

Overview

The following report is authored per the requirements outlined in Section 2 of Legislative Bill 701. LB 701 was passed by the Nebraska Unicameral on April 26, 2007, and signed into law by Governor Dave Heineman on May 1, 2007.

Sections 1 and 2 of LB 701 create the Riparian Vegetation Management Task Force (to be known as the Task Force throughout this report) and charge the Task Force with these activities:

1. Develop and prioritize vegetation management goals and objectives;
2. Analyze the cost-effectiveness of available vegetation treatment; and
3. Develop plans and policies to achieve such goals and objectives.

The legislation also requires the Task Force to make preliminary recommendations to the Governor and the Legislature by December 15, 2008, regarding funding and legislation needed to achieve its goals. The Task Force respectfully submits this report per the above requirement. It represents a summary of discussion during the five Task Force meetings held since December 2007. This is the second report required by LB 701. The first was submitted to Governor Heineman and the Nebraska Unicameral on December 15, 2007. A copy of the 2007 report can be found at www.agr.ne.gov under the Riparian Vegetation Management Task Force button.

The Task Force has been diligent in its work over the past 17 months; however, the group has collectively agreed there is much work yet to be done before it can offer responsible recommendations regarding additional funding and legislation needed for future riparian vegetation management objectives. That said, the information that follows in this report highlights several key issues that could influence future Task Force legislative recommendations.

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History

On May 1, 2007, Governor Dave Heineman signed into law LB 701, comprehensive water legislation that included riparian vegetation management activities originally included in a bill introduced by Senator Tom Carlson, LB 458. With an emergency clause attached, the legislation went into effect immediately. Sections 1 and 2 of the legislation created the Riparian Vegetation Management Task Force and assigned it specific responsibilities. This report reflects the requirements of Sections 1 and 2. Sections 3 and 4 of the legislation created a grant program for management of riparian vegetation, and stated the Legislature's intent to appropriate \$2 million annually for this purpose. A separate report on the grant program is included as an addendum.



Senator Tom Carlson, flanked by Governor Dave Heineman, addresses the audience during the May 1, 2007, signing of LB 701.

Photo Courtesy: Governor's Office

Creation of the Task Force

Governor Dave Heineman appointed the Task Force members on June 21, 2007. Per the legislation, Task Force membership includes:

- One surface water project representative from each river basin determined to be fully appropriated or designated overappropriated, including the Niobrara River Basin, Platte River Basin, and Republican River Basin;
- One representative each from the Department of Agriculture, Department of Environmental Quality, Department of Natural Resources, Office of the Governor, Game and Parks Commission, Office of the State Forester, Nebraska Environmental Trust, and University of Nebraska;
- Two representatives nominated by the Nebraska Association of Resources Districts;
- Two representatives of the Nebraska Weed Control Association;
- One riparian landowner from each of the state's congressional districts; and,
- Any member of the Legislature who chose to serve.

Twenty-three members were named (see chart at right). The members bring a wide range of experience and technical knowledge to assist in accomplishing the goals and objectives outlined by the Task Force. Task Force members also play a vital role in communicating riparian vegetation management issues to the public. Members have actively participated at meetings and tours, and even volunteered additional time to serve on, and in some cases chair, small work groups.

In addition, the Task Force meetings have been attended by other interested parties, such as representatives of the Nebraska Department of Roads and the USDA Natural Resources Conservation Service.

