Evolution of a Robust Tribal-University Research Partnership to Investigate Tribal Exposures and Build Scientific Capacity

Tribal-University Collaboration to Address Tribal Exposures to PAHs and Improve Community Health

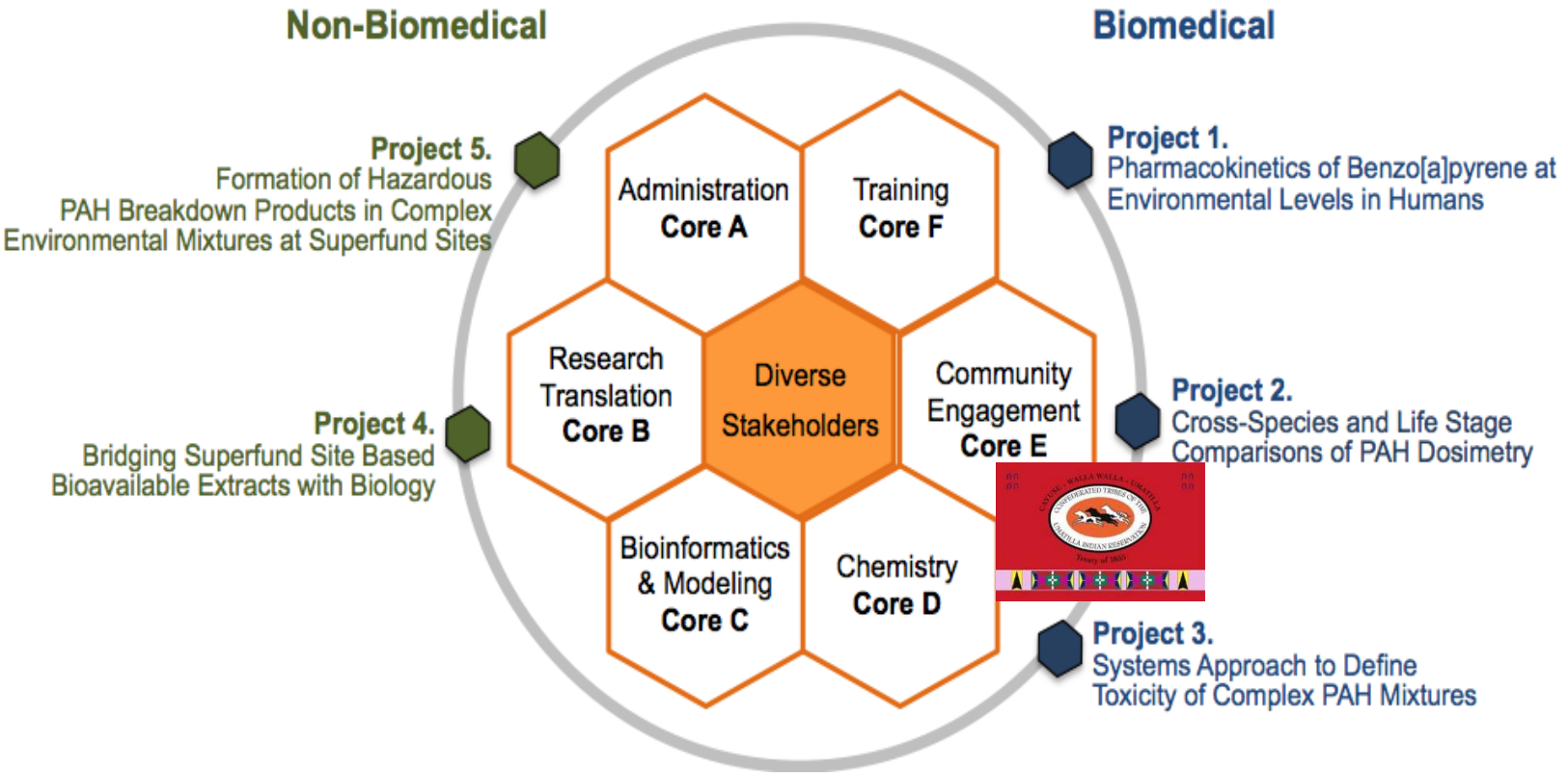
6th Annual Northwest Environmental Health Conference
April 8, 2014
Portland State University, Portland, OR

