

# Protocol and Best Practice for the Research on and Public Distribution of Information from Projects involving Indigenous Peoples

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## Introduction and Overview

This is a protocol that seeks to protect a federally recognized American Indian tribe's intellectual property (IP) and traditional knowledge (TK) from unapproved usage, while securing a process through which researched information can be effectively obtained and disseminated.

While acknowledging that each American Indian community may vary regarding its own unique protocol practices, the following four sets of principles and issues are over-arching recommendations for developing positive communications and collaborative research relationships between a tribe(s) and researchers funded by federal and/or state agencies. Illustrative case examples will be provided throughout this document that were derived from the Coeur d'Alene Tribe and the University of Idaho collaborative, USGS-funded project, "Schitsu'umsh Relationships with Their Dynamic Landscapes: Identifying, Managing and Applying Indigenous Knowledge and Praxis" (2014-5).

Nevertheless, this protocol is designed to be generalizable and applicable to research with other Indigenous communities in North America. Readers should attempt to apply the principles to the specifics of their particular project. This protocol entails sets of interwoven and overlapping initiatives; aspects of which may occur *simultaneously*. These are sets of initiatives that do not align as a linear procedural series, e.g., starting with a Preliminary Phase, then an On-Going Phase, and ending with a Conclusion Phase. We advise you to read through the entirety of this protocol, becoming familiar with all four sets of principles, and then as you initiate your project and it unfolds, draw upon these sets of principles when appropriate.

The four sets of principles and related issues are:

### 1. **Ethics and Legality of Obtaining Permission to Conduct Research**

This entails acknowledging the intellectual and cultural property rights, as well as Tribal sovereignty of the federally-recognized American Indian tribe with whom you are seeking to initiate a research project. Do you have permission to enter the home of your host community? Upon entering, traveling within and eventually leaving the home, will the researcher adhere to responsibilities associated with the sovereignty of the host community? To effectively conduct research, is to have permission to do so.

Investigators should:

- Obtain an agreement with the Native community with which you are working to protect the IP and TK of the group, and which lays out the conditions of the research. This may take the form of a Memorandum of Agreement, a Tribal Council Resolution, or some other legally-binding agreement.
- Obtain approval from institutional authorities to conduct research with human subjects through an Institutional Review Board or similar approval process in which informed consent is recognized.
- Create a data management plan, which communicates the nature of the documentation, products, and deliverables generated under the research, as well as any restrictions placed upon each product.

Administrators should:

- Communicate institutional, agency, or other organizational requirements of funding or approving research, so that those requirements are understood by all parties entering into research and are represented in the agreements.
- Facilitate approval of such documents, recognizing the variety of groups that may have to review these documents, including legal teams, committees, and executive offices.

Data Stewards should:

- Expect the conditions of data management and sharing to be presented in the legal documents.
- Obtain, when possible, a copy of the agreements governing management and release of the data. This will facilitate communication around concerns in sharing data.

## 2. Collaboration with the Host community

This entails working in partnership with your host community, from designing the project, to conducting the research, and to disseminating the research. You will need to work in collaboration with your host community. You will need to allow the host community to help guide your travels within their home territory. To effectively conduct research is to do so in collaboration.

Investigators should:

- Insure that at each aspect and phase of the project, from research design, to research team membership, to data gathering (interviews, surveys, observations, archival), to data interpretation, to forms of tribal review and to forms of dissemination, are coordinated and implemented collaboratively, from co-designing and co-authorship.
- Meet often, meet as collaborators, face-to-face.
- Listen, be humble and ask frequently, even if you think you know the right procedure. Your humility in asking can be a testament to your sincerity. In asking and in collaborating, the project can be “our project,” with the tribe taking on more involvement in and ownership of the project’s initiatives.

Administrators should:

- Help insure that tribal collaborators are part of every aspect and phase of the project, from the proposal through to the final deliverables.
- Recognize that tribal organizational processes may not perfectly align with an agency schedule and process or vice versa. Be aware that some accommodation, such as accepting delays in the process, may be necessary.

Data Stewards should:

- Recognize that the tribal collaborators have as much responsibility and governance over products – reports, maps, datasets, etc. – as investigators. That responsibility *should* be outlined in the agreements obtained in principle 1.

- Identify the data contact(s) for the project should any questions about products arise. Verify if this contact has the authority to speak on behalf of both the tribal and non-tribal collaborators. If not, identify contacts that represent both tribal and non-tribal parties. All communications should go through both to prevent miscommunication.

### 3. Seeing from the Perspective of the Host community.

This entails acknowledging the possibility of a reality and worldview distinct from your own, based on differing ontological and epistemological principles. In entering the home of the host community, you will be traveling this Indigenous cultural landscape. To effectively communicate, collaborate and conduct research, is to begin to appreciate and understand the culture of the host community.

Investigators should:

- Acknowledge other ways of knowing and doing, other epistemologies, distinct from your own scientific way of knowing, not predicated on Cartesian Dualism or material reductionism. Without giving up validity and reliability tests, acknowledge other criteria for information, such as authenticity and appropriateness. To acknowledge the indigenous does not require giving up the scientific or vice versa.
- Recognize and facilitate forms and formats for the Indigenous products that align with the content of those products, e.g., narrative story and not a list of quantifiable variables.
- Recognize and facilitate Indigenous nomenclature and schema, aligned with the content projects, for metadata inventorying and repository housing. This would likely entail creative ways of linking the indigenous with the scientific.
- Recognize and honor that some knowledge and practice may be deemed too culturally sensitive to be shared publically.

Administrators should:

- Acknowledge other ways of knowing and doing, other epistemologies, distinct from your own scientific way of knowing, not predicated on Cartesian Dualism or material reductionism. Without giving up validity and reliability tests, acknowledge other criteria for information, such as authenticity and appropriateness. To acknowledge the indigenous does not require giving up the scientific or vice versa.
- Recognize that the projects of investigators may not align with existing archival and repository systems, but explore ways with investigators and their collaborators on how to house and disseminate.
- Expect that some anticipated deliverables (or portions of them) may not be delivered due to denials in the approval process. Approval is not merely a technical review of the product, but also a historically, politically, and socially determined review.

Data Stewards should:

- Recognize that the form or format of the product may not be an easy “fit” into existing archival and repository systems. However, it may be the best form for that product to take. This does not mean that the data is “invalid” or of low-quality.

- Obtain or construct metadata in a form that accommodates the cultural sensitivities of the product. For example, if the indigenous language is present in the digital object represented by the metadata, make note of it in the metadata record, using the appropriate ISO 639-3 code.
- Geographic locations should only be used with precision if agreed to through the approval process. Otherwise, abstract the location to a much larger, but still somewhat representative level. For example, revealing the precise locations of the Schitsu'umsh-valued *Sagittaria latifolia* is culturally insensitive. However, describing the region using the Schitsu'umsh ancestral lands allows the location to be generally representative, but not too specific.
- Temporal extents, such as ISO 8601 date/time formats, may be inaccurate. Traditional ecological knowledge may not have a beginning and ending or follow a linear temporal pattern. There may be no way to express the date of something other than the date the digital object represented by the metadata was created.
- Maintain adherence to legal restriction on personally identifiable information (PII) and similar laws designed to protect the privacy of individuals. Do not release information with names, social security numbers, addresses, etc. This applies to both data and metadata.
- The appropriate metadata format should align with the disciplinary basis for the research, e.g. geographic formats (FGDC, ISO) for earth science research, biological formats (EML, FGDC BDP) for life sciences research, and social science formats (DDI) for sociological or anthropological research.
- Expect that some anticipated deliverables (or portions of them) may not be delivered due to denials in the approval process. Approval is not merely a technical review of the product, but also a historically, politically, and socially determined review. .

