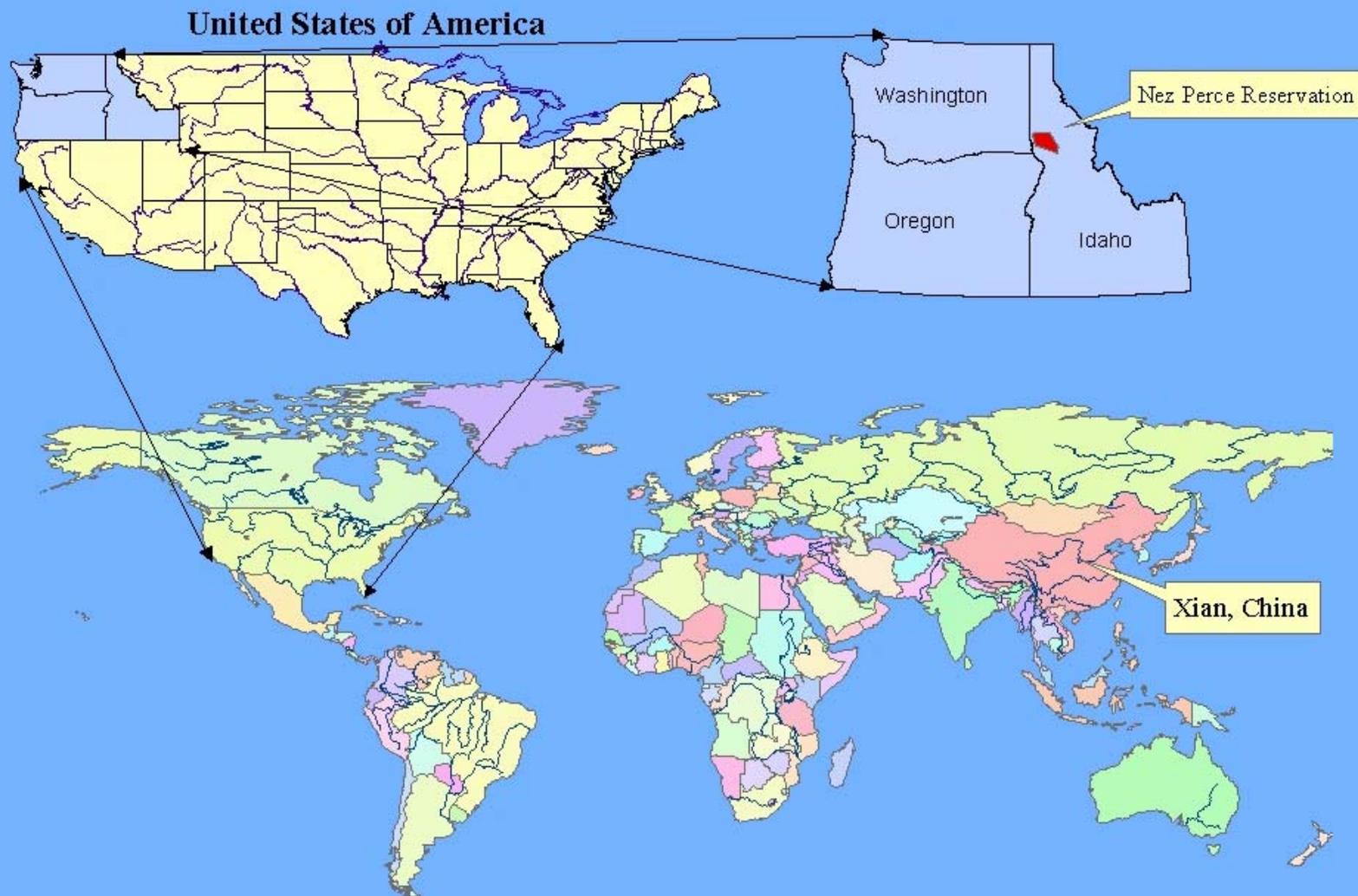


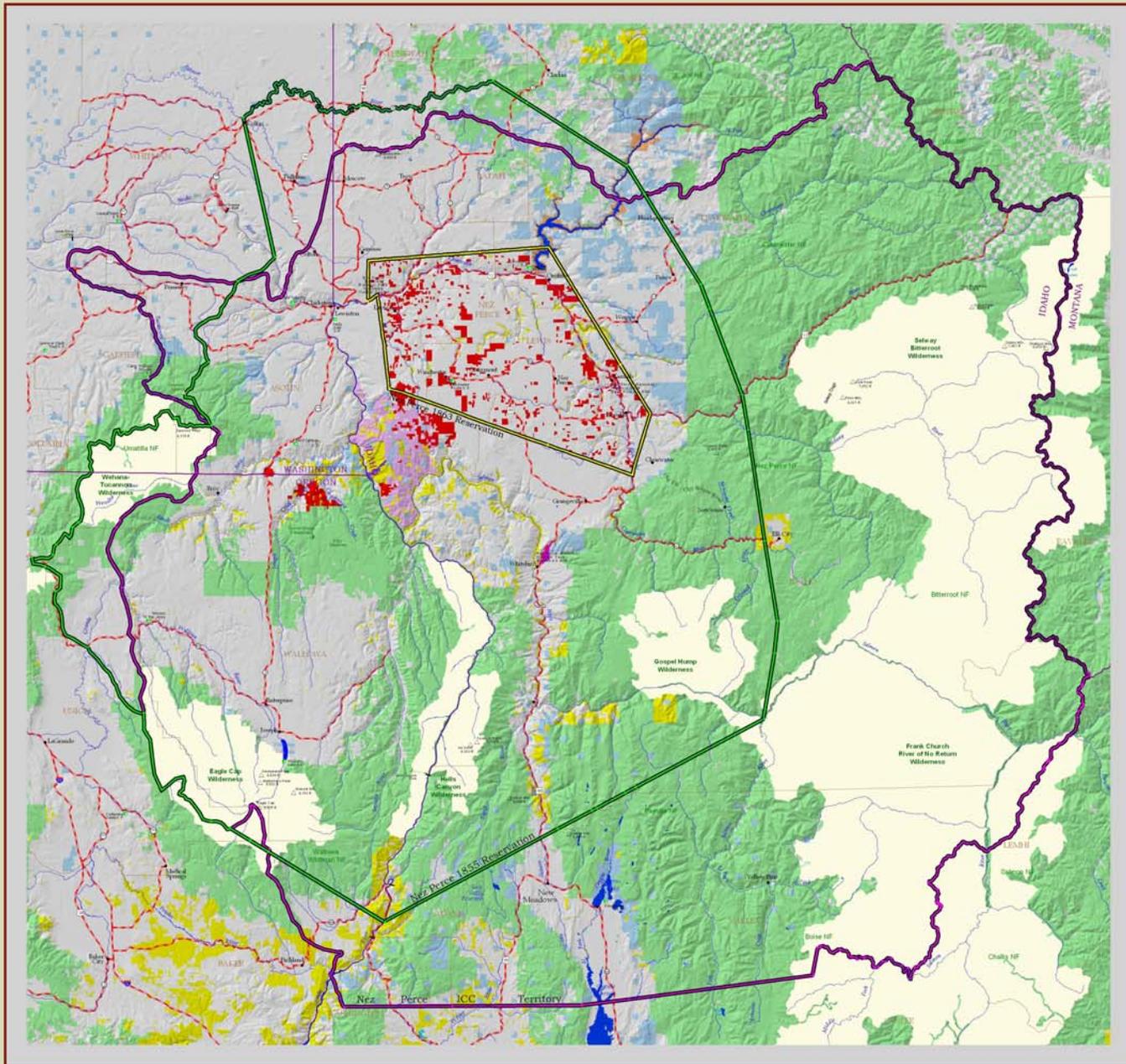
# Measurable Outcomes of a Woodstove Changeout on the Nez Perce Reservation

