Nebraska's Water Quality Report for the Big Blue Compact

April 20, 2023

Assessment categories for waterbodies in the Draft 2022 Integrated Report:

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 or climatic conditions. It should be noted, this definition is not inclusive.
>
> ***Category 4r***[1] – 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 5-Alt*** – 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 plan development, best management practice implementation and adaptive management strategies.

Table 1: Blue River Basin waterbodies by assessment category in the Draft 2022 NE Integrated Report*

Basin	Category								Basin Total
	1	2	3	4A	4B	4C	4R	5	
Big Blue Streams	5	16	19	7	0	0	0	16	63
Big Blue Lakes	2	5	4	0	0	0	0	20	31
Little Blue Streams	1	11	16	5	0	0	0	5	38
Little Blue Lakes	0	2	0	0	0	0	0	10	12

*The 2022 NE IR is currently on public notice and will be submitted to EPA for final review upon completion.

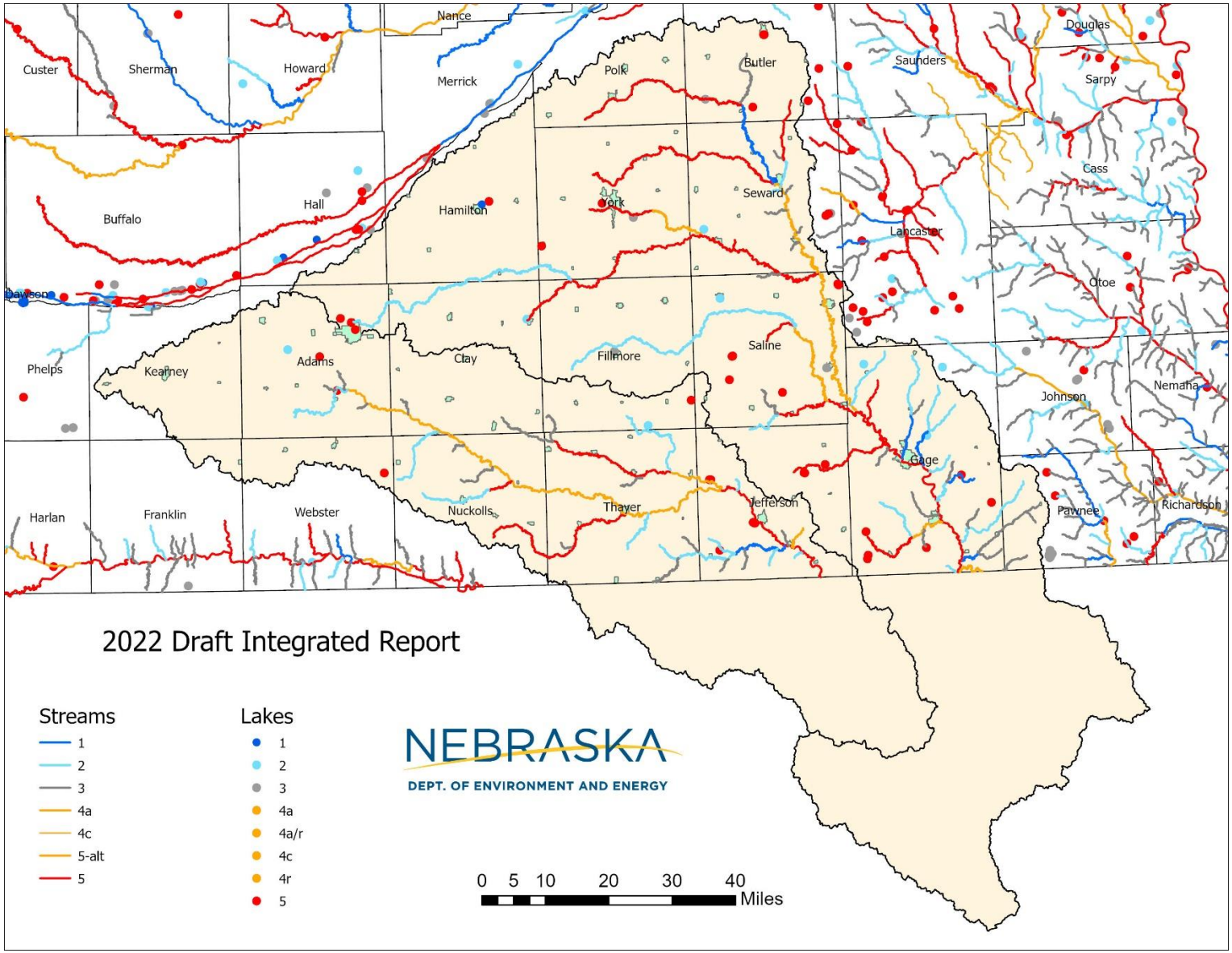


Figure 1: Assessment status of the Blue River Basin in the Draft 2022 NE Integrated Report

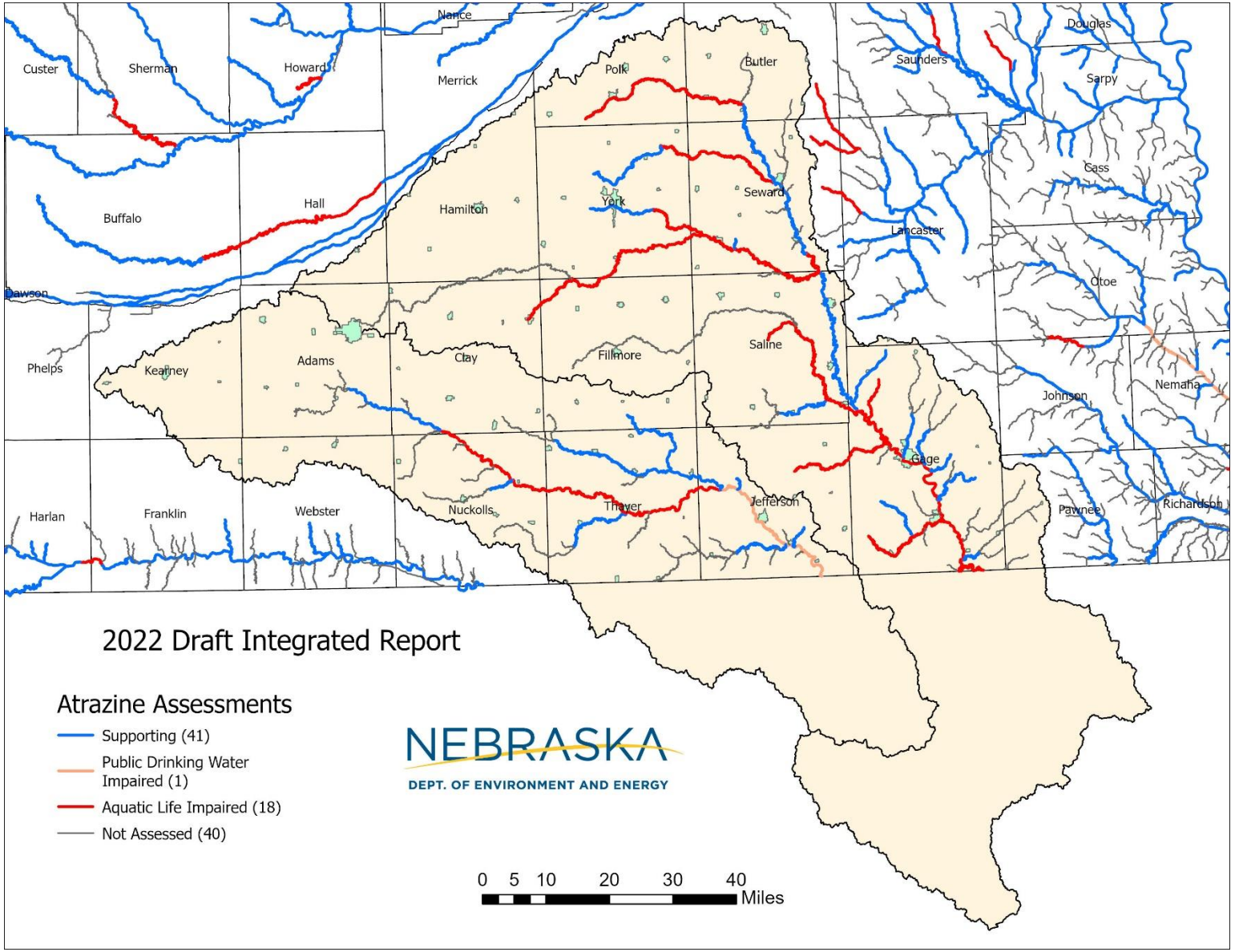


Figure 2: Blue River Basin streams assessments for atrazine in the Draft 2022 NE Integrated Report

