



Traditional Ecological Knowledge (TEK): An Introduction and Discussion of TEK's Potential to Inform Adaptive Management

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Traditional Ecological Knowledge (TEK):

- What is traditional ecological knowledge?
- How is TEK compatible with and different from traditional western science?
- What are the historical roots of TEK?
- How has TEK been applied in environmental decision making and adaptive management programs?
- What are key barriers to integration of TEK?
- What past efforts have been made to integrate Native American perspectives and TEK in the GCDAMP?
- How could TEK be incorporated in science-based adaptive management programs like the GCDAMP?

Basis for this Presentation

- **Extensive Literature Review**
 - **100's of journal articles; numerous books**
 - Extensive anthropological literature
 - Resource management applications: examples
 - Global Sustainability, biodiversity Initiatives
 - **Review of Websites**
 - Federal Government: USFWS, NRCS, NOAA
 - Ecological Society of American, SERI, IUNC, etc.
 - Native American educational organizations
- **Informal Discussions & Correspondence**
- **Personal Education & Experience**

Common Themes in the Literature

- **Definitional Issues**
 - What is TEK? Scope of TEK?
- **Challenges of integrating Science and TEK**
 - Similarities and differences
 - Power inequities
- **Epistemological challenges**
 - How do we know what we know?
- **Cross-cultural communication**
 - Same words, different meanings
- **Need for & value of TEK**



What is TEK?

- **No single accepted definition**
- **Multiple variants and synonyms, e.g., indigenous knowledge, local knowledge**
- **Most commonly cited (Berkes 1999):**
“A cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment.”
- **Alternative definition (Usher 2000):**
“TEK refers specifically to all types of knowledge about the environment derived from the experience and traditions of a particular group of people.”

TEK vs. Traditional/Local Knowledge

- **“Traditional knowledge”, “Indigenous knowledge”, “Native science”**

Implies broader scope but not used consistently . . .

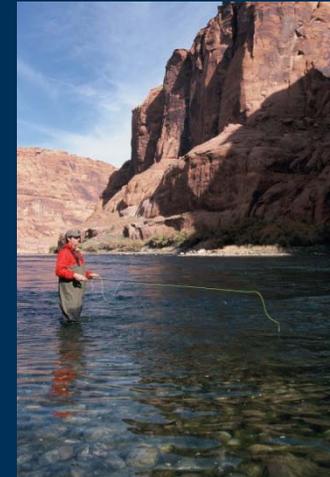
- **Definition of “Traditional Knowledge” of Canadian NW Territorial Government:**

“Knowledge and values, which have been acquired through experience, observation, from the land or from spiritual teachings, and handed down from one generation to another.”



“Local Knowledge”

- Sometimes used in lieu of TEK
- Knowledge derived from long term, direct experience with local area and its resources
- Not specific to indigenous people
- Not necessarily “traditional”



“Its not really ‘knowledge’ at all, it’s more a way of life.” (Nadasdy, 2003)

- Experience-based (“learning through doing”)
- Based on use of plants and animals
- Reflects Native understanding of human-animal-land relationships (social relationships)
 - Respectful
 - Reciprocal
 - Spiritual
- Holistic perspective
- Personal
- Based on tradition
but not static!



TEK and Traditional Western Science: Emphasizing Differences *

TEK	TWS
Holistic, all elements linked	Reductionist
Learned from direct observation and experience	Formally taught and learned through analysis of data
Environment includes social and spiritual relationships	Environment is distinct and separate from society, religion
Based on cumulative, collective experience	Based on laws and theories
Mainly qualitative	Mainly quantitative
Emic: “insider” view / local actor	Etic: “outside” view/ observer
Data generated and collected by the primary resource users	Data generated and collected by specialists or professional “experts”***
Tested through application to daily living and subsistence practices	Tested through hypothesis falsification and modeling**
Transmitted orally from one generation to the next	Transmitted in writing between professional scientists**

