



# CASTNET Tribal Partnerships

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# Outline

- CASTNET Overview
- CASTNET monitoring on tribal lands
- CASTNET tribal intern
- How tribes use CASTNET data
  - Benefits to the tribes
- Feedback

Pinedale, WY CASTNET site (PND165). Filter pack, O<sub>3</sub> and NO<sub>y</sub> is collected by EPA. Meteorology is collected by BLM.



# CASTNET Overview

## CASTNET Site Map

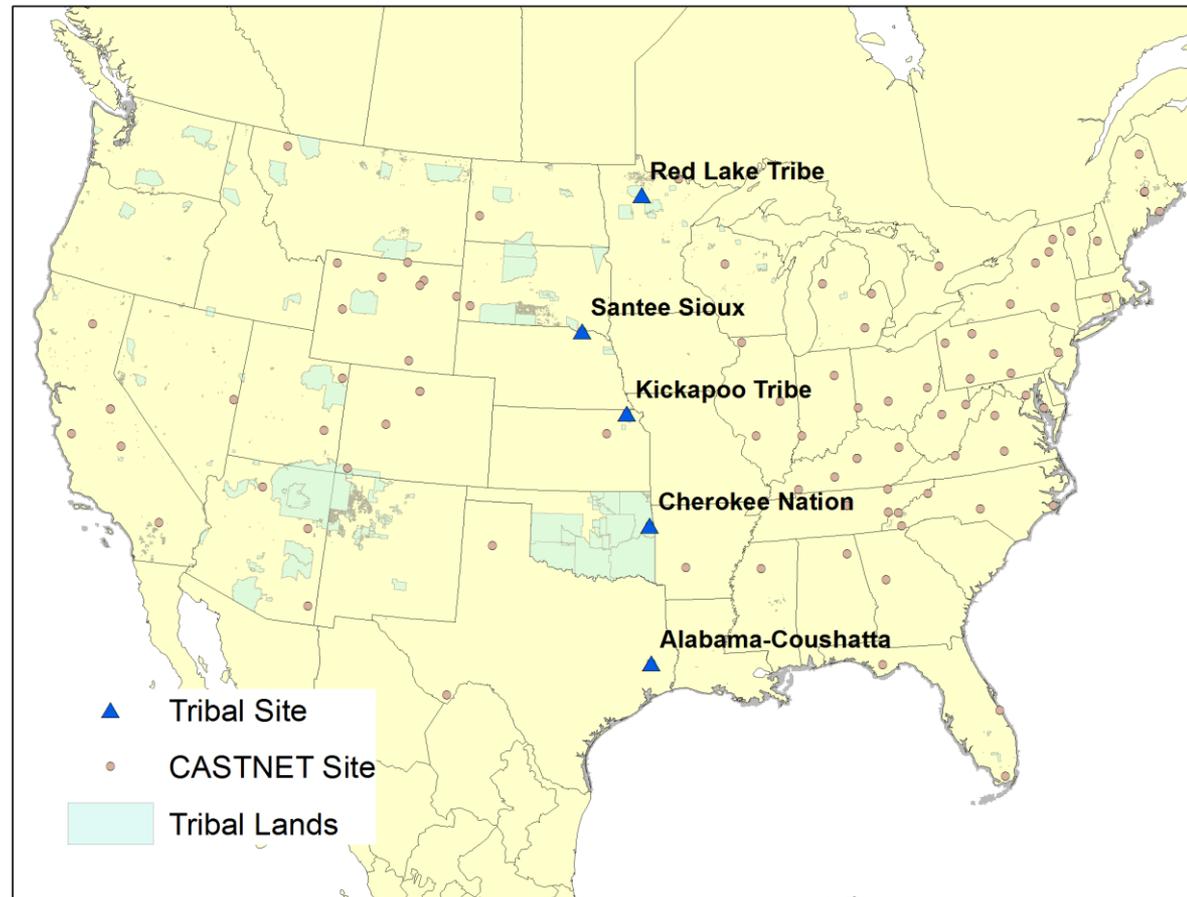
- 92 monitoring sites sponsored by EPA, NPS, BLM, NY DEC/NYSERDA
- Long-term rural monitoring network designed to provide ambient concentrations and estimates of dry deposition
- Most sites are co-located with NADP/NTN sites which provides wet deposition data. CASTNET reports dry and total deposition fluxes.
- Each site measures weekly concentrations of  $\text{SO}_2$ ,  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$ ,  $\text{NH}_4^+$ ,  $\text{HNO}_3$ ,  $\text{Cl}^-$  and base cations
- Most sites measure hourly  $\text{O}_3$
- Ambient data, quality assurance data and documentation posted routinely to the public website



