. The aim of this study was to highlight practical, ethical and legal issues with digitization of indigenous peoples' materials, and draw lessons from the experiences of libraries to guide archives moving forward. The report also includes a discussion of legal issues surrounding the digitization of indigenous materials (this treatment includes a chart and discussion detailing the differences between western and indigenous customary laws, see pp. 8-9).

- Guidelines and best practices for archivists and indigenous people: This study includes extensive information about 1) ongoing issues and problems current practices of archiving indigenous materials in Australian libraries, and 2) larger issues of western and indigenous law that underpin archiving problems (e.g. copyright law, historical marginalization and genocide, loss and recovery of TKs, ownership and

custodianship). The authors describe a system for guiding decisions on whether or not to digitize that includes not only considerations of copyright status of materials, but also the status of the material in indigenous customary law—they call this developing a risk management approach.

Nakata, NM, V Nakata, A Byrne, J McKeough, G Gardiner, and J Gibson. 2008. [Australian Indigenous Digital Connections: First Generation Issues](#).

Type of Publication: Technical Report

Keywords: archive, intellectual property rights, customary laws, copyright law, ethics

[NCAI Policy Research Center and MSU Center for Native Health Partnerships. 2012. Walk softly and listen carefully: Building research relationships with tribal communities.](#)

In an effort to promote mutually beneficial relationships between Native communities and researchers, the NCAI Policy Research Center and MSU Center for Native Health Partnerships released a guiding document for researchers. This document seeks to strengthen relationships between Native and non-Native researchers and Native communities. This document uses case studies to highlight critical considerations for researchers as they work in Native communities, including issues regarding research in sovereign tribal communities, the necessity of trust-building and honest relationships, the importance of conducting mutually beneficial research, the potential of Community Participatory Research Methods as an effective and just method, and importance of respecting local and traditional knowledges in research. The document also lays out guidelines which ask researchers to challenge personal assumptions as well as biases that may be inherent within certain research frameworks in order to create research that benefits Native communities, promotes insightful research, and supports equitable relationships with Native communities. These guidelines offer strategies to ensure that researchers are both cultural competent and well informed. The case studies in this document provide concrete examples of successful research partnerships in Native communities, and draw larger lessons from these case studies to help identify how to make research with Native communities successful and responsible.

NCAI Policy Research Center and MSU Center for Native Health Partnerships. 2012. “[Walk softly and listen carefully: Building research relationships with tribal communities](#).” Washington, DC, and Bozeman, MT: Authors.

Type of Publication: Protocol

Keywords: research, ethics, protocols, mutually beneficial research, partnership

[Nuu-chah-nulth Tribal Council Research Ethics Committee. 2008. Protocols & Principles for Conducting Research in a Nuu-Chah-Nulth Context.](#)

This document establishes protocol for government agencies and other researchers who are seeking to work with the Nuu-chah-nulth Nation. These protocols were designed to ensure that research done in Nuu-chah-nulth land is done so ethically, and with respect for Nuu-chah-nulth protocol. The document outlines research protocol and provides principles and ethics that must guide research conducted under the Nuu-chah-nulth Nation’s supervision.

- Best practices for tribes/TEK holders: This set of protocols offers a template for First Nations and tribes who are seeking to create research protocols of their own. While the document does not explicitly address FPIC or TK protection, the principles and ethics in the document relate directly to these issues.

Nuu-chah-nulth Tribal Council Research Ethics Committee. 2008. [Protocols & Principles for Conducting Research in a Nuu-Chah-Nulth Context](#).

Type of Publication: Protocol

Keywords: research, ethics, Nuu-Chah-Nulth

O’Neal, Jennifer. n.d. Respect, Recognition and Reciprocity: The Protocols for Native American Archival Materials.

This article contextualizes the development of the First Archivist Circle’s *Protocols for Native American Archival Materials*, explores the theoretical basis of the protocols, and responds to criticism that the protocols undermine modern archival theory and practice. O’Neal argues that the protocols strengthen archival work by promoting community involvement, an awareness of historical and social context, and actualization of social justice for Native communities. O’Neal’s article also provides insight into the contention that the protocols have brought within the archival community.

O’Neal, Jennifer. n.d. Respect, Recognition and Reciprocity: The Protocols for Native American Archival Materials.

Type of Publication: Academic paper, Protocol Review

Keywords: Protocols for Native American Archival Materials, postmodern archival theory, social justice

Secretariat of the Convention on Biological Diversity. 2004. Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessment regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities.

These guidelines were developed by CBD staff and indigenous partners to inform development projects that will impact indigenous peoples and their traditional lands and waters. These guidelines emphasize partnership between indigenous peoples and government agencies in scoping, planning and conducting projects, the protection of indigenous interests, lands and waters, and traditional knowledges. These guidelines focus on sharing information about proposed projects with affected indigenous communities, creating opportunities for indigenous people to approve/oppose projects, creating mechanisms for indigenous people to participate in project planning, supporting indigenous efforts to participate in planning, and measures for post-project relationships between project planners and indigenous people (e.g. an action plan moving forward, identification of a responsible party in the event of grievances, etc.). The guidelines also recommend that environmental impact assessments, cultural impact assessments and social impact assessments be carried out before projects are undertaken, in order to inform project planners about possible impacts facing the local peoples and environment as a result of the project. For each of these topics, the guidelines offer point-by-point guidance. This document also discusses prior and informed consent, ownership and protection of traditional knowledge, and the need for dispute resolution measures.

Secretariat of the Convention on Biological Diversity. 2004. Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessment regarding Developments Proposed to Take Place on, or which are Likely to Impact on, Sacred Sites and on Lands and Waters Traditionally Occupied or Used by Indigenous and Local Communities. Montreal, 25p. (CBD Guidelines Series).

Type of Publication: Technical Report, Protocol, Guidelines

Keywords: traditional knowledges, protocol, impact assessment, cultural impact assessment, sacred sites, indigenous peoples, informed consent

Substance Abuse and Mental Health Services Administration (SAMHSA). 2009. Culture Card: A Guide To Build Cultural Awareness—American Indians and Alaska Natives.

The Substance Abuse and Mental Health Services Administration developed a set of guidelines to assist federal disaster responders and others working in American Indian and Alaska Native (AI/AN) communities. These guidelines focus on ensuring that federal staff develop a rudimentary level of cultural competency for first responders to improve sensitivity and awareness before interacting with AI/AN communities. These guidelines provide information about common cultural norms and introductory information about how historical relationships can affect reaction within tribal communities, an encapsulated, fundamental description of tribal sovereignty and rights, and a brief overview of how knowledge and beliefs found in AI/AN communities are a

source of strength and adaptability for Native people. The Culture Card provides a helpful list of “do’s” and “don’ts” regarding etiquette in social interactions.

Substance Abuse and Mental Health Services Administration (SAMHSA). 2009. [Culture Card: A Guide To Build Cultural Awareness—American Indians and Alaska Natives.](#)

Type of Publication: Protocol

Keywords: cultural norms, cultural competency, guidelines, tribal sovereignty, social etiquette

Thaman, R., Lyver, P., Mpande, R., Perez, E., Carino, J. and Takeuchi, K. (eds.) 2013. The Contribution of Indigenous and Local Knowledge Systems to IPBES: Building Synergies with Science.

This report is broken into two parts. Part one draws from case studies and notes from the proceedings of an IPBES expert meeting to detail how Indigenous peoples’ knowledge systems are contributing to biodiversity and habitat management, while also exploring opportunities for traditional knowledges (TKs) and science to collaborate. Part two presents principles to guide IPBES’ approach for working with Indigenous peoples and knowledges. This annotation will treat part one and part two as separate.

Part one provides short summaries of case studies from around the world highlighting successful collaboration between TKs and science on ecosystem management. It also provides a detailed report of the IPBES Expert Meeting, during which panels discussed opportunities and challenges for increasing participation of Indigenous peoples and knowledge into IPBES initiatives. Outputs from the meeting include procedures working with different knowledge systems within IPBES which emphasize meaningful involvement of multiple perspectives and worldviews and respect for the unique rights of TK holders (28-32), and recommendations for creating a conceptual framework to guide IPBES work with Indigenous peoples (32). Key concepts discussed include co-production of knowledge, Free Prior and Informed Consent, intellectual property rights and respectful collaboration between TKs and science.

Part two provides information about how to work with ILK/TKs in IPBES initiatives. It offers specific guidance for IPBES programs, including requirements for successfully working with indigenous peoples (72), and guidance for collaborating with ILK holders during IPBES sub-global and global assessments. While the scope of the document is limited to IPBES assessments, several of the guidelines included are application to other efforts. One useful thing found within this document are a list of potential benefits resulting from collaboration between ILK holders and western scientists and decision-makers (68-70). Also included is a list of obstacles which prevent collaboration (71-3).

Thaman, R., Lyver, P., Mpande, R., Perez, E., Carino, J. and Takeuchi, K. (eds.) 2013. The Contribution of Indigenous and Local Knowledge Systems to IPBES: Building Synergies with Science. IPBES Expert Meeting Report, UNESCO/UNU. Paris, UNESCO.

Type of Publication: Technical Report, Protocol

Keywords: Intergovernmental Platform on Biodiversity & Ecosystem Services (IPBES), Free Prior and Informed Consent (FPIC), intellectual property rights, traditional knowledges (TKs), informed consent

Traditional Knowledge Governance Project. 2013. Preliminary Interim Guidelines on Traditional Knowledge.

This document provides a set of definitions and guidelines to guide tribes and others in making agreements and choosing how or whether to share TKs. The report includes a set of foundations regarding TKs, which help to explain how TK may be viewed in Native communities, and the importance this has for working with TKs. The guidelines emphasize the importance of Free, Prior and Informed Consent (FPIC) in creating partnerships that do not place undue burdens on tribes, informing tribes of risks regarding disclosure of TK and in fostering partnerships not based in exploitation.

- Guidelines for TK holders, researchers and others: These guidelines give perspective into tribal priorities around the nature of TKs, especially with regards to the Puget Sound, and around the importance of

having procedures such as FPIC when creating agreements in order to ensure non-exploitative and just partnerships.