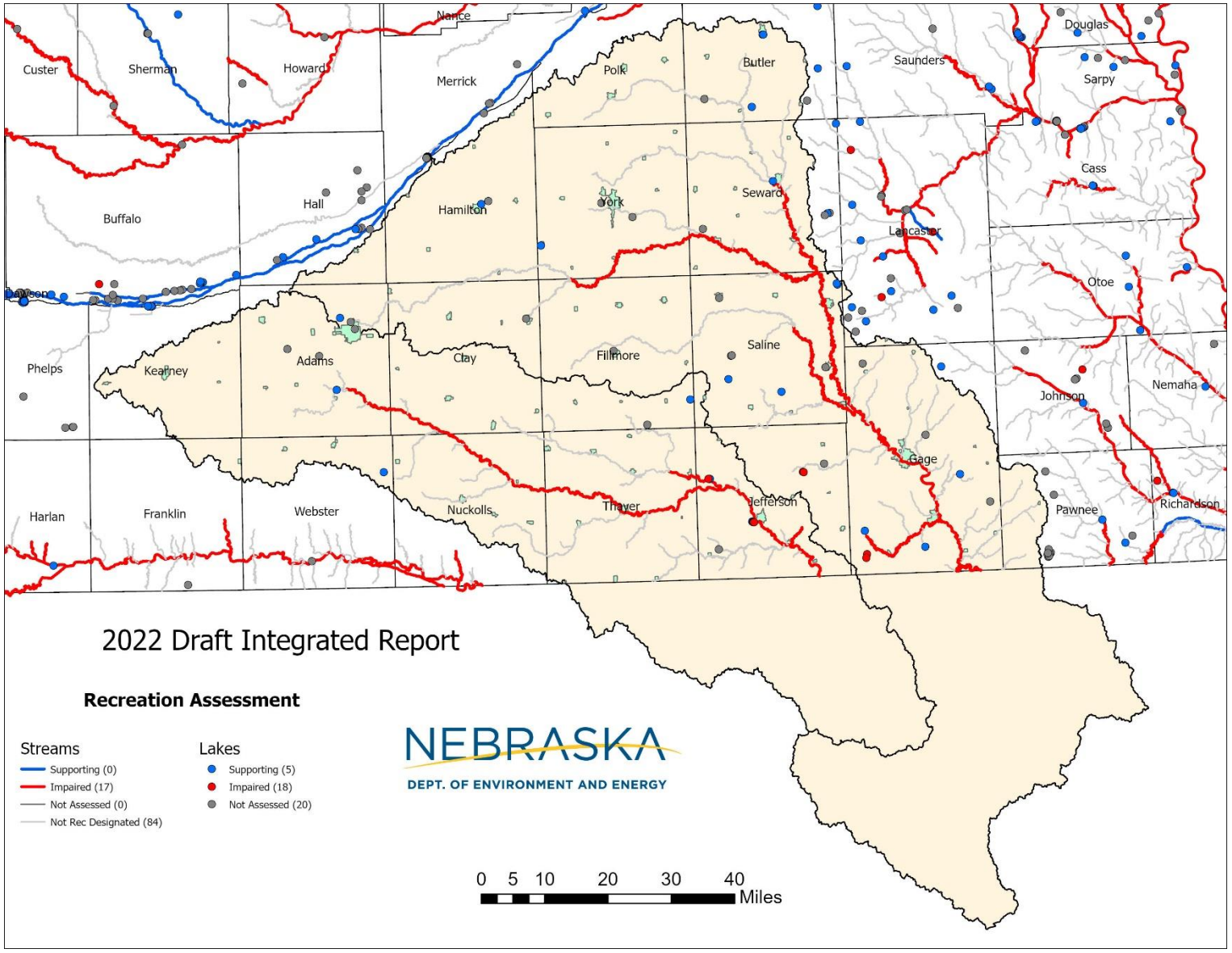


Figure 3: Blue River Basin streams assessments for *E. coli* in the Draft 2022 NE Integrated Report