Task Force Members

Kent Aden – Platte River Basin
Jim Miller – Republican River Basin
**Greg Ibach – Department of Agriculture;
Task Force Secretary/Treasurer**
**Mike Linder – Department of Environmental
Quality**
**Brian Dunnigan – Department of Natural
Resources**
**Neil Moseman – Nebraska Department of
Energy (Governor's Office Representative)**
Kirk Nelson – Game and Parks Commission
Scott Josiah – State Forester
**Gloria Erickson – Nebraska Environmental
Trust**
Gary Cunningham – University of Nebraska
**Mike Clements – Nebraska Assoc. of Resources
Districts**
**Ron Bishop – Nebraska Assoc. of Resources
Districts**
**Charles Brooks – Nebraska Weed Control
Assoc.; Task Force Chairperson**
**Russ Shultz – Nebraska Weed Control Assoc.;
Task Force Vice Chairperson**
Mike Arps – First Congressional District
Rich Tesar – Second Congressional District
Mike Sarchet – Third Congressional District
Senator Tom Carlson
Senator Cap Dierks
Senator Deb Fischer
Senator John Harms
Senator Don Preister
Senator Tom Hansen

Per LB 701, the Nebraska Department of Agriculture (NDA) is administratively responsible for the Task Force. NDA received this assignment, in part, due to its experience administering the Noxious Weed Control Act.

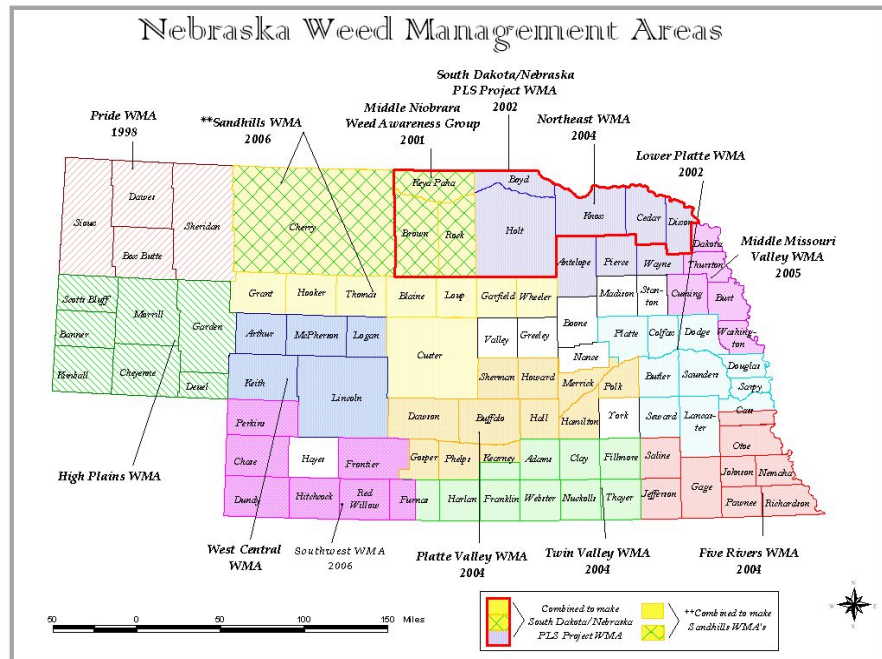
The Act requires that each county employ a weed control superintendent. These individuals work hand-in-hand with NDA staff to monitor for the presence of noxious weeds and manage infestations through proper protocols.

Because of the magnitude of statewide weed management, NDA and county weed control authorities also have worked to develop partnerships. For example, county weed control authorities have organized themselves regionally into 13 weed management areas (WMAs), including almost every county in the state. This type of regional approach aids in more effective surveying and control efforts, and improves the opportunity to leverage grant dollars.

Other partners who have an interest in weed management have been engaged in projects, including key entities like the natural resources districts (NRDs), wildlife and environmental organizations, irrigation districts, University of Nebraska officials, and other state and federal agencies. Landowners also play a key role in any efforts.

While the Task Force collectively has the expertise to develop a solid riparian vegetation management plan, it will take a strong county weed control system, in cooperation with entities like those listed above, to ultimately make the Task Force successful. These entities have the hands-on experience, local knowledge, and appropriate relationships forged to aid in the implementation of the final riparian vegetation management plan.

Weed Management Areas are an example of collaboration to encourage effective surveying and control efforts.



