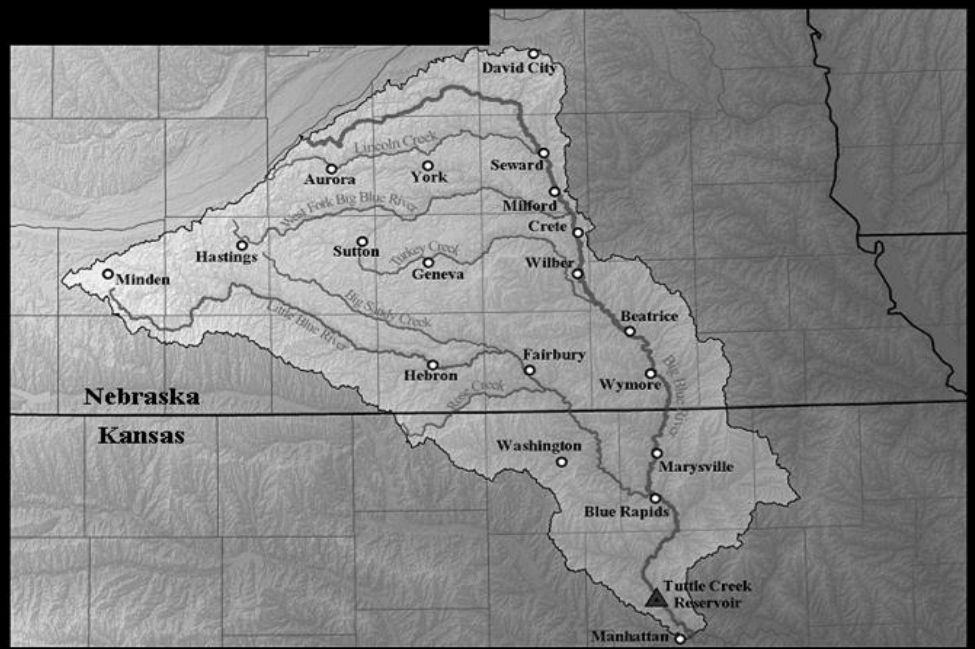


# KANSAS-NEBRASKA BIG BLUE RIVER COMPACT

## FORTY FOURTH ANNUAL REPORT



FISCAL 2017

York, NE  
May 17, 2017



KANSAS – NEBRASKA BIG BLUE RIVER  
COMPACT ADMINISTRATION

May 24, 2018

The Honorable Donald J. Trump  
President of the United States of America

The Honorable Jeff Colyer, M.D.  
Governor of Kansas

The Honorable Pete Ricketts  
Governor of Nebraska

Pursuant to Article VIII, Section 1 of the Rules and Regulations of the Kansas-Nebraska Big Blue River Compact Administration, I submit the Forty-Fourth Annual Report. The report covers the activities of the Administration of the Compact for the Fiscal Year 2017 while I was the presiding Federal Chairman.

Respectfully,



W. Don Nelson  
Federal Compact Chair





## Table of Contents

Announcement letter of the 44th Annual Meeting	6
Agenda of the 44th Annual Meeting	8
Minutes of the 43rd Annual Meeting	9
Kansas State Report	16
Report of the Topeka, KS Field Office	19
Nebraska State Report	29
Nebraska Water Administration Report	34
Lower Big Blue NRD Report	36
Upper Big Blue NRD Report	51
Upper Big Blue NRD map (online only)	68
Upper Big Blue NRD Operation Conservation	70
Little Big Blue NRD	76
Treasurer / Budget Report	82
USGS Report	86
Engineering Committee Report	102
Water Quality Committee Report, Nebraska	108
Water Quality Committee Report, Kansas	116
Water Quality Committee Report, Wraps, Kansas	127

# NEBRASKA

Good Life. Great Water.

## DEPT. OF NATURAL RESOURCES

April 7, 2017

W. Don Nelson, Federal Chairman  
Kansas-Nebraska BBRCA  
2430 S. Canterbury Lane  
Lincoln, NE 68512

David W. Barfield, KS Commissioner  
Kansas-Nebraska BBRCA  
1320 Research Drive, 3<sup>rd</sup> Floor  
Manhattan, KS 66502



Pete Ricketts, Governor

Sharon Schwartz, Kansas Advisor  
Kansas-Nebraska BBRCA  
2051 20<sup>th</sup> Road  
Washington, KS 66968

Larry Moore, Nebraska Advisor  
Kansas-Nebraska BBRCA  
2240 A Road  
Ulysses, NE 68669

Dear Compact Members:

The 2017 annual meeting of the Kansas-Nebraska Big Blue River Compact Administration will be hosted by Nebraska on Wednesday, May 17, 2017, at 9:00 a.m. The meeting will be held at the Upper Big Blue NRD, located at 319 E 25<sup>th</sup> Street in York, NE.

A tentative agenda is enclosed with this meeting notice.

Sincerely,

Gordon W. "Jeff" Fassett  
NE Commissioner

Enclosures or Attachments (1)

cc: Budget Committee – Amy Zoller, Chris Beightel  
Legal Committee – LeRoy Sievers, Robert Large  
Engineering Committee – Jeremy Gehle, Chris Beightel, Katie Tietsort  
Water Quality Committee – Tom Stiles, Annette Kovar, Craig Romary, Dan Howell,  
Marty Link  
NRDs – Michael Onnen, David Clabaugh, David Eigenberg, John Thorburn  
Add'l – Jim Macy, Jason Lambrecht

Gordon W. "Jeff" Fassett, P.E., Director

### Department of Natural Resources

301 Centennial Mall South  
P.O. Box 94676  
Lincoln, Nebraska 68509

OFFICE 402-471-2363  
FAX 402-471-2900

[dnr.nebraska.gov](http://dnr.nebraska.gov)



# **Kansas-Nebraska Big Blue River Compact Administration**

## **44<sup>th</sup> Annual Meeting**

**May 17<sup>th</sup>, 2017**

9:00 a.m.

Upper Big Blue NRD

319 E 25<sup>th</sup> Street

York, NE

### **AGENDA**

1. Call to Order
2. Introductions and Announcements
3. Minutes and Report of the 43<sup>rd</sup> Annual Meeting
4. Chairman's Report
5. Kansas Report
  - a. State Overview
  - b. Topeka Field Office Report
6. Nebraska Report
  - a. State Overview
  - b. Water Administration Report
  - c. NRDs Reports
7. Secretary's Report
8. Treasurer and Budget Report
9. United States Geologic Report
10. Legal Committee Report
11. Engineering Committee Report
12. Water Quality Report
13. Old Business
14. New Business
15. Committee Membership and Special Assignments
16. Adjourn

**MINUTES OF THE 44<sup>th</sup> ANNUAL MEETING  
OF THE  
KANSAS-NEBRASKA BIG BLUE RIVER COMPACT ADMINISTRATION**

**Call to Order**

The Forty-Fourth annual meeting of the Kansas-Nebraska Big Blue River Compact Administration was held on May 17, 2017 at the Upper Big Blue NRD office in York, NE. The meeting was called to order at 9:07 a.m. by Compact Chair, W. Don Nelson.

Mr. Nelson introduced himself and suggested that those in attendance introduce themselves.

**Introductions**

Those in attendance were:

W. Don Nelson	Compact Chairman
Chris Beightel	Kansas Department of Agriculture, Division of Water Resources, Secretary
David Barfield	Chief Engineer, Kansas Department of Agriculture, Division of Water Resources, Kansas Compact Commissioner
Jesse Bradley (Alternate)	Nebraska Department of Natural Resources, Nebraska Compact Commissioner
Amy Zoller	Nebraska Department of Natural Resources, Treasurer
Jeremy Gehle	Nebraska Department of Natural Resources, Chairmen Engineering Committee
LeRoy Sievers	Nebraska Department of Natural Resources, Legal Counsel
Kenneth Titus	Chief Counsel for Kansas Department of Agriculture
Larry Moore	Nebraska Compact Advisor
Scott Snell	Upper Big Blue Natural Resources, Public Relations Manager
John Miller	Upper Big Blue Natural Resources, Director
David Eigenberg	Upper Big Blue Natural Resources, General Manager
Rod DeBuhr	Upper Big Blue Natural Resources, Assistant General Manager
Jack Wergin	Upper Big Blue Natural Resources, Project Manager
Doug Bruns	Upper Big Blue Natural Resources
Merlin Vokmer	Upper Big Blue Natural Resources
Jim Ostdiek	Nebraska Department of Natural Resources
Trevor Flynn	Kansas Department of Health and Environment
Katie Tietsort	Topeka Field Office Water Commissioner, Kansas Department of Agriculture, Division of Water Resources
Steve Peterson	United States Geological Survey, Studies Section
Mike Onnen	Little Blue Natural Resources District, General Manager
Dave Clabaugh	Lower Big Blue Natural Resources District, General Manager
Elise Jarrett	Nebraska Department of Natural Resources
Eric Connor	Nebraska Department of Natural Resources, Legal Intern
Craig Romary	Nebraska Department of Agriculture, Environmental Specialist
Ryan Chapman	Nebraska Department of Environmental Quality
Marty Link	Nebraska Department of Environmental Quality

## **Approval of the Minutes of the 43<sup>rd</sup> Annual Meeting**

Secretary Chris Beightel gave a report on the minutes for the 43<sup>rd</sup> annual meeting. Last year's meeting was recorded and minutes were drafted. Kansas collaborated with the state of Nebraska to complete a final version of the minutes. Kansas prepared three print versions, which the commissioners signed to take back with them. The signature pages will be scanned and placed online. There was no notable cost associated with printing this year. So, during the budget discussion later we will want to address this. Mr. Barfield moved that the minutes for the 43<sup>rd</sup> annual meeting be approved. The motion was seconded and passed.

## **Chair's Report**

Chair Nelson indicated that he did not have a specific report as things this past year ran smoothly and as anticipated. Moreover, neither Chair Nelson nor any Kansas representative received any suggestions to change the draft agenda.

## **Kansas Report**

### **State Overview Report**

David Barfield started the Kansas report (Attachment A). He reported on statewide activities and what was going on legislatively and some of the more significant issues around the state. The Kansas Legislature is still in session working on budget issues, but the session was light on water issues. Two bills pertaining to water did pass during this session. Senate Bill 46 addressed two separate provisions: Impairment, and Water Conservation Areas. House Bill 2312 clarified procedures related to certain administrative hearings conducted by the chief engineer. Kansas also continues to develop and amend regulations.

Local Enhanced Management Areas (LEMAs) and Water Conservation Areas (WCAs) are tools that are initiated differently but both help with managing the loss of groundwater resources. David Barfield discussed the differences between the tools, how they are implemented, and the recent example of both tools within the state.

The Quivira National Wildlife Refuge submitted an impairment complaint to Kansas Department of Agriculture / Division of Water (KDA/DWR) in 2013 and all parties involved are still working to resolve the impairment.

Mr. Barfield also indicated that last year he reported on the Hays water transfer project, and the project is still in process.

Mr. Barfield also reported on the City of Wichita's Aquifer Storage and Recovery (ASR) project. It was originally envisioned as a supplemental source of water for the city, but has been repurposed for use during a long-term drought.

### **Topeka Field Office Report**

The climate and water administration report for Kansas was presented by Katie Tietsort, Water Commissioner at the Topeka Field Office, who provided a handout (Attachment B). Kansas got between 25 to 40 inches of precipitation in calendar year 2016. Temperatures for the calendar year 2016 remained warmer than normal by about 2-4 degrees. There was no minimum desirable streamflow (MDS) administration in Blue River basin in Kansas last year.

Ms. Tietsort then provided an explanation for the compliance and enforcement regulations that continue to be a focus. The Kansas Department of Agriculture has been working to change its structure of penalties.

Included in her report were that 28 new applications were received in the BBRC basin.

Ms. Tietsort also stated that her office had completed sending out meter orders state-wide.

Her report on the Tuttle Creek Reservoir stated that the lake level management plan has stayed the same.

Ms. Tietsort was asked if surface water rights were still available in the basin. Ms. Tietsort answered that surface water permits are still available under certain conditions, the main one being that any new use cannot impair an existing use. Tributary basins – the Little Blue, Mill Creek and all the tributaries – are restricted streams where direct diversion from the stream from July 1 thru September, during peak season, is not allowed. Ms. Tietsort noted that Kansas has four open basins in the state, the Blue is one of them. Most of the state is closed or restricted. The Big Blue, the Kansas River, the Missouri, and Spring River are open to new surface water appropriations, but all remaining stream systems are fully closed or restricted.

David Barfield wrapped up by revisiting the matrix that prescribes the civil penalties that are available to the chief engineer to deal with Kansas water users who violate the terms and conditions of their permits to use water. Mr. Barfield reported that the penalties were supported and encouraged by the water user community who wants all water users to be responsible and held accountable. Mr. Barfield noted that the water penalty – losing the ability to use water for one or more years – is a more effective deterrent than the monetary fines included in the matrix.

Mr. Barfield was asked if KDA/DWR could issue the civil penalties themselves or if they had to go through a court. Mr. Barfield answered that KDA/DWR issues the penalties.

## **Nebraska Report**

### **State Overview Report**

Jesse Bradley welcomed the Kansas delegation, and thanked the Upper Big Blue NRD for hosting. A handout of the Nebraska State report was provided (Attachment C). The water supply for the past year was highly variable throughout. Last year, Nebraska reached a new milestone with all 23 natural resources districts participating with the Nebraska Department of Natural Resources through integrated water management plans.

In statewide management activities there is basin-wide water planning throughout the state in four main basins, the Republican, Upper and Lower Platte, and Niobrara Basins.

Similar to Kansas, Nebraska's legislature has been battling with budget issues as well. In addition to budget related issues, two bills relating to water resources were introduced and passed, LB154 changed provisions relating to certain dam filing fees and LB176 eliminated obsolete provisions related to milldams.

The Nebraska Water Sustainability Fund was established in 2014 and 11 applications were approved for funding in the second round of applications approved by the Nebraska Natural Resources Commission. Two projects are in the Little Blue River Basin.

Mr. Bradley again thanked Kansas for their continuing partnership and introduced Jim Ost diek to report on Nebraska Water Administration.

## Nebraska Water Administration Report

Mr. Ostdiek reported this was his first year at the Lincoln field office so did not have much in the way of history. As Mr. Bradley had indicated, the year was variable in precipitation and thus quite in the way of administration (Attachment D).

## Lower Big Blue Natural Resource District (NRD) Report

Dave Clabaugh presented slides for the Lower Big Blue NRD (Attachment E). He indicated that water levels declined in two of three counties measured. Overall levels are on the increase since the drought of 2012.

The number of permits being issued have decreased since 2012. The application process was revamped in 2014 through their Groundwater Management Plan. In the Plan, a scoring system was adopted for new well permits. It essentially put a moratorium on parts of the district that had pretty marginal water. A point system was used based on the aquifer system, depth of water and other qualifiers.

In the past year a monitoring program of 40 dedicated wells was put in using environmental trust monies.

Mr. Clabaugh also discussed certified acres and the increasing number of chemigation permits in the district. Nitrogen seems to be the most popular nutrient applied to the fields through chemigation. Mr. Clabaugh also discussed water sampling, well decommissioning, and blue-green algae. He reported that the Environmental Protection Agency is proposing to reduce the limits of microsystems from 20 to 4, which will essentially close a lot of public beaches across Nebraska. A couple of projects the natural resources district is helping with are the Wilber Reservoir and Cub Creek Rec Area. Storm shelter installation at Willard Meyer, Big Indian Rec Areas, and some residential areas. Flooding cleanup from 2015 continues. The NRD is in the final phase of the Lower Turkey Creek project. It was the last major watershed in the district that did not have any flood control in it.

David Barfield asked how rural water fits with the NRDs' responsibilities and authorities? The NRDs are the only ones who can sponsor them now. Existing ones are still their own entities but new ones are sponsored by the NRD.

Katie Tietsort asked about chemigation permitting and if the NRD did the whole inspection also. Mr. Clabaugh answered, yes, and each district sets them up a little differently.

## Upper Big Blue NRD Report

Scott Snell provided handouts for his report (Attachments F, G, H). The average groundwater level change is down half a foot, which places the district 3.02 feet above the allocation trigger. He included information about withdrawal for irrigation, well drilling activities, and certified irrigated acres in the district. Mr. Snell noted that nitrate is still a groundwater quality concern in the district.

He briefly touched on the district's municipal water quality assistance program and how it can assist communities through cost-share, paying 25% of drilling to move away from high-nitrate locations, and to implement other improvements to municipal water systems to eliminate high nitrate wells.

Continuing on he included in his report information on the district's private dams program, a pilot program on variable rate irrigation, Project GROW where cover and rotational food crops will create soil health and sustain water quality free from pesticides, herbicides, and over fertilization/irrigation.



## Little Blue River NRD Report

Mike Onnen presented his report for the Little Blue NRD and provided handouts (Attachment I). He discussed the district's watershed management plan and integrated water management planning.

Groundwater levels in the district are down about one foot from last year. Mr. Onnen provided information on district groundwater management activities including permits, certification of irrigated acres and uses, as well as flow meters. Pumping reports have been compiled and added to the historical summary.

Water quality was touched on as part of the report. Another objective of the Watershed Management Plan was the addition of additional stream gages on the Little Blue River.

Mr. Onnen indicated the district has had a moratorium in the Little Blue for new hookups on the rural water project, since 2012. The district has a study going on with the City of Fairbury, their supplier, to consider allowing more hookups.

Mr. Onnen also noted that the use of chemigation in the district continues to grow.

## Secretary's Report

Chris Beightel provided a brief secretary's report. Last year went well working with Melissa Mosier and Elise Jarrett in creating the annual report and unless decided otherwise the same process will be performed for this year's report. Mr. Beightel posed a question to the group about including all the provided reports within the printed report. In addition, there used to be budget for printing of the annual report, last year the process moved to only printing a small number and providing the report online. After a brief discussion it was determined that the individual reports were wanted but certain items were going to be left up to the secretary's discretion.

## Treasurer and Budget Report

Amy Zoller provided the treasurer report (Attachment J). The report contained budget tracking from FY 15-16 to a projected FY 18-19, a report as of year-end May 2017, and a budget analysis.

Chris Beightel recommended that the printing budget line item be reduced to \$200.

David Barfield moved to adjust the printing budget from \$450 to \$200 and approve the budget. Seconded and approved.

## United States Geological Survey (USGS) Report

Steve Peterson presented the USGS report (Attachment K). Jason Lambrecht was involved in a training and was unable to attend the compact meeting. Stream gage data for Barneston and Hollenberg was presented.

Through a congressional mandate, the USGS does water availability assessments of principal aquifers around the nation from time to time. This information gets reported to Congress for status of the nation's water availability. This is also meant to be a jumping off point for local stakeholders and water resources managers. The USGS has worked on one for the Northern High Plains aquifer, including the Upper Big Blue and most of the Little Blue River Basins in Nebraska, including groundwater models.

## Legal Committee Report

There was no report submitted.

**Engineering Committee Report**

Jeremy Gehle provided a handout for the engineering committee report (Attachment L).

**Water Quality Report**

Marty Link presented the Nebraska water quality report (Attachment M). Foam was reported in some of the eastern and Southeast Nebraska rivers and streams. Water quality assessments were unchanged from 2016. The Nebraska Department of Environmental Quality administers the Beachwatch program at 53 beaches and 50 lakes across the state to warn against toxins in the water.

Trevor Flynn presented the Kansas water quality report (Attachment N). He reported on total maximum daily loads (TMDLs), de-listings, and atrazine data. Mr. Flynn also provided a handout on the Tuttle Creek WRAPs Plan and update summary (Attachment O). Kansas has a sign-based system in place to deal with any toxins in the water. The Kansas Department of Health and the Environment noted there have been 57 lakes affected since 2011.

**Old Business**

All old business has been covered throughout the course of the meeting.

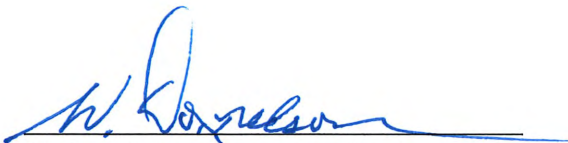
**New Business**

There was no new business to be addressed.

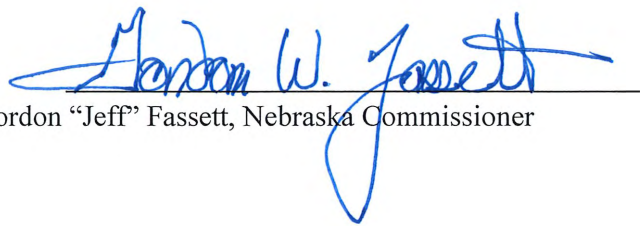
**Committee Membership and Special Assignments**

There are no changes to the existing assignments.

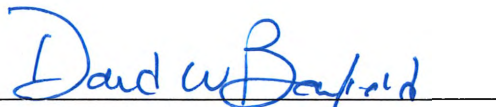
It was moved to adjourn, and seconded. Meeting adjourned at 12:00 pm.



W. Don Nelson, Compact Chair



Gordon "Jeff" Fassett, Nebraska Commissioner



David W. Barfield, Kansas Commissioner

# **Attachment A**

**Report of the Kansas Commissioner  
to the  
BIG BLUE RIVER COMP ACT ADMINISTRATION**

**2017 Annual Meeting  
York, Kansas  
May 17, 2017**

**1. Legislation:** Our legislature remains in session, principally working through issues related to taxation and budget. It was a relatively light session related to water issues.

Senate Bill 46 addressed two separate provisions:

- **Impairment** – Under the Kansas Water Appropriation Act, there are two avenues for seeking relief if you believe your water is being impaired by a junior appropriator: the chief engineer or District Court. The bill requires you first exhausting the remedies available under K.S.A. 82a-717a, i.e. the chief engineer, before you can seek relief in District Court.
- **Water Conservation Areas (WCAs)**– the bill amended statutory provisions passed in 2015 to allow a water right owner or group of water right owners to develop and implement approved management plans with the consent of the chief engineer, to reduce water withdrawals while maintaining economic value via water right flexibility. This year’s amendment extends where WCAs are allowed to include all areas closed to new appropriations and allows WCA orders to provide certain flexibilities without the need for term permits.

House Bill 2312 clarified procedures related to certain **administrative hearings** conducted by the chief engineer.

**2. Regulations:** We continue to develop new and amended regulations, many of them responsive to what we have been hearing in the water vision process. Hearings on regulations currently under consideration include:

- Amendments to K.A.R 5-14-10 and 5-14-12 related to civil penalties for pumping more water than authorized.
- Amendments to K.A.R. 5-14-11 regarding civil fines for non-reporting of wateruse.
- Amendments to K.A.R. 5-5-9, 5-5-10 and 5-5-16 on consumptive use in conversions from irrigation to another use.

**3. Water management activities**

- **Interstate matters – Republican River** – After more than 2 years of intense activity, including monthly face-to-face meetings and six interim agreements, last summer the states of Colorado, Kansas, and Nebraska, adopted long-term agreements to resolve separate disputes that arise as Colorado and Nebraska work to implement measures to insure their compliance with the Compact.

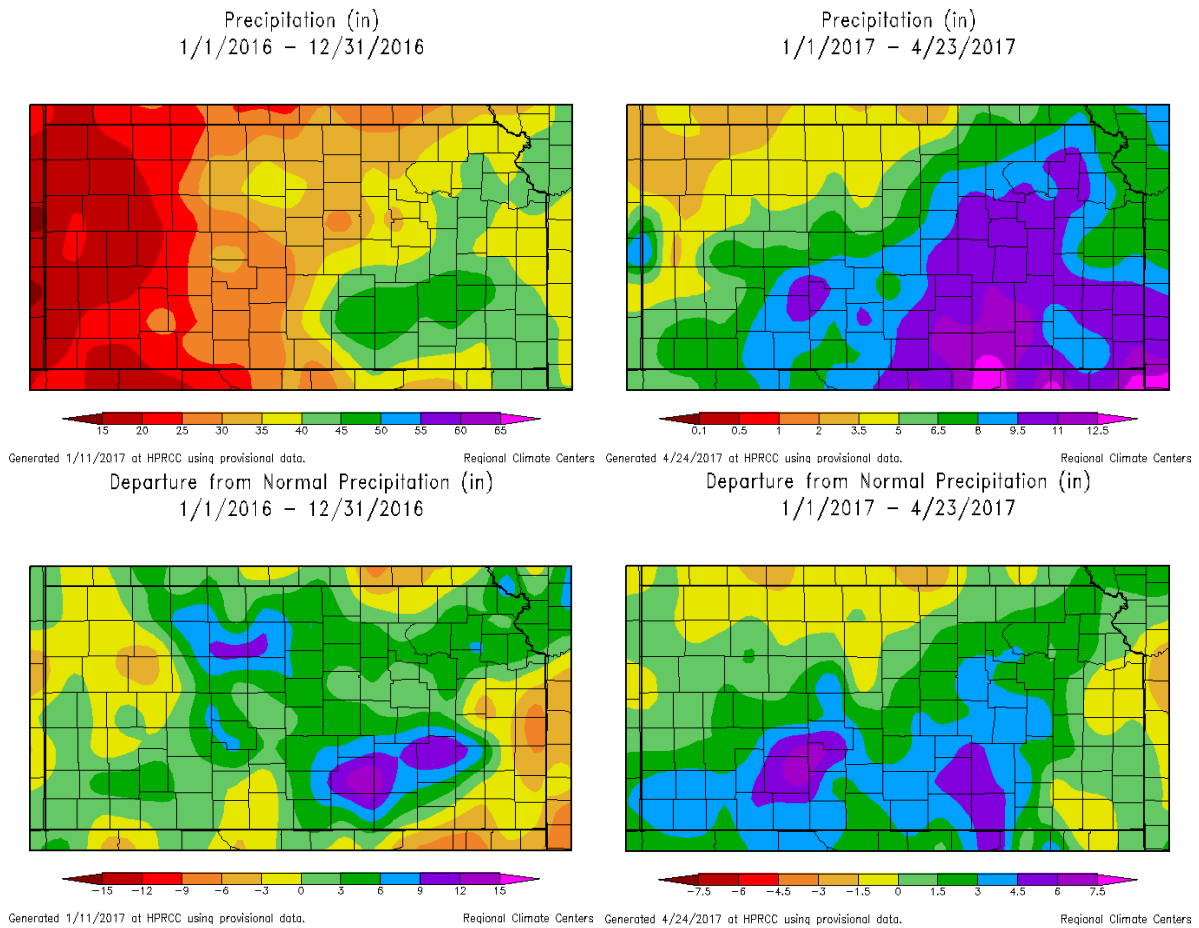
- **Local Enhanced Management Areas (LEMAs)** – In 2012, the Kansas Groundwater Management Districts were amended to allow GMDs to initiate the creation of these special management areas:
  - Northwest Kansas GMD No. 4 has requested the Sheridan 6 LEMA be extended for another 5 years under the same terms, except for some carryover of unused allocations from the first 5 years. The hearing will be on May 31 in Hoxie. More on KDA’s web site.
  - Northwest Kansas GMD No. 4 has also requested a new District-wide LEMA that is currently under review by DWR. More on KDA’s web site.
  - A group of water users just northwest of Garden City in northern Kearney and Finney County are developing a LEMA proposal for their area. They have held two public meetings and are meeting monthly with GMD No. 3.
- **Water Conservation Areas (WCAs)** – We now have 7 approved WCAs with more actively being considered. The most significant is the Wichita County WCA, a plan that covers the entire county which is highly depleted, allowing individuals to enroll in the plan to extend the useful life of the aquifer in their area. All approved plans and more information is on our web site.
- **Quivira National Wildlife Refuge Impairment Complaint** – The U.S. Fish and Wildlife Service (Service) owns and operates the Quivira National Wildlife Refuge (Quivira), a wetland of international significance and part of the central U.S. flyway. Water is a critical component of its operation with a water right priority date of 1957. After decades of voluntary efforts to resolve its concerns were unsatisfactory, the Service filed an impairment complaint with KDA-DWR in April of 2013. KDA-DWR then began its investigation of the alleged impairment. KDA-DWR published its final impairment investigation during April 2016. We are now working with effected parties to reach a solution. Earlier this year, GMD No. 5 made a second offer to resolve the impairment. The U.S. Fish and Wildlife responded during April that the offer was insufficient, with specific comments on needed reforms. Discussions continue.
- **City of Hays / R9 Ranch Water Right Changes and Water Transfer Application** – The City of Hays purchased the approximately 7,000-acre R9 Ranch and its thirty water rights in southwestern Edwards County in 1995 with the intention of someday using the water as part of the city's water supply. During June, 2015, the City submitted applications to KDA-DWR to change the use made of water from irrigation to municipal use for the R9 Ranch water rights. As these proposed changes envision moving greater than 2,000 acre-feet more than 35 miles, during January, 2016, the cities of Hays and Russell submitted an application to transfer water from Edwards County to the cities of Hays and Russell pursuant to the Water Transfer Act (K.S.A. 82a-1501, et seq.). We are nearing completion of consideration of the change applications, which must be completed prior to the water transfer process.
- **Aquifer Storage and Recovery Project, City of Wichita** – DWR continues discussions with the City of Wichita in regard to their ASR project and how its permit conditions can be revised to meet the City’s current objectives for the project (as a supplemental source of water for long-term drought) in a manner that protects the public interest.

# **Attachment B**

**Kansas- Nebraska Big Blue River Compact Meeting 2017**  
**Report by Kansas Department of Agriculture- Division of Water Resources**  
**Topeka Field Office- Katherine A. Tietsort**  
**May 17, 2017**

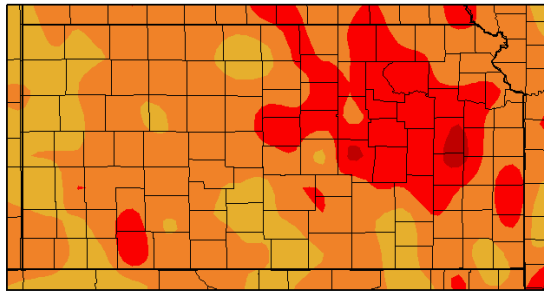
**Climatic Conditions- Precipitation & Temperatures**

The High Plains Regional Climate Center reported between 25 and 40 inches of precipitation in calendar year 2016 across the entire Big and Little Blue River basin area in Kansas, including their tributary basins, the Mill Creek and Black Vermillion River (hereinafter “BBRC”) and reported 3½ to 11 inches so far this year through April 23, 2017. We are seeing mostly wetter than normal conditions in the Basin so far this spring with most the Basin (with exception to a small portion in Republic County) receiving above normal precipitation. Percent of normal precipitation in 2016 ranged from -6 inches (Washington County) to +6 inches (Riley County) with the northern portion of the Basin receiving the lesser than normal precipitation in 2016.



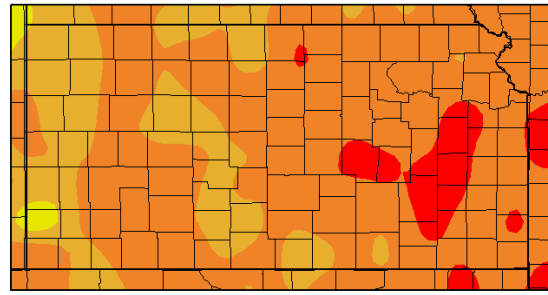
Temperatures for the calendar year 2016 remained warmer than normal by about 2-4 degrees in most of the Basin. Temperatures have been clearly warmer this spring in comparison to normal spring temperatures.

Departure from Normal Temperature (F)  
1/1/2016 - 12/31/2016



Generated 1/11/2017 at HPRCC using provisional data.

Departure from Normal Temperature (F)  
1/1/2017 - 4/23/2017

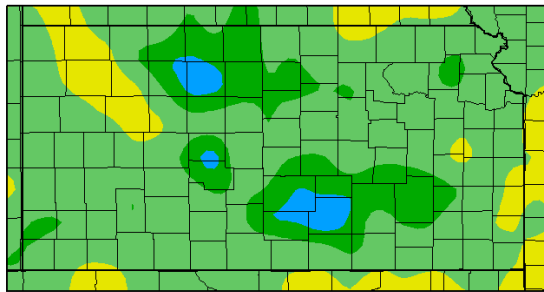


Regional Climate Centers Generated 4/24/2017 at HPRCC using provisional data.

Regional Climate Centers

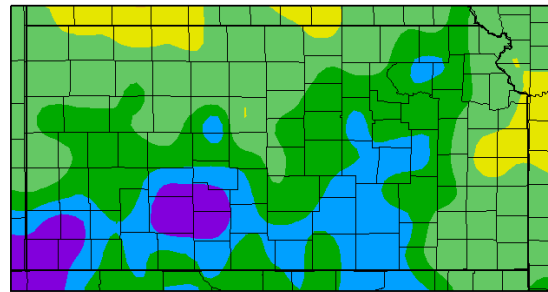
The Standardized Precipitation Index (SPI) is like the Palmer Drought Index (PDI) but considers only precipitation and no other factors. The SPI generally showed a slightly wetter trend for 2016, and so far this spring for the vast majority of the Basin (exception northern Washington County).

12-Month SPI  
1/1/2016 - 12/31/2016



Generated 1/5/2017 at HPRCC using provisional data.

Year-to-date SPI  
1/1/2017 - 4/23/2017



Regional Climate Centers Generated 4/24/2017 at HPRCC using provisional data.

Regional Climate Centers

### **Streamflow and Administration Within the Big Blue Compact Basin**

Statistics reflect 32 years of data at Marysville (Big Blue) and 58 years of data at Barnes (Little Blue).

Streamflow in the Big Blue generally mirrored the median trend, with late Spring/early Summer above average fluctuations. Streamflow in the Little Blue was generally at the median during the Fall, but fluctuated above and below the median during the Spring and Summer, respectively. Mid-summer 2016 conditions on the Little Blue were relatively dry and below median but, we did not trigger Minimum Desirable Streamflow (MDS) criteria within the Basin; MDS administration of junior rights did not occur in either sub-basin in 2016 nor in 2017 to date.

