

Watershed Education in the Red River Basin, a Multi-state Analysis

Delphi 2013

Gregory Carlson, Ph.D., David DeMuth, Jr., Ph.D.



valley city state university

www.stem.vcsu.edu

Abstract

Title: **Watershed Education in the Red River Basin, a Multi-state Analysis**

Speaker: *Dr. David DeMuth, Jr., Dr. Gregory Carlson, Valley City State University*

Abstract: NDSU Extension, University of Minnesota Extension, the International Water Institute, and the Great Plains STEM Education Center at Valley City State University conducted a study using the Delphi method to inventory watershed education activities in the Red River Basin so as to forecast an effective and efficient framework to advance understanding of water issues affecting a variety of stakeholders. The survey queried seven audience groups: Teachers, Research/Extension/Professionals, Natural Resource Professionals, Local Government Leaders, K-12 Students, General Public, and Agriculture Producers. Current and past education programming, gaps in education programming, the role demonstration sites, drainage, land reclamation, technical training, are among the topical points. The key results of the survey will be presented in this session.

Location: <http://info.bismarckstate.edu/ceti/waterquality/>

Program: <http://info.bismarckstate.edu/ceti/waterquality/pdfs/conference-agenda2014.pdf>

Overview

- Chronology of a Study
- Players
- Stakeholders
- Results
- Suggested areas of over-emphasis
- Opportunities for growth



U of M Extension Educator (2010)

- In 2010 a new, grant funded joint position to lead, manage, & coordinate Watershed Education in ND & MN RRB
- To work cooperatively with RRB Partners
- To provide basin-wide leadership for sustainable living focused on RRB water resource issues.
- The position ended in Fall 2012.

RRB Watershed Education Strategy

- U of MN Extension, International Water Institute, and NDSU
 - *Responsive to stakeholders*
 - *Long term*
 - *Sustainable*
- External consultant to facilitate and develop a Red River Basin Watershed Education (RRBWE) working group.

RRBWE Working Group

- External evaluators interviewed eight team members in order to:
 - Understand strengths and perspectives
 - Express concerns and hopes
 - Communicate core values
 - Develop a watershed education strategy that is responsive to stakeholders, long-term, and sustainable.



Stakeholder ID Meeting (Nov. 2012)

- 50+ stakeholder organizations identified with role and/or interest in WE, and ranking each in **stake** and **power**:
 - *Stake in WE efforts: High or Low*
 - *Power to affect WE in Basin: High or Low*
 - Classified each as one or more of:
 - *deliverer, receiver, or funder of watershed education*
 - Determined a need for a gap analysis.



Gap Analysis

- The gap analysis included three phases guaranteeing a thorough understanding:
 - *of the current situation,*
 - *the needs of the diverse audience groups,*
 - *and the gaps that exist.*

What follows in an overview of the gap analysis process that was used as well as findings and recommendations for next steps.



Watershed Education Study Partners

Karen Terry

UNIVERSITY OF MINNESOTA
EXTENSION
Driven to Discover™

University of MN Extension
Extension Educator in Water
Resources

kterry@umn.edu
218-770-9301

Tom Scherer

NDSU
Extension Service

NDSU Extension
Associate Professor

thomas.scherer@ndsu.edu
701-231-7239

Chuck Fritz

 International Water Institute
Supporting Flood Research and Watershed Education

International Water Institute
Executive Director

charles@iwinst.org
701-388-0861

Jody Horntvedt

UNIVERSITY OF MINNESOTA
EXTENSION
Driven to Discover™

University of MN Extension
Extension Educator in
Leadership and Civic
Engagement

hornt001@umn.edu
218-483-0296

David DeMuth, Jr.



Valley City State University
Executive Director of Great
Plains STGM Education
Center and Professor

david.dcmuth@vcsu.edu
218-280-9322

Danni Halvorson

 International Water Institute
Supporting Flood Research and Watershed Education

International Water Institute
Director of Education
and Monitoring

danni@iwinst.org
218-280-0515

Charlie Stoltenow

NDSU
Extension Service

NDSU Extension
Interim Assistant Director and
Professor of Animal Sciences

charles.stoltenow@ndsu.edu
701-231-7522

Renee Pardello

UNIVERSITY OF MINNESOTA
EXTENSION
Driven to Discover™

University of MN Extension
Assistant Dean

pard0017@umn.edu
612-624-6479

Project Implementation Timeline

- Stakeholder meeting in Moorhead, MN (Dec. 28, 2012)
 - Identify those with stake in WE and power to deliver.
- Development of Round 1 survey instrument
- Administer:
 - Round 1 (Jun. 25 - Jul. 15, 2013)
 - Round 2 (Jul. 25 - Aug. 21, 2013)
 - Round 3 (Sep. 19 - Sep. 30, 2013)
- Team Overview/Planning Meeting (Nov. 19, 2013)

Methodology Overview

- Three-round Delphi
- To what extent is this type of education important in the basin?
- To what extent is this type of education available to all teachers in the Basin?



