



Geographically FIT (*Forestry Institute for Teachers*)

“The Environment: Our Essential Resource”

July 31 - August 2, 2018

FINAL REPORT



A total of 37 participants, pictured here at the replica of Fort Mandan, took part in the 2018 Geographically FIT (Forestry Institute for Teachers), which was a broad-learning experience covering three days in central North Dakota covering “The Environment: Our Essential Resource.”



The North Dakota Forest Service (NDFS) and North Dakota Geographic Alliance (NDGA) partnered to deliver their 11th Geographically FIT (*Forestry Institute for Teachers*) in 2018 titled **The Environment: Our Essential Resource**. The annual “GeoFIT” institute focus is a collective decision made by both education coordinators, guided by agency missions, and with input from past participants. Scarce resources are leveraged annually to study social, economic, and environmental issues and possible solutions in a different geographic area around the state. The NDGA and NDFS both have a mission to help ensure a sustainable environment for the future. Safe and sufficient water and the depletion of natural resources are the top concerns for our state and nation.

This workshop was made possible by the **North Dakota Geographic Alliance** and **North Dakota Forest Service**, with additional funds and resources from the **National Geographic**, **North Dakota Petroleum Council**, **North Dakota State University**, **Project Learning Tree**, **State of North Dakota**, and **US Forest Service-NRCE**.

The three-day institute and traveling tour began in the center of the state at the Coal Creek Inn (former public school) in Stanton, ND, with a welcome, get acquainted icebreaker, general overview, and completion of credit and liability forms by Jeff Beck, teacher of record and coordinator of the ND Geographic Alliance, and Glenda Fauske, Information and Education Coordinator, ND Forest Service. Team color-coded notebooks for journaling descriptive, reflective, and personal writing expressing their feelings and thoughts from our adventures during the institute and tour were distributed. This professional development opportunity enabled the participating K-12 educators an opportunity to expand their content knowledge of North Dakota and provided them resources for curriculum planning and development.

The first presenter was Derek Senn, Senior Environment Advisor, **Enbridge Energy**, Minot, ND. Enbridge operates the world's longest crude oil and liquids transportation system, delivering more than two million barrels per day of crude oil and liquids. They are also a North American leader in the gathering, transportation, processing and storage of natural gas, and have an increasing involvement in power transmission. They have interests in more renewable and alternative generating capacity, and continue to expand into wind, solar and geothermal power.



Laying Enbridge pipeline in ND.

As an Environment Advisor, Senn oversees the environmental management systems and is responsible for the soil, water, air, vegetation, wildlife, waste management, and emergency response to ND pipelines. He also serves as a liaison with various internal and external stakeholder groups and third party contractors; crafts environmental legislation; and identifies opportunities for improvements in environmental operating practices relating to compliance, waste handling, and vegetation management.



A park ranger explained all the items made from local natural resources in an earthlodge and how they were used in the past compared to what we use today.

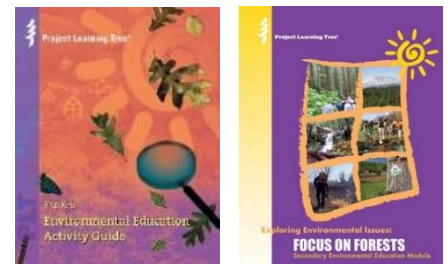
Everyone carpoled next to **Knife River Indian Villages** near Stanton, ND. We explored the lives of the Northern Plains Indians on the Upper Missouri. The earthlodge people hunted bison and other game, but were in essence farmers living in villages along the Missouri and its tributaries. The site was a major Native American trade center for hundreds of years prior to becoming an important market place for fur traders after 1750.

Here patterns of change were observed in human uses of natural resources. Human attitudes and values, and therefore behavior, with regard to the environment also changed over the course of generations. Participants had a chance to express their own views about the changes and issues in their journaling exercise following the visit.



Glenda Fauske, NDFS

Glenda Fauske, Information and Education Coordinator, North Dakota Forest Service, gave an overview of **Project Learning Tree (PLT)** after the evening meal and distributed the books and other forestry resources to the teachers. The K-8 teachers received a guidebook and the 9-12 high school teachers received two modules. PLT activities help foster a future where the next generation values the natural world and has the knowledge and skills necessary to make informed decisions, and take responsible actions to sustain forests and the broader environment.