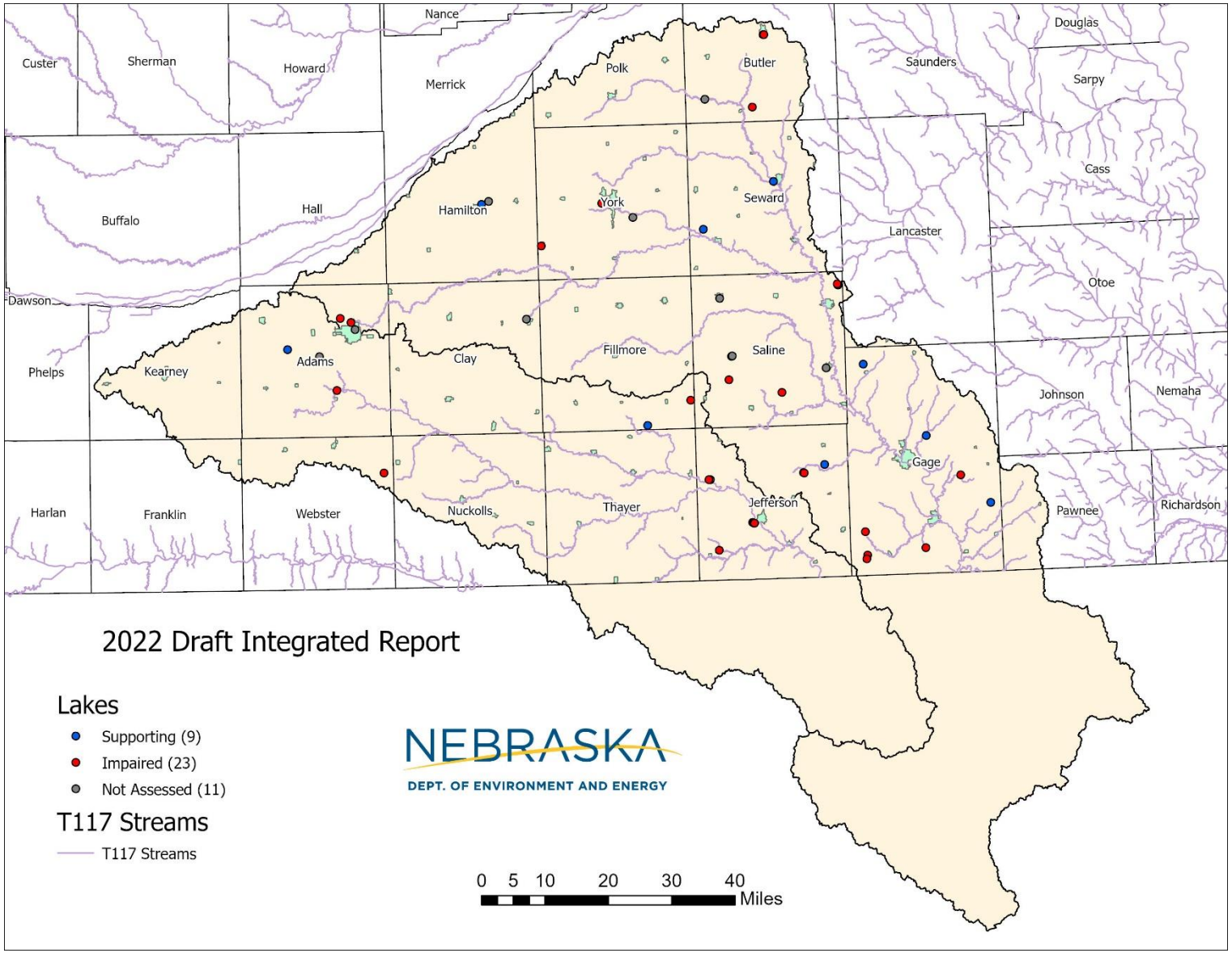


Figure 4: Blue River Basin lake assessment for Total Nitrogen and Total Phosphorus in the Draft 2022 NE Integrated Report