Sumatra, FL (SUM156)

# CASTNET Tribal Monitoring Program

- Three CASTNET sites are located on Tribal lands
  - CHE185, OK
  - SAN189, NE
  - ALC188, TX
- Recently, through EPA's OAR tribal program, CAMD's outreach to tribes and the design of a low-cost, small footprint site – EPA has expanded the network
  - KIC003, KS
  - RED004, MN
- Amber Reano joined EPA through ITEP summer intern program



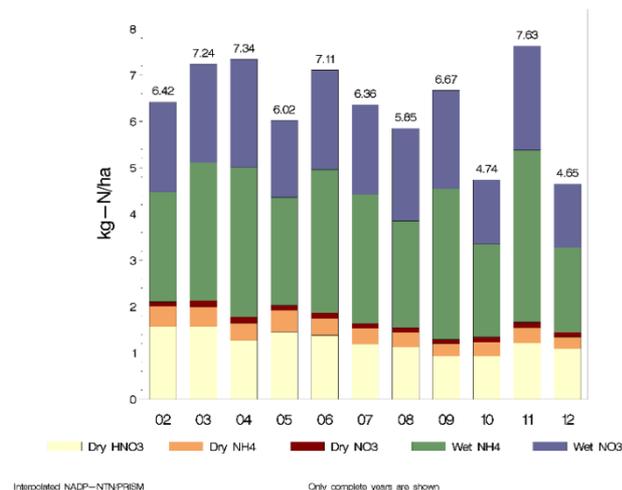


# Cherokee Nation (CHE185, OK)

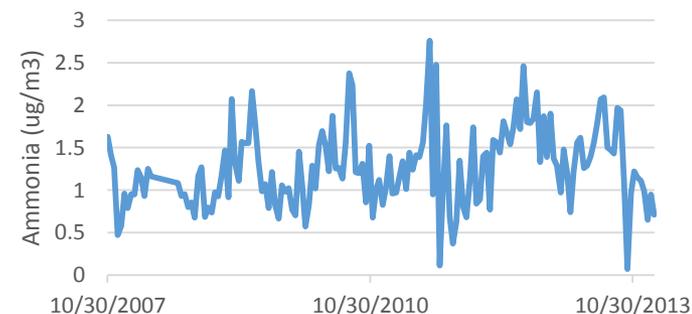


- CASTNET site began in 2002
- Co-located with NCore
  - CASTNET operates filter pack and meteorological measurements
  - Cherokee Nation collects ozone, PM and trace gas measurements
- Co-located with National Atmospheric Deposition Program:
  - Mercury Deposition Network (MDN)
  - Atmospheric Mercury Network (AMNet)
  - Ammonia Monitoring Network (AMoN)
- CHE185 is located at a Cherokee middle school. Students have access to the site and data through the American Indian Science and Engineering Society (AISES) program