Traditional Knowledge Governance Project. 2013. [Preliminary Interim Guidelines on Traditional Knowledge.](#)

Type of Publication: Protocol

Keywords: Free Prior and Informed Consent (FPIC), traditional knowledges (TKs)

[United Nations. 2013. Best practices and available tools for the use of indigenous and traditional knowledge and practices for adaptation, and the application of gender-sensitive approaches and tools for understanding and assessing impacts, vulnerability and adaptation to climate change.](#)

This report reviews existing best practices and tools for using traditional knowledges (TKs) in climate adaptation and explores existing issues of gender sensitivity in integrating TKs into climate adaptation planning. The report emphasizes that in order to integrate TKs into regional and national adaptation planning, researchers and adaptation planners must move beyond the use of TKs primarily as a means of indigenous participation in local adaptation efforts, and towards meaningful involvement of both western science and TKs as partner knowledge systems. The report discusses needs for improvement surrounding gender-sensitivity, including the disproportionate impacts that women face, the often diminished role that women play in climate planning, and the importance of developing gender-sensitive planning processes that engage all people meaningfully. The report is international in scope, drawing from a wide variety of adaptation planning examples. This report also includes information about several databases highlighting ongoing, local efforts to adapt to climate impacts (12). An existing risk facing indigenous people in adaptation planning that is emphasized throughout the report is the potential for adaptation planning that doesn't take TKs into account to lower the resiliency of indigenous people by severely altering the environment, and undermining existing indigenous strategies and tools to adapt. The authors caution that this is particularly likely to occur in instances where adaptation planners view TKs as static, and unable to contribute to a modern or contemporary context. The report discusses adaptation plans and vulnerability assessments, highlighting opportunities for greater integration of TKs in these plans (across multiple scales), and include a variety of examples of current plans and assessments (16-21). This extremely dense report also covers issues of indigenous ownership/stewardship of TKs (22-24), methods for enabling indigenous participation in planning (24), analysis of gaps in current trends of TKs use in adaptation planning (26), an analysis of gender-sensitive adaptation strategies and practices (30-34), lessons learned about gender-sensitivity adaptation planning (40), practices to foster gender-sensitivity (44-49), and a summary of the report's findings of gaps and opportunities for growth in adaptation planning (51-2).

- Guidelines for policymakers and planners: This report contains a dense synthesis of information, making it a valuable resource. It contains numerous examples and lessons learned regarding TKs in adaptation planning, and tools and methods for increasing gender-sensitivity in adaptation planning. Both of these issues are only beginning to emerge in international and national treatment of TKs, making this report valuable as a guide for those working with TKs on a national scale.

United Nations. 2013. [Best practices and available tools for the use of indigenous and traditional knowledge and practices for adaptation, and the application of gender-sensitive approaches and tools for understanding and assessing impacts, vulnerability and adaptation to climate change.](#)

Type of Publication: Technical Paper

Keywords: Traditional knowledges (TKs), gender-sensitivity, adaptation planning, vulnerability, resiliency

[UN Framework Convention on Climate Change \(FCCC\). 2014. Report on the meeting on available tools for the use of indigenous and traditional knowledge and practices for adaptation, needs of local and indigenous communities and the application of gender-sensitive approaches and tools for adaptation.](#)

Proceedings from a meeting dedicated to addressing available tools for use of traditional knowledges, the needs of indigenous peoples in adaptation, and the potential application of gender-sensitive approaches in adaptation. The meeting brought together indigenous and non-indigenous experts and scholars in order to establish best practices for working with indigenous peoples and TKs, and to better understand challenges facing indigenous people during climate adaptation efforts. The meeting focused on finding ways to effectively use TKs in adaptation efforts at a variety of scales. Another point of emphasis was effectively engaging holders of TKs. These notes include a figure of best practices (6) which offers good practices for engaging with TKs. The notes also offer an extensive list of challenges facing indigenous people and TKs in adaptation planning and project implementation (7-8); these challenges draw from the experiences and research of participants and others. The best practices offered by the expert panel emphasize relationship-building, communication, empowerment of indigenous communities. Some specific recommendations include legislative reform in order to better protect TKs from appropriation (9), and the use of methods which emphasize participatory research and project planning (9). This document includes recommendations for UN actors and others (10-13) which are based on the above good practices, experiences and challenges. In addition to issues of TKs, the proceedings also dedicate a section to creating gender-sensitive approaches and tools. Information which applies to TKs and climate change include recognitions of the importance of women in adaptation efforts, and the different roles that men and women play in many knowledge systems, as well as figure illustrating good practices and an informed process (15).

UN Framework Convention on Climate Change (FCCC). 2014. [Report on the meeting on available tools for the use of indigenous and traditional knowledge and practices for adaptation, needs of local and indigenous communities and the application of gender-sensitive approaches and tools for adaptation.](#)

Type of Publication: Technical report, proceedings, best practices

Keywords: indigenous peoples, traditional knowledge, indigenous knowledge, gender-sensitive approaches, participatory approaches

[Wild, Robert and Christopher McLeod \(eds\). 2008. Sacred Natural Sites: Guidelines for Protected Area Managers.](#)

This paper is part of a series dedicated to describing best practices in protected areas, and deals with the protection of sacred sites, and the need for reform in international and national policies regarding the protection and recognition of sacred sites, especially with regards to indigenous peoples. The report extensively details existing protection of sacred sites by conservation designations (e.g. national parks), and explores these issues from national and international perspective. The authors advocate for the use of sacred sites as a method for protecting biodiversity. Recognizing this potential offers room for indigenous stewards of sacred sites to increase the perceived legitimacy of their management practices.

- Guidelines for government agencies and managers: Report argues that indigenous management practices enhance biodiversity, and provides evidence that sacred sites are often high in biodiversity, and managed by indigenous stewards. Management practices should respect sacred places, and make room for indigenous management practices and priorities.

Wild, Robert and Christopher McLeod, Eds. 2008. [Sacred Natural Sites: Guidelines for Protected Area Managers.](#) IUCN, Gland & UNESCO: Paris.

Type of Publication: Technical Report

Keywords: Protected area, indigenous peoples, conservation, sacred sites, international law, traditional knowledges (TKs)

CASE STUDIES

[Anaya, S James, Report by the UN Special Rapporteur on the situation of human rights and fundamental freedoms of Indigenous People: Addendum, The Situation of Indigenous Peoples in Australia.](#)

This report provides context about historical human rights abuses against indigenous Australians, and evaluates the current state of aboriginal human rights in Australia. Some of the information in the report applies to

indigenous peoples in other areas of the world (e.g. North America). Specifically, information about failures of Australian law and policy to account for UNDRIP and other international standards of human rights are in many cases comparable to US and Canadian laws. One example is the rights of Indigenous peoples to redress for lands taken without free, prior and informed consent. Another concern which parallels those in North America is the effect that legislation can unintentionally have on indigenous rights (e.g. restrictions on water rights due to drought and impacts to indigenous gathering rights and/or land rights). Also relevant is the author's emphasis on self-determination and land rights.

Anaya, S James. [Report by the UN Special Rapporteur on the situation of human rights and fundamental freedoms of Indigenous People: Addendum, The Situation of Indigenous Peoples in Australia. 15th sess, UN Doc A/HRC/15/.](#)

Type of Publication: Technical Report

Keywords: Australia, aborigines, Torres Strait Islanders, indigenous rights, human rights, human rights abuses, land rights, policy reform, indigenous methods

Drought in the Four Corners Region.

Tribes in the Four Corners Region—located at the convergence of New Mexico, Colorado, Utah and Arizona's state borders—currently face a significant and extended drought. In addition to a diminishing water supply, these tribes also struggle with subpar water quality as well as aging and/or inadequate water supply infrastructure. Another consequence of drought is that sand dunes throughout the region are currently growing in size; dune movement and growth is encroaching on many rural, Native communities. A lack of effective coordination between federal, state and tribal agencies has made drought adaptation for tribes in the region even more difficult. Additionally, inadequate federal support has been allocated to these tribes to assist in drought adaptation measures. Despite these obstacles, tribes and others in this region are undertaking projects that demonstrate the potential for collaboration between federal and tribal governments in climate adaptation.

In response to drought concerns, the National Integrated Drought Information Services (NIDIS), tribal environmental staff and non-tribal agency staff have come together for a series of workshops. One such workshop, "Drought Preparedness for Tribes in the Four Corners Region," held in April of 2010 in Flagstaff, Arizona, highlighted several opportunities to increase effectiveness of drought preparedness programs by increasing tribal involvement in climate adaptation. Participants identified a greater level of support from the federal government, increased opportunities for collaboration both between tribes and between tribal and non-tribal governments, and a greater place for TK in drought planning as keys for effective drought adaptation. One avenue to increase representation of TK in drought adaptation is to involve elders and others with TK in drought monitoring and assessment efforts. Workshop participants noted that focusing on collaboration between scientific monitoring (by both tribal and non-tribal departments) and local/tribal communities can benefit tribes in adaptation by providing more integrated drought planning. Drawing on both TK adaptation measures—which have a long history of effective adaptation in the region—and on scientific data, tribes hope to create adaptation measures that are well funded, well supported and effective in aiding tribes in the region.

Margaret Hiza Redsteer, Margaret; Bogle, Rian C.; Vogel John M. 2011. [Monitoring and Analysis of Sand Dune Movement and Growth on the Navajo Nation, Southwestern United States.](#) United States Geological Survey.

Ferguson, Daniel et al. 2010. [Drought Preparedness for Tribes in the Four Corners Region.](#) Climate Assessment for the Southwest (CLIMAS): University of Arizona.

Type of Publication: Case Study, Scientific Study

Keywords: Four Corners, Drought, Climate Adaptation, traditional knowledge, National Integrated Drought Information Services (NIDIS), Navajo

[Emery, Marla R.; Wrobel, Alexandra; Hansen, Mark H.; Dockry, Michael; Moser, W. Keith; Stark, Kekek Jason; Gilbert, Jonathan H. 2014. Using traditional ecological knowledge as a basis for targeted forest inventory: paper birch \(*Betula papyrifera*\) in the US Great Lakes Region.](#)

This article describes a collaborative effort between the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) and the Forest Service to inventory paper birch, using both western science and TK. The project team relied on information provided by traditional craftspeople from the member tribes of the GLIFWC to inventory paper birch tree characteristics within the Great Lakes region. TK provided by these experts guided fieldwork carried out by the Forest Service's Forest Inventory and Analysis (FIA) Program. This collaborative work offers several lessons about working with science and TK. For example, FS field workers described difficulty interpreting some of the TK-based measurement criteria. This study proved many traditional gatherers' observation that paper birch supplies are decreasing in the region. The highly specific knowledge of these gatherers facilitated this finding, and opened the door to revising management strategies to include birch restoration. The findings are also notable because they featured large-scale collaboration between regional organizations. TK information was effectively transmitted from Anishnaabe TK holders to FS workers using guides and trainings in a way that benefitted gatherers and remained culturally appropriate.

- Guidelines for managers and tribal organizations: The case study presented in this study offers an example of effective collaboration between a US government agency and an inter-tribal organization. The emphasis on equal partnership, and respect for Anishnaabe values and TK provided the groundwork for inventorying paper birch in a way that was useful to both the Forest Service and to GLIFWC.

*Emery, Marla R.; Wrobel, Alexandra; Hansen, Mark H.; Dockry, Michael; Moser, W. Keith; Stark, Kekek Jason; Gilbert, Jonathan H. 2014. "Using traditional ecological knowledge as a basis for targeted forest inventory: paper birch (*Betula papyrifera*) in the US Great Lakes Region." *Journal of Forestry* 112(2): 207-214.*

Type of Publication: Academic Journal

Keywords: Traditional knowledges (TKs), Anishnaabe, Great Lakes Indian Fish and Wildlife Commission, Forest Service, paper birch, inventory, resource management, western science

[Gautam, Mahesh, Karletta Chief, and William Smith. 2013. Climate Change in Arid Lands and Native American Socioeconomic Vulnerability: the Case of the Pyramid Lake Paiute Tribe.](#)

This study focuses on the role that social vulnerabilities play in determining the climate vulnerability of the Pyramid Lake Paiute Tribe. There is extensive research on impacts to water resources in the Western US, including in the region of Nevada where Pyramid Lake is found. The dependence of tribal members on the lake and its ecosystem creates unique vulnerabilities for tribal members. This study uses interviews, surveys and socio-economic data to assess the vulnerability of tribal members to ongoing climate impacts. The authors also point out limitations to adaptive capacity that the Tribe faces due to underfunded federal support.

