Native American Tribal Emission Inventories, A 2005 Update

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ABSTRACT

In the years between 1990 and 2000, tribes completing emission inventories (EIs) used them in their own communities and tribal air programs. The main reasons for conducting an EI were to identify sources of air pollution that were affecting the health of community members and to determine the need for a continuing air quality program and/or air quality monitoring. In 2001, the US EPA's Office of Air Quality Planning and Standards (OAQPS) recognized the need to provide tribes with assistance in submitting their data to the National Emission Inventory (NEI) database. Through a project funded by both OAQPS and the Tribal Data Development Working Group (TDDWG) of the Western Regional Air Partnership (WRAP), the Institute for Tribal Environmental Professionals (ITEP) raised the number of tribes represented in the 1999 NEI from 1 to 12. This project is continuing with efforts to increase the number of tribes represented in the 2002 NEI. By March 15, 2005, 25 tribes had released their data to the NEI.

This paper presents a summary of the source types and pollutants inventoried by US tribes up to March 2005. The future of tribal EIs will also be discussed. Opportunities for tribes partnering with state, local and federal agencies to improve inventories will be presented.

INTRODUCTION

As inter-agency air pollution planning expanded in the 1990s, in response to the Regional Haze Rule, so did interest in emission inventories of Native American Tribe's (Tribes) Reservations. This paper aims to describe the EI work that has been completed in Indian Country through March 1, 2005. Future efforts by tribes to conduct inventories, as well as opportunities for tribes to partner with other agencies will also be discussed.

Background

Tribes have been inventorying sources of air pollution on their reservations since the early 1990s. The earliest inventories on Tribe's reservations were conducted to

identify threats to community health and to determine the need for a Tribal air quality control program and ambient air monitoring. These earliest inventories were usually kept in the Tribe's environmental offices and not shared with neighboring agencies. The Tribal Authority Rule (TAR), passed in 1998, provided that tribes will be treated in the same manner as states for virtually all CAA programs. The TAR affirmed that, absent special circumstances, reservation lands are not subject to state jurisdiction.

In June 1996, the Grand Canyon Visibility Transport Commission (GCVTC) report identified a "need for more comprehensive emissions inventories for areas on and near tribal areas as well as monitoring of air quality on tribal lands" The WRAP was formed in 1997 as the successor to the GCVTC. The WRAP promotes, supports, and monitors the implementation of the GCVTC recommendations throughout the West. Identifying and filling the gaps in EI data for tribal lands has been one of the goals of the WRAP since its inception. Other regional planning organizations (RPOs) also recognized the value of collecting data from tribal agencies to augment their regional inventories.

In 2001, the US EPA's OAQPS recognized the need to assist tribes in submitting their data to the National Emission Inventory (NEI) database. The NEI is widely used for air dispersion modeling, risk assessment screening, and tracking emission trends. The data in the NEI has come primarily from state and local air agencies. The lack of tribal data leaves significant gaps in air quality data not only over large parts of the western US, but the rest of the country as well. Figure 1 shows Indian reservations in the United States.

Through a project funded by both OAQPS and the TDDWG of the WRAP, ITEP raised the number of tribes represented in the 1999 NEI from 1 to 11. The Midwest RPO began working with the tribes located in their area to assist them in developing EIs for their reservations. Through the efforts of the tribes and assistance from these projects, significant progress has been made in filling the EI data gaps in Indian Country. By March 15, 2005, 25 tribes had released their data to the 2002 NEI and their RPOs.

METHODS

Obtaining Tribal Emission Inventories

Since the Fall of 2001, ITEP has conducted outreach to tribes through presentations at meetings and conferences, announcements at workshops and personal contacts. As ITEP identifies tribes who have or plan to conduct EIs, letters are sent asking the tribe to participate in this project. The tribes believed to have EIs are located across the US and in almost every EPA region as shown in Table 1.

Table 1. Geographic distribution of tribes believed to have EIs, whom have not submitted data to the NEI as of December 31, 2004.