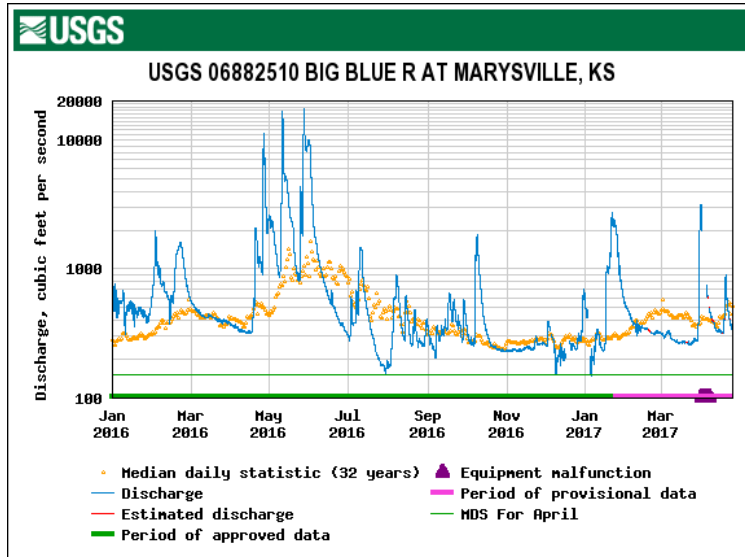


**Minimum Desirable Streamflows (cfs)**

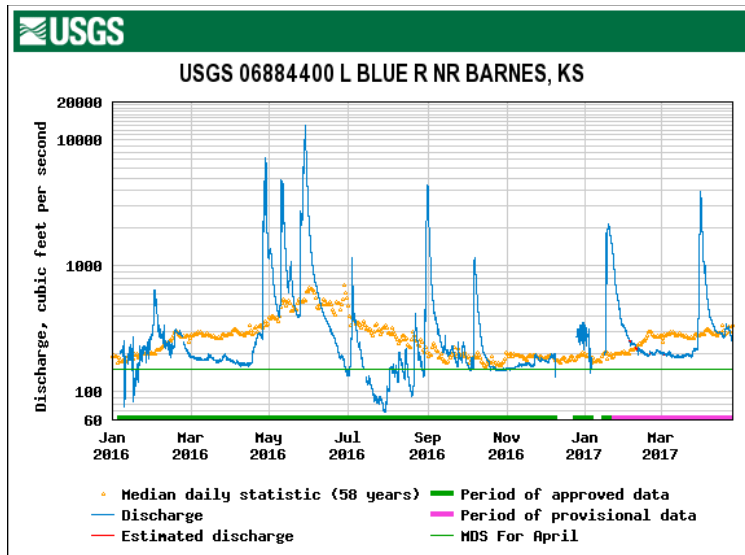
Watercourse	Month											
	J	F	M	A(a)	M(a)	J(a)	J	A	S	O	N	D
Big Blue												
Marysville	100	100	125	150	150(d)	150(d)	80	90	65	80	80	80
Little Blue												
Barnes	100	100	125	150	150(d)	150(d)	75	80	60	80	80	80

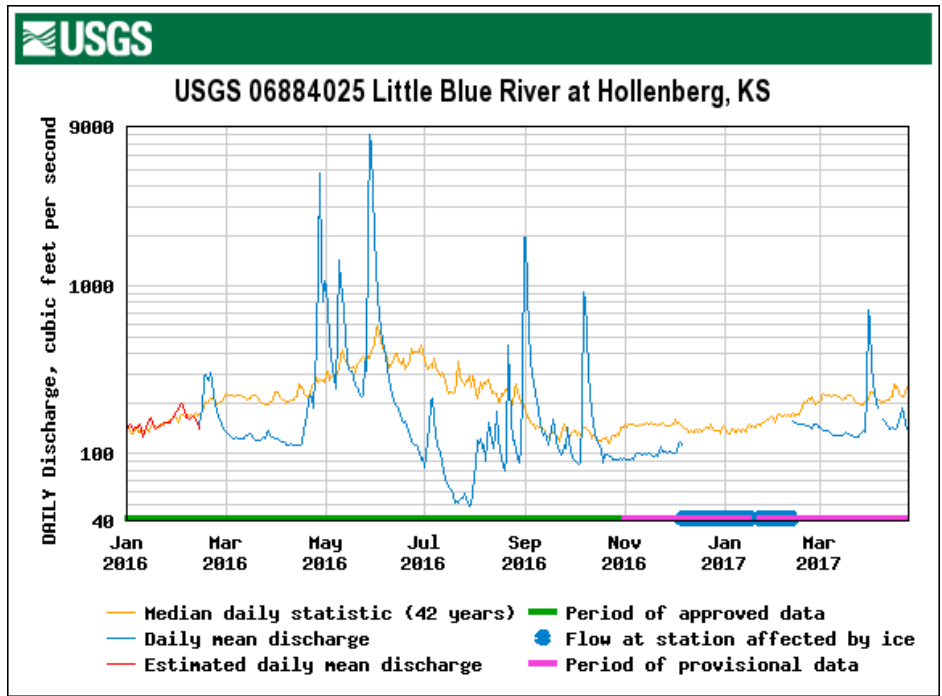
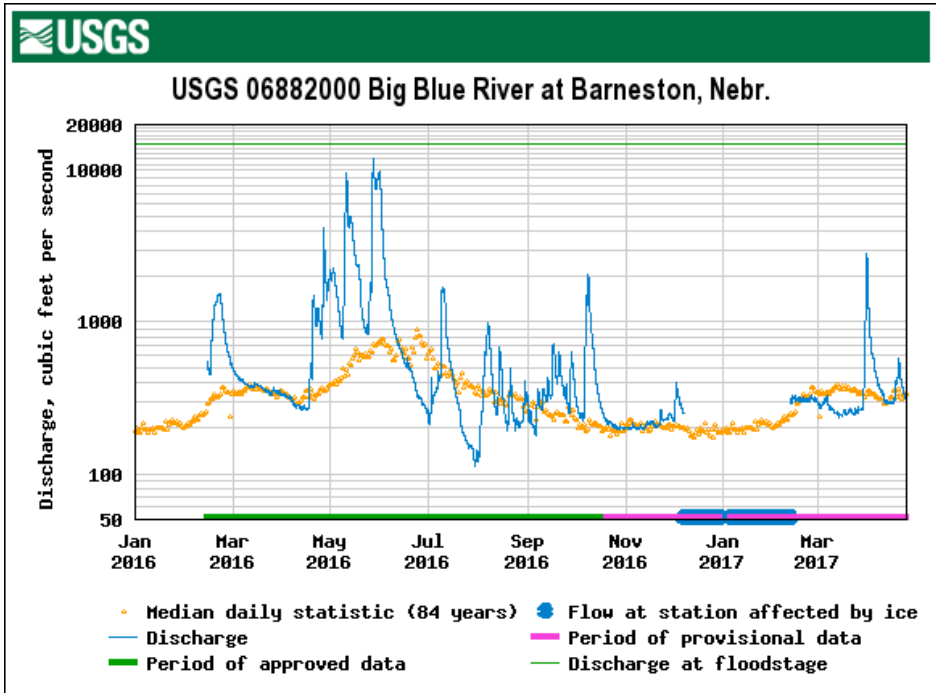
(d) Subject to the stateline flows contained in the Blue River Compact.

**USGS 06882510 BIG BLUE R AT MARYSVILLE, KS**



**USGS 06884400 L BLUE R NR BARNES, KS**





The compact gage at Barneston and at Hollenberg reflected a bit more variability. In August of 2016, Orders were issued by Nebraska on the Little Blue River due to flows falling below criteria designated by the Compact.

## **Administration Activities**

Administration activities include administration for Minimum Desirable Streamflow (MDS) of water rights junior to April 12, 1984 due to flows falling below MDS criteria, administration of water rights subject to statutory protection of releases from storage under water reservation rights (K.S.A. 82a-706b), and administration of water rights by priority. Generally, our statutory protection of releases occurs to protect releases made from storage in federal reservoirs for the Water Assurance Districts (Kansas, Cottonwood & Neosho, Marais Des Cygnes Rivers). For the period of 1/1/2016 through today, flows remained sufficient to avoid any MDS administration in the Big Blue River, Little Blue River, Mill Creek, or Black Vermillion River basins.

In 2016, a total of 260 water rights were administered for MDS as follows:

<b>MDS Stream</b>	<b>Administration Began</b>	<b>Administration Ceased</b>	<b>Files Administered</b>
Republican River	April 19, 2016 (Above Concordia)	May 13, 2016	71
	April 19, 2016 (Clay Center to Concordia)	May 13, 2016	147
Smoky Hill River	June 26, 2015	May 3, 2016	3
Little Arkansas River	March 18, 2016 (Alta Mills-Valley Center)	April 15, 2016	8
	March 18, 2016 (above Alta Mills)	April 15, 2016	21
Saline River	September 5, 2015	May 3, 2016	10

The Division is working with a stakeholder group and the Kansas Water Office (KWO) to evaluate the potential formation of a Lower Republican Special Irrigation District (District). This group may be able to access water under Warren Act Contact made available through Republican River Compact Agreements, which were recently reached. A Steering Committee, consisting of eight (8) members within the potential District, met on February 10, 2017 to discuss the concept and logistics. The overarching consensus was a high level of interest from the members to potentially have the ability to pump junior surface water and/or groundwater during MDS administration; however, the conclusion was that more information, particularly related to costs and framework, was needed. Subsequently, to aid in such efforts the Division updated a stream depletion model, which evaluated stream depletion resulting from currently-administered groundwater wells pumping in the effective alluvium of the Republican River Basin. Three sets of groundwater wells (129 set total wells) were used to provide a relative understanding of pumping with respect to streamflow depletion for a time-period of March 1 through May 31 of the following year.

Subsequent communications were held on March 31, 2017 at the Lower Republican River Stakeholder Advisory Committee. Further clarification related to the potential structure (in collaboration with Kansas Bostwick Irrigation District) was provided. Additional communication took place on May 1, 2017 at a Lower Republican River Super Regional Advisory Committee (RAC) meeting.

## **Compliance & Enforcement Update**

Compliance and enforcement continues to be a focus. The Division of Water Resources enforces violations of the Kansas Water Appropriation Act through our Compliance and Enforcement Unit with support from

KDA legal. The amendment to penalty for failure to submit a water use report closed the loophole where an owner could simply pay a civil penalty of \$250 and not report water use, masking other violations. Now the civil penalty for this is \$1,000. The Division is also working to provide clarity to our civil penalties related to all other violations of the Kansas Water Appropriation Act, including over-pumping and to raise the cap to \$10,000 per violation, as well as provide for suspensions.

The Agency will be conducting Public Hearings on May 22, 2017 at 10 AM in multiple locations (i.e., Manhattan Headquarters and 4-Field Offices) for the following proposed regulation changes related to civil penalties:

Violation Category	Monetary Penalty	Penalty Applied on a Per Day Basis?	Maximum # of Days Applied	Can a Suspension be Applied?	Suspension
Failure to Provide Information	\$500	Yes, for each day the violation exists	20 (\$10,000)	Yes	One Year
Unauthorized Diversion or Threat to Divert	\$500	Yes, for each day the violation exists	20 (\$10,000)	Yes	One Year
Lower Tier Miscellaneous	\$500	Yes, for each day	20 (\$10,000)	Yes	One Year

Violation Category	Monetary Penalty	Penalty Applied on a Per Day Basis?	Maximum # of Days Applied	Can a Suspension be Applied?	Suspension
Failure to Timely Install or Remove Flowmeter	\$1,000	Yes, for each day the violation exists	10 (\$10,000)	Yes	Up to Three Years
Violation of a Substantial Order of the Chief Engineer	\$1,000	Yes	10 (\$10,000)	Yes	One to Five Years
Meter Manipulation	\$1,000	Yes	10 (\$10,000)	Yes	One to Five Years

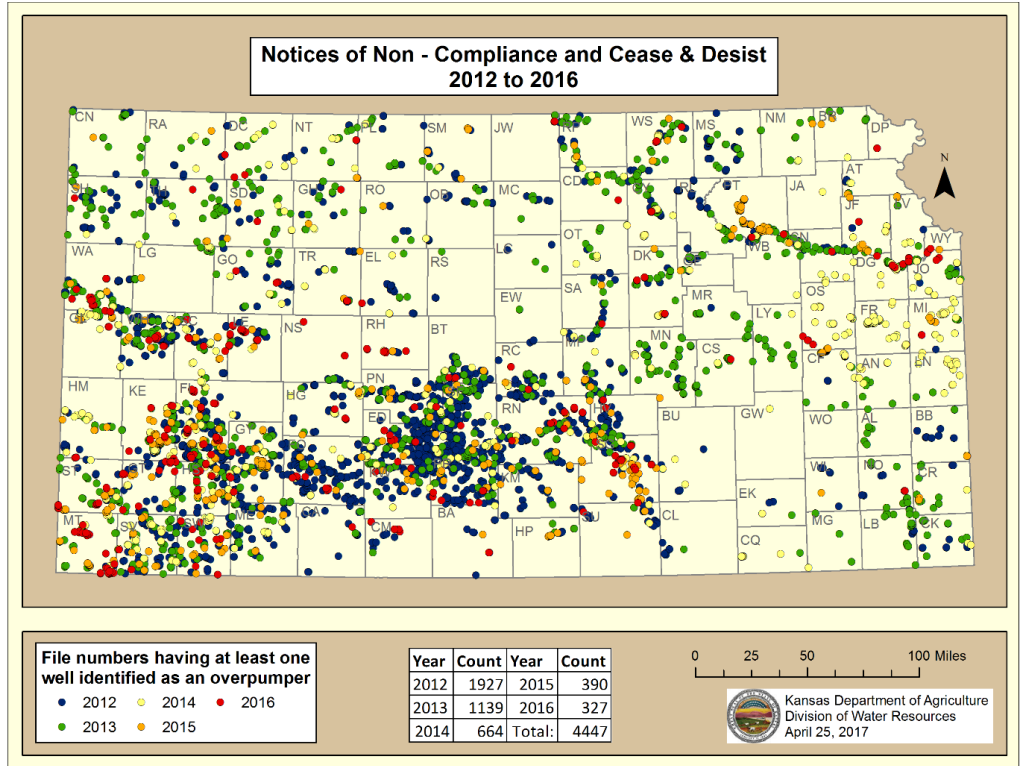
  

Violation Category	Monetary Penalty	Penalty Applied on a Per Day Basis?	Maximum # of Days Applied	Can a Suspension be Applied?	Suspension	Category	Level A <24 Hours	Level B 24 – 72 Hours	Level C More than 72 Hours
						No Penalty w/in 5 yrs	One Penalty w/in 5 yrs	Two Penalties w/in 5 yrs	
Violation of a Change Application	\$1,000	Yes	10 (\$10,000)	Yes	Up to Three Years	No Penalty w/in 5 yrs	Written Notice of Non-Compliance	\$1000 per day and a reduction in quantity equal to 2X quantity overpumped (not to exceed one year suspension)	\$1000 per day and a reduction in quantity equal to 3X quantity overpumped (not to exceed one year suspension)
Violation of a MYFA	\$1,000	Yes	10 (\$10,000)	Yes	Two to Five Years	One Penalty w/in 5 yrs	\$1000 per day and a reduction in quantity equal to 2X quantity overpumped (not to exceed one year suspension)	\$1000 per day and a one year suspension	\$1000 per day and a three year suspension
						Two Penalties w/in 5 yrs	\$1000 per day and a one year suspension	\$1000 per day and a three year suspension	\$1000 per day and a four year suspension

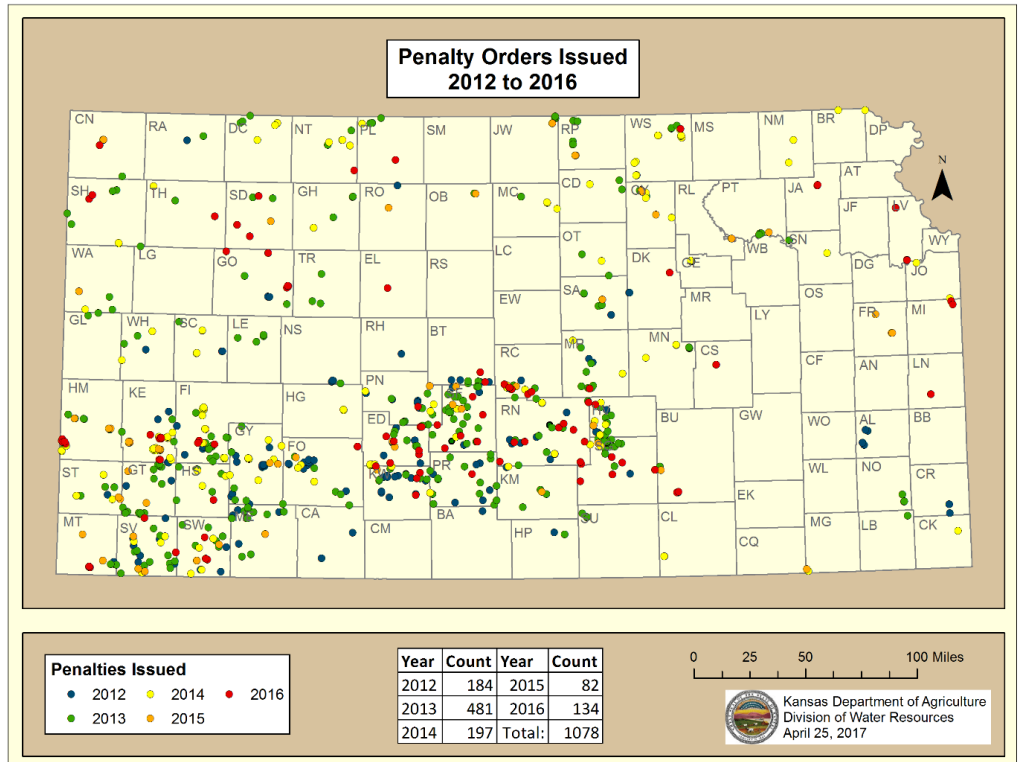
Additionally, public hearings will be held at the same aforementioned locations in late July 2017 related to change application rule changes.

## Compliance & Enforcement Activities

Notice of Non-Compliance/Cease & Desist Notice-In 2016, the Division sent “Notice of Non-Compliance/Cease & Desist Notice” (NONC-CD) on three water rights for over-pumping or for lack of metering in the BBRC area. Three NONC-CD’s were issued the year prior for overpumping and permit condition violations in the BBRC area. So far in 2017 no NONC-CD orders have been issued in the BBRC area. The figure to the right represents the State-wide NONC-CD issued during the 2012-2016 timeframe.

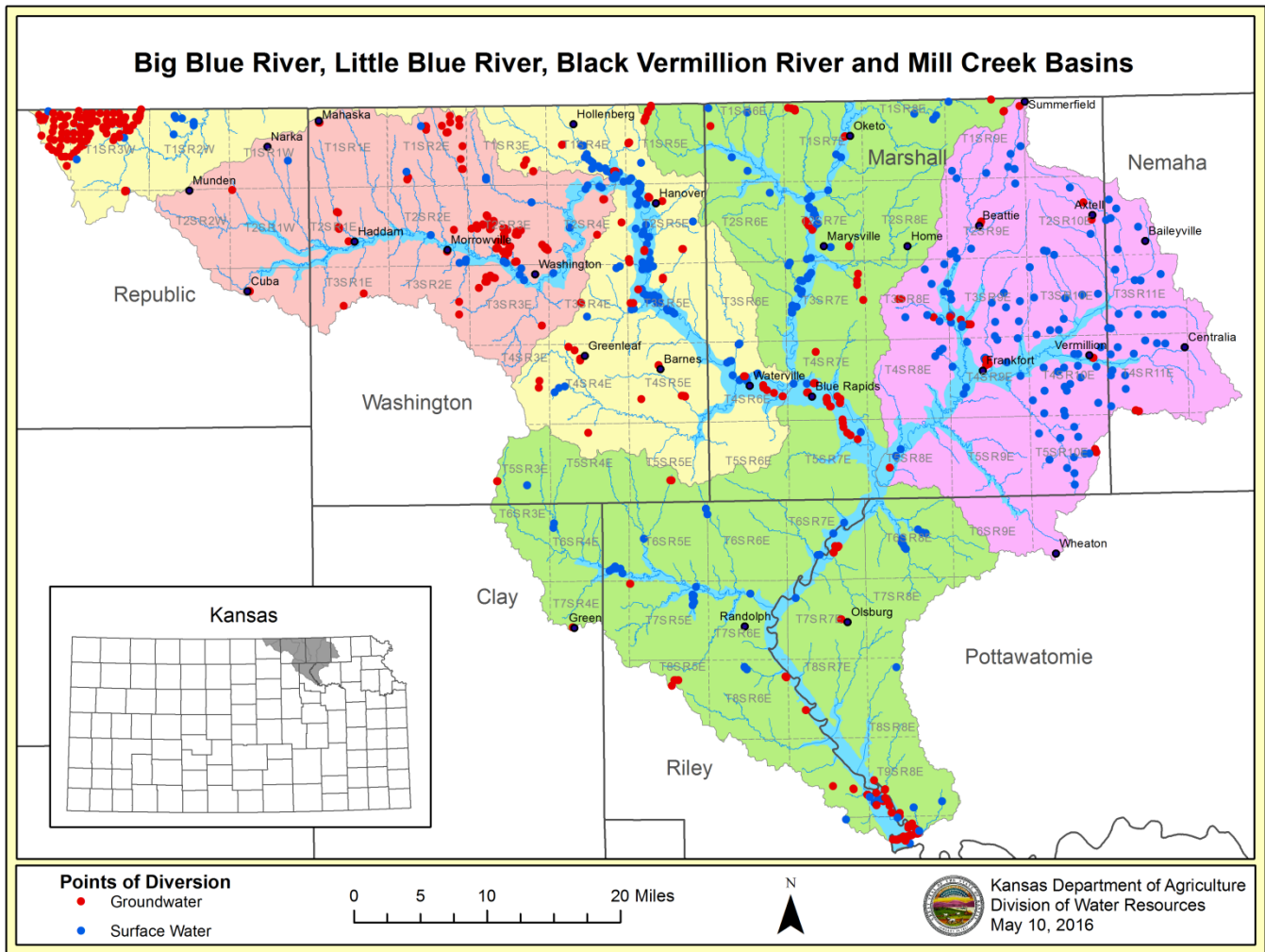


Penalty Orders-In 2016, two penalty orders were issued in the BBRC area related to overpumping. So far for 2017, no penalty orders have been issued in the BBRC area. State-wide, in 2016, 134 penalty orders were issued. The figure to the right depicts the distribution of those penalty orders issued during the 2012-2016 timeframe.



## New Applications

In 2016, the Divisions received 28 new applications (23 appropriations + 5 term permits) for the BBRC basin. This number is slight less than the 33 applications received in 2015 for the BBRC basin. For 2017 thus far we have received 11 new application requests in the BBRC basin. The following figure represents the total appropriations through 2016 within the BBRC.



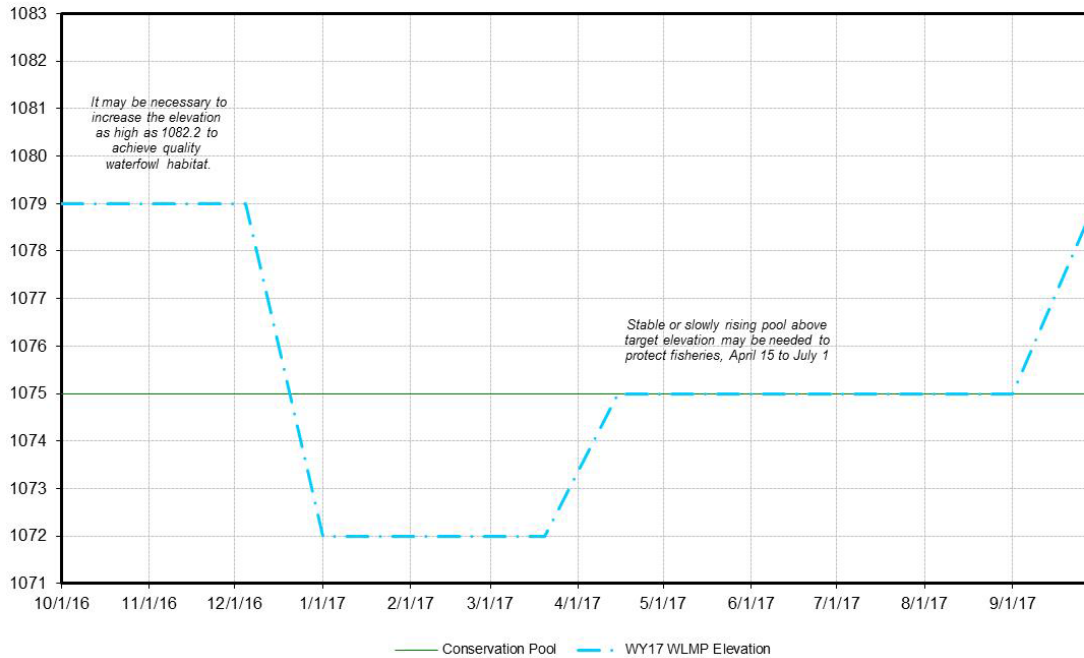
## Metering

The Topeka Field Office completed working through the Kansas River Meter Order (our largest issued to date), effectively completed the Missouri River Basin Meter Order, and we issued two final orders for the Smoky Hill River/Chapman Creek Basins and a small subset of the Republican River Basin (Dakota aquifer and a few rights that never got an order). We are currently completing inspections on the Smoky Hill River and Chapman Creek and will have all Basins completely metered and inspected by the end of 2017, as we currently have less than 250 files left to inspect. This item will complete a significant item in the vision goals, which is State-wide metering. It represents that the TFO staff have visited nearly every pumping file in the Eastern 1/3 of Kansas in the last ~10 years.

## Tuttle Creek Reservoir

Lake Level Management plans were approved in fall of 2016. It is the same plan as was approved for a number of years. The focus continues to be wildlife support.

**Tuttle Creek Lake**  
 Conservation Pool = 1075.0 Flood Pool = 1136.0 5% into FP = 1082.2



<b>TUTTLE CREEK LAKE</b>	Time	Elevation	Comment
	Oct 1 – Dec 5	1079-1082.2	Attract migrating waterfowl, achieve quality habitat
	Dec 5- Jan 1	1072	Reduce ice damage potential and provide water storage, then hold through Mar 20
	Mar 20 – Apr 15	1075	Rise to reach top of conservation pool and enhance boating then hold through Sep 1
	Apr 15 – July 1	1082.2 max	Evacuate flood water to enhance crappie population. Protect tern and plover nests on the Kansas River
	July 1 – Sep 1	1075	Maintain conservation pool to re-vegetate shoreline
	Sep 1 – Sep 30	1079	Rise to inundate wetland habitat and attract migrating waterfowl

# Attachment C



**Nebraska State Report  
Big Blue River Compact Administration  
2017 Annual Meeting  
May 17, 2017**

Welcome

I would like to thank the Kansas Department of Agriculture for traveling and joining us today for the Big Blue River Compact annual meeting. I would also like to extend our thanks to the Upper Big Blue Natural Resources District for hosting the 2017 annual meeting of the Compact Administration, and for this wonderful meeting space. The Nebraska Department of Natural Resources (Department) appreciates the ongoing efforts of the Natural Resources Districts (NRDs), as well as other state agencies, and our agricultural producers who work together to help manage the water resources in the Big Blue and Little Blue River Basins.

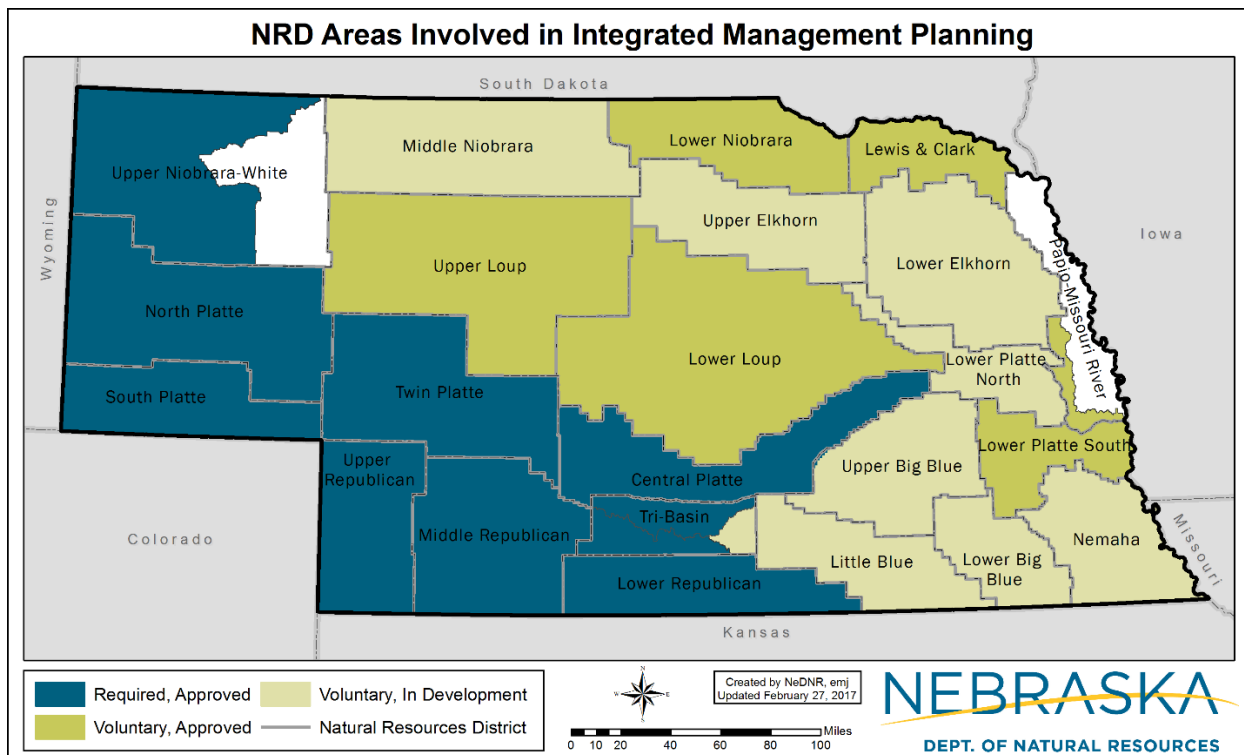
Water Supply Conditions

In the 2016 water year, the water supply conditions varied significantly between the Big Blue and the Little Blue River Basins. In the Big Blue Basin, precipitation was generally average or slightly below average. In contrast, the upper portion of the Little Blue Basin was one of the most drought-stricken areas in Nebraska, as shown by the U.S. Drought Monitor report. Here, moderate to severe drought conditions persisted from July 2016 to September 2016. This area typically receives an average of 18 inches of rain from May to September. But in 2016, the area received only 10 inches of rain for the same period, with about half of that coming from a single storm event at the end of August. As a result, there was fierce competition for the limited amount of surface water available in the upper end of the Little Blue River Basin. Our Lincoln field office supervisor, Jim Ostdiek, will have more on this in his upcoming surface water administration report.

Water Planning

*Integrated Water Management*

Integrated management planning efforts have continued to progress in the State of Nebraska. A significant milestone was reached in 2016, as all 23 NRDs in the state were cooperatively working the Department on some phase of integrated water management (Figure 1). Developing an integrated water management plan is typically a multi-year effort, and requires much coordination between the NRDs and the Department. Each plan has an overarching purpose to protect and sustain a balance between hydrologically connected ground and surface water supplies, yet each plan can be customized to address the unique and specific conditions or issues that may fit the situation within each NRD.



**Figure 1.** Status of integrated management plans throughout the State.

Voluntary integrated water management activities increased in both the Little Blue and Big Blue River Basins in 2016. Both the Lower Big Blue and Upper Big Blue NRDs initiated development of their own voluntary integrated management plans, each of which will be developed jointly with the Department. These processes are expected to gear up this fall. As a part of this effort, the Upper Big Blue NRD has been initiating discussions on groundwater modeling concepts and related technical data collection and analyses issues in the Basin. The Department has appreciated the opportunity to participate in and contribute to these discussions.

For the Little Blue Basin, progress was made on the development of the Little Blue and the Tri-Basin NRD voluntarily integrated management plans. As a part of this, a diverse stakeholder advisory committee was convened for each NRD to provide input on goals and objectives that lay the foundation for each plan. Both broad-based stakeholder groups initially met jointly to discuss the Basin as a whole. Subsequently, several NRD-specific stakeholder meetings were held to focus on local issues and potential solutions. Both public processes are continuing in 2017, as the stakeholder advisory committees, the NRDs, and the Department work through a complex set of challenges regarding an array of data collection, technical analyses, and potential regulation alternatives and options for inclusion in the plans.

To compliment integrated management planning activities, the Department has created a voluntary online water use reporting tool that is now being used by water users in both the Little Blue and Big Blue River Basin. In 2016, 25% percent and 22% of surface waters users voluntarily reported their water use in the Little Blue and Big Blue River Basins, respectively. The Department aims to offer this tool across the entire state by the end of 2017.

The Department continues to recognize great value in working with the Blue Basin NRDs on integrated management planning initiatives. We look forward to continuing these relationships to proactively manage surface and groundwater supplies and uses in the Basin. I expect we may hear more from the NRD representatives here today on these on-going and complex planning efforts.

### *Basin-Wide Water Planning*

In 2016, the Department also continued to work with local NRDs on basin-wide planning and coordination activities that cover the Republican, Upper and Lower Platte, and Niobrara Basins. Upon completion of a basin-wide plan, the individual NRDs' integrated management plans may be updated to support the basin-wide initiatives, so that the two planning mechanisms work in conjunction with and parallel to one another.

The Republican River Basin-wide Plan is currently in development by the four Republican River NRDs and the Department. The two entities are working together with a diverse Stakeholder Advisory Committee to develop components of the plan. So far, vision and mission statements have been agreed upon, as well as several specific goals and objectives. The work on this plan will continue in 2017 and the projected completion date of the plan is April 17, 2018.

The year 2019 will mark the conclusion of the first 10-year increment of the Upper Platte River Basin-wide plan. This is a joint effort between the five Upper Platte NRDs and the Department. Development of the second increment plan is underway and will be completed by September 2019. A broad-based and diverse stakeholder group was convened for this planning process and the group met several times in 2016. The overarching goal of the plan is to sustain a balance between water uses and supplies and also to maintain compliance with interstate agreements, such as the Platte River Recovery Implementation Program.

For the Lower Platte River Basin, the seven Lower Platte NRDs and the Department have formed a coalition to develop a voluntary Basin-wide Plan, which will be implemented in five year increments. The Lower Platte River Basin Coalition met several times in 2016 to work on developing goals and objectives and plan implementation strategies. On a parallel track, much data acquisition and technical analysis were conducted to support Coalition decision making.

In the Niobrara River Basin, the Nebraska Game and Parks Commission, Nebraska Public Power District, the five encompassing NRDs and the Department have been discussing a coordinated approach to water management. This will address the impacts of LB1038 which involves a transfer of ownership of the Spencer Dam surface water appropriations. This coordinated approach process is expected to continue through 2020.

### Legislative Updates

In 2016, two bills were introduced at the Department's request. Both have been passed by the legislature and are awaiting the Governor's signature. The bills and introducers are:

1. **LB154**, Geist: *Change provisions relating to certain dam filing fees*. It removes a \$10 filing fee for engineer's certification of completed dam under Safety of Dams and Reservoirs Act.
2. **LB176**, Bostelman: *Eliminate obsolete provisions related to milldams*. It repeals obsolete 19<sup>th</sup> century statutes granting eminent domain rights to landowners of one side of a stream to condemn the other side of a stream to create an impoundment to

provide the necessary head for water powered machinery. The statutes are inconsistent with current water appropriation and eminent domain statutes.

Adaptations to correct the State's projected budget shortfall for the 2017-2018 biennium is the primary business of the legislature's 2017 session. The effort began with reductions to the current FY2016-17 budget. The biennial budget bill is under-going review and adoption by the legislature with approval expected in the next several weeks.

### Water Sustainability Fund

The Nebraska Water Sustainability Fund, established in 2014 through LB1098, accepted its second round of applications in July 2016. Thirty-four applications were submitted. The Director of the Department determined that 28 of the applications were satisfactory. These were then forwarded to the Nebraska Natural Resources Commission (Commission) for review scoring in accordance with the authorizing legislation. Ultimately, eleven of the applications were approved for funding in December 2016, resulting in over \$20.5 million dollars being awarded for water sustainability projects and studies.

Two of the approved applications were for projects that are located in the Little Blue River Basin. Both applications were submitted by the Little Blue NRD to help offset costs associated with Low-head Embankment and Instream Weir Stabilization Pilot Projects. Approval of the Little Blue projects, added to the City of Hastings project that was approved last year, bring the total amount granted to Blue Basin projects to just over \$4.6 million.

Sponsors of projects that were previously approved for funding by the Commission have recently submitted required annual reports which briefly describe project status, accomplishments, and plans for the next year. These reports are available to the public on the Commission's website at: <https://nrc.nebraska.gov/water-sustainability-fund-reports>.

The third round of applications for the Water Sustainability Fund will be submitted between July 16 and July 31, 2017, via the Commission's website. The Commission has approximately \$4.7 million dollars available, and is anticipating that an additional \$10.6 million will be available as of July 1, 2017 for this next set of applications.

### Concluding Remarks

I would like to thank Kansas for continuing the partnership to work together to resolve Republican River issues, and proactively manage the Blue River Basin. I would now like to turn it over to Jim Ostdiek who will give a report on Nebraska water administration, and Jim's report will be followed by the Blue Basin NRD reports.

# Attachment D

## **2017 Big Blue River Compact Administration Report**

### **2016 Water Administration Activities in Nebraska**

Precipitation conditions in 2016 showed a decrease from previous years. The Little and Big Blue River Basins received below average precipitation for the months May through September. Surface water administration was only in the Little Blue River Basin this year, with localized administration in the upper section of the Little Blue and several calls for the Blue River Compact.