Task Force Activities to Date

Since its formation, the Task Force has met eight times and had five field tours in association with the Task Force meetings.

Meeting dates and locations include:

July 26, 2007 Franklin, Nebraska
October 3, 2007 Lexington, Nebraska
November 14, 2007 Grand Island, Nebraska
January 14, 2008 Lincoln, Nebraska
March 26, 2008 Lincoln, Nebraska
May 6, 2008 Gering, Nebraska
July 24, 2008 Franklin, Nebraska
September 17, 2008 Waterloo, Nebraska

Numerous Work Group meetings have been held on several occasions.

Minutes from all Task Force meetings can be found at www.agr.ne.gov under the Riparian Vegetation Management Task Force button. This web site also includes other important information regarding Task Force activities.



Task Force member Mike Clements (hand in air) explains vegetation control activities on the Republican River. Board members of the Nebraska Environmental Trust participated in this Task Force field tour.

Photo Courtesy: Nebraska Environmental Trust

Legislative Requirements/Goals and Objectives

Per LB 701, the Riparian Vegetation Management Task Force, in consultation with appropriate federal agencies, is charged with:

1. Developing and prioritizing vegetation management goals and objectives;
2. Analyzing the cost-effectiveness of available vegetation treatment; and
3. Developing plans and policies to achieve such goals and objectives. Any plan shall utilize the principles of integrated vegetation management and sound science.

While work on items 2 and 3 is ongoing, Task Force members have adopted vegetation management goals and objectives. Those are:

1. Improve stream flow and riparian health in a manner that:
 - a. Removes streambed vegetation to improve and maintain channel conveyance in fully and overappropriated river basins;
 - b. Manages vegetation in riparian areas to improve and maintain ecosystem health; and
 - c. Does not have negative effects on water quality for recreation, aquatic, and terrestrial life.
2. Maintain riparian health through:
 - a. Cooperative arrangements and education efforts that encourage voluntary landowners participation;
 - b. Federal, state, and local government assistance and incentives; and
 - c. Legislative action as needed.
3. Measure the effectiveness of actions taken through:
 - a. Reporting of increased capacity of the streambed to handle flow;
 - b. Reporting of acres treated and managed in 2007 and 2008;
 - c. Calculation of estimates of water saved by vegetation management; and
 - d. Presentation of pictorial evidence of vegetation removal.

As work continues, the Task Force may determine a necessity to revise these points, but at present, believes this to serve as a solid base from which to develop appropriate plans and policies.

Highlights to Date

Seven work groups were created to aid the Task Force in identifying, and then framing, issues critical to meeting the goals and objectives. It was determined that work groups could solicit information from, and include in discussions, experts who are not Task Force members. Any final decisions, however, will be made solely by the Task Force.

Each work group has met on several occasions. These groups have highlighted several points that may very well figure into future policy development. These work groups continue to meet, gather information, and make recommendations to the Task Force.

In addition to issues highlighted by the work groups, a number of key points also already have been discussed as part of general dialogue during full Task Force meetings. Included below are a few of these important issues. Much work is yet to follow.

1. The Vegetation Management and Treatment Work Group continue to address the importance of, and difficulty of, framing a plan of attack on invasive riparian vegetation. The Task Force will need to determine which invasive species are addressed first, and while phragmites, saltcedar, and Russian olive have received a great deal of publicity to date, other species, such as purple loosestrife, may be important, depending on location. Equally important is determining how and in what order to address these invasive species. A best management plan may be needed, and Work Group members agreed research is needed to develop such a plan.