Total N Deposition  
CHE185



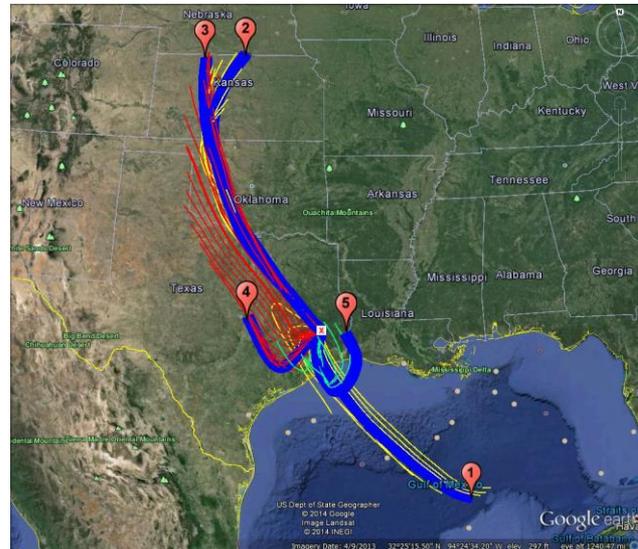
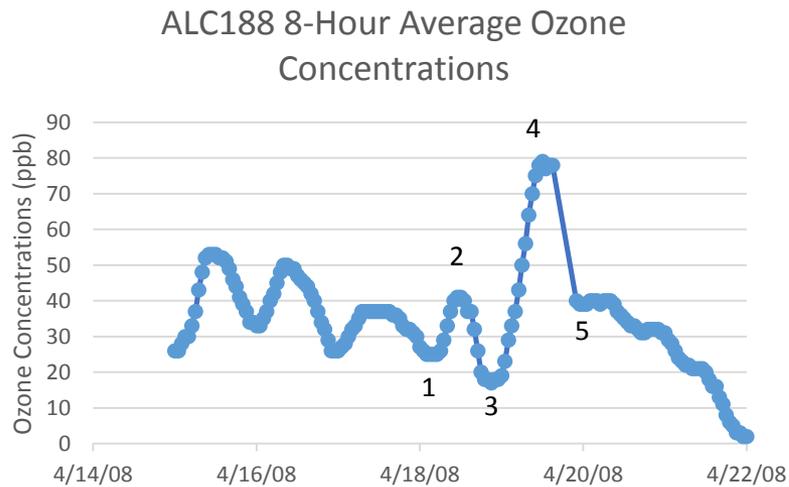
Ammonia Bi-Weekly  
Concentrations





# Alabama-Coushatta (ALC188, TX)

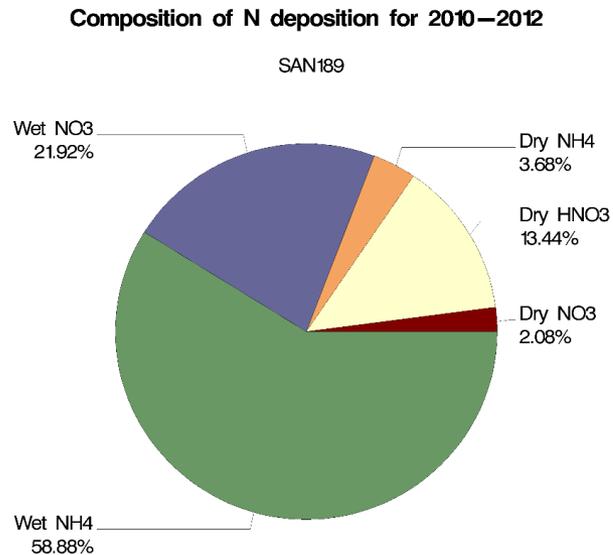
- Site began in 2004
- Site is located in an area impacted by agricultural burns, wildfires and urban air pollution
- Yellow – 4/18, Red - 4/19, Green – 4/20



# Santee Sioux (SAN189, NE)



- CASTNET site began in 2006
- Only CASTNET site in Nebraska
- Co-located with AMoN



# Small-footprint CASTNET site

- AMEC developed the small footprint site
- Shelter contains pump, flow meter, data logger, and cellular modem
- Low cost, low power



Whiteface Mountain, NY (WFM105)





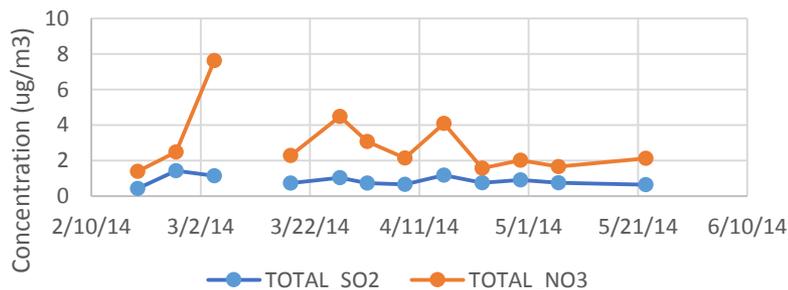
# Kickapoo Nation (KIC003)

- Located in NE Kansas
- Small-footprint site established in February 2014
- NADP wet deposition installed in Summer 2014 (estimate total deposition S + N)
- Located site at the Kickapoo Nation School to enhance science/environmental education.



