Generations of Knowledge

Traditional Ecological Knowledge and Environmental Science

(DRL: #1010559)

Primary Audiences

- Public audience: general—families, underserved—Native youth (ages 11–14) and their communities
- Professional audience: project team members from all partner organizations

Collaborators

Generations of Knowledge **is a collaboration lead by:**

- Oregon Museum of Science and Industry (OMSI)

  PI: Victoria Coats, Co PI: Cecilia Nguyen
- Indigenous Education Institute (IEI)

  Co PI: Nancy Maryboy, Ph.D; Co PI: David Begay, Ph.D
- National Museum of the American Indian (NMAI) and Smithsonian Institution Traveling Exhibition Service (SITES)

With four Native community partners:

- Confederated Tribes of the Umatilla Indian Reservation and Tamástslikt Cultural Institute
- Tulalip Tribes and Hibulb Cultural Center and Natural History Preserve
- Eastern Band of Cherokee Indians and Revitalization of Traditional Cherokee Artisan Resources
- Pacific American Foundation and Waikalua Loko Fishpond Preservation Society in Hawaii

With review and input from:

- National experts in traditional ecological knowledge and environmental science
- A local Native Youth Advisory Board (YAB) of middle school students from Portland Public Schools (PPS) Title VII Indian Education Program

Native Youth Advisory Board

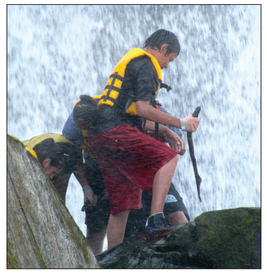
Project Team

Overview

This project engages underserved Native and non-native youth and adults in environmental science content and awareness through innovative exhibitions and hands-on activities. Traditional ecological knowledge (TEK) and western science are communicated and promoted within culturally relevant contexts as valuable, complementary ways of knowing, understanding, and caring for the world.

OMSI, partner institutions, Native scientists, tribal museum partners, exhibit developers, advisors, and members of Native American and Hawaiian communities are co-developing the project deliverables.

Lifelong Learning Group, Native Pathways, and RMC Research conducted the external evaluation using a mixed method, community-based participatory research (CBPR) approach.



Umatilla

Tulalip

Hawaii

Cherokee

Project Goals

- Produce *Roots of Wisdom: Native Knowledge. Shared Science.* This traveling exhibition is designed to engage families at science and tribal museums in the "Big Idea" that "Native American traditional ecological knowledge (TEK) and western science are valuable and relevant to society and offer complementary ways for understanding the natural world."
- Produce a traveling graphic panel *Roots of Wisdom* exhibition and interactive website in collaboration with NMAI and SITES for small tribal museums and other venues.
- Create and disseminate an activity kit for Native youth with programming ideas for use in schools, after-school programs, tribal museums, or science centers. The activities complement both traveling exhibitions, and invite youth to explore issues in their communities using both TEK and environmental science.
- Create opportunities and resources for reciprocal collaboration between informal science educators and indigenous partners on the development, evaluation, and interpretation of the public deliverables.

Challenges

Collaboration between a completely non-Indigenous science center and many Indigenous communities and organizations continues to be a rich learning experience for everyone involved. Much of the collaborative effort was focused on co-development of deliverables with partners and inclusion of Native audiences in development and evaluation. Co-leadership by OMSI and IEI and collaborative evaluation were also critical to the project's success.

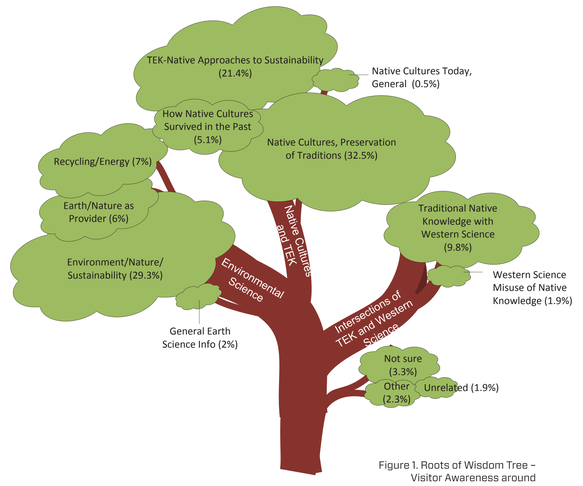


Figure 1. Roots of Wisdom Tree – Visitor Awareness around Exhibit Main Ideas

Summative Evaluation

For Professional Audience Impacts
Evaluators from the Lifelong Learning Group (at COSI) and Native Pathways (Laguna, NM) conducted a summative evaluation focused on the Roots of Wisdom collaborative process. The team gathered input from 15 collaborative partners from OMSI and the four tribal community partners (Confederated Tribe of the Umatilla Indian Reservation, Eastern Band Cherokee, Native Hawaiians and Tulalip Tribes). Methods included in-depth interviews, group discussions, relationship mapping and PhotoVoice. Key findings were as follows:

- The ROW project was successful in increasing partners' **skills** and **confidence** in facilitating reciprocal collaboration between a science museum and Native / tribal organizations.
- More salient to the partners were outcomes related to **relationship and trust building,** gaining deeper **understanding of cultural protocols and worldviews,** and impacts on organizational culture and perceptions.
- Partners identified aspects of the collaboration that **supported success** as follows:
  - The collaboration was built on **prior relationships**
  - Having the Indigenous Education Institute as Co-PIs and "bridge people" who could provide guidance on building relationships and cultural protocols
  - Including **Native youth voice** through a youth advisory board
  - Some of the OMSI team had participated in **prior projects that focused on bridging worldviews**
  - OMSI also participated in Native Universe, which coincided with the Roots of Wisdom project and had complementary goals
  - Focusing on **deep listening, frequent phone calls, in-person visits**
- Important **lessons learned** included the following:
  - Starting **small and local** is recommended when collaborating between a science center and tribal communities or organizations
  - Reciprocal collaboration **takes considerable time and budget** to support relationship building and leaving room for learning to communicate and understand one another
  - Attempting to produce **fewer deliverables** would leave more room to focus on process, relationship building and authentic collaboration

For Public Audience Impacts
Evaluators from the Lifelong Learning Group (at COSI) and Native Pathways (Laguna, NM) also conducted a summative evaluation of the public audience deliverables. Methods included semi-structured exit interviews, written questionnaires, and reflective tracking. A total of 317 visitors participated in the full exhibition evaluation; 39 visitors participated in the banner exhibit evaluation; and 6 teachers participated in an expert review of youth activities. Key findings from the **2,000 square foot traveling exhibition** were as follows:

- Visitors **highly enjoyed** the *Roots of Wisdom* full exhibition. They stopped at the majority of exhibition components (with 67% attending more than half of the stops), and found the exhibits to be **somewhat to very interesting**. The most appealing exhibits were those that allowed visitors to do something, such as the computer games and interactives/manipulatives. Youth were far more likely than adults to play a game or use an interactive; adults were more likely to read label text than were youth, though overall, adults and youth found exhibits equally interesting.
- **Visitors clearly gained an awareness of some of the main ideas within the exhibition,** including ideas around awareness of Native cultures and traditions, practices, and preservation of cultural knowledge; the importance of environmentally sustainability practices in general; Traditional Ecological Knowledge, though very few actually used
  this term; and connections between Indigenous ways of knowing and western science.
- **Visitors reported learning gains that align with intended outcomes for the exhibition.** Quantitative self-report measures of how the exhibit may have influenced visitors' awareness, interest, and attitudes around TEK (or Native ways of knowing) and western science showed significant positive change throughout, and was strongest for areas related to Native ways of knowing (the aspect visitors may have known least about coming in).
- **Learning outcomes were best supported by the interactive, hands-on nature of the full exhibition.** Visitors consistently referenced these components as key to their engagement and learning; although adults were more likely to cite information shared via panel text as an important component of their learning.
- **OMSI visitors were highly supportive of the idea to feature Indigenous perspectives in the science museum.** The vast majority of respondents shared positive opinions, with nearly half of the visitors expressing a general, positive remark and more than one-quarter of visitors stating more specifically that they enjoyed learning about Native cultures and perspectives. **Visitors to the tribal museums generally felt positively about the idea of featuring science, including Native science, in a tribal or cultural museum.** More than one-third shared a general, positive response, and almost one-fifth even felt that this could help connect people to their cultural knowledge. Some simply enjoyed learning about science and felt that a focus on Native science was well aligned with the museum's goals.

omsi.edu/exhibitions/row

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Roots of Wisdom
Native Knowledge. Shared Science.

Indigenous Education Institute I.E.I.

NSF

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