**Tuiaana Moliga –**  
**Student Intern for Nez Perce Tribe’s**  
**Environmental Restoration and Waste**  
**Management (ERWM) Air Quality**  
**Program**

## Location of the Nez Perce Reservation

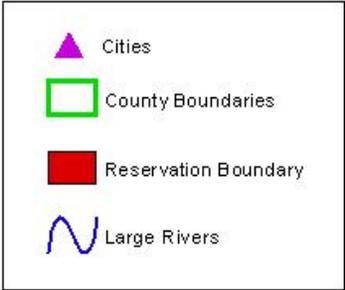
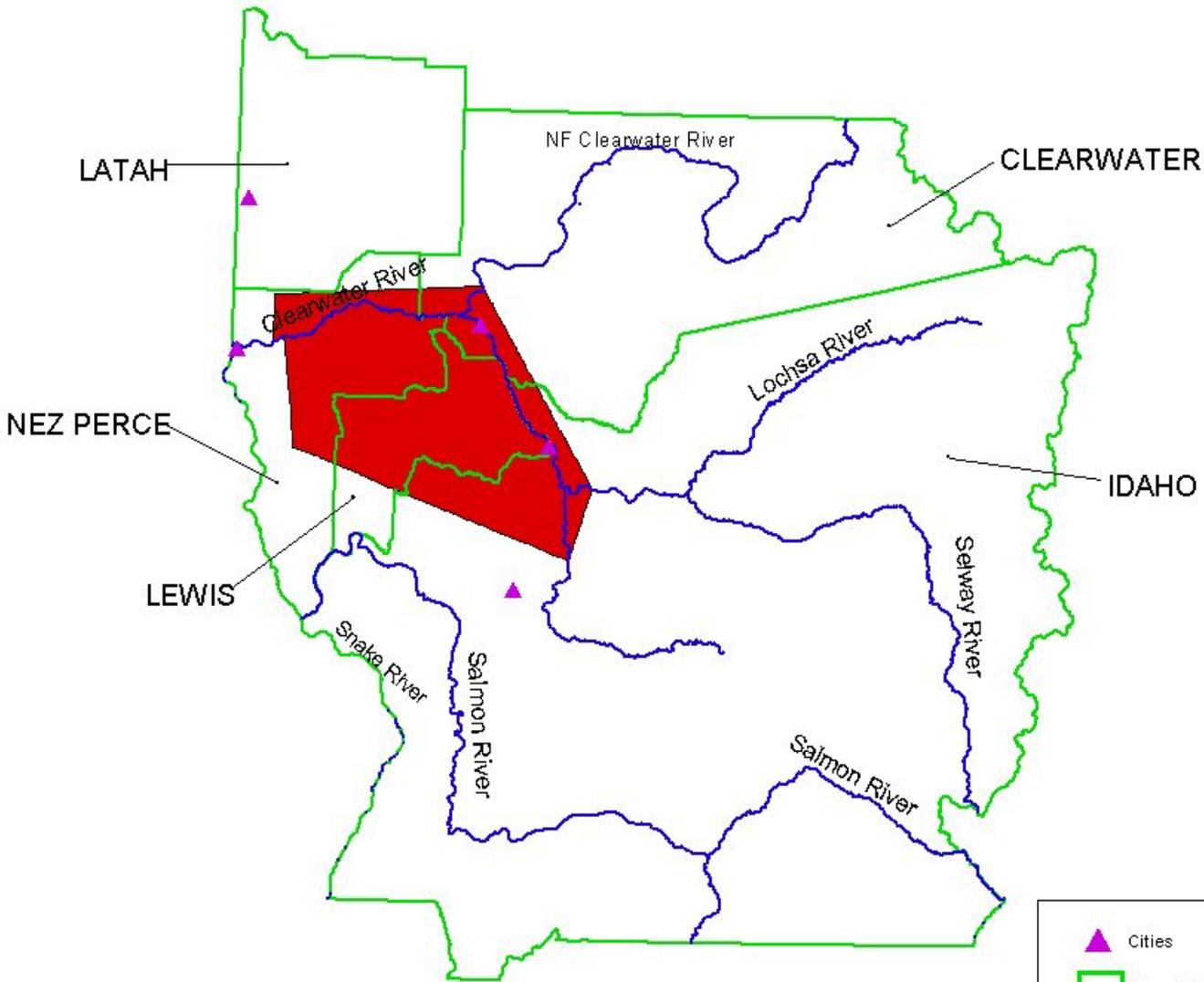