- Guidelines for managers (federal and tribal): This study demonstrates a variety of social and economic factors that influence vulnerability for the Tribe. Considering a wide variety of social factors in vulnerability assessments and in adaptation planning has the potential to strengthen adaptive capacity, as this study demonstrates.

*Gautam, Mahesh, Karletta Chief, and William Smith. 2013. "Climate Change in Arid Lands and Native American Socioeconomic Vulnerability: the Case of the Pyramid Lake Paiute Tribe." *Climatic Change*. 120: 585-599.*

Type of Publication: Academic Journal

Keywords: vulnerability, resiliency, social vulnerability, Pyramid Lake

[Indigenous Observations of Climate Change in the Lower Yukon River Basin, Alaska.](#)

The potential for TKs to contribute to broader understandings of regional climate impacts can be found in a recent study from Herman-Mercer, Schuster, and Maracle (2011). By interviewing elders in the St. Mary's and Pitka's Peak communities, these researchers were able to record local observation of changes to weather patterns, as well as changes to flora and fauna. The authors stress that the observations collected in the interviews should be accepted as valid on their own, and are not in need of scientific validation. They go on to describe their research as an attempt to deconstruct the imaginary divide between western science and TKs. These methods move research away from a paradigm that views TKs as only another set of data to reinforce studies, and towards a system of co-production of knowledge.

*Herman-Mercer, Nicole, Paul F. Schuster and Karonhiakt'tie Bryan Maracle. 2011. "[Indigenous Observations of Climate Change in the Lower Yukon River Basin, Alaska.](#)" *Human Organization* 70(3).*

Type of Publication: Academic Journal, Case Study

Keywords: traditional knowledge, climate impacts, western science, co-production of knowledge

[Spoon, Jeremy; Arnold, Richard. 2012. Collaborative research and co-learning: Integrating Nuwuvi \(Southern Paiute\) ecological knowledge and spirituality to revitalize a fragmented land.](#)

This article provides history about impacts of colonization to Nuwuvi (Southern Paiute) peoples, and showcases collaborative land management projects undertaken between Nuwuvi peoples and various government agencies. These projects highlight the potential for collaborative research projects to promote co-learning amongst Nuwuvi peoples and agency staff. The authors argue that these types of projects are effective at both revitalizing ecosystems and strengthening cultural revitalization efforts of Nuwuvi (e.g. by conducting research that involves multiple generations of Nuwuvi people as both participants and researchers). This article outlines elements of successful collaborative research—many of the key points articulated by the authors may be applicable for research protocols and guidelines (481-2). This research paper also includes ethnographic information from extensive interviews with Nuwuvi elders; it is a potential resource for others hoping to work with their elders. As part of these interviews, elders describe the importance of places in maintaining spirituality, and the importance of spirituality in maintaining places. Also of note, this paper includes land management principles from tribal research participants to FWS staff (494). These research projects have also led to the creation of the Nuwuvi Knowledge-to-Action Project, which aims revitalize cultural and ecology the region further by advocating for increased collaboration between Nuwuvi peoples and agencies through a government-to-government framework.

*Spoon, Jeremy; Arnold, Richard. 2012. "[Collaborative research and co-learning: Integrating Nuwuvi \(Southern Paiute\) ecological knowledge and spirituality to revitalize a fragmented land.](#)" *Journal for the Study of Religion, Nature and Culture* 6(4): 477-500.*

Type of Publication: Academic Journal

Keywords: Great Basin, space-based spirituality, ecological knowledge, traditional knowledges (TKs), collaborative research, Nuwuvi (Southern Paiute)

[Tooker, Lisa; Ka'ai'ai, Charles; Spalding, Sylvia and Simonds, Kitty. 2008. HO'OHANO HANO / NĀKUPUNAPUWALU.](#)

This quarterly journal includes articles which address issues of teaching traditional knowledges (TKs) and fishing practices in Hawai'i. One of these articles discusses teaching traditional knowledges in schools, and developing appropriate curriculum. Specifically, the authors detailed the proceedings of the Puwalu conference series that was dedicated to ensuring that Native Hawai'ian youth continue to receive instruction in their traditional ways, with an emphasis on traditional fishing and farming methods, and on addressing barriers of current education systems (e.g. requirements for teacher certification, curriculum that emphasizes Western cultural values).

*Tooker, Lisa; Ka'ai'ai, Charles; Spalding, Sylvia and Simonds, Kitty (eds.). 2008. [HO'OHANO HANO / NĀKUPUNAPUWALU.](#) *Current: The Journal of Marine Education* 24(2).*

Type of Publication: Academic Journal, Quarterly

Keywords: traditional knowledges (TKs), Native Hawai’ian, education, traditional fishing, traditional farming, natural resource management

INTELLECTUAL PROPERTY

[Alexander, Merle, K Chamundeeswari, Alphonse Kambu, Manuel Ruiz, Brendan Tobin. 2004. The Role of Registers and Databases in the Protection of Traditional Knowledge: a Comparative Analysis.](#)

This report analyzes existing registers and databases to explore their potential for protecting TK. The report provides background and definitions relating to TK, including an exploration existing definitions of TK (10-11), protection of TK (11), and the distinction between a registry and a database (11-12). The report also includes several case studies which highlight existing issues in TK databases and registries. One key issue highlighted in the discussion of databases is that many databases choose to remain private because national laws do not adequately protect the intellectual property rights of Indigenous communities to TK. One potential solution being explored in Canada is the implementation of “customary” First Nations law to protect TK, as current intellectual property rights in Canada were not created with TK in mind. Databases also raise questions of Prior and Informed Consent (PIC), as some databases may not be administered or controlled by the communities from whom TK was gathered—leaving ground for abuse and appropriation of TK by government or corporate interests (such as with the BioZulua Database in Venezuela). The document discusses at length the opportunities and challenges for protecting TK that databases and registers offer (29-33).

- Guidelines and best practices for federal managers: This document provides a summary of ongoing international issues surrounding TK. Additionally, it includes introductory information about what TK is, what protection of TK means, and what ongoing legal and policy issues surround protection of TK.
- Guidelines and best practices for tribes/TEK holders: This document offers case studies that highlight potential pitfalls associated with sharing of TK, including inadequate protection under current intellectual property laws, and the possibility that databases and registries may not be legally in the control of Indigenous peoples.

Alexander, Merle, K Chamundeeswari, Alphonse Kambu, Manuel Ruiz, Brendan Tobin. 2004. [The Role of Registers and Databases in the Protection of Traditional Knowledge: a Comparative Analysis](#). United Nations University Institute of Advanced Studies (UNU-IAS) Report. http://www.ias.unu.edu/binaries/UNUIAS_TKRegistersReport.pdf. (November 14, 2013).

Type of Publication: Technical Report

Keywords: Intellectual property rights, databases, registers, traditional knowledges (TK), customary laws

[Bannister and Hardison. 2006. Mobilizing Traditional Knowledge and Expertise for Decision-Making on Biodiversity.](#)

This paper discusses how TK can be appropriately implemented in ecological management practices. The authors emphasize the legal and ethical pitfalls facing TK-holders as they attempt to include TK in management decisions. The article argues that in order to use TK in a manner that benefits Indigenous communities and supports the relationship between Indigenous and ecological/biodiversity health, management strategies must move beyond viewing the integration of TK into existing management strategies as a viable or ideal strategy. Instead, the authors offer that both TK and western scientific worldviews must be respected and valued as parallel and co-equal in order for effective and non-exploitative collaboration to occur. This paper is a preliminary investigation of existing tools being used by Indigenous organizations and others supporting Indigenous communities to simultaneously implement and protect TK within the field of biodiversity conservation.

- Risks of sharing/TK: Placing TKs in the public domain can lead to TKs being decontextualized (6). Current western legal framework (e.g. intellectual property rights, copyright laws) offer no protection for privacy/sacred TK (6).
- Guidelines for tribes/TK holders: Indigenous Information Networks offer a place for indigenous people to concentrate their knowledge, still have issues of public domain (8-9). Communities benefit from developing community research policy and protocols (10-11), including forming legal agreements between researchers and tribes (13-4). In order ensure TK within community is managed and watched after, create community traditional knowledge databases to (16-7). Relying on Indigenous community controlled/participatory research address issues of misuse and appropriation of TK (18).
- Guidelines for agencies and other non-Indigenous managers: Create and promote supportive structures for community-based management and co-management (20-1)

Bannister, Kelly, and Preston Hardison. 2006. "[Mobilizing Traditional Knowledge and Expertise for Decision-Making on Biodiversity](#)." International Mechanism of Scientific Expertise on Biodiversity (IMoSEB).

Type of Publication: Technical Report

Keywords: traditional knowledge, natural resource management, biodiversity conservation, ethics, western science

Hansen and Van Fleet. 2003. Traditional Knowledge and Intellectual Property.

Drawing from an international context, this report explores risks facing Indigenous communities surrounding TK. This report goes on to describe different methods that Indigenous people can use to protect their TK, and the risks and benefits associated with these methods. Included in this discussion is the economic risks and benefits facing Indigenous communities (e.g. corporate "biopiracy").

- Benefits and risks of sharing/TK: Risks to TK center around intellectual property rights, and the difficulties of retaining control of TK in Indigenous communities once that knowledge has been shared with people outside the community (3-5).
- Guidelines and best practices for tribes/TK holders: Document provides guiding information about how to protect TK within the existing intellectual property rights legal system. Advantages and drawbacks of several strategies are discussed. These include: patenting information/knowledge (several types of patents are explored), creating traditional knowledge registries, forming trade secrets, prior art and defensive disclosure (proof that knowledge under review for patent was already held by others), mutual benefits from sales/research of TK (9-30). Document also includes a step-by-step flow chart to aid Indigenous people in identifying where TK is held within their community, and how available/protected that knowledge is.

Hansen, Stephen A. and Van Fleet, Justin W. 2003. [Traditional Knowledge and Intellectual Property: A Handbook on Issues and Options for Traditional Knowledge Holders in Protecting their Intellectual Property and Maintaining Biological Diversity](#).

Type of Publication: Policy and Law

Keywords: traditional knowledge, intellectual property rights, property law, protection of TK, biopiracy

Hardison and Bannister. 2011. Ethics in Ethnobiology.