Table 2: Blue River Basin lake impairments in the Draft 2022 Integrated Report

Waterbody ID	Waterbody Name	Impairments (Causes)
BB1-L0010	Donald Whitney Memorial Lake	Recreation (*E. coli*), Aquatic Life - Dissolved Oxygen (Total Nitrogen, Total Phosphorus)
BB1-L0020	Diamond Lake South	Recreation (*E. coli*), Aquatic Life - Dissolved Oxygen (Total Nitrogen, Total Phosphorus)
BB1-L0030	Big Indian Lake (11A)	Aquatic Life - Fish Consumption Advisory (Mercury), (Total Nitrogen, Total Phosphorus)
BB1-L0040	Arrowhead Lake	Aquatic Life - Chlorophyll α, Dissolved Oxygen (Total Nitrogen, Total Phosphorus)
BB1-L0050	Wolf Wildcat Lake	Aquatic Life - Fish Consumption Advisory (Mercury)
BB1-L0060	Rockford Lake	Aquatic Life - Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
BB1-L0070	Leisure Lake	Aquatic Life - Fish Consumption Advisory (Mercury)
BB1-L0080	Cub Creek Lake	Recreation (*E. coli*), Aquatic Life (Total Nitrogen, Total Phosphorus)
BB1-L0100	Walnut Creek Lake (2A)	Aquatic Life - Fish Consumption Advisory (Mercury), pH (Total Nitrogen, Total Phosphorus)
BB2-L0005	Swanton Lake	Aquatic Life - Fish Consumption Advisory (Mercury), pH (Total Nitrogen, Total Phosphorus)
BB2-L0010	Swan Creek Lake (2A)	Aquatic Life - Dissolved Oxygen (Unknown)
BB2-L0020	Swan Creek Lake (5A)	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
BB3-L0040	Henderson Pond	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)
BB3-L0050	Lake Hastings	Aquatic Life - Fish Consumption Advisory (Hazard Index Compounds*, Cancer Risk Compounds*), Chlorophyll α (Total Nitrogen, Total Phosphorus), Aesthetics (Sediment)
BB3-L0060	Hastings Northwest Dam Lake	Aquatic Life - Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
BB3-L0070	Heartwell Lake	Aesthetics-Algae Blooms (Unknown)
BB3-L0080	Recharge Lake	Aquatic Life -Chlorophyll α (Total Nitrogen, Total Phosphorus)
BB4-L0010	David City Park Lake	Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)
BB4-L0035	Oxbow Trail Reservoir	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
BB4-L0040	Pioneer Trails Lake	Aquatic Life - Fish Consumption Advisory (Mercury)
LB1-L0010	Buckley Reservoir (3F)	Aquatic Life - (Total Nitrogen, Total Phosphorus)
LB1-L0020	Crystal Springs Northwest Lake	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
LB1-L0030	Crystal Springs Center Lake	Aquatic Life - Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)

Waterbody ID	Waterbody Name	Impairments (Causes)
LB1-L0040	Crystal Springs East Lake	Recreation (E. coli), Aquatic Life - Chlorophyll α (Total Nitrogen, Total Phosphorus)
LB1-L0050	Lone Star Reservoir	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α, Dissolved Oxygen (Total Nitrogen, Total Phosphorus)
LB2-L0010	Alexandria Lake No. 1 & 2	Aquatic Life - pH (Unknown)
LB2-L0030	Alexandria Lake No. 3	Recreation - Algae Toxins (Microcystin), Aquatic Life - Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
LB2-L0050	Liberty Cove Lake	Aquatic Life - Fish Consumption Advisory (Mercury), Chlorophyll α, pH (Total Nitrogen, Total Phosphorus)
LB2-L0070	Crystal Lake (SRA)	Aquatic Life - Chlorophyll α, pH, Dissolved Oxygen (Total Nitrogen, Total Phosphorus)
LB2-L0080	Prairie Lake (32-Mile H)	Aquatic Life - pH (Unknown)