Round 1: N = 92 (42 completed)

Questions:

- *What Red River Basin water-related education opportunities are you familiar with (current or upcoming)?*
- *What River River Basin water-related education opportunities were once available but no longer exist due to lack of interest, funding, or other support?*
- *Who are others that you know that would have information to provide about water related education in the Red River Basin?*

Round 2: N = 91 (36 completed)

Questions:

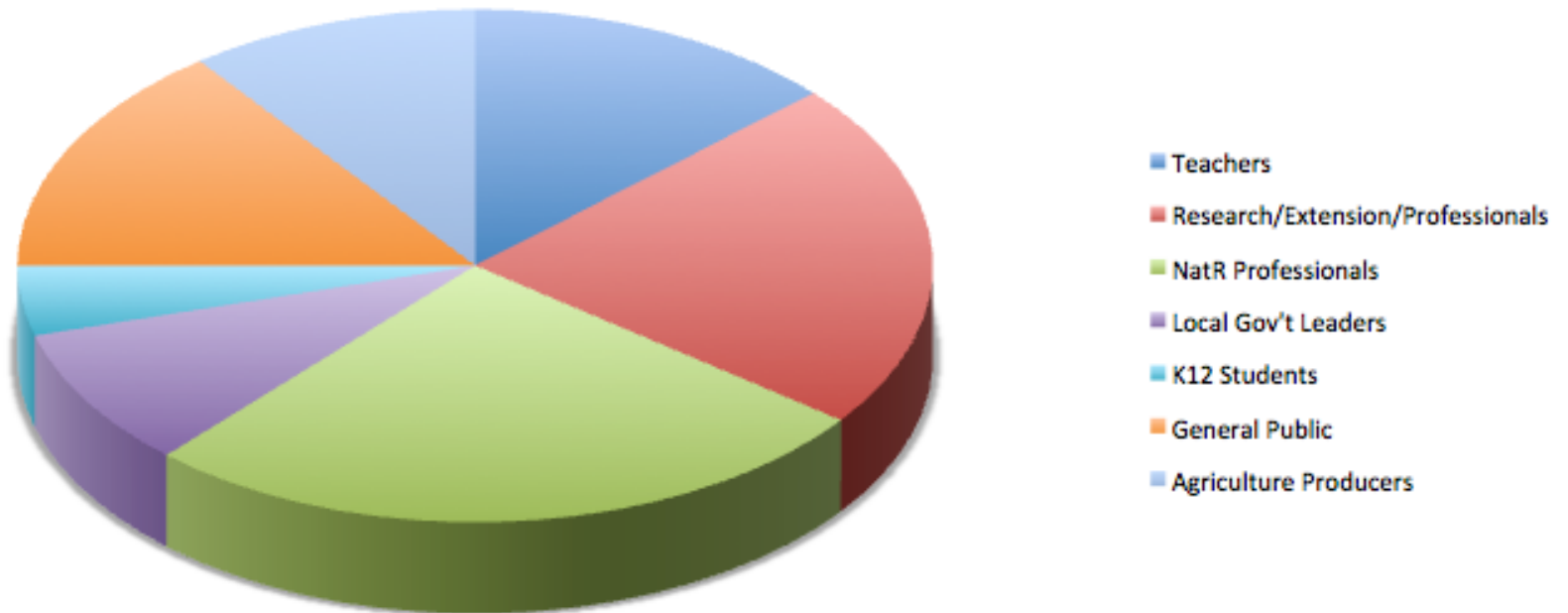
- *If after reviewing existing Watershed Education Opportunities from Round 1 you recall additional education opportunities, please add here.*
 - *8 new programs were added.*
- *What Red River Basin water-related education opportunities do you wish existed? Please identify the gaps and why filling those gaps would be valuable.*
 - *29 programs wish-listed*

Round 3: N = 35 (24 completed)

- Participants were directed to respond in any of seven audience groups based on knowledge of that group.
- Participants were asked to rate the importance and availability of the watershed education programs that were identified in Rounds 1 & 2 then categorized, for example in the Natural Resources audience group:
 - *Tours and Demonstration Sites*
 - *Environmental Learning Centers*
 - *Workshops and Specialized Training*
 - *Conferences and Meetings*
- Likert Scales: High-4, 3, 2, 1-Low, NC & Comment providing a measure of mean, standard deviation, frequency, and a mean difference between importance and availability.