This article offers a historical summary of the development of ethics surrounding TK and Indigenous rights in order to provide the reader with a foundation to understand ongoing issues of TK, ethnobiology and issues surrounding western legal concepts of intellectual property rights, the rights of Indigenous people to manage and protect their knowledge systems, and ongoing attempts to advocate for Indigenous people through international law. This article is framed to offer background information about the creation of codes of ethics by international, national and regional organizations research involving Indigenous people and ethnobiology. Additionally, this paper provides guidance for ethnobiologists who work with Indigenous people. By offering historical perspective, and

information of a broad scope, this article offers insight about where current international laws and policies regarding TK and Indigenous people stand.

- Benefits and risks of sharing/TEK: Intellectual property rights in a western legal system offer poor protection for communal, sacred or familial knowledge. Copyright laws prevent reverse engineering of an invention as a method to copy and re-patent; applying this line of thinking to protection of Indigenous knowledge and practice, why is it acceptable for outside parties to modify or study landscapes and technology that has been developed and utilized by Indigenous groups for thousands of years/since time immemorial?
- Guidelines for federal managers and scientists: The article offers several ethics documents which may serve as guides. Additionally, it includes a summary of current issues for ethnobiologists to consider as they work with Indigenous people (43-6); this list of current issues includes intellectual property rights, access and benefits of sharing, and collections/dissemination of TK (e.g. public domain in western society).

*Hardison, Preston, and Kelly Bannister. 2011. "[Ethics in Ethnobiology: History, International Law and Policy, and Contemporary Issues](#)." In *Ethnobiology*, edited by E.N. Anderson, Deborah Pearsall, Eugene Hunn, and Nancy Turner. Hoboken, N.J.: Wiley-Blackwell.*

Type of Publication: Policy and Law, Academic Article

Keywords: ethnobiology, ethics, traditional knowledge, Indigenous rights, intellectual property rights, international law

[Hill et al. 2010. Guide to Free Prior and Informed Consent.](#)

This document is a resource for Indigenous communities, and details how to successfully employ FPIC to ensure positive outcomes. Included in the report is a definition of FPIC (8). The report gives a broad, internationally applicable, step-by-step guide for Indigenous communities as they exercise their right to FPIC. Their seven step plan is: 1) find out who is planning/developing a project, 2) request information from the developers, 3) hold discussions within your community, 4) community negotiations with developers, 5) seek independent advice, 6) make decisions as a community, 7) ongoing communications with project developers.

- Best practices for Indigenous people/TK holders: Includes step-by-step guide for ensuring that a community exercises their right to FPIC.

Hill, Christina, Serena Lilywhite, Michael Simon. 2010. [Guide to Free Prior and Informed Consent](#). Oxfam.

Type of Publication: Protocol

Keywords: Indigenous communities, Free Prior and Informed Consent (FPIC)

[Janke, Terri. 2009. Writing up Indigenous Research: Authorship, Copyright and Indigenous Knowledge Systems.](#)

This paper addresses issues of copyright and ownership of indigenous knowledge, in hopes of establishing research practices that empower indigenous people and respect indigenous rights to TKs and research products. Janke also advocates for the decolonization of research about indigenous people through increasing the number of indigenous researchers and indigenous-led research. While much of the report is applicable to a broader audience, the report is written within the context of Australian aboriginal rights. This report clearly explains current international laws regarding the rights of indigenous people to ownership over their own knowledges, and describes the inadequacy of copyright laws to protect indigenous rights to knowledges. One major consideration with research materials is authorship, as these have serious implications for copyright and ownership. Specific legal issues with copyright discussed in the report pertain to Australian law, but have many similarities to US law. This report also offers a sheet of guidelines/points of consideration for research involving indigenous peoples (21), which includes a discussion of free, prior and informed consent, indigenous rights and other key concepts.

Janke, Terri. 2009. [Writing up Indigenous Research: Authorship, Copyright and Indigenous Knowledge Systems](#). Terri Janke & Company.

Type of Publication: White paper

Keywords: Australia, copyright law, traditional knowledges (TKs), intellectual property, research ethics, benefit sharing, appropriation, Aboriginal rights, collective ownership

[Laughlin, Jennifer. UN REDD Programme. 2013. Guidelines on Free, Prior and Informed Consent.](#)

This document offers 1) a summary of existing UN documents that define and discuss FPIC from both an international and regional context, 2) a definition of FPIC (18-20), and 3) a set of requirements for all REDD+ participant countries, as well as guidelines for others, to ensure that they respecting Indigenous rights to FPIC in management decisions (specifically those regarding forest conservation and management). These guidelines were created as part of the UN REDD+ Program, which aims to conserve forests and forest resources in order to mitigate climate change and promote ecosystem health. This document also includes a discussion of what governmental level is appropriate to seek consent from. Finally, the document includes several appendices which are designed to assist non-Indigenous agencies identify and appropriately work with Indigenous people. This document also includes information about the importance of Indigenous language in ensuring that a FPIC process occurs.

- Best practices for federal/governmental managers: The document offers very specific, step-by-step guidelines for REDD+ participant countries (22-4). It also includes information on when FPIC is required (taking cultural/intellectual/physical property, requesting that Indigenous people relocate, causing damages, any development, legislative measures). Also includes a table to help determine if action requires FPIC (27).

Laughlin, Jennifer. UN REDD Programme. 2013. [Guidelines on Free, Prior and Informed Consent.](#)

Type of Publication: Protocol

Keywords: United Nations, Free Prior and Informed Consent (FPIC), management, conservation, Indigenous peoples, guidelines

[Talakai, Malia. 2007. Intellectual Property and Safeguarding Cultural Heritage: A Survey of Practices and Protocols in the South Pacific.](#)

This survey investigates practices and protocols designed to protect cultural/intellectual property of Indigenous people in the South Pacific, and was commissioned by WIPO in response to concerns by Indigenous people that facilities such as museums, libraries and archives abuse and mishandle Indigenous cultural/intellectual property. The survey relied on published materials (e.g. existing protocols), and on interviews with facilities staff (e.g. museum curators) about their relationships with Indigenous intellectual/cultural property. This document includes two parts: a survey of existing ethics guidelines and practices at museums, libraries, archives, etc. across several South Pacific countries, and analysis of needs and opportunities for improvement in protocols (e.g. to protect Indigenous rights and property). Each country's survey results are given their own section in the paper.

Additionally, each major institution type is given its own subsection. As a result, the paper gives detailed information that allows comparison of protocols and standards across several countries in a region that features a sizable Indigenous population. This provides opportunities for comparison with United States policy and protocol, in addition to giving an overview of protocols in several countries.

- Guidelines and best practices for federal managers: This document offers case studies that allow comparison between different research protocols. The analysis in the report uses case studies to demonstrate the needs of cultural institutions with respect to technology, developing new and more just protocols, etc. For federal managers, this report offers a broad array of existing cases in which cultural institutions are undergoing changes in order to form more positive relationships with Indigenous people. These cases have value in informing management of cultural resources within the US.

Talakai, Malia. 2007. "[Intellectual Property and Safeguarding Cultural Heritage: A Survey of Practices and Protocols in the South Pacific.](#)" World Intellectual Property Organization (WIPO).

Type of Publication: Survey

Keywords: Traditional knowledges (TKs), intellectual and cultural property, ethics guidelines, archives

Tamang, Parshuram. 2005. An Overview of the Principle of Free, Prior and Informed Consent and Indigenous Peoples in International and Domestic Law and Practices.

This report gives extensive detail on existing international and national laws enforcing FPIC. A summary of international laws and declarations expressing the right of Indigenous people to FPIC can be found on pages 5-8. Page 9 features examples of some existing national laws requiring FPIC, including the Philippines. The report also includes a list of challenges and ongoing issues regarding the implementation of FPIC laws in national and international context (13-15). Amongst these challenges are: defining FPIC formally, legal recognition of FPIC and development of practical tools to aid agencies in implementing FPIC.

- Guidelines and best practices for tribes, federal managers, researchers: The report offers a summary of existing international laws regarding FPIC which are useful as a reference material both for tribes and agencies seeking to educate themselves on the development and current state of FPIC laws and practices.

Tamang, Parshuram. 2005. "An Overview of the Principle of Free, Prior and Informed Consent and Indigenous Peoples in International and Domestic Law and Practices," from *UNIES Workshop on Free, Prior and Informed Consent*, New York, January 17-19, 2005.

Type of Publication: Policy and Law

Keywords: Free Prior and Informed Consent (FPIC), International law, Indigenous peoples

Taniguchi et al. 2012. A comparative analysis of indigenous research guidelines to inform genomic research in indigenous communities.

This article addresses genetic research of Indigenous communities. The authors 1) review existing research guidelines for ensuring ethical research, and 2) offer policy recommendations for Indigenous leadership to ensure that their communities are protected. The articles finds that in the Canada, Australia, New Zealand and the US, existing ethical research guidelines are not adequate, and that the implementation of additional ethics protocols would benefit Indigenous peoples, researchers, policymakers and others in ensuring that research is conducted in a proper, ethical and good manner. The authors provide a set of recommendations that include 1) developing Indigenous research guidelines in the US, Australia, Canada and New Zealand, 2) recognizing the importance of trust in research and 3) creating policy that holds violators of ethics protocols accountable. The comparison of research practices across four countries gives this article a broad scope that helps to explain international trends in research practices. This article also offers insight by virtue of its critique of existing ethical research protocols.

- Guidelines and best practices for tribes, federal managers, researchers: Establishing protocols before conducting research is a vital aspect of forming an equitable and mutually beneficial relationship in research. Accounting for historical legacies and trauma, while also acknowledging that unethical research continues to be perpetrated against Indigenous people, is another vital point of consideration for both Indigenous peoples and their would-be collaborators.

Taniguchi, Nicole K.; Tualii, Maile; Maddock, Jay. 2012. [A comparative analysis of indigenous research guidelines to inform genomic research in indigenous communities.](#) *The International Indigenous Policy Journal* 3(1): Article 6.

Type of Publication: Academic Journal

Keywords: ethics, research, genetic research, research guidelines, Indigenous peoples

Williams and Hardison. 2013. Culture, Law, Risk and Governance: Contexts of Traditional Knowledge in Climate Change Adaptation.

Williams and Hardison note that there is a shortage of literature discusses legal risks that tribes face when choosing whether or not to share TK. Their article describes how existing western legal concepts of intellectual property rights, public domain and copyright make it difficult for tribes to retain control over TK. Williams and Hardison also discuss how existing laws such as the Freedom of Information Act (FOIA) present substantial obstacles to tribes as they decide if, when or how to share TK. Finally, this article offers up guidelines for tribes and TK-holders as they make decisions about if/how to share TK.

- Risks of sharing TK for tribes: Once TK is shared, it enters alien legal context. This means TK may not be adequately protected in US/non-tribal context, even if SEK and TK holders operated in a co-production/respectful cooperation (534). Copyright laws make it difficult to protect TK in globalized world (535-6). FOIA dictates that tribes cannot share information with US government on a private basis because these communications must be available for public review (536).
- Guidelines and best practices for tribes: Free, Prior and Informed Consent (537-8), Risk-Spirituality matrix (538-9).