Kickapoo (KIC003) Filter Pack  
Concentrations

(DATA ARE NOT FINAL - CONCENTRATIONS MAY CHANGE DURING FINAL REVIEW)





# Red Lake Nation (RED004, MN)

- Site installation underway
- Located in Northern Minnesota on the largest reservation in R5
- Proposed site location near Red Lake Nation school, however the site did not meet CASTNET siting criteria.
- Primary sources of livelihood - hunting, fishing and subsistence natural resource harvesting
- Red Lake is installing continuous PM2.5 at the hospital near the CASTNET site
- Concerns over impacts to air quality due to prescribed and natural burns

Red Lake Department of Natural Resources  
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## Red Lake Air Quality Program

The Air Quality Program is responsible for protecting and monitoring the air quality of the Red Lake Nation. A full-time Air Quality Specialist position was added in 2007 to work toward the development of an inventory of emissions sources on or near the Red Lake Nation, to establish ambient (outdoor) air monitoring stations within the reservation boundaries, to conduct studies to determine if there are pollution problems from indoor sources, and to provide community education and outreach.

### Air Quality Projects

-An **Emissions Inventory (EI)** was completed for 2008 and will be updated for 2011. An EI is a comprehensive listing, by source, of air pollutant emissions associated with a specific geographic area for a specific time interval. This inventory can be used to evaluate stationary area sources within Reservation boundaries to establish baseline data and assess air quality.



-The **School Air Toxics Monitoring Program** is a partnership between the RL DNR, US EPA, and Red Lake School District. This program is meant to assess the ambient air near schools, in a larger effort to protect schoolchildren where they learn and play. For more information on this program (and results, as they become available), see [US EPA website](#).

-A **Smoke Management Plan (SMP)** to be used by the Forestry Program, for use with prescribed burning and managed wildland fires throughout the Reservation, is in the process of being created. The purposes of SMPs are to minimize health risks, mitigate the nuisance and public safety hazards (e.g. on roadways and at airports), prevent deterioration of air quality and National Ambient Air Quality Standards (NAAQS) violations, and address visibility impacts in federal mandatory Class I areas.

-The Air Quality Program hopes to begin participating in an **Indoor Air Quality Tools for Schools** program that is intended to create healthy indoor environments in schools for students and staff.

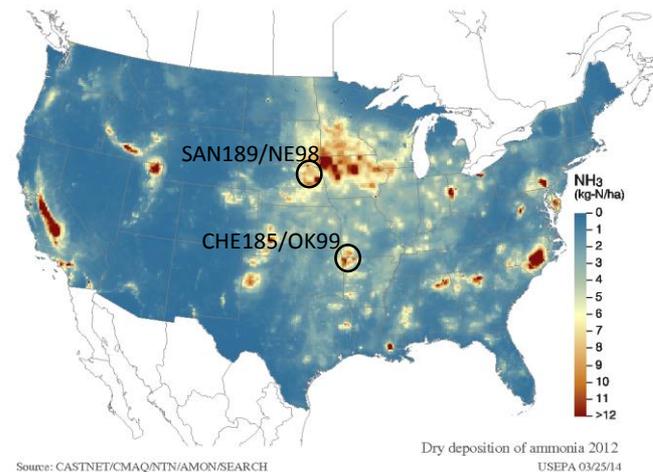
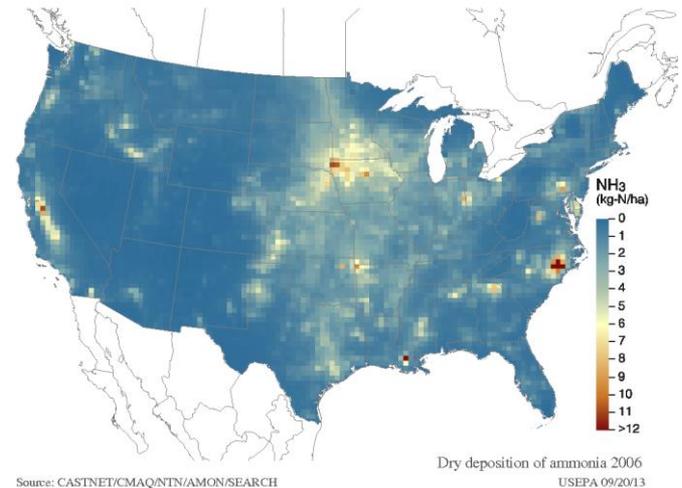
Check out today's [Air Quality Index](#) or [Red Lake Air Quality BLOG](#)