The Task Force members, at the March 2008 meeting, supported a proposal by the Work Group to study various vegetation treatment methods, including chemical, mechanical, and biological, for their long-term effectiveness. Work Group members have partnered with appropriate researchers at the University of Nebraska – Lincoln for this integrated weed management applied research project. The treatment study will take place over four years. The Work Group received an Environmental Trust Fund grant for the first year of activities and is seeking additional funding for years two through four. The treatment study will focus on:

- Optimizing strategies for managing riparian invasive plant species over a range of growing conditions and to provide knowledge on how to adapt control methods to different ecosystems;
- Reducing the risks associated with invasive plant species competition with native plants and potentially reduce the loss of wildlife habitat;
- Determining the relationship between the land management practices and various control methods to improve acceptance of integrated weed management; and
- Strengthening involvement of several disciplines at the university, state, federal, county and private sector levels.

Project activities were initiated this summer in three locations on the Platte River between Brady and Kearney with herbicide, disking and mowing being done. Preliminary results from herbicide treatments showed 65% or better control. Control

is expected to improve with more time for chemical translocation through the plant. Disking was rated to be about 75% effective, which was expected, since it is an aggressive control method with noticeable decrease in plant populations. Re-growth is limited, but occurring. Mowing had the least amount of initial effectiveness, with a rating of 50% control. This was expected, and re-growth is more than half of the existing height of untreated populations. In all of the above, plant flowering was delayed in the test plots compared to the control plots.

Late season treatments were applied at all sites in September 2008, and monitoring of the effectiveness of various treatments is ongoing. An analysis of the results for 2008 treatments is scheduled for completion in early 2009.

2. The Streambed Ownership Work Group continues to discuss the need for clear designation of ownership within the streambed, a point which is not clearly addressed within Nebraska law, and which is handled differently in various counties for tax purposes. The ownership issue takes on increased importance as the Task Force reviews potential treatment strategies and discusses whose responsibility it may be to conduct the treatment and then maintain the streambed/riparian areas following the activity.

The Task Force has talked a number of times about the importance of maintaining any riparian improvements so Nebraska does not find itself in a similar situation of streambed and riparian overgrowth a decade from now. No decision has been reached regarding whether this should be a landowner responsibility, a state responsibility, or some mixture of the two. However, the group feels emphasis needs to be placed on this issue to ensure the fiscal soundness of any state funds invested in riparian cleanup.

Streambed Ownership Work Group Survey of 22 Platte River Counties	
Does county have up-to-date streambed cadastral maps?	6 of 19 counties have up-to-date streambed cadastral maps; 3 of 16 counties have up-to-date accretion maps
Does county assess value and levy taxes on streambed?	17 of 19 counties tax accretion; 8 of 19 counties tax streambed
Can county provide 5-year updates on these maps?	3 of 16 counties indicated they could provide updates
Is county currently updating cadastral maps?	7 of 22 counties have or are in the process of updating streambed cadastral maps

To gain a better understanding of the issue of streambed ownership, the Work Group surveyed 22 Platte River counties regarding the matter. The survey concluded cadastral maps of the streambed are not current in most counties so ownership of these areas is questionable, making it difficult to assign responsibility for streambed vegetation management. In Nebraska, ownership is assigned to the thread of the stream, which is capable of moving regularly, thereby creating additional management problems. Some counties do not tax or assess a value to the

streambed; however, officials are starting to realize that these riparian areas are being developed and do have a value.

Based on the survey results, the Work Group has proposed additional actions, including: (1) determine county current status of cadastral information on the Platte River streambed and any planned actions to make this information available; (2) outline what is needed to make cadastral information available on all streambeds in the state; and (3) outline legislation needed to provide a clear understanding of permanent boundaries in streambeds.

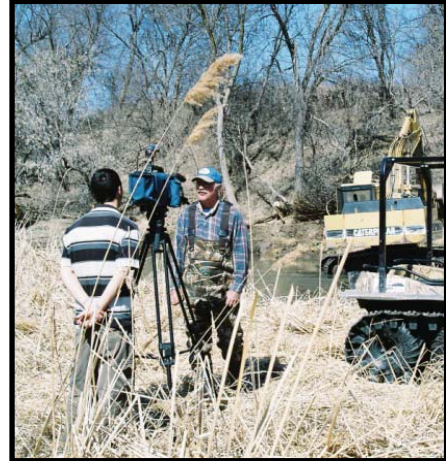
The Work Group moved ahead with addressing these proposed actions by scheduling time on the agenda of the Nebraska Association of County Officials (NACO) annual meeting for discussion of streambed ownership. The Work Group plans additional educational outreach as they further evaluate the need for legislative action and develop recommendations for streambed management responsibilities.