Williams, Terry, and Preston Hardison. 2013. "[Culture, Law, Risk and Governance: Contexts of Traditional Knowledge in Climate Change Adaptation](http://link.springer.com/article/10.1007/s10584-013-0850-0)." *Climatic Change (special issue)*.
<http://link.springer.com/article/10.1007/s10584-013-0850-0>.

Type of Publication: Academic Journal

Keywords: traditional knowledge, intellectual property rights, copyright, public domain, Freedom of Information Act (FOIA), risks of sharing TK

TRADITIONAL KNOWLEDGES AND CLIMATE CHANGE

Baldy, Cutcha Risling. 2013. Why we gather: traditional gathering in native Northwest California and the future of bio-cultural sovereignty.

In this article, Risling uses examples from Karuk, Yurok and Hupa country (her homeland) to discuss how traditional gathering activities are critical to Native identity and sovereignty. She draws on Stefano Varese's concept of bio-cultural sovereignty to explore how gathering of basketry materials and the land management required to maintain culturally important plants are forms of cultural resistance. Risling also critiques current western intellectual understandings of California Indians struggles to retain their cultural practices against pressures of genocide, cultural genocide, legal oppression and bigotry. Risling also explores how the legal case Lynn v. Northwest Indian Cemetery Protective Association (1988) exemplifies the above issues. Risling's article contributes an understanding of how current US law does not adequately respect indigenous ways of knowing and interacting with the land. Her article also contextualizes these injustices historically.

Baldy, Cutcha Risling. 2013. [Why we gather: traditional gathering in native Northwest California and the future of bio-cultural sovereignty](#). *Ecological Processes* 2: 17.

Type of Publication: Academic Journal

Keywords: bio-cultural sovereignty, Lynn v. Northwest Indian Cemetery Protective Association (1988), cultural resistance, genocide, gathering, traditional knowledge (TK), traditional ecological knowledge (TEK)

Bohensky, Erin L., and Maru, Yiheyis. 2011. Indigenous knowledge, science, and resilience: what have we learned from a decade of international literature on "integration"?

In this article, the authors explore issues with efforts and theories centered on integrating indigenous knowledge into science. Specifically, the authors examine resilience-based theories, which promote collaboration between sciences and IK/TKs in order to create more resilient ecosystems and synthesize new knowledge. The authors offer three points as a way to promote beneficial resilience-based theories for knowledge integration between western science and TKs, while noting the potential drawbacks that resilience-based theories have had in the past. This paper used software to perform content analysis of existing papers in order to identify current themes in literature. In table 2, the authors provide the findings of their content analysis, which provide a succinct summary of key issues to integrating TKs and western science—this table is a strong reference. In their analysis, the authors

extensively deal with colonization of TKs, and power imbalances in collaboration. The authors offer four “critical features” to guide a more beneficial view of collaboration between TKs and western science: new frames (i.e. moving away from ideas of integration and towards co-equal conceptions), cognizance of social contexts, expanded modes of evaluation, and intercultural knowledge barriers.

*Bohensky, Erin L., and Maru, Yiheyis. 2011. “[Indigenous knowledge, science, and resilience: what have we learned from a decade of international literature on ‘integration’?](#)” *Ecology and Society* 16(4): 6.*

Type of Publication: Academic Journal

Keywords: Indigenous knowledge (IK), traditional knowledges (TKs), integration, resilience, western science, indigenous people, power, politics

[Cochran, Patricia; Huntington, Orville; Pungowiyi; Caleb, Tom, Stanley; Chapin III, F Stuart; Huntington, Henry; Maynard, Nancy; Trainor, Sarah. 2013. Indigenous frameworks for observing and responding to climate change in Alaska.](#)

This article identifies a lack of indigenous participation in climate change research in the Arctic. In response, the authors outline several strategies to increase indigenous participation. The authors provide context for their strategies by discussing the important role that traditional knowledges (TKs) play in indigenous climate observation, adaptation and research. Additionally, the authors describe ongoing impacts to indigenous Arctic communities. Lastly, they discuss their strategies, which emphasize fostering respect for multiple ways of knowing, and generating meaningful partnerships between indigenous and non-indigenous people at multiple scales (e.g. regional, national).

- Guidelines for researchers: This article provides strategies for both non-indigenous and indigenous peoples engaged in climate research. The 5 strategies described in the article provide a template for respectful and mutually-beneficial research.

*Cochran, Patricia; Huntington, Orville; Pungowiyi; Caleb, Tom, Stanley; Chapin III, F Stuart; Huntington, Henry; Maynard, Nancy; Trainor, Sarah. 2013. “[Indigenous frameworks for observing and responding to climate change in Alaska.](#)” *Climatic Change* 120: 557-567.*

Type of Publication: Academic Journal

Keywords: Arctic, traditional knowledges (TKs), adaptation, community engagement

[Doyle, John; Redsteer, Margaret; Eggers, Margaret. 2013. Exploring Effects of Climate Change on Northern Plains American Indian Health.](#)

This study uses the observations of tribal elders, including author John Doyle, as well as data from monitoring stations to gather insight about climate impacts (e.g. changes to phenology and seasonal water flows) on the Crow reservation in Montana. TK and western science data complement each other in the study. They also provide evidence that Northern Plains indigenous peoples and lands are already experiencing climate impacts. The study is also an example of one method for collaboration between western scientific and traditional knowledge. Co-authorship, complementary knowledge, and knowledge co-production are integral parts of this research project.

- Guidelines for researchers: This study is one example of how western science and TK can collaborate meaningfully. By emphasizing the importance of TK in making specific, fine-scale and long-term observations, the author team conducts research that is collaborative.

*Doyle, John; Redsteer, Margaret; Eggers, Margaret. 2013. “[Exploring Effects of Climate Change on Northern Plains American Indian Health.](#)” *Climatic Change*. 120: 643-655.*

Type of Publication: Academic Journal

Keywords: co-authorship, Crow Tribe, traditional knowledges (TK), knowledge co-production

[Lake, Frank. 2007. Traditional ecological knowledge to develop and maintain fire regimes in NW California, Klamath-Siskiyou bioregion: management and restoration of culturally significant habitats.](#)

In this dissertation, Lake explores how tribally-led prescribed burns in the Klamath-Siskiyou bioregion may improve the quality of plants used as basket materials. Lake's research included carrying out prescribed burns and drew on interviews with basket weavers and elders. To contextualize this research, Lake detailed past use of fire as a management tool by Native peoples, and western management strategies that impacted and continue to impact Native opportunities to practice prescribed burning. This dissertation provides an in-depth analysis of TK use and explores the issues associated with TK use, including obstacles to the use of TK, the effectiveness of prescribed burns, the historical and current impacts of fire suppression, and recommendations from tribal collaborators about incorporating TK into current management practices.

- Risks of sharing TK: It is difficult to transmit knowledge across TK and SEK. Historical appropriation creates potential for future misappropriation. There is a tendency of SEK to claim dominance over TK, which raises issues accountability for TK once gathered/used by SEK-holders (4-6).
- Guidelines and best practices for tribes/TK holders and SEK holders: Find opportunities for incorporation of TK into management (parallel and co-equal knowledge systems work together instead of integration of TK into management (how TK can contribute/support SEK) (48-55). Lake also discusses economic benefits of TK use (i.e. prescribed burns) when compared to fire suppression-based forest management (328-331).

Lake, Frank. 2007. "Traditional ecological knowledge to develop and maintain fire regimes in Northwestern California, Klamath-Siskiyou bioregion: management and restoration of culturally significant habitats." Ph.D. dissertation, Oregon State University.

Type of Publication: Dissertation

Keywords: natural resource management, Klamath-Siskiyou, Northern California, traditional knowledge, western science, scientific ecological knowledge (SEK), prescribed burns, fire

[Lynn, Kathy, John Daigle, Jennie Hoffman, Frank Lake, Natalie Michelle, Darren Ranco, Carson Viles, Garrit Voggesser, and Paul Williams. 2013. The Impacts of Climate Change on Tribal Traditional Foods.](#)

This study examines the importance of traditional foods to tribal culture, wellbeing and ways of life. By examining climate impacts to traditional foods, the authors expose subsequent impacts to tribal communities. This study argues that paying greater attention to traditional foods in adaptation efforts will strengthen the capacity of tribal communities to respond to and be resilient towards climate impacts. The authors of this study include indigenous and non-indigenous scholars and professionals who lend perspective to both the importance of traditional foods to native communities, and the variety of climate impacts facing traditional food species today. The article also discusses how TK has been used in the past and is used today to promote adaptation in native communities.

- Guidelines for natural resource managers: This article can contribute to climate adaptation efforts by highlighting cultural and social vulnerabilities faced by tribes through impacts to traditional foods.

Lynn, Kathy, John Daigle, Jennie Hoffman, Frank Lake, Natalie Michelle, Darren Ranco, Carson Viles, Garrit Voggesser, and Paul Williams. 2013. "The Impacts of Climate Change on Tribal Traditional Foods." Climatic Change. 120: 545-556.

Type of Publication: Academic Journal

Keywords: traditional foods, traditional knowledge (TK), adaptation, social and cultural vulnerability

[McGregor. 2005. Traditional Ecological Knowledge: An Anishnabe Woman's Perspective.](#)

McGregor discusses the shortcomings of TEK as a concept, and of current academic understandings of TEK. She does so using her perspective as an Anishnabe woman and college professor. Central to her critique is the point that from her understanding as an Anishnabe woman, the act of living TEK is what makes one knowledgeable about it, while current literature treats TEK as something that can be possessed outside of lived experience.

- Guidelines for Indigenous people: McGregor offers a helpful and grounding perspective for those people currently working with agencies and others. Her perspective is a reminder that TEK is not only a concept to describe the knowledges and lived experiences of Indigenous peoples.

McGregor, D. 2005. "[*Traditional Ecological Knowledge: An Anishnabe Woman's Perspective.*](#)" *Atlantis: Critical Studies in Gender, Culture & Social Justice*, 29(2), 103-109.

Type of Publication: Academic Journal

Keywords: traditional knowledge, Anishnabe

[McLean, Galloway Kirsty; Ramos-Castillo, Ameyali; Rubis, Jennifer \(Eds\). 2011. Indigenous Peoples, Marginalized Populations and Climate Change: Vulnerability, Adaptation and Traditional Knowledge.](#)

This report is the product of a workshop brought together indigenous community representatives, international organizations and research scientists in order to gain a better understanding of climate impacts to Indigenous and marginalized people, to compile data on traditional knowledge that may aid in adaptation and mitigation efforts and to provide input to the lead authors of the IPCC Fifth Assessment report regarding climate impacts to Indigenous peoples. This report details the proceedings of each session within the workshop, goes on to discuss the key issues raised in each session, and then provides recommendations for future adaptation efforts and research. A sample of some key issues raised in the report includes: use of traditional knowledge as a foundation for decision-making, challenges integrating Indigenous perspectives into science, cosmology/worldview in understanding climate impacts, social and cultural challenges (e.g. wars, political conflicts) which may exacerbate climate impacts and importance of promoting policies and action on climate impacts. The lessons learned through the workshop highlight a wide variety of issues facing Indigenous people. Because many of the panels address related information, there is some redundancy in the key issues and recommendations—this also makes the workshop proceedings difficult to summarize briefly. However, the report raises valuable and pertinent issues facing Indigenous peoples today. This workshop produced some notable outcomes, including a network of traditional knowledge holders and researchers who are collaborating through email listserv and the creation of a research database by UN University to hold research on TK, climate impacts, adaptation and mitigation.