EPA Region (states in parentheses)	Number of Tribes who may have EIs
1 (ME, NH, VT, MA, CT, RI)	2
2 (NY, NJ)	1
4 (KY, NC, TN, SC, MS, AL, GA, FL)	2
5 (MN, WI, IL, IN, MI, OH)	6

EPA Region (states in parentheses)	Number of Tribes who may have EIs
6 (NM, TX, OK, AR, LA)	2
8 (MT, ND, SD, WY, UT, CO)	9
9 (CA, NV, AZ)	9
10 (WA, OR, ID)	4
TOTAL	35

Notes: There are no federally recognized tribes in EPA region 3. There are no tribes believed to have EIs in EPA Region 7.

The requests to participate sent to tribes included three documents. The first was an introductory letter describing the project, the NEI, and a summary of the benefits of submitting data to the NEI. The second was a single-page fact sheet describing the benefits of releasing tribal data to the NEI. The third was a data release form, to be signed by the tribal EPA director, a tribal administrator, or tribal council, whichever was most appropriate. ITEP sent these three documents to both the tribal air program manager and the tribal government for each tribe. This was done to ensure that the tribal government was aware of the request for information and aware that the information would become public if the tribe chose to participate. By requiring a signature from a responsible tribal official, ITEP ensured that the tribe would not be releasing any data that they classified as sensitive. By signing the form, the tribe released their data to ITEP and the NEI.

Obtaining the release of tribal data was a time-consuming part of this work. In most cases, tribal air staff needed to present the request to their tribal governments. This often entailed reserving time on the tribal government's regular meeting agenda, which in some cases took several months. The tribal government then needed to make the decision to release the data.

Obtaining Additional Information Mandatory to the NEI

Upon receipt of the signed data release form and the tribe's EI, ITEP conducted a quality check to ensure that EPA accepted methods were used to calculate emissions. The EIs were also checked to ensure that they contained all of the information mandatory in the NEI. The most common information missing from tribal EIs were Standard Industrial Classification (SIC) codes, Source Classification Codes (SCC) and latitude and longitude coordinates for point sources. ITEP obtained this information by comparing the narrative included in the EI with the code tables, using internet mapping resources, and through phone calls to the tribal air staff. In some cases the units used in the tribal EI were not compatible with the NEI format. In these cases, ITEP staff converted the tribe's data to NEI acceptable units.

Coding, Summarizing, and Submitting Tribal Data to the NEI

After verifying the quality of the tribe's EI data and obtaining any necessary additional data, ITEP converted the data into the NEI database format, NEI Input Format (NIF), version 3.0. The NIF requires that data be placed into a number of tables. When the encoding was complete, ITEP produced a copy of the coded data tables for the tribe's review. The review copy of the tables included explanation for all NEI codes included in the tables. A summary report, detailing any data collection or conversion conducted by ITEP, was also created for the

tribe's review. The tribes were asked to give the coded data a final review and give ITEP verbal authorization to submit the data to the NEI.

RESULTS

Tribal EI Data Obtained

As of March 15, 2005, 25 tribes have released their EI data to the NEI and to RPO databases. These tribes, along with the source categories included in their EIs, are summarized in Table 2.

Table 2. Tribes releasing their EI data as of March 15, 2005, with source types included in the EIs.

Tribe Name	Point	Area	Non-Road Mobile	On-Road Mobile
Penobscot Indian Nation*	X	X	X	X
Mississippi Band of Choctaw Indians*		X	X	X
Fond du Lac Band of the Minnesota Chippewa Tribe*	X	X		
Oneida Tribe of Wisconsin	X	X	X	X
Pueblo of Acoma*		X	X	X
Pueblo of Laguna*	X	X	X	X
Pueblo of Santa Ana*	X	X		
Assiniboine and Sioux Tribes of the Fort Peck Reservation*	X	X	X	X
Fort Belknap Indian Community	X	X		X
Arapahoe and Shoshone Tribes of the Wind River Reservation	X			
Ute Mountain Ute Indian Tribe*	X	X		X
Cortina Indian Rancheria of Wintun Indians*		X		
Gila River Indian Community*	X	X	X	X
La Posta Band of Mission Indians*	X	X	X	X
Navajo Nation	X			
Paiute-Shoshone Indians of the Bishop Community*		X		
Paiute-Shoshone Indians of the Lone Pine Community*		X		X
Pauma Yuima Band of Luiseno Mission Indians*		X		X

Tribe Name	Point	Area	Non-Road Mobile	On-Road Mobile
Salt River Pima-Maricopa Indian Community*	X	X		X
Tohono O'odham Nation	X			
Couer D'Alene Tribe*	X			
Colville Reservation	X			
Umatilla Reservation*	X	X	X	X
Warm Springs Reservation	X			
Shoshone Bannock Tribes*	X			

*Indicates tribes with data formatted to the NIF as of March 15, 2005.

Source Categories Inventoried on Tribal Lands

As of March 15, 2005, ITEP had formatted EI data from 18 of the 25 tribes listed in Table 2 to the NIF. The following analyses summarize data from those 18 tribes. Point source facilities located on the 18 reservations represent a broad range of North American Industrial Classifications System (NAICS) industry sectors as shown in Table 3.

Table 3. Industry sectors represented by point source facilities on 18 reservations with NIF formatted data as of March 15, 2005.

NAICS	NAICS Description	Number of Facilities
11	Agriculture, Forestry, Fishing and Hunting	3
21	Mining	8
22	Utilities	3
321	Wood Product Manufacturing	5
324	Petroleum and Coal Products Manufacturing	5
325	Chemical Manufacturing	4
327	Nonmetallic Mineral Product Manufacturing	9
331	Primary Metal Manufacturing	3
332	Fabricated Metal Product Manufacturing	2
333	Machinery Manufacturing	1
334	Computer and Electronic Product Manufacturing	2
336	Transportation Equipment Manufacturing	1
337	Furniture and Related Product Manufacturing	1
42	Wholesale Trade	7
44	Retail Trade	10
48	Transportation and Warehousing	6
54	Professional, Scientific, and Technical Services	1
56	Administrative and Support and Waste Management and Remediation Services	7
61	Educational Services	3

NAICS	NAICS Description	Number of Facilities
62	Health Care and Social Assistance	1
72	Accommodation and Food Services	1
81	Other Services (except Public Administration)	8
92	Public Administration	1

Analysis of point source emissions on these 18 reservations indicates that 77% of point source NOx is emitted from pipeline transportation of natural gas. Approximately 5,700 tons of NOx are emitted annually from point sources on these 18 reservations. Other significant emitters of NOx on these reservations include utilities, mining and wood products manufacturing. The largest emitters of SOx on the 18 reservations are asphalt manufacturing (40%) and mining (34%). Other significant emitters of SOx on these reservations include wood products manufacturing and waste management services. The total annual emissions of SOx from point sources on these 18 reservations is approximately 152 tons. Emitters of VOCs on the 18 reservations include wood products manufacturing (49%), primary metal manufacturing (13%), pipeline transportation of natural gas (13%), and asphalt manufacturing (9%). These sources emit a total of approximately 600 tons VOC per year.

The area sources most commonly inventoried by tribes include stationary source combustion, paved and unpaved road dust, mining, construction, solvent utilization, retail gas stations, waste disposal, agricultural activities, wildfires and prescribed fires.

Table 4. Area source categories commonly inventoried by Tribes with annual emissions in tons for each category summed for 18 reservations with NIF formatted data as of March 15, 2005.

SCC description	CO	NOX	PM10-PRI	SO2	VOC
Stationary Source Fuel Combustion	0	0	0	145	0
Paved and Unpaved Road Dust			36,731		
Industrial Processes	0	0	0	0	0
Petroleum and Petroleum Product Storage					85
Waste Disposal, Treatment, and Recovery	106	7	5	1	37
Agriculture Production - Crops	2,836	144	2,949	20	236
Forest Fires - Wildfire	215	6	8	1	26
Prescribed Fires	1,776	30	159	0	180

Non-road vehicles inventoried by the 18 tribes with NIF formatted data include construction equipment, logging equipment, railroad, and lawn and garden equipment categories. In most cases, tribes inventorying non-road sources obtain emission factors for these sources from US EPA guidelines and/or state reports and apply those emission factors to activity data collected on the reservation. Recently, tribes have begun using the NONROAD model to estimate emissions for non-road sources. The NONROAD state input files are modified to reflect the activity and population data collected by the tribe and the model is run as though the reservation is a state.

On-road sources are inventoried by many tribes. As with NONROAD, most tribes obtain emission factors from MOBILE6 modeling done by the states for the counties that surround their reservations. Because the tribes often have limited resources to collect on-road

activity data, emissions estimates are frequently made for a limited set of road class-vehicle type SCCs. For example, often tribes will account for all light-duty vehicles together, without separating out cars versus trucks. Because the data is summarized in this way, the tribe's mobile source inventories are often not compatible or consistent with state or federally developed mobile source emission estimates.

Data required of Tribal EIs for submission to the NEI

The preceding section in this paper, on obtaining additional information mandatory to the NEI, described the codes that are often not included in emission inventories conducted by and for tribes. Both SCC and NAICS codes are often not assigned to sources in tribal emission inventories. Another commonly missing data element is latitude and longitude assigned for point source release points.

Through the use of the Tribal Emission Inventory Software Solution (TEISS), developed by the TDDWG of the WRAP, assigning of codes is made easier. TEISS is available at no cost to all federally recognized US Indian Tribes. It contains easily searchable databases of all NEI-required codes. TEISS also prompts the user to enter all data elements mandatory to the NIF. A geographic information system (GIS) interface in TEISS eases the assigning of latitude and longitude to point source release points for tribes who do not have access to a global positioning system (GPS) or other GIS resources. Extensive quality assurance/quality control (QA/QC) functions in TEISS aide the users in tracking who has entered data, which estimation methods were used to calculate emissions, stores activity data inputs and provides a place to track notes on the source and development of the activity data.

DISCUSSION

Future Tribal EIs

Table 1 of this paper summarizes tribes working on emission inventories by US EPA region. ITEP is aware of several significant projects under way that will assist tribes in completing inventories. The first is a project funded by the TDDWG of the WRAP to inventory significant point sources on reservations in the western United States. The tribes electing to participate in this project include some of the largest western reservations, they are (with adjacent states in parentheses):

- Navajo Nation (AZ, NM, UT)
- Arapahoe and Shoshone Tribes of the Wind River Reservation (WY)
- Confederated Tribes of the Colville Reservation (WA)
- Confederated Tribes of the Warm Springs Reservation (OR)
- Tohono O'odham Nation (AZ)
- Ute Mountain Ute Tribe (CO)

Through preliminary research, these tribes were discovered to have either significant point sources not yet inventoried and/or significant oil and gas production and exploration activities on their reservations. The WRAP plans to begin an important stage of their modeling efforts in the spring of 2005, therefore it was imperative to get these significant sources included in their inventory. ITEP is assisting WRAP by coordinating this project and will ensure that the data developed through this project is also submitted to the NEI. The WRAP is working with the State of Alaska to collect activity data and produce emissions estimates for native villages in Alaska. The Emission Forum of the

WRAP has commissioned a comprehensive inventory of mobile sources in the WRAP region. The contractor for this work will be providing mobile source estimates for reservations that will be consistent with the WRAP region's approach.

The second project that may result in increasing EI data on tribal lands is a training project funded by US EPA's Region 7 in 2005. Through this project, training on TEISS and technical assistance on collecting activity data will be made available to all Region 7 tribes.

In 2003-2004, the Lake Michigan Air Director's Consortium (LADCO) provided TEISS and EI training and technical assistance to tribes located in MN, WI and MI. Several tribes who took part in those trainings are known to be working on EIs for their reservations and may complete them in 2005.

Opportunities for Tribes to work with Federal, State and Local Agencies

Tribes conducting their own inventories focus on developing data that will be useful to them in their local reservation air programs. ITEP has several suggestions for increasing the compatibility of reservation EIs with the EIs conducted for adjacent areas.

<u>On-Road mobile sources</u>

On-road mobile sources are the most significant, in terms of pollution produced, of the source types for which cooperation between tribes and other agencies would provide a substantial improvement in the inventories. There are few tribes with the resources to run the MOBILE 6 model for their reservations. Several of the inputs to MOBILE 6 are most easily obtained from state motor vehicle departments. Exploring ways of allocating state or locally developed MOBILE 6 emission factors and vehicle miles traveled data to reservations may be worthwhile. Allocating state or local mobile source emission estimates would provide tribes with more detailed estimates of motor vehicle emissions on their reservations. Estimates developed through such an allocation would be consistent with adjacent inventories and therefore more useful to regional and national inventories. Further study on which data inputs need to be refined for reservations could provide guidance for tribes who wish to collect reservation-specific data on on-road mobile sources.

<u>Non-Road mobile sources</u>

Non-road mobile sources are an area where federal, state and local agencies would benefit by coordinating. At the present time, tribes develop their estimates for these source categories independently of the estimates developed by other agencies. Federal, state and local agencies should become aware of tribes in their geographic areas of interest who are conducting non-road inventories. Regional and national inventories should be constructed to incorporate non-road emissions estimates for areas other than counties. The WRAP has developed their Emission Data Management System (EDMS) to incorporate non-road emissions estimates developed by tribes. The EDMS could be used as a model for other regional or national databases on incorporating non-county based data. A user-friendly interface to the NONROAD model that would allow tribes to modify the population and activity input files and run the model at the state level to obtain reservation emission estimates would be helpful to tribes inventorying non-road sources.

Area (non-point) sources

Area (non-point) source emissions estimates are developed by tribes independently of estimates developed by other agencies. This is a topic upon which coordination between tribes, federal, state and local agencies is needed to avoid double-counting. At present, this issue is being addressed by the WRAP for its region, but there is no coordinated effort nationally to ensure consistency in the way tribal area source emission estimates are incorporated into regional or national databases. This issue is made more difficult by the varying methods used by state and federal agencies to estimate emissions for these sources. Tribes conducting EIs in the future should be encouraged to review county-level estimates for area sources of interest to them on their reservations. If a tribe finds that activity levels on the reservation are not likely to be significantly different than those off the reservation, the tribe may wish to allocate a portion of the county emissions to their reservation, rather than conducting their own activity data collection efforts.

Point sources

Point source inventories conducted by tribes are most easily incorporated into regional and national databases. It is usually clear if a source is located on or off of a reservation. However, through this project ITEP has found a continuing need to educate state agency personnel on the Tribal Authority Rule (TAR), which gives tribes jurisdiction over air resources within the exterior boundaries of their reservations. As tribes conduct their own point source inventories, it will be occasionally necessary to remove a source that was incorrectly assigned to a state's inventory and replace it with correct data identifying the source as one located on tribal lands. Another point-source related issue uncovered through ITEP's work and the tribe's EI efforts, is that Clean Air Act Title V, Part 71 sources permitted by the US EPA regional offices are often not included in the NEI. A mechanism to update each NEI with current compliance data on actual annual emissions from these sources would take that reporting burden off of the tribes. Tribes often assume that the US EPA Regional staff are reporting data on permitted point sources and their emissions to the NEI.

CONCLUSIONS

Tribes in the US have made great strides over the past 5 years to collect data and estimate emissions from sources on their reservations. Progress can be continued through continued support to the tribes for conducting EIs. The most important type of support is direct funding to the tribes to conduct EIs. Without tribal air specialists, it can be difficult for a contractor or other organization to gain the data needed to develop meaningful, reservation-specific emission estimates. Continued support of training and technical assistance for tribes conducting inventories has proven beneficial over the last 5 years. Support for tribes using TEISS will improve tribal inventories' compatibility with regional and national EI databases by ensuring that NIF mandatory data is included in tribal EIs.

Collaboration between tribes and state and local agencies could be important to improving emission estimates for on-road mobile sources on tribal lands. A nationally consistent method of incorporating tribally developed emission estimates for non-road and area sources would improve national and regional inventories, as well as respecting the rights of tribes to provide data for their own reservations. A mechanism by which

Title V, Part 71 point source compliance actual emissions reporting could be transmitted to the NEI, would ensure that the largest point sources in Indian Country are included in regional and national inventories.

KEYWORDS
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Point Sources