Red Lake DNR PO Box 279 Red Lake, MN 56671 Phone (218) 679-3959

# Mutual Benefits for Tribal Partners and CASTNET

- Partnerships are important for operating a consistent, long-term monitoring network
- Atmospheric pollutant and deposition impacts to areas important to tribes
  - Negative effects to land and water quality
  - Health effects due to ozone and/or PM formation
- Current sites fill in gaps in the network within the central US region
- Many tribes provide in-kind support for operations and land use
- Training availability
  - EPA provided training to Cherokee in 2002
  - Cherokee has provided training to many tribal partners

Monitoring data is essential for providing input to models. Figures show total deposition maps – dry deposition of  $\text{NH}_3$  before and after AMoN



# ITEP Student Summer Internship (SSI) Program

- What else can we do to supply tribes with the tools they need to assess air quality and deposition to their lands?
- How should we identify tribal monitoring needs? Where are the gaps?
- Amber Reano was selected by CAMD to help answer some of these questions during the 10-week program



# ITEP Student Summer Internship (SSI) Program

- Created a Tribal monitoring webpage for the CASTNET website
  - Basic information about CASTNET
  - Details on each tribal partner
  - Instructions for data access and data viewing tools – AIRNow, HYSPLIT, AQS, etc.
- Tribal site supervisor interviews
  - How, why the tribe was interested in operating a CASTNET site
  - What else could CASTNET do to improve outreach to tribes

## KICKAPOO TRIBE IN KANSAS DEPOSITION MONITORING STATION

The equipment at this monitoring site is used to collect samples for the measurement of air pollutants related to acid rain. The site itself was developed through the cooperative efforts of the Kickapoo Environmental Office, the US Environmental Protection Agency, the National Atmospheric Deposition Program and the City of Powhattan.

### CASTNET FILTER TOWER SAMPLER

The CASTNET monitoring network includes 90 sites located throughout the US and Canada. This network is managed by EPA's Clean Air Markets Division (CAMD). CASTNET measures concentrations of sulfur and nitrogen compounds in the air. Results from CASTNET are used to report on geographic patterns and trends related to acid rain.

### NADP-NTN WET DEPOSITION SAMPLER

The National Atmospheric Deposition Network (NADP) monitors pollutants in rain and snow. The National Trends Network (NTN) provides a long-term record of these pollutants. The NTN contains over 260 sites, and each site includes a precipitation sampler and a rain gauge. The automated collector ensures that the sample is collected only when it is raining or snowing.



# Remaining thoughts/questions

- What can we do to make sure we are receiving feedback from the tribes?
  - What information is important to tribes?
- How can we improve our message about the effects of nitrogen?
  - Eutrophication of terrestrial and aquatic ecosystems
    - Invasive species, loss of biodiversity
  - Relationship to human health effects (PM formation)
  - Acidification
- Suggestions for CASTNET and/or EPA monitoring programs?
- Should CASTNET continue to expand to support tribal monitoring?
- If we receive funding to support additional sites – how should we select sites?



SAN189, NE