#### **Little Blue Administration**

The Little Blue's headwaters are near Minden and the river exits the state south of Fairbury. The basin encompasses some 2,700 square miles in all or parts of 10 counties. It has 249 irrigation permits and 132 storage rights.

The upper reach of the Little Blue River saw an increase in administration this year. On July 14 36 natural flow and 58 storage rights were closed in the Deweese area to protect rights with a priority date of 3/19/1957. On July 15 the flow on the Little Blue at Hollenberg fell below the compact target of 75 cfs and an additional 110 natural flow and 66 storage rights were closed. On July 27 decreasing flows in the Deweese area forced the closure of 7 additional rights for local administration. One right was opened on July 29 and 6 rights were opened on August 7 as flows increased in the Deweese area. Target flows were met on August 3 and 146 natural flow and 124 storage rights were opened. On August 15 flows in the Deweese area dropped off forcing the closure of 49 natural flow and 67 storage rights for local administration. On August 19 flows at the Hollenberg gage dropped below the compact target closing 97 natural flow and 87 storage rights. On August 22 flows at the Hollenberg gage exceeded the compact target and we were able to open 108 natural flow and 87 storage permits, but were still administering rights in Deweese area. On August 24 we opened 2 rights, on August 25 we closed 1 right. Heavy rains in the Hastings area provided much needed increased flows in the Little Blue River and all rights were opened for the season on August 29.

#### **Big Blue Administration**

The headwaters of the Big Blue River are in Hamilton County, north of Aurora. At its farthest western extent, the basin's headwaters are northwest of Hastings. The Big Blue River exits the State south of Barneston, and continues to its junction with the Kansas River. The basin encompasses 4,450 square miles in all or parts of 15 counties, has 833 surface water irrigation permits and 359 storage permits.

The flow at Barneston exceeded the target through the entire administration period.

#### **Concluding Thoughts**

In general, the basin received below average rainfall and experienced average summer temperatures. DNR issued two rounds of closing notices for compact compliance for a total of 22 days in the Little Blue basin.

# **Attachment E**



**Wymore Rural Water**

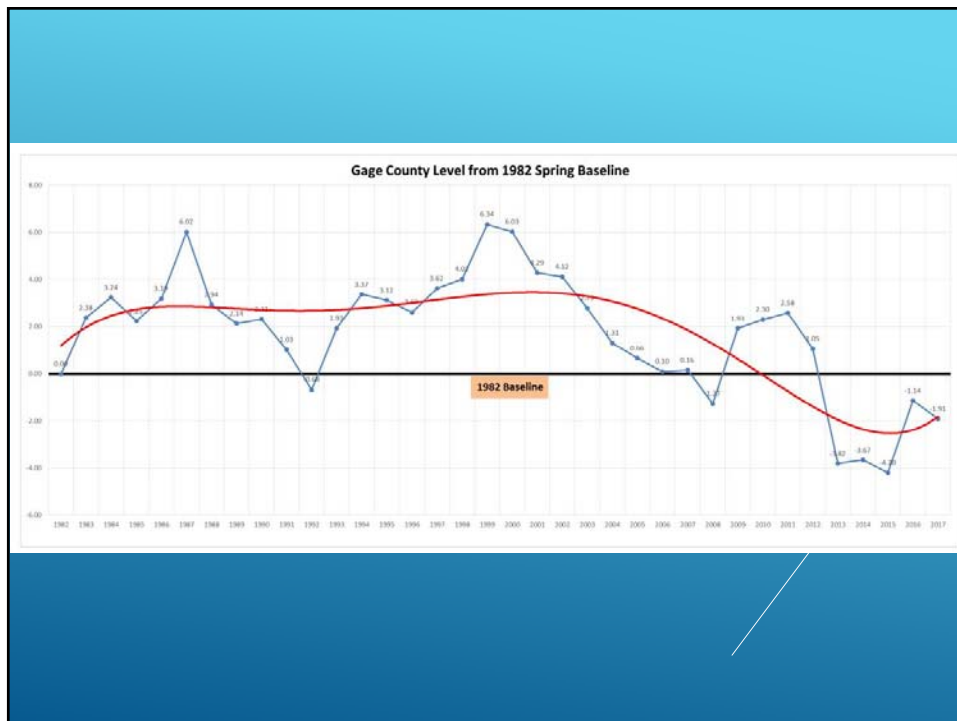
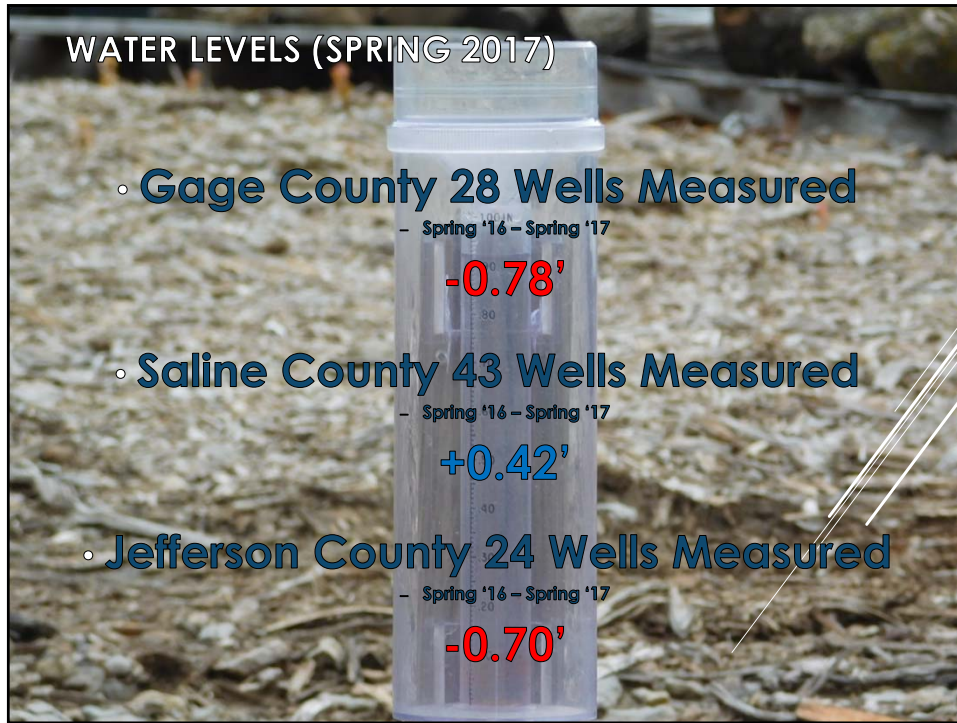
- 220 users
- 160 miles
- Remote Telemetry – Computer/Cell Phones

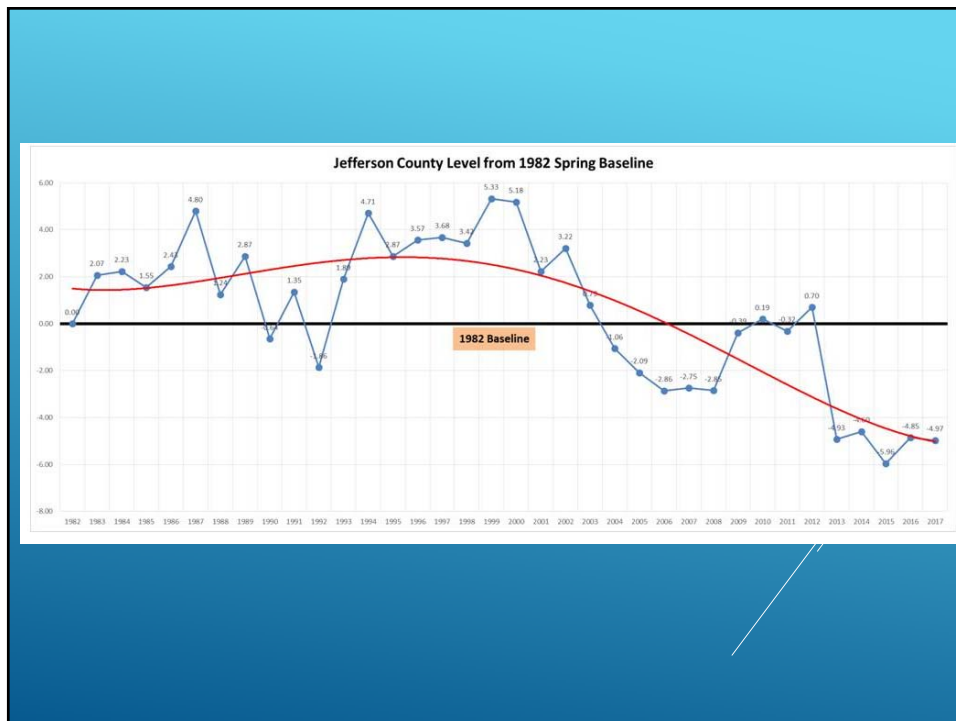
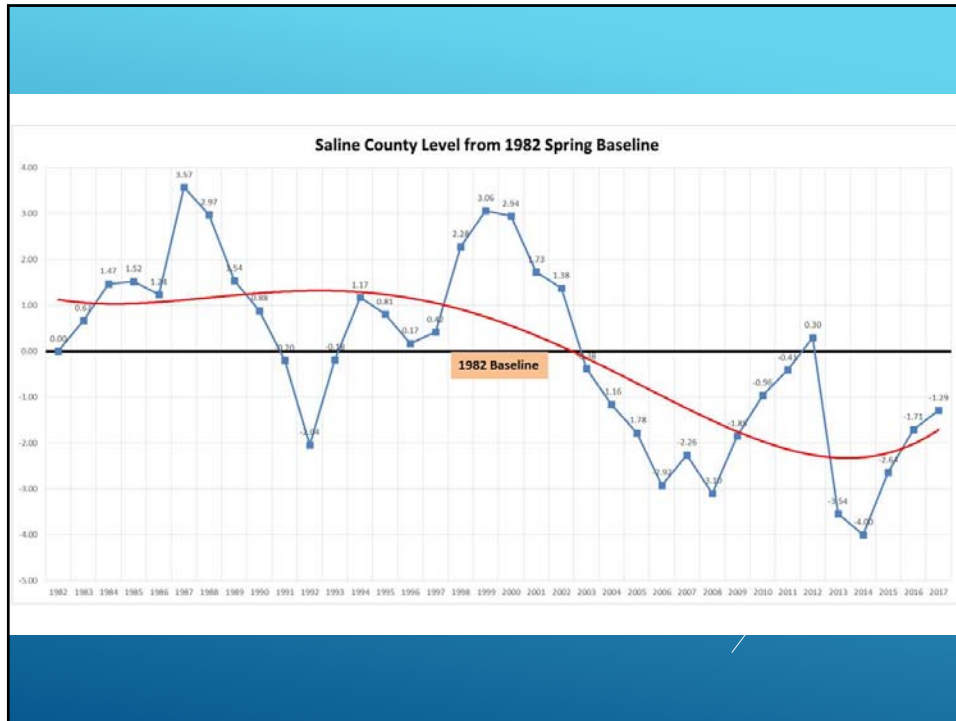
**Beatrice West Rural H2O**

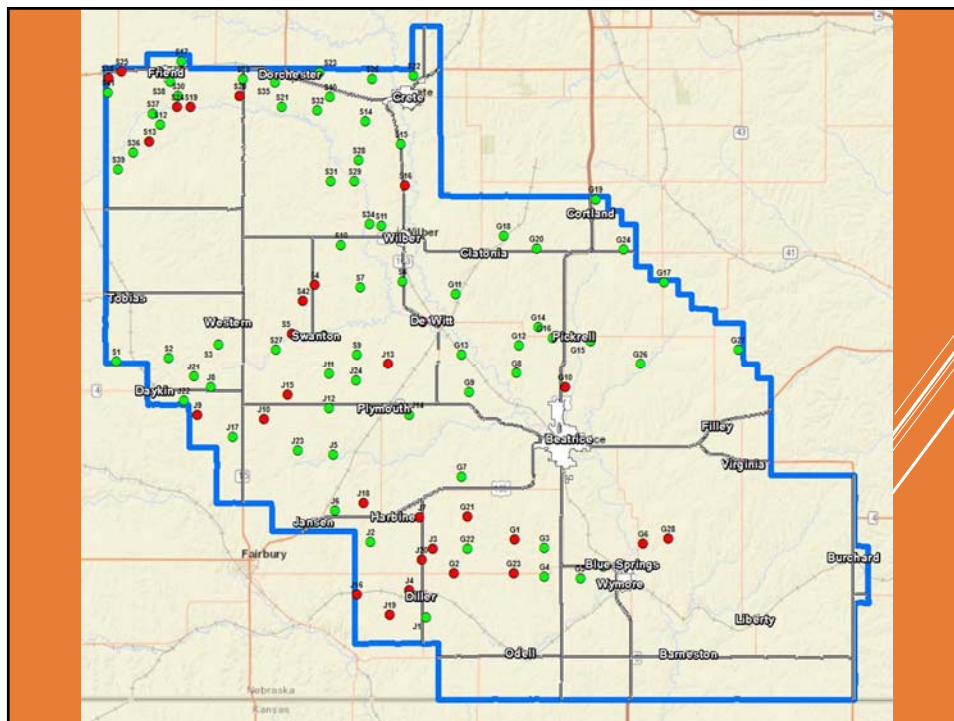
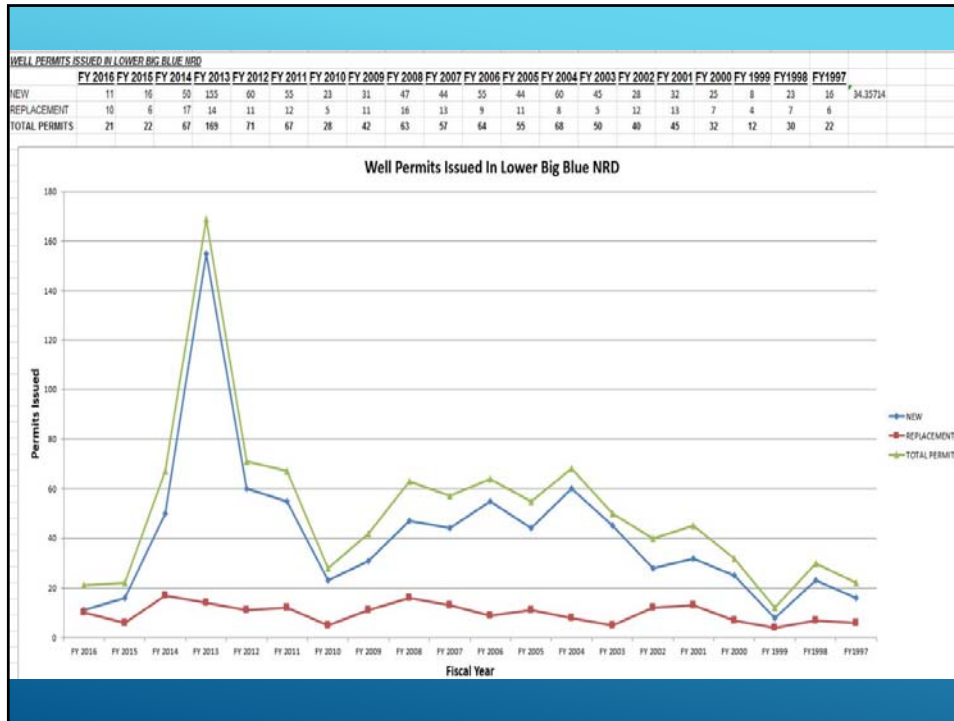
- 50 Users
- Beatrice City Water
- Started in 2000







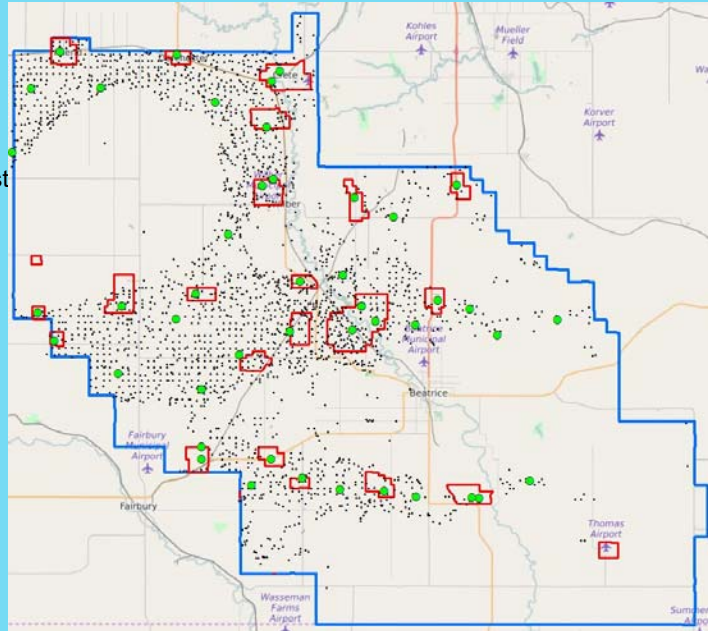




# Monitoring Well Project

## Project Status

- 43 wells drilled
- \$200,000 - 319
- \$100,000 - Environmental Trust
- \$100,000 - NRD



## Monitoring Wells

- Wells will be outfitted with In-Situ Rugged Troll Level 500 transducers
- Grundfos Variable Speed Rediflo pumps (4 in., 1/2 Hp, 10 gpm, 230 V motor)





## Certifying Irrigated Acres

- 578 Form and Maps from FSA offices
- Currently 113,313 acres certified
- Expecting ≈ 180,000 acres in the LBBNRD

## WELL & CHEMIGATION PERMITS

**WELL PERMITS ISSUED IN LOWER BIG BLUE NRD**

Fiscal Year	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005
NEW	14	23	55	126	60	55	23	31	47	47	55	44
REPLACEMENT	11	6	18	12	11	12	5	11	16	10	9	11
<b>TOTAL PERMITS</b>	<b>25</b>	<b>29</b>	<b>73</b>	<b>138</b>	<b>71</b>	<b>67</b>	<b>28</b>	<b>42</b>	<b>63</b>	<b>57</b>	<b>64</b>	<b>55</b>

	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Renewals	400	305	302	348	196	156	118	80	75	75	84	80	84	88	98	110
New Applications	70	59	29	107	60	40	39	39	11	15	2	3	8	4	4	3
Denied	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Inspected	247	143	243	328												
<b>TOTAL PERMITS</b>	<b>470</b>	<b>364</b>	<b>331</b>	<b>455</b>	<b>256</b>	<b>196</b>	<b>157</b>	<b>119</b>	<b>86</b>	<b>90</b>	<b>86</b>	<b>83</b>	<b>92</b>	<b>92</b>	<b>102</b>	<b>114</b>

\* LBBNRD Inspects Chemigation equipment every three years on renewal permits and annually on new permits.

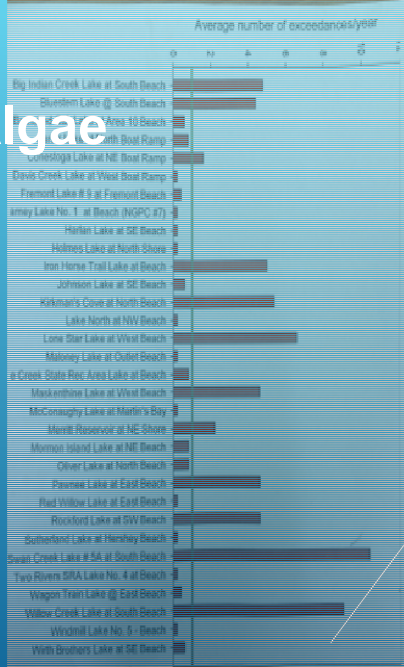


## WELL DECOMMISSIONING

YEAR	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	TOTAL SINCE 1995
WELLS CLOSED	10	18	18	27	28	46	32	39	47	35	801
COST SHARE PAID	4488.21	\$ 7,781.45	\$ 4,875.85	\$10,214.68	\$9,831.27	\$ 13,064.47	\$ 7,529.96	\$ 12,037.83	\$ 13,145.00	\$ 10,933.00	\$ 197,542.37
AVE CIS PAID /WELL	448.82	\$ 432.30	\$ 270.88	\$ 378.32	\$ 351.12	\$ 277.97	\$ 235.31	\$ 308.66	\$ 278.00	\$ 312.00	\$ 246.62
ACTUAL COST	11635.58	\$ 20,153.92	\$ 9,424.95	\$ 17,069.07	\$ 20,655.96	\$ 24,929.10	\$ 13,862.50	\$ 22,368.15	\$ 22,981.00	\$ 21,044.00	\$ 363,744.95
ACTUAL AVERAGE COST	1163.56	\$ 1,119.66	\$ 523.61	\$ 632.19	\$ 1,032.79	\$ 530.41	\$ 433.20	\$ 573.54	\$ 489.00	\$ 638.00	\$ 454.11
WWDF				\$ 2,668.00	\$ 3,367.49	\$ 1,771.11	\$ 3,214.67	\$ 5,931.19	\$ 6,097.00	\$ 8,060.00	\$ 92,499.44
NRD & NWQF FUNDS				\$ 7,546.68	\$ 6,463.78	\$ 11,293.36	\$ 4,315.29	\$ 6,106.64	\$ 7,048.00	\$ 2,873.00	\$ 55,453.58

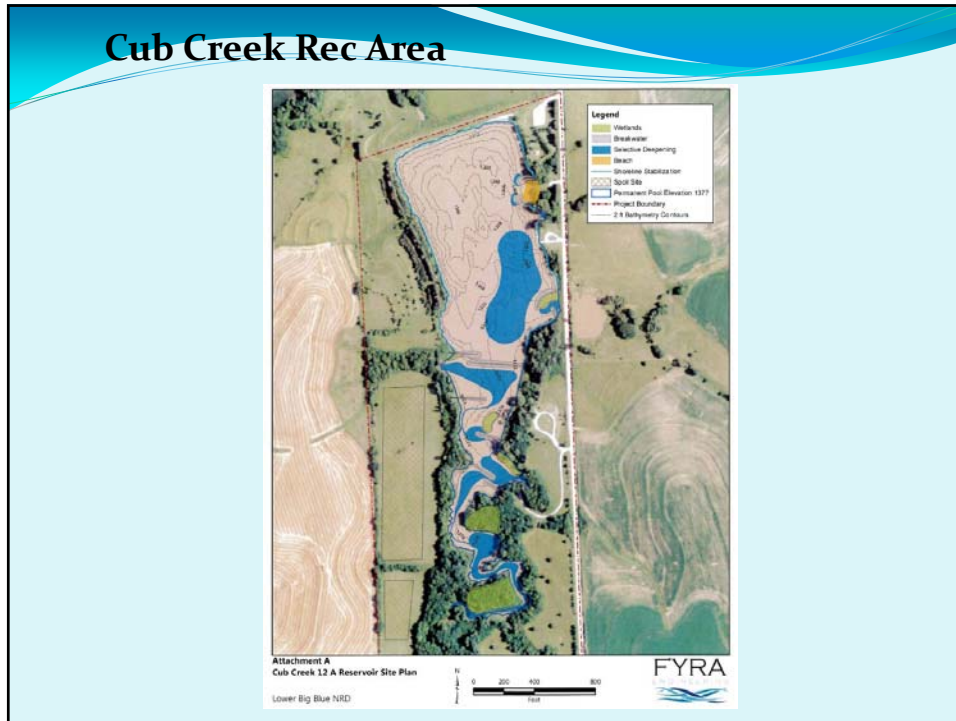


# Blue-Green Algae



## WILBER RESERVOIR NUMBER 1 MASTER PLAN





- ▶ Flow Meters – 2017 \$30,000 Budgeted
  - ▶ 50% up to \$500
    - ▶ 64 meters installed with CS in 2016 totaling \$ 31,925.00
    - ▶ Applied for Water Sustainability Fund (1000 meters, \$180,000 from WSF, \$120,000 from NRD, \$1,000,000 from producers)
- ▶ 2016 Water Sensors and ET Gauge Cost Share
  - ▶ 11 growers in the Lower Big Blue NRD ordered 67 watermark sensors, 9 ET-gauges, 4 hand-held readers, 0 data loggers
  - ▶ \$2,475.00 in total equipment sales
  - ▶ \$1,725.00 provided in cost-share by the LBBNRD

COST SHARE PROGRAMS





## Storm Shelters

Willard Meyer and Big Indian Rec Areas

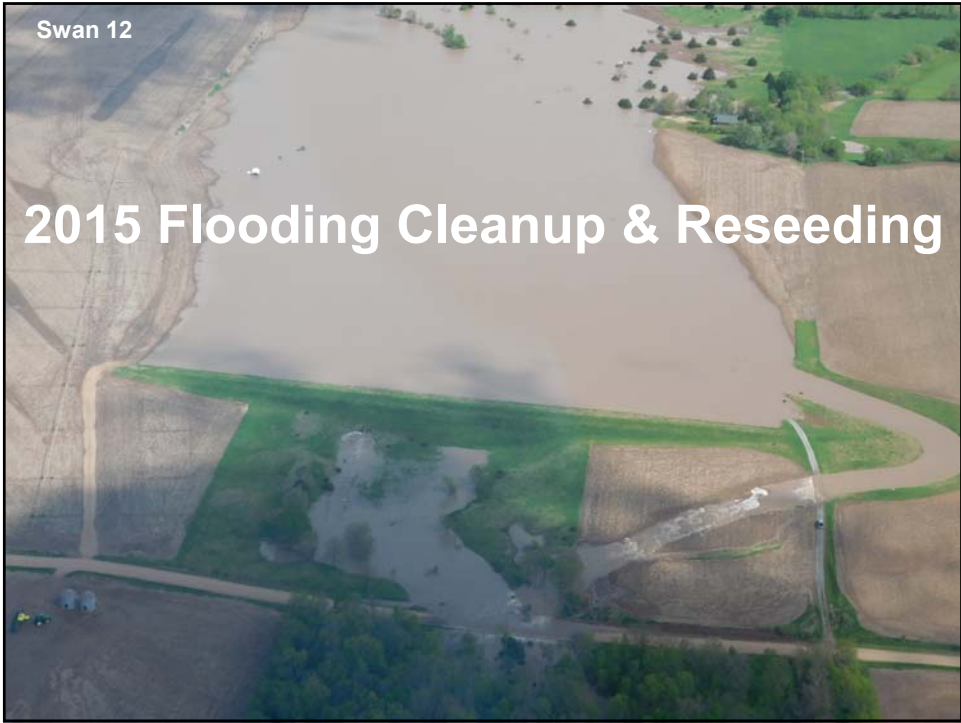
- \$17,000 – NRD
- \$52,000 – Federal
- \$69,000 – Total



## Residential

- 5 Shelters
- \$7000 max share









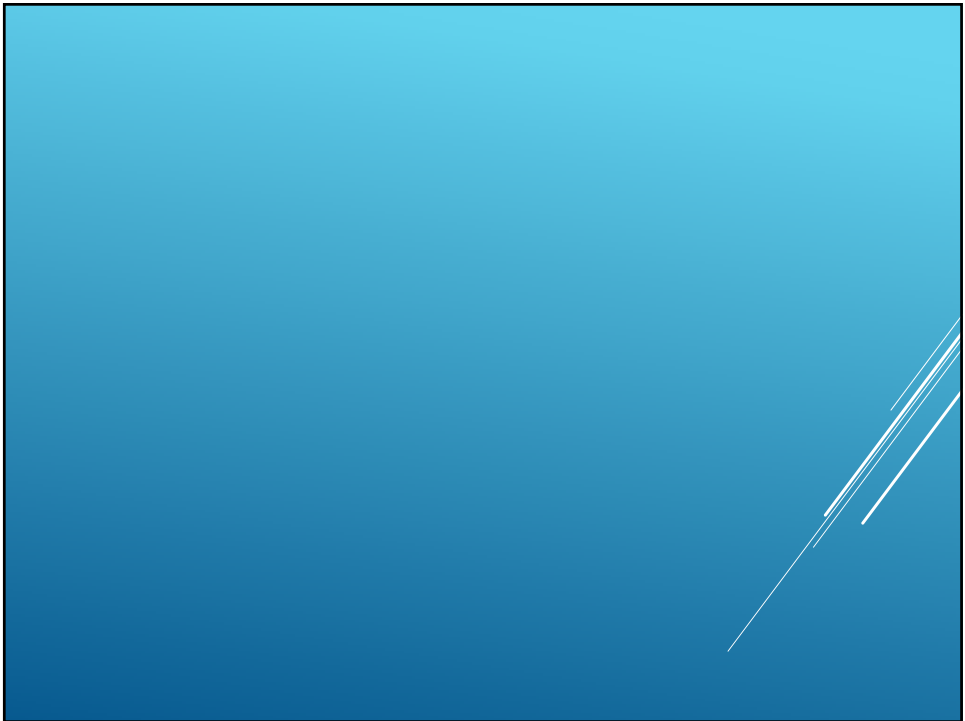
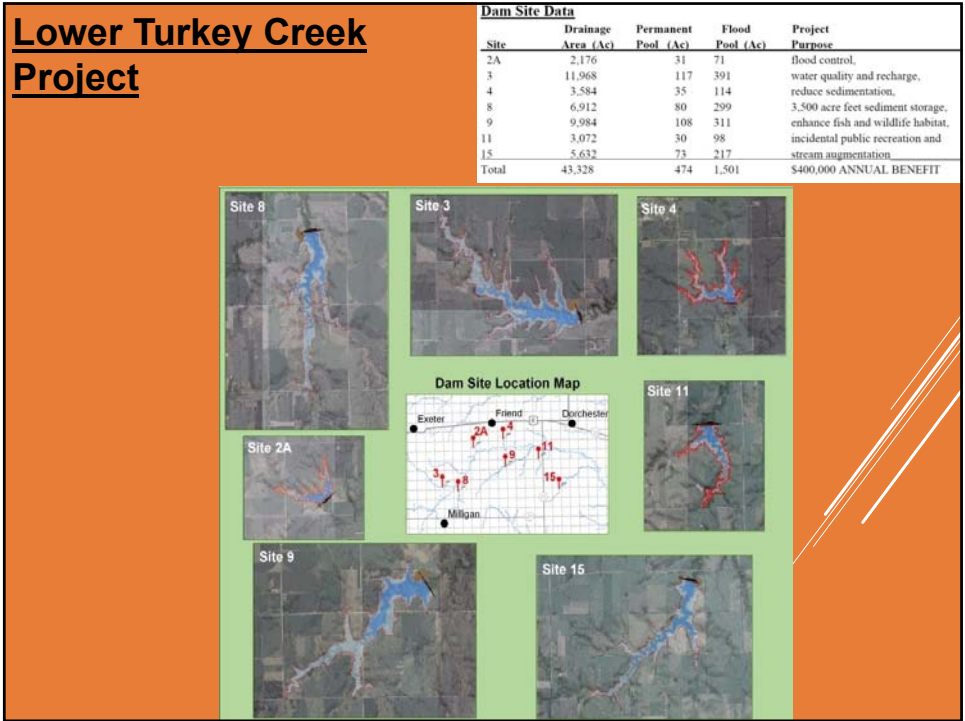
### Debris Cleanup

- \$112,337.72 FEMA
- Emergency Spillway Repairs
- Debris Cleanup
- Seeding



### Reseeding





# Attachment F





**COMPACT REPORT**

**2017**

**Kansas-Nebraska Big Blue River Compact  
Nebraska Report**

**Scott Snell, Public Relations Manager  
May 17, 2017**



## How a Natural Resources District functions:

- All 23 NRDs are organized as governmental sub-divisions of the State of Nebraska.
- Local control is provided by a Board of Directors, elected by voters within each District.
- Locally elected NRD Board of Directors are given a broad range of authority to manage within the context of state laws.
- This authority includes the power to tax, regulate, enforce rules and regulations, educate, conduct research, facilitate, assist and provide financial incentives.
- Across the state, NRDs offer a major source of assistance to landowners in conservation and natural resources management.





## The Numbers Are In

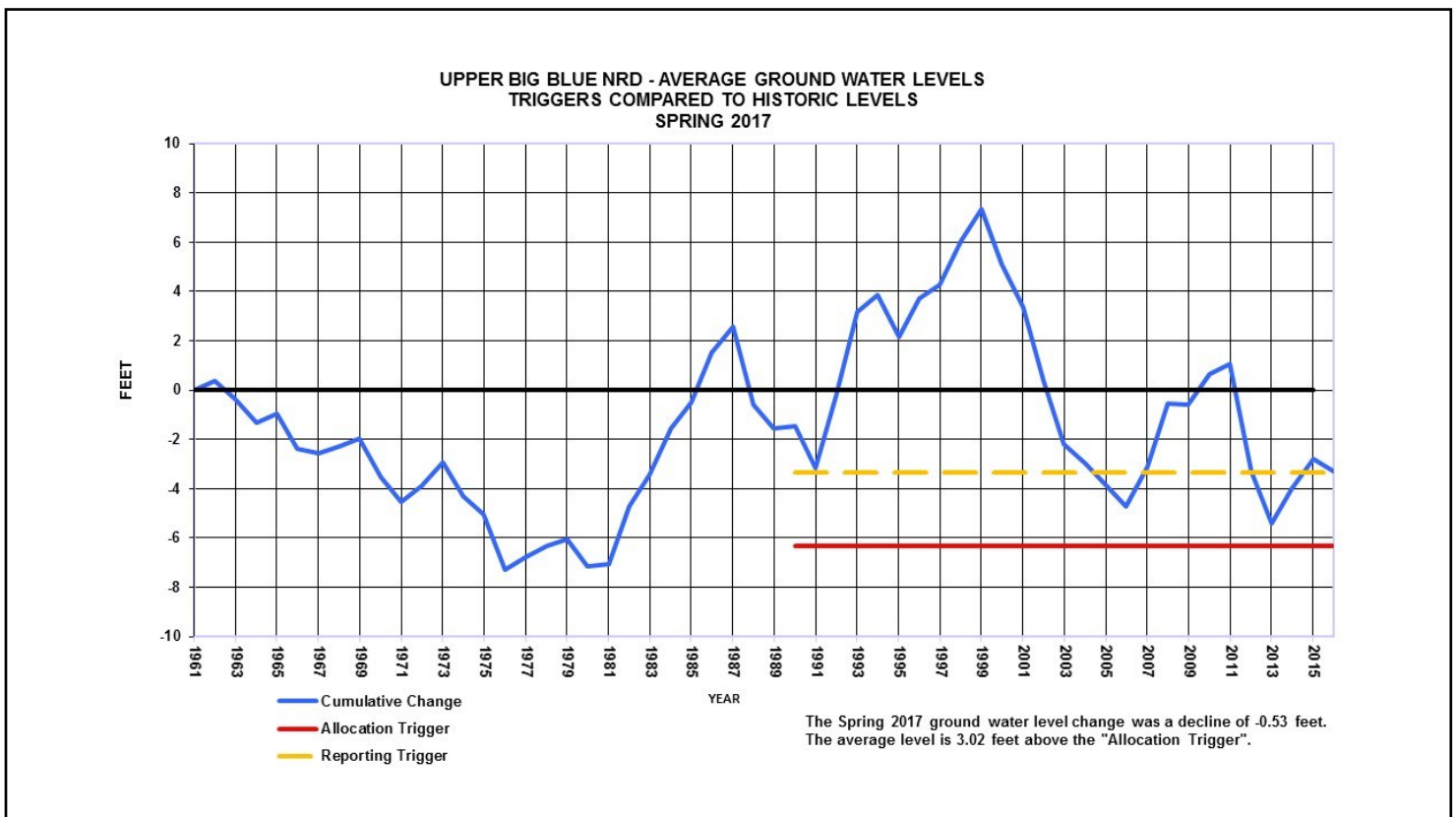
By Marie Krausnick, Water Department Manager, UBBNRD

District staff technicians completed the spring groundwater level measurements in mid-April. The District used 528 sites in this year's calculation. The average groundwater level change is -0.53 ft. This places the District 3.02 feet above the allocation trigger.

Each well measured is assigned an area of the District based on distances to other measured wells. This method of averaging is called the Thiessen polygon method, and gives the average groundwater level change calculation a weighted average.