# Territory of the Nez Perce Tribe



- Nez Perce ICC Territory**  
13,310,530 Acres  
Official maps of the original territory of the Nez Perce Tribe as defined by the U.S. Indian Claims Commission in 1967 (Final No. 17). This is the area that the Tribe had exclusive use and occupancy of since time immemorial and custom accepted hunting and fishing were for the Nez Perce. The Treaty of 1855 and 1863 ceded much of this area to the United States.
  - Nez Perce 1855 Reservation**  
2,880,470 Acres  
In May and June of 1855, a treaty council was held at Walla Walla. The Territorial Governor of the Washington Territory, Isaac I. Stevens, negotiated treaties with several of the Salishian speaking tribes of the Inland Northwest, including the Nez Perce. The primary effect of the treaty with the Nez Perce was the cession by the Tribe to the United States of some 7 million acres of land. In addition, the Tribe ceded certain rights including rights to hunt, gather, and graze their animals on "open and unoccupied" lands within the ceded territory and the right to take fish, at seasonal and accustomed places outside the reservation. The United States Supreme Court held that these rights are not a grant of rights to the Tribe, but accretions to the Tribe of rights already held. U.S. v. Shoshone, 188 U.S. 67, 103 (1903).
  - Nez Perce 1863 Reservation**  
270,470 Acres  
In the early 1860s gold was discovered in portions of the 1855 reservation. Miners and settlers largely ignored the existence of the reservation and land prospecting began. A settlement was established at the confluence of the Snake and Clearwater Rivers to supply mining camps. The settlement, which became the city of Lewiston and the first territorial capital of Idaho, was actually a violation of the reservation. Instead of enforcing the terms of the 1855 treaty and attempting to prevent the trespass and fill of gold from the reservation, the United States created a new treaty that provided for the land acquisition of the Nez Perce land holdings. Although this treaty was created by Nez Perce leaders, it was ultimately executed to land upon the death of federal negotiators that there would be no sane compensation if the Tribe failed to agree to the treaty. This treaty had no effect on any of the fishing, hunting, gathering, or grazing rights reserved in the 1855 treaty.
- State Lines
  - County Lines
  - Major Streams
  - State Highway
  - US Highway
  - Interstate Highway
  - Other Major Roads
  - Cities & Towns
- Ownership Management**
- Nez Perce Indian Lands
  - Water
  - US Forest Service
  - Crops of Engineers
  - Bureau of Land Management
  - National Park Service
  - County Land
  - Idaho Fish & Game (Mitigation)
  - Other State Land
  - The Nature Conservancy
  - Private
  - Federally Designated Wilderness





