



2017 GeoFIT: *Environmental Perspectives*

August 7 - 10, 2017

FINAL REPORT



GeoFIT '17 educators visit the Enbridge Berthold Station.

The North Dakota Forest Service (NDFS) and North Dakota Geographic Alliance (NDGA) partnered to deliver their tenth **Geographically FIT** (*Forestry Institute for Teachers*) entitled **Environmental Perspectives** in 2017. GeoFIT is a professional development opportunity for all PreK-12 educators across the state and is held each summer in a different location. The institute provides experiential learning and resources for curriculum planning and development that help foster environmental responsibility of natural resources in stewards of all ages.

Educators had an opportunity to expand their content knowledge and study how geology, geography, and forests can work together to minimize environmental impacts and land disturbances, as well as improve and protect surface and ground water. The “classroom on wheels” (charter bus) tour left Minot State University and stopped at Weiser’s property near Surrey, Enbridge Station in Berthold, Upper Souris National Wildlife Refuge at Lake Darling near Foxholm, Twisted Oaks Recreational Site and Mystical Horizons in the Turtle Mountain State Forest, International Peace Garden north of Dunseith, Anishinabe Cultural Center near Belcourt, Towner State Nursery, Denbigh Experimental Forest, and concluded back at Minot State University. Presentations and discussions focused on how individually and collectively environmental issues may be addressed and resolved.

GeoFIT was made possible by in-kind support, grant funds, or donations from: **Enbridge, National Geographic Society Education Foundation, North Dakota Forest Service, North Dakota Geographic Alliance, Project Learning Tree, State of North Dakota, and the United States Forest Service.** **THANK YOU** sponsors!



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. NDGA and the 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.

The GeoFIT workshop began at Minot State University with a welcome by **Jeff Beck, ND Geographic Alliance Coordinator**. He was followed by the new **geography professor at Minot State University, Dr. Zeb Wallace**, who gave some brief remarks about the role all teachers have to incorporate geography into their classes.



Jeff Beck welcomes GeoFIT participants.



Glenda Fauske, Information and Education Coordinator, North Dakota Forest Service, gave a synopsis of *Project Learning Tree (PLT)* and the resources available to teachers. The K-8 teachers received a guidebook and the 9-12 high school teachers could select 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. Many of the PLT activities related to the places we visited and the information presented by the speakers. The PLT activities can be implemented immediately in their classrooms this fall.



Dr. Clark Markell gives an overview of the geology of the north central area covered on the 2017 GeoFIT traveling tour.

Dr. Clark Markell, Minot State University Geology Professor (retired), gave an overview of how geology impacted the geography of North Dakota throughout time to create North Dakota's three distinct regions today. He provided background on the sites we visited throughout the tour. The better we understand Earth's history, the better we can foresee how events and processes of the past might influence the future.

Dave Hodek, Manager for Major Projects, Engineering, and Construction and Nick D'Aloia, Team Lead, CAD/GIS for Enbridge Energy in the Superior Region at Duluth, MN, gave an overview of Enbridge and their diverse energy projects. People in North Dakota mostly think of Enbridge as installing pipelines, but they have many energy related-businesses around the country and world. Enbridge is the largest energy infrastructure company in North America, transporting, distributing and generating energy across the continent. As Enbridge evolves and grows, they remain deeply committed to sustainability priorities and focus on safety and environmental protection; stakeholder and Indigenous inclusion; and climate and energy solutions.



Enbridge works towards replacing nonrenewable energy sources with renewable ones.



Chuck Weiser leads a horticulture tour of their property.

Charles "Chuck" Weiser, retired NDSU Extension Agent, concluded the first day with an evening tour of their property near Surrey, ND. Considered one of the "premier horticultural attractions" in the region, the *Just About Anything that Will Grow in the Northern Tier* tour encourages exploration of different environments as you investigate the variety of trees, shrubs, flowers, cactus, and

the vegetable garden. Participants had many questions about the physical, chemical and biotic factors (climate, soil, and living things) that determine their form and survival.



Marilyn Weiser received the 2016 Friend of Geography Award from the NDGA Board of Directors.