Even though withdrawals were above the three-year average, they were still well below the 2012 growing season usage. That is good news for landowners, operators, and District staff as the 2016 growing season was certainly one for the record books. Heavy spring rains (avg. 10.21" in April and May) and above average temperatures in June (8 degrees warmer than June 2015) made for a non-typical growing season in the Upper Big Blue NRD.

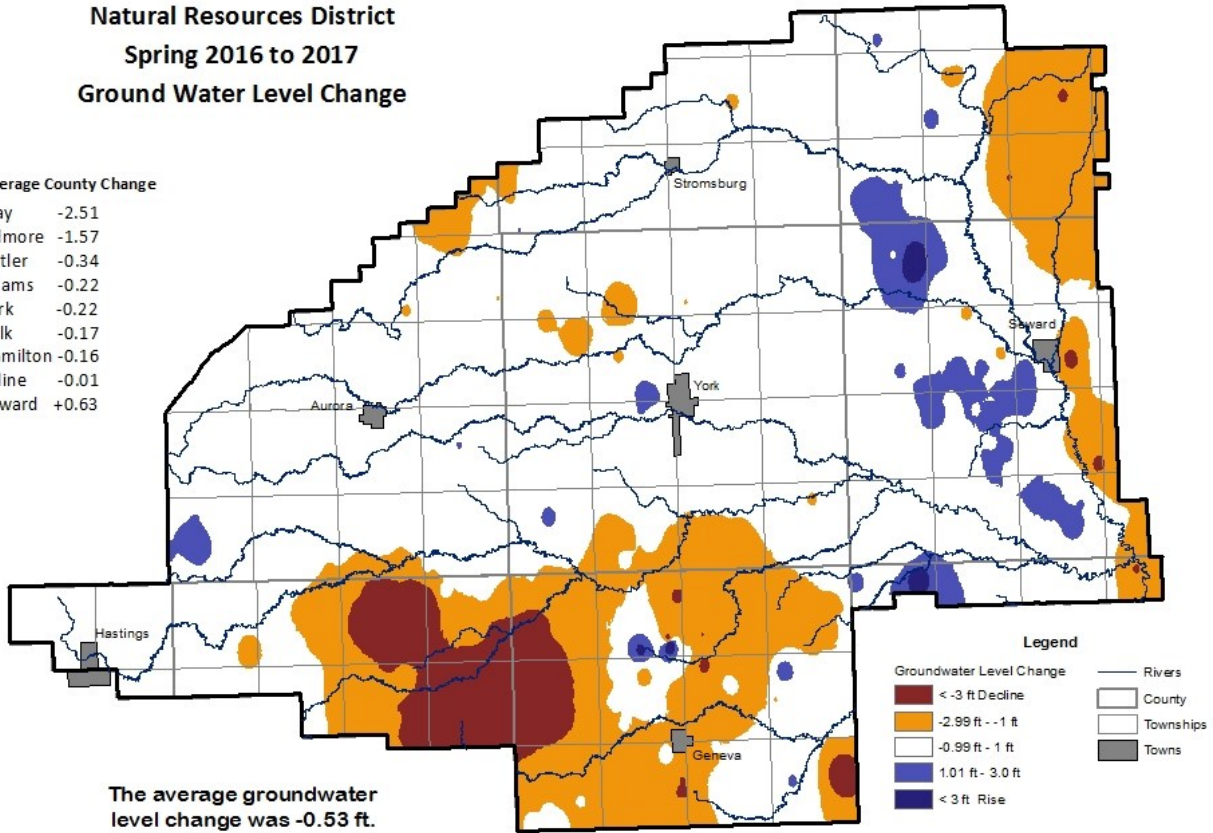
As the growing season and harvest went by, we had quite a few producers telling us that they were using just as much water in 2016 as they did in 2012. This had District staff bracing for large withdrawal report usage and drastic groundwater level declines. The amount of water pumped during the growing season has a direct impact on the groundwater level measurements we collect each spring.



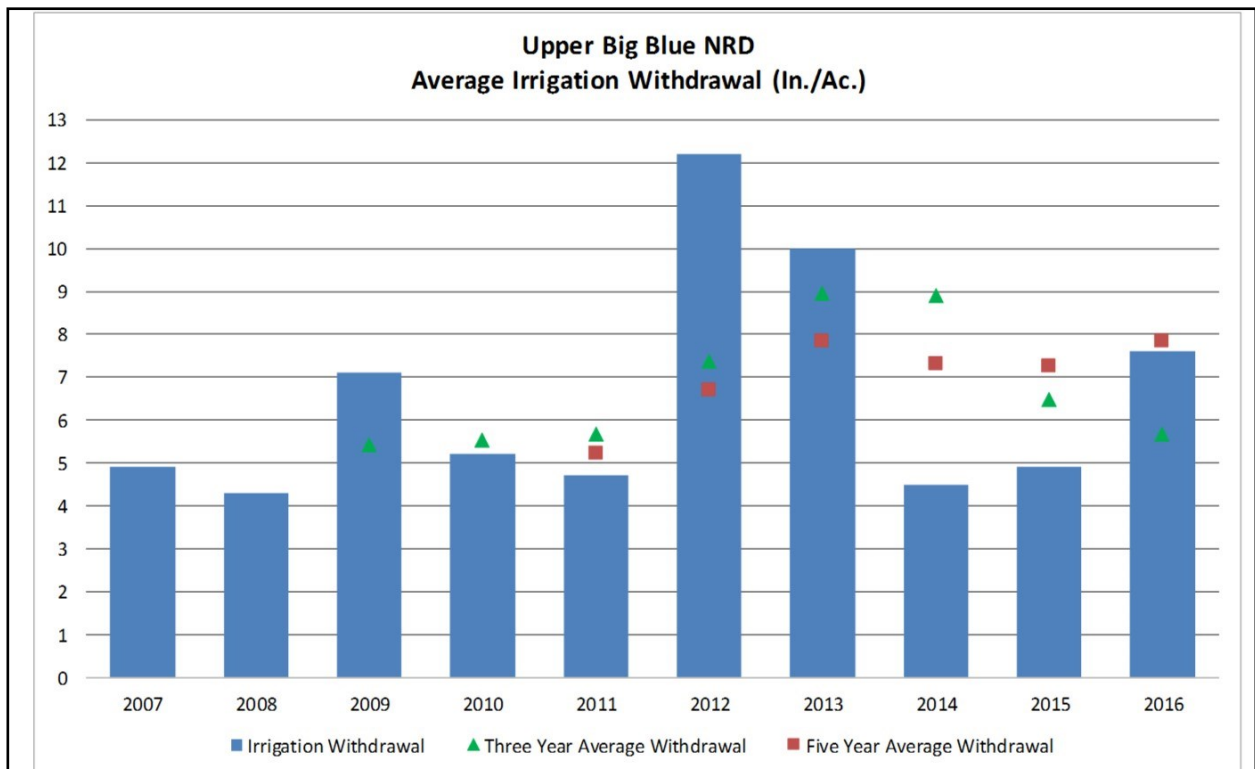
**Upper Big Blue  
Natural Resources District  
Spring 2016 to 2017  
Ground Water Level Change**

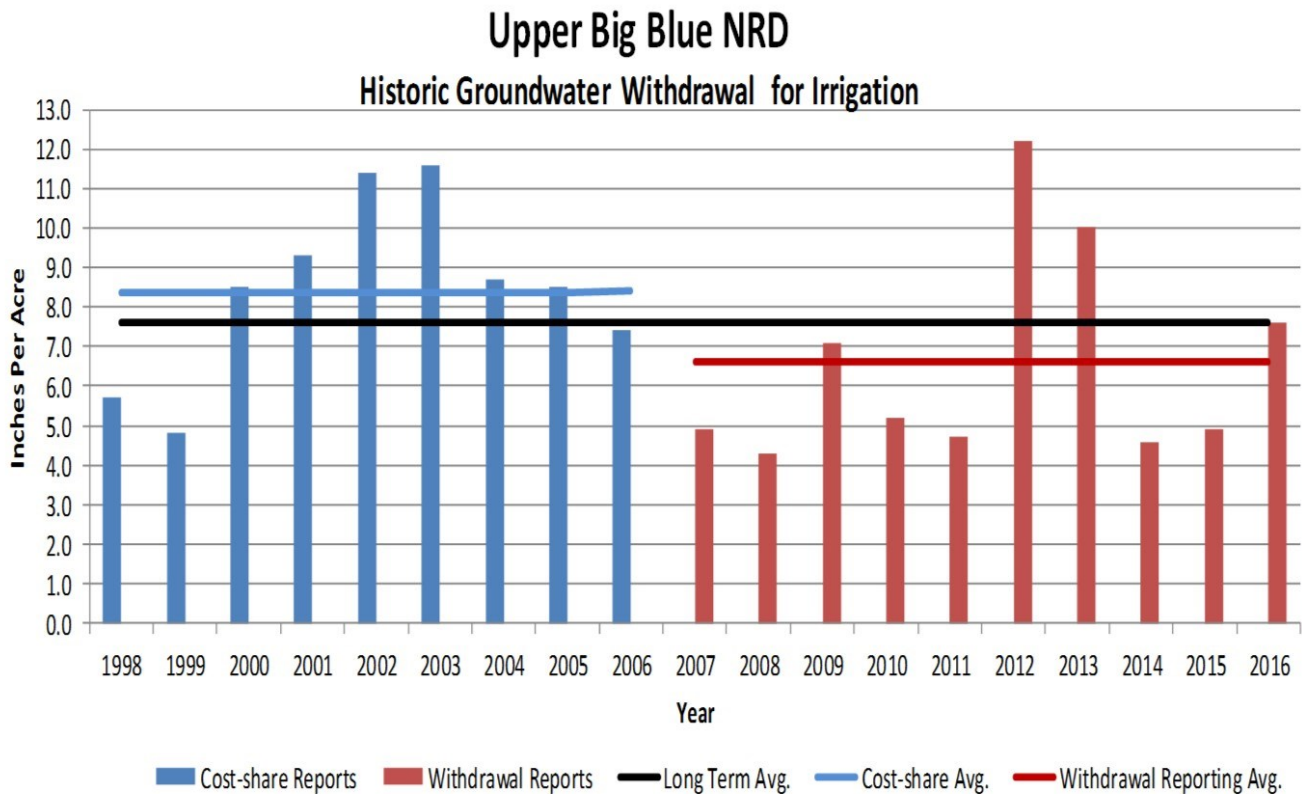
**Average County Change**

Clay	-2.51
Fillmore	-1.57
Butler	-0.34
Adams	-0.22
York	-0.22
Polk	-0.17
Hamilton	-0.16
Saline	-0.01
Seward	+0.63



The average groundwater level change was -0.53 ft.





## Well Drilling Activities

One hundred three permits were issued for irrigation wells (103 new & 56 replacements) in 2016. At the end of 2016 there were 12,165 registered irrigation wells in the District. This is an decrease of 22 active irrigation wells compared to the end of 2015.

## Certified Irrigated Acres

Mandatory reporting of irrigated acres and other water uses began in 2006. As of January 1, 2017, there were 1,234,101 groundwater irrigated acres certified by the NRD. This represents an increase of 4,004 acres since January 1, 2016.

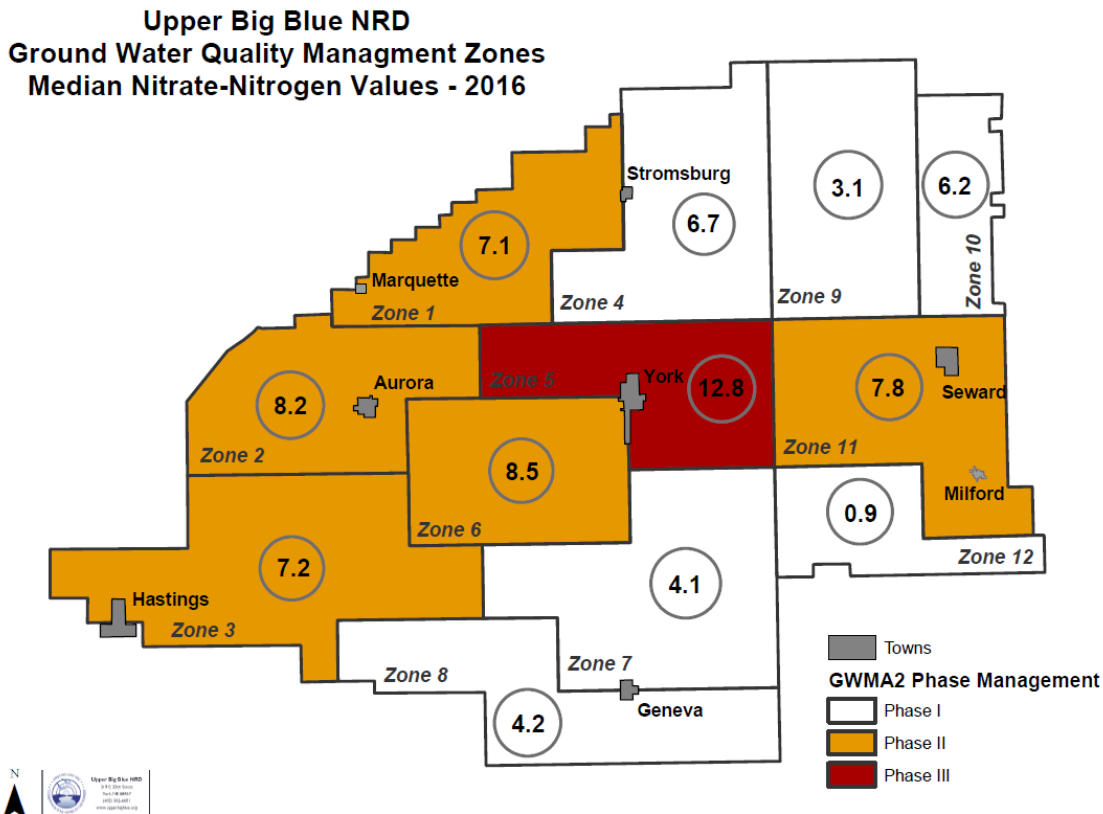
## Groundwater Quality

### Nitrate

The District is divided into twelve management zones for groundwater quality management. The primary groundwater quality management concern is nitrate. Five zones are currently designated a Phase II Management Area and one (Zone 5) is designated a Phase III Management Area. Phase II & III management requires farm operators to attend a training session on best management practices related to fertilizer and irrigation management. It also requires deep soil sampling, irrigation scheduling, and annual BMP reports. Farm operators in Phase II & III must schedule irrigation using soil moisture sensors in at least one field. In a Phase III management zone, anhydrous ammonia fertilizer applied from November 1<sup>st</sup> through February 29<sup>th</sup> must include a nitrification inhibitor. The timing of application of nitrogen fertilizers is restricted District-wide. The District is also working with the City of Hastings and the Little Blue NRD on a special water quality management area to address nitrate contamination in the Hastings Wellhead Protection Area. There are currently over 1,000 farm operators in the District required to attend nitrogen management training.

### Arsenic, Selenium, and Uranium

Potential groundwater contaminants such as arsenic, selenium, and uranium occur in many areas. These constituents are associated with sediments in the aquifer, as well as the unsaturated zone above the aquifer. Recent groundwater quality investigations near Hastings, Nebraska, as well as other parts of the mid-west indicate that these naturally occurring contaminants may be released into the groundwater as a result of increased agricultural chemical contamination such as nitrate. The District has completed the second year of a three-year project to sample wells in the District for these contaminants.



## Groundwater Modeling

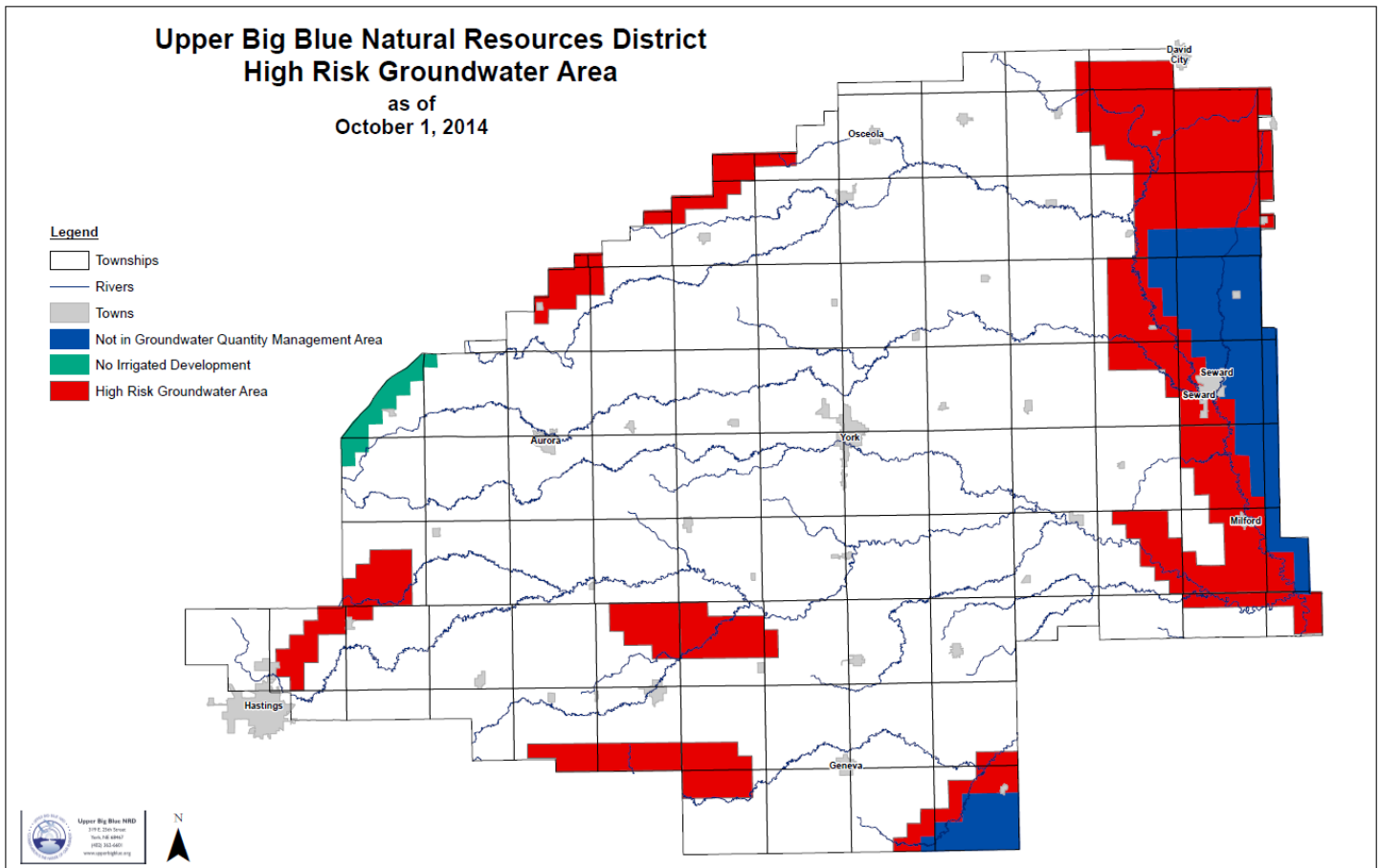
The Upper Big Blue NRD contracted with a consulting firm to prepare a Blue Basin groundwater model to identify the hydrologic connection of the aquifer and the Blue River system. The District has completed a fully transient, sub-regional model in a portion of Seward County. The District continues to meet with representative of the Department of Natural Resources to discuss model details and the potential for future modeling efforts.

## Wellhead Protection Planning

The District continues to assist communities to develop Wellhead Protection Area (WHPA) Plans. There are currently 26 communities that have approved WHPA plans. The District also assists communities with implementation of some plan components. These include water sample collection, analysis from rural wells, and soil samples collected from the unsaturated zone for nitrates.

## Nebraska Agricultural Water Management Demonstration Network

This program encourages producers to improve irrigation scheduling using ETgages and Watermark Sensors to determine crop water needs. The ETgage simulates crop water use through evaporation through a ceramic and green canvas membrane. Watermark Sensors are used to measure soil moisture in a nearby field to confirm the ETgage's accuracy. This program began in the Upper Big Blue NRD in 2005 with a collaborative effort from the University of Nebraska Extension and 18 collaborators. The program is now being implemented in several NRDs and over 2,000 collaborators. The Upper Big Blue NRD sells this equipment to irrigators at a reduced cost to encourage adoption of the scheduling practices.







## Municipal Water Quality Assistance Program

By Rod DeBuhr, Assistant General Manager,  
Upper Big Blue NRD

Nitrates are a water quality concern. There is a potential health risk from ingesting water with higher nitrates, especially to infants and the elderly. The State of Nebraska and the Nebraska Department of Environmental Quality have regulations on what the legal levels of nitrates can be in drinking water for safe consumption. If the nitrate level is more than 10 ppm (parts per million), communities need to treat their water, or provide an alternative source of water for their residents.

In the Upper Big Blue NRD, with the heavy irrigated agriculture, there has been a long history of nitrogen application on corn. Of course, it is essential to have fertilizer to grow good crops. Historically however, excess nitrogen application, coupled with excess irrigation, has caused that nitrogen to leach through the crops' root zone and down into the aquifer and contaminating the local groundwater.

As a result, the Upper Big Blue NRD has adopted a new program this year recognizing that the nitrate concern is a long-term problem. Equally, it will be a long-term solution. Yet in the meantime, people still need safe drinking water. As a result, the Municipal Ground Water Quality Program was adopted by the Upper Big Blue NRD Board of Directors in September. The purpose of the program is to assist communities through cost-share by paying up to 25% of drilling new and/or deeper wells to get away from nitrates, and to implement other improvements to municipal water systems to eliminate high nitrate wells. Both Aurora and Seward have now partnered with the Upper Big Blue NRD through this new program.

In the case of the City of Seward, they have a water treatment plant that removes nitrates and they are currently going through a retro-fit to improve the treatment plant's efficiency. The city's filtration membranes have surpassed their life cycle and new, more energy efficient membranes that the NRD helped underwrite are now lowering the nitrate levels for safe drinking water. According to Tim Richtig, City of Seward Waste Water Director, "The support from the Upper Big Blue NRD is such a great benefit because of the high cost of replacing membranes and operating the system. This program is a great help to the City of Seward and any other city interested in participating in the program."

The Upper Big Blue NRD continues to work on both educational and regulatory efforts to get producers to soil sample and only



Tim Richtig, City of Seward Water/Waste Water Director, is interviewed by "Pure Nebraska" about Seward's partnership with the Upper Big Blue NRD.



Rod DeBuhr, Assistant General Manager at the Upper Big Blue NRD, talks with "Pure Nebraska" about the cost share program in Seward.

apply the amount of fertilizer that the crops truly need. Also, the educational process is helping producers set realistic yield goals, plus adjusting the timing of the application so that these fertilizers do not lay in the ground for a long period of time to leach away before the crop has an opportunity to use them. At the same time, the Municipal Ground Water Quality Program is restoring safe drinking water levels to cities, towns, and villages. If your city is interested in water quality assistance through this program, please contact Marie Krausnick, Upper Big Blue NRD Water Department Manager, at (402) 362-6601.

## Private Dams Program

The Private Dams Program provides planning, design and financial assistance for the construction or reconstruction of dams located on private property. These dams generally have a cost exceeding \$15,000 and have a drainage area of approximately 80 to 640 acres. Dams constructed under this program generally involve only one landowner. Public benefits include flood control, sediment and erosion control, water conservation, groundwater recharge, and fish and wildlife enhancement.

### Application and Project Design:

Applications for funding are handled by the NRCS or District offices. Planning, design and construction inspection will normally be provided by the NRCS or the District. If the NRCS or District is unable to provide these services, the landowner may hire a private engineering firm to provide all or part the needed services. The District will assist in preparation of the scope of services needed.

### Permits and Land Acquisition:

The landowner will be responsible for obtaining any required permits or easements for access or use of lands owned by another person. The NRCS and/or District will assist the landowner. All required permits must be obtained before construction can begin.

### Maintenance:

The landowner shall be responsible for the cost of all normal maintenance. "Normal" maintenance shall include, but not be limited to, preventing over grazing, removal of debris from or near the principle and emergency spillways, soil erosion on the dam, the control and removal of trees and brush on the structure and spillways. If repairs are needed, due to a major storm event, which are deemed, by the District, to be in excess of "normal" maintenance, the District will consider cost-share assistance for said repairs on a case-by case basis. Factors to be considered in determining the need for and merits of repair shall include, but not limited to, cost of the repairs and the age of the structure.

### Repayment of Cost-share Funds:

If the project is removed or the District determines that it has been altered so as to lessen its effectiveness within the design life of the project and after receipt of payment, the landowner(s) must refund all cost-share funds used for the project. This condition will be binding on heirs, assigns or other transferees.

### Cost-Share Rate:

The cost-share rate will be 75% of the project cost. Eligible costs include construction and design services provided by a private engineering firm. The cost-share of private engineering will only be paid if the dam is constructed. The maximum cost-share is \$50,000. Final cost above the District approved cost shall be the landowner's responsibility.

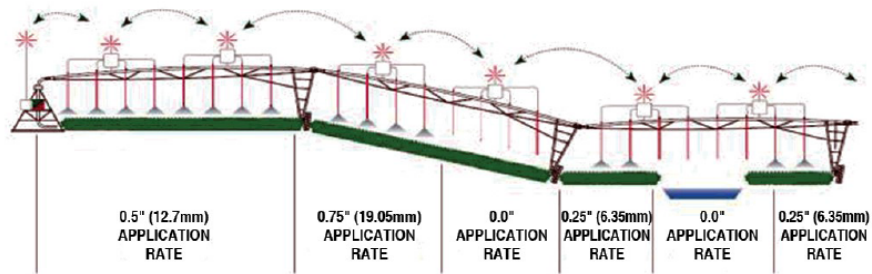


## Conservation Benefits of Variable Rate Irrigation

By Marie Krausnick, Water Department Manager, Upper Big Blue NRD

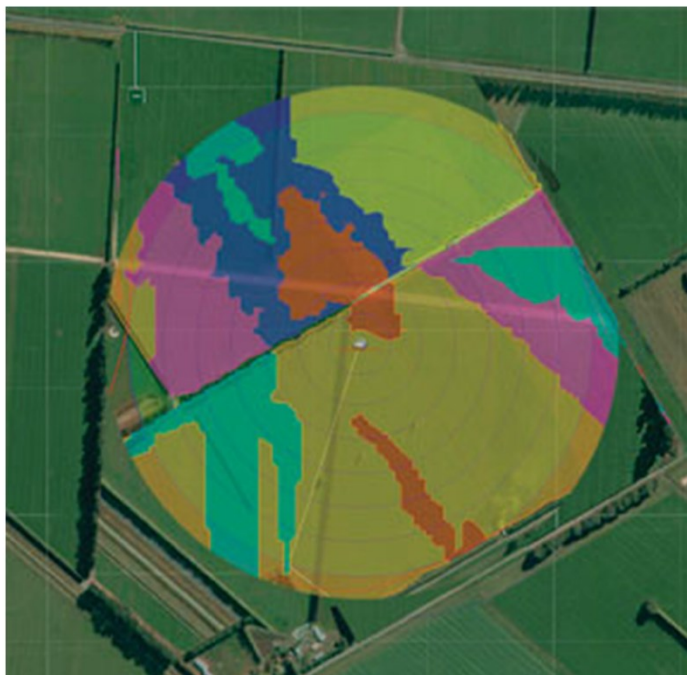
Variable Rate Irrigation, or VRI, is one of the new buzz words in irrigated agriculture. Having the ability to vary irrigation applications along a center pivot based on soil type or topography will decrease runoff, improve surface and groundwater quality, increase chemigation application efficiency, save energy, and in most cases, save water. VRI is gaining adoption in areas of the U.S. where water restrictions are forcing producers to look at their field and ask, "How can I maximize production with limited water resources?"

We are fortunate in the Upper Big Blue NRD that we currently do not have water restrictions. There are many areas where VRI might be a good fit in our District.



*A variable rate irrigation system can automatically adjust application of water based on soil type, topography and other factors.*

## Conservation Benefits of Variable Rate Irrigation



*The colors on the image above indicate variations in soil type and topography. VRI can recognize these areas and increase or decrease water application automatically.*

We do have an increasing concern with groundwater quality and irrigation runoff. In fields with varying water holding capacities due to differing soil types, over-applied irrigation water pushes nitrate toward the aquifer. In areas of our District with rolling topography, having the ability to speed a system up, or shut nozzles off to cut down on the amount of water applied to slopes can decrease runoff and sediment losses. With these factors in mind, Dr. Derek Heeren, Assistant Professor of Irrigation Engineering with the Robert B. Daugherty Water for Food Institute at UNL, suggests the following: "Increasing pressure on our water resources prompts us to look for ways to manage our water more precisely.

VRI is a tool with several potential benefits, and its usefulness will depend on the specific field being considered. It may be possible to increase yield by using VRI to prevent yield losses due to over-irrigation. UNL is leading research to develop best management practices for VRI."

For producers in the Upper Big Blue NRD who have implemented VRI, the benefits are evident. According to Gary Eberle, Bradshaw area producer, "The VRI system has allowed our operation to realize greater fuel and water savings creating a more uniform water distribution pattern. With lower input costs, this consistency and reliability has brought me peace of mind that our natural resources are sustainable."

VRI is something new that the Upper Big Blue NRD is looking toward to protect our natural resources. Please call Marie Krausnick, Upper Big Blue NRD Water Department Manager, at (402) 352-6601, to discuss how a VRI system might benefit your operation.



## Diverse Partnership Turns Good Ideas into Good Habitat — and Good Pasture

By Andy Bishop, Rainwater Basin Joint Venture Coordinator

A restored wetland in southwestern Hamilton County is the site of an innovative partnership that combines new technology with some old-fashioned common sense. Rainwater Basin Joint Venture (RWBJV) partners, including conservation agencies and agriculture technology and equipment companies, are working with the Marsh family to maximize the value of their Rainwater Basin wetland – in their farm operation and as migratory bird habitat.

Not long ago, the Marsh family was evaluating options to deal with 50-plus acres of flood-prone cropland. They considered the Wetlands Reserve Program (which has since been replaced by Agriculture Conservation Easement Program - Wetlands Reserve Easement Option, or WRE), administered by the USDA's Natural Resources Conservation Service. But like many producers in south-central Nebraska, the Marshes were dissuaded by a significant obstacle: the program would limit their ability to cross a pivot irrigation system over the enrolled lands, thereby reducing the system's efficiency. However, in 2011, a Wetlands Reserve Enhancement Program (WREP) was established under which landowners maintained a reserved right to pass their irrigation system over enrolled acres.

The program's flexibility encouraged the Marshes to sign up for WREP. Their wetland was restored through sediment removal and seeding of native plants, and a permanent easement was placed on the acres involved.

The family reinvested the easement payment into the purchase of a corner system for their center pivot, which allowed them to irrigate their field corners and thus gain 15 acres of high-quality irrigated cropland to offset 53 acres of previously marginal ground.

The Marshes and the Joint Venture partners wanted to ensure the wetland's long-term value, both to the farm operation and to migratory birds. For that, two things were necessary: an ability to precisely control irrigation inputs, and a method for controlling undesirable invasive species such as reed canary grass. Wetland plant communities can be managed through regular disturbances – such as prescribed fire, haying, or chemical and mechanical treatments. But the method promoted by the RWBJV's Working Lands Initiative – and the one chosen by the Marshes – is grazing, which not only improves wildlife habitat, but produces income.

To facilitate grazing, RWBJV partners provided 85% cost-share to construct wildlife-friendly perimeter fence, as well as a solar livestock well tank. Sixteen pivot-crossing ramps will be installed on the fence so that the pivot can cross over and make a complete rotation. The RWBJV is also helping the Marshes develop a grazing plan that will maximize habitat and forage production.

Precise control of irrigation inputs – through retrofitting the existing pivot irrigation system – will protect the wetland by ensuring that it doesn't become too wet and

*Continued on next page* →





maximize crop production by applying irrigation inputs to locations in the field that are in water deficit. A variety of Variable Rate Irrigation technology upgrades were needed. These included modifications to the valves and sprinklers, plus GPS and specialized software at the pivot panel. Together these upgrades allow producers to control when nozzles are turned on and off, according to their location in the field. Soil moisture probes along with precision mapping allow the producer to understand in real time how much moisture is needed, and where.

Funding for the project comes from the Nebraska Environmental Trust, a State Wildlife Grant from the Nebraska Game and Parks Commission, the U.S. Fish and Wildlife Service’s Partners for Fish and Wildlife program, and the landowner. Valmont Industries is providing funding for modifications to the pivot system; CropMetrics is providing funding to support the precision mapping and development of irrigation prescriptions; and, AgSense is contributing financially to hardware and firmware upgrades.

RWBJV coordinator Andy Bishop says, “We’re pleased to join irrigation companies in this project. Like our conservation partners, they recognize that when wetlands become assets in an agriculture operation, we all benefit.”

An added outcome of the project is that it will serve as one of several test sites in a study to quantify how net farm income is affected by a transition of flood-prone cropland to forage production, and by adoption of VRI technology. The two-year study will be conducted by the

Daugherty Water for Food Institute at the University of Nebraska-Lincoln and will be funded by the National Fish and Wildlife Foundation and the Nebraska Natural Legacy Project.

“Variable Rate Irrigation is an option that offers answers to many of the challenges we face in integrating conservation with agriculture,” says Bishop. We hope the results of this project will encourage more producers to explore this option, and will provide them with information to make an informed decision.”



## Project GROW

A project benefiting York, Nebraska citizens by planting cover & rotational crops, berry orchard, community garden, and pollinator habitat atop the City of York wellfield. The *Project GROW* acronym stands for:

**G**rowing **R**otational crops **O**n **W**ellfields

Multiple benefits abound through the proposed *Project GROW* program. Cover & rotational food crops will create soil heath and sustain water quality free from pesticides, herbicides, and over fertilization/irrigation. A community garden, berry orchard, and a pollinator habitat are fundamental to this project design. The community garden and berry orchard will help supplement individual needs for locally-grown food, and the cover & rotational crop plot of barley, wheat, rye, triticale, field/sweet corn, pumpkins, and potatoes will reach a greater group of consumers throughout the York area.

The pollinator habitat will involve the cooperation of a local beekeeper who happens to be the York City Administrator, and thus will create a honey production epicenter to enter the local food market. Two local FFA chapters can team up and engage in a honey production project at the pollinator habitat site, market their own honey brand, and learn beekeeping skills. The barley can be contracted with several craft breweries 45 miles away in Lincoln, Nebraska. Grazing opportunities will also be available at the wellfield site. (Please see the aerial map of *Project GROW* on following page).

*Project GROW* will change the current conditions on 160 acres of the total 400, by using no-till, cover crops, and unconventional crop rotations to improve soil health, increase water infiltration, decrease soil erosion, and improve profitability. Diverse cover crop mixes, containing legumes, grasses, grains, and brassicas—along with nonconventional crops, such as field peas and barley—will bring the wellfield soils back to life. *Project GROW* comes around full circle by placing an emphasis on creating a new channel for food production at the wellfield to address underserved areas and food deserts.