*adapted from Barnhardt and Kawagley 2005

** USGS Fundamental Science Practices



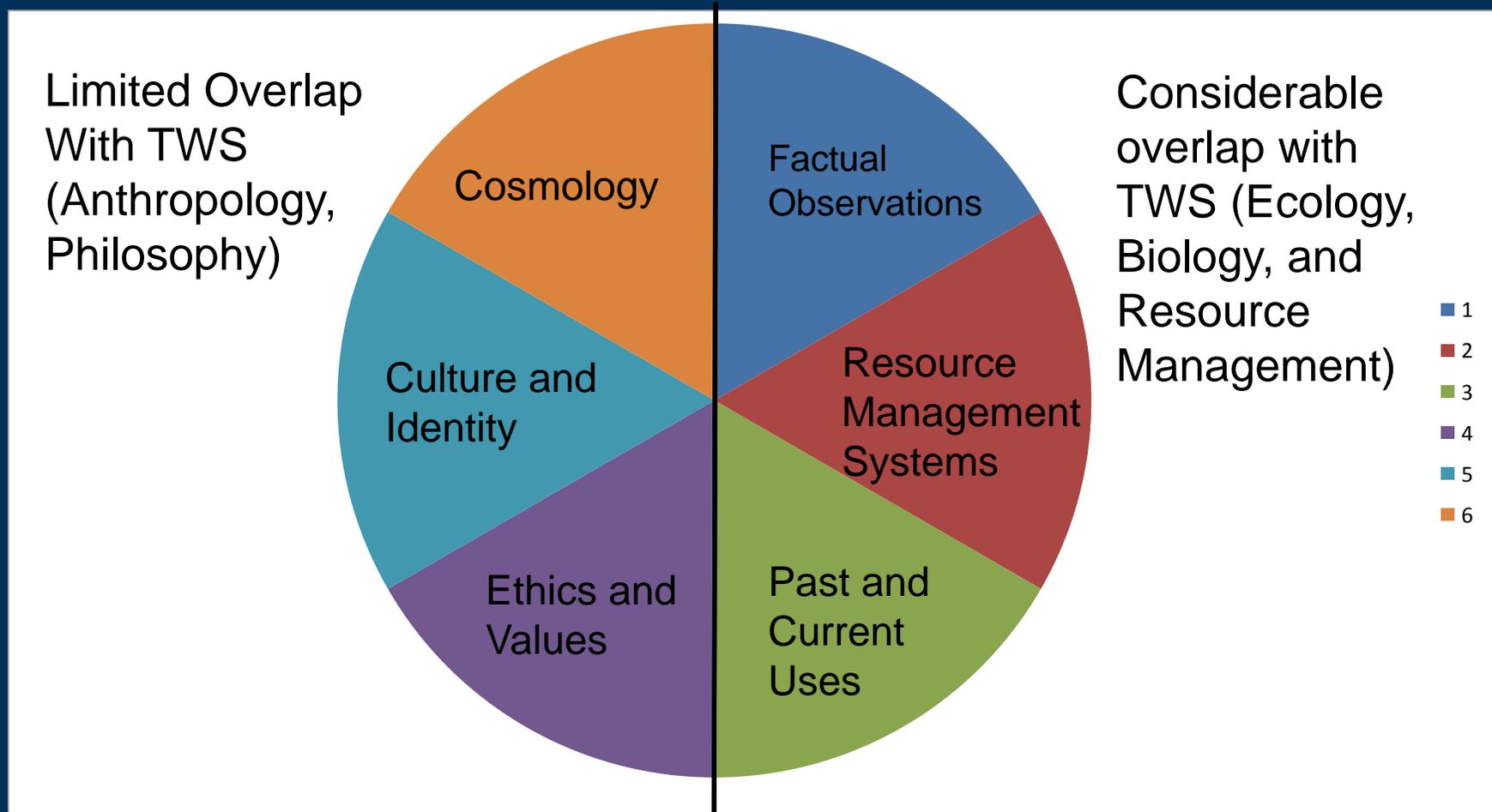
TEK and Western Science: Emphasizing Common Ground

Topic	Commonalities between TEK & TWS
Organizing Principles	Universe is unified, knowledge is subject to modification based on new evidence; management practices can be adapted based on new information
Habits of Mind	Inquisitiveness, honesty, perseverance, open-mindedness
Skills and Procedures	Empirical observation in natural settings, pattern recognition, verification through repetition, inference and prediction
Knowledge	Plant and animal behavior, cycles, habitat requirements, interdependence; properties of objects and materials; positions and motion of objects; cycles of the earth and sky

*adapted from Barnhardt and Kawagley 2005



6 Faces of TEK (from Houde 2007)



What are the historical roots of TEK in environmental decision-making?