Table 3: Blue River Basin stream impairments in the 2022 Integrated Report

Waterbody ID	Waterbody Name	Impairments (Causes)
BB1-10000	Big Blue River	Recreation (*E. coli*), Aquatic Life (May-June Atrazine, Aluminum, ~~Lead~~)
BB1-10100	Mission Creek	Recreation (*E. coli*), Aquatic Life (May-June Atrazine)
BB1-10800	Big Indian Creek	Recreation (*E. coli*), Aquatic Life (May-June Atrazine)
BB1-10900	Big Indian Creek	Recreation (E. coli), Aquatic Life (May-June Atrazine)
BB1-11900	Cub Creek	Aquatic Life (May-June Atrazine)
BB1-12000	Soap Creek	Aquatic Life - Impaired Aquatic Community (Unknown), (May-June Atrazine)
BB1-20000	Big Blue River	Recreation (*E. coli*)
BB2-10000	Turkey Creek	Recreation (*E. coli*), Aquatic Life - Impaired Aquatic Community (Unknown), (May-June Atrazine)
BB2-10100	Swan Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
BB2-20000	Turkey Creek	Recreation (*E. coli*), Aquatic Life (May-June Atrazine)
BB2-20100	Spring Creek	Aquatic Life (May-June Atrazine)
BB3-10000	West Fork Big Blue River	Recreation (*E. coli*), Aquatic Life - Impaired Aquatic Community (Unknown), (May-June Atrazine)
BB3-10200	Walnut Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
BB3-10300	Beaver Creek	Aquatic Life (May-June Atrazine)
BB3-10400	Beaver Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
BB3-20000	West Fork Big Blue River	Recreation (*E. coli*), Aquatic Life - Impaired Aquatic Community (Unknown), (May-June Atrazine)
BB3-20100	School Creek	Aquatic Life (May-June Atrazine)
BB4-10000	Big Blue River	Recreation (*E. coli*), Aquatic Life (May-June Atrazine)
BB4-20000	Big Blue River	Recreation (*E. coli*)
BB4-20700	Plum Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
BB4-20800	Lincoln Creek	Aquatic Life - Impaired Aquatic Community (Unknown), (May-June Atrazine)
BB4-20900	Lincoln Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
BB4-40000	Big Blue River	Aquatic Life - (May-June Atrazine), Dissolved Oxygen (Unknown)
LB1-10000	Little Blue River	Recreation (*E. coli*), Aquatic Life - Fish Consumption Advisory (Mercury), (~~May-June Atrazine~~, Lead, Aluminum), Public Drinking Water Supply (Atrazine, Arsenic, Aluminum)
LB1-10200	Rock Creek	Recreation (*E. coli*)
LB2-10000	Little Blue River	Recreation (*E. coli*), Aquatic Life (May-June Atrazine)

Waterbody ID	Waterbody Name	Impairments (Causes)
LB2-10100	Big Sandy Creek	Recreation (*E. coli*)
LB2-10200	Big Sandy Creek	Aquatic Life - Fish Consumption Advisory (Hazard Index Compounds*, Mercury)
LB2-10500	Spring Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
LB2-10600	Spring Creek	Aquatic Life - Impaired Aquatic Community (Unknown)
LB2-20000	Little Blue River	Recreation (*E. coli*), Aquatic Life (May-June Atrazine)
LB2-20100	Elk Creek	Aquatic Life- Dissolved Oxygen (unknown)
LB2-30000	Little Blue River	Recreation (*E. coli*)

Table 4: Blue River Basin waterbodies with approved TMDLs

Basin	ID	Waterbody Name	Imapired 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	

Nebraska's Lake Numeric Nutrient Criteria

Title 117

Chapter 4

003.05 Nutrient Criteria for Lakes and Impounded Waters.

The following criteria associated with various nutrient classifications apply to lakes or impounded waters according to codes listed in Chapter 6. Criteria are based on seasonal averages from April 1 through September 30. Eastern Lakes and Impounded Waters are located within the Big Blue, Little Blue, Elkhorn, Lower Platte, Missouri Tributaries, and Nemaha River Basins. Western Lakes and Impounded Waters are located within the Loup, Middle Platte, Niobrara, North Platte, Republican, South Platte, and White River-Hat Creek Basins. Natural Sandhill Lakes are not subject to these criteria as they exist in a relatively undisturbed condition.