Barbara Harper, CTUIR/OSU and Anna Harding, OSU

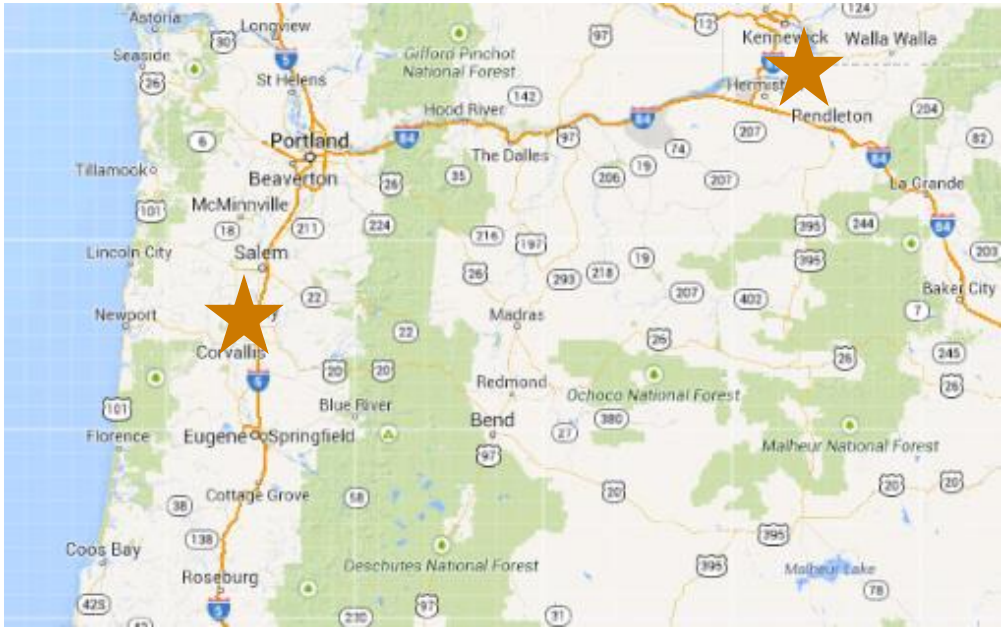
OSU: Barbara Harper, Anna Harding, Molly Kile, Kim Anderson, Staci Simonich
CTUIR: Barbara Harper, Stuart Harris

Focus of the OSU Superfund Research Program

Polycyclic Aromatic Hydrocarbons



Confederated Tribes of the Umatilla Indian Reservation



<u>CTUIR Field Station equipment:</u>

Two greenhouses

Botany and chemistry labs

ICP/AES; GC/MS; UV/Vis spec.

Equipment installed Jan-Feb 2012

History of Collaboration

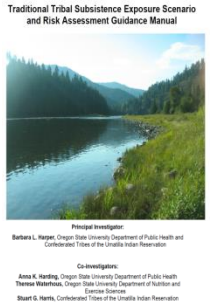
EPA-STAR-JI-R831046 (2003 – 2007)

NIEHS – P42ESO16465 (2009 – 2018)

Air and urine samples collected
Passive sampling devices (PSD) deployed

PSD deployed in the Nixyáawii Governance Center

2003 - 2009 2010 2011 2012 2013 2014 2015 - 2018



Memorandum of Understanding
OSU and the CTUIR Department of Science and Engineering (DOSE) begin collaboration