Watershed Education Study Audience Groups

Audience	Teachers	Research/Extension/Professionals	NatR Professionals	Local Gov't Leaders	K-12 Students	General Public	Agriculture Producers
N	9	15	18	6	3	10	7



Round 3: NatR Professionals (N=18)

Natural Resource Professionals

Current and past educational programming. Please respond to each category based on the examples listed below it.

	To what extent is this type of education <u>important</u> in the Basin?					To what extent is this type of education <u>available</u> to all teachers in the Basin?					To what extent is this type of education available to all teachers in the Basin?
	1-lo	2	3	4-hi	* N/C	1-lo	2	3	4-hi	* N/C	Enter any comments (optional)
Tours and Demonstration Sites: (Clay County Drainage Site; Discovery Farms Demonstration Sites; Abandoned Well Sealing Demonstrations)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<div style="border: 1px solid black; height: 40px;"></div>
Environmental Learning Centers: (Prairie Waters Education and Research Center)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<div style="border: 1px solid black; height: 40px;"></div>
Workshops and Specialized Training: Watershed Education Program by UM Extension; Watershed Specialist Training Program, online through UM Water Resources Center; Wetland delineation)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<div style="border: 1px solid black; height: 40px;"></div>
Conferences and Meetings: (Joint annual conference of the Red River Watershed Management Board and Flood Drainage Reduction Work Group; International Red River Basin Land and Water Conference; Red River Water Management Board Annual Meeting/Seminars; Red River Basin Commission Annual Conference)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<div style="border: 1px solid black; height: 40px;"></div>

Round 3: NatR Professionals (Con't)

Natural Resource Professionals

Gaps in educational programming. Please respond to each of these identified programming gaps.

	To what extent is this type of education <u>important</u> in the Basin?					To what extent is this type of education <u>available</u> to all teachers in the Basin?					To what extent is this type of education available to all teachers in the Basin?
	1-lo	2	3	4-hi	x N/C	1-lo	2	3	4-hi	x N/C	Enter any comments (optional)
Effect of "Pre-Glacial and Glacial" processes on the current status of Red River Basin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Education related to tile drainage in the Red River Basin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Use applied science research	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
More education, demonstration and training events focused on feasible farming practices that will "work" in the Valley to improve water quality and soil health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
There is a lack of information about the Devils Lake situation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Civic engagement education to improve skills in collaboration/engagement, discussion, and reflection	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Basic agronomy classes/education	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
More efforts like Green Corp, Earth Teams, Americorp, Extension summer interns, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="text"/>



Round 3: NatR Professionals (Con't)

Please provide any additional comments you may have related to Questions 5.2 and 5.3.

Please share information about key partners and available resources relating to any of the educational programs or opportunities identified above in Q5.2 or Q5.3

Under the Program heading, name the program from those listed above ...

Under the Key Partners heading, Identify the individuals or groups (including yourself) who could help...

Then list Resources (time, money, policies, equipment, etc.) you are aware of to support this...

Column Options ▾		
Programs	Key Partners	Resources



Results Through Round 3

Criteria/cuts:

- *Population size: $N \geq 3$ (three or more)*
- *Mean Difference ≥ 1 (Importance and availability)*
- *Standard Deviation ≤ 1 (minimize spread)*

As a result 26 items met criteria, and after ranking suggest areas of investment, based on our study.



1. Teachers (N=9)

- Importance is viewed in excess of availability: **opportunity** (mean difference: 3.67-1.60)
- Education related to “state borders” and/or Canadian border.