#### 4. Reciprocity and “Giving Back”

This entails assuring that some aspect of the research project is meaningful and applicable to your host community, as defined by your host the host community. For what has been shared with the researcher, often what is most cherished by the host community?

Investigators should:

- In consort with your collaborators, explore and develop ways in which the research of the project will benefit the host community, as defined by the community.

Administrators should:

- Expect that some project deliverables may not have direct scientific value, but are designed to have value for the host community. Funding should be allocated accordingly.
- Deliverables should be signed off on by all collaborators, both tribal and non-tribal. If revisions to reports are needed, both parties need to approve.

Data Stewards should:

- Expect that some project deliverables may not have direct scientific value, but are designed to have value for the host community. Develop and facilitate dissemination accordingly.

- Rights statements should concern all parties represented by the investigators, unless specified otherwise in the research agreement.
- Authorship statements in metadata should be careful to include both tribal and non-tribal collaborators, unless otherwise instructed by the investigators.

## *Detailed Discussion of the Four Principles*

### **1. Ethics and Legality of Obtaining Permission to Conduct Research**

If “welcomed,” the researcher should strive to engage as a “guest” in the “home” of a “host community,” and act accordingly. When one comes “knocking on the door” one must not be surprised to be greeted by some who would question their intentions. The wounds of historical trauma still exist within tribal communities and given that your agency is a representative of a federal government with a history of past assimilation policies, the “guest” should listen respectfully, acknowledging past transgressions, and humbly accept a possible “tongue lashing” (Brown-Rice 2014).

“Being invited in” demonstrates a level of initial trust that needs to be earned by action, and implies that the host community has hope that no harm will come to the members of their community as a result of the research. Care must be taken to maintain that trust and avoid intentional or unintentional actions that might violate the trust between the host community and the guest. Trust is maintained through careful actions, understanding of the host community’s cultural norms, and a motivation to benefit both parties.

Thus, a primary responsibility of the researcher is to:

- Protect the intellectual and cultural property rights of the Indigenous “community” from exploitation and expropriation
- Protect the tribe’s ethical right to frame a research protocol that would initiate, carryout and disseminate research

But researchers also must respond to the concerns and needs of a funding organization – whose requirements placed on the research integrate them into the role of the “guest” - and facilitate public access, dissemination, and management of the generated research. This approach is consistent with federal, state, and university expectations of the protection of human subjects in research through informed consent (45 CFR § 46). The Department of the Interior adheres to these protections, through the “Common Federal Policy for the Protection of Human Subjects” (56 Fed. Reg. 28012-28018; DOI Manual, 305 DM 3.10).

Protected under Tribal laws and policies, as well as Federal treaty and executive order agreements, a protocol should acknowledge the sovereignty of Tribal communities. Established by the U.S. Constitution, treaties, federal case law, and executive orders, the United States Federal Government has a special Trust relationship with federally-recognized tribes. As affirmed in Executive Order 13177, a critical component of that Trust responsibility is a government-to-government relationship in which a federal or state governmental agency or department would first develop consultation with a tribe **before** initiating research that could affect Tribal cultural practices, natural resources, or trust lands. Consultation would subsequently continue during the research phase through to its conclusion and dissemination of the resulting research.

Initial consultation would seek to establish a collaborative relationship between the agency and its researcher(s) with the appropriate Tribal official and/or staff member associated with the focus of



the intended research, e.g., Cultural Resources, Education, Natural Resources, etc. The Tribal official to be contacted is likely the head of a department or program, or an elected Tribal Council member.

Each tribe will likely have its own tribal research protocol that must be followed. As in the case of the Coeur d'Alene Tribe, if the Tribal department is amenable to the proposed research, the agency researcher and designated Tribal official would collaboratively develop a proposal that would eventually go to a Natural Resources and Culture Committee for review and approval, and then onto the Tribal Council (or Executive Committee or other Tribal governing body) for review and approval. Whether or not Traditional Knowledge (TK) is involved in the proposed project or not, it is likely, though not certain that the tribe's Culture Committee would be involved in the review process. A Culture Committee is a body of elders and other Tribal members who are acknowledged by the community for their cultural competency and are vested with the responsibility of reviewing and approving research involving Tribal history and/or culture. Of primary concern in determining the value of proposed research is the protection of Tribal cultural practices.

The nature of Tribal participation at the pre-approval stage should include consultation in the research design, in methods of information gathering, in the analysis and interpretation of information, and in the nature of the format for information sharing. The project proposed should identify the general merit of the project and that the results of the proposed research would have application and benefit for the tribe. This will be defined by the tribe. (See discussion of D) Willingness to Share and to "Give Back" below.)

The forms of internal and external communication and decision making, routing and approval processes can be complex within any given tribe and vary from tribe to tribe. Consider that each tribe, with enrollments ranging from the hundreds to a few thousand, functions as independent nations, with their own governing laws, codes and procedures, while at the same time coordinating with federal and state laws and jurisdictions and the associated agencies and departments. The timelines for communications and decision making between tribal and Federal/State offices and departments may not align, necessitating the allowance of extra time to facilitate partnerships. In the case of the Coeur d'Alene Tribe, their Natural Resources and Culture Committees, both necessary in the review and approval processes, meet once monthly. Also acknowledge that each tribe represents multiple families, each with their own historic and cultural traditions subtly distinct from each other. A successful implication of a project represents having negotiated a local social territory and attained of a *consensus* among the governing levels of Tribal representatives. As a researcher or administrator, seek to be as inclusive and neutral in your communications and collaborations with all families, while at the same time taking the advice and direction of your particular sponsoring host community as you travel that social territory.

Approval of the proposal could be typically formalized in a Tribal Resolution or similar document. As a legal document, a Tribal Council Resolution is an enactment of Tribal jurisdictional authority and is binding within that jurisdiction. A resolution will likely stipulate that "no information derived from this project can be disseminated outside the Tribe without prior approval by the Tribe." This formalized approval must come before an agreement between the Tribe and governmental agency regarding the distribution of funding has been defined and approved.

After approval, the agency researcher would consult with the tribe's cultural resources office, who would identify any potential Traditional Knowledge (TK) that might be part of the research sought. As research is conducted, all recorded information would be identified and marked as "confidential information." As in the instance of the Coeur d'Alene Tribe and the University of Idaho "Schitsu'umsh Relationships with Their Dynamic Landscapes: Identifying, Managing and Applying Indigenous Knowledge and Praxis," 2014-15, the researcher is granted a "license" to use the TK in fulfillment of a project's research and educational objectives. Ongoing consultation with the tribe provides for regular reviews of research for newly identified TK and thus confidential designation. Only upon review and determination by the tribe can the "confidential" status of the TK be removed and the TK released to a third party, e.g. for publication or presentation. As a recipient of federal funding, the general public has the right to request and receive on-going research. When research is identified and marked as "confidential," and the TK is excluded from public access and thus not subject to FOIA requests (43 CFR § 12.936).

