

WATER TOPICS WORKSHOP FOR NEBRASKA TEACHERS AND EDUCATORS



May 25-26, 2016
Kimmel Education Center, Nebraska City



BACKGROUND:

The American Ground Water Trust has organized over 70 training programs for teachers in 17 states attended by close to 2,000 teachers and educators.

The program is a great opportunity for teachers and educators (in formal and informal settings) to explore aspects of water that are relevant to Nebraska. Water science and water management experts from the water industry, agriculture, universities and government agencies will be presenting the program. We recognize that teachers in all grades must adhere to state standards for content and required learning objectives, and so our approach, through class sessions, demonstrations, discussions and handouts, is to show how to integrate water topic subject matter into existing curricula and traditional subject areas.

Our Institutes get teachers excited and focused. There are thousands of school storerooms groaning with unused curriculum materials. The institutes get teachers fired up to make use of the many excellent materials that are already available. We hope students impacted by water-savvy teachers will recognize the connected and integrated nature of the environment and be empowered to play an active role in protecting resources for sustainable use. To be effective stewards of our water resources, there must be greater awareness and understanding of the science behind the resource.

SPONSORS OF THE WATER TOPICS WORKSHOP

**RICHARD P. KIMMEL
& LAURINE KIMMEL**
Charitable Foundation Inc.



AMERICAN GROUND WATER TRUST



The AGWT was formed in 1986 as a non-profit education organization with the mission of promoting interest and awareness in groundwater issues. The AGWT's conference and workshop programs and educational materials:

- ◆ Communicate the environmental and economic value of groundwater
- ◆ Showcase ground water science and technology solutions
- ◆ Increase citizen, community and decision-maker awareness
- ◆ Facilitate stakeholder participation in water resource decisions
- ◆ Promote efficient and effective groundwater management



The mission of the Kregel Windmill Factory Museum is to use the unique resources of this historic factory and its contents to provide a tangible way for visitors to understand how Americans throughout the years have used innovation, resourcefulness, hard work and thrift to live successfully through changing times. The factory demonstrates how Americans have used, and continue to use the renewable power of the wind to enhance the quality of human life.

Program – May 25

8:00 – 8:30 SIGN-IN (Coffee, fruit and pastries)

8:30 WELCOME & INTRODUCTION

Lee Orton, Executive Director, Nebraska Well Drillers Association
Dean Shissler, Curator, Kregel Windmill Museum

- Origins of this program
- Partnership with American Ground Water Trust
- What we hope you will take away from the workshop

8:45 SEVEN BUILDING BLOCKS TO HYDROLOGIC LITERACY

Andrew Stone, Executive Director, American Ground Water Trust

- The importance of a foundation of basic environmental concepts
- Adding "water and environmental issues" to traditional subjects
- Earth Systems – connections of geology, hydrology, atmosphere and biology
- The basic "water" concepts we want our students (and citizens) to understand

THE BASICS OF ROCKS & WATER

- Geology fundamentals (rock types and origins)
- Geologic structure/ aquifer geometry
- How water moves through the landscape (where is it, how did it get there, where is it going?)
- Water budget concepts (rain, snow, evaporation, flow in rivers, storage underground)
- Water from springs (What keeps the water flowing?)

9:30 THE GEOLOGY AND HYDROLOGIC CHARACTERISTICS OF NEBRASKA'S AQUIFERS

Aaron Young, P.G., Survey Geologist, Conservation and Survey Division, UNL, Lincoln, NE

- Geologic Setting of Nebraska
- The State's water balance (IN, OUT and changes in STORAGE)
- Major Alluvial Aquifers
- Sedimentary Rock Aquifers

10:30 BREAK

10:45

HISTORICAL PERSPECTIVE: DEVELOPMENT, MANAGEMENT AND CONTROL OF NEBRASKA'S WATER

Lee Orton, Executive Director, Nebraska Well Drillers Association; Board member - Kregel Windmill Museum

- Early settlers – what was it like when they arrived?
- Development of an irrigation based economy
- How electric power and turbine pumps impacted irrigation
- Establishment of management controls and oversight
- Compacts and agreements with neighboring states

11:30

HOW WATER WELLS ARE DESIGNED, DRILLED AND EQUIPPED

Andrew Stone, Executive Director, American Ground Water Trust

- Video "Water Well Basics"
- Well design and well equipment (casing, screens) for domestic wells and high-yield commercial wells