Chlorophyll *a* represents the desired biological condition (response) and is generally influenced by the amount of phosphorus and nitrogen (cause). Thus, if the chlorophyll *a* criterion is met, total phosphorus or total nitrogen values above the listed values will not be considered to violate their respective criteria.

Lake or Impounded Waters Classification	Codes	Total Phosphorus (µg/L)	Total Nitrogen (µg/L)	Chlorophyll *a* (µg/L)
Eastern Lakes and Impounded Waters:	E	50	1000	10
Western Lakes and Impounded Waters:	W	40	800	8
Natural Sandhill Lakes:	SH	---	---	---

Nebraska first adopted numeric nutrient criteria in its 2005 triennial review. The EPA deferred action and a Technical Advisory Group was convened to develop criteria. The TAC included UNL and EPA Region 7. These criteria were adopted in the 2011 triennial review. The final report on how those criteria were developed is available if requested.

Nonpoint Source Activities in the Blue River Basin

Upper Big Blue NRD:

Beaver Creek-Recharge Lake Watershed Project.
Beaver Creek, including the sub-watershed of Recharge Lake near York, Nebraska, is a tributary of the Big Blue River. Section 319 funds were used to develop and initiate implementation of a watershed management plan to reduce Atrazine contamination of the lower segments of Beaver Creek. Conservation practices focus on abatement of Atrazine loads to Beaver Creek and Recharge Lake. Practices are selected that also contribute to the reduction of *E. coli*, nitrogen, phosphorus and sediment.

Lake Hastings Watershed Plan.
Lake Hastings lies in the headwaters of the West Fork Big Blue River. Section 319 funds were awarded to develop a watershed management plan for the Lake Hasting watershed. The plan will identify the conservation practices effective in reducing loading of nutrients (phosphorus, nitrogen) and sediment to Lake Hastings The plan also will develop concepts for renovation of the lake following completion of the watershed management efforts.

Inter-seeder Demonstration Project.
NDEE and University of Nebraska Extension initiated an inter-seeder demonstration project in 2021. The purpose of the project is to demonstrate the efficacy of sowing cover crops into standing corn. It also will document operating costs for the machine and the return-on-investment potential for private service providers. The primary objective is to encourage service providers to purchase inter-seeder to serve the cover crop market. Demonstrations will be initiated in the Upper Big Blue and Lower Big Blue NRDs in 2023.

Aurora Drinking Water Protection Management Plan – in the planning stage, is at EPA for review and approval.

Lower Big Blue NRD:

Cub Creek Watershed/Lake Renovation Project.
BMPs to reduce *E. coli*, sediment and nutrient runoff were implemented in the watershed of Cub Creek Reservoir followed by renovation of the reservoir. Cub Creek Reservoir is in the headwaters of Cub Creek, a tributary of the Big Blue River. Plans are in process to implement additional BMPs in the Cub Creek Reservoir watershed.

Turkey Creek-Wilber Watershed (NWQI) Project.
Turkey Creek is a tributary of the Big Blue River. A National Water Quality Initiative project is currently being implemented in the lower reach of Turkey Creek to abate *E. coli* and Atrazine runoff. Irrigation and nutrient management practices are being implemented in the wellhead protection areas of Wilber and DeWitt to reduce nitrate contamination of groundwater.

Indian Creek Watershed.
USDA is developing a Watershed EA plan for Indian Creek watershed near Beatrice, NE to address flooding.

Beatrice Drinking Water Management Plan – In the planning stage.

Little Blue NRD:

Big Sandy Creek Watershed (NWQI) Project.
Big Sandy Creek is a Tributary of the Little Blue River near Alexandria, Nebraska. A National Water Quality Initiative is currently being implemented in the lower reach of the watershed to reduce *E. coli* and Atrazine runoff.