Traditional Knowledge can be defined as information that is: generated, preserved and transmitted in a traditional and intergenerational context; distinctively associated with a tribe which preserves and transmits it between generations; integral to the cultural identity of the tribe, which holds the knowledge through a form of custodianship, guardianship, collective ownership, or cultural responsibility. This relationship may be expressed formally or informally by customary or traditional practices, protocols or laws. The foundations for this definition of Traditional Knowledge is based upon the definition given by the World Intellectual Property Organization (WIPO), an agency of the United Nations (see <http://www.wipo.int/tk/en/>), and is used in the 2014-15 "Schitsu'umsh Relationships with Their Dynamic Landscapes" Project. It is important to note that the particular tribe through which an agency is seeking to collaboratively work with may have a different definition of Traditional Knowledge (i.e., Traditional Ecological Knowledge, Indigenous Knowledge, etc.), and clarification with that tribe is necessary. In the instance of the Coeur d'Alene, their closest phrase to TK is *hnkhwelkhwlnet*, "our ways of life in the world," which necessitates clarifying its similarities and distinctions from that of Traditional Knowledge.

**An Example Agreement.** The following information summarizes a contract agreement protocol for intellectual property and traditional knowledge developed between the Coeur d'Alene Tribe and the University of Idaho in the "Schitsu'umsh Relationships with Their Dynamic Landscapes: Identifying, Managing and Applying Indigenous Knowledge and Praxis," 2014-15. Although the following summarized protocol provides the general structure for addressing concerns of the tribe and University related to Intellectual Property (IP) and Traditional Knowledge (TK), it was developed to fit within the University's existing federal subaward agreements involving the transfer of funding to the tribe to support the research initiative, and to respond to the particular terms required of a USGS award to the University. In this sense, the following protocol potentially shows how IP and TK might be recognized as protected under sub-awards with other federal funding sources. As such, an agency or university will likely make adjustments in other Terms and Conditions Protocols, based on the federal funding sources and consultation with the tribe involved. A generic version of this agreement is included as an appendix, "Exhibit [X] Traditional Knowledge." Many of legal terms used in the Example Agreement are provided definitions in the appendix document.

## **Coeur d'Alene Tribe - University of Idaho Terms and Conditions Intellectual Property and Traditional Knowledge**

**Protocol.** Upon written agreement between the University and the Tribe, the following conditions and terms would be followed.

**License Granted.** The Tribe grants to the University a license to its Traditional Knowledge to be used for the project. See definition of "Licensed Traditional Knowledge Rights" below.

**Initial Consultation and Determination of Confidential Information.** The University and Tribe shall, prior to performing the work under the project, use reasonable efforts to identify, in writing, traditional knowledge that is likely to be contributed to the project and that Tribe deems to be sensitive in nature. Any TK designated through this initial consultation as "sensitive" or "confidential" shall be treated by the University as Confidential Information of the Tribe; the confidential status of such sensitive TK shall be further evaluated through the coordinated, ongoing review of TK by the designated representative[s] of the University and the Tribe. See definition of "Confidential Information" below.

**Ongoing Consultation.** Ongoing consultation between the University and the Tribe provides for the Tribe's regular review of research for newly identified TK that might be evaluated as sensitive/confidential, and for re-evaluation, as needed, of previously determined TK regarding continued confidentiality status.

**Confidential Determination in Writing.** Written information exchanged between the University and Tribe shall be clearly marked with an appropriate stamp or legend "Confidential Information." Non-written information exchanged shall only be considered Confidential Information if, at the time of such disclosure, the Confidential Information being disclosed is identified as confidential and the disclosing Party provides the receiving Party, within thirty (30) days after such disclosure, affirms in writing the confidential nature of the disclosed information and clearly identifies the nature and content of the disclosed information. Notwithstanding the forgoing, non-written Traditional Knowledge shall be treated as Confidential Information until such time that the University and the Tribe have had the opportunity to review disclosed TK, and the Tribe has described in writing any disclosed TK to be treated as Confidential Information. After such consultation, any non-written TK reviewed by the Tribe not described and affirmed in writing as confidential, shall not be treated as Confidential Information.

**Deletion of Confidential Information Status.** Only upon review and determination by the Tribe can the "confidential" status of the TK be deleted and any TK designated as confidential be released to a third party, e.g., for publication or presentation, except when the University and Tribe have agreed, through the research agreement, to provide TK to a sponsor (such as a federal agency) as a deliverable under the funding award.

**Unauthorized Disclosure of Confidential Traditional Knowledge.** Unauthorized disclosure of Traditional Knowledge that has been gathered by the University or Tribe and/or contributed by Tribe to this project, has been identified by the Tribe, in writing, as Confidential Information, shall, at Tribe's discretion, result in termination of the license to TK granted in the agreement.

Regarding **Background Intellectual Property Rights**, except as otherwise expressly provided by the agreement between the University and the Tribe, the Background Intellectual Property of each Party is and shall remain the separate intellectual property of the University or Tribe, as applicable, and is not affected by the agreement. The agreement shall not be construed as implying that either Party shall have the right to use the Background Intellectual Property of the other Party, except as provided herein. See definition of “Background Intellectual Property Rights” below.

Regarding **Sole Intellectual Property Rights**, all right, title, and interest to all University Sole Intellectual Property shall be owned solely and exclusively by and vest entirely in the University. All right, title, and interest to all Tribal Sole Intellectual Property shall be owned solely and exclusively by and vest entirely in the Tribe. See definition of “Sole Intellectual Property Rights” below.

Regarding **Joint Intellectual Property Rights**, all right, title, and interest to all Joint Intellectual Property shall be jointly owned by the University and the Tribe. See definition of “Joint Intellectual Property Rights” below.

Regarding **Licensing of Intellectual Property Rights**, each Party grants to the other license to its Background Intellectual Property used in the project or Sole Intellectual Property. See definition of “Licensing of Intellectual Property Rights” below.

Regarding **Publication and Presentation**. The University or its employees or students, may issue publications, e.g., journal article or MA thesis, or give presentations, e.g., professional conference or thesis defense, based on the work of the project, *excluding* the Confidential Information of the Tribe. The University will provide the Tribe an opportunity for thirty (30) days prior to the proposed submission of any publication or the delivery of any presentation to review such publication and, if necessary, request the University to delete any reference to the Tribe’s Confidential Information. Furthermore, the Tribe shall have the right to request a delay in publication or presentation for up to thirty (30) additional days, if necessary, to allow for filing of patents if such publication or presentation contains patentable subject matter. The right of review by the Tribe shall terminate twelve (12) months from completion of the project. All TK must go through an Indigenous Review Process involving the criteria of trustworthiness, authenticity, and appropriateness. In no event shall any of the Tribe’s Confidential Information be included in any publication or presentation without written authorization from Tribe.

The Tribal Review Process may involve the application of criteria such as trustworthiness, authenticity, and appropriateness, as distinct from tests of reliability and validity. Among the key standards implicitly or explicitly used and deemed important by the host community reviewers are such criteria as “trustworthiness,” involving qualities of credibility, dependability and confirmability, and “authenticity,” involving the inclusion and acknowledgement of the multiplicity of the elders and collaborators, of knowledge relied upon and conveyed in the research. In addition, collaborators and various Culture Committees typically consider “appropriateness” as critical to this evaluative process. There is a vast amount of cultural knowledge and practices that are not meant, for various reasons, to be shared outside a family or tribal community with the general public. Appropriateness relates to that information that can be shared publically, to third parties.

## 2. Collaboration with your Host community

There will likely be missteps in proper cultural protocol and etiquette while communicating and collaborating with members of the host community, and the host community can help you effectively address these gaffes. Ask frequently, even if you think you know the right procedure. Your humility in asking can be a testament to your sincerity. In asking and in collaborating, the project can be “our project,” with the tribe taking on more involvement in and ownership of the project’s initiatives.