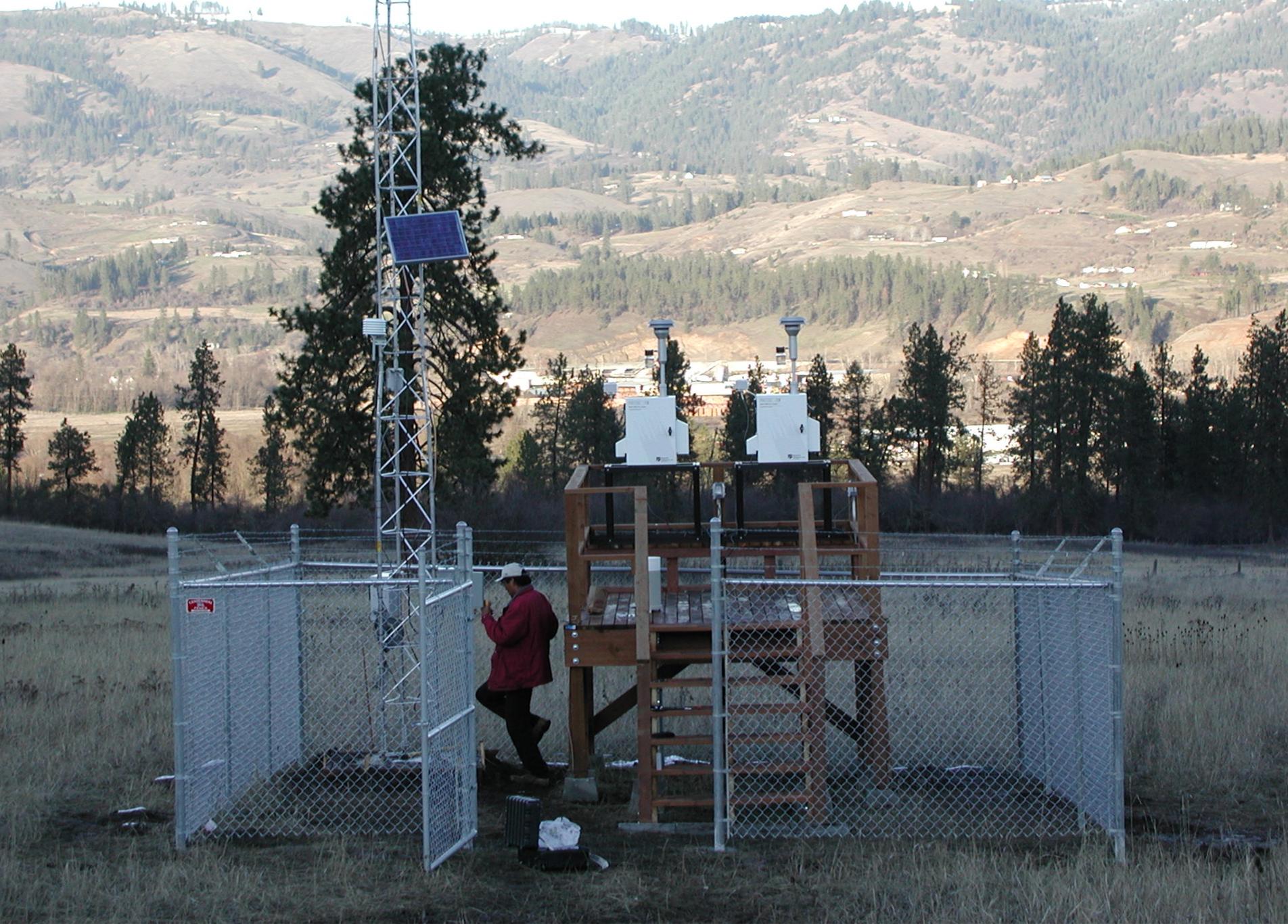








9/21/99



# Hypothesis

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- Woodstove replacement will reduce indoor levels of particulate matter (PM) and associated wood smoke chemical markers from domestic wood burning

# Project Partners

- EPA
- Nez Perce Tribe
- University of Montana
- Northwest Indian College, Nez Perce Tribe  
Distance Learning Center
- Institute for Tribal Environmental Professionals  
(ITEP)

# Study Overview

- Recruit households
- Conduct sampling during winter months 06/07 and 07/08 in 16 households in Kamiah and Lapwai
- Conduct woodstove changeouts in summer 2007 from the older non-EPA certified stove to a new EPA certified stove
- Measure ambient PM<sub>2.5</sub> mass before and after changeout
- Measure residential indoor PM<sub>2.5</sub> levels before and after woodstove changeout
- Education and outreach