McLean, Galloway Kirsty; Ramos-Castillo, Ameyali; Rubis, Jennifer (Eds). 2011. [*Indigenous Peoples, Marginalized Populations and Climate Change: Vulnerability, Adaptation and Traditional Knowledge.*](#) 19-21 July. Mexico City: Mexico.

Type of Publication: Proceedings, Summary

Keywords: traditional knowledges (TKs), vulnerability, adaptation, mitigation, resilience, marginalized populations

[Mercer et al. 2010. Framework for integrating indigenous and scientific knowledge for disaster risk reduction.](#)

This paper presents a framework for integrating western science and TEK into community environmental hazard planning; the framework presented by the authors emphasizes a participatory approach. The article focuses on small island developing states, and draws on research from Papua New Guinea. In addition to providing a framework based on their research, the authors also discuss existing challenges to implementing TEK in disaster risk reduction efforts (e.g. marginalization of TEK, economic pressure/inequalities). Also of note in the article is a chart/suggested additional research reference material which lists areas of environmental hazards (e.g. soil, water, etc.), and offers existing literature on how TEK may be applied to community-level solutions in these areas (215). A particularly interesting point noted by the authors is that TEK can be further marginalized by being centralized in archives, museums, etc. as these methods have the potential to disempower local communities, and TEK holders/users (219). Another contribution of the article is that it acknowledges that process-oriented frameworks can pigeonhole or limit Indigenous communities by imposing strict guidelines; the authors attempt to remedy this by offering a framework which is adaptive and focused on identifying community priorities, goals and strategies

(220). For an example of outputs this framework produces, see the cause-effect tree produced by the Kumalu community (227). In their research, the authors found that language barriers were a major barrier to collaboration, as connotation and finer points of communication were often lost between languages. They recommend that all parties involved collaborative efforts are very deliberate in ensuring that meanings are translated accurately and with care (229).

- Best practices for TK users and managers: The framework in this article explores one way to create collaborative disaster response plans. This framework emphasizes community participation and community control over research and research products.

*Mercer J., I. Kelman, L. Taranis, and S. Suchet-Pearson. 2010. "[Framework for integrating indigenous and scientific knowledge for disaster risk reduction.](#)" *Disasters* 34(1): 214-239.*

Type of Publication: Academic Journal

Keywords: traditional knowledge, disasters, risk reduction, small island developing states, adaptation, Native language

[Nakashima et al. 2012. Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation.](#)

Chapters 2 and 3 of this report detail ways in which TK offers unique contributions to understandings of climate impacts. In many instances, western scientific methods are ill-suited to observing and recording fine-scale, multi-variable changes to climate that TK is equipped to observe. In part because of this, TK can contribute unique insight into ongoing climate impacts. The report goes on to critically investigate vulnerability and adaptive capacity of Indigenous people. While Indigenous people are disproportionately impacted by climate change, they also possess tools for adaptation—many Indigenous people have expressed confidence in their ability to adapt, even to severe climate impacts. The report notes that TK enables many Indigenous people to claim such a high level of resiliency to climate impacts.

- Guidelines for policymakers: Indigenous peoples are being disproportionately impacted by climate change. At the same time, many Indigenous communities are amongst the most resilient to climate impacts because of TK held within their communities. Social and colonial stresses work in tandem with climate impacts to reduce Indigenous peoples' adaptive capacity.

Nakashima, D.J., Galloway McLean, K., Thulstrup, H.D., Ramos Castillo, A. and Rubis, J.T. 2012. "[Weathering Uncertainty: Traditional Knowledge for Climate Change Assessment and Adaptation.](#)" Paris, UNESCO, and Darwin, UNU.

Type of Publication: Technical Report

Keywords: traditional knowledge, adaptation, resiliency, vulnerability, climate impacts, western science

[Shackeroff, Janna M. and Campbell, Lisa M. 2007. Traditional Ecological Knowledge in Conservation Research: Problems and Prospects for their Constructive Engagement.](#)

In this paper, Shackeroff and Campbell explore challenges associated with the growing interest in using TEK/TK in the field of conservation. They note that conservation goals do not always align with TK holders goals and practices, and that the current enthusiasm for applying knowledge extracted from TK systems to conservation brings with it ethical and human rights considerations that are often overlooked by conservationists and natural resource managers. This article uses themes of power and politicization, ethics and situated knowledge to explain risks facing TKs as a result of conservationists' interest in TKs. The authors also argue that successful research is research that benefits both researchers and TK-holding communities, while being conducted in an ethical manner. The authors also explore ethical obligations for researchers in the U.S., and how this relates specifically to conservation research involving TKs. Finally, this article provides guidelines for conducting ethical and mutually

beneficial research with TK holders. These guidelines emphasize the importance of establishing clear protocols early in the research process, adopting collaborative research methods, working across academic disciplines,

*Shackeroff, Janna M. and Campbell, Lisa M. 2007. "[Traditional Ecological Knowledge in Conservation Research: Problems and Prospects for their Constructive Engagement.](#)" *Conservation and Society* 5(3): 343-360.*

Type of Publication: Academic Journal

Keywords: traditional knowledges (TKs), conservation, ethics, indigenous peoples, natural resource management, traditional ecological knowledge (TEK)

[Stark, Heidi Kiiwetinepinesiiik. 2010. *Respect, Responsibility and Renewal: The Foundations of Anishnaabe Treaty Making with the United States and Canada.*](#)

This article draws on historical accounts of treaty making between Anishnaabe nations, the United States, and Canada, as well as on existing literature describing Indigenous conceptions of treaties, to explain differences that exist between Indigenous and Euro-American conceptions of treaty-making. Stark then applies three principles from Indigenous treaty-making: respect, responsibility and renewal, in order to demonstrate how current interpretations of treaties between Indigenous people and United States and Canadian governments are limited, as they only consider European definitions and conceptions of treaty-making. Stark presents these three concepts as pillars that can be used to create more equitable and mutually beneficial relationships in the future. Additionally, Stark notes that existing treaties already hold these concepts, although the obligations of the United States and Canadian governments are not being met with regards to these concepts. Stark's article gives insight into a critical fact: treaties were made between two sovereign nations, yet only one of those nations' definitions and assumptions about treaties are being used to interpret what those treaties mean. Stark's explanation of Indigenous views on treaties that are currently overlooked by US and Canadian law gives a more complete understanding of the obligations found within existing treaties.

*Stark, Heidi Kiiwetinepinesiiik. 2010. "[Respect, Responsibility and Renewal: The Foundations of Anishnaabe Treaty Making with the United States and Canada.](#)" *American Indian Culture and Research Journal* 34(2): 145-164.*

Type of Publication: Academic Journal

Keywords: Anishnaabe, treaties, Indigenous treaty-making, American Indian, First Nations, Tribes

[Swinomish Indian Tribal Climate Change Initiative.](#)

In response to concerns about climate impacts on their community, the Swinomish Tribe developed their Adaptation Action Plan. This plan utilizes indicators of community and environmental health developed within the Swinomish community to gauge which climate impacts will be most severe to the community, and why. This plan drew on community members and TK from within the community to integrate TK into identifying and prioritizing climate impacts.

- Guidelines for tribes/TK holders: This document provides a template for integrating TK into climate adaptation planning. Both highly technical, and focused on community involvement and applicability to the Swinomish community (as opposed to being generalized), the plan demonstrates one way that tribes can incorporate community members' knowledge and priorities into climate change planning.
- Guidelines for agencies/federal managers: This plan clearly explains how community input and TK formed an integral part of identifying the Swinomish community's vulnerability and adaptive capacity to climate impacts. This plan is an example of how tribes can integrate TK into their planning process effectively; reviewing this plan may offer federal managers insight into what tribally-led integration of TK looks like, and how it is a valuable part of climate adaptation planning.

Swinomish Indian Tribal Community (Swinomish). 2010. [Swinomish Climate Change Initiative Climate Adaptation Action Plan.](#)

Type of Publication: Technical Report

Keywords: Climate impacts, adaptation, Swinomish Tribe, traditional knowledge, western science

[Tengö, M., Malmer, P., Brondizio, E., Elmqvist, T. & Spierenburg, M. 2013. The Multiple Evidence Base as a Framework for Connecting Diverse Knowledge Systems in the IPBESPDF.](#)

This paper, which preceded a more detailed report on the same topic, explores the Multiple Evidence Base (MEB) as a potential framework for creating productive collaboration between western science and TKs. The authors note that TKs can much to contribute to conservation and natural resource management, but that current frameworks are limited in bringing TKs and western science together as equal partners. The authors wrote these reports to be integrated into UN IPBES practices. This paper provides a summary of the MEB framework, as well as visual representations of the model. The authors note that current collaborative projects often require that TKs be validated by scientific methods; the MEB framework provides a more equitable alternative in which each knowledge system is treated as an equal partner. The paper also includes a list of case studies which have utilized a MEB approach, which provides examples of what this approach looks like in action.

Tengö, M., Malmer, P., Brondizio, E., Elmqvist, T. & Spierenburg, M. (2013). [The Multiple Evidence Base as a Framework for Connecting Diverse Knowledge Systems in the IPBESPDF](#). Stockholm Resilience Center (SwedBio), Stockholm.

Type of Publication: Technical Report

Keywords: TKs, Multiple Evidence Base (MEB) approach, IPBES, knowledge co-production

[Tengö, Maria; Brondizio, Eduardo S.; Elmqvist, Thomas; Malmer, Pernilla; Spierenburg, Marja. 2014. Connecting Diverse Knowledge Systems for Enhanced Ecosystem Governance: The Multiple Evidence Base Approach.](#)

This paper explores the potential for indigenous knowledge systems and western science to better collaborate in managing and conserving natural resources. The authors describe an approach—the multiple evidence base (MEB) approach—which attempts to bring indigenous and non-indigenous ways of knowing together as equals to address environmental and social problems and enrich both knowledge systems through cooperation. The MEB approach attempts to address existing power imbalances between indigenous knowledge and western science that exist in intergovernmental and other climate and/or natural resource management programs. By framing power imbalances in terms of validity, this paper demonstrates that indigenous knowledges have their own systems of validating knowledge, and that in order to have mutual respect, knowledge systems must respect multiple avenues for validating knowledge. The authors note that power imbalances must be explicitly dealt with during collaborative processes, to ensure that participants are all given the means to participate in an equitable manner. This paper also provides a guide/template for operating within an MEB approach.

Tengö, Maria; Brondizio, Eduardo S.; Elmqvist, Thomas; Malmer, Pernilla; Spierenburg, Marja. 2014. [Connecting Diverse Knowledge Systems for Enhanced Ecosystem Governance: The Multiple Evidence Base Approach](#). AMBIO.