- **1920s-1960s:** Anthropological research among indigenous communities (worldwide)
- **1960s-1980s:** International development, biodiversity conservation movement (UNESCO Conventions)
- **1980s-1990s:** Canadian Government negotiates with First Nations to settle land claims; final agreements call for TEK recognition/use in resource planning



Barriers to Integration of TEK in Environmental Management Programs

- **Political**: questions of power sharing, who defines the rules; underlying agendas (e.g., co-management, allocation of funding, etc.)
- **Epistemological**: very different forms of knowledge, not easily merged or compared; difficulties with interdisciplinary science a significant factor
- **Sociocultural**: communication styles, jargon, social discourse, intellectual property rights
- **Technical**: data standards, peer review standards, data-sharing protocols, reporting

Prior to GCDAMP (GCES II, 1991-1997)

- 1993-1994: Tribes funded to document traditional knowledge about Grand Canyon and Colorado River. Reports by Hopi, Zuni, Navajo, Hualapai, and Southern Paiute Consortium
- 1995-1997: Zuni Soil Conservation Service & NPS install traditional-style check dams at archeological sites
- 1990s: Hualapai Tribe funded to monitor fish below Diamond Creek
- 1994-1997: Tribes funded to monitor cultural resources. Some are explicit monitoring programs; others informal



Past Efforts to Integrate TEK and Native American Perspectives in the GCDAMP

- 1999-2001: Reclamation funds tribal monitoring as part of the NHPA PA program
- 2001-2005: GCMRC funds ethnobotany studies & some tribal monitoring (“Stakeholder-initiated Proposals”)
- 2001-2004: Terrestrial Ecosystem Monitoring Project (TEMP)
- 2005: GCMRC hosts workshop to discuss & refine tribal monitoring programs
- 2007: Dr. Jesse Ford presents on TEK to DOI managers
- 2007: TWG recommends funding tribal monitoring programs through Reclamation

Can TEK be incorporated into science-based Adaptive Management Programs?

- Potential roles for TEK in policy arena:
 - Could help to define “desired future conditions”
 - Evaluate experimental outcomes based on TEK
- Potential role for TEK in science program:
 - Identify potential monitoring indicators based on TEK
 - Design experiments that incorporate TEK
- Potential role for TEK in compliance arena (“mitigation of effects”)
 - Monitor resource condition with TEK perspectives
 - Intergenerational outreach / education programs

Establish Foundations for Success

- **Communication among GCDAMP stakeholders:**
 - Clarify goals: Integration vs. plural views
 - Clarify how TEK would contribute to AMP (Tribes)
 - Clarify how TEK would contribute to decision-making; specify TEK-inclusion process (AMP leadership)
 - Host focus groups or workshops to identify potential applications of TEK in the AMP and define standards re: data collection, data sharing, data management, etc.
- **Communication with Scientists:**
 - Provide cultural awareness training; educate scientists and managers about TEK and its relevance to AEM
 - Encourage interdisciplinary & collaborative research

Foundations for Success, continued

Need written Agreements w/ Tribes specifying:

1. Study goals (explicit)
2. Data collection standards (also methods?)
3. Reporting requirements
4. Data sharing and data archiving plan
5. Resolution of intellectual property issues
6. Resolution of compensation issues
7. Clear standards for what constitutes “success”

Literature Review: Take Home Points

- TEK has some commonalities with traditional western science – but there are also significant differences
- Value of TEK as alternative source of knowledge for environmental management is recognized internationally
- Different epistemologies, language, and cultural views make integration with science very challenging
- Processes and frameworks for incorporating TEK in environmental planning are still evolving
- There have been many attempts to integrate TEK, but relatively few unqualified success stories

Take Home Points, continued

- Integration of TEK is inherently political
 - Requires validation/acceptance of other forms of knowledge besides western science
 - Provides a platform for Native people's involvement
 - Has implications re: power- sharing
- Successful incorporation of TEK in adaptive management requires (at a minimum):
 - Clear goals for incorporating TEK (explanation of how and where TEK could be applied in the process)
 - Agreement and commitment by scientists, stakeholders and managers to embrace alternative knowledge sources
 - Standards & Agreements for accountability (all parties)

Questions?