Collaboration with the host community by researchers can be established through equal “ownership” of the desired research, which should be designed to be of mutual benefit by the researcher and the tribe. To help assure mutual benefit, and provide guidance over an unfamiliar cultural territory, it is recommended to develop Co-PIs, Co-designers, and Co-authors with the tribe and federal, state, or university researcher.

A Co-PI partnership relationship involving Tribal and state/ federal agency personnel could effectively focus a project such that it is beneficial and appropriate for all parties. Building rapport with one’s Tribal Co-PI helps assure a trusted source to avoid most missteps. The Co-PIs could also be involved in the co-design of the project, from implementation of the research protocol, establishing processes and procedures for actual research gathering, all framed within a shared set of goals for the project. This entails more than just agreement by both parties as mentioned previously, but due to the difference in cultural territories, both parties should collaborate at the design stage to allow for a broader approach and incorporation of ideas that may not be apparent within each other’s own normal procedures and cultural paradigm.

A stated co-authorship of the final “deliverables” and any formal or information presentation of the research helps acknowledge that the research belongs to **both** investigating researchers and host community tribes. This is accomplished by equal rights to and credit for published materials. Both parties also retain the rights to present the research. Host community as co-authors are more than capable of conducting the best ethnographic interviews and research. In so doing, Tribal members can gain a forum from which to disseminate their Tribal information and knowledge, as well as help maintain control of the information and knowledge. A strong and proven positive relationship between the host community and researchers, having adhered to agreed-upon protocols, opens opportunities for future collaboration. In the instance of the “Schitsu’umsh Relationships with Their Dynamic Landscapes: Identifying, Managing and Applying Indigenous Knowledge and Praxis,” 2014-15, one of the Co-Principle Investigators, had a history of successful collaborative research projects and co-authorship of that research with Tribal members. While never a guarantee for success and acknowledging many other factors, this proposal was readily approved by the Culture Committee and Tribal Council.

Collaboration and mutual trust, and the listening to each other that collaboration and trust entail, is only the result of frequent, face-to-face consultations. Only through a deep sense of listening, can the depths of Traditional Knowledge (TK) be grasped, or the likely premises of a conversation with an elder be grasped. Relying on emails can facilitate the scheduling of meetings, but is not a viable form of sharing meaningful information.

Plan regular in-person meetings with your project’s designated Tribal partners, at a location most comfortable for your partners. Round-table, eye-to-eye seating is the best; not theater-style with a

podium. Enter the meeting with a handshake and a name. . Have your partners help set the meeting's agenda. Plan to review the various dimensions of the ongoing research. Given any new interviews with Tribal members, check the transcripts for any possible culturally-sensitive information. To help assure candor and honest conversations, engage in dialogue that is committed to the mutual exchange of information, and that reviews and renews the project's shared goals. Following a talk by a Tribal elder or consultant, as if a "student" yourself, attempt to summarize what you just heard, putting it into your own words, and add to your response to how that information might contribute to some aspect of the project. In do so doing, your response helps acknowledge that you are indeed listening, correcting anything you didn't quite get right, and it helps to validate the information just shared, showing respect to an elder. Honestly should frame all of one's conversations.

### 3. Seeing from the Perspective of your Host community.

As you engage in research in an Indigenous community, at some level of that research involvement, you will be confronted with another way of knowing the world distinct from your own, i.e., Indigenous knowledge or what we are calling Traditional Knowledge (TK). Can you "*feel*" this way of knowing and of doing? While you may have a sense of another worldview, another epistemology at play, it nevertheless may remain elusive and mysterious, not fully understandable. After all, the Traditional Knowledge your partners and interviewees may be expressing is not predicated on the epistemological foundations you might be most familiar, i.e., the Cartesian Dualism and Aristotelian Materialism foundations of rational and empirical science (Frey 2015). Our scientific methodologies are premised on our ability to objectively and empirically observe and record the structures and dynamics of the world; to keep our thoughts and theories, often reducing them to quantifiable material-based variables, about the world autonomous from the natural world itself; to keep our "mind" distinct from the "body." While Indigenous peoples are among the most deliberate observers of the natural cycles of the world, they also hold dear to the conviction that they exist as a part of the world and not apart from it. Larry Mason and his numerous Tribal and non-Tribal co-authors provides an insightful summary of the distinctions between traditional knowledge (TK) and scientific ecological knowledge (SEK) in their article, "Listening and Learning from Traditional Knowledge and Western Science" (2012). And secondly, as you engage in your project's research.

In essence you are being asked to acknowledge that there is an unequivocal relationship between the means of discovering TK information, i.e., the *how*, and the content of that Traditional Knowledge, i.e., the *what*." The being "attentive" and the "listening with your heart" relate to a means, the "*how*," to an understanding of the content, the "*what*" of "feeling the intense heat." To reach the summit of understanding the Indigenous, an Indigenous route to that summit is necessary. This is not to suggest that scientific quantitative routes, for example, cannot be applied, as such methodological means can reveal invaluable insights into such data as frequency of a human action, comparability of a trait with other human societies, or contextualization of a trait within its ecological or societal setting. But if the goal is to appreciate, understand and apply the meanings, structures and dynamics of the Indigenous, to utilize a route to the summit other than an Indigenous methodology would only result in reaching a "false summit," and a distorted, if not misinterpreted view of the Indigenous.

## An Example Approach to Seeing from the Perspective of your Host community

The following summarizes one approach to aligning the *how* and the *what*, as developed in the “Schitsu’umsh Relationships with Their Dynamic Landscapes: Identifying, Managing and Applying Indigenous Knowledge and Praxis” project (2014-15). After consultation with the Schitsu’umsh, a definition of the Traditional Knowledge was developed based on two key phrases: *hnhkwelkhwlnet* “our ways of life in the world,” and *miyp* “teachings from all things” (see Campbell, Cleveley, Frey and *et alia* 2015). *Hnhkwelkhwlnet* is based upon fundamental ontological (what is real) and epistemological (ways of knowing) principles distinct from that of Western worldview and science. *Hnhkwelkhwlnet* is phenomena that have existence as a transitory intersection of those participating, be it human, animal, plant, water, rock, spirit participants, each of which has an equality with the others, all of which is anchored in place-based oral-based traditions, the *miyp*. *Miyp* are with aesthetic, moral, and utilitarian values and norms, understood to have been ultimately derived from K’u’Intsutn (the Creator), embedded in the oral traditions, language, narratives, songs, dance styles, kinship behaviors, and architectural styles. *Hnhkwelkhwlnet* † *miyp* entails a phenomenal reality distinct from that predicated upon Aristotle’s materialism, René Descartes’ rationalism and his Cartesian Dualism, and John Locke’s empiricism. For additional background on the semantics, structures and dynamics of Schitsu’umsh knowledge and practice, see Schitsu’umsh and Frey 2001:257-68, 286, or Campbell, Cleveley, Frey and *et alia* 2015.