High-volume ambient air sampler installed on the Umatilla Reservation

1 joint paper published

Personal air monitoring training video's

3 joint papers published

Dietary study - PAH

PAH in traditionally smoked salmon study published

Engage Tribal Youth

The beginning of a partnership

2003 – EPA grant

2006 – Memorandum of Understanding

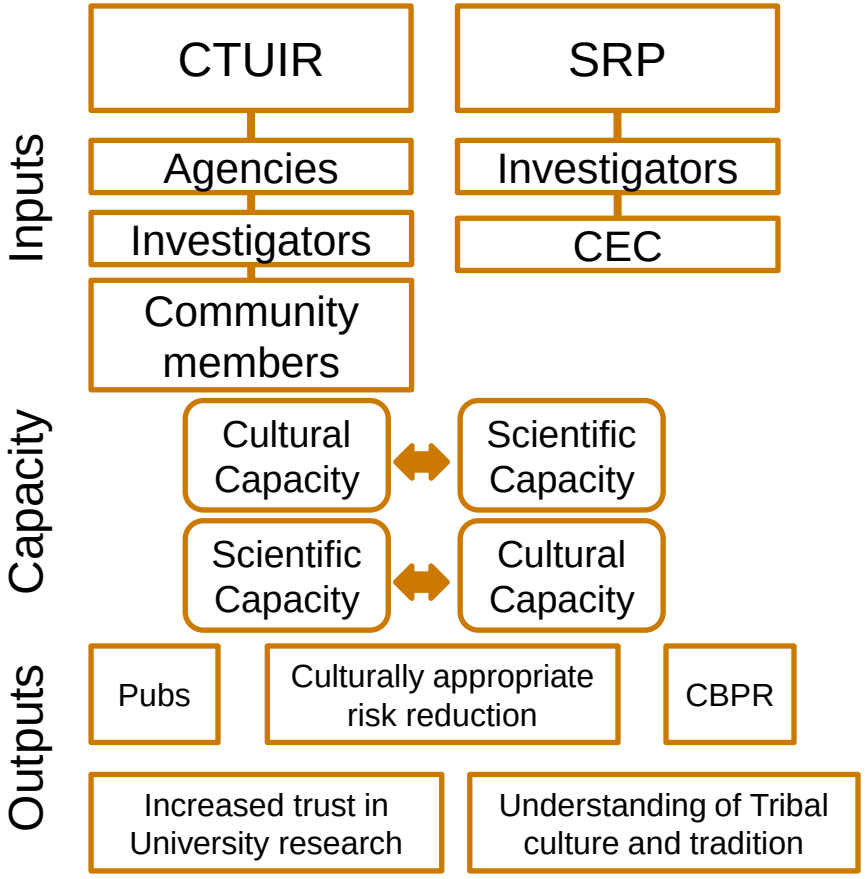
Template for the Data Sharing Agreement currently being used (CTUIR, Swinomish, Samish)

All data belong to the CTUIR

Specific CTUIR concerns identified

Mission of the University-Tribal Partnership

Create a collaborative project and partnership aimed at better understanding health risks associated with PAH exposure on the Reservation and assist in capacity building with tribal partners and research scientists.



CTUIR-University Partnership: Activities

Research interests identified by CTUIR

(1) PAH Exposures created during the traditional smoking of salmon

- PAH exposure from conducting traditional smoking practices
- PAH exposures from eating traditionally smoked foods

(2) PAH concentrations in ambient air on the Reservation

(3) Tribal member engagement in research (CBPR)

What makes a University-Tribal Partnership Sustainable?

Community-based participatory Research

- Empowering communities to make informed decisions regarding their health and their environment
- Doing collaborative research that has been identified as important by CTUIR
- Trust between CTUIR and OSU Scientists

Attention to capacity building in scientists and Tribal members

- Utilize the CTUIR Field Station
- Increase scientist cultural capacity

Respect for Tribal culture and traditions

- Develop culturally respectful ways to reduce the health effects of chemical exposures
- Recognition of a sovereign government with laws & policies

2007 - 2010

Traditional Tribal Subsistence Exposure Scenario and Risk Assessment Guidance Manual

Srp Superfund Research Program

Oregon State University | Environmental Health Sciences Center

Symposium on Conducting Research in Tribal Communities

La Sells Stewart Center
Engineering and Construction Auditorium
Oregon State University
Corvallis, Oregon

April 7, 2010

SUMMARY

This jointly sponsored symposium was on important issues related to working with tribal communities. The program covered historical legal context, Tribal perspectives, research ethics and informed consent, and a case study on Tribal risk research.

Approximately 80 participants attended the symposium. Attendees included OSU SRP researchers, a wide variety of other OSU academic departments, OSU Extension, US Forest Service, and non-profit organizations working with local tribes.

