The Oxbow

FROM THE NORTH DAKOTA STATE WATER COMMISSION

Educators are using a seine net to catch fish and other aquatic organisms on Painted Woods Creek, to help determine its water quality.

Water Quality Institute a hit with educators

By Bill Sharff

The Project WET Summer Water Quality Institute was held July 16-20 at the 4-H camp near Washburn. The consensus among the 31 participants was that the 2001 Institute was an awesome outdoor, hands-on, learning experience. The Institute uses a variety of outdoor investigation units (i.e., groundwater, wetland, stream, and lake) to study how human and natural environments interact within watersheds.

"...a super learning experience. I most definitely know more about water quality now in North Dakota than I did before I came to the Institute," said Rob Heinley, a high school algebra teacher from Fargo. Jodi Fugleberg, grade 2 and 4 teacher at Mayville-Portland, said "my experiences (at the Institute) were more than I ever expected. I would definitely recommend this Institute to other educators."

Many Project WET Curriculum, Activity Guide, and Wonders of Wetlands (WOW!) Guide activities were completed. Altogether, between the field investigation days and the programs completed at the 4-H Camp, Institute participants experienced 15 hands-on interactive K-12 activities from the Project WET curriculum materials.

Included was an activity that demonstrated physical and chemical properties of water (H_2Olympics), point and non-point source pollution (Sum of the Parts), ground-water contamination (Pucker Effect), creating an earth window to investigate groundwater (Get the Groundwater Picture), the importance and movement of water in a watershed (Just Passing Through), and analyzing streamflow data to predict floods and water shortage (Back to the Future).

The 2001 Institute put additional emphasis on the Project WET "Rainstick" activity. Each participant constructed a rainstick from a mailing tube, filled the tube with various seeds to simulate a sound of rain, decorated their rainstick according to a chosen theme (wetlands, lake, stream, groundwater, or watersheds), and developed a poem or story to describe their rainstick and its relationship to water.

Brenda Geray, grade 7 and 9 teacher from Larimore High School, said "This was better water quality education than I ever anticipated...my earth/life science classes will greatly benefit from this week." Marlan Engstrom, a ninth grade history teacher from Minot High School commented, "I thoroughly enjoyed this Institute while picking up many new ideas and information about teaching water quality to my students. (It was) a memorable experience to share with students and other teachers."

New to the 2001 Institute were sessions devoted to using technology in water quality investigations and education. Educators learned how to conduct water quality tests using various sensors and probes and a computer based lab. Participants conducted tests on temperature, pH, phosphate, nitrates, alkalinity, total dissolved solids, and salinity. They also collected, displayed, graphed and analyzed data, and learned how to use websites to search for water quality education materials and resources.

The Summer Water Quality Institute was taught by several Project WET facilitators and many water resource professionals representing state and federal agencies: the State Water Commission, the North Dakota Department of Health, the U.S. Geological Survey, the Natural Resource Conservation Service, and the Bureau of Reclamation. ■

Lewis & Clark's Missouri River comes alive

By Bill Sharff

Lewis and Clark's Big Muddy Missouri River Cultural History Institute was held June 24-29 at the 4-H camp near Washburn with 42 participants attending. Educators were impressed with the broad topics covered in the Institute that made them much more aware of the role the Missouri River played in North Dakota's societal and cultural history.

The Institute uses a variety of historical and cultural sites located on the Missouri River, including: the Lewis and Clark Interpretive Center, Knife River Indian Villages National Historic Site, Lewis and Clark Monument Site, Ft. Clark State Historic Site, and the Ft. Mandan Historic Site.

Additionally, participants were able to witness some of North Dakota's foremost presenters on Missouri River Cultural Traditions. Presenters and re-enactors brought participants face to face with the cultures and characters of the mighty Missouri River. Presenters included: Sioux, Mandan-Hidatsa, and Euro-American cultural traditions, the Patrick Gass (Lewis and Clark expedition member) program, a fur-trapper/trader program, a Sakakawea presentation, an 1870s 17th Infantry Regiment living history program, and an 1870 Euro-American water history presentation. More powerful than the written word, the images they presented and reenacted added to the visual understanding of the river's historic past.

The agenda was also jam packed with hands-on water and historical/cultural education activities and projects for teachers to learn and take back to their classrooms. Activities included comparing quantities of water used in the late 1800s and in the present (Easy Street), hauling water to appreciate the amount of water used daily (The Long Haul), simulating floating up the Missouri River and relating the historical significance of waterways (River Run), creating Lewis and Clark style journals (In Your Own Words), creating Missouri River Indian hoop and sticks game (Games, Sports and Amusements), understanding sounds of the Lewis and Clark days on the Missouri River (Soundscapes), participating in Lewis and Clark expedition games (Fun and Games), and understanding the roles of members of the Lewis and Clark Expedition (Right for the Job).

Packaged props, artifacts, and pictures that were part of several educational trunks told stories about how people lived and related to the Missouri River and water. Teachers could see what it was like to hunt buffalo, make bone and stone tools, grow corn, homestead, use old washboards, ice tongs, and water bags.