Teachers (Yes: 9; No: 21)

Question	To what extent is this type of education important in the Basin?								To what extent is this type of education available to all								Mean Difference
	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD	Comments		
Education related to the watershed over its political boundaries	0	0	2	4	6	3.67	0.52	3	1	1	0	5	1.60	0.89	(1 comment) I found many people only care about things if they are related to them, but not things out of their domain.	2.07	

2. Research/Extension/Professional (15)

- Land Reclamation is an important type of education in the Basin, the example of delivery by Prairie Waters Education and Research Center cited.
- Availability is challenged: **Opportunity**

Research Extension (Yes: 15; No: 13)																	
To what extent is this type of education important in the Basin?								To what extent is this type of education available to all								Mean Difference	
Question	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD	Comments		
Land Reclamation: (Prairie Waters Education and Research Center)	0	3	6	4	13	3.08	0.76	3	5	1	1	10	2.00	0.94	(1 comment) This program should also include the study of soil chemistry, salts versus sodium effects.	1.08	

3. Natural Resource Professionals (18)

Opportunity: Ed/demo/training (1.5), Tile drainage (1.36)

Natural Resource Professionals (Yes: 18; No: 9)																	
Question	To what extent is this type of education important in the Basin?								To what extent is this type of education available to all								Mean Difference
	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD	Comments		
Tours and Demonstration Sites: (Clay County Drainage Site; Discovery Farms Demonstration Sites; Abandoned Well Sealing Demonstrations)	0	1	1	12	14	3.79	0.58	0	5	5	1	11	2.64	0.67	(1 comment) Summer tours would more than likely be available to teachers.	1.15	
Workshops and Specialized Training: Watershed Education Program by UM Extension; Watershed Specialist Training Program, online through UM Water Resources Center; Wetland delineation)	0	0	1	12	13	3.92	0.28	1	5	4	2	12	2.58	0.90	(1 comment) If available, am not getting notice of how many opportunities from U of Mn. Most training's in this area seem to be offered by NDSU Ext.	1.34	
Effect of "Pre-Glacial and Glacial"; processes on the current status of Red River Basin	1	1	6	3	11	3.00	0.89	3	4	1	1	9	2.00	1.00		1.00	
Education related to tile drainage in the Red River Basin	0	0	2	12	14	3.86	0.36	2	4	4	2	12	2.50	1.00	(1 comment) Very little material exists that can be shared with students.	1.36	
More education, demonstration and training events focused on feasible farming practices that will "work" in the Valley to improve water quality and soil health	0	0	0	14	14	4.00	0.89	2	4	4	2	12	2.50	1.00	(1 comment) I know of very little about "BMP's" that is available, short of some technical discussion on the web.	1.50	
Civic engagement education to improve skills in collaboration/engagement, discussion, and reflection	0	1	3	8	12	3.58	0.67	1	6	2	1	10	2.30	0.82		1.28	

4. Local Government Leaders (6)

- **Opportunity:** Tile drainage (1.58)
- **Opportunity:** Civic engagement (1.34)

Local Government Leaders (Yes: 6; No: 20)																
To what extent is this type of education important in the Basin?								To what extent is this type of education available to all								Mean Difference
Question	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD	Comments	
Education related to tile drainage in the Red River Basin	0	1	1	2	4	3.25	0.96	1	2	0	0	3	1.67	0.58		1.58
Civic engagement education to improve skills in collaboration/engagement, discussion, and reflection	0	0	1	2	3	3.67	0.58	0	2	1	0	3	2.33	0.58		1.34
Facilitation training to build skills to improve effectiveness of project team meetings	0	1	2	1	4	3.00	0.82	1	2	0	0	3	1.67	0.58		1.33

5. K-12 Students



6. General Public (10)

- **Opportunity:** Basin wide information on beneficial management measures.
- **Opportunity:** Broad-based Workshops

Question	To what extent is this type of education important in the Basin?								To what extent is this type of education available to all								Mean Difference
	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD	Comments		
Broad-based Workshops: (Lake Association Study Circles; Watershed Education Program by UM Extension)	0	0	2	5	7	3.71	0.49	2	1	2	0	5	2.00	1.00		1.71	
Hands-on Learning: (Aquatic Robotics; Envirothon Year Long Study (ND); River Watch; The Regional Environmental Education Series (TREES); River of Dreams Canoe Launch Program; Wetland Centre of Excellence)	0	0	3	5	8	3.63	0.52	1	3	2	0	6	2.17	0.75		1.46	
Basin wide information on beneficial management measures	0	1	0	7	8	3.75	0.71	2	2	2	0	6	2.00	0.89		1.75	
Using the vision available for the Basin and gaining public support	0	1	3	3	7	3.29	0.76	2	2	1	0	5	1.80	0.84		1.49	
Managing riparian zones and associated edges as wildlife habitat	0	0	2	6	8	3.75	0.46	2	1	3	0	6	2.17	0.98		1.58	