Symposium: Conducting Research in Tribal Communities

Scientific Capacity ⟷ Cultural Capacity

CTUIR community

DOSE

SRP Researcher

SRP Community Engagement Core

2010 - 2011

Specific Tribal Requests

- PAH concentrations in ambient air on the Reservation
- Tribal member engagement in research (CBPR)

Installed ambient PAH monitors

Produced training videos – How to use personal air samplers

Trained Tribal Air Quality Technician to collect PAH filters

2011 - 2012

Specific Tribal Requests

- Traditional Smoking Practices
  - PAH exposure from traditional smoking practices

Traditional Salmon Smoking Event

Collection and analysis of personal air and urine samples from Tribal members smoking food

Tribal involvement: Catching and smoking Chinook salmon, wearing air monitors, provide urine samples

OSU involvement: Analysis of PAH in air and fish, analysis of PAH in urine

Scientific Capacity ⟷ Cultural Capacity

Traditional Salmon Smoking Event

Anderson and Simonich Laboratories, CTUIR Tribal members, DOSE

- Shed
  - Apple
  - Alder
  - Chinook Salmon
- Tipi
  - Apple
  - Alder
  - Chinook Salmon
- Non-smoked salmon
- Commercial Salmon #1
- Commercial Salmon #2
- Commercial Salmon #3

Analysis of 33 PAH in ambient air, personal air exposure, salmon

∑PAH levels between 140 – 430X higher in CTUIR smoked salmon

∑PAH levels in commercial vs CTUIR non-smoked salmon similar

Traditional Salmon Smoking Event

Personal air sampling
The first of its kind conducted with tribal members.

PAH concentration was higher in the tipi versus the shed

Effect of Native American Fish Smoking Methods on Dietary Exposure to Polycyclic Aromatic Hydrocarbons and Possible Risks to Human Health

Norman D. Forsberg,[†] Dave Stone,[†] Anna Harding,[‡] Barbara Harper,[‡,§] Stuart Harris,[§] Melissa M. Matzke,[∥] Andres Cardenas,[‡] Katrina M. Waters,[∥] and Kim A. Anderson*[,†]

[†]Department of Environmental and Molecular Toxicology, and [‡]School of Biological and Population Health Sciences, Oregon State University, Corvallis, Oregon 97331, United States

[§]Confederated Tribes of the Umatilla Indian Reservation, Nixyáawii Governance Center, Pendleton, Oregon 97801, United States

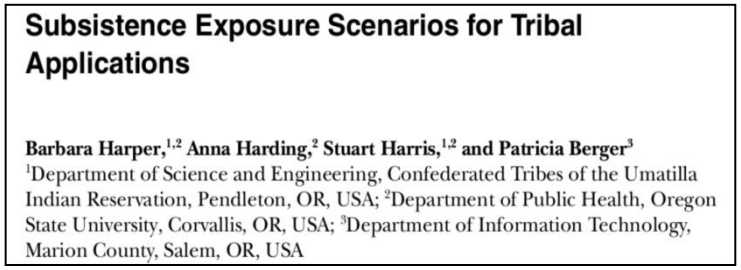
[∥]Computational Biology & Bioinformatics, Pacific Northwest National Laboratory, Richland, Washington 99352, United States

Forsberg, N., Stone, D., Harding, A., Harper, B., Harris, S., Matske, M., Cardenas, A., Waters, K., Anderson, K. (2012) Effect of Native American fish smoking methods on dietary exposure to polycyclic aromatic hydrocarbons and possible risks to human health. *Journal of Agricultural & Food Chemistry, 60(27), 6899-6906*.

PAH in urine
Collected urine from 2 Tribal members to analyze PAH levels in urine

2011 - 2012

Scientific Capacity ⟷ Cultural Capacity



Subsistence Exposure Scenarios for Tribal Applications

Barbara Harper,[1,2] Anna Harding,[2] Stuart Harris,[1,2] and Patricia Berger[3]
[1]Department of Science and Engineering, Confederated Tribes of the Umatilla Indian Reservation, Pendleton, OR, USA; [2]Department of Public Health, Oregon State University, Corvallis, OR, USA; [3]Department of Information Technology, Marion County, Salem, OR, USA

Harper, B.L., Harding, A.K., Harris, S., Berger, P. (2012) Subsistence Exposure Scenarios for Tribal Applications. *Human and Ecological Risk Assessment, 18,* 810-831.

Develop culturally respectful ways to reduce the health effects of chemical exposures.

"The initial trigger for this work occurred because regulatory agencies need to understand tribal exposures in order to evaluate risks and set risk-based remedial goals at contaminated sites if tribal lands, health or resources are affected either on- or off-reservation."