If *hnhkwelkhwlnet* † *miyp* is the “what” of the project, the challenge is discerning the *Schitsu’umsh* “how.” Based upon consultation, it was determined that the “how” revolves around an approach expressed in what the *Schitsu’umsh* call ‘*me’y’mi’y’m*, “telling stories,” referring to the act of sharing their oral narratives. To attempt to access and convey *hnhkwelkhwlnet* in a manner consistent with *Schitsu’umsh* reality, the act of re-telling the oral traditions, as in the reciting aloud in the presence of others the story of Chief Child of the Yellowroot (the tribe’s culture-hero), has been a primary means through which *Schitsu’umsh* knowledge is both acquired and disseminated from-generation-to-generation. The structural and dynamic attributes of the act of storytelling involve “attentive participation” in an unfolding journey through a landscape, with each participant seeking to uncover the embedded perennial *miyp*. The key competency to both being attentive and of participating is ability to appreciate an experience distinct from one’s own, to project into someone else’s situation, to have empathy, or what the *Schitsu’umsh* call *snukwnkhwtskhwts’mi’ls*, literally meaning “fellow sufferer.” For additional background on the structure and dynamics of Schitsu’umsh knowledge and practice, see Aripa, Yellowtail and Frey 1995, or Campbell, Frey, Cleveley, *et alia* 2015.

The ‘*me’y’mi’y’m* approach informed the research design and methods, and the interpretation of the research results. As a shared experience through an unfolding landscape, collaboration, as previously noted, was critical. Consultation with the host community on the research design was a first step, adjusting research goals and methodology appropriately. At this stage it was decided to add two additional ways to express the application and importance of *hnhkwelkhwlnet* † *miyp*, as in a Tribal Garden that would demonstrate the value in producing food for the community and provide an educational venue for Tribal youth, and a Curriculum that would provide a means for teaching and disseminating this form of knowledge and practice. Central to the research design was the application of methods akin to semi-structured interviewing and participant observations, both dependent on being attentive and empathetic. The interviewing of elders about the significance and meaning of a traditional root gathered for sustenance, such as *sqigwts* (water potatoes), along with the observations made during participation in digging of that root, provided invaluable insights into the cultural landscape in question.

Adhering to the “Terms and Conditions- Intellectual Property and Traditional Knowledge Agreement” (above), the research design also involved the Co-PIs meeting periodically with the Coeur d’Alene Tribe’s Natural Resources and Culture Committees. The opportunity allowed for updating committee members on the progress of the research and consulting with these Tribal experts on any questions that arose during the course of the research. It would be these committees that would also be the Tribal vehicle for the final review and approval of the project. In the instances of the updated and final research results, the Indigenous criteria of trustworthiness and appropriateness (discussed earlier) framed the presentations.

Consistent with the aligning of the “what” and the “how,” the research design also considered questions of the presentation format for the final results, i.e., the means to present the content. Given the orality-based nature of *hnxhwelkhwlnet t miyp*, and a ‘*me’y’mi’y’m*’ approach, the “Schitsu’umsh Relationships with Their Dynamic Landscapes” project tested the viability of introducing the results of the research via an Interactive 3-D Landscape. The structures and dynamics of an interactive 3-D Landscape entailed users taking the form of avatars visible to others. With auditory and visual sensations, the avatars, each with their own profiles, interact in a computer-simulated world of perceptual stimuli, who in turn can manipulate elements of the modeled world and thus experience a degree of presence. While certainly labor intensive to create (using virtual world technology), this approach effectively replicated critical dynamic attributes in a ‘*me’y’mi’y’m*’ event as the means for gaining a better understanding of the meaning of the *Schitsu’umsh hnxhwelkhwlnet* associated with *sqigwts*. This is not to suggest that other means cannot be utilized to accomplish this same end.

Seeing from the perspective of another does not equate with having to give up one’s own perspective and approach, provided one can engage in *snukwnkhwtskhwts’mi’ls t stsee’nidmsh*. This *Schitsu’umsh* phrase encapsulates what can be called “empathetic adaptability,” – *snukwnkhwtskhwts’mi’ls* “fellow sufferer,” or “empathy,” and *stsee’nidmsh* “adaptive. This is a competency that facilitates a level of understanding of the perspectives and positions of others, which in turn, allows one the ability to more effectively walk the walk of others and engage in multiple ways of thinking and doing. Directly related to the project and the climate scientists to whom it was intended, this is the capacity to understand “perfect strangers” and acquire a level of competency to begin to approximate the thinking and behaving of that stranger, i.e. for a scientist to better understand and behave Indigenously, and thus acknowledge and appreciate Indigenous ways of knowing and doing complementary to scientific ways of knowing and doing. This is a willingness to acknowledge multiple ways of knowing and doing, i.e., Indigenous and scientific, also referred to as “Multiple Evidence Base (MEB) Approach,” which advocates multiple knowledge systems, as discussed in “Guidelines for Considering Traditional Knowledge In Climate Change Initiatives” (2014:19 and 38), and “Compartmentalized Integration” (Frey 2015).

#### 4. Reciprocity and “Giving Back”

As the Tribal information and data has been shared with the researcher and agency, how will the researcher and agency reciprocate, how will the researcher “give back” for what was shared. A pervading value in Indigenous communities is the importance of assisting others and, in particular, of sharing with those in need (Frey and Schitsu’umsh 2001:10). How will the project benefit the community, as defined by the community? The experiences of far too many Indigenous communities



has been one of expropriation and exploitation of their natural and cultural resources by the dominate society (Frey and Schitsu'umsh 2001:62-100). As a representative of a federal or state agency, it is important to dispel this historic tendency.

Will the results of the project, as determined by the host community, benefit the host community? A benefit to the community could be the intended audience in the dissemination of any Traditional Knowledge and cultural information of the tribe. This will help ensure, so that issues of public misunderstanding will be addressed or that the researched information will be used in a public school curriculum. Such applications could also include research strategies for any variety of natural resource preservation, e.g., for forestry or fisheries. It could be applications for health care delivery or for new curriculum for a local Tribal school.

Making Tribal collaborators fellow co-authors in all products also confers rewards usual open only to researchers. This may include increased attention to the tribe or the collaborator for their intellectual and scholarly accomplishments, increased attention for their efforts through popular media channels, and increased dissemination of the tribal perspective in all channels. While these "rewards" may seem obvious, in a Tribal community, to "stand-out" as an "author" can also bring about suspicion and even ridicule by some from that community. First consult on the wishes of your possible "co-author."

The long-term legacy of any research project, and hence its potential benefit to a Tribal Community and to the researcher's agency, should be addressed as well. While insightful research might be published in a prestigious university press, the continued public availability of that research is still dependent on marketability. A project disseminated through digital means, e.g., HTML pages, streaming video, or even a virtual world platform, and currently housed on an institution's server, issues of long-term management and host community must be addressed. How will research materials be archived? The best-practice protocol for archiving research materials, ranging from recorded interviews and their transcriptions, to photographs and other material items gathered in the course of the research, revolves around having the tribe house those artifacts. Questions then arise on security, manageability and accessibility of those materials, and must be addressed.

In addition, questions such as how will the results of the research be disseminated and rendered accessible to the public, and how will the results of the research be managed and sustained for long-term archiving, should be addressed.