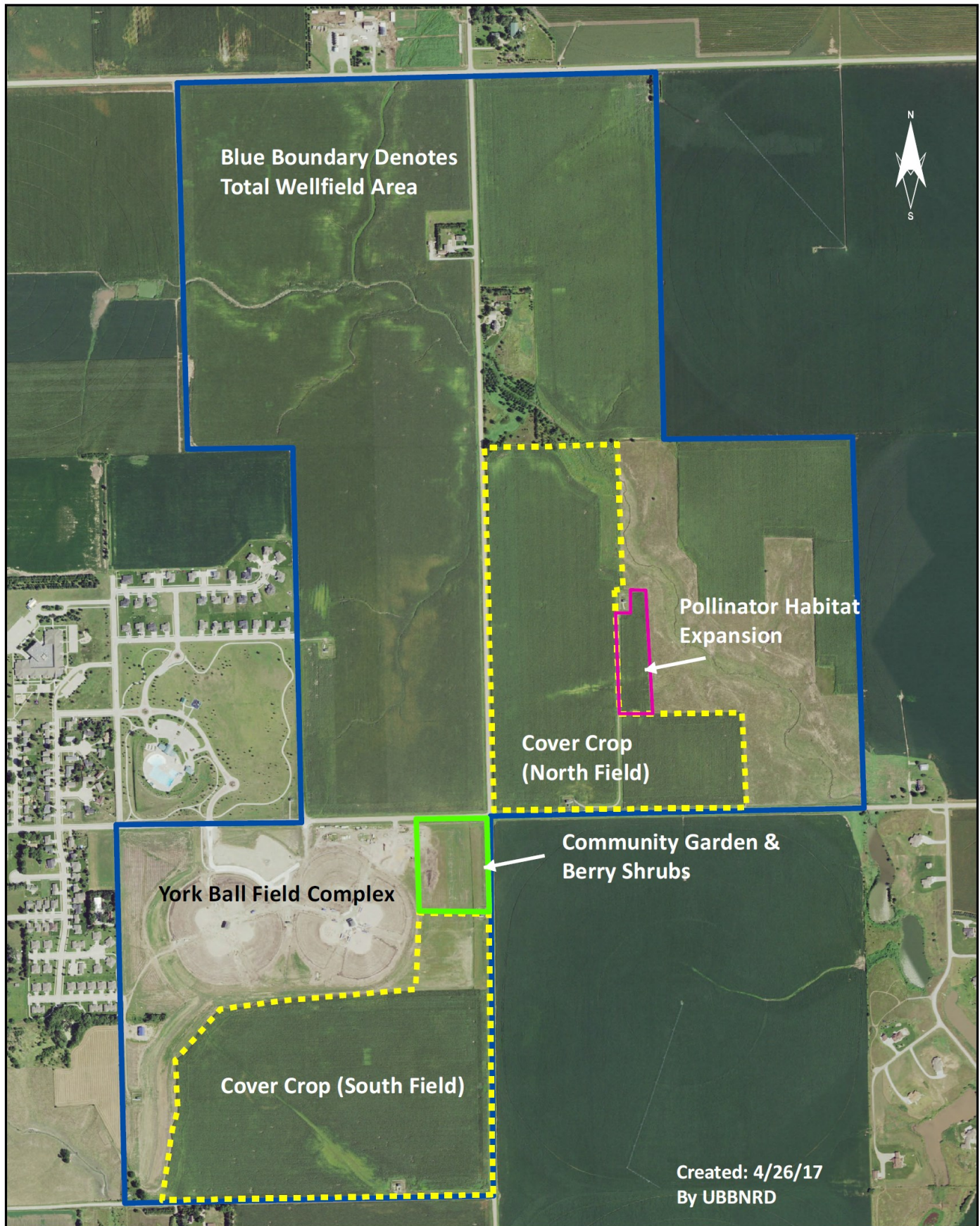
Our desire is to also engage local school students and citizens to show them the biodiversity of Nebraska's soils and what is grown on the land surface relates to the soils biological health below. The wellfield thus becomes a demonstration site for folks of all backgrounds and interests in conserving and utilizing natural resources wisely.

*Project GROW* has been viewed by the Upper Big Blue NRD and its partners as a win-win scenario with a positive domino effect. As a goal for eradicating the local food desert, the multiplicity of improving soil health, controlling erosion, non-leaching of nitrogen into the water table, and increasing water holding capacity in the soil, all come into confluence for protecting York's water quality at the wellfield.

Imagine how this project could change behavior in neighboring municipalities as they might begin converting their wellfield sites to the same degree of success. *Project GROW* has the potential to change the way wellfields are managed across Nebraska thus addressing statewide food deserts.



## Project GROW aerial map







# Upper Big Blue Natural Resources District



319 East 25th Street  
York, NE 68467

Scott C. Snell, M.A.  
Phone: (402)-362-6601  
Fax: (402)-362-1849  
Email: [ssnell@upperbigblue.org](mailto:ssnell@upperbigblue.org)

From our leaders to yours...thank you for the decisions you all make to safeguard our collective resources that we share between Kansas and Nebraska!

As water leaders, you are making a difference in the lives of so many...



# Attachment G



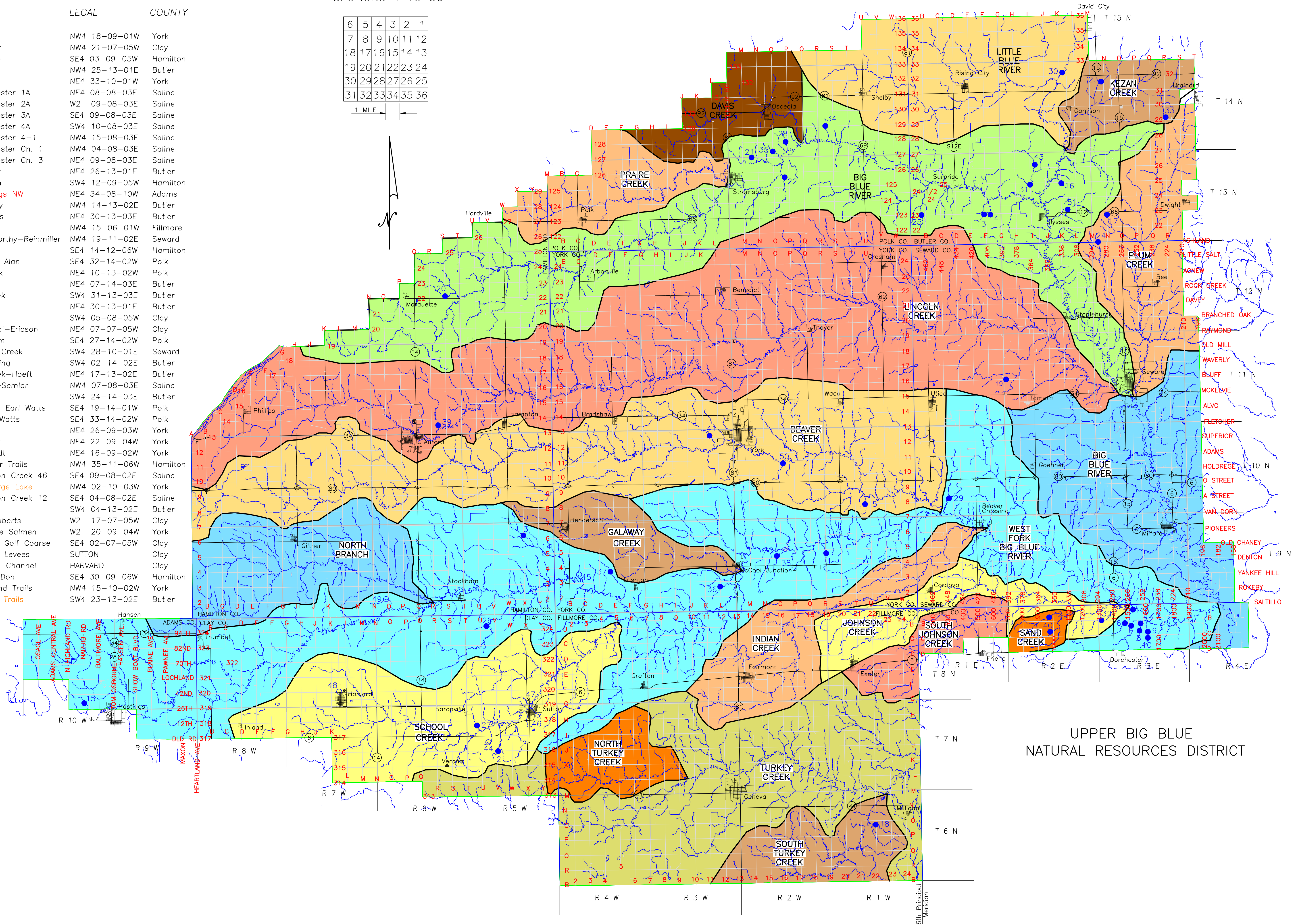
UPPER BIG BLUE NATURAL RESOURCES DISTRICT  
STRUCTURE INDEX

TYPICAL TOWNSHIP LAYOUT  
SECTIONS 1 TO 36

MAP NO.	ROAD/ FIELD	NAME	LEGAL	COUNTY
1	F	Bailey	NW4 18-09-01W	York
2	R	Benson	NW4 21-07-05W	Clay
3	R	Bergan	SE4 03-09-05W	Hamilton
4	R	Bruner	NW4 25-13-01E	Butler
5	R	Bulgrin	NE4 33-10-01W	York
6	F	Dorchester 1A	NE4 08-08-03E	Saline
7	F	Dorchester 2A	W2 09-08-03E	Saline
8	F	Dorchester 3A	SE4 09-08-03E	Saline
9	F	Dorchester 4A	SW4 10-08-03E	Saline
10	F	Dorchester 4-1	NW4 15-08-03E	Saline
11	F	Dorchester Ch. 1	NW4 04-08-03E	Saline
12	F	Dorchester Ch. 3	NE4 09-08-03E	Saline
13	R	Dunker	NE4 26-13-01E	Butler
14	R	Friesen	SW4 12-09-05W	Hamilton
15	R	Hastings NW	NE4 34-08-10W	Adams
16	R	Hottovy	NW4 14-13-02E	Butler
17	R	Hromas	NE4 30-13-03E	Butler
18	R	Kassik	NW4 15-06-01W	Fillmore
19	R	Langworthy-Reinmiller	NW4 19-11-02E	Seward
20	R	Larson	SE4 14-12-06W	Hamilton
21	R	Lason, Alan	SE4 32-14-02W	Polk
22	F	Mentink	NE4 10-13-02W	Polk
23	F	Miller	NE4 07-14-03E	Butler
24	R	Moravek	SW4 31-13-03E	Butler
25	R	Noble	NE4 30-13-01E	Butler
26	F	Nuss	SW4 05-08-05W	Clay
27	F	Percival-Ericson	NE4 07-07-05W	Clay
28	R	Ransom	SE4 27-14-02W	Polk
29	F	Smith Creek	SW4 28-10-01E	Seward
30	F	Struebing	SW4 02-14-02E	Butler
31	R	Urbanek-Hoeft	NE4 17-13-02E	Butler
32	R	Vavra-Semlar	NW4 07-08-03E	Saline
33	R	Vrbka	SW4 24-14-03E	Butler
34	R	Don & Earl Watts	SE4 19-14-01W	Polk
35	R	Merle Watts	SE4 33-14-02W	Polk
36	R	Weiss	NE4 26-09-03W	York
37	F	Siebert	NE4 22-09-04W	York
38	F	Albrandt	NE4 16-09-02W	York
39	F	Pioneer Trails	NW4 35-11-06W	Hamilton
40	F	Johnson Creek 46	SE4 09-08-02E	Saline
41	F	Recharge Lake	NW4 02-10-03W	York
42	F	Johnson Creek 12	SE4 04-08-02E	Saline
43	F	Stara	SW4 04-13-02E	Butler
44	F	Tom Alberts	W2 17-07-05W	Clay
45	F	Maurice Salmen	W2 20-09-04W	York
46	F	Sutton Golf Course	SE4 02-07-05W	Clay
47	F	Sutton Levees	SUTTON	Clay
48	F	Havard Channel	HARVARD	Clay
49	F	Wells, Don	SE4 30-09-06W	Hamilton
50	F	Overland Trails	NW4 15-10-02W	York
51	F	Oxbow Trails	SW4 23-13-02E	Butler

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

1 MILE



UPPER BIG BLUE  
NATURAL RESOURCES DISTRICT



# Attachment H

**“OPERATION: Conservation” Educational Exhibit**

Based on Milton Bradley’s “Operation” board game, the “OPERATION: Conservation” traveling educational exhibit is a hands-on display designed to creatively feature all of Nebraska’s 23 Natural Resources Districts (NRDs) with boxes that contain objects germane to the mission of Nebraska’s NRDs. It is a three-dimensional model in the shape of the State of Nebraska.

Imagine if you will that one of the objects that a person tries to retrieve from a box is a small foam tree. Giant barbecue tongs serve as the “tweezers.” Once the tree is removed, a standing graphic display has a match for that object. In our particular case... a tree. A factoid description of the NRD tree program is featured: “Did You Know that since 1972, Nebraska’s Natural Resources Districts have planted 18 million trees?”



If the contestant happens to touch the sides of the box, a buzzer sound will be audible and a 3-D representation of the State Capitol building in Lincoln, will light up with four distinctly colored LED lights depending on which region of the state was touched by the tongs. Because students are “operating” on the State of Nebraska, the idea for lighting up the capitol building became apparent because the Nebraska NRD system was created by the state legislature. Other objects such as plastic fish, boats, a dam, bulldozer, rain gauge, farm animals, toy bicycles, irrigation scheduling equipment, etc., are matched to the display banners that feature the mission of the NRDs through recreation/parks/trails, groundwater protection (quality & quantity), forestry, flood control projects, and more.

**Target Audience/Objective:**

The objective is to create awareness amongst Nebraska students age Kindergarten through 5th grade over a five-year period as to what functions Nebraska’s Natural Resources Districts perform across the state, and to spur discussion and action in their classrooms to conserve and preserve natural resources. “OPERATION: Conservation” will be displayed in schools, county fairs, town libraries, and educational festivals. It made its debut in the spring of 2014.

**Technical:**

The exhibit disassembles in four sections and is easily transported in a small enclosed trailer. When assembled it measures 8 feet by 16 feet, and rises 1 foot up from the floor. The exhibit is fully wired with buzzer sounds and lights inside the three-dimensional Nebraska State Capitol. The panels are made from tubular steel and 1/2 inch plywood and covered in durable and colorful vinyl graphics that depict each NRD, all of Nebraska’s 93 counties, and major river systems. It is purposely built large in scale so that it can accommodate up to 20-25 students at a time. Students also gain in their sense of geography.

**Budget:**

*The budget for producing the exhibit is broken down as follows:*

Hardware/Materials:	\$560.00
Steel/Aluminum/Plywood:	\$1,440.00
Graphics/Artwork:	\$6,450.00
Electrical:	\$7,950.00
Labor/production:	\$12,850.00
<b>TOTAL:</b>	<b>\$29,250.00</b>



**Results:**

From 2015-2017, the “OPERATION: Conservation” exhibit has traveled over 1,100 miles and has reached over 10,000 students and parents. The exhibit is scheduled to travel for four more years. Creating an interactive and hands-on exhibit has given Nebraska’s Natural Resources Districts a fun tool to help reach and teach students about the importance of our natural resources and how to conserve them for future generations.

***For more information, please contact Scott Snell,  
Public Relations Manager, Upper Big Blue Natural Resources District  
ssnell@upperbigblue.org  
(402) 362-6601***











# OPERATION: CONSERVATION



LAURA BEAHM/Tribune

Wallace Elementary first-graders Addison Ackles (left), Ryan Stritt (center) and Axel Andersen use tongs to pull an item out of the Nebraska-shaped "board game," "Operation: Conservation," Friday afternoon.



# Interactive display aids understanding of NRDs

By **ANDY RAUN**  
Hastings Tribune

**HASTINGS** — Did you realize that since they were founded in 1972, Nebraska's 23 natural resources districts have sold a combined total of 89 million seedling trees for windbreaks and other conservation functions?

How about this one: Did you know the NRDs maintain about 15,500 acres across the state as public recreation areas?

Or, did you have any idea that the districts hold permits for a combined total of 959 flood control dams?

These and other statistics offer a glimpse of what Nebraska's NRDs do for the state's citizens. And with a new interactive display built by a Hastings man, that information now is available to kids of all ages — or at least those with the dexterity to pluck a toy out of a cubbyhole using tongs.

"The whole idea was to make this a very tactile, tangible, hands-on learning experience," Scott Snell, public relations manager for the Upper Big Blue NRD and creator of "Operation: Conservation," said on a break from showing the display to students at the Adams Central Wallace Elementary School south of Hastings.

The three-dimensional "board game," which Snell built of tubular steel and plywood in his Hastings garage, is a 16-by-8-foot replica of the state of Nebraska, divided into four sections that are laid out flat

on the floor.

Cubbyholes built into each section are loaded with small stuffed animals, toy trucks and other "kid stuff" meant to represent some aspect of a Nebraska NRD's duties as it relates to natural resources across the state.

Viewers of the display take the tongs and try to remove a toy without touching the sides of the cubbyhole — reminiscent of the old Milton Bradley (nowadays Hasbro) "Operation" board game so many Nebraskans of a certain age remember from their childhoods.

Once players retrieve a piece, they can take it to a large sign board nearby and find an informational entry corresponding to that piece. The entry contains facts and figures like those cited above.

"I'm a visual learner," said Snell, a Hastings College graduate who has worked for the NRD for 10 years but also builds furniture and other items as a business sideline or hobby. "I'm building this for myself: 'How would I like to learn?'"

Snell built the structure over a six-week period recently. His part of the work included doing all the metal fabrication himself. Then, he took his creation to Krieger Electric in Hastings for wiring and to Wallingford Signs in York for the graphics and artwork.

He's especially proud of the replica of the State Capitol that stands attached to the board over the city of Lincoln, which he also built. A

light bulb inside the Capitol shines and a tone sounds when a player touches the side of a cubbyhole, just like the patient's nose lights up and a buzzer goes off in the old "Operation" game.

"What amazes me is the wiring and how close they got it to the actual 'Operation' game," said Max Granstrom, 12, a sixth-grader at Wallace. "The Capitol is cool, too?"

Max's classmate, 11-year-old Makena Lindblad, said the students had fun with Snell's creation, trying to use the tongs to fish the items out of the cubbyholes.

"Some of them are tricky," Makena said.

Under Nebraska law, the entire state is divided into NRDs, which regulate groundwater resources to preserve quantity and quality but also are responsible for public education and for promoting soil and water conservation, flood control, disaster preparedness and other duties.

The NRDs are supported in part by property tax dollars and are governed by elected boards of directors. Snell said he hoped his "Operation" game would help engage the public and increase understanding of what the NRDs do, as well as the importance of the natural resources themselves. He collected and compiled the statistical information himself through numerous contacts with state and NRD officials.

"I'm not required to build these kinds of things (as part of my job),"

said Snell, who worked in fund-raising for Hastings College before joining the NRD. "I do it because I enjoy it and I have the background to do it."

Snell tackled the project with support from the NRD management and board and is proud to say he finished the project for about \$12,500, which was \$4,000 under budget.

This is his second such initiative. In 2005, he built a display called "Fantastic Fun River Run," which has traveled 18,000 miles and visited six states for showings at schools, fairs and other venues. In 2006, the Upper Big Blue NRD won an award for that project from the National Association of Conservation Districts, an organization of 3,000 conservation districts across the United States.

Snell unveiled the "Operation" display in September at the annual meeting of the Nebraska Association of Resources Districts in Kearney. He then took the display back to the NRD office in York to await bookings. His afternoon visit to Wallace last week was the first of what he hopes will be many school visits to come.

It also was a homecoming of sorts since his wife, Sarah, teaches fourth grade there and his oldest two children, Jonah and Norah, are students. Snell commutes daily from Hastings to York.

Through the course of an afternoon, he spoke to 123 students in grades kindergarten through six

and then let them get their hands on the display itself.

Granstrom, the sixth-grader, gave the experience a positive review.

"It's a good, interactive way to show kids about natural resources," he said. "Putting it into a game is pretty cool."

Wallace Principal Allyson Bohlen said she was thrilled to have the display visit school and that students of different ages had been able to learn from it on various levels.

"It was absolutely wonderful," Bohlen said. "It's definitely given the kids something tactile to put with abstract ideas we're trying to teach."

Whereas younger children may have gotten the most out of the display concerning the giant map of Nebraska or the discussion of what natural resources are, Bohlen said, older students had a chance to learn more about the role and function of government — specifically, the NRD system, which is unique to Nebraska.

Snell is anxious to hear from more groups that would like to see "Operation: Conservation" and hopes it will be able to travel widely just as "River Run" has done. He said the NRD does not intend to charge for bringing the display to schools or other venues, and that other NRDs can borrow it if they wish.

"I really think this could be fun for people of all ages," he said.



# Attachment I

# KANSAS-NEBRASKA BIG BLUE RIVER COMPACT

## Nebraska Report - Little Blue NRD

Mike Onnen, Manager  
May 17, 2017

### Actions Related to Watershed Management Plan

The District finished its Watershed Management Plan which addresses surface and groundwater quality and quantity issues. We applied for funding through the Nebraska Water Sustainability Fund for two groundwater recharge projects in the western end of the District and were awarded over \$200,000 for the projects. We have also hired a consulting firm to help develop the next set of projects as part of that plan, those projects include some off-stream diversions, ox-bow reconnections and control structures. It has been interesting to work on projects that are a little different than the typical flood control projects to capture and retime water supplies.



### Integrated Water Management Planning

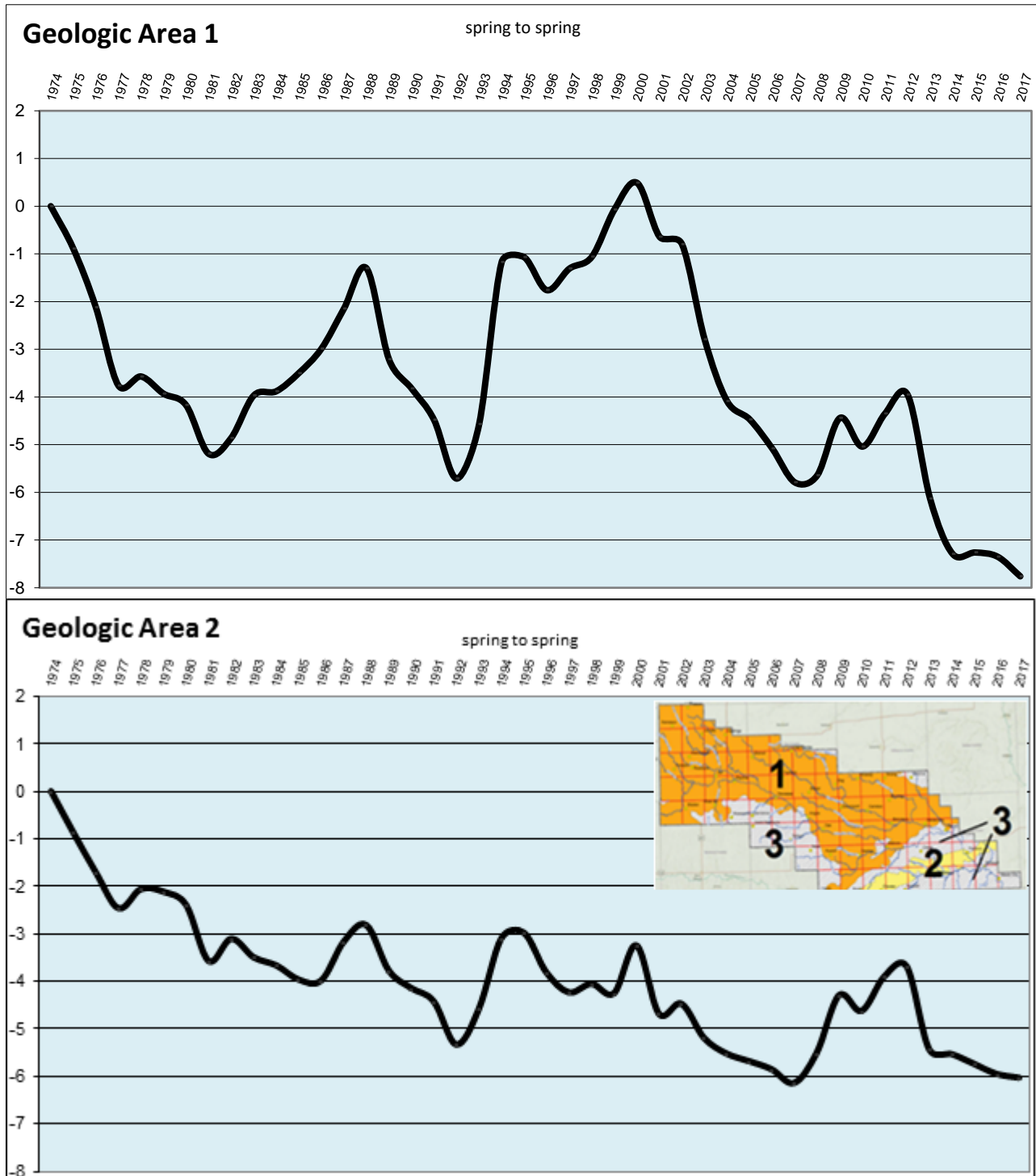
The Little Blue NRD reported last year that a voluntary integrated water management plan had been initiated in cooperation with the Department of Natural Resources and Tri-Basin NRD. The stakeholders group is charged with developing goals and objectives for managing interconnected ground and surface water. The stakeholders have held four meetings and have offered recommendations which are much more pointed than simple goals and objectives. They are urging the NRD board to implement a specific management strategy, calling for an immediate 9" allocation of groundwater. The board is evaluating their recommendations and trying to determine the path they should take.

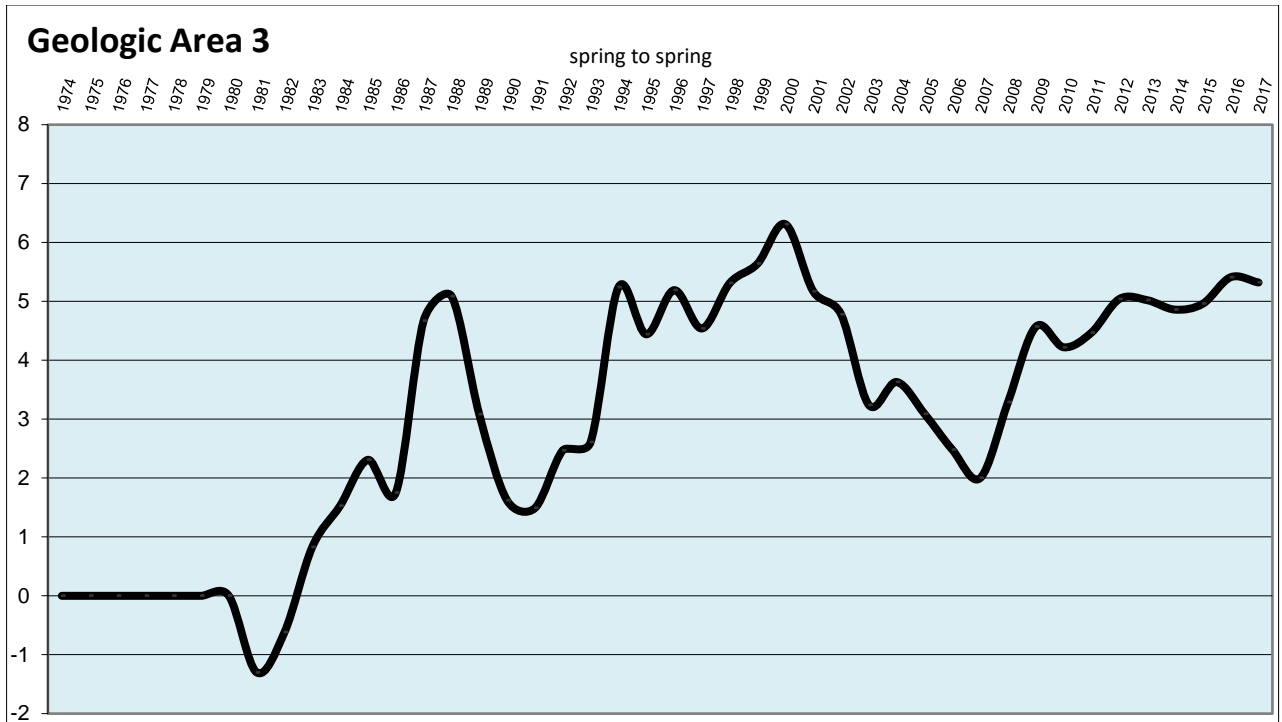
Meanwhile, the Tri-Basin NRD's stakeholders in the upper portion of the watershed have completed their goals and objectives and are interested in meeting with the LBNRD stakeholders to compare notes soon. Our hope is to coordinate management actions so more consistency is present across the District's boundaries.

In assessing the IMPs stakeholder's recommendation, the Board acknowledged that our current Groundwater Management Plan outlines specific triggers which must be amended before an allocation program could be implemented. Those triggers, established in 1996, were based on a 10% depletion of the aquifer before allocations would be implemented. We are still several feet away from the triggers being met. So, amendments to our Groundwater Management Plan are being drafted at this time so new rules can be adopted paving the way for a possible allocation at some time in the future. It is still likely that the Board will opt for a tighter water level trigger rather than a calendar date implementation.

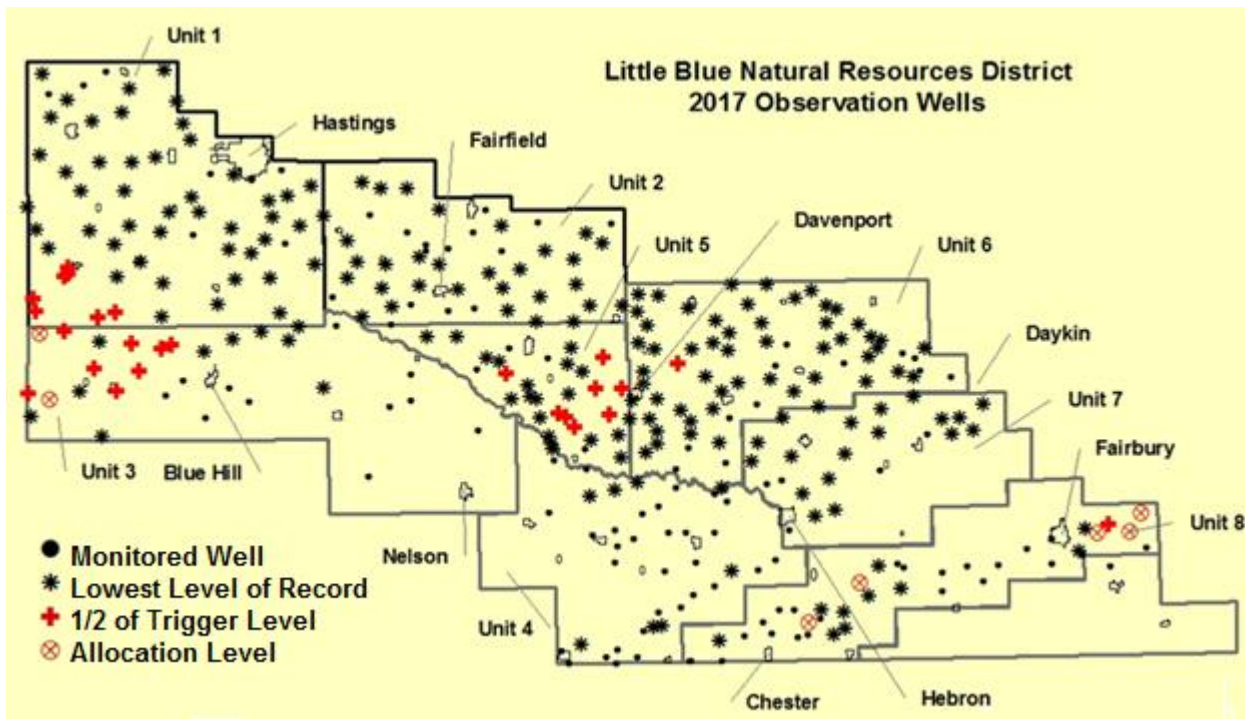
## Groundwater Levels

Spring 2017 groundwater levels declined -0.36' from the 2016 levels. The levels generally rose in Thayer County and fell over the rest of the District. The western half of the District experienced severe drought conditions through late August and producers in that area said they had never worked so hard to water crops. The water levels reflect that hard pumping. A insert map below shows the Units.





Another reason the Board is examining trigger levels is because 2017 readings reflect the lowest level of record for many of the wells in our monitoring network as shown on the following map. Our goal is to have new rules written by next winter, and those rules will complement those that will be developed as a component of our IMP.



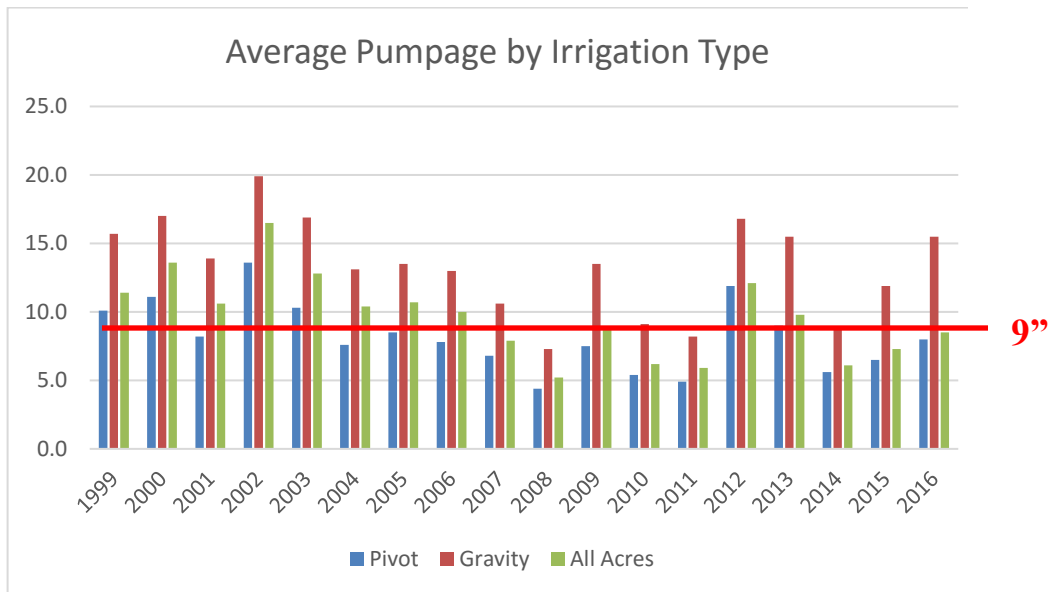
## **Groundwater Management Activities**

There were 70 well permits approved in 2016, 31 of those were replacement wells. Some wells have been put in just to run a swing arm pivot or irrigate pivot corners with a small pivot.

So far in 2017, 20 new well permits have been approved of which 11 are replacement wells.

The certification of irrigate acres and uses, as well as certification on new flow meters is still in progress. The deadline for completion of certification of acres has been moved back due to issues with our database and the volume of reporting coming into the office for pumpage and meter certifications.

Irrigation crop pumpage reports from 2016 were compiled and added to a historical summary. We had over 554,000 acres reported for 2016, which is about 85% of all irrigated acres. The average water pumped for all acres was 8.5". Pivot applications averaged 8.0" and gravity was 15.5". Since we haven't finished our certification of acres, it is uncertain the division of acres by pivot verses gravity irrigation. The chart below also shows the historical use of irrigation water and what a 9" allocation would look like. Obviously, most years, 9" would be enough water with the exception of gravity irrigation systems. However, more and more gravity systems are being converted each year.