2011 – 2012

Building a sustainable partnership – using the Material and Data Sharing Agreement as a model for other projects

Harding, A.K., Harper, B., Stone, D., O'Neill, C., Berger, P., Harris, S., Donatuto, J. (2012). Conducting research with tribal communities: Sovereignty, ethics, and data-sharing issues. Environmental Health Perspectives, 120(1), 6-10. http://dx.doi.org/10.1289/ehp.1103904.

Distributed to:

- Regional EPA Tribal Liaisons
- Regional Indian Health Service providers
- NIEHS Resource Center (Accessible to SRPs and EHSCs)

2012 – 2013

Scientific Capacity ⇔ Cultural Capacity

Focus Groups

Three 90-minute focus group sessions with a total of 27 participants were held to elicit opinions on meanings of health and how the environment interacts with health

Selection of questions asked during the focus group:

1. What does being a healthy individual mean to you?
2. What does a healthy community look like?
3. In what ways is your health and the health of your family connected to the environment?
4. What sources of pollution or types of chemicals concern you the most?
5. Would you eat plants or game or fish obtained [near sources of pollution]?

Themes describing barriers to healthy communities

Perceptions of Health

- Participants expressed a holistic view of health that included environmental, physical, mental, spiritual, and intergenerational social components.

- A healthy natural environment was identified as an essential component of a healthy individual and a healthy community.

- Many believe the identified environmental hazards contribute to diseases in their community.

Schure M, Kile ML, Harding AK, Harper B, Harris S, Uesugi S, Goins T. (2013) Perceptions of the Environment and Health Among Members of the Confederated Tribes of the Umatilla Indian Reservation. *Environmental Justice*, *6(3), 115-120.*

2013 – 2014

Scientific Capacity ⟷ Cultural Capacity

Specific Tribal Requests

PAH exposures from traditionally smoked foods

Dietary Study

10 Tribal members

50g smoked salmon

Survey – exposures to other sources of PAH

Pre-breakfast urine sample

Urine sample – 3 hours

Urine sample – 6 hours

Urine sample – 12 hours

Urine sample – 24 hours

PAH analysis, PBPK analysis for metabolism

Restricted Foods

2014 – 2018 – Future work

Material and Data sharing agreements ⇨ Improve understanding of PAHs among the Swinomish and Samish Indian communities

Use PSD to measure ambient PAH exposure

Engage Tribal Youth

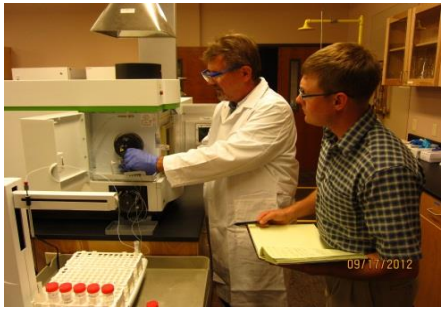
Multi-media Environmental Health Activity

Use air samplers indoors

Measure air quality in CTUIR homes using wood burning stoves

Summary: Building a robust, sustainable partnership

- Community-based participatory research
- Scientific and cultural capacity building between CTUIR and OSU researchers
  - Emphasis on trust between CTUIR and University
- Developed data sharing agreements for Tribal-University partnerships that protect Tribal rights
- Develop culturally appropriate risk reduction strategies with CTUIR
- Disseminated knowledge through journals, newsletters and community meetings to provide Tribal Perspectives on research practices



Acknowledgements

Confederated Tribes of the Umatilla Indian Reservation

- Michelle Burke
- Jack Butler
- CTUIR participants in salmon smoking study and focus group sessions
- Tribal Advisory committee members

OSU Superfund Researchers, Staff

- Andres Cardenas (Community Engagement Core)
- Norman Forsberg, PhD (Anderson Lab)
- Yuling Jia (Simonich Lab)
- Oleksii Motorykin (Simonich Lab)
- Jill Schrlau (Simonich Lab)
- Dave Stone, PhD (Research & Translation Core)
- Dan Sudakin, MD (Director, Research & Translation Core)
- Lane Tidwell (Anderson Lab)
- Sandra Uesugi, MS (Former Program Coordinator, Community Engagement Core)

Pacific Northwest National Laboratories

- Katrina Waters, PhD