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## Appendix 1

### Exhibit [X] Traditional Knowledge

#### Terms & Conditions –Traditional Knowledge

- 1) UNIVERSITY and CONTRACTOR hereby acknowledge and agree that the terms and conditions set forth in this Exhibit [X], Traditional Knowledge, are intended to supplement the terms and conditions of the University of Idaho Contract for Services (“Contract”), and that, to the extent that there are conflicts and/or inconsistencies between the terms and conditions of this Exhibit [X] and those of the Contract, the terms and conditions this Exhibit [X] shall control.
- 2) Definitions.
  - a. “Background Intellectual Property” means all UNIVERSITY, CONTRACTOR, and third party intellectual property, including but not limited to inventions, patents, trademarks, copyrights, computer software, and tangible analysis techniques created and/or first reduced to practice prior to or outside the scope of the Contract.
  - b. “UNIVERSITY Sole Intellectual Property” means individually and collectively all intellectual property that is created and first reduced to practice solely by UNIVERSITY faculty, staff, students, or contractors, excluding CONTRACTOR, during the term of and through the performance of the statement of work under the Contract.
  - c. “CONTRACTOR Sole Intellectual Property” means individually and collectively all intellectual property that is created and first reduced to practice solely by CONTRACTOR employees during the term of and through the performance of the statement of work under this Contract.
  - d. “Joint Intellectual Property” means individually and collectively all intellectual property which is created and first reduced to practice jointly by UNIVERSITY and CONTRACTOR during the term of and through the performance of the statement of work under the Contract.
  - e. “Confidential Information” means any data or information having commercial value which may include but not be limited to data, databases, product plans, strategies, forecasts, research procedures, marketing techniques and materials, customer names and other information related to customers, price-lists, pricing policies, and financial information which the Parties consider sensitive and which is not generally known to the public. With respect to CONTRACTOR, “Confidential Information” shall also include Traditional Knowledge of CONTRACTOR, which may include, but is not limited to, religious, cultural, or ceremonial information.
  - f. Traditional Knowledge means knowledge that is:
    - i. generated, preserved and transmitted in a traditional and intergenerational context;
    - ii. distinctively associated with a tribe which preserves and transmits it between generations; and
    - iii. integral to the cultural identity of CONTRACTOR tribe, which holds the knowledge through a form of custodianship, guardianship, collective

ownership, or cultural responsibility. This relationship may be expressed formally or informally by customary or traditional practices, protocols or laws. Such knowledge should be intergenerational in character, should have an objective link with the CONTRACTOR tribal community of origin, and should have a subjective association within that tribal community, so that it forms part of the tribal community's own self-identity. Traditional Knowledge may be contributed by CONTRACTOR, CONTRACTOR's employees, or individual members of CONTRACTOR tribe.

### 3) Intellectual Property Rights.

- a. Background Intellectual Property Rights. Except as otherwise expressly provided by this Agreement, the Background Intellectual Property of each Party is and shall remain the separate intellectual property of the UNIVERSITY or CONTRACTOR, as applicable, and is not affected by this Agreement. This Agreement shall not be construed as implying that either Party shall have the right to use the Background Intellectual property of the other Party, except as provided herein.
- b. Sole Intellectual Property Rights.
  - i. All right, title, and interest to all UNIVERSITY Sole Intellectual Property shall be owned solely and exclusively by and vest entirely in UNIVERSITY.
  - ii. All right, title, and interest to all CONTRACTOR Sole Intellectual Property shall be owned solely and exclusively by and vest entirely in CONTRACTOR.
- c. Joint Intellectual Property Rights. All right, title, and interest to all Joint Intellectual Property shall be jointly owned by UNIVERSITY and CONTRACTOR.

### 4) Licensed Intellectual Property Rights.

- a. Project Intellectual Property. Each Party grants to the other a non-exclusive, fee-free and royalty-free, irrevocable, nontransferrable, world-wide license, without the right to sublicense, to its Background Intellectual Property used in the project or Sole Intellectual Property, which licensed rights shall be used only in the performance of the statement of work of the Contract; provision of any deliverable to any federal agency, as applicable; or for non-commercial purposes, including but not limited to research and educational purposes. Traditional Knowledge of CONTRACTOR shall be governed by the license granted to UNIVERSITY under Section 4(b).
- b. Traditional Knowledge. CONTRACTOR grants to UNIVERSITY a non-exclusive, fee-free and royalty-free, nontransferrable, world-wide license, without the right to sublicense, to its Traditional Knowledge that it has contributed to this project, which licensed rights shall be used only in the performance of the statement of work of the Contract; provision of any deliverable to any federal agency, as applicable; or for non-commercial purposes, including but not limited to research and educational purposes.

This license to rights in Traditional Knowledge shall be subject to the limitations set forth below and may be terminated by CONTRACTOR in the event that UNIVERSITY breaches its obligations under these limitations.

- i. License Limitations.
  1. Initial Consultation. UNIVERSITY and CONTRACTOR shall, prior to performing the statement(s) of work under the Contract, use reasonable efforts to identify, in writing, Traditional Knowledge that

is likely to be contributed to the project and that CONTRACTOR deems to be sensitive in nature. Any Traditional Knowledge designated through this initial consultation as “sensitive” or “confidential” shall be treated by UNIVERSITY as Confidential Information of the CONTRACTOR; the confidential status of such sensitive Traditional Knowledge shall be further evaluated through the coordinated, ongoing review of Traditional Knowledge by the designated representative[s] of UNIVERSITY and CONTRACTOR, as described in Section 4(b)(i)(2)(b).

2. Ongoing Consultation.
  - a. Designated representatives of UNIVERSITY and CONTRACTOR shall meet at regular intervals during the course of the performance of the statement(s) of work to evaluate whether Traditional Knowledge gathered or contributed after initiation of the research should be designated as Confidential Information of the CONTRACTOR; the status of Traditional Knowledge identified as Confidential Information by CONTRACTOR during the initial consultation shall also be evaluated at each meeting.
  - b. UNIVERSITY shall consult with CONTRACTOR regarding any use of Traditional Knowledge subject to the license granted in Section 4(b), when such use is not in furtherance of the statement(s) of work of Contract or in satisfaction of obligations of the UNIVERSITY when contractor has been engaged in support of UNIVERSITY’S efforts on a federal grant or contract. Such consultation shall be for purposes of confirming that the proposed use under the granted license is non-commercial in nature and adequately protects the confidentiality of identified sensitive Traditional Knowledge. This consultation may be part of, but does not supersede, the research approval process of CONTRACTOR or review by the Institutional Review Board of UNIVERSITY.
3. Unauthorized Disclosure of Confidential Traditional Knowledge. Disclosure by UNIVERSITY of Traditional Knowledge that has been gathered by UNIVERSITY or CONTRACTOR and/or contributed by CONTRACTOR to this project, has been identified by CONTRACTOR, in writing, as Confidential Information, and is subject to the obligations for Confidential Information set forth in Section 6 unless authorized in writing by CONTRACTOR, shall, at CONTRACTOR’S discretion, result in termination of the license to Traditional Knowledge granted in Section 4(b).

Notwithstanding the foregoing limitations on the license granted in this Section 4(b), UNIVERSITY and CONTRACTOR agree that UNIVERSITY shall have an irrevocable license to any Traditional Knowledge incorporated into and integral to a deliverable under a federal award or contract from the federal government; the underlying Traditional Knowledge shall remain the property of the CONTRACTOR.

5) Confidentiality.