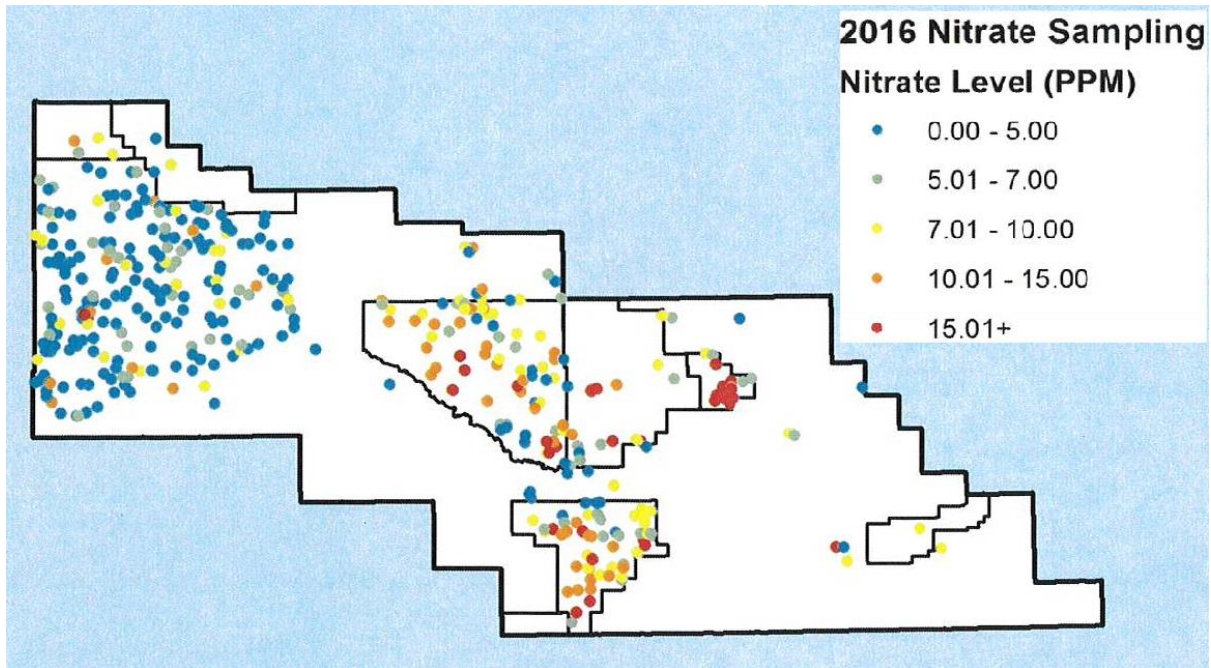


The District has also collected municipal pumpage data to assess domestic, business and industrial demands. The average water use per capita, based on reports from the cities and villages was approximately 243 gallons per day in 2016 with a range from approximately 44 gallons per day to 482 gallons per day. These numbers reflect not only drinking water and other domestic needs, but also outside watering, business and industrial uses which are supplied by the municipalities. Communities with the highest per capita water use typically do not have individual water meters and/or have one or more large commercial water users which distorts the per capita calculation.

## **Water Quality**

Approximately 500 water samples were collected in 2016 as part of the Little Blue NRD's ongoing three-year rotation in our water quality monitoring program. Adams and Webster counties were our main focus as were the established water quality sub-areas. The western portion of the district has considerably lesser nitrate problems than the eastern one half.

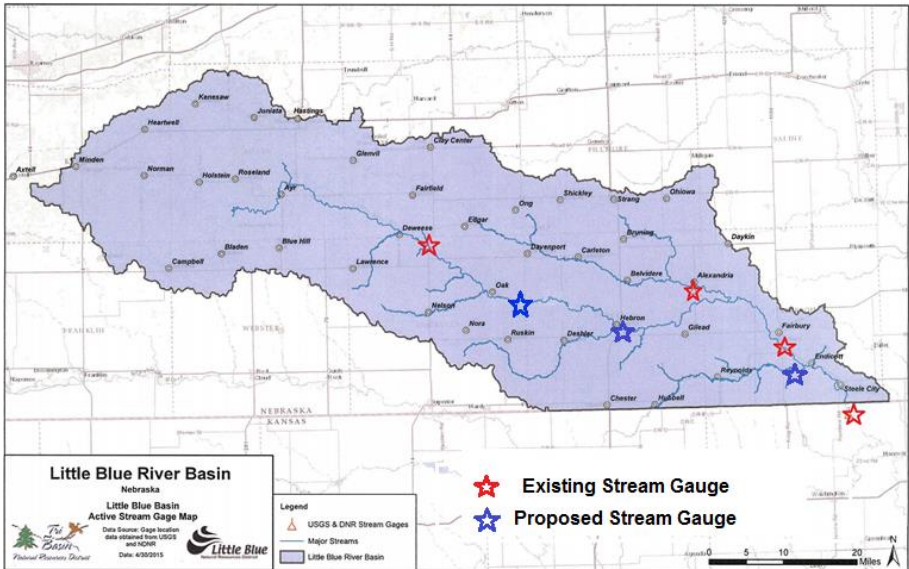




We've assembled a historical nitrate summary from all municipalities in the District because of the long-term collection requirements of municipalities. This probably gives us the best picture of the progression of nitrate pollution that has occurred in the area. In virtually every community, nitrate levels are on the increase. The only exceptions are where communities discontinued use of a high nitrate well and replaced it, or sought a water supply from a different area. Two communities are currently under administrative orders for violation of the 10 ppm nitrate level and several others are getting close.

**Stream Gages on Little Blue River**

Another objective of the Watershed Management Plan was the addition of additional stream gages on the Little Blue River. Only two USGS gages existed on the river on one DNR gage on Big Sandy Creek. The District has been working with USGS and DNR to establish three additional gages, two on the Little Blue River and one on Rose Creek south of Fairbury.



These gages should provide much better instantaneous and historical flow data for many purposes. The map below shows the existing gages and those that are part of our expanded network. This should give us a much better historical record for the basin and provide critical emergency notification for communities along the river.



# **Attachment J**

---

# BBRCA TREASURER/BUDGET REPORT

- **Treasurer's Report (Attachment A)**

- We are doing well overall for funds, with \$23,967 on hand and we expect to end the year at around \$23,777. We are up \$2,371 from the beginning year balance of \$21,406.

- **Budgeting Tracking Document (Attachment B)**

- **The first two columns are closing the book on FY 15-16.**
  - \$100 budgeted for Postage and Office Supplies and \$100 budgeted for Miscellaneous Expenses were not spent.
  - The actual interest earned in FY 2015-2016 was lower than the budgeted amount, due to a lower interest rate.
- **The next two columns show how the Compact Administration Budget has been spent this FY 16-17.**
  - We have submitted \$15,790 to USGS for the state line gaging stations.
  - The actual interest earned in FY 2016-2017 was higher than the budgeted amount due to additional income from the state assessment dues.
  - The Annual Report Printing budget for the 2015 report was not spent in the current fiscal year (FY16-17)
- **The next two columns are the budget for FY 17-18.**
  - The first set of numbers is what was estimated for the budget last year and the second set of numbers is what I propose we adopt today.
    - The proposed figure for USGS gaging is \$17,500, which reflects an annual increase of 3%
    - The proposed figure for the Annual Report Printing budget stays at \$450.00.
    - The proposed figure for the Audit Review stays at \$870.00.
    - The proposed figure for the Lower Big Blue NRD observation wells stays at \$700.00.
    - The Interest Income estimate is \$35.00 for FY17-18.
- **The final column on the right is the projected budget for FY 18-19.**
  - The projected figure for USGS gaging reflects an annual increase of 3%
  - The projected figure for the observation wells stays at \$700.00.
  - The projected figure for Annual Report Printing stays at \$450.00.
  - The projected figure for the Audit Review stays at \$870.00.
  - \$100 each for the Postage & Office Supplies and the Miscellaneous Expenses budgets will remain the same.

**ATTACHMENT A**

**REPORT OF THE TREASURER  
TO THE  
KANSAS-NEBRASKA BIG BLUE RIVER COMPACT ADMINISTRATION  
May 17, 2017**

Balance on Hand July 1, 2016	\$ 21,406.23
State Assessments	\$ 19,000.00
Interest Income through June 30, 2017	\$ 31.10
	<hr/>
Funds Available as of June 30, 2017	<b>\$ 40,437.33</b>
Expenditures as of June 30, 2017	
USGS - Stateline Gages	\$ (15,790.00)
Printing Annual Report	\$ -
Lower Big Blue Natural Resources District - Observation Wells	\$ (680.00)
Dana Cole - Audit	\$ -
Balance on Hand	<b>\$ 23,967.33</b>
Estimated Expenditures through June 30, 2017	
USGS - Stateline Gages	\$ -
Dana Cole - Audit	\$ -
Lower Big Blue Natural Resources District - Observation Wells	\$ -
Printing Annual Report	\$ -
Postage and Office Supplies	\$ 100.00
Miscellaneous	\$ 100.00
	<hr/>
Total Estimated Additional Expenditures	<b>\$ 200.00</b>
Estimated Income through June 30, 2017	
Interest Income	\$ 10.00
	<hr/>
<b>End of Fiscal Year Balance</b>	<b>\$ 23,777.33</b>

BIG BLUE RIVER COMPACT BUDGET ANALYSIS May 2017							
Column A	FY 2015 - 2016		FY 2016 - 2017		FY 2017 - 2018		FY 2018-2019
	Actual June 2016	Budgeted May 2015	Status May 2017	Budgeted May 2016	Estimated May 2016	Proposed May 2017	Projected May 2018
<b>EXPENDITURES</b>							
Operations							
USGS - Stateline Gages	\$ (15,506.00)	\$ 16,500.00	\$ 15,790.00	\$ 17,000.00	\$ 17,500.00	\$ 17,500.00	\$ 18,000.00
LBBNRD - Observation Wells	\$ (680.00)	\$ 700.00	\$ 680.00	\$ 700.00	\$ 700.00	\$ 700.00	\$ 700.00
Water Quality Committee	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Annual report - Printing	\$ -	\$ 450.00	\$ -	\$ 450.00	\$ 450.00	\$ 450.00	\$ 450.00
Annual Audit	\$ (1,717.00)	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Audit Review	\$ -	\$ 870.00	\$ -	\$ 870.00	\$ 870.00	\$ 870.00	\$ 870.00
Postage and Office Supplies	\$ -	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
Miscellaneous Expenses	\$ -	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00
<b>Total Expenses</b>	\$ (17,903.00)	\$ 18,720.00	\$ 16,670.00	\$ 19,220.00	\$ 19,720.00	\$ 19,720.00	\$ 20,220.00
<b>INCOME &amp; CARRY OVER</b>							
Assessments (Both States)	\$ 19,000.00	\$ 19,000.00	\$ 19,000.00	\$ 19,000.00	\$ 19,000.00	\$ 19,000.00	\$ 19,000.00
Interest earned	\$ 23.74	\$ 25.00	\$ 25.00	\$ 25.00	\$ 35.00	\$ 35.00	\$ 35.00
Carry Over from Prior Year	\$ 20,285.49	\$ 16,618.33	\$ 21,406.23	\$ 21,406.23	\$ 21,211.23	\$ 23,761.23	\$ 23,076.23
<b>Total Income and Carry Over</b>	\$ 39,309.23	\$ 35,643.33	\$ 40,431.23	\$ 40,431.23	\$ 40,246.23	\$ 42,796.23	\$ 42,111.23
<b>Balance End of Year</b>	\$ 21,406.23	\$ 16,923.33	\$ 23,761.23	\$ 21,211.23	\$ 20,526.23	\$ 23,076.23	\$ 21,891.23

ATTACHMENT B

# **Attachment K**

**KANSAS-NEBRASKA BIG BLUE RIVER COMPACT REPORT**  
**U.S. Geological Survey—Water Year 2016**

The U.S. Geological Survey (USGS) continues to operate two streamflow gaging stations for the Compact Administration—Big Blue River at Barneston, NE (06882000), and Little Blue River at Hollenberg, KS (06884025). An electronic data logger (EDL) at each station automatically records streamflow stage every 15 minutes. Every hour, these instantaneous values are transmitted via satellite to USGS offices, where they are used to compute preliminary values of instantaneous and daily discharge that are immediately posted to the USGS National Water Information System (NWIS) website (addresses shown below). Before the data are finalized, updates and revisions are made as needed, based on a series of quality checks and reviews. Finalized values of daily discharge and daily gage height, along with associated summary statistics are published annually on a site-by-site basis on the NWIS web page (address shown below).

During water year (WY) 2016 (October 1, 2015 to September 30, 2016), periodic visits were made to the stations to maintain and calibrate the sensing and recording equipment, make discharge measurements, and download the data directly from the EDLs, as a backup to the satellite-telemetered data. The discharge measurements were used to determine shifts from the stage-discharge relations (rating curves) that were then used to convert stage values to corresponding values of discharge.

For each of the State delegations and the Compact chairman, copies of the WY 2016 published data (manuscript; discharge daily values; statistics tables; and discharge hydrograph) from the NWIS web page are attached for each station. These site-data sheets (PDF files) are available online within the NWIS site page for each of the streamgages, along with data for other streamgages for the Nation. Also attached are plots of the annual mean discharges for the periods of record, and plots of the daily discharges for WY 2016 compared to those for the median daily statistic for each day of the year.

Current (real-time) and historical data on surface water, groundwater, and water quality for the Nation can be accessed and downloaded via the new Water Resources of the United States website (<https://www2.usgs.gov/water/>) or from the Nebraska Water Science Center website, also new (<https://www.usgs.gov/centers/ne-water>). All unit values of discharge data since October 2007 and all daily values of discharge can be accessed using the NWIS web.

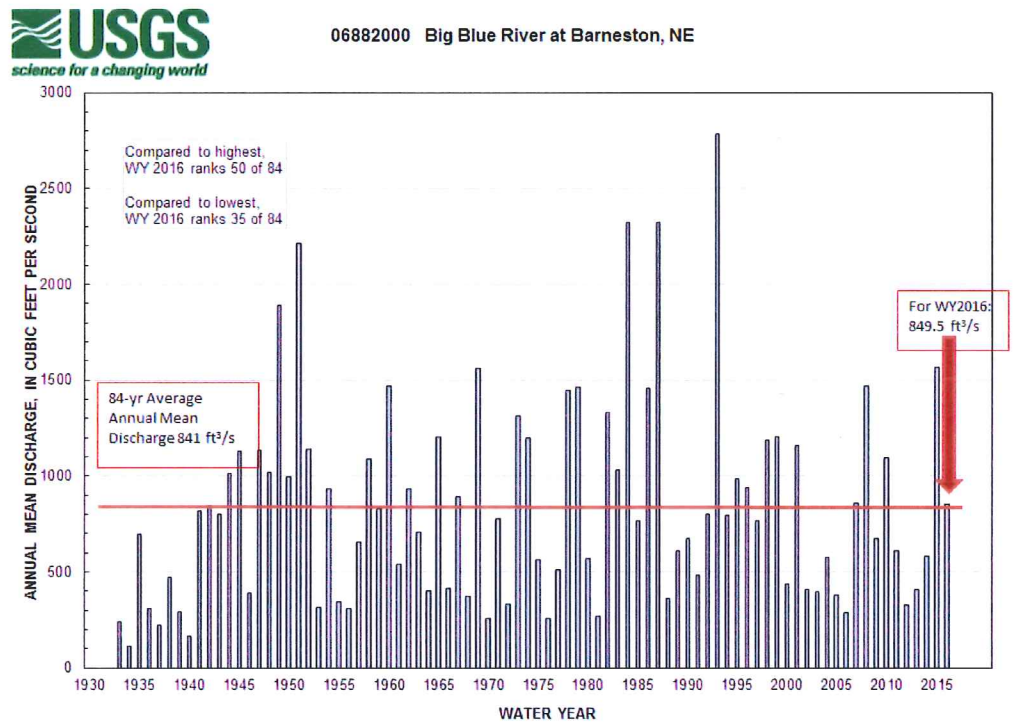
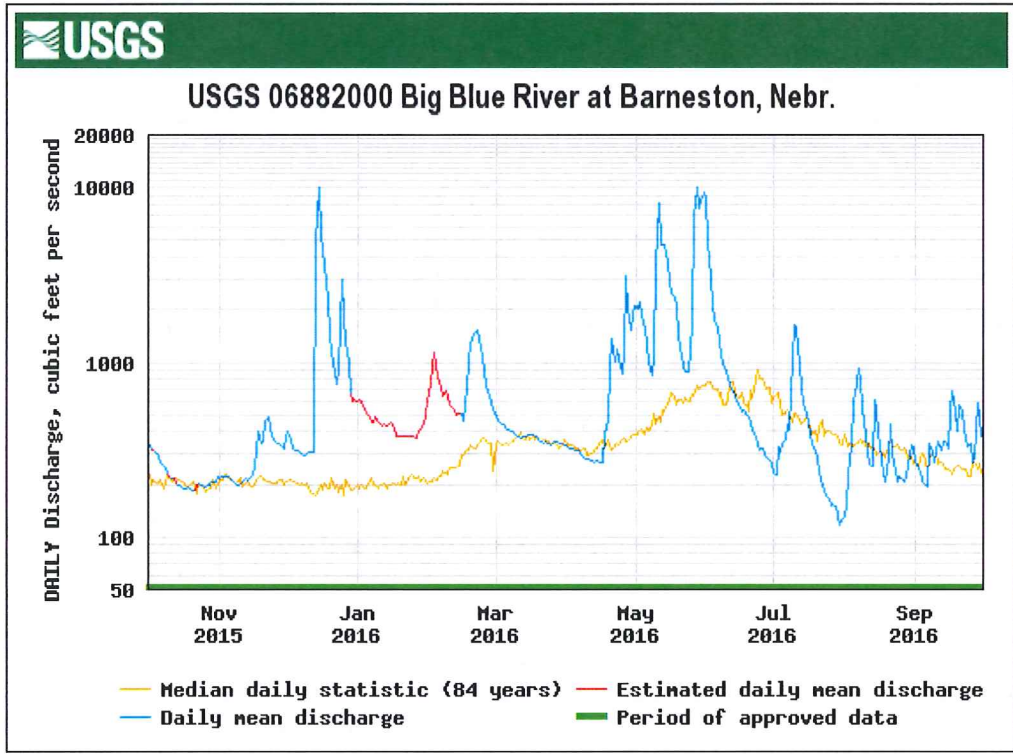
Jason Lambrecht  
Assistant Director, Hydrologic Data Section Chief

U.S. Geological Survey, Nebraska Water Science Center  
5231 S. 19th St., Lincoln, NE 68512-1271  
([jmlambre@usgs.gov](mailto:jmlambre@usgs.gov))  
402-328-4124 (office), 402-416-2363 (mobile)

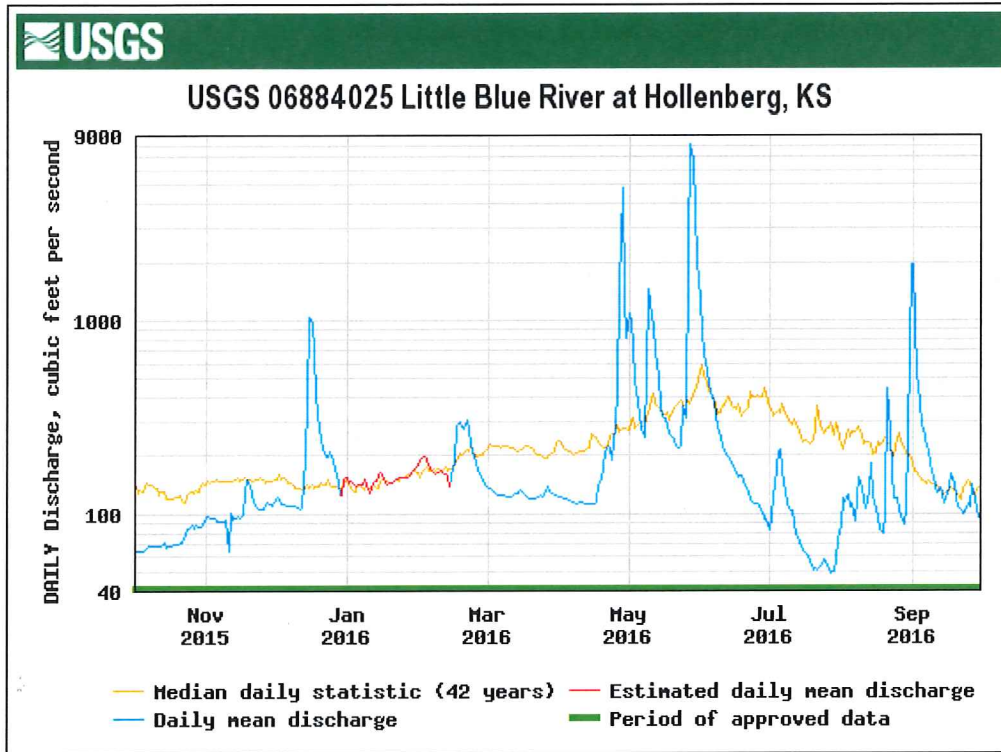
May 14, 2017



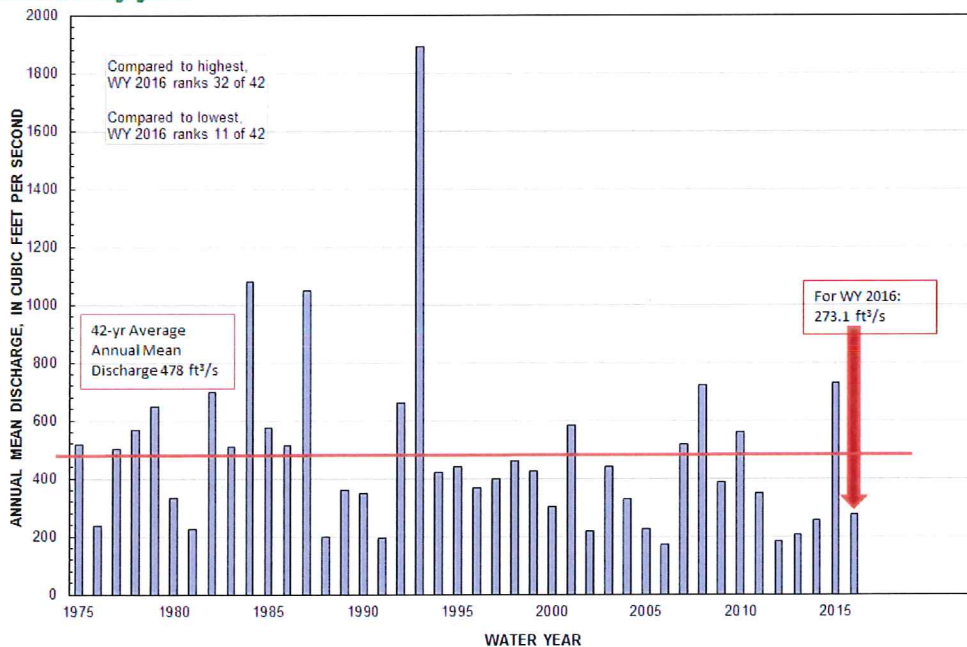
For station **06882000 Big Blue River at Barneston**, thirteen discharge (and stage) measurements, ranging from 222 ft<sup>3</sup>/s (3.76 ft stage) to 9,440 ft<sup>3</sup>/s (14.87 ft stage), and five inspections were made during WY 2016. The annual mean discharge of 850 ft<sup>3</sup>/s was 1.8 times less than that of the WY 2015 mean of 1,564 ft<sup>3</sup>/s; and just slightly higher than the new historical mean of 841 ft<sup>3</sup>/s for WYs 1933–2016 (84 years of record). The maximum and minimum daily discharges were 10,100 ft<sup>3</sup>/s on May 28, 2016; and 117 ft<sup>3</sup>/s on July 30, 2016.



For station **06884025 Little Blue River at Hollenberg**, sixteen discharge (and stage) measurements, ranging from 52.0 ft<sup>3</sup>/s (1.67 ft stage) to 3,010 ft<sup>3</sup>/s (6.29 ft stage), and two inspections were made during WY 2016. The annual mean discharge of 273 ft<sup>3</sup>/s was 2.7 times less than that of the WY 2015 mean of 730 ft<sup>3</sup>/s; and 1.8 times less than the new historical mean of 478 ft<sup>3</sup>/s for WYs 1975–2016 (42 years of record). The maximum and minimum daily discharges were 8,080 ft<sup>3</sup>/s on May 28, 2016; and 49.0 ft<sup>3</sup>/s on July 28, 2016.



06884025 Little Blue River at Hollenberg, KS





USGS Water-Year Summary 2016

**06882000 Big Blue River at Barneston, Nebr.**

LOCATION - Lat 40°02'41", long 96°35'14" referenced to North American Datum of 1983, in NE 1/4 NW 1/4 sec.24, T.1 N., R.7 E., Gage County, NE, Hydrologic Unit 10270202, on right bank just downstream of bridge on State Highway 8, 0.6 mi southwest of Barneston, 1.3 mi upstream from Plum Creek, and 4.3 mi upstream from Nebraska-Kansas State line.

DRAINAGE AREA - 4,447 mi<sup>2</sup> of which 77 mi<sup>2</sup> probably is noncontributing.

**SURFACE-WATER RECORDS**

PERIOD OF RECORD - May 1932 to current year.

REVISED RECORDS - WSP 896: 1932, 1935. WSP 1919: Drainage area.

GAGE - Water-stage recorder with satellite telemetry. Datum of gage is 1,162.20 ft above sea level. Prior to June 9, 1941, water-stage recorder at site 0.3 mi downstream at datum 1.56 ft higher. June 9 to Nov. 17, 1941, non-recording gage, and Nov. 18, 1941 to Sept. 30, 1979, water-stage recorder at site 0.7 mi upstream at datum 2.0 ft higher.

REMARKS - Accuracy of records for water years prior to 2014 are noted in the individual Annual Data Reports for those water years. For water years 2014 onward, records fair to good except for estimated daily discharges, which are poor, unless otherwise noted.

EXTREMES FOR PERIOD OF RECORD - Maximum peak flow, 57,700 ft<sup>3</sup>/s, June 9, 1941, gage height, 34.30 ft, at site datum then in use.

**U.S. Department of the Interior  
U.S. Geological Survey**

Suggested citation: U.S. Geological Survey, 2017, National Water Information System data available on the World Wide Web [USGS Water Data for the Nation], accessed [May 14, 2017], at URL: [https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93783&wys\\_water\\_yr=2016&site\\_no=06882000&agency\\_cd=1565](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93783&wys_water_yr=2016&site_no=06882000&agency_cd=1565)

[https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93783&wys\\_water\\_yr=2016&site\\_no=06882000&agency...](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93783&wys_water_yr=2016&site_no=06882000&agency_cd=1565) 5/14/2017

Water-Data Report 2016  
 06882000 Big Blue River at Barneston, Nebr. -- Continued

**DISCHARGE, CUBIC FEET PER SECOND**  
**YEAR 2015-10-01 to 2016-09-30**  
**DAILY MEAN VALUES**  
 [e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	2016	2016
1	339	217	406	e606	e749	496	334	2,120	8,660	231	132	267
2	e310	222	360	e589	e952	468	329	2,020	4,940	225	152	244
3	e312	221	322	e543	e1,140	455	322	2,200	3,050	329	229	236
4	298	221	312	e504	e827	440	319	1,860	2,120	304	330	208
5	283	224	312	e492	e756	422	311	1,520	1,760	340	607	199
6	267	212	305	e456	e719	413	316	1,260	1,580	361	657	192
7	256	209	297	e449	e640	412	302	991	1,290	443	932	344
8	247	204	293	e481	e677	404	290	837	1,100	417	790	309
9	e227	200	302	e454	e634	391	280	1,060	972	1,060	546	268
10	e222	202	309	e439	e565	387	282	3,630	872	1,650	386	304
11	218	209	306	e436	e541	376	280	8,170	799	1,550	303	351
12	e215	216	309	e439	e520	372	273	4,750	735	958	260	311
13	e203	211	4,870	e437	e496	374	269	4,760	684	716	257	353
14	197	217	9,980	e446	e504	374	271	4,670	645	589	610	350
15	194	225	5,360	e456	505	389	273	3,780	598	509	529	321
16	188	253	4,270	e427	465	389	266	2,910	550	450	390	524
17	187	314	3,650	e373	709	383	269	2,450	517	386	278	692
18	192	401	2,280	e380	1,010	379	383	2,360	530	333	228	522
19	190	345	1,470	e377	1,270	374	471	2,120	492	303	206	407
20	185	350	1,130	e373	1,360	361	916	1,400	485	278	289	569
21	e186	463	885	e379	1,480	354	1,350	1,090	438	231	444	529
22	e199	487	748	e379	1,530	347	1,010	955	407	196	299	410
23	203	426	910	e379	1,350	348	1,200	879	369	185	236	363
24	199	379	3,010	e378	1,080	345	1,060	891	334	174	206	326
25	193	353	1,790	e377	873	335	871	1,150	317	165	220	346
26	195	346	1,320	e370	732	345	1,140	1,700	318	149	214	266
27	200	346	1,000	e403	640	353	3,100	6,860	294	153	208	281
28	206	330	e660	e409	591	348	2,010	10,100	285	149	219	589
29	207	320	e598	e446	534	343	1,540	7,700	275	131	263	484
30	206	378	e609	e494		345	1,870	8,360	258	117	337	375
31	222		e591	e593		338		9,480		129	325	
<b>Total</b>	6,946	8,701	48,960	13,760	23,850	11,860	21,910	104,000	35,670	13,210	11,080	10,940
<b>Mean</b>	224	290	1,579	444	822	383	730	3,356	1,189	426	357	365
<b>Max</b>	339	487	9980	606	1530	496	3100	10100	8660	1650	932	692
<b>Min</b>	185	200	293	370	465	335	266	837	258	117	132	192
<b>Ac-ft</b>	13,780	17,260	97,120	27,300	47,300	23,520	43,450	206,300	70,760	26,200	21,980	21,700

[https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93783&wys\\_water\\_yr=2016&site\\_no=06882000&ag...](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93783&wys_water_yr=2016&site_no=06882000&ag...) 5/14/2017



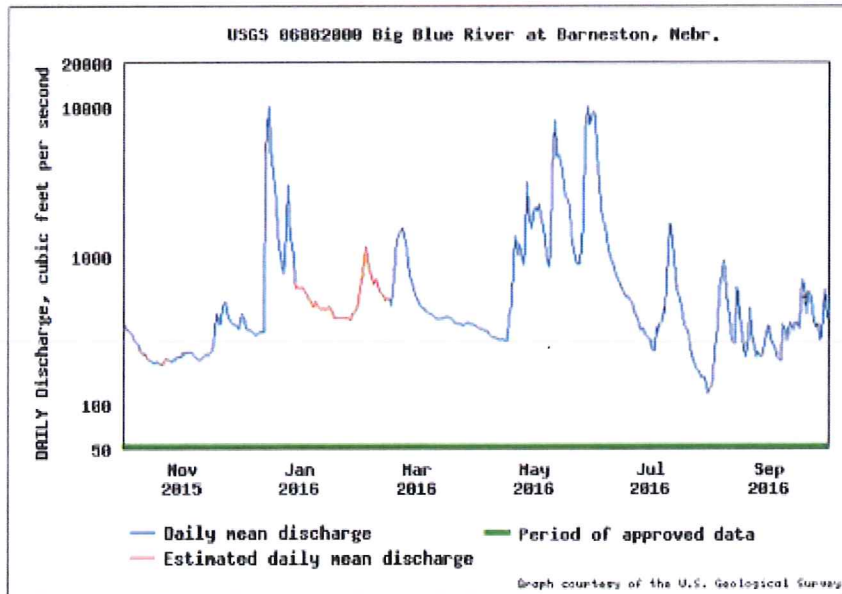
<b>STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1933 - 2016, BY WATER YEAR (WY)</b>												
	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>
<b>Mean</b>	548	308	254	289	598	1,232	822	1,374	2,085	1,236	668	674
<b>Max</b>	7,451	1,526	1,579	1,596	2,876	10,560	5,280	5,207	10,460	12,270	5,227	3,420
<b>(WY)</b>	(1974)	(1999)	(2016)	(1973)	(1984)	(1979)	(1984)	(1995)	(1951)	(1993)	(1954)	(1989)
<b>Min</b>	61.5	77.5	87.4	67.6	116	137	132	96.0	69.3	30.7	21.1	50.6
<b>(WY)</b>	(1941)	(1937)	(1977)	(1937)	(1940)	(1968)	(1934)	(1934)	(1934)	(1934)	(1934)	(1939)

[https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93783&wys\\_water\\_yr=2016&site\\_no=06882000&ag...](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93783&wys_water_yr=2016&site_no=06882000&ag...) 5/14/2017

Water-Data Report 2016  
 06882000 Big Blue River at Barneston, Nebr. -- Continued

SUMMARY STATISTICS				
	Water Year 2016		Water Years 1933 - 2016	
<b>Annual total</b>	310,900			
<b>Annual mean</b>	849.5		840.9	
<b>Highest annual mean</b>			2,781	1993
<b>Lowest annual mean</b>			115.0	1934
<b>Highest daily mean</b>	10,100	May 28	50,000	Jun 09, 1941
<b>Lowest daily mean</b>	117.0	Jul 30	1.00	Nov 30, 1945
<b>Annual 7-day minimum</b>	137.1	Jul 26	15.1	Aug 03, 1934
<b>Maximum peak flow</b>			57,700	Jun 09, 1941
<b>Maximum peak stage</b>			34.30 <sup>a</sup>	Jun 09, 1941
<b>Annual runoff (cfsm)</b>	0.191		0.189	
<b>Annual runoff (inches)</b>	2.60		2.57	
<b>10 percent exceeds</b>	1,665		1,700	
<b>50 percent exceeds</b>	381.5		280.0	
<b>90 percent exceeds</b>	206.7		107.0	

<sup>a</sup> Gage height at different site and/or datum



[https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93783&wys\\_water\\_yr=2016&site\\_no=06882000&ag...](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93783&wys_water_yr=2016&site_no=06882000&ag...) 5/14/2017

U.S. DEPARTMENT OF THE INTERIOR - U.S. GEOLOGICAL SURVEY - WATER RESOURCES

Short-Form Discharge Measurement Summary With Inspections

STATION NUMBER 06882000 Big Blue River at Barneston, Nebr. TYPE:Stream AGENCY USGS STATE 31 COUNTY 067  
 LATITUDE 400241 LONGITUDE 0963514 NAD83 DRAINAGE AREA 4447 CONTRIBUTING DRAINAGE AREA 4370.00 DATUM 1162.20 NGVD29

Date Processed:2017-05-11 14:44 By jmlambre

MEAS NO.*	DATE	* TIME	* MADE BY	* GAGE	* DISCHARGE	* RATING	* INDIC	* UNSFT	* SHIFT	* GHT.	* TIME	* RATED	* STATUS		
CONTROL LOCATION:		* HEIGHT	* CFS	* SHIFT	* DIFF	* CHG.									
1431	2015/10/09	1153	CDT	gsn/tpb	3.81	234	35.1	-0.06	-0.08	-8.9	3.1	0.0	0.37	F	L
CONTROL LOCATION: Clear															
INSP	2015/10/13	1004	CDT	bhi	3.74										L
CONTROL LOCATION: Clear															
INSP	2015/10/22	1010	CDT	bhi/jtc	3.72										L
CONTROL LOCATION: Clear															
INSP	2015/11/13	1103	CST	LWN	3.78										L
CONTROL LOCATION: Clear															
1432	2015/11/25	1119	CST	NDS/LWN	4.14	355	35.1	-0.09	-0.09	-9.9	0	-0.01	0.43	F	L
CONTROL LOCATION: Clear															
1433	2015/12/16	1017	CST	Jtc/jrp	9.73	4260	35.1	-0.50	-0.46	-10.1	-0.9	0.0	0.5	F	L
CONTROL LOCATION: Light debris															
1434	2016/01/07	1105	CST	bhi/nds	4.36	449	35.1	-0.10	-0.10	-9.8	0	0.02	0.52	F	L
CONTROL LOCATION: Shore ice															
INSP	2016/01/27	1030	CST	jrp	4.53										L
CONTROL LOCATION: Clear															
1435	2016/02/17	1232	CST	JTC	4.94	757	35.1	-0.12	-0.14	-8.9	1.9	0.01	0.5	F	L
CONTROL LOCATION: Clear															
1436	2016/03/30	0955	CDT	JTC	4.12	354	35.1	-0.07	-0.09	-8.3	2.0	0.01	0.25	F	L
CONTROL LOCATION: Clear															
INSP	2016/04/19	1300	CDT	bhi/nds	4.40										L
CONTROL LOCATION: Clear															
1437	2016/04/27	1014	CDT	JTC	9.90	4010	35.1	-0.93	-0.74	-18.3	-4.3	0.03	0.25	F	L
CONTROL LOCATION: Clear															
1438	2016/05/06	1320	CDT	bhi	5.66	1220	35.1	-0.11	-0.08	-6.2	-1.6	-0.01	0.52	F	L
CONTROL LOCATION: Clear															
1439	2016/05/11	1118	CDT	gsn	14.63	9110	35.1	-0.97	-0.88	-11.6	-1.2	0.18	1.15	F	L
CONTROL LOCATION: Clear															
CONTROL REMARKS: bank vegetation															

1440	2016/05/31	1224 CDT	nds/lwn	14.87	9440	35.1	-0.94	-0.86	-10.9	-1.0	0.02	0.24	G	L
CONTROL LOCATION: CONDITION: Clear														
1441	2016/06/24	1047 CDT	bhi	4.06	345	35.1	-0.03	-0.06	-4.2	3.3	-0.01		F	L
CONTROL LOCATION: CONDITION: Clear														
1442	2016/08/03	1016 CDT	nds	3.76	222	35.1	-0.04	-0.06	-6.7	2.3	-0.01	0.5	G	L
CONTROL LOCATION: 700 ft downstream														
CONTROL REMARKS: Ripple downstream														
1443	2016/09/12	1038 CDT	nds/lwn	4.00	301	35.1	-0.08	-0.06	-9.9	-2.6	-0.01	0.45	F	L
CONTROL LOCATION: CONDITION: Clear														





USGS Water-Year Summary 2016

**06884025 Little Blue River at Hollenberg, KS**

LOCATION - Lat 39°58'49", long 97°00'17" referenced to North American Datum of 1983, in NE 1/4 SW 1/4 sec.8, T.1 S., R.4 E., Washington County, KS, Hydrologic Unit 10270207, on right bank just downstream from bridge on county road, 0.6 mi west of Hollenberg, 1.8 mi downstream from Nebraska-Kansas State line, and at mile 43.1.