Type of Publication: Academic Journal

Keywords: Indigenous knowledge, traditional knowledges (TKs), validation, ecosystem assessments, multiple evidence base (MEB) approach, co-production of knowledge

[Turner and Clifton. 2009. "It's so different today": Climate change and indigenous lifeways in British Columbia, Canada.](#)

Ethnobotanist Nancy Turner and Gitga'at elder Helen Clifton co-authored this article, which describes ongoing climate impacts in and around Hartley Bay, B.C. They note that phonological cues that Gitga'at people use to predict and guide gathering are becoming less predictable. More broadly, the article notes that the predictive capacity of TK suffers when climate impacts cause rapid environmental changes. The authors also discuss the

resiliency of southeast Alaskan Native peoples to past environmental changes such as drastic changes in sea levels, and floods. The authors advocate that TK be respected and considered in adapting to climate impacts, especially in the following three ways: “[1] providing direct knowledge and insights relating to weather, environments, species and habitats; [2] contributing to development of models for accommodating and adapting to ongoing and imminent climate change; and [3] presenting alternative pathways and approaches to sustainable living for future generations.” They also discuss these three points in greater detail.

- Best practices for managers: This article gives an excellent case study of 1) how Indigenous communities are using their knowledge to note and adapt to climate impacts and 2) what challenges are facing Indigenous communities. The authors’ call to respect and follow in the footsteps of the pathways provided by TK provides a viewpoint that may aid collaboration with TK users and holders.

Turner, N.J. and H. Clifton. 2009. [*“It’s so different today’: Climate change and indigenous lifeways in British Columbia, Canada.”*](#) *Global Environmental Change* 19, 180-190.

Type of Publication: Academic Journal

Keywords: Gitga’at, traditional knowledge, climate impacts, sea level rise, floods, adaptation

[Vinyeta and Lynn. 2013. Exploring the Role of Traditional Ecological Knowledge in Climate Change Initiatives.](#)

This report offers a synthesis of existing literature on TK and climate change. It goes on to explore the potential for TK in assessing and adapting to climate change. Additionally, it identifies problems that exist in merging western science and TK. This report also offers examples of how tribes are currently using TK in climate adaptation planning.

- Guidelines for tribes/TK holders: Guidelines for agencies and others: Report offers a broad synthesis of literature on TK, climate and adaptation planning; it is a strong reference material that provides background information and highlights current challenges facing TK in a climate change context. Additionally, the report explores issues surrounding collaboration between western science and TK.

Vinyeta, Kirsten, and Kathy Lynn. 2013. [*“Exploring the Role of Traditional Ecological Knowledge in Climate Change Initiatives.”*](#) *USDA Forest Service General Technical Report.*

Type of Publication: Technical Report

Keywords: traditional knowledge, climate change initiatives, adaptation, management

[Voggesser, Garrit; Kathy Lynn, John Daigle, Frank Lake, and Darren Ranco. 2013. Cultural Impacts to Tribes from Climate Change Influences on Forests.](#)

This article discusses current and projected climate impacts to forests that will in turn affect indigenous peoples in the US. The article then explores opportunities for action, including tribal adaptation and increased collaboration between the federal government and tribal governments. One concern facing tribes discussed in the article is the impacts that climate may have on forest-related TK. Drastic changes to ecosystems may weaken or undermine the maintenance, use and applicability of certain TKs. This article also urges for increased involvement of tribes in federal forest resource management and climate adaptation measures. The article includes suggestions for specific strategies such as species monitoring projects.

- Guidelines for managers: This article gives an overview of issues facing tribes and forests from climate impacts. Specific strategies for facing these challenges included in the article may help to increase productive and mutually beneficial collaboration between the US and tribal governments.

Voggesser, Garrit; Kathy Lynn, John Daigle, Frank Lake, and Darren Ranco. 2013. [*“Cultural Impacts to Tribes from Climate Change Influences on Forests.”*](#) *Climatic Change* 120: 615-626.

Type of Publication: Academic Journal

Keywords: traditional knowledges (TKs), forest resource management, wildfire, invasive species, adaptation

[Whyte, Kyle. 2014. Indigenous Women, Climate Change and Collective Action.](#)

This work stands alongside a growing body of literature that highlights the too often marginalized work of Indigenous women. Whyte uses examples from across the world to demonstrate how Indigenous women are working to maintain the cultural health of their communities by investing in responsibility-based relationships. Whyte posits that both ancient and novel systems of responsibility can guide Indigenous people in forming adaptive and mutually-beneficial relationships. Whyte also analyzes non-Indigenous political institutions' responsibilities towards Indigenous women. This analysis draws on an Indigenous perspective to provide a clearer understanding of what successful and just political relationships between Indigenous women and colonial states may look like.

*Whyte, Kyle. 2014. "[Indigenous Women, Climate Change and Collective Action.](#)" *Hypatia* 29(3): 599-616*

Type of Publication: Academic Journal

Keywords: Women, justice, ethics, responsibility, political change

[Wildcat, Daniel. 2013. Introduction: Climate Change and Indigenous Peoples of the USA.](#)

Wildcat's article provides an introduction to a series of academic articles addressing climate impacts to indigenous peoples in the US. Wildcat provides a perspective on tribal climate adaptation which views tribes as leaders in climate adaptation. Despite their position as innovators in climate adaptation and as those on the frontline of struggles against climate impacts, Wildcat notes that tribal efforts are often overlooked and under-supported by policymakers, western scientists and others. Wildcat also briefly describes the contributions of the other articles included in the special issue.

*Wildcat, Daniel. 2013. "[Introduction: Climate Change and Indigenous Peoples of the USA.](#)" *Climatic Change* 120: 509-515.*

Type of Publication: Academic Journal

Keywords: adaptation, traditional knowledge (TK), water, traditional foods, climate impacts

ETHICS AND TRADITIONAL KNOWLEDGE**[Battiste, Marie. 2005. Indigenous Knowledge: Foundations for First Nations.](#)**

This paper addresses the current gap in popular standing between Eurocentric and Indigenous knowledge in order to promote empowerment of Indigenous knowledge systems. Battiste notes that marginalization of Indigenous knowledge systems has been a hallmark of Eurocentric thought, one that is largely unfounded. Battiste explores the work of Indigenous scholars to reverse the marginalization of Indigenous knowledge systems, and draws heavily on the history and scholarship of Canadian First Nations peoples. Battiste goes on to explore how Indigenous knowledges are assuming a larger role in the academy, to the benefit of Indigenous peoples. Battiste critiques Eurocentric notions of Indigenous knowledges because Eurocentric thought considers TKs to be static, and applicable only to spirituality. Battiste also discusses how defining TKs is problematic because current definitions rely on a Eurocentric perspective. Finally, Battiste discusses the current extent of protection of TKs under Canadian law, noting the limitations of intellectual property law when applied to Indigenous peoples.

*Battiste, Marie. 2005. [Indigenous Knowledge: Foundations for First Nations.](#) *WINHEC Journal.**

Type of Publication: Academic Journal

Keywords: Traditional knowledges (TKs), Eurocentric knowledge, Indigenous knowledge, intellectual property law

[Mayer, R. 2007. What's wrong with exploitation?](#)

This philosophy paper explores exploitation in relation to other forms of wrongful gain to offer an explanation for why exploitation is wrong. Mayer also argues that the lack of mutual benefit is part of what makes exploitation wrong.

Mayer, R. 2007. "[What's wrong with exploitation?](#)" *Journal of Applied Philosophy*, 24(2), 137–150.

Type of Publication: Academic Journal

Keywords: ethics, exploitation, wrongful gain

[Meyers, C. D. 2004. Wrongful beneficence: Exploitation and third world sweatshops.](#)

In this philosophy article, Meyers argues that sweatshops are a form of exploitation not just because of human rights abuses that occur there, but because the wages and hours suffered by workers represent a form of exploitation. He notes that even though workers benefit from being employed, they are still exploited in that their employers are benefitting at their expense.

Meyers, C. D. 2004. "[Wrongful beneficence: Exploitation and third world sweatshops.](#)" *Journal of Social Philosophy* 35(3): 319–333.

Type of Publication: Academic Journal

Keywords: exploitation, ethics, philosophy

[Reo, Nicholas, and Angela Parker. 2013. Re-thinking colonialism to prepare for the impacts of rapid environmental change.](#)

This article argues that by coupling understandings of ecological and social impacts of colonization in New England, a better understanding of how colonization impacted indigenous people can be gained. Furthermore, the authors argue that that this understanding can be applied to ongoing climate impacts now facing the region. Using relevant concepts from ecology to analyze past changes may provide insight about how people are adapting to current environmental changes. The article relies upon concepts taken from the field of ecology in order to analyze historical, colonial environmental changes and offer lessons for current environmental change. By taking this approach, this article is advocating for an understanding of climate change that considers both social and ecological impacts. Unlike some other advocates who have considered social impacts (e.g. social vulnerability), the authors present a framework which applies ecological concepts to create a new understanding. Their approach demonstrates that there are multiple ways to understand the interplay between ecological and social impacts from drastic environmental change.

- Guidelines for managers: This article demonstrates that historical and social context are very important in understanding contemporary issues in Native communities. The authors also offer a new way to understand social and ecological impacts that can give insight into issues of rapid environmental change that Native communities are facing today.

Reo, Nicholas, and Angela Parker. 2013. "[Re-thinking colonialism to prepare for the impacts of rapid environmental change.](#)" *Climatic Change* 120: 671-682.

Type of Publication: Academic Journal

Keywords: Ecology, colonialism, coupled human and natural systems, feedback loops, environmental change

[Stories of Conflict: Genetic Science and Traditional Origins.](#)

One example of how western science and TKs can become polarized against one another is found in genetic research of the origins of Indigenous peoples of the Americas. This research has a bitter history with Indigenous communities, including exploitative and illegal research practices (e.g. using blood samples obtained for diabetes research for genetic analysis). On a more fundamental level, this conflict exposes how TK and western science may have core disagreements. For many Native people in the US, efforts to trace their genetic ancestry represent an attempt to de-legitimize their indigeneity; origin and creation stories in Native communities clearly state that

Native people emerged from their homelands. It is examples such as genetic research, which feature both a rocky history of abusive genetic research in Indigenous communities and the existing disagreements between Indigenous people and genetic researchers, that highlight the importance of establishing guidelines for mutually beneficial and respectful research relationships.

[“Ancient genome won’t heal rifts with Native Americans.”](#) NewScientist.com. February 12, 2014.