- a. In the course of performing under this Agreement, CONTRACTOR may disclose to UNIVERSITY CONTRACTOR Confidential Information, and UNIVERSITY may disclose to CONTRACTOR UNIVERSITY Confidential Information pursuant to proposing to or soliciting from the other Party research and/or service proposals and performing statement(s) of work of the Contract (hereinafter referred to as "Purpose").
- b. UNIVERSITY agrees to hold in confidence and not disclose any and all CONTRACTOR Confidential Information received from CONTRACTOR hereunder. CONTRACTOR agrees to hold in confidence and not disclose any and all UNIVERSITY Confidential Information received from UNIVERSITY hereunder. The confidentiality obligations of each Party receiving Confidential Information shall extend for three (3) years from the date of disclosure, when such disclosure is made consistent with Section 5(c); with respect to Traditional Knowledge designated as Confidential Information, such information shall be maintained in confidence by UNIVERSITY indefinitely. Unless otherwise permitted by this Agreement, each Party shall use the Confidential Information only for and to the extent required to accomplish the Purpose. The Parties shall only disclose the Confidential Information to those faculty, staff, or students that have a legitimate business need for such information and only for and to the extent required to accomplish the Purpose or to exercise the rights granted herein. Either Party may disclose the other Party's Confidential Information to its affiliates, contractors, and consultants that are under a written obligation of confidentiality no less restrictive than contained herein to the extent necessary to accomplish the Purpose.
- c. Written information exchanged hereunder shall be clearly marked with an appropriate stamp or legend "Confidential Information." Markings such as "Confidential Information." Markings such as "In Confidence," "Confidential," "UNIVERSITY Use Only," or "CONTRACTOR Use Only" shall also be sufficient. Non-written information exchanged hereunder shall only be considered Confidential Information if, at the time of such disclosure, the Confidential Information being disclosed is identified as confidential and the disclosing Party provides the receiving Party within thirty (30) days after such disclosure, with a writing which affirms the confidential nature of the disclosed information and clearly identifies the nature and content of the disclosed information. Notwithstanding the forgoing, non-written Traditional Knowledge shall be treated as Confidential Information until such time that UNIVERSITY and CONTRACTOR have had the opportunity to review disclosed Traditional Knowledge, consistent with the consultation process described in Section 2(a), and CONTRACTOR has described in writing any disclosed Traditional Knowledge to be treated as Confidential Information under this Section. After such consultation, any non-written Traditional Knowledge reviewed by CONTRACTOR but not described and affirmed in writing as confidential, shall not be treated as Confidential Information.
- d. Neither Party shall be liable to the other Party for the disclosure of Confidential Information that:
  - i. is published or otherwise in the public domain through no fault of the receiving Party; or
  - ii. can be demonstrated by the receiving Party to have been in its possession prior to receipt under this Agreement; or

- iii. is obtained by the receiving Party without restriction from a third party; or
  - iv. is independently developed by the receiving Party by individuals who have not had either direct or indirect access to such information; or
  - v. is disclosed by the receiving Party to a third party with the written approval of the disclosing Party without any restriction; or
  - vi. is required to be disclosed under operation of law, including but not limited to the Idaho Public Records Law, Idaho Code §§9-337 through 9-350.
  - vii. is reasonably ascertained by UNIVERSITY or CONTRACTOR to create a risk to a trial subject or to public health and safety.
- e. In furnishing any information hereunder, the disclosing Party makes no warranty, guarantee, or representation, either expressed or implied, as to its adequacy, accuracy, sufficiency, or freedom from defects or that the use or reproduction of any information shall be free from any patent, trade secret, trademark, or copyright infringement. The disclosing Party shall not be liable for damages of whatever kind or for any costs, expenses, risks, or liabilities as a result of the other Party's receipt or use of or reliance on any such information furnished hereunder.
- f. The provisions of this Section shall survive termination of this Contract.
- 6) **Publication and Presentation.** UNIVERSITY, or its employees or students, may issue publications or give presentations based on the statement(s) of work of the Contract, excluding the Confidential Information of CONTRACTOR. UNIVERSITY will provide CONTRACTOR an opportunity for thirty (30) days prior to the proposed submission of any publication or the delivery of any presentation to review such publication and, if necessary, request UNIVERSITY to delete any reference to CONTRACTOR'S Confidential Information. Furthermore, CONTRACTOR shall have the right to request a delay in publication or presentation for up to thirty (30) additional days, if necessary, to allow for filing of patents if such publication or presentation contains patentable subject matter. The right of review CONTRACTOR has under this Section shall terminate twelve (12) months from completion of the Contract, except with respect to any review required consistent with Section 2(b). In no event shall any of CONTRACTOR'S Confidential Information be included in any publication or presentation without written authorization from CONTRACTOR.
- 7) Nothing in this Agreement shall be deemed to affect UNIVERSITY or CONTRACTOR'S obligations under the Freedom of Information Act (FOIA) or UNIVERSITY'S Obligations under the Idaho Public Records Law (IRPL) or UNIVERSITY or CONTRACTOR'S ability to assert exemptions with regard to FOIA or IPRL requests applicable.
- 8) Nothing in this Agreement shall be construed as a waiver or diminishment of the inherent sovereign immunity of the Coeur d'Alene Tribe or of the sovereign immunity of the State of Idaho or of the University of Idaho, a public corporation, state educational institution, and a body politic and corporate organized and existing under the constitution and laws of the state of Idaho.

## Appendix 2

### Best Practices for Metadata Creation on TEK Data Products in ISO 19115

#### Metadata Review

All metadata should undergo the same project approval processes as data products. This means that metadata should be prepared by researchers prior to delivery to the CSC data steward. Data stewards should be available to assist researchers as needed.

#### Social Scientific Data and Biophysical Scientific Data

ISO 19115 is a geographic metadata schema, designed principally for the treatment of biophysical datasets with significant spatial characteristics. Many of its elements are unsuitable for describing research products derived from qualitative, creative, and non-empirical forms of research. As such, the document will only treat those elements considered relevant to for TEK-associated data, and not all elements.

#### 1. Metadata Description (MD\_Metadata)

Element Name	NOAA Definition/Best Practice <sup>i</sup>	Recommendations for TEK-related Products
language	language of the metadata composed of an ISO639-2/T three letter language code and an ISO3166-1 three letter country code	If an item contains more than one language, such as an American Indian, Native Alaskan, or Native Hawaiian language, specify the primary language of the metadata. In many cases, this is likely to be English, despite the presence of terminology from other languages in free text fields. Include any other languages as described under <gmd:locale>
characterSet	The character set for the metadata is set to “utf8” by default.	If an item contains characters that cannot be displayed in utf8, check the other recommended options in the LanguageCode codelist, such as 8859-1. Most American Indian typographic characters can be displayed using utf8, including some non-Latin scripts, such as Cherokee. However, this may be an issue for Native Alaskan and Inuit communities whose scripts may include Cyrillic characters.
locale	locale is mandatory when more than one language is used in free text descriptions	If an item contains more than one language, use PT_Locale to create the language description. For sub-element gmd:LanguageCode, options include: ISO639-2/T code “nai” for North American Indian languages; ISO639-5 for language families, e.g. Salishan (“sal”) or Algonquian (“alg”); or ISO639-3 which contains more precise codes, e.g. Coeur d’Alene/Schitsu’umsh is “crd”. <i>Note that only ISO639-2 is permitted formally in the ISO 19139 schema, but that any of the above codes will pass schema validation.</i>