DRAINAGE AREA - 2,752 mi<sup>2</sup>.

**SURFACE-WATER RECORDS**

PERIOD OF RECORD - March 1973 to February 1974 (discharge measurements only), March 1974 to current year.

GAGE - Water stage recorder with satellite telemetry. Datum of gage is 1,216.10 ft above sea level.

REMARKS - Accuracy of records for water years prior to 2014 are noted in the individual Annual Data Reports for those water years. For water years 2014 onward, records good except for estimated daily discharges, which are poor, unless otherwise noted. Discharge measurements made prior to 1974 water year are published in table of miscellaneous sites in WDR NE-73.

EXTREMES OUTSIDE PERIOD OF RECORD - A gage height of 23.07 ft, present datum, from floodmark, discharge not determined, occurred October 12, 1973.

**U.S. Department of the Interior**  
**U.S. Geological Survey**

Suggested citation: U.S. Geological Survey, 2017, National Water Information System data available on the World Wide Web (USGS Water Data for the Nation), accessed [May 14, 2017], at [https://waterdata.usgs.gov/nwis/sways\\_rpt/dv\\_ts\\_ids=93795&wys\\_water\\_yr=2016&site\\_no=06884025&agency\\_cd=USGS](https://waterdata.usgs.gov/nwis/sways_rpt/dv_ts_ids=93795&wys_water_yr=2016&site_no=06884025&agency_cd=USGS).

[https://waterdata.usgs.gov/nwis/sways\\_rpt/dv\\_ts\\_ids=93795&wys\\_water\\_yr=2016&site\\_no=06884025&agency\\_cd=USGS](https://waterdata.usgs.gov/nwis/sways_rpt/dv_ts_ids=93795&wys_water_yr=2016&site_no=06884025&agency_cd=USGS) 5/14/2017

Water-Data Report 2016  
06884025 Little Blue River at Hollenberg, KS -- Continued

**DISCHARGE, CUBIC FEET PER SECOND**  
**YEAR 2015-10-01 to 2016-09-30**  
**DAILY MEAN VALUES**  
[e, Value has been estimated.]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	2015	2015	2015	2016	2016	2016	2016	2016	2016	2016	2016	2016
1	64	98	122	e144	e185	137	123	1,090	1,280	83	86	1,960
2	64	95	117	e149	e193	135	122	978	869	94	120	959
3	65	95	113	e144	e199	133	121	731	679	126	116	527
4	65	96	112	e139	e191	130	119	482	543	139	124	375
5	66	92	111	e143	e179	126	117	378	474	212	109	284
6	67	91	111	e143	e166	124	117	322	423	215	113	277
7	69	91	111	e143	e164	124	114	278	379	166	91	221
8	69	92	110	e151	e162	126	112	246	324	128	120	210
9	69	93	110	e140	e163	123	113	539	282	112	153	178
10	69	65	109	e127	e167	123	115	1,450	249	105	136	153
11	69	102	107	e135	e165	122	114	1,030	226	104	118	137
12	68	93	109	e145	e159	124	113	925	210	89	107	128
13	72	95	199	e149	e153	128	112	681	197	78	130	135
14	67	97	395	e158	e140	129	112	514	190	71	181	126
15	68	96	1,040	e164	175	132	112	354	182	67	122	112
16	68	99	973	e154	180	131	113	317	170	64	106	127
17	70	128	681	e145	289	126	115	313	159	62	94	137
18	70	151	412	e141	300	123	141	283	155	61	83	160
19	70	141	274	e144	280	121	151	257	156	57	80	142
20	71	125	243	e146	273	121	171	248	148	51	97	121
21	72	115	218	e148	303	120	209	237	138	52	442	109
22	77	109	196	e151	267	121	226	225	129	51	266	103
23	84	105	198	e153	229	122	217	219	118	53	159	99
24	84	106	212	e153	198	125	189	226	116	55	121	101
25	88	107	188	e153	181	123	294	357	113	58	120	112
26	85	110	170	e153	168	131	437	311	112	55	104	109
27	88	115	160	e155	156	138	1,470	2,300	109	51	95	143
28	86	113	e126	e161	149	130	4,790	8,080	102	49	88	118
29	86	110	e125	e166	141	127	1,310	6,710	93	50	105	103
30	88	115	e152	e170		125	806	3,700	94	57	247	95
31	97		e154	e179		124		2,010		74	1,960	
<b>Total</b>	<b>2,295</b>	<b>3,140</b>	<b>7,458</b>	<b>4,646</b>	<b>5,675</b>	<b>3,924</b>	<b>12,370</b>	<b>35,790</b>	<b>8,419</b>	<b>2,688</b>	<b>5,993</b>	<b>7,561</b>
<b>Mean</b>	<b>74.0</b>	<b>105</b>	<b>241</b>	<b>150</b>	<b>196</b>	<b>127</b>	<b>413</b>	<b>1,155</b>	<b>281</b>	<b>86.7</b>	<b>193</b>	<b>252</b>
<b>Max</b>	<b>97</b>	<b>151</b>	<b>1040</b>	<b>179</b>	<b>303</b>	<b>138</b>	<b>4790</b>	<b>8080</b>	<b>1280</b>	<b>215</b>	<b>1960</b>	<b>1960</b>
<b>Min</b>	<b>64</b>	<b>65</b>	<b>107</b>	<b>127</b>	<b>140</b>	<b>120</b>	<b>112</b>	<b>219</b>	<b>93</b>	<b>49</b>	<b>80</b>	<b>95</b>
<b>Ac-ft</b>	<b>4,552</b>	<b>6,228</b>	<b>14,790</b>	<b>9,215</b>	<b>11,260</b>	<b>7,783</b>	<b>24,550</b>	<b>70,990</b>	<b>16,700</b>	<b>5,334</b>	<b>11,890</b>	<b>15,000</b>

[https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93795&wys\\_water\\_yr=2016&site\\_no=06884025&ag...](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93795&wys_water_yr=2016&site_no=06884025&ag...) 5/14/2017

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 2016, BY WATER YEAR  
(WY)**

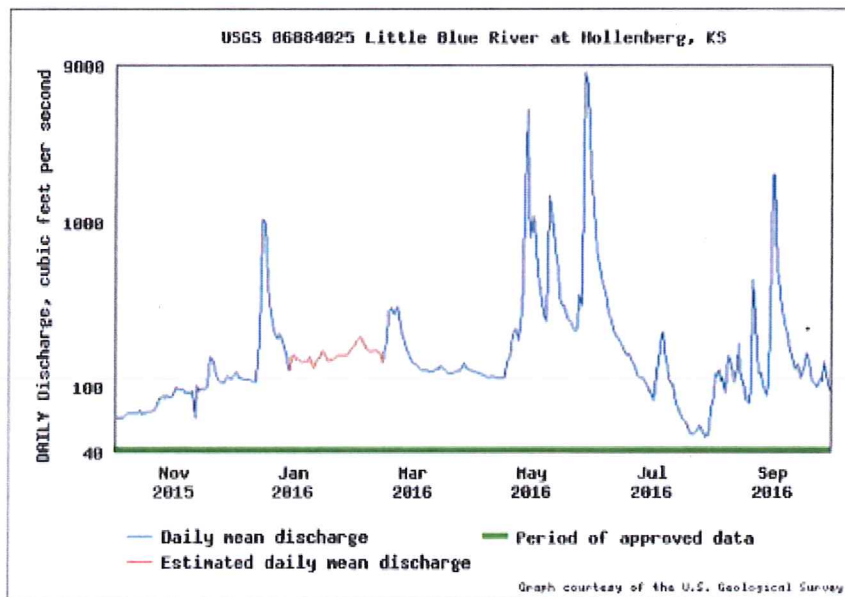
	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>
<b>Mean</b>	319	217	170	172	293	628	467	826	994	808	478	345
<b>Max</b>	2,163	1,113	424	577	1,059	3,816	2,379	2,638	4,654	9,014	2,572	1,320
<b>(WY)</b>	(1987)	(1997)	(1993)	(1984)	(1993)	(1993)	(1987)	(2015)	(2015)	(1993)	(1985)	(1977)
<b>Min</b>	45.3	81.1	87.1	84.5	97.0	118	118	109	151	68.0	51.5	32.0
<b>(WY)</b>	(1992)	(1992)	(2013)	(2015)	(2015)	(1981)	(2014)	(1992)	(1981)	(2013)	(2012)	(1991)

[https://waterdata.usgs.gov/nwis/wys\\_rpt/?dv\\_ts\\_ids=93795&wys\\_water\\_yr=2016&site\\_no=06884025&ag...](https://waterdata.usgs.gov/nwis/wys_rpt/?dv_ts_ids=93795&wys_water_yr=2016&site_no=06884025&ag...) 5/14/2017

Water-Data Report 2016  
 06884025 Little Blue River at Hollenberg, KS -- Continued

**SUMMARY STATISTICS**

	Water Year 2016		Water Years 1975 - 2016	
<b>Annual total</b>	99,970			
<b>Annual mean</b>	273.1		477.6	
<b>Highest annual mean</b>			1,891	1993
<b>Lowest annual mean</b>			172.9	2006
<b>Highest daily mean</b>	8,080	May 28	39,300	Jul 26, 1992
<b>Lowest daily mean</b>	49.0	Jul 28	24.0	Sep 12, 2012
<b>Annual 7-day minimum</b>	53.0	Jul 23	26.0	Sep 06, 2012
<b>Maximum peak flow</b>			59,200	May 07, 2015
<b>Maximum peak stage</b>			22.97	May 07, 2015
<b>Annual runoff (cfsm)</b>	0.099		0.174	
<b>Annual runoff (inches)</b>	1.35		2.36	
<b>10 percent exceeds</b>	383.8		778.8	
<b>50 percent exceeds</b>	128.5		190.0	
<b>90 percent exceeds</b>	71.0		98.0	



[https://waterdata.usgs.gov/nwis/wys\\_rpt?dv\\_ts\\_ids=93795&wys\\_water\\_yr=2016&site\\_no=06884025&ag...](https://waterdata.usgs.gov/nwis/wys_rpt?dv_ts_ids=93795&wys_water_yr=2016&site_no=06884025&ag...) 5/14/2017



U.S. DEPARTMENT OF THE INTERIOR - U.S. GEOLOGICAL SURVEY - WATER RESOURCES

Short-Form Discharge Measurement Summary With Inspections

STATION NUMBER 06884025 Little Blue River at Hollenberg, KS TYPE:Stream AGENCY USGS STATE 20 COUNTY 201  
 LATITUDE 395849 LONGITUDE 0970017 NAD83 DRAINAGE AREA 2752 CONTRIBUTING DRAINAGE AREA DATUM 1216.10 NGVD29

Date Processed:2017-05-11 14:45 By jmlambre

MEAS NO. *	DATE	TIME	MADE BY	GAGE	DISCHARGE	RATING	INDIC	APPLD	UNSF	SHIFT	GHT.	TIME	RATED	STATUS
				HEIGHT						DIFF				
539	2015/10/13	1215	CDT	bhi	1.53	77.1	11.0	0.03	0.03	8.6	0.8	0.0	0.52	F L
CONTROL LOCATION: Clear														
540	2015/11/20	1058	CST	jrp	1.77	125	11.0	0.02	0.03	4.2	-1.6	0.0	1.08	F L
CONTROL LOCATION: 200 ft downstream CONDITION: Light debris														
INSP 2015/12/04 1022 CST nds/jrp 1.70														
CONTROL LOCATION: Clear														
CONTROL REMARKS:														
541	2015/12/16	1204	CST	Jtc/jrp	3.58	1030	12.0	0.03	-0.02	2.0	3.0	-0.01	0.66	F L
CONTROL LOCATION: Clear CONDITION: Moderate debris														
542	2016/01/07	1311	CST	bhi/nds	1.84	155	12.0	-0.05	-0.02	-7.7	-4.9	0.0	1.05	F L
CONTROL LOCATION: Clear CONDITION: Shore ice														
CONTROL REMARKS: Shore ice and ice around sandbars. See pictures.														
543	2016/02/17	1416	CST	JTC	2.26	303	12.0	-0.03	-0.02	-3.8	-1.0	0.0	0.58	F L
CONTROL LOCATION: Clear														
544	2016/03/30	1147	CDT	JTC	1.80	126	12.0	-0.13	-0.12	-20.3	-1.6	-0.01	0.65	F L
CONTROL LOCATION: Clear														
INSP 2016/04/11 1152 CDT bhi/tpb 1.74														
CONTROL LOCATION: Clear														
545	2016/05/09	1047	CDT	bhi	2.58	380	12.0	-0.18	-0.17	-18.1	-1.0	-0.02	1.0	F L
CONTROL LOCATION: Clear														
546	2016/06/24	1456	CDT	bhi	1.95	117	12.0	-0.32	-0.33	-41.5	1.7	0.0	0.65	F L
CONTROL LOCATION: Clear														
547	2016/07/12	1027	CDT	LWN	1.82	88.0	12.0	-0.34	-0.33	-46.0	-1.2	-0.01	0.8	F L
CONTROL LOCATION: Clear														
548	2016/07/20	1042	CDT	bhi	1.67	52.0	12.0	-0.42	-0.42	-58.7	0	0.0	0.65	F L
CONTROL LOCATION: Clear														
549	2016/08/02	1238	CDT	nds	1.92	118	12.0	-0.29	-0.28	-38.2	-0.8	0.0	0.6	F L
CONTROL LOCATION: Clear														

550	2016/08/31	1309 CDT	bhi/nds	5.92	2680	12.0	-0.08	-0.09	-2.5	0.4	0.11	0.23	F	L
	CONTROL LOCATION:		CONDITION: Clear											
551	2016/08/31	1335 CDT	bhi/nds	6.02	2840	12.0	0.0	-0.08	0	2.5	0.07	0.3	F	L
	CONTROL LOCATION:		CONDITION: Clear											
552	2016/08/31	1403 CDT	bhi/nds	6.14	2970	12.0	0.02	-0.07	0.7	2.8	0.04	0.22	F	L
	CONTROL LOCATION:		CONDITION: Clear											
553	2016/08/31	1448 CDT	bhi/nds	6.29	3010	12.0	-0.09	-0.06	-2.9	-1.0	0.04	0.22	F	L
	CONTROL LOCATION:		CONDITION: Clear											
554	2016/09/12	1205 CDT	nds/lwn	1.96	128	12.0	-0.28	-0.28	-36.9	0	0.01	0.7	F	L
	CONTROL LOCATION:		CONDITION: Clear											

# Attachment L

**REPORT OF THE ENGINEERING COMMITTEE  
TO THE  
KANSAS-NEBRASKA BIG BLUE RIVER COMPACT ADMINISTRATION**

May 17, 2017

The engineering committee was not given any special assignments from the Compact Administration and did not meet during the past year. The 2016 data for this report were collected as provided by the United States Geological Survey (USGS) and the Lower Big Blue Natural Resources District (LBBNRD).

**Review of Streamflow Data**

The Compact sets forth the following streamflow targets at the stateline gaging stations:

	Big Blue River	Little Blue River
May	45 cfs	45 cfs
June	45 cfs	45 cfs
July	80 cfs	75 cfs
August	90 cfs	80 cfs
September	65 cfs	60 cfs

During the May through September time period of the 2015 water year (October 1, 2015 thru September 30, 2016) only the Little Blue River Basin fell below Compact target flows. The mean daily streamflow at the Barneston gage on the Big Blue River (Exhibit A) met or exceeded target flows throughout the year. The mean daily streamflow on the Little Blue River at the Hollenberg gage (Exhibit B) was below target flows for 18 days.

Real-time and historical data for these gaging stations can be found at the following websites:

Big Blue River – [http://waterdata.usgs.gov/ne/nwis/uv/?site\\_no=06882000](http://waterdata.usgs.gov/ne/nwis/uv/?site_no=06882000)

Little Blue River – [http://waterdata.usgs.gov/ne/nwis/uv/?site\\_no=06884025](http://waterdata.usgs.gov/ne/nwis/uv/?site_no=06884025)

**Review of Groundwater Data**

The Lower Big Blue Natural Resources District provided the groundwater levels (Exhibit C) for the Big Blue Basin near Beatrice.

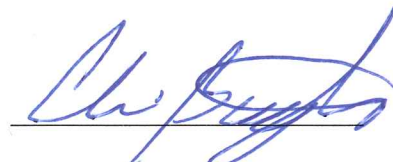
**Review of Wells in the Regulatory Reaches**

Exhibit D is a listing of the irrigation wells within the regulatory reaches. There were no new wells drilled in the Big Blue River regulatory area and no new wells drilled in the Little Blue River regulatory area during this reporting period.

Respectively Submitted,



Jeremy F. Gehle, Chair  
Nebraska



Chris Beightel, P.E.  
Kansas



**SUMMARY STATISTICS**

	Water Year 2016		Water Years 1933 - 2016	
<b>Annual total</b>	310,900			
<b>Annual mean</b>	849.5		840.9	
<b>Highest annual mean</b>			2,781	1993
<b>Lowest annual mean</b>			115.0	1934
<b>Highest daily mean</b>	10,100	May 28	50,000	Jun 09, 1941
<b>Lowest daily mean</b>	117.0	Jul 30	1.00	Nov 30, 1945
<b>Annual 7-day minimum</b>	137.1	Jul 26	15.1	Aug 03, 1934
<b>Maximum peak flow</b>			57,700	Jun 09, 1941
<b>Maximum peak stage</b>			34.30 <sup>a</sup>	Jun 09, 1941
<b>Annual runoff (cfsm)</b>	0.191		0.189	
<b>Annual runoff (inches)</b>	2.60		2.57	
<b>10 percent exceeds</b>	1,665		1,700	
<b>50 percent exceeds</b>	381.5		280.0	
<b>90 percent exceeds</b>	206.7		107.0	

<sup>a</sup> Gage height at different site and(or) datum

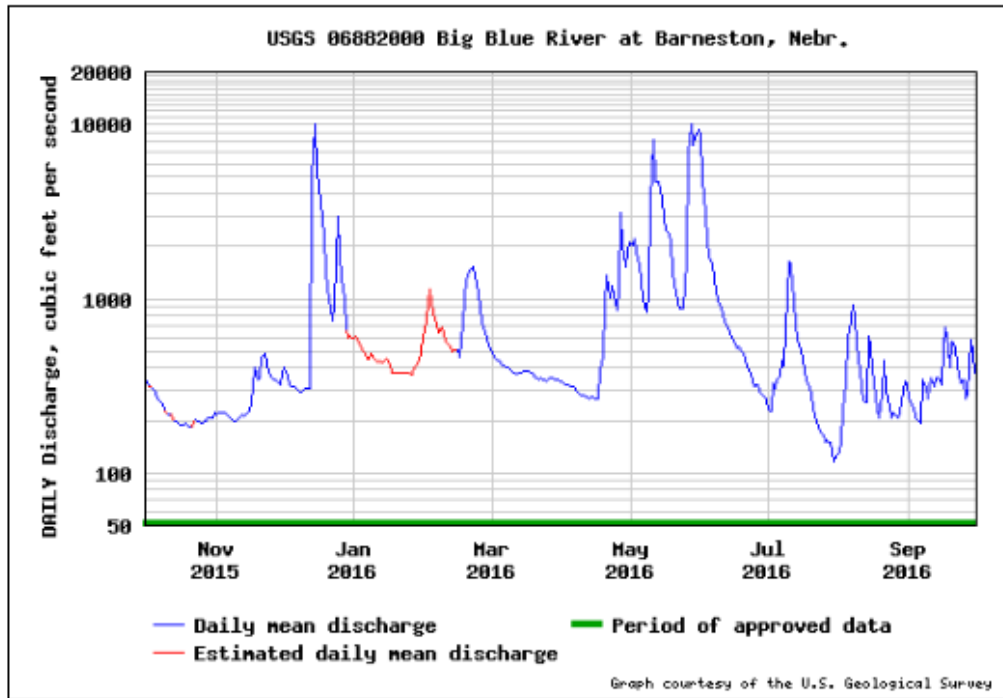


Exhibit A

**SUMMARY STATISTICS**

	<b>Water Year 2016</b>		<b>Water Years 1975 - 2016</b>	
<b>Annual total</b>	99,970			
<b>Annual mean</b>	273.1		477.6	
<b>Highest annual mean</b>			1,891	1993
<b>Lowest annual mean</b>			172.9	2006
<b>Highest daily mean</b>	8,080	May 28	39,300	Jul 26, 1992
<b>Lowest daily mean</b>	49.0	Jul 28	24.0	Sep 12, 2012
<b>Annual 7-day minimum</b>	53.0	Jul 23	26.0	Sep 06, 2012
<b>Maximum peak flow</b>			59,200	May 07, 2015
<b>Maximum peak stage</b>			22.97	May 07, 2015
<b>Annual runoff (cfsm)</b>	0.099		0.174	
<b>Annual runoff (inches)</b>	1.35		2.36	
<b>10 percent exceeds</b>	383.8		778.8	
<b>50 percent exceeds</b>	128.5		190.0	
<b>90 percent exceeds</b>	71.0		98.0	

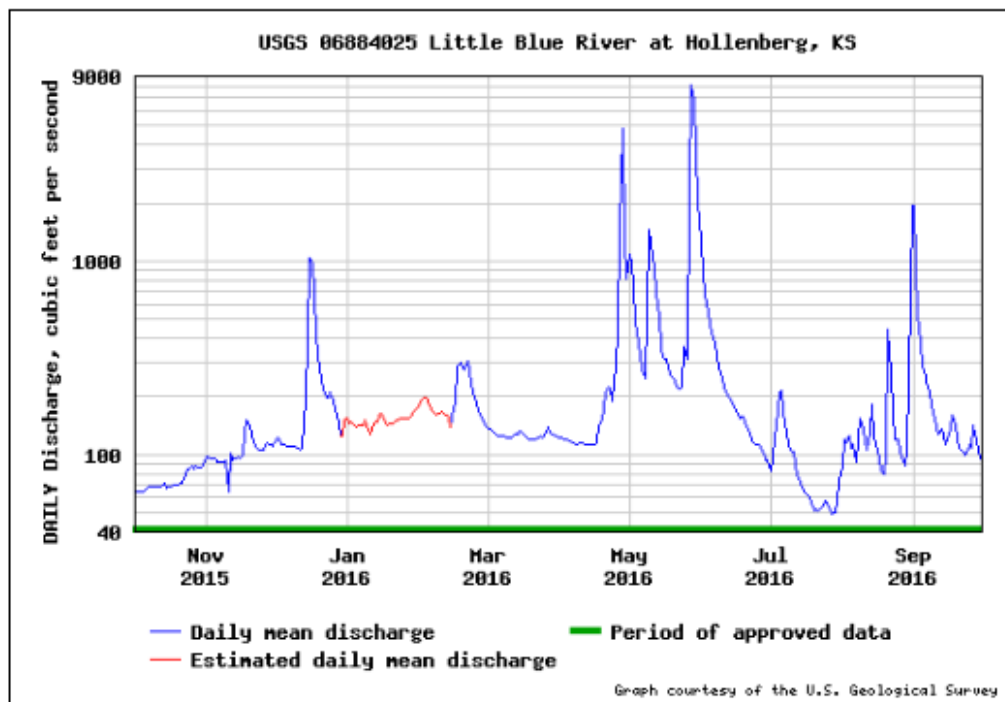


Exhibit B

## BIG BLUE RIVER COMPACT STATIC WATER LEVELS 2016

LEGAL	SECT	SITE	TYPE	Spring 2016	Fall 2016
4N-5E	2	AAAA	OW	93.85	97.83
4N-5E	2	DDAA	IW	19.48	20.85
4N-5E	4	BBBC	IW	20.89	22.64
4N-5E	9	CBCC	IW	73.56	75.37
4N-5E	10	DDAA	IW	26.85	29.18
4N-5E	11	DACA	IW	16.62	17.57
4N-5E	14	ABBB	IW	13.57	14.68
4N-5E	25	AACD	IW	19.93	18.73
5N-4E	12	ABBA	IW	18.78	19.87
5N-4E	13	BADD	IW	15.15	15.97
5N-4E	23	BABB	IW	17.06	18.07
5N-4E	24	AACD	IW	18	18.73
5N-5E	7	CADD	IW	61.68	64.32
5N-5E	20	BCCD	IW	19.63	20.46
5N-5E	21	DDBB	IW	53.6	59.39
5N-5E	29	CBBB	IW	14.4	15.99
5N-5E	33	AADD	IW	18.76	20.70

OW - OBSERVATION WELLS

IW - IRRIGATION WELLS

Exhibit C

<b>Big Blue River Regulatory Area Wells</b>					
Registration Number	Location T-R-S	Completion Date	Depth (FT)	Registration Pumping Capacity (GPM)	Filing Date
G-036485	4N-5E-11BC	3/28/1972	82	750	4/24/1972
G-038314	4N-5E-2DD	1/16/1973	188	1,300	1/29/1973
G-047820	4N-5E-12BB	11/1/1975	117	1,200	12/4/1975
G-050086	5N-5E-33AD	5/26/1976	123	800	6/9/1976
G-054047	4N-5E-24BB	3/1/1976	84	800	1/6/1977
G-054260	4N-5E-14AA	6/1/1974	70	800	1/14/1977
G-054261	4N-5E-14AB	5/2/1970	70	800	1/14/1977
G-056152	4N-5E-4BB	4/14/1977	91	1,000	5/11/1977
G-059128	5N-5E-29AA	4/25/1977	60	400	1/4/1978
G-059727	5N-5E-33CB	4/19/1978	91	1,200	4/20/1978
G-081769	4N-5E-13CD	4/22/1994	65	250	6/24/1994
G-100788	5N-5E-29AB	3/19/1999	65	500	6/2/1999
G-110669	4N-5E-13CC	7/12/1995	64	375	6/29/2001
G-110847	4N-5E-3DA	5/4/1979	82	800	7/2/2001
G-110849	5N-5E-29DD	4/30/1983	102	800	7/2/2001
G-151969	5N-5E-33BB	12/11/2008	112	800	1/20/2009
G-155061	4N-5E-10BB	12/4/2009	98	800	1/27/2010
G-166637	5N-5E-33BC	3/20/2013	120	1,200	3/28/2013

<b>Little Blue River Regulatory Area Wells</b>					
Registration Number	Location T-R-S	Completion Date	Depth (FT)	Registration Pumping Capacity (GPM)	Filing Date
G-058158	2N-2E-16AD	8/15/1977	29	650	9/6/1977
G-139240	2N-2E-9DD	0/0/1956	50	400	3/23/2006

Exhibit D



# **Attachment M**

**Nebraska Dept. Environmental Quality**  
**Blue River Basin – Water Quality Report**

**May 17, 2017**

**Reports of Foam**

In January 2017, NDEQ took calls regarding extreme foaming in eastern and southeast Nebraska rivers and streams. All complaints were investigated and no human spill or cause was detected. As organic matter breaks down, the oils contained within (think vegetable oil) are released. These oils act as a surfactant in the water so gases that are released from the decomposition process or air added due to the water aerating over rocks, dams, and other structures are trapped and foam is formed. The rains in January, combined with the frozen ground, likely carried in a tremendous amount of decaying organic matter and thus we had an extreme amount of foaming going on in some places.



## Water Quality Assessments

**Assessment categories for waterbodies in the 2016 Integrated Report (this information unchanged for 2017):**

**Category 1** – Waterbodies where all designated uses are met.

**Category 2** – Waterbodies where some of the designated uses are met but there is insufficient information to determine if all uses are being met.

**Category 3** – Waterbodies where there is insufficient data to determine if any beneficial uses are being met.

**Category 4 – Waterbody is impaired, but a TMDL is not needed. Sub-categories 4A-C and R outline the rationale for the waters not needing a TMDL:**

**Category 4a** – Waterbody assessment indicates the waterbody is impaired, but all of the required TMDLs have been completed.

**Category 4b** – Waterbody is impaired, but “other pollution control requirements” are expected to address the water quality impairment(s) within a reasonable period of time. Other pollution control requirements include, but are not limited to, National Pollutant Discharge Elimination System (NPDES) permits and best management practices.

**Category 4c** – Waterbody is impaired but the impairment is not caused by a pollutant. This category also includes waters where natural causes/sources have been determined to be the cause of the impairment. In general, natural causes/sources shall refer to those pollutants that originate from landscape geology and climactic conditions. It should be noted, this definition is not inclusive.

**Category 4r** – Waterbody data exceeds the impairment threshold however a TMDL is not appropriate at this time. The category will only be used for nutrient assessments in new or renovated lakes and reservoirs. Newly filled reservoirs usually go through a period of trophic instability – a trophic upsurge followed by the trophic decline (Holdren, et. al. 2001). Erroneous water quality assessments are likely to occur during this period. To account for this, all new or renovated reservoirs will be placed in this category for a period not to exceed eight years following the fill or re-fill process. After the eighth year monitoring data will be assessed and the waterbody will be appropriately placed into category 1, 2, or 5.

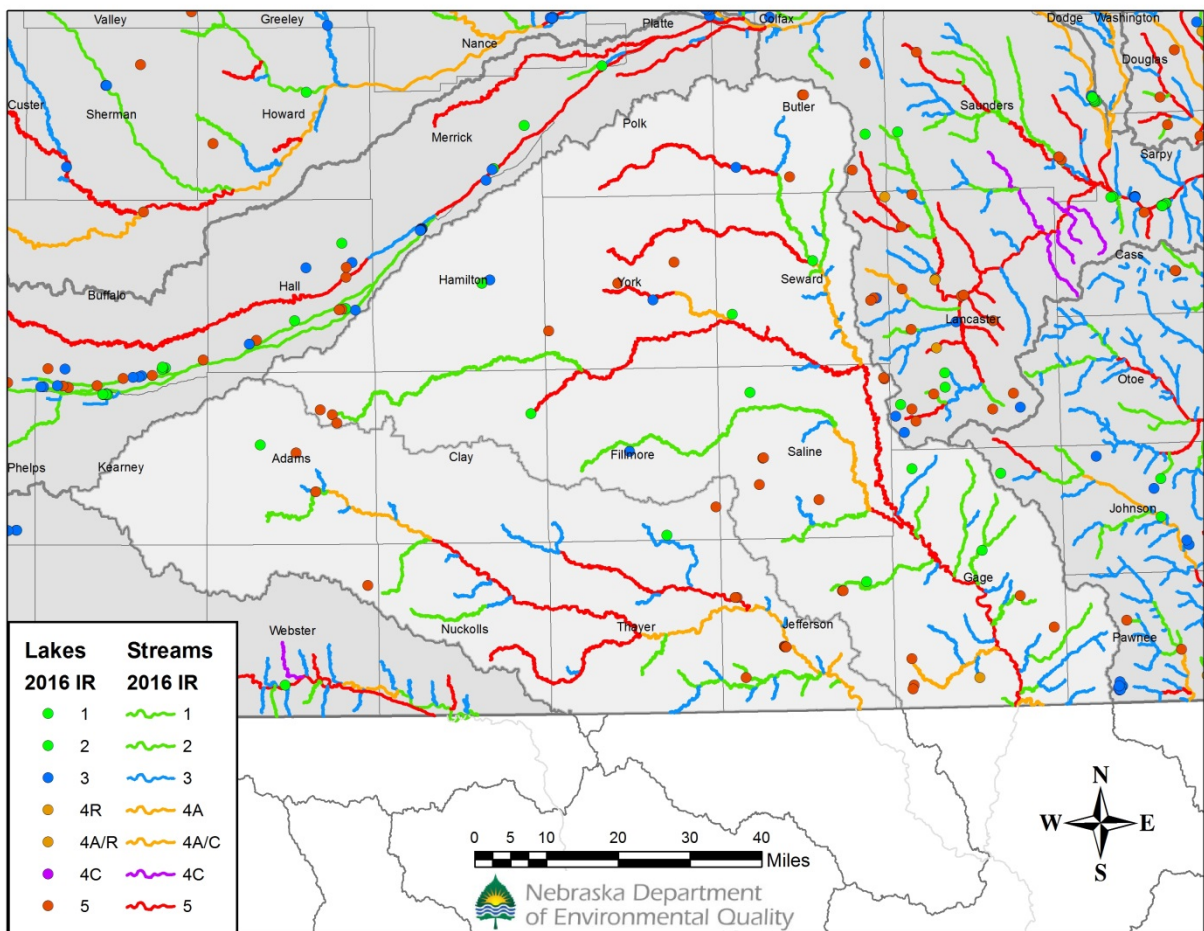
**Category 5** – Waterbodies where one or more beneficial uses are determined to be impaired by one or more pollutants and all of the TMDLs have not been developed. **Category 5 waters constitute the Section 303(d) list subject to EPA approval/disapproval.**

**Category 5alt** – Waterbody is impaired, but “other pollution control alternatives besides a TMDL” are expected to address the water quality impairment(s) within a reasonable period of time. Other pollution control alternatives include, but are not limited to, watershed management plans and best management practices.

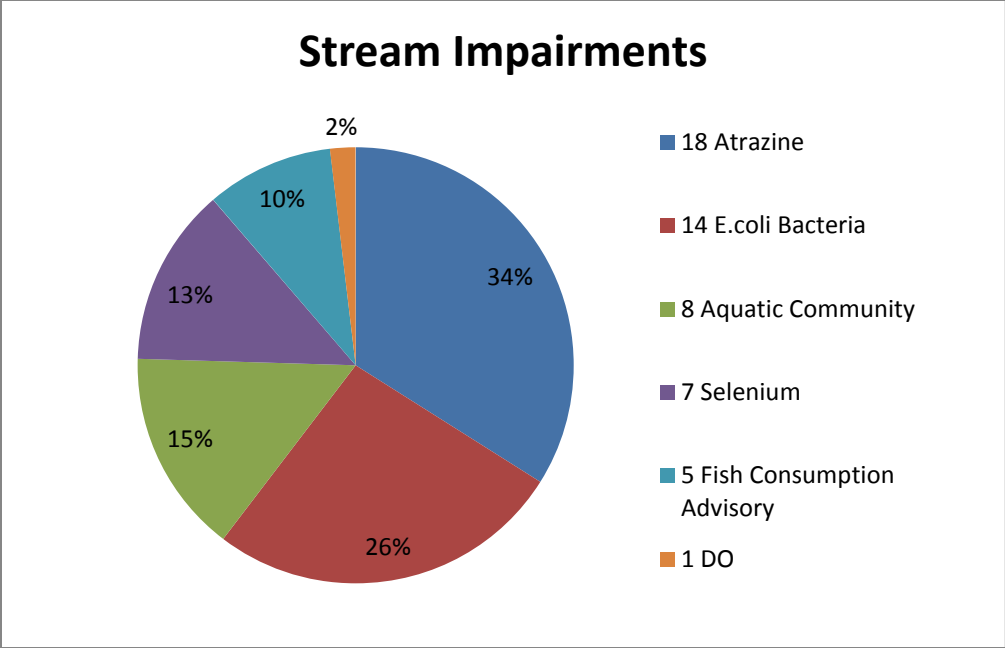
## 303d Listing: 2016 Integrated Report Assessment Statuses

Basin	Category								Basin Total
	1	2	3	4A	4B	4C	4R	5	
Big Blue Streams	5	16	24	7	0	0	NA	11	63
Big Blue Lakes	2	6	4	0	0	0	1	18	31
Little Blue Streams	1	9	19	4	0	0	NA	5	38
Little Blue Lakes	0	2	0	0	0	0	0	10	*12

\*LB2-L0060: Brick Yard Park Pond was removed from Title 117: Nebraska Surface Water Quality Standards in the 2014 Triennial Review as it was determined to not exist.