Marilyn Weiser, retired ND Geographic Alliance coordinator (Chuck's wife and former classroom educator), was presented the *2016 Friend of Geography Award* by board members of the ND Geographic Alliance. The award recognizes an individual who contributes to geography education and understands its impact on North Dakota students. The award included a trip to Washington, D.C. to attend the National Council for Geographic Education Annual Conference.

The charter bus departed the second day from Minot State University with driver Ann Jorde ... and the wheels on the bus went round and round.

Our first stop was the **Enbridge Berthold Station**. **Katie Haarsager, Community Engagement Advisor**, and **Brandon Roehrich, Berthold Area Operations Coordinator**, informed us this site was constructed with new storage tanks, a rail and double loop track, piping, and associated buildings to serve as a rail transfer facility with the potential to move 70,000 bpd of crude oil from pipelines to markets. Due to market changes and customer's near-term needs to access and transport Bakken crude oil, and postponement of the Sandpiper Pipeline Project, Enbridge decided to decommission the site until market conditions support the need for additional pipeline infrastructure.



Teachers board the charter bus.



Frank Durbian talks about Refuge efforts and programs to protect all wildlife.

Frank Durbian, Project Leader at the Upper Souris National Wildlife Refuge, told us about the role of the Refuges in the conservation of wildlife habitat and protecting environmental quality through stewardship and habitat easement programs. Although species become extinct naturally, the increasing number of extinctions in recent history may be linked to the rapid increase in human populations and loss of habitat. Increased public knowledge of conserving natural resources and protecting environmental quality is beneficial to human health and the well-being of other life forms.

Cody Clemenson, Resource Forester, ND Forest Service, met us at the Twisted Oaks Equestrian Recreation Site in the Turtle Mountain State Forest. He told us privately and publicly owned forests are managed to provide products, recreation, and a healthy environment. The structure and scale of natural resources in a given area shape the economy upon which society and its culture are based. He also talked about who works in forestry and the variety of career opportunities from foresters to loggers, from scientists to naturalists. Evolving technologies require well-educated and skilled workers who are dedicated to the conservation ethic.



Cody Clemenson told us about management objectives and multiple-use of all the State Forests in North Dakota.



GeoFIT '17 participants enjoyed Mystical Horizons...a "Century 21 Stonehenge" in the Turtle Mountain State Forest. It consists of a Polaris sighting tube, sundial, and walls that represent the solar calendar—winter and summer solstices and the vernal and autumnal equinox.

Just across the road on Scenic Byway Highway 43, we stopped at **Mystical Horizons**. Mystical Horizons is a scenic overlook located on ND Forest Service land. Bottineau native, Jack Olson, created the idea and referred to his configurations for his equinox and solstice structures as a “Century 21 Stonehenge.” The site includes a Polaris sighting tube positioned perfectly to view the North Star; a sundial that uses Roman numerals to tell time; and a group of six walls that represent the solar calendar. The walls have slots in them to allow sunlight to pass through only on the winter and summer solstice and the vernal and autumnal equinox. Besides the solar and astronomical sites, visitors have an observation point where they can get a panoramic view of the Turtle Mountains and the prairie.

The last class of the day, **Jeff Beck, ND Geographic Alliance Coordinator** introduced the educators to the new National Geographic *Giant Map of North Dakota!* National Geographic Giant Traveling Maps are oversized vinyl floor maps. They are the largest maps ever produced by National



Teachers brainstorm ideas on how they could utilize the giant ND map in their classroom.

Geographic and require a school gym or large room for use. Each map is accompanied by a set of activities and materials. The map is in one piece and requires no assembly. These kinds of resources help educators teach students about the state and empower them to make a difference in the place they live.



The International Peace Garden, located on the border between Canada and the United States, commemorates the peace between our two countries.

Garry Enns, Director, International Peace Garden, began the third day with an official welcome; some history about the founding of the Garden; an overview of current projects; and special initiatives in the works today. He stressed how increased public knowledge of the environment and the need for conservation of natural resources have resulted in lifestyle changes in many cultures.



Participants spent the morning viewing the largest collection of more than 4,000 different species and 6,500 thriving cacti in the Vitko Xeric Collection in the Peace Garden Conservatory. Minot native Don Vitko started collecting cacti when he was eight years old in 1963. The plants come from the America's, Southern Africa, and Madagascar. It is the largest private indoor collection in the world (see left photo below of just one area).



