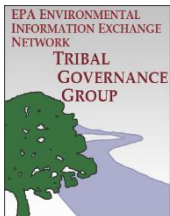




# Summary Report: 2019 TRIBAL ENVIRONMENTAL DATA AND TECHNOLOGY ACADEMY



*Prepared by the Institute for Tribal Environmental Professionals and  
the Exchange Network Tribal Governance Group  
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## Highlights

- 3-day event on environmental data management for tribal professionals
- 3 workshop sessions + networking and mentoring opportunities
  - *Data Carpentries – Using Open-source Tools with Ecology Data*
  - *Creating a GIS Project in ArcMap*
  - *Basics of SQL Databases*
- 39 attendees from 25 tribes
- 8 workshop instructors
- 14 workshop support/volunteers from NAU-ITEP staff and students

*In summary: The event set out to respond to the need for training and technical assistance for tribal staff working with environmental data. Attendees overall were satisfied with the information provided and the opportunity to connect with both peers and mentors in a supportive and interactive environment. To build on these experiences, ITEP and the TGG are working to help tribes establish communities of practice for sharing knowledge and developing skills for effective environmental data management. With such satisfactory outcomes from this inaugural event, as well as areas identified for improvement, tribes can look forward to more opportunities to build important skills, learn from, and connect with, each other.*

## Background

The **2019 Tribal Environmental Data and Technology Academy (TribalDATA)** took place from November 4<sup>th</sup> to November 7<sup>th</sup> on the Northern Arizona University campus in Flagstaff, Arizona. It was developed by the **Exchange Network's Tribal Governance Group (TGG)** and the **Institute for Tribal Environmental Professionals (ITEP)**, in response to a recent assessment of tribal environmental data management concerns and needs. Through hands-on, interactive workshops focused on building practical skills, the goal of the event was to better equip attendees to use technology solutions to harness the power of their data to inform their programs and help enhance their environmental protection capacity.

## Event Description

Three concurrent training workshops took place during the event: *Data Carpentries*, *Creating a GIS Project in ArcMap*, and *Basics of SQL Databases*; the workshops were followed by a half-day interactive networking and mentoring session to help participants reinforce learning and connect with colleagues working in the field of data management. Attendees worked with the tools presented to develop basic skills include data cleaning, geo-referencing, basics of coding, relational databases, and creating plots and queries. A total of 39 participants attended, with an average of 15 participants in each workshop. There were eight collective instructors from the Tribal Governance Group (TGG), the Muscogee (Creek) Nation, and the Data Carpentries organization. A total of fourteen volunteers from the ITEP assisted instructors and students throughout the three workshops.

The Data Carpentries workshop taught the core skills for working with data effectively and reproducibly. It followed a narrative structure, working with one dataset through the data lifecycle from data and project organization, to data analysis and visualization. The workshop used a tabular ecology dataset from the Portal Project Teaching Database, which taught data

cleaning, management, analysis, and visualization. The workshop used a single dataset to model the data management and analysis workflow a researcher would use. Participants used the R statistical software for data activities.

The Geographic Information Systems (GIS) workshop presented the basics of using ESRI's ArcMap GIS software to create maps for sharing sampling results from a mock monitoring project. The workshop followed a learn-by-doing format, with brief demonstrations accompanied by hands-on work by participants. Topics included understanding data types, metadata, and components of the geospatial data system, as well as collecting and processing data to build an example map.

The SQL Databases workshop discussed the variety of applications and uses of the SQL database language, including how to work with and understand the structure of a basic relational database. Lectures and hands-on activities focused on examples using typical environmental monitoring data, such as ambient air and water quality, to teach attendees how to query data and generate basic reports for summary and analysis.

*"I thought it was a great opportunity to speak your data problems into existence and getting either feedback or similar problems and solutions...it was a fast week filled with good and lots of information..."*

On the final half-day of the event, attendees and instructors had the opportunity to have in-depth discussions and address follow-up questions from the previous day's topics. Attendees who brought their own data received one-on-one assistance from the instructors. Several student interns from Northern Arizona University attended this session to learn more about tribal environmental protection and engage with professionals working in their field of interest. Roundtable discussions also took place with topics such as concerns about data management, the Exchange Network, the Tribal Governance Group, and general feedback about the event.

## Evaluation Results

TGG and ITEP distributed two evaluations to the participants to gather their feedback and comments on the individual workshops and the overall event. Thirty participants responded to the workshop evaluation and twenty participants responded to the overall event evaluation. In general, the participants expressed positive feedback about the workshops and the event.

Several attendees expressed new-found confidence in the software and programs utilized in the workshops and affirmed they came away with at least one new skill. Attendees generally rated the amount and difficulty of information presented as being "just right," although some suggested an additional day of training would help reinforce the material they learned. The discussions during the final day of the event allowed attendees to share concerns and issues

*"I learned a lot and wish there was more time. I am glad that we have plenty of info and lessons to take home/back to work to keep practicing. I also made new contacts to work on similar projects."*

experienced in their tribal programs and build connections with peers and colleagues; attendees also appreciated the time to network and brainstorm. The instructors were commended on their patience and level of knowledge about the topics, and the volunteers were commended for the assistance they provided to participants.

As this was the first time an event with this format was offered, attendees were also asked to make suggestions and recommendations for the future, should a similar event take place. Several common themes arose and some ideas for improvements were shared by attendees,

including: extending the event duration, offering both beginner and advanced workshop options, and clarifying expectations for attendees to enable them to select the most appropriate session. An introductory or opening session before the beginning of the workshops was also suggested in order to better familiarize attendees with one another and the instructors. Communicating the agenda, expected outcomes, and context would have enhanced the understanding and importance of the event. In addition, some attendees noted that more basic explanations and definitions would have been beneficial at the beginning of the workshop, to set foundational knowledge, especially for those who had little to no prior experience. On the topic of prior knowledge, some comments addressed the possibility of preparation exercises if the material covered in the workshops are going to be at an advanced level. Also, some participants would have liked to see more examples presented with data sets specific to air quality, water quality, and land or natural resources. Attendees expressed some frustration with the technology challenges experienced (e.g. wi-fi connections and software installation), but were thankful to have access to “loaner” laptops that were provided. Other topics or skills requested for future workshops include basic data management, data validation and software, water quality data, advanced GIS topics, and advanced R topics.

### **Outcomes and Next Steps**

The event accomplished its goal of providing practical skills to tribal professionals on the software tools and technology that are important for working with environmental data. The majority of those attending the event had little prior experience with the tools presented, yet walked away more confident and knowledgeable than when they arrived. The knowledge gained will help tribes more effectively manage their data collection and reporting activities, and the skills provided enabled tribes to take what they learned and immediately apply it to their daily work. However, due to the complexity of the information presented, there will be a need for on-going training and mentoring for tribes to successfully implement these skills in their programs. ITEP and the TGG will be working to identify ways to continue to foster continued communication and learning opportunities for the attendees, through helping to build communities of practice among tribal professionals.

The TGG and ITEP will continue to seek feedback from tribes to develop learning and information-sharing opportunities that focus on building tribal capacity for environmental data management and are responsive to tribal needs. Hosted webinars, calls, and/or refresher sessions will be explored as a way to highlight helpful resources and provide on-going support for tribal practitioners, and existing workshop materials will be refined and improved for future use. These opportunities will be shared widely, both via the Tribes and the Exchange Network website, email listserv, and newsletter. Through a combination of small-group and individualized mentoring and assistance activities, the TGG and ITEP will continue to expand both the knowledge base and the support network for tribal professionals.