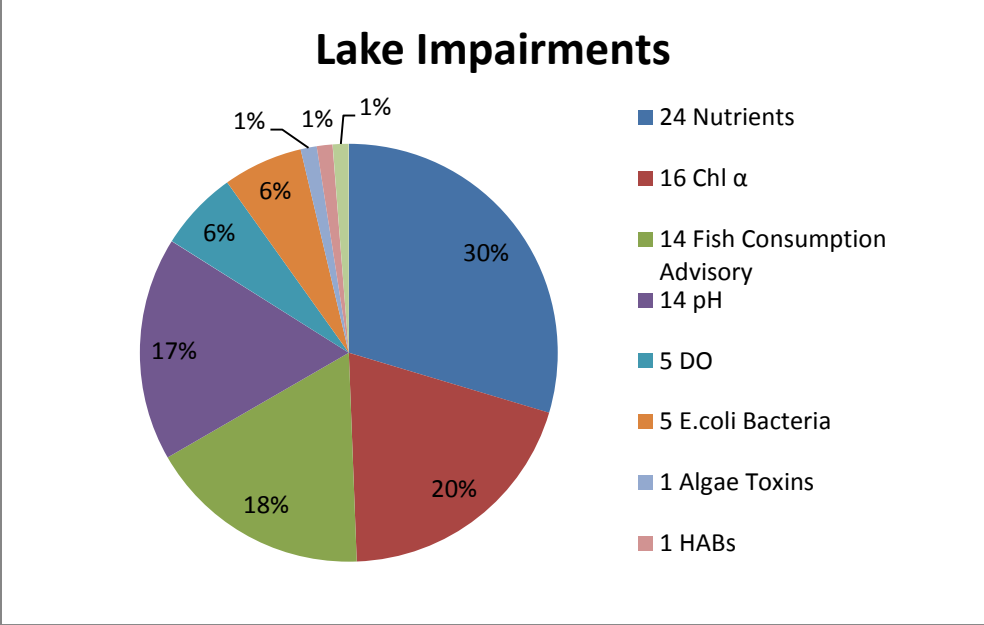






10 Atrazine Impaired Streams have TMDLs and are listed as 4a

8 *E.coli* Bacteria Impaired Streams have TMDLs and are listed as 4a.



One Nutrient Impaired lake is currently being renovated and is listed as 4r.

In 2013, EPA approved 23 TMDLs in the Big Blue Basin for ten stream segments impaired by *E. coli*, three of which were revised TMDLs from 2005, and thirteen stream segments impaired by Atrazine. See the table below.

**TMDL Development: Blue River Basin Waterbodies with Established/Approved TMDLs**

Basin	ID	Waterbody Name	Impaired Use	Impairment	WMP	Notes
BB	BB1-10000	Big Blue River	Primary Contact Recreation	E coli	Lower Big Blue River Basin	revised TMDL
			Aquatic Life	Atrazine	Lower Big Blue River Basin	
	BB1-10100	Mission Creek	Aquatic Life	Atrazine	Lower Big Blue River Basin	
			Primary Contact Recreation	E coli	Lower Big Blue River Basin	
	BB1-10800	Big Indian Creek	Aquatic Life	Atrazine	Lower Big Blue River Basin	
			Primary Contact Recreation	E coli	Lower Big Blue River Basin	
	BB1-10900	Big Indian Creek	Aquatic Life	Atrazine	Lower Big Blue River Basin	
	BB1-20000	Big Blue River	Primary Contact Recreation	E coli	Lower Big Blue River Basin	revised TMDL
			Aquatic Life	Atrazine	Lower Big Blue River Basin	
	BB1-L0030	Big Indian Lake	Aesthetics, Aquatic Life	T.Phosphorus	Big Indian Reservoir	
			Aesthetics, Aquatic Life	Sediment	Big Indian Reservoir	
	BB2-10000	Turkey Creek	Aquatic Life	Atrazine	Lower Big Blue River Basin	
			Primary Contact Recreation	E coli	Lower Big Blue River Basin	
	BB2-20000	Turkey Creek	Primary Contact Recreation	E coli	Lower Big Blue River Basin	
			Aquatic Life	Atrazine	Lower Big Blue River Basin	
	BB3-10000	West Fork Big Blue River	Primary Contact Recreation	E coli	None	revised TMDL
			Aquatic Life	Atrazine	None	
	BB3-10300	Beaver Creek	Aquatic Life	Atrazine	None	
	BB3-20000	West Fork Big Blue River	Primary Contact Recreation	E coli	None	
			Aquatic Life	Atrazine	None	
BB4-10000	Big Blue River	Primary Contact Recreation	E coli	None		
		Aquatic Life	Atrazine	None		
BB4-20000	Big Blue River	Primary Contact Recreation	E coli	None		
BB4-20800	Lincoln Creek	Aquatic Life	Atrazine	None		
BB4-40000	Big Blue River	Aquatic Life	Atrazine	None		
LB	LB1-10000	Little Blue River	Primary Contact Recreation	E coli	Draft Little Blue River Basin	revised TMDL
			Public Drinking Water Supply	Atrazine	Draft Little Blue River Basin	
			Aquatic Life	Atrazine	Draft Little Blue River Basin	
	LB1-10200	Rock Creek	Primary Contact Recreation	E coli	Draft Little Blue River Basin	
	LB2-10000	Little Blue River	Primary Contact Recreation	E coli	Draft Little Blue River Basin	revised
			Aquatic Life	Atrazine	Draft Little Blue River Basin	
	LB2-10100	Big Sandy Creek	Aquatic Life	Atrazine	Draft Little Blue River Basin	
	LB2-10100	Big Sandy creek	Primary Contact Recreation	E coli	Draft Little Blue River Basin	
	LB2-20000	Little Blue River	Aquatic Life	Atrazine	Draft Little Blue River Basin	
			Primary Contact Recreation	E coli	Draft Little Blue River Basin	
LB2-30000	Little Blue River	Primary Contact Recreation	E coli	Draft Little Blue River Basin		

**Clean Water Act Section 319 Activities in the Blue River Basin, 2017**

**Lower Big Blue NRD**

- LBBNRD has a 9-element basin plan in place, effective 2013.

- LBBNRD’s 319 project to treat the Cub Creek 12A watershed was wrapped up in the spring of 2016.
- LBBNRD applied to NDEQ and NET to renovate Cub Creek 12A in 2014, 2015 and 2016. Nebraska Environmental Trust (NET) did not fund. They are making plans to downscale renovation plans and possibly having the NRD cover the match funds in lieu of NET funds. They will make a decision in June 2017.

**Little Blue NRD**

- LBNRD has a draft 9-element basin plan which has been undergone an initial review by EPA R7. NDEQ is currently working the LBNRD on revisions to address R7 comments.
- LBNRD was granted a green light to initiate their first 319 project from the basin plan, though the basin plan is still being revised. This initial project will be at Crystal Lake in Ayr, NE.

**Upper Big Blue NRD**

- UBBNRD will be developing a 9-element basin plan for their entire NRD area. The planning process is set to start in June 2017 and be completed by January 2019.

=====

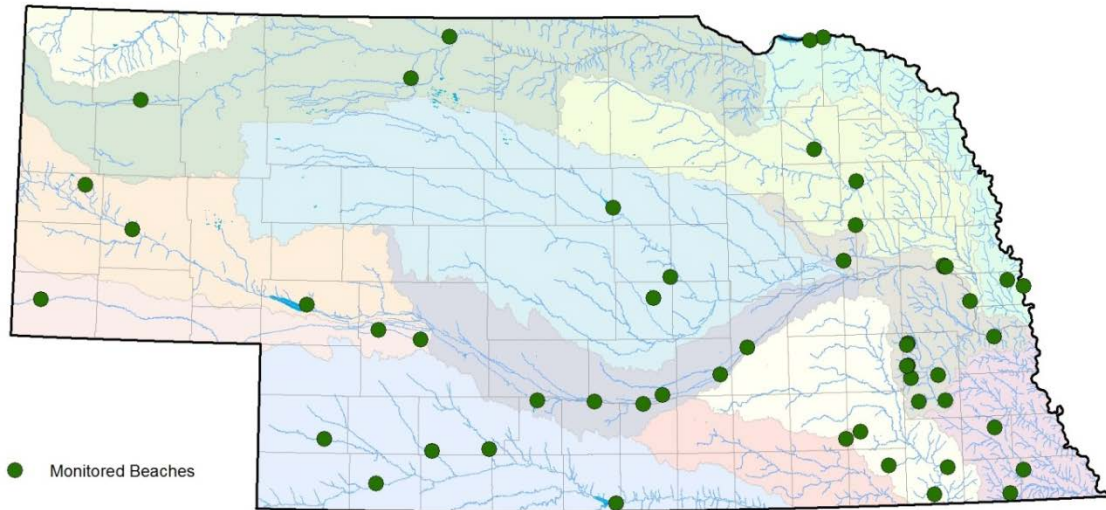
**Title 117 – Nebraska Surface Water Quality Standards**

NDEQ is preparing its triennial review and update (as required by the Federal Clean Water Act) of the Nebraska Surface Water Quality Standards for hearing by our Environmental Quality Council this fall. Items identified for possible revision include the following:

- Language including State listed endangered and threatened species as key species under the biological criteria (federally listed species are already recognized).
- Revisions for 84 human health related criteria according to EPA 304(a) recommendations. Some criteria would become less stringent, some more stringent.
- Revision of the cadmium aquatic life criteria based on EPA 304(a) recommendations. It would become slightly less stringent.
- New selenium aquatic life criteria based on fish tissue concentrations that would take precedent over water column values. Preliminary monitoring indicates many Se impairments would be removed with the new criteria.
- Several new public lakes have been identified for addition to Chapter 6.
- Housekeeping changes that deal with formatting, notations, etc.

# BeachWatch

NDEQ samples 53 Beaches at 50 Lakes across the state weekly, May 1 through September 30<sup>th</sup>. Sampling is done early in the week and posted later Thursday afternoon.



Find these results at <http://deq.ne.gov>

**WATER QUALITY HEALTH ALERT**  
**HARMFUL ALGAL TOXIN PRESENT**  
*ALERTA DE SALUD - ALGAS TOXICAS PRESENTES*

Contact with water **NOT** recommended

- Do not swim or water ski
- Do not ingest water
- Keep pets away from lake
- Avoid contact with water when boating or fishing

**THIS LAKE IS MONITORED FOR HARMFUL ALGAL BLOOMS AND E.COLI BACTERIA**

MAY 1<sup>st</sup> – SEPT 30<sup>th</sup>

**WATER QUALITY HEALTH ALERT**

Statewide Sampling Results and More Information:  
<http://deq.ne.gov>

NDEQ recommends no swimming at beaches which have been sampled with microcystin >20 ppb and *E.coli* bacteria >235 colonies/100 ml. When microcystin is above 20 ppb, signs with lake-use recommendations will be posted (DRAFT version of sign shown to the left).

Sign up for the BeachWatch listserv to get weekly emails with microcystin and *E.coli* bacteria.

Send an email to sign up, here are the details:

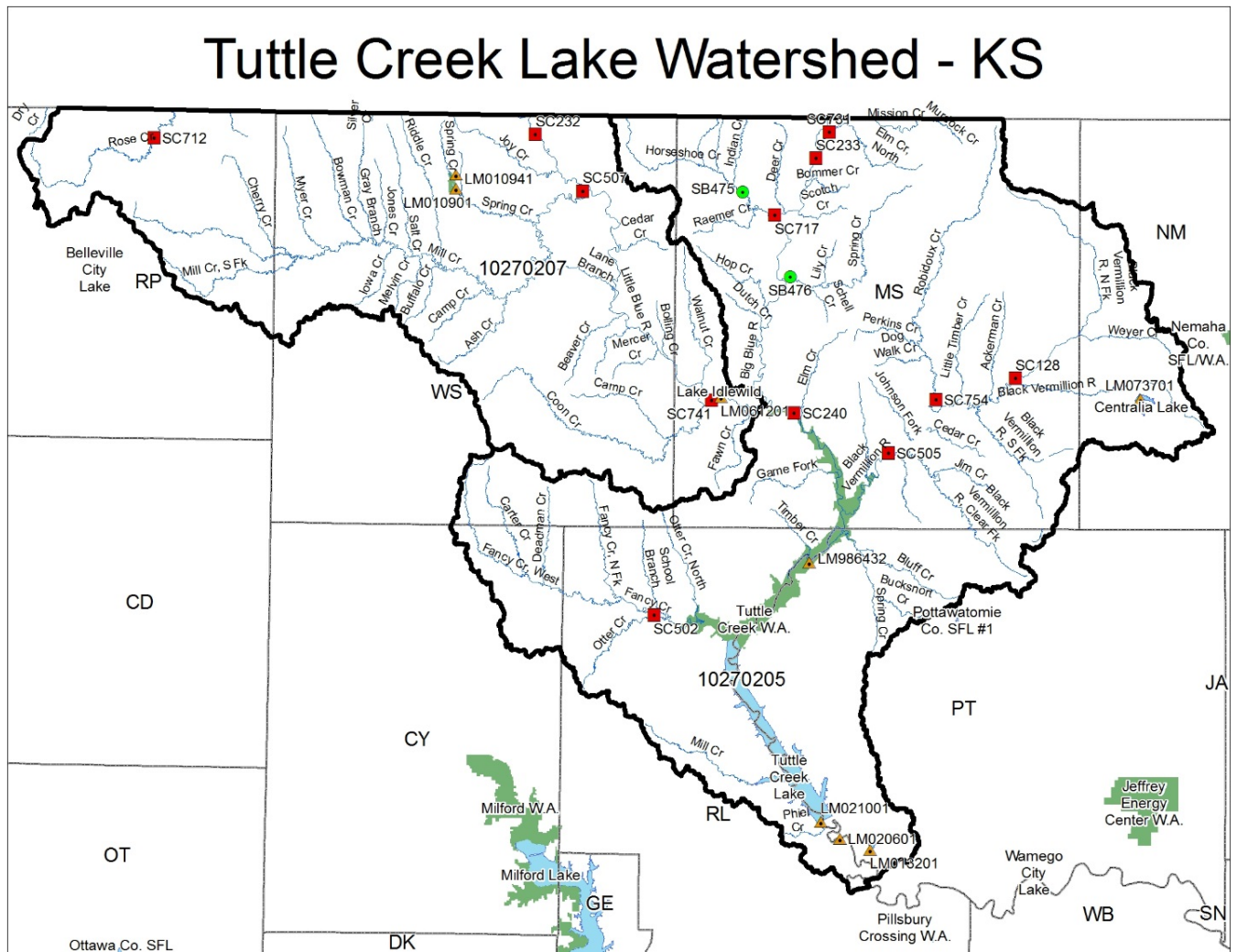
To: [listserv@listserv.nebraska.gov](mailto:listserv@listserv.nebraska.gov)  
Subject: LEAVE THIS SPACE BLANK  
Body of Message/email (use these words, use your name): Subscribe DEQ-BeachWatch John Smith  
*Use your name (not John Smith, unless your name is John Smith!) Then send.*

*You will receive an email requesting you confirm. You confirm by clicking on the link provided, and you will be added to the listserv.*



# **Attachment N**

2017 Big Blue River Compact – Kansas Water Quality Summary  
Prepared by the Kansas Department of Health and Environment, Bureau of Water



## Kansas Monitoring Stations:

Lower Big Blue, HUC8: 1270205

STATION	NAME_PROPER	HUC8_CODE	Waterbodies
LM013201	Pottawatomie Co. SFL #2	10270205	1
LM020601	Rocky Ford W.A.	10270205	1
LM021001	Tuttle Creek Lake	10270205	1
LM073701	Centralia Lake	10270205	1
LM986432	Tuttle Creek W.A.	10270205	1
SB475	Horseshoe Creek	10270205	1
SB476	Spring Creek	10270205	1
SC128	North Fork Black Vermillion River Near Vliets	10270205	2
SC233	Big Blue River Near Oketo	10270205	3
SC240	Big Blue River Near Blue Rapids	10270205	14
SC502	Fancy Creek Near Randolph	10270205	6
SC505	Black Vermillion River Near Frankfort	10270205	19
SC717	Horseshoe Creek Near Marysville	10270205	5
SC731	North Elm Creek Near Oketo	10270205	1
SC754	Robidoux Creek near Frankfort	10270205	3

Lower Little Blue, HUC8: 10270207

STATION	NAME_PROPER	HUC8_CODE	Waterbodies
LM010901	Washington Co. SFL	10270207	1
LM010941	Washington W.A.	10270207	1
LM061201	Lake Idlewild	10270207	1
SC232	Little Blue River Near Hollenberg	10270207	5
SC507	Mill Creek Near Hanover	10270207	20
SC712	Rose Creek Near Narka	10270207	1
SC741	Little Blue River Near Waterville	10270207	14

## Kansas 2016 303(d) Listings

Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION
Big Blue River Near Oketo	5	P	Total Phosphorus	SC233
Big Blue River Near Oketo	5	P	Total Suspended Solids	SC233
Big Blue River Near Oketo	5	P	Arsenic	SC233
Big Blue River Near Oketo	5	P	Biology	SC233
Big Blue River Near Oketo	5	P	pH	SC233
Fancy Creek Near Randolph	5	R	Sulfate	SC502
Black Vermillion River Near Frankfort	5	P	Total Suspended Solids	SC505
Black Vermillion River Near Frankfort	5	P	Total Phosphorus	SC505
Black Vermillion River Near Frankfort	5	P	Biology	SC505
Horseshoe Creek Near Marysville	5	R	Total Phosphorus	SC717
Horseshoe Creek Near Marysville	5	R	Sulfate	SC717
North Elm Creek Near Oketo	5	P	Total Phosphorus	SC731
Robidoux Creek near Frankfort	5	R	Total Phosphorus	SC754
Horseshoe Creek	5	B	Biology	SB475
Spring Creek	5	B	Biology	SB476
North Fork Black Vermillion River Near Vliets	5	R	Biology	SC128
Big Blue River Near Blue Rapids	5	P	Total Suspended Solids	SC240
Big Blue River Near Blue Rapids	5	P	pH	SC240
Big Blue River Near Blue Rapids	5	P	Total Phosphorus	SC240
Big Blue River Near Blue Rapids	5	P	Copper	SC240

Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION
Washington Co. SFL	5	L	Eutrophication	LM010901
Washington W.A.	5	W	Lead	LM010941
Little Blue River Near Hollenberg	5	P	Total Suspended Solids	SC232
Little Blue River Near Hollenberg	5	P	Total Phosphorus	SC232
Little Blue River Near Hollenberg	5	P	pH	SC232
Little Blue River Near Hollenberg	5	P	Copper	SC232
Little Blue River Near Hollenberg	5	P	Biology	SC232
Mill Creek Near Hanover	5	P	Total Suspended Solids	SC507
Mill Creek Near Hanover	5	P	Total Phosphorus	SC507
Rose Creek Near Narka	5	R	Arsenic	SC712
Rose Creek Near Narka	5	R	Total Phosphorus	SC712
Little Blue River Near Waterville	5	P	Total Suspended Solids	SC741
Little Blue River Near Waterville	5	P	Total Phosphorus	SC741



## Kansas Approved TMDLs

<b>Lower Big Blue</b>				
HUC8: <b>10270205</b>				
<b>TMDLs - Category 4a</b>				
Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION
Tuttle Creek Lake	4a	L	Eutrophication	LM021001
Tuttle Creek Lake	4a	L	Atrazine	LM021001
Tuttle Creek Lake	4a	L	Alachlor	LM021001
Tuttle Creek Lake	4a	L	Siltation	LM021001
Big Blue River Near Oketo	4a	P	E. coli	SC233
Big Blue River Near Oketo	4a	P	Atrazine	SC233
Fancy Creek Near Randolph	4a	R	Atrazine	SC502
Fancy Creek Near Randolph	4a	R	E. coli	SC502
Black Vermillion River Near Frankfort	4a	P	E. coli	SC505
Black Vermillion River Near Frankfort	4a	P	Atrazine	SC505
Horseshoe Creek Near Marysville	4a	R	Atrazine	SC717
Horseshoe Creek Near Marysville	4a	R	E. coli	SC717
North Elm Creek Near Oketo	4a	P	Atrazine	SC731
Centralia Lake	4a	L	pH	LM073701
Centralia Lake	4a	L	Eutrophication	LM073701
Centralia Lake	4a	L	Aquatic Plants	LM073701
Big Blue River Near Blue Rapids	4a	P	Atrazine	SC240
Big Blue River Near Blue Rapids	4a	P	E. coli	SC240

<b>Lower Little Blue</b>				
HUC8: <b>10270207</b>				
<b>TMDLs - Category 4a</b>				
Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION
Washington Co. SFL	4a	L	Aquatic Plants	LM010901
Washington Co. SFL	4a	L	Dissolved Oxygen	LM010901
Washington W.A.	4a	W	Eutrophication	LM010941
Washington W.A.	4a	W	Siltation	LM010941
Lake Idlewild	4a	L	Eutrophication	LM061201
Little Blue River Near Hollenberg	4a	P	E. coli	SC232
Little Blue River Near Hollenberg	4a	P	Atrazine	SC232
Mill Creek Near Hanover	4a	P	E. coli	SC507
Mill Creek Near Hanover	4a	P	Atrazine	SC507
Rose Creek Near Narka	4a	R	Atrazine	SC712
Little Blue River Near Waterville	4a	P	E. coli	SC741
Little Blue River Near Waterville	4a	P	Atrazine	SC741

## Kansas Delistings

<b>Lower Big Blue</b>				
HUC8: <b>10270205</b>				
<b>Delistings - Category 2</b>				
Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION
Centralia Lake	2	L	Atrazine	LM073701
Big Blue River Near Oketo	2	P	Copper	SC233
Big Blue River Near Oketo	2	P	Lead	SC233
Big Blue River Near Blue Rapids	2	P	Lead	SC240
Big Blue River Near Blue Rapids	2	P	Berylium	SC240
Black Vermillion River Near Frankfort	2	P	Lead	SC505
Black Vermillion River Near Frankfort	2	P	Copper	SC505
Horseshoe Creek Near Marysville	2	R	Copper	SC717
Horseshoe Creek Near Marysville	2	R	Total Suspended Solids	SC717
Horseshoe Creek Near Marysville	2	R	Lead	SC717

<b>Lower Little Blue</b>				
HUC8: <b>10270207</b>				
<b>Delistings - Category 2</b>				
Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION
Little Blue River Near Hollenberg	2	P	Lead	SC232
Mill Creek Near Hanover	2	P	Lead	SC507
Mill Creek Near Hanover	2	P	Copper	SC507
Rose Creek Near Narka	2	R	Lead	SC712
Rose Creek Near Narka	2	R	Copper	SC712
Rose Creek Near Narka	2	R	Total Suspended Solids	SC712
Little Blue River Near Waterville	2	P	Copper	SC741
Little Blue River Near Waterville	2	P	Lead	SC741

### Kansas TMDL Development Schedule:

In accordance with the *Kansas TMDL Prioritization Framework*, Kansas has chosen to address excessive nutrients in state waters through a strategy of load reduction ahead of pursuing numeric nutrient criteria. This strategy is being implemented with the development of nutrient TMDLs, which primarily address Total Phosphorus stream impairments in the highest priority HUC 8s in the state. There are 16 HUC8s that were designated as top priority for 303(d) purposes addressing nutrient impairments, with the Lower Big Blue HUC8 being designated within these top priority HUC8s.

Total Phosphorus TMDLs are scheduled for development in 2019 to address nine TP impaired stations and contributing areas above Tuttle Creek Lake, covering 65 stream segments.

### TMDLs Scheduled for development in 2019 in Lower Big Blue and Lower Little Blue watersheds:

Waterbody Name	CATEGORY	SITE_TYPE	IMPAIRMENT	STATION	Stream Segments
Big Blue River Near Oketo	5	P	Total Phosphorus	SC233	3
Black Vermillion River Near Frankfort	5	P	Total Phosphorus	SC505	19
Horseshoe Creek Near Marysville	5	R	Total Phosphorus	SC717	5
North Elm Creek Near Oketo	5	P	Total Phosphorus	SC731	1
Robidoux Creek near Frankfort	5	R	Total Phosphorus	SC754	3
Big Blue River Near Blue Rapids	5	P	Total Phosphorus	SC240	14
Little Blue River Near Hollenberg	5	P	Total Phosphorus	SC232	5
Rose Creek Near Narka	5	R	Total Phosphorus	SC712	1
Little Blue River Near Waterville	5	P	Total Phosphorus	SC741	14

### Current Kansas TMDL Activities:

Kansas submitted Total Phosphorus TMDLs for the Kansas River to EPA for approval at the beginning of 2017. Tuttle Creek Lake releases and water quality served as a major component of the Kansas River TMDLs. Ultimately, the existing eutrophication TMDLs associated with Tuttle Creek Lake and other reservoirs contributing significant flow to the Kansas River (Milford and Perry Lakes) are key to achieving the endpoints of the Kansas River TMDLs.

2017 TMDL development activities are focused on the Arkansas River near Wichita.

### Tuttle Creek Lake Chlorophyll-*a* Water Quality Standard

EPA recently approved the chlorophyll *a* water quality standard of 10 µg/L for Tuttle Creek Lake. The approval came on March 29, 2017 as part of the approval of 81 site-specific chlorophyll-*a* criteria established for the protection of the domestic water supply use for Kansas Lakes serving as primary or secondary public water supply lakes.

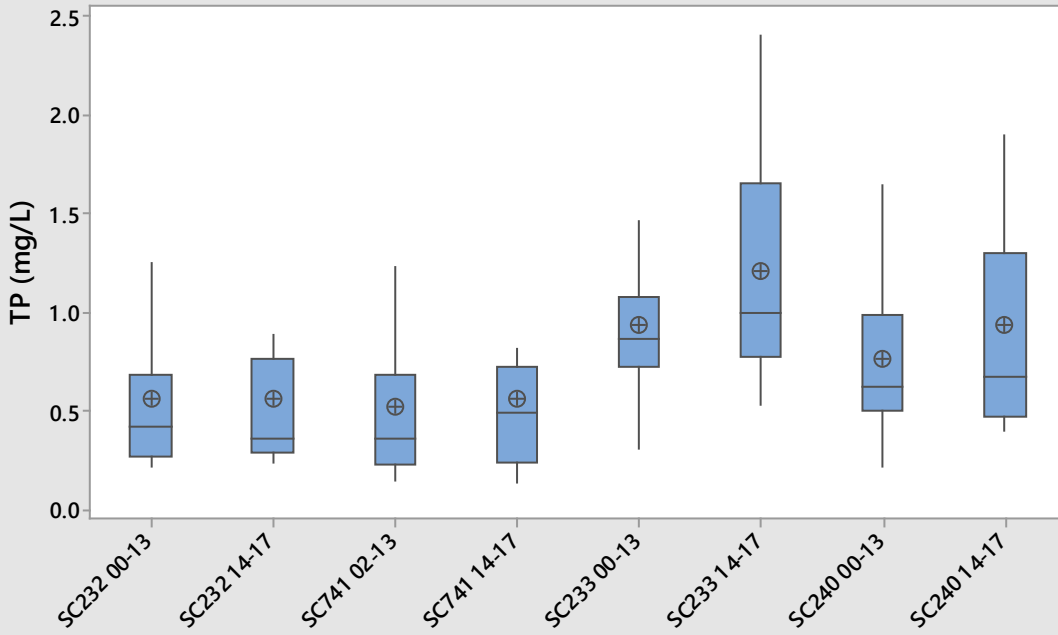
## Kansas Water Quality Summary:

### Kansas Lower Blue River Watershed Data Summary for Total Phosphorus (TP) and Total Suspended Solids (TSS):

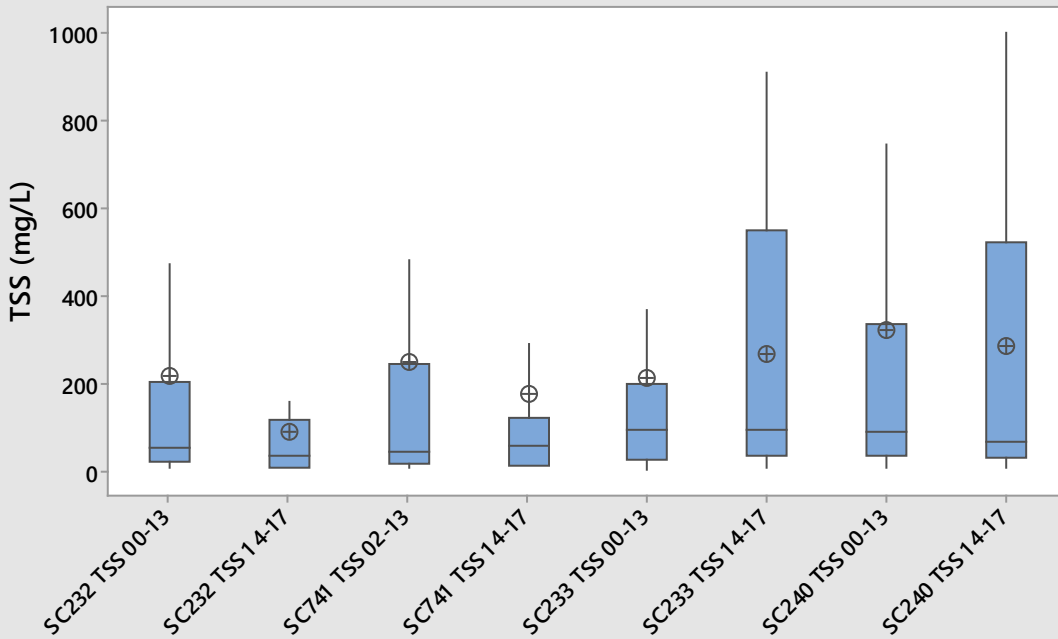
Station	Waterbody	Period of Record	TP Avg	TP Median	TP Max		TSS Avg	TSS Median	TSS Max
SC233	Big Blue R near Oketo	2000-2013	0.937	0.866	2.648		215.7	97.5	1590
		2014-2017	1.21	1	2.4		266.8	96	910
SC240	Big Blue R near Blue Rapids	2000-2013	0.764	0.623	1.843		321.9	91	2052
		2014-2017	0.932	0.67	1.9		286.2	69	1000
SC502	Fancy Cr near Randolph	2000-2009	0.27	0.214	1.025		58.6	32	464
		2013-2017	0.309	0.078	1.21		310.4	10	1510
SC505	Black Vermillion R near Frankfort	2000-2013	0.351	0.26	2.84		188.7	44	5130
		2014-2017	0.458	0.22	2		244.54	25	1600
SC717	Horseshoe Cr near Marysville	1998-2013	0.378	0.249	1.35		111.5	21.5	624
SC731	North Elm Cr near Oketo	2001-2009	0.237	0.202	0.822		74.8	25	720
		2011-2013	0.226	0.2	0.506		22.56	11	94
SC754	Robidoux Cr near Frankfort	2009-2017	0.29	0.256	0.594		58.9	27	266
SC232	Little Blue R near Hollenberg	2000-2013	0.565	0.417	3.43		221.2	56.5	4160
		2014-2017	0.563	0.36	1.7		90	39	530
SC507	Mill Cr near Hanover	2000-2013	0.32	0.197	1.36		165.9	52	1780
		2014-2017	0.335	0.13	1.7		203	23	2000
SC712	Rose Cr near Narka	1997-2009	0.739	0.407	5.35		252.2	21	3210
		2013-2017	0.531	0.4	1.03		45	10	147
SC741	Little Blue R near Waterville	2002-2013	0.52	0.361	1.76		249.2	47	1970
		2014-2017	0.559	0.49	1.5		176.72	58	1300



**Total P Concentrations in Blue R Watershed - KS**



**TSS Concentrations in the Blue R Watershed - KS**



**Lower Blue River Watershed Atrazine Data Summary for all samples:**

Station	Waterbody	Period of Record	Number of Atrazine Samples	Number of Samples > 3 ppb	% of Samples > 3ppb
SC233	Big Blue R near Oketo	2000-2013	37	6	16.22
		2014-2017	10	2	20.00
SC240	Big Blue R near Blue Rapids	2000-2013	38	8	21.05
		2014-2017	10	1	10.00
SC502	Fancy Cr near Randolph	2000-2009	11	2	18.18
		2013-2017	3	0	0.00
SC505	Black Vermillion R near Frankfort	2000-2013	39	5	12.82
		2014-2017	10	1	10.00
SC717	Horseshoe Cr near Marysville	1998-2013	12	4	33.33
SC731	North Elm Cr near Oketo	2001-2009	23	6	26.09
		2011-2013	7	2	28.57
SC754	Robidoux Cr near Frankfort	2009-2017	6	1	16.67
SC232	Little Blue R near Hollenberg	2000-2013	37	7	18.92
		2014-2017	12	1	8.33
SC507	Mill Cr near Hanover	2000-2013	36	8	22.22
		2014-2017	9	1	11.11
SC712	Rose Cr near Narka	1997-2009	12	5	41.67
		2013-2017	3	0	0.00
SC741	Little Blue R near Waterville	2002-2013	30	6	20.00
		2014-2017	10	2	20.00

**Lower Blue River Watershed Atrazine Data Summary for April-July Samples:**

Station	Waterbody	Period of Record	April-July Number of Atrazine Samples	April-July Number of Samples > 3 ppb	April-July % of Samples > 3ppb
SC233	Big Blue R near Oketo	2000-2013	12	6	50.00
		2014-2017	4	2	50.00
SC240	Big Blue R near Blue Rapids	2000-2013	12	8	66.67
		2014-2017	4	1	25.00
SC502	Fancy Cr near Randolph	2000-2009	3	2	66.67
		2013-2017	1	0	0.00
SC505	Black Vermillion R near Frankfort	2000-2013	10	5	50.00
		2014-2017	4	1	25.00
SC717	Horseshoe Cr near Marysville	1998-2013	4	3	75.00
SC731	North Elm Cr near Oketo	2001-2009	9	6	66.67
		2011-2013	2	2	100.00
SC754	Robidoux Cr near Frankfort	2009-2017	2	1	50.00
SC232	Little Blue R near Hollenberg	2000-2013	12	7	58.33
		2014-2017	4	1	25.00
SC507	Mill Cr near Hanover	2000-2013	12	7	58.33
		2014-2017	3	1	33.33
SC712	Rose Cr near Narka	1997-2009	4	4	100.00
		2013-2017	1	0	0.00
SC741	Little Blue R near Waterville	2002-2013	11	6	54.55
		2014-2017	3	2	66.67

# Attachment O

#### **Tuttle Creek WRAPs / 319 Nonpoint Source Program Update:**

- **Streambank Projects on Big Blue and Little Blue Rivers**
  - **2015: 11 sites completed accounting for reduction of 22,516 tons/year of sediment**
  - **2016 & 2017: 17 sites designed and constructed; reduction of 28,914 tons/year of sediment**
  - **Total project costs to date: ~\$2.5 million**
  - **Interagency project coordinated through Tuttle Creek WRAPs; 319 funded**
- **Tuttle Creek WRAPs:**
  - **Coordinator position is currently vacant**
  - **BMP focus**
    - **cover crops**
    - **livestock relocation**
    - **soil health**
  - **Aerial Assessments completed to reprioritize Livestock targeted areas**
    - **Reprioritized targeted area to cropland/winter feeding sites**
  - **Tuttle Creek WRAPs allocates \$100,000 per/year on BMP cost share**

**Tuttle WRAPs Plan Update Summary (attached)**