ITRC has developed a series of fact sheets that summarizes the latest science, engineering, and technologies regarding environmental data management (EDM) best practices. This fact sheet explains the general concepts of traditional ecological knowledge (TEK), what distinguishes TEK from other types of ecological knowledge, and how TEK can be useful to environmental regulatory agencies.

1. INTRODUCTION

Traditional ecological knowledge (TEK) is a collection of knowledge held by people in communities with a long history of direct dependence on local resources about the relationship of living beings, both human and non-human, to one another and to the natural environment (NYSDEC 2020). TEK can be held by Indigenous and non-Indigenous communities and is a combination of practical knowledge, practices, and beliefs that is "handed down through generations, and used for life-sustaining ways" (U.S. NPS 2020). Because TEK is based on long-standing relationships between people and the natural world, it is "specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry" (U.S. FWS 2011). The uses of TEK by environmental agencies are discussed in more detail in Section 4 below.

2. DIFFERENCES BETWEEN TEK AND CONVENTIONAL SCIENCE

TEK bears many similarities to ecological knowledge generated through conventional science (sometimes mislabeled as "Western science") in that both are based on systematic observations of natural environments and processes, both can be used to predict future conditions, and both have a cultural context for interpreting the observations (NYSDEC 2020). The important distinction of TEK, however, is that it focuses on human relationships with the natural world and incorporates cultural values such as reciprocity, respect, and responsibility (NYSDEC 2020; U.S. NPS 2020). These values are essential to the process of acquiring TEK from traditional knowledge holders, as described in the Acquiring TEK Data subtopic sheet and Managing TEK Data subtopic sheet. Conventional ecological science, on the other hand, tends to discount the relationship of the scientific observer to the ecosystem being studied (U.S. NPS 2020). Ecological studies also take place over relatively short time frames, a few years to a few decades, in contrast to TEK, which is developed over centuries.

3. ELEMENTS OF TEK

There are four elements of TEK that distinguish it from other bodies of knowledge and make it valuable to environmental agencies: TEK is knowledge gained (1) by a community of people (2) through life-sustaining relationships (3) with their surrounding environment (4) through many generations (U.S. NPS 2020).

3.1 Community Knowledge

TEK is knowledge that has been gained and maintained by a community of people, not by individuals alone. This can include Indigenous (Native American or First Nation) communities or non-Indigenous communities that have been using local natural resources for centuries, such as old agricultural and fishing communities (U.S. NPS 2020; NYSDEC 2020). This community aspect of TEK acts as a sort of pragmatic peer review—ideas about the natural environment and resource use that do not benefit the community are winnowed out over time (NRCS Undated). The community nature of TEK also emphasizes the need for agency representatives who want to acquire such knowledge to first establish a trusting relationship with leaders and elders in the community. Many communities—particularly Indigenous communities—have long-standing and well-founded mistrust of government authorities that can be challenging to overcome.

3.2 Life-Sustaining Relationships

Another aspect of TEK that can make it a reliable source of environmental information is the importance of that knowledge to the communities that developed it through generations of living off the land and sea. The relationships that traditional farmers and healers and subsistence hunters and anglers develop with the plants, animals, land, water, and seasons around them have been necessary for the long-term survival of their families and communities. Traditional farmers who deplete the soil and mismanage water resources will find their fields barren. Traditional healers who don't understand the lifecycles and habitats of the medicinal plants they use will not be able to help their patients. Subsistence hunters and anglers who don't

follow a deep knowledge of the game and fish they pursue won't put food on the table. All of these lifeways require respectful relationships with the natural world to sustainably manage resources for the use of future generations—a community that depletes its resources won't survive.

3.3 Ecological Knowledge

An important aspect of TEK that distinguishes it from other forms of traditional knowledge is that the knowledge is about the natural environment and people's relationships to ecological processes. Because TEK is pragmatic knowledge that is an integral part of all other aspects of life in traditional communities, teasing the ecological information out of the intertwined folk tales, religious stories, local histories, and other community lore can present a challenge for outside parties trying to acquire TEK. An ongoing relationship between those acquiring TEK and the community members who are providing it can be very important, as multiple discussions with different knowledge keepers may be necessary to get the full picture of the ecological relationships and information (Miraglia 1998).

3.4 The Test of Time

The fourth essential aspect of TEK is that it is knowledge developed over centuries and handed down through many generations. TEK is important information about the natural environment because it has stood the test of time. Subsequent generations will not employ practices and knowledge about the local environment that are not useful or accurate. Consequently, long-standing ecological knowledge—on the order of hundreds of years old—can be a useful information resource for environmental agencies. TEK is living knowledge; however, it is not just a snapshot of what a community's ancestors knew hundreds of years ago. Modern practitioners of TEK will have a more detailed and accurate picture of those traditional practices and will know how the knowledge has evolved through changing environmental conditions (Miraglia 1998).

In addition to TEK, a related form of information is local ecological knowledge (LEK), which is knowledge about the local environment held by community members that has not been handed down through many generations (U.S. NPS 2020). While not time-tested like TEK, environmental information gleaned from LEK can provide useful insights into more recent events in an area that can affect land-use planning, as described in the anthrax (see Local Ecological Knowledge of Historic Anthrax in a Natural Gas Field Case Study) and Mud Lake (see Collection and Application of Local Knowledge to Local Environmental Management in Duluth, Minnesota Case Study) case studies.

4. HOW ENVIRONMENTAL AGENCIES CAN USE TEK

State and federal environmental agencies are using TEK to inform environmental management decisions for a variety of purposes, described in detail in the Using and Consuming TEK Data subtopic sheet. Communities that have used the resources of an area for many generations will have a deep knowledge of what management practices have worked well in the past and what practices have failed. People who live in a close relationship with their local environment and have used information handed down by their elders can know subtleties about the local ecology that aren't apparent to those outside their community.

Six case studies provide examples of the use of TEK and LEK:

- Collection and use of TEK in developing remediation plans for 37 former uranium mines in Saskatchewan (see Integration of TEK to the Remediation of Abandoned Uranium Sites Case Study)
- Incorporation of TEK during revegetation of a uranium mill in Canada (see Use of TEK to Support Revegetation of a Former Uranium Mill Site in Saskatchewan Case Study)
- Developing a coastal resiliency plan for an Alaskan Native community based on TEK and LEK (see Improving Coastal Resilience in Point Hope, Alaska Case Study)
- Collection of LEK in planning a municipal recreation trail in Duluth, Minnesota (see Collection and Application of Local Knowledge to Local Environmental Management in Duluth, Minnesota Case Study)
- Use of LEK to avoid an outbreak of anthrax in planning a gas drilling operation in Wyoming (see Local Ecological Knowledge of Historic Anthrax in a Natural Gas Field Case Study)
- A cautionary tale from the Southeast U.S. about the problems that can ensue when a permitting agency does not consider TEK (see Rest in Peace? A Cautionary Tale of Failure to Consult with an Indigenous Community Case Study)

5. REFERENCES AND ACRONYMS

The references cited in this fact sheet, and the other ITRC EDM Best Practices fact sheets, are included in one combined list that is available on the ITRC web site. The combined acronyms list is also available on the ITRC web site.