# Outreach Efforts

- Recruiting households
  - T.V. interview with KLEW News
  - News article in Lewiston Morning Tribune
  - Meeting with NiMiiPuu Health
  - Presentation for Lewis Clark Air Advisory Committee
  - Notification in Tribal employee email
  - Nez Perce Tribe Environmental Education Group
  - Nez Perce Tribe Intradepartmental Coordination

# Working with Households

- “Qualifying” households
  - Tribal member home
  - Asthmatic children in household between the ages of 6-16
  - Non-smoking home
  - Use older woodstove as their main source of heating the home
  - Questionnaire
    - ~20 received
      - 6 qualifying
    - Contact with prospective participants
      - Sharing incentives
      - Challenges

# Ambient Monitoring

- Utilize existing network in Kamiah and Lapwai
  - PM2.5 TEOM
  - Met Tower: temperature, humidity, precipitation, wind speed & direction
  - Record of observations and forecasts of inversion conditions (predicted elevations and when/if the inversion breaks)

# EPA Standards

- 24 hour PM<sub>2.5</sub> standard went from 65  $\mu\text{g}/\text{m}^3$  to 35  $\mu\text{g}/\text{m}^3$
- Annual PM<sub>2.5</sub> standard is still 15  $\mu\text{g}/\text{m}^3$

# Indoor Air Sampling

- Sample for 24-hour period, 4 sample days
- Leland Sampler / Personal Environmental Monitor with a quartz filter:
  - Organic Carbon / Elemental Carbon (OC/EC)
  - Chemical markers (vanillin, acetovanillone, guaiacol, 4-ethylguaiacol, levoglucosan, abietic acid, dehydroabietic acid)
- DustTrak (continuous PM<sub>2.5</sub> mass) set to run for 48 hours straight
- Health Effects

# Health component

- As a participant in the woodstove changeout, we asked the homeowner to take part in the health component and monitor their asthmatic child's breathing using the PiKo peak flow meter
- Peak flow meter measures how much air the child can take into the lungs and breathe out

# Health component cont'



# Sample Days

- Interview with participant
  - Explain study
  - Equipment
  - Keeping records of daily activities
- Collecting home information
  - Age of home, square footage, number of rooms
  - Age of woodstove, wood type, cords burned per year