#### 2. Data Identification (MD\_DataIdentification)



abstract	Brief narrative summary of the dataset's contents	If an item requires descriptive information that cannot fit anywhere else appropriately in the schema, place the information in the abstract. As this is often the most discursive part of the metadata, make sure this particular piece is reviewed and approved by all authors.
purpose	Summary of the intentions for which the dataset was developed	When possible, enter the "why" of the project here. Explain the reasons for collecting the data in the context of the larger project. This is also a good place to explain why the format of the object is the way it is.
credit	Recognition of those who contributed to the dataset	Include all parties involved in the projects, including groups involved in the review process, e.g. the "Coeur d'Alene Tribe Natural Resources Committee"
pointOfContact	Identification and means to contact people/organizations associated with the dataset	If an item has more than one contact, discuss with investigators who the appropriate person is. Make sure they have the authority to speak on behalf of the whole project, including tribal collaborators.
descriptiveKeywords	Commonly used words or phrases that describe the resource. Optionally, the keyword type and a citation for the authoritative or registered resource of the keywords are also provided. It is highly recommended that keywords from the authoritative source be used instead of using user defined keywords.	Recognize that terms may be used by indigenous people that should need to be included in the keyword list. For example, the Coeur d'Alene refer to <i>Sagittaria latifolia</i> as <i>sqigwts</i> , which is also referred to as the water potato, duck-potato, or wapato. All should be listed in the keywords. When possible, using keywords from existing thesauri. Possible options include the <a href="#">Outline of Cultural Materials</a> (OWC) and the <a href="#">Library of Congress Subject Headings</a> (LCSH) for cultural and sociological topics. The <a href="#">Integrated Taxonomic Information System</a> (ITIS) and the <a href="#">Global Change Master Directory (GCMD) Science Keywords</a> are options for scientific terminology. The <a href="#">Geographic Names Information System</a> (GNIS) is an option for geographic locations.
resourceSpecificUsage	Provides basic information about specific application(s) for which the resource(s) has been or is being used by different users.	If feedback or concerns are expressed about the resource, this is a place to indicate the specific use case in which the feedback occurred. It also allows the authors to express a response to this feedback, documenting for future users a discussion about the quality of the resource. The tribal approval process may generate use cases for this field.
LegalConstraints		See Constraints section
language	Languages of the dataset using standard ISO three letter codes	This repeatable element refers to the resource rather than the metadata. If it contains more than one language, use sub-element gmd:LanguageCode, options include: ISO639-2/T code "nai" for North American Indian languages; ISO639-5 for language families, e.g. Salishan ("sal") or Algonquian ("alg"); or ISO639-3 which contains more precise codes, e.g. Coeur d'Alene/Schjitsu'umsh is "crd". <i>Note that only ISO639-2 is permitted formally in the ISO 19139 schema, but that any of the above codes will pass schema validation.</i>
characterSet	Character coding standard in the dataset. Set to utf8 by default	See characterSet under the Metadata Description section
topicCategory	The main theme(s) of the dataset. A code shall be provided when hierarchy level is set to "dataset"	Use "society" whenever the product involves indigenous knowledge. Otherwise, use as many as is relevant to the

		topic; it is repeatable and commonly used in discovery tools supporting ISO 19115.
supplementalInformation	Other descriptive information about the dataset	If an item has omitted or altered from the original dataset, add information about the omissions here. For non-biophysical data, the data quality section is too cumbersome and requires too many fields.

### 3. Constraints (MD\_Constraints, MD\_LegalConstraints)

useLimitations	Statement on the fitness of use or limitations on the use of the resource or metadata	<p>If an item contains technical limitations that prevents its use, this should be noted here. In the case of the 3D Sqigwts Landscape, the 3D model uses browser capabilities no longer supported in Google Chrome. This kind of restriction should be noted.</p> <p>If the item should not be used for certain actions, such as decision- or policy-making, this should be specified. This is perhaps most valuable for instances in which the shared resource has been modified or altered to prevent the release of sensitive information.</p>
accessConstraints	Limitations on access to the resource or metadata to protect privacy, intellectual property, or any special limitations	There should be few, if any, access constraints on the resource, as the information that would cause this constraint should be removed from the document through a process of redaction, aggregation, deletion, or some other technique.
useConstraints	Restrictions or limitations or warnings to protect privacy, intellectual property, or other special restrictions on the resource or the metadata	<p>If conditions on the future use of the information, such as those indicating seasonality or gender restriction, are of interest to the authors, consider using traditional knowledge labels, such as those located at <a href="#">Local Contexts</a>.</p> <p>If conditions are more stringent, consider applying <a href="#">Creative Commons</a> licenses on the information.</p>

### 4. Extent (EX\_Extent)

description	Spatial and temporal extent as free text. Mandatory if geographic or temporal extent details are not used.	If a resource contains either explicit spatial or temporal information, present according to the standard. However, if the information is altered in some way, or if the information is used only to give a general sense of the spatial or temporal characteristics of the data, use this field to indicate as such.
geographicExtent	Description of the geographic area	Avoid using locations of sensitive information and instead make the locations general enough to prevent deduction of those locations. One strategy might be to use the overall lands of the group or tribe involved in the research. This gives a user a general idea of the location, but prevents the disclosure of precise locations. For more discussion of these challenges, see: <a href="#">VanWey et al</a>

		<a href="#">2005</a> <sup>ii</sup> . For some approaches to prevent disclosure within spatially-explicit datasets, see: <a href="#">MEASURE 2007</a> <sup>iii</sup> .
temporalExtent	Time period covered by the dataset	Temporal extents, such as ISO 8601 date/time formats, may be inaccurate. Traditional ecological knowledge may not have a beginning and ending or follow a linear temporal pattern. There may be no way to express the date of something other than the date the digital object represented by the metadata was created. For more discussion, see: <a href="#">Reid and Sieber 2015</a> <sup>iv</sup> .

## 5. Data Quality (DQ\_DataQuality)

If the resource is not quantitative in nature, the data quality section of ISO 19115 possesses too many irrelevant mandatory fields to be used for non-quantitative TEK products, such as stories, interviews, and audiovisual materials. As such, information about the quality of the data should be entered into <supplementalInformation> under MD\_DataIdentification.

## 6. Lineage (LE\_Lineage)

procedureDescription	Additional details about the processing procedures	Classify the stages of the research leading up to the creation of the TEK-related data product. For each, fill out the subsequent process steps.
description (LE_ProcessStep)	Description of the processes performed on the data.	Use this field and its parent section recursively to narrate the steps used in producing the data product. Some future users may not be familiar with the techniques and methods used in producing TEK-related products. This field can help communicate this information.
rationale (LE_ProcessStep)	Purpose for performing the process on the data.	Use this field to provide further justification for steps in the research process.

<sup>i</sup> From: National Oceanic and Atmospheric Administration. National Oceanographic Data Center. National Coastal Data Development Center. 2012. *Workbook: Guide to Implementing ISO 19115-2:2009(E), the North American Profile (NAP), and ISO 19110 Feature Catalogue*.

<sup>ii</sup> VanWey LK, Rindfuss RR, Gutmann MP, Entwisle B, Balk DL. 2005. Confidentiality and spatially explicit data: concerns and challenges. *Proceedings of the National Academy of Sciences*, 102(43): 15337-15342. doi: 10.1073/pnas.0507804102

<sup>iii</sup> MEASURE GIS Working Group. 2007. *Overview of issues concerning confidentiality and spatial data*.

MEASURE Evaluation project, University of North Carolina at Chapel Hill. Available at:

<http://www.cpc.unc.edu/measure/publications/wp-08-106>

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<sup>iv</sup> Reid G, Sieber R. 2015. What is Time? Indigenous conceptualizations of time and the geoweb. Presented at Spatial Knowledge and Information (SKI) – Canada, Feb 27-March 1, Banff, CA. Available at: [http://rose.geog.mcgill.ca/ski/webfm\\_send/405](http://rose.geog.mcgill.ca/ski/webfm_send/405)