Type of Publication: News Article

Keywords: Genetic research, traditional knowledge, exploitative research

[Tropser, Ronald L. and Parrotta, John A. \(eds\). 2012. Traditional Forest-Related Knowledge: Sustaining Communities, Ecosystems and Biocultural Diversity.](#)

This book is intended to explore 1) the importance of Traditional Forest-Related Knowledge (TFRK) for the maintenance of cultural values and sustainable forest management, 2) conflicts and opportunities for collaboration between fields of western science and TFRK, 3) provide historical context of TFRK use and policies towards TFRK from an international scope and 4) analysis of approaches for included TFRK in management, including best practices and pitfalls. This book offers a detailed definition of TFRK and explores the similarities and differences between TFRK and western science disciplines (6-15). It also includes a detailed overview of intergovernmental and international policies and resolutions regarding the use of TK and TFRK (appendix chapter 1). The book includes a chapter dedicated to exploring research ethics of working with TFRK holders and users. This section offers advice on common research methods. It also includes an extensive list of best practices and ethical considerations for researchers, including the importance of free, prior and informed consent (FPIC), co-sharing of research benefits, respect for local laws and protocols and supporting the wellbeing of local communities during and after research. The book also cautions that conflicts of interest may lead to unethical research practices, and that appropriation and marginalization of TFRK is a serious concern for researchers.

- Guidelines for researchers and indigenous communities: Chapter 14 of this book offers a broad yet detailed summary of common issues and pitfalls to conducting ethical research, and offers best practices for doing so.

Tropser, Ronald L. and Parrotta, John A. (eds). 2012. [“Traditional Forest-Related Knowledge: Sustaining Communities, Ecosystems and Biocultural Diversity.”](#) World Forests 12.

Type of Publication: Book

Keywords: Traditional Forest-Related Knowledge (TFRK), traditional knowledges (TKs), research ethics, intergovernmental policy, international policy

[Wertheimer, A. 1996. Exploitation.](#)

In this book, philosopher Alan Wertheimer attempts to explain a process for determining when an action is exploitative. Drawing from a wide variety of historical examples, Wertheimer explores the nature of benefiting at another’s expense.

Wertheimer, A. 1996. [Exploitation.](#) Princeton, N.J.: Princeton University Press.

Type of Publication: Book

Keywords: ethics, exploitation, philosophy

[Whyte. 2013. On the role of traditional ecological knowledge as a collaborative concept: a philosophical study.](#)

Working from the field of philosophy, Whyte explores existing definitions of TEK in policy and natural resource science literature, and conflicts between Indigenous and non-Indigenous people surrounding how the term TEK is invoked and used. Whyte attributes this conflict to three factors 1) TEK as a term is often dismissed because of colonial preference for western science, 2) definitions of TEK are often coined by people from outside TEK-holding

communities who may “privilege their own agendas for...management” and 3) TEK is seen as a “competing authority” with western science, which predisposes conflict between scientists and TEK users. Because of the multiple, conflicting and possibly irreconcilable definitions of TEK, Whyte argues that we should redefine TEK to be a collaborative concept. Instead of focusing on finding a definition of TEK, Whyte proposes that managers and Indigenous people use to process of working together to understand different ways in which knowledge can be understood, and to achieve mutually beneficial relationships. The focus of this approach would be on bringing different knowledge systems together to create greater understanding of management issues, and more opportunities for productive collaboration.

- Best practices for managers and TEK users: Reimagining TEK as a collaborative concept takes the focus away from defining TEK, and towards finding productive management relationships.

Whyte, K. P. 2013. [“On the role of traditional ecological knowledge as a collaborative concept: a philosophical study.”](#) *Ecological Processes* 2(1): 1-12.

Type of Publication: Academic Journal

Keywords: traditional knowledge, natural resource management, collaborative management

[Whyte, Kyle Powys. 2013. Justice Forward: Tribes, Climate Adaptation and Responsibility.](#)

This article provides a philosophical framework for tribal and non-tribal professionals working with tribes on adaptation issues. In an attempt to address political and policy obstructions to tribal adaptation, Whyte proposes a forward-thinking justice approach to guide adaptation work with tribes. This approach emphasizes the responsibilities between parties as they develop and maintain relationships. Whyte argues that current political obstructions, when viewed in light of current climate impacts, create an unjust situation for tribal communities, as they severely limit the ability of tribes to adapt to climate change. Forward-thinking justice would remedy this problem by encouraging more responsible relationships between tribes and others. Whyte proposes five keys to achieving this state: conducting work that is “beyond compliance,” sheltering “government-to-government relationship[s],” honoring “trust responsibility,” “integrating tribal and non-tribal sciences” and increasing “multiparty governance.”

- Guidelines for federal managers: This article gives concrete guidance on an approach to build relationships between tribes and others that will strengthen tribal capacity to adapt to climate impacts. The framework that Whyte proposes has value both as a tool to guide individuals working within agencies, and to guide institutional reform on a larger scale.

Whyte, Kyle Powys. 2013. [“Justice Forward: Tribes, Climate Adaptation and Responsibility.”](#) *Climatic Change* 120: 517-530.

Type of Publication: Academic Journal

Keywords: justice, government-to-government relationship, trust responsibility, multiparty government, forward-thinking justice framework

CLIMATE SCIENCE AND IMPACTS

[Cozzetto et al. 2013. Climate Change Impacts on the Water Resources of American Indians and Alaska Natives in the U.S.](#)

This paper describes impacts to water resources facing AI/AN people in the U.S. While the authors acknowledge that the impacts to any particular community are unique, they note five common categories that climate impacts take across the U.S.: water supply and management, culturally important aquatic species, ranching and agriculture, tribal sovereignty and water rights, soil quality. This article describes these impacts in greater detail by looking at each region of the U.S. and examining how AI/AN communities in each region are being affected; the article lists water resource impacts specific to each region. This article includes demographic information on how many AI/AN

people live in rural communities, on-reservation and in urban centers. Additionally, the article includes statistical information about the access that AI/AN communities have to water, as well as comparisons to the U.S. general public. Based on the five impact categories, the authors of the paper also include a table of potential questions for future research (580).

- Best practices for federal managers: The content of this article supplies information about impacts facing tribes by region which provides context about climate impacts on AI/AN communities. Furthermore, the potential research questions supplies opportunities for collaboration between tribes, or between tribes and non-tribal entities (e.g. agencies).

Cozzetto, K., K. Chief, K. Dittmer, M. Brubaker, R. Gough, K. Souza, F. Ettawageshik, S. Wotkyns, S. Opitz-Stapleton, S. Duren, and P. Chavan. 2013. "[Climate Change Impacts on the Water Resources of American Indians and Alaska Natives in the U.S.](#)" *Climatic Change*. 120: 569-584.

Type of Publication: Academic Journal

Keywords: water management, climate impacts, American Indian and Alaska Native (AI/AN), tribal sovereignty, water rights

[Dittmer, Kyle. 2013. Changing Streamflow on Columbia Basin Tribal Lands-Climate Change and Salmon.](#)

This study looks at climate-induced changes to streamflow in the Columbia Basin. Drawing from existing hydrological data and supplemental modeling, the author finds that salmon (and lamprey) in the Columbia and Snake River basins face additional threats to their health as a result of increasing water temperatures and changes to seasonality and amount of streamflow. This study utilized several ways of measuring streamflow in order to determine possible climate impacts. Additionally, this study considers the large role that dams have played and continue to play in restricting salmon migration (and health). Impacts to streamflow and salmon health. These methods are: Seasonal Flow Fraction (SFF), Center of volume Timing (CT), Spring Flow Onset (SFO) and High Flow (HF). Amongst the findings are that streamflow spring-summer flows are decreasing, and that flood events are increasing in frequency. Impacts to salmon and lamprey depend on many factors, including individual species characteristics, variables in habitat and severity of climate impacts. However, the author concludes that climate impacts to Columbia Basin salmon face serious barriers as a result of increasing temperatures, floods and resulting disturbances to stream and river beds, and changes in seasonality of water flow.

Dittmer, Kyle. 2013. "[Changing Streamflow on Columbia Basin Tribal Lands-Climate Change and Salmon.](#)" *Climatic Change*. 120: 627-641.

Type of Publication: Scientific Study, Academic Journal

Keywords: salmon, lamprey, streamflow, Columbia Basin, climate impacts

[Grah and Beaulieu. 2013. The Effect of Climate Change on Glacier Ablation and Baseflow Support in the Nooksack River Basin and Implications on Pacific Salmonid Species Protection and Recovery.](#)

This study details the effects of climate change on glaciers in the Nooksack watershed. It explores the implications of changes to glacier size and health, and subsequent changes to hydrological systems in the Nooskack watershed on salmon health. The study identifies notable changes to glacial health, and identifies these changes as a potential source of harm for salmon populations. The study recommends in order to mitigate these effects that habitat restoration measures be aggressively and immediately implemented on the Nooksack River.

- Guidelines for tribes/TK holders: This paper is an excellent example of how scientific knowledge can be used to complement and reinforce TK. The data gathered for the study quantifies some of the challenges faced by salmon populations, and in doing so supports TK observations about climate impacts.

Grah, Oliver, and Jezra Beaulieu. 2013. "[The Effect of Climate Change on Glacier Ablation and Baseflow Support in the Nooksack River Basin and Implications on Pacific Salmonid Species Protection and Recovery.](#)" *Climatic Change*. 120: 657-670.

Type of Publication: Scientific Study

Keywords: Nooksack Tribe, glaciers, ablation, climate impacts, salmon, habitat restoration

[Grossman and Parker. 2012. Asserting Native Resilience: Pacific Rim Indigenous Nations Face the Climate Crisis.](#)

This anthology brings together works from Indigenous scholars across the Pacific Rim to provide Indigenous perspectives on climate change, information about ongoing impacts to Indigenous peoples in the Pacific Rim, cases of ongoing responses to climate impacts, and messages for possible paths forward; the topics covered in the book are diverse both in topic and geography.

Grossman, Zoltan and Alan Parker. 2012. [Asserting Native Resilience: Pacific Rim Indigenous Nations Face the Climate Crisis.](#) Oregon State University Press.

Type of Publication: Compendium

Keywords: Indigenous perspective, climate impact, Pacific Rim

[IPCC. 2012: Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change.](#)

This report addresses strategies to manage climate-induced disasters, and is international in scope. Included in the report is an executive summary. The report includes extensive information about how to determine risk and vulnerability to disaster, what ongoing and projected climate impacts ecosystems and human societies can expect to face, as well as a discussion of local, national and international adaptation strategies. Several sections of the report address Indigenous peoples' issues, including the severe impacts of dislocation to indigenous peoples (80-1), indigenous knowledge, risk assessment and community-based adaptation efforts (82, 84, 90), cultural aspects of risk (85), the importance of considering consequences of adaptation strategies on local and indigenous communities (298, 307), and the potential for local and Indigenous knowledge to contribute to climate adaptation (311-12). Also included in the report are case studies of disaster management, including examples featuring Indigenous peoples (503-4).

- Guidelines for federal managers: This report offers extensive information about disaster, vulnerability, risk and exposure. These concepts commonly arise in discussions of Indigenous people and climate impacts. This report introduces several issues currently facing Indigenous people in the field of disaster management. Additionally, the report situates these issues within the broader context of local, national and international management. The document is useful in describing disaster risks facing Indigenous people across the globe, and in outlining some potential strategies to address these risks.

IPCC. 2012: [Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change](#) [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, UK, and New York, NY, USA, 582 pp.

Type of Publication: Technical report

Keywords: disaster, risk assessment, vulnerability, indigenous and community-based adaptation