12:00 LUNCH

1:00

ALL YOU EVER WANTED TO KNOW ABOUT PUMPS AND HOW THEY WORK

David Kill, P.E. Training Consultant, Xylem Goulds Water Technology, St. Paul, MN

- How pumps lift water
- The basic components of pumps and pump motors (hands-on demonstration)
- Typical types of water pump in use in Nebraska
- With so many sizes and designs available – how does a farmer/ engineer/ well contractor choose which to use?
- Simple calculations about energy costs of pumping water

2:00

HOW THE AGRICULTURE INDUSTRY MAXIMIZES THE USE OF AVAILABLE WATER

Roric Paulman, President, Nebraska Water Balance Alliance

- Where Nebraska producers obtain irrigation water
- How irrigation technology has increased food production
- Water conservation by efficient on-farm management
- What are the implications of changing weather patterns for Nebraska agriculture?

3:00 BREAK and discussion

SOME “HOT” WATER-RELATED ISSUES – HOW TO HANDLE THEM IN THE CLASSROOM?

Discussion and brain-storming facilitated by Andrew Stone, American Ground Water Trust

- Bottled water industry
- Hydraulic fracturing
- Crops for biofuels
- Water as a basic human right

3:45

WRAP-UP OF DAY ONE

Program – May 26

8:30

TOUR AND EXPLANATION OF THE KREGEL WINDMILL FACTORY MUSEUM

Dean Shissler, Acting Curator, Kregel Windmill Museum

- 112 Years of technology and manufacturing history
- Renewable power of the wind. ... How is rotating motion converted to up & down pumping?
- How do wind-pumps automatically protect themselves in high winds?
- How was Nebraska’s rise as a food producer dependent on water pumping technology?

10:00 Return to Kimmel Education Center (5985 G Road Nebraska City, NE 68410)

10:15 HOW BEST TO MAXIMIZE THE EDUCATION OPPORTUNITIES OF THE KREGEL MUSEUM FOR SCHOOLS

Discussion and brain-storming facilitated by Cindy Kreifels, Groundwater Foundation

11:00 GROUNDWATER QUALITY ISSUES (Quick generic overview)

Andrew Stone, Executive Director, American Ground Water Trust

- Sources of biological and microbiological threats
- Sources of chemical compounds that could impact water quality
- Saline soils resulting from high groundwater levels
- On-site waste-water disposal systems (great when they work!)
- What can be taught in schools that will help change behavior and increase resource protection?

11:30 WATER QUALITY CONCERNS AND SOURCE PROTECTION STRATEGIES IN NEBRASKA

Tom Christopherson, Nebraska Department of Health and Human Services

- Which departments/ agencies are responsible for what in sustaining and protecting Nebraska’s water?
- Strategies for protecting groundwater from contamination
- What the state is doing to “clean-up” past contamination
- Examples of how research and scientific knowledge helps water policy decisions

12:15 LUNCH

1:00

GLOBAL GROUNDWATER ISSUES, COMMON MISCONCEPTIONS, AND HOW THE ISSUES ARE SIMILAR OR DIFFERENT TO THOSE FOUND IN NEBRASKA

Nicholas Brozovic, Director of Policy, Water for Food Institute, University of Nebraska

- The mission of the Water for Food Institute
- What does sustainability mean?

- How can we ensure global food security with the challenge of changing climate?
- Institute research projects and partnerships

2:00
EDUCATION RESOURCES ON FOOD & WATER TOPICS FOR NEBRASKA SCHOOLS
 Show and tell about information and curriculum materials with discussion facilitated by Education Service Unit Science Coordinators

2:30
SCHOOL SUBJECTS AND CAREERS IN THE WATER INDUSTRY
 Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH
 David Kill, P.E. Training Consultant, Xylem Goulds Water Technology, St. Paul, MN

- Subjects and skills needed for water resource assessment, operation and management
- Hydrologic, environmental, health, engineering, water management, regulatory, planning etc.
- Technicians, operators, construction, maintenance, records data management, etc.

CLASSROOM LESSON OPPORTUNITIES (Quick “how to use” introduction)

- The water drop journey (Outside exercise with observation, recording and interpretation)
- Porosity & permeability (Easy to measure – gives “numbers” that students can use)
- Plant transpiration (Week-long water measurement project for any classroom, any grade)
- Using literature and poetry with PowerPoint to enhance awareness of water (Project with interdisciplinary potential and adaptable for class and/ or homework assignments)

3:15 PROGRAM ASSESSMENT - COMPLETION OF PROFESSIONAL DEVELOPMENT PAPERWORK

3:30 ADJOURN