As they continue their research efforts, the Work Group has offered suggestions for streambed ownership issues, including: (1) the recommendation that county assessors use existing cadastral maps until updated ones become available; (2) the recommendation that a Streambed Cadastral Mapping Program be created to assist counties; and (3) regarding permanent boundaries for establishing land ownership and for taxing purposes, the recommendation that a geographic centerline be used. Legislation may be needed to establish it for ownership purposes.

The Work Group intends to research options for assigning responsibility for streambed vegetation management.

3. The Education and Awareness Work Group continues to discuss the value of sharing information about successful riparian vegetation management activities with the general public and landowners, and has encouraged entities involved with LB 701 grant projects to pursue opportunities to educate through the media and in direct contact settings. The Work Group maintains its emphasis on outreach to riparian landowners, as satisfied landowners are the best spokespersons for implementation and maintenance of vegetation management.

Landowner outreach has been modeled through both the Nine Mile Creek project and the Eastern Republican Riparian Improvement Project. The groups responsible for these projects conducted aggressive landowner education and outreach campaigns. It is hoped that this successful model can be duplicated in other riparian areas as programs and plans are made in the future.



A reporter from KHAS-TV interviews Project Coordinator Merle Illian, on location during debris removal on the Republican River.

Photo Courtesy: Nebraska Department of Agriculture

The Work Group acknowledges that the leaders of the LB 701 grant projects to date have provided valuable and timely public awareness within the project areas. These activities have continued to strengthen the goals and objectives of the Task Force.

The Task Force has discussed the importance of involving the media in message distribution. While it is key to deliver success stories in areas that will be directly impacted by riparian improvement projects, it may be equally important to share the message with greater Nebraska so there can be an understanding of why this issue is important to the state as a whole.

Numerous print and radio outlets have provided coverage of LB 701 grant projects and Task Force activities throughout the project areas and across the state. It is difficult to measure the effectiveness of media coverage to date. However, Task Force members continue to comment on the positive coverage that has taken place and have discussed the need for more education and awareness for the public outside of the current grant project areas, as the Task Force believes all citizens of Nebraska can and will benefit from these efforts. The Work Group has applied to the Nebraska Environmental Trust for grant dollars to enhance public awareness across the state regarding riparian vegetation management.

The Work Group also has discussed ongoing educational opportunities that could come in partnership with other entities interested in broader invasive species issues. Several entities are considering the formation of a unified invasive species management organization, and the Work Group has talked with some of these entities regarding possible future activities and collaboration in order to gain efficiencies and avoid redundancy. Discussions in this area are ongoing.

4. The Survey and Monitoring Work Group continues discussion about how the identification of infestation location, composition, and extent, will critically impact other segments of the Task Force because survey information may be used to help prioritize future funding of vegetation control efforts. However, before this can happen, vegetation surveys and documentation of vegetation control efforts would need to be catalogued and integrated. Georeferencing vegetation control locations using global positioning (GPS) technology was identified as a potential component of any future funding criteria, not only for accountability, but for future quality assessment.

Various weed control entities already are surveying and monitoring invasive weeds, including weeds in riparian zones. These groups include Natural Resources Districts, the county weed authorities, the Weed Management Areas, University of Nebraska researchers, and/or private nonprofit natural resources organizations. The Survey and Monitoring Work Group discussed the importance of contacting these entities to review their existing information and make a determination regarding the quality and extent of the data. Survey and monitoring protocols could possibly be established and serve as a potential requirement for receiving state funding for future control efforts.