7. Agriculture Producers (7)

Opportunity: Benefits of controlled drainage, Drainage

Agriculture Producers (Yes: 7; No: 18)																
Question	To what extent is this type of education important in the Basin?							To what extent is this type of education available to all							Mean Difference	
	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD		Comments
Production and Runoff: (Discovery Farms and Demonstration Sites; ND Manure Sampling Program)	0	0	1	5	6	3.83	0.41	1	1	2	0	4	2.25	0.96		1.58
Drainage: (Sub-Irrigation Demonstration Research; Drainage Design and Watershed Management Workshop)	0	0	1	5	6	3.83	0.41	1	2	1	0	4	2.00	0.82		1.83
Irrigation: (Annual Irrigation Tours; NDSU Extension Irrigation Workshops)	0	0	3	3	6	3.50	0.55	1	2	1	0	4	2.00	0.82		1.50
Conferences and Meetings: (Joint annual conference of the Red River Watershed Management Board and Flood Drainage Reduction Work Group; International Red River Basin Land and Water Conference; Red River Water Management Board Annual Meeting/Seminars; Red River Basin Commission Annual Conference)	0	0	3	3	6	3.50	0.55	1	2	1	0	4	2.00	0.82		1.50
Education related to tile drainage in the Red River Basin	0	0	2	4	6	3.67	0.52	1	2	1	0	4	2.00	0.82	(1 comment) There are a lot of educational opportunities, but are all of them good? If it comes from industry, is it accurate?	1.67
Benefits of controlled drainage (e.g., ag productivity, flood damage reduction, etc.)	0	0	1	5	6	3.83	0.41	1	3	0	0	4	1.75	0.50		2.08
Use applied science research	0	0	0	5	5	4.00	0.00	0	2	1	0	3	2.33	0.58		1.67
Education, demonstration and training events focused on feasible farming practices that will "work" in the Valley to improve water quality and soil health	0	0	0	5	5	4.00	0.00	0	1	2	0	3	2.67	0.58		1.33
On-farm water storage - options and considerations	0	0	2	3	5	3.60	0.55	1	2	0	0	3	1.67	0.58		1.93
Managing riparian zones and associated edges as wildlife habitat	0	2	1	2	5	3.00	1.00	1	1	1	0	3	2.00	1.00		1.00

Areas of over-emphasis

- Data for $N \geq 3$
- Importance-Availability < -1 (almost none)
- Example: Difference -0.33 (1.2) (Importance $3 -$ Availability 3.3): Value of manure as a fertilizer (perspective of Ag producers, $N=3$ availability and $N=5$ on importance)

Suggested areas of over-emphasis

	To what extent is this type of education important in the Basin?	To what extent is this type of education available to all teachers in the Basin?														Mean Difference	
Audience	Question	1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD	Comments	
Local Government Leaders	Tours and Demonstration Sites: (Discovery Farms Demonstration Sites; Clay County Drainage Sites)	0	1	1	2	4	3.25	0.96	0	0	2	1	3	3.33	0.58		-0.08
General Public	Conferences and Meetings: (Joint annual conference of the Red River Watershed Management Board and Flood Damage Reduction Work Group; International Red River Basin Land and Water Conference; Red River Water Management Board Annual Meeting/Seminars; Red River Basin Commission Annual Conference; Post Flood outreach efforts)	1	4	1	1	7	2.29	0.95	1	1	2	1	5	2.60	1.14		-0.31
Agriculture Producers	Value of manure as a fertilizer	1	0	2	2	5	3.00	1.22	0	0	2	1	3	3.33	0.58		-0.33

Primary Opportunities

- Benefits of controlled drainage
- Education related to watershed over its political boundaries
- On-farm water storage - options and considerations
- Drainage (Subirrigation demonstration research, Drainage design & watershed management workshop)
- Basin-wide information on beneficial management measures