# Indoor Sampling Equipment



# Sample Days cont'

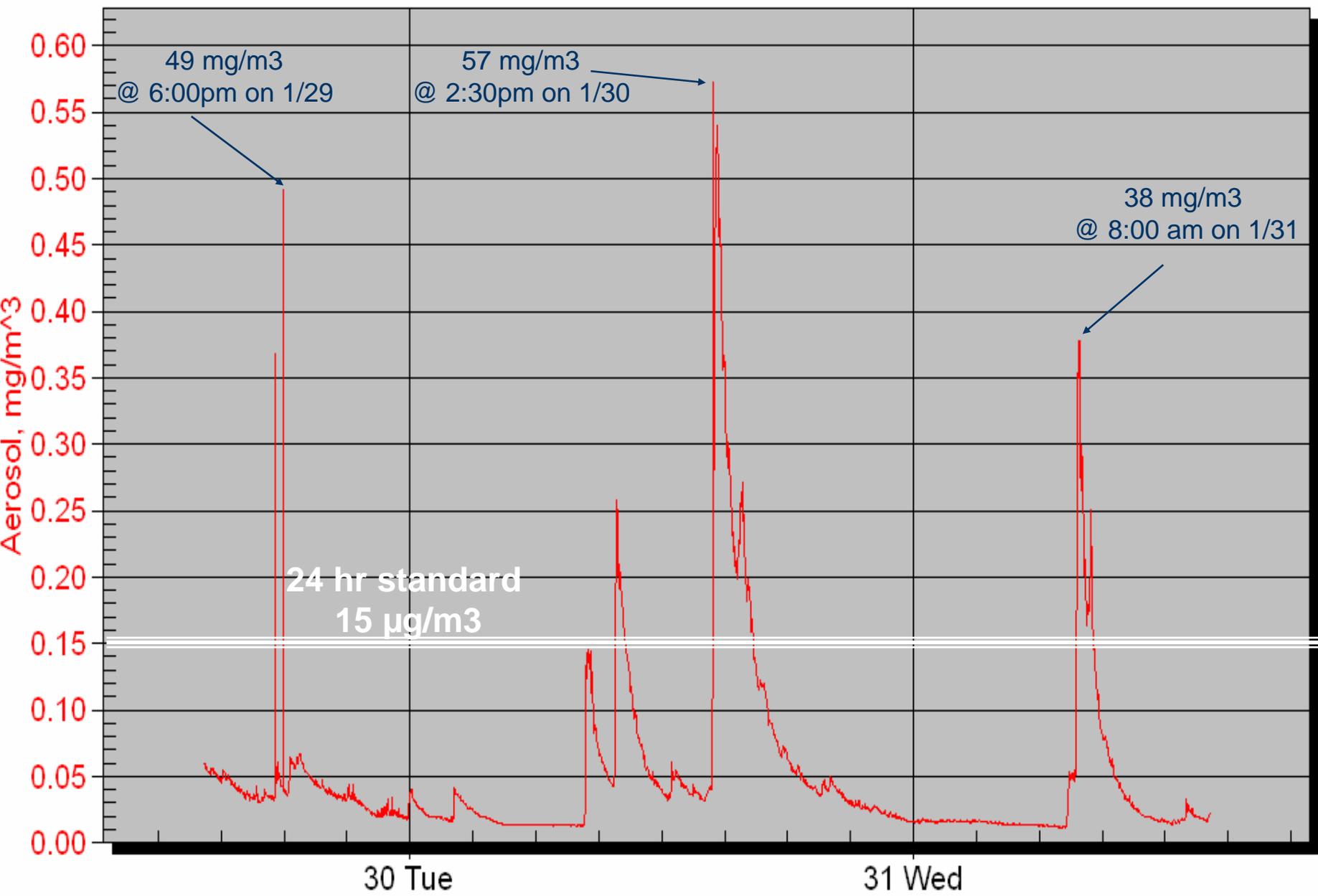
- Equipment duties
  - Calibration and set-up
  - Cleaning
  - Uploading information to the Dust Trak to set run time and date
- Record Keeping
  - Documenting equipment readings
  - Downloading data from the Dust Trak & emailing information to Tony Ward

# Calibrating the equipment



# Home # 3

Test # 1



Jan 2007

# Sample Days cont': Participant Commitment

- Record of home activities during sample day
  - 2 pages: cooking, cleaning activities, candles, etc.
  - Nez Perce traditional burning activities such as burning sweet grass, sage, or boiling kouse kouse
- Record of wood burning activities
  - Loading & stoking
  - How many pieces of wood used
- Challenges

# Older woodstoves in homes sampled



# Wood Stove Changeouts

- Provide & install up to 16 EPA certified stoves which are more efficient and give off less emissions
- Tribal Employee Rights Office (TERO)
  - Certifications for tribal members to become stove installers
- Work with Libby, MT changeout folks

# Education and Outreach

- Health effects of wood burning stoves
- Optimal operation of wood stoves
- Asthma, smoking, & indoor air quality
- NWIC student presentations on study results
- Tribal programs
  - Wood Delivery Program
  - Housing Authority
  - Early Childhood Development Program (Headstart)
- Community events, schools

# Preliminary Results from Univ. of Montana's research in Libby, Montana

- Pre-changeout average PM<sub>2.5</sub> concentrations within 21 homes: 53.4 µg/m<sup>3</sup>.
- Post-changeout average PM<sub>2.5</sub> concentrations within 16 homes: 15.0 µg/m<sup>3</sup>.
- Average reduction in indoor PM<sub>2.5</sub> as a result of woodstove changeout within 16 homes:

72%

**Questions?**