This work group will have a number of questions to consider as discussions continue, including to what scale should riparian weeds be surveyed and monitored, and how often do surveys need repeating.

Remote sensing is able to show different types of plants through different visual “signatures” on infrared aerial photos. This mapping has advantages, such as the ability to show information that is comprehensive over an area, the ability to gather data from areas that aren’t easily accessible on the ground, and over successive years, it can show the spread of plants or effectiveness of treatment. It also allows for more accurate measuring of infested areas, meaning better estimates for cost of treatment. There are limitations, including that a patch must be at least three square meters to be detectable, and that the cost of infrared photography can be somewhat expensive.

Task Force members talked about various remote sensing mapping projects that currently are being conducted. The U.S. Fish and Wildlife Service is doing some work in the Platte River critical habitat areas, and some surveying has been conducted on the Republican River.

The Work Group has applied for a Nebraska Environmental Trust grant to incorporate remote sensing and survey on fully and overappropriated river systems.

- Perhaps the issue that has received the most discussion to date is the potential for quantifying water savings associated with riparian vegetation management. The Task Force has arrived at a discussion of this point several times.

The grant portion of the law directs that funding shall be awarded for activities that have as their primary objective the improvement of conveyance of streamflow. Even though the legislation places an emphasis on conveyance, the Task Force has discussed water usage by riparian vegetation and whether, or to what extent, vegetative water use can be determined to affect that streamflow. This is a primary question that will be considered by the Vegetation Water Use Work Group. The group already is taking a comprehensive look at existing and ongoing research that may help answer this question. To that point, several

Table 4-1. Ranges of published values of annual consumptive use of water by common riparian and wetland vegetation as compiled by Johns (1989). Ranges of values of annual consumptive use for Phragmites calculated from published rates in Burba (1999) and Cummings (2007).

Common Name	Range of Annual Consumptive Use (inches)	Number of Studies	Study Locations	Methods
Arrowweed	96	1	AZ	Tank
Cattail	35-198	7	AZ, CA, CO, MI, MN, NM, UT	Tank, Water Balance
Cottonwood	39.3-92.7	7	AZ, CA, CO, KS, NM, Saskatchewan	Tank, Diurnal Fluctuation, Gravimetric, Water Balance
Bermuda Grass	28.8-73	1	CA	Tank, Water Balance
Phragmites	7.2-30.71	2	NE	Lysimeter, Energy Balance, Leaf Porometer
Salt Grass	6.2-48.8	11	CA, CO, NM, NV, UT, WA	Tank, Water Balance, Lysimeter, Diurnal Fluctuation
Rush	20.8-86.6	5	CA, CO, MI, Saskatchewan	Tank, Water Balance, Diurnal Fluctuation
Russian Olive	18.6-114.6	1	NM	Lysimeter
Saltcedar (Tamarisk)	11.8-86	16	AZ, CA, CO, KS, NM, NV, UT, WA	Tank, ET Tent, Lysimeter, Water Balance, Leaf Area Model, Energy Balance, Gravimetric
Willow	13.2-47.8	8	CA, KS, NM, NV, UT, WA, Saskatchewan	Tank, Water Balance, Diurnal Fluctuation, Gravimetric - Portable Chamber
Riparian Woodland	13.2-22.4	4	AZ	Water Balance

This chart catalogues research done on consumptive water use of riparian vegetation. It is included within a report prepared by the Nebraska Department of Natural Resources for the Task Force titled, Assessment of Resources Available to Quantify Non-beneficial Consumptive Water Use by Riparian Vegetation in Nebraska.

researchers from the University of Nebraska -Lincoln have shared with the Task Force work they are doing related to invasive riparian vegetation. Information shared included:

- A research project designed to look at the “Impacts of Riparian Vegetation on Water Quantity, Quality, and Stream Ecology” in the Republican River basin. The project has three main objectives: (1) measure evapotranspiration (ET) rates along a transect of the Republican River before and after exotic vegetation removal; (2) estimate ET savings of vegetation removal using a regional water balance model; and (3) determine how riparian vegetation removal affects water quality, stream function, and channel morphology.
- A research project designed to look at “Water Use of Invasive Species” in the Republican River basin. The primary components of this project are to: (1) measure baseline ET from riparian grasslands; (2) measure ET of Russian olive; (3) measure ET of red cedar; (4) measure ET of riparian systems using remote sensing; (5) integrate these measurements with physically based models; (6) survey species composition across the basin; and (7) measure ET across the basin. This project has four sites, including two near Benkelman, one near Bartley, and one near Franklin.
- A research project to calculate plant transpiration, which is a component of ET, using the sap flow method. The outcome of this research will be to quantify water consumption in riparian invasive species at different developmental stages. Three species will be studied as a part of the research: cottonwood, red cedar, and Russian olive.
- A research project designed to look at satellite remote sensing-based estimation of land surface ET. The objectives of this project are to: (1) quantify spatial distribution and seasonal variation of ET in Nebraska; and (2) modify remote sensing energy balance models for improved prediction of daily and seasonal ET.

Through existing work, it has been determined that several challenges need to be addressed, including calibration of the models against measurements over dry-land and irrigated conditions, testing sub-models to estimate things like soil heat flux under various agro-meteorological conditions, and scaling methods to extrapolate instantaneous ET to daily and seasonal ET.

Several conclusions have been reached, including that land surface energy balance models can be a viable tool for quantifying daily and seasonal ET at a regional scale, and that beyond quantification, there is another level of analysis necessary to describe the relative effects on the water balance at any location and on streamflow.

The Nebraska Department of Natural Resources has prepared a report for the Task Force titled, *Assessment of Resources Available to Quantify Non-beneficial Consumptive Water Use by Riparian Vegetation in Nebraska*. This report is available for review at www.dnr.ne.gov/docs/studiesandresearch.html. The Task Force had not discussed the report as of this writing.

Regardless of water savings associated with vegetation removal, the Task Force has noted a number of times the other important benefits of riparian vegetation management, including flood control issues, recreation improvement, terrestrial and aquatic habitat improvement, and conveyance of stream flow, particularly in basins that are subject to an interstate compact or decree.

Next Steps

The Task Force is set to meet next on Monday, January 6, 2009, at the Nebraska Department of Agriculture.

On the agenda for that meeting will be Task Force member Senator Tom Carlson. He has indicated he plans to introduce legislation during the 2009 Unicameral session to extend the Riparian Vegetation Management Grant Program portion of LB 701, with possible funding for an additional two years.

Senator Carlson already has begun to publicly frame the discussion regarding the value of investing additional funding into the LB 701 riparian vegetation grant program. At a meeting of the Nebraska Water Resources Association in late November, he presented a report that included estimates of the water saved within the Republican River streambed due to the LB 701 vegetation control work in the 2007-2008 fiscal year. He figured removal of phragmites and invasive woody vegetation saved, conservatively, 46,760 acre feet of water, at a cost of \$1.2 million, for a per acre foot of water cost of \$27. By comparison, the State of Nebraska in 2007 purchased 32,000 acre feet of surface water from irrigators at a cost of \$10 million, for a per acre foot of water cost of \$312.

To arrive at his calculations, Senator Carlson took into consideration measurements from a study conducted by Anne Cummings at the University of Nebraska – Kearney in 2007. He adjusted her study data to reflect higher phragmites plant population and 180 growing days, and the water savings he arrived at with these changes was between 35,000 acre feet and 105,000 acre feet. Senator Carlson's full Power Point report further details how he arrived at his calculations. It can be viewed on the Riparian Task Force website at www.agr.ne.gov under the blue Riparian Task Force button.

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