Audience	Question	To what extent is this type of education important in the Basin?							To what extent is this type of education available to all teachers in the Basin?							Comments	Mean Difference
		1-lo	2	3	4-hi	N	Mean	SD	1-lo	2	3	4-hi	N	Mean	SD		
Agriculture Producers	Benefits of controlled drainage (e.g., ag productivity, flood damage reduction, etc.)	0	0	1	5	6	3.83	0.41	1	3	0	0	4	1.75	0.50		2.08
Teachers	Education related to the watershed over its political boundaries	0	0	2	4	6	3.67	0.52	3	1	1	0	5	1.60	0.89	(1 comment) I found many people only care about things if they are related to them, but not things out of their domain.	2.07
Agriculture Producers	On-farm water storage - options and considerations	0	0	2	3	5	3.60	0.55	1	2	0	0	3	1.67	0.58		1.93
Agriculture Producers	Drainage: (Sub-Irrigation Demonstration Research; Drainage Design and Watershed Management Workshop)	0	0	1	5	6	3.83	0.41	1	2	1	0	4	2.00	0.82		1.83
General Public	Basin wide information on beneficial management measures	0	1	0	7	8	3.75	0.71	2	2	2	0	6	2.00	0.89		1.75
General Public	Broad-based Workshops: (Lake Association Study Circles; Watershed Education Program by UM Extension)	0	0	2	5	7	3.71	0.49	2	1	2	0	5	2.00	1.00		1.71
Agriculture Producers	Education related to tile drainage in the Red River Basin	0	0	2	4	6	3.67	0.52	1	2	1	0	4	2.00	0.82	(1 comment) There are a lot of educational opportunities, but are all of them good? If it comes from industry, is it accurate?	1.67
Agriculture Producers	Use applied science research	0	0	0	5	5	4.00	0.00	0	2	1	0	3	2.33	0.58		1.67
Local Government Leaders	Education related to tile drainage in the Red River Basin	0	1	1	2	4	3.25	0.96	1	2	0	0	3	1.67	0.58		1.58
General Public	Managing riparian zones and associated edges as wildlife habitat	0	0	2	6	8	3.75	0.46	2	1	3	0	6	2.17	0.98		1.58
Agriculture Producers	Production and Runoff: (Discovery Farms and Demonstration Sites; ND Manure Sampling Program)	0	0	1	5	6	3.83	0.41	1	1	2	0	4	2.25	0.96		1.58

Wish Listed (29)

	A
1	What type of watershed education is missing?
2	more youth programs on RR recreational opportunities
3	Effect of "Pre-Glacial and Glacial" processes on the current status of red river basin.
4	Education related to tile drainage in the Red River Basin
5	Benefits of controlled drainage - Ag productivity and Flood Damage Reduction
6	Riverwatch program modeled from MN (IWI) implemented into ND in a partnership with Andre DeLorme (VCSU) where the citizens monitoring data recorded would be well regarded by water and land use professional and thus be utilized in decision making for the Red River Basin.
7	Focus on K-12
8	Need more education, demonstration and training events focused on feasible farming practices that will "work" in the Valley to improve water quality and soil health
9	There is a lack of information about the Devils Lake situation. Most of the general public fails to understand that drainage in the upper basin of the lake is one of the main causes of the rise of the lake. Since that cause is ignored, the only methods of dealing with too much water on DL is draining water from the lake and into the Sheyenne River. Upper basin wetland restoration has not been seriously considered as one of the ways to alleviate the high water problem on the lake.
10	Status of the use of precision agriculture in the Red River Valley.
11	Civic Engagement Education
12	Basic agronomy classes/education
13	How farming and livestock production affects streams and rivers. Rules that govern farming and livestock production to prevent a negative impact on water quality.
14	programs that engage citizens as local volunteers for youth audiences
15	Education related to the watershed over its political boundaries, e.g. taking those from one part of the watershed to another part they may not have visited before.
16	Basin wide information on beneficial management measures
17	Proper manure management
18	Benefits of buffers (from farming) along riparian zones
19	What is needed most in the Devils Lake situation seems to be a scientific, objective study of the DL Basin and how much drainage has added to runoff into Devils Lake. Until that is done until drainage is taken into consideration as part of the problem, only results of excess water will be dealt with, rather than causes. Prevention has not been tried.
20	On-farm water storage - options and considerations.
21	Facilitation Training
22	Programs that stay the course using a "watershed approach"
23	Vision and support
24	Value of manure as a fertilizer
25	Managing riparian zones and associated edges as wildlife habitat
26	Water quantity trading.
27	Succession Planning
28	more efforts like Green Corp, Earth Teams, Americorp, Extension summer interns, etc
29	Proper nutrient management
30	Grazing management of grazed riparian zones and associated upland, crop residue

Wish Listed (29)

- Verify data integrity, incompleteness impacts
- Could a Round 4 clarify outcomes?
- White Paper targeting extension personnel
- UMN CURA article

Contacts

- David DeMuth, Jr. david.demuth@vcsu.edu
- Gregory Carlson gregory.carlson@vcsu.edu
- Karen Terry: kterry@umn.edu



valley city state university

www.stem.vcsu.edu