While half of the participants were getting a tour of the cacti, the other half were getting a tour of the Garden to see first-hand how populations of organisms exhibit variations in size and structure as a result of their adaptation to their habitats. Immersed in this beautiful environment, we took in our surroundings using all our senses. There's a growing body of evidence that spending time outdoors in a natural environment can help boost immunity and mood, lower blood pressure, and help reduce stress. Today, some need a little nudge to get back out there.

The afternoon was spent with **Lezlee Johnson, Forest Health Manager, North Dakota Forest Service**, at the Anishinabe Cultural Center near Belcourt. She covered the benefits of community forestry, the Tree City USA program, forest health issues, as well as ideas on how tree-related technology can be used. The ND Forest Service provides technical assistance, program direction, and recognition for a healthy, sustainable forestry program in communities. She also informed the teachers on how to use i-Tree to calculate the benefits trees provide. The “Tree Selector” webpage was also shared.



Lezlee Johnson shared information about Community Forestry, forest health, and tree-related technology programs useful to teachers, homeowners, and professionals.



While at the Towner State Nursery, participants viewed the green house, shade house, and fields where over one million conifer (evergreen) seedlings are annually grown.

On the final day, our “classroom on wheels” proceeded on to the **Towner State Nursery**. **Jeff Smette, Nursery Manager**, led participants on a tour to view the facilities where one million conifer (evergreen) tree seedlings are annually produced in over thirty different species and stock types for distribution to landowners. The trees are used for farmstead, living snow fence, field windbreaks, wildlife, forestry and other conservation plantings. The nursery is a self-supporting operation. It also provides tree improvement services, such as testing, evaluation, selection and development of improved nursery stock.

Casey Johnson, District Ranger, United State Forest Service, met us at the unique Denbigh Experimental Forest. Today, the Denbigh Forest is an arboretum and experimental forest owned and operated by the US Forest Service, and used mainly for recreation, hunting, and conservation education. Their use for the land has changed over time as circumstances have changed.



Casey Johnson, US Forest Service, gives an overview of the Denbigh Experimental Forest prior to a tour of the Arboretum.

In 1931, more than 40 tree species from throughout the US, Europe, and Asia, were planted there to see what trees would grow in the northern Great Plains to reduce soil erosion from wind and how a planted forest might provide employment after the dust storms during the Great Depression. This vision never came to pass. Funds for the experimental forest ended when the country went to war. The participants learned about some of the effects that human activities (war, farming) and environmental impacts (wind, drought) can have on a forest. Today, the forest contains about 30 surviving species of trees labeled and planted in a park-like setting. The trees also serve as a seed source for the Towner State Nursery.



Teachers look into an augmented reality sandbox and learn a new hands-on way to teach concepts in the classroom using color topographic maps.

Following a noon picnic lunch, we headed back to Minot State University for our last presenter. **Kent Ellis, employed by the Bismarck Public Schools**, and a petroleum landman associated with Aurora Energy Solutions in Bismarck, shared with the teachers an “Augmented Reality Sandbox,” which is a new hands-on way to teach concepts. It helps students visualize earth science concepts and allows users to create their own topography models. Students can shape the sand, which is then

mapped in real time. The sandbox becomes a three-dimensional color topographic map, which can be touched, changed, and even transformed by water. The sandbox is available, free of charge, to bring to schools.

The workshop concluded with a debriefing about the importance of understanding human-environmental interactions and the legal, political, ecological, economical, and social affects – good and bad – on our natural resources, our health, and our state’s economy. All issues are varied and complex. Solutions are not always obvious or satisfying to everyone. In most conflicts, many individuals, organizations, and agencies have different perspectives and beliefs on how natural resources should be managed in a sustainable way. Resolving issues usually involves compromise.

The intent of the joint efforts of the ND Geographic Alliance and ND Forest Service were to connect educators; provide world-class professional development; and promote educational innovation at the state, district and local levels. The tools and experiences provided to the teachers will help them establish, in youth of all ages, a foundation for effective citizen involvement in future environmental decision-making processes.

A 2018 GeoFIT traveling “classroom on wheels” tour is being planned for July 2018. Check back with us in February next year for details.

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