Upper Little Blue Sub-Watershed Plan/Prairie Lake Watershed Project.
The Little Blue NRD is developing a watershed plan for the Upper Little Blue Sub-watershed. The plan will identify priority areas and waterbodies for treatment to abate nutrient, pesticide, bacteria and sediment runoff.

Groundwater Quality Awareness Project
The Little Blue NRD conducted a vadose zone sampling project and groundwater awareness campaign in the upper reaches of the Little Blue River bason. The focus was to provide data and interest in protecting drinking water sources for communities in the area.

Fairbury Drinking Water Protection Management Plan – in active status.

Impacts of elevated nitrate / uranium in Nebraska

2022 Nebraska Groundwater Quality Monitoring Report

Several recent studies considered the relationship of nitrate leaching into the subsurface and uranium concentrations found in groundwater. Research indicates that natural uranium in the subsurface may be oxidized and mobilized as the nitrate (in many forms) moves through the root zone and eventually to groundwater. Uranium is found naturally in sediment deposited mainly by streams and rivers.

Some public water supply systems treat not only nitrate, but also arsenic and uranium. The MCL for arsenic is 0.010 mg/L add uranium is 0.030 mg/L. Figure 16 shows the location of active community public water systems with arsenic, nitrate, and uranium requirements.

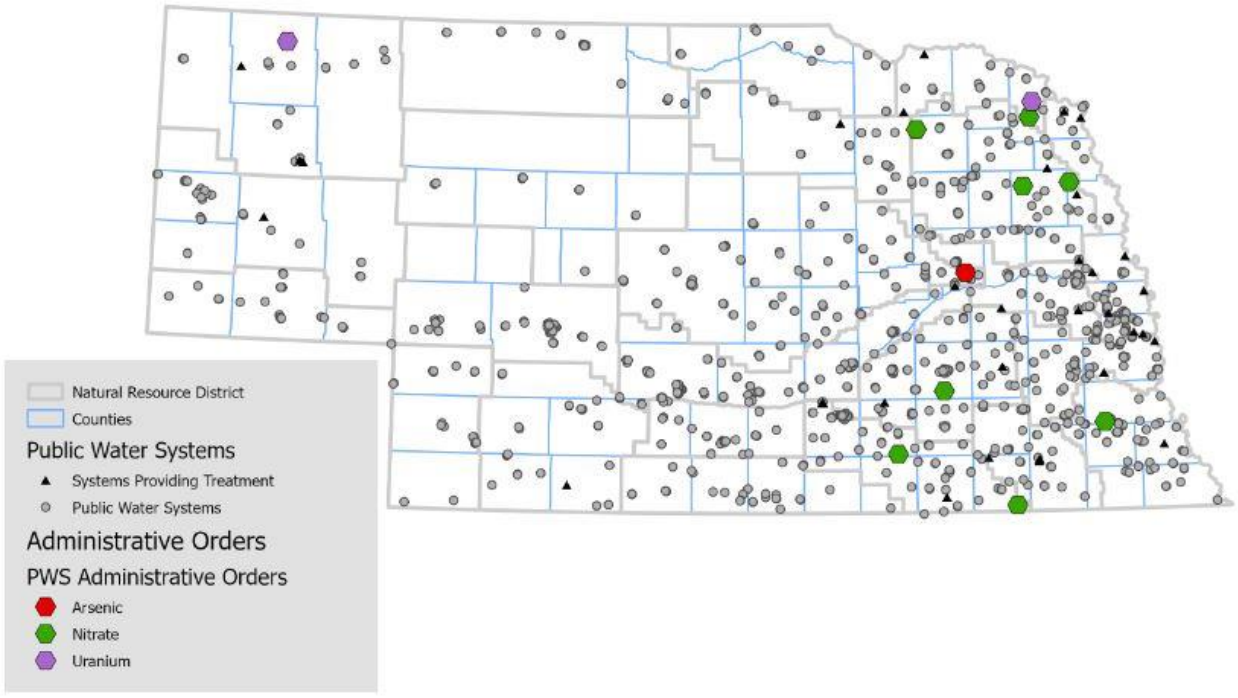