The 2001 Institute put great emphasis on Lewis and Clark style journaling. Each participant constructed and decorated a journal out of materials designed to simulate a historical looking journal with their own personal creativity. Each day of the Institute, participants were required to journal in words and drawings their experiences. Each participant then had a chance to display their journal and read their favorite day of journaling.

Melisa Rames, grades 7-9 science teacher from Fargo said, "Excellent!

Amy Mossett, a Mandan-Hidatsa from New Town, wears traditional clothing while giving her Sakakawea presentation.

I loved it. This is one of the most educational and entertaining graduate classes I have ever taken. The program and curriculum rock!" Betty Heinrich, a kindergarten teacher from Rhame, commented "(There is) so much to see and do. I expected it to be a long week but it went by very fast because it was so interesting. I'll tell others so they can experience all I did."

Charity Nix, eighth grade science teacher at Lisbon, said, "everything was very informational. I learned more this week than I have in six months. I'm now able to see and understand the specific importance of the Missouri River as a critical part of North Dakota's history and future."

The Lewis and Clark Institute was taught by several Project WET facilitators. The facilitators not only helped instruct participants but also completed historical/cultural presentations themselves—depicting life near the Missouri River in the past.

Both institutes were funded in part by: EPA Section 319 Nonpoint Source Pollution grant, the State Water Commission, local county water resource districts, soil conservation and school districts. ■

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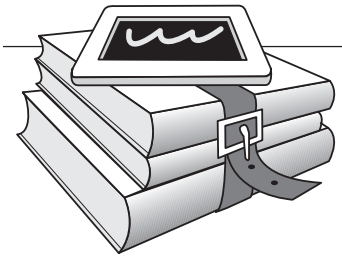

Planning to irrigate? (Part 2)

This is the last half of a two-part article addressing important questions for anyone who is planning to invest in an irrigation system as part of their farm operation.

Does irrigation pay in your farm enterprise?

Detailed crop budgets covering economic and cash costs must be prepared for the proposed irrigated cropping system. If the budgets show an adequate return to labor, capital, and management, then a total enterprise analysis should be made to determine how irrigation will fit into the farming operation. For example, irrigation of grass or hay may not bring a big return by itself, but coupled with a livestock operation may increase net returns and lend stability to the farm enterprise. As pointed out in the previous "Planning to Irrigate" segment, irrigation alone does not assure financial success. It requires planning and good management on the part of the farm operator.

Can you obtain financing?

Adequate financing can be obtained more easily through proper planning before contacting a financial institution. Success in irrigation depends largely on your management ability. An indication of that ability can be expressed to your credit supplier in the form of farm records, profit and loss statements, net worth statements, and cash flow statements. In addition to these records, you should be prepared to supply your credit agency with an estimate of the payback capacity of the irrigation investment. This is where the crop budgets and total enterprise analysis would be very helpful.

How are you going to select and manage your irrigated crops?

Crops selected for irrigation must exhibit an economic yield increase. This means the average yearly yield increase over dryland production must be great enough to pay for the investment in irrigation and increased production costs as well as some additional profit. Historically, crops that have been profitable for good irrigation managers include, corn (for silage or grain), alfalfa, sugarbeets, potatoes, and dry edible beans.

Irrigation provides an environment conducive to increased plant production for long season crops. However, it also provides a favorable environment for disease, insects, and weeds. The irrigator must know how to manage the irrigation system and crop rotations to minimize potential problems. Further, the irrigator should be able to manage the irrigation system profitably by scouting the field on a regular basis and by using the following two management techniques:

- *Integrated Pest Management (IPM)* - IPM is an effective approach to pest management that takes into consideration the life cycles of pests and their interaction with the environment to control them in an environmentally sensitive manner. IPM provides an economical means of reducing damages caused by pests with the least possible hazard to people, property, and the environment.
- *Best Management Practices (BMPs)* - BMPs are land management practices that act to reduce the nonpoint source pollution load in surface water systems by reducing runoff in the surrounding watershed. Selection and suitability of BMPs should be based on site-specific conditions, type of land use activity, the physical makeup of the watershed, and consideration of the pollutant(s) involved. BMPs could include the establishment of riparian zones and shelterbelts, grassed waterways, and grassed contours as a few examples.

The irrigator must be aware of management practices that favor irrigation and are crop specific, such as proper row widths, appropriate plant populations, higher fertilizer requirements, split applications of fertilizer to minimize leaching potential, and hybrid selection.

Irrigated crop water management is extremely important to prevent yield loss due to moisture stress. It is also important in that it can prevent leaching of nutrients and minimize pumping costs, thus increasing profits. To maintain adequate soil moisture, a method of irrigation scheduling must be implemented. Soil moisture monitoring by the feel method is commonly used but there are more accurate methods such as the checkbook method. The checkbook method is a soil moisture accounting process that deducts water being used by the plant and adds water replaced by irrigation or rainfall. It is compared to a checkbook because of the similarity to withdrawals and deposits. Whichever method is used, it will require increased management skills and additional time. Remember, irrigation scheduling is a daily process. ■

Adapted from: "Planning to Irrigate... a Checklist" by Thomas Scherer and James Weigel. Printed with permission from NDSU Extension Services.