PLT K-8 book and 9-12 module

Many of the PLT activities complement the places we visited and the information presented by the speakers. The PLT activities can be implemented immediately in their classrooms this fall.

Jeff Beck, coordinator, ND Geographic Alliance, provided participants with a variety of **geography teaching materials and maps** that promote public awareness of the importance of geographic skills and fluency. Their programs teach students to care for the planet, its resources, and all of its inhabitants, and prepares them to succeed as citizens in an increasingly global society. He also brought the **Giant ND Map**, which is enormously entertaining and an educationally powerful tool for introducing geography and map reading skills to students. They can explore, travel around, compete, collaborate, and have lots of fun.



Jeff Beck, NDGA



Teachers mine for coal (blueberries in a muffin).

The final presenter the first day was Kent Ellis from the **ND Petroleum Council**. Ellis brought several hands-on activities about different energy for the teachers to try, because we need all forms of energy in ND to make the state run. The teachers peddled a bike to make electricity to run lights, assembled parts for an oil rig, and dug for coal (blueberries) out of the ground (a muffin) and “reclaimed” their land (got to eat their muffin) at the end.

The second day, we stepped into our “classroom on wheels” and began our tour. The first stop was the **Garrison Dam**, which is an earth-fill embankment dam on the Missouri River in central North Dakota. It was constructed as part of a flood control and power generation project along the river. A little over two miles (3 km) in length, it is the fifth-largest earthen dam in the world, constructed by the U.S. Army Corps of Engineers from 1947-53. The reservoir, impounded by the dam, is Lake Sakakawea that has more shoreline than the coast of California.



Garrison Dam in central North Dakota is two miles long.



Bus driver John Axtman took us safely around central ND.

The standard of living of various people throughout the world depends on environmental quality, and the availability, use, and distribution of resources. Resource management and technological systems help to meet, within limits, the needs of a growing human population. The site visit helped participants understand the difference between renewable and nonrenewable resources, and the factors that make a renewable resource sustainable.

Our second stop was next door at the **Garrison Dam National Fish Hatchery**. The Fish Hatchery plays a key role in providing quality fishing opportunities throughout the Great Plains Region and in restoring the endangered paddlefish and pallid sturgeon in their northern range. This federal hatchery is challenged with meeting fish stocking requests from several states, providing in excess of 10 million native fish annually for restoration stockings or balancing fish populations in hundreds of waters. Garrison Dam Fish Hatchery produces in excess of 25 tons of trout and salmon annually for stocking into North Dakota waters as well. State game and fish agencies in several states such as North Dakota, Wyoming, Idaho, and Nevada do not operate hatcheries for cool water fish species such as walleye and pike, and rely on this facility to produce these species for them.



Teachers got to see and hold paddlefish and pallid sturgeon at the Fish Hatchery. Both are prehistoric fish with skin, not scales, in danger.

Teachers love to see old schools repurposed, so we stopped for our noon lunch at the Riverdale High Hotel and Restaurant for burgers.



Teachers get an overview of the Lake Audubon Wildlife Refuge and its mission.

Environmental Design, is the most widely used green building rating system in the world. Available for virtually all building, community, and home project types, **LEED** provides a framework to create healthy, highly efficient, and cost-saving buildings designed using strategies aimed at improving performance across all the metrics that matter the most (energy savings, water, etc.).

Our visit concluded with a short South Shore Auto Tour along the scenic shoreline of Lake Audubon. Highlights included views of Lake Audubon, prairie wetlands and grasslands, and opportunities to observe many species of birds, other animals, and plants.

Our afternoon and evening sessions concluded at the **Lewis and Clark Center and Fort Mandan**. Throughout the history of the United States, society's attitudes towards the environment have evolved. The writings of different authors and pictures/paintings influenced their contemporaries' attitudes at the time and reflect the view of their time periods. Early on, people with vision, such as Thomas Jefferson, were concerned about natural resources. Everything you've ever wanted to know about the Corps of Discovery, from the technology they used to the Native nations they encountered, to the geography of their journey, was found at the Interpretive Center.



Participants compared items we travel with today to some items the Corps members used.

Aside from all the amazing artifacts and journals from the expedition, the maps alone showed how much geography Clark learned from the Indians and former travelers to the West. For all the "mistakes" by 21st-century standards, Clark's maps showed his extraordinary ability to observe and remember details. He had a capacity for geographic memory and imagination that other travelers and explorers relied upon for the next fifty years.



After a wonderful evening meal, we had a chance to tour Fort Mandan. Some took the chance to briefly walk along the shore of the Missouri River before departure back to the Inn at Stanton.

If you were looking for a hat that would draw attention, some teachers found several impractical ones for a winter in North Dakota at the fort.

Each morning, Norm, and his staff at the Bistro, served up an amazing breakfast, as well as other catered meals, for our institute.



Enjoying caramel French toast casserole and more for breakfast!



Our third, and last day, found us departing on the charter bus for the **Great River Energy (GRE)** plant near Falkirk. GRE is a wholesale power cooperative; the organization's members and owners are 28 Minnesota electric distribution cooperatives.



Aerial view of the Great River Energy plant near Falkirk, ND.

Individuals and businesses are members of those distribution cooperatives based on their geographic location. As a Touchstone Energy Cooperative, GRE is part of a nationwide alliance made of more than 750 electric cooperatives in 46 states. Electric cooperatives were established to provide electricity to rural America, and now make up the largest electric utility network in the nation.

GRE power plants use a variety of fuel sources, including coal, natural gas, and biomass to generate electricity for their member owners. Their combined power plants produce more than electricity, they provide heat and steam that benefit other partnerships. They are committed to supply their member-owned

cooperatives with energy that is 50 percent made from solar, wind, biomass, and hydro power by 2030. GRE is conserving resources through environmental stewardship, pollution prevention, waste minimization, recycling and reuse.

The charter bus headed to the **ND Heritage Center and State Museum** in Bismarck next to learn about the history of energy and the environment in our state, and the resources available to teachers to bring into their classroom. Erik Holland, curator of education, presented the many new online resources available for free to all teachers. North Dakota Studies provides teaching and learning materials about the geography, environments, history, government, current issues, and citizenship of North Dakota. Their website provides a host of resources for students, teachers, and the public. When the classroom portion concluded, participants had a catered noon luncheon and then headed out to tour the museum on their own and learned about other resources.



Teachers viewing online resources available at the Heritage Center for their classes.



Artifacts in the water SEND trunk.

Thematic **SEND** (suitcase exhibits for ND) trunks provide hands-on experiences for learners of all ages. Artifacts, photographs, and documents contained in the suitcases may create dialogues for a more comprehensive understanding by piecing together the tangible evidence of the past. The Center has several free on loan.

A number of primary document sets have also been developed to accompany and assist with the articles in the *North Dakota History: Readings about the Northern Plains State* textbook. These documents, chosen to tell the story about particular historic events through the eyes of those who lived in the past, are intended to provide further research, inquiry, and understanding for students and teachers investigating the fascinating history of North Dakota.

After leaving the museum, the charter bus headed up the west side of the Missouri River to the **Cross Ranch State Park** for a forestry presentation on dendrochronology by Dr. Joseph Zeleznik, NDSU Extension Forester. Participants learned some interesting history about North Dakota's native forests. Their distribution and structure have been shaped by ecological disturbances such as fire and flooding. Management decisions in the 20th century have drastically reduced the intensity and return interval of those disturbances, resulting in ecosystems that are very different today than those of pre-settlement times. Some remnant forests remain, but they are dwindling.



Teachers took their own samples from trees with an increment borer.

His presentation and activities explored the consequences of those management decisions. He used dendrochronology (tree ring analysis), the science or technique of dating events, environmental changes, and archaeological artifacts by using the characteristic patterns of annual growth rings in timber and tree trunks.

Dr. Zeleznik explains dendrochronology (tree ring analysis) using growth rings in tree trunks.

For the entire period of a tree's life, a year-by-year record or ring pattern is formed that in some way reflects the climatic and environmental conditions in which the tree grew. These patterns can be compared and matched ring for ring with trees growing in the same geographical zone and under similar climatic conditions. The

teachers got to take their own samples out of the trees using an increment borer. They could take their sample back home and compare it to the trees growing in their schoolyard or community.



The traveling tour concluded at the Coal Country Inn in Stanton with a Taco Bar followed by a debriefing and completion of a participation survey. Thank you to all the presenters and participants for making this a very worthwhile adventure that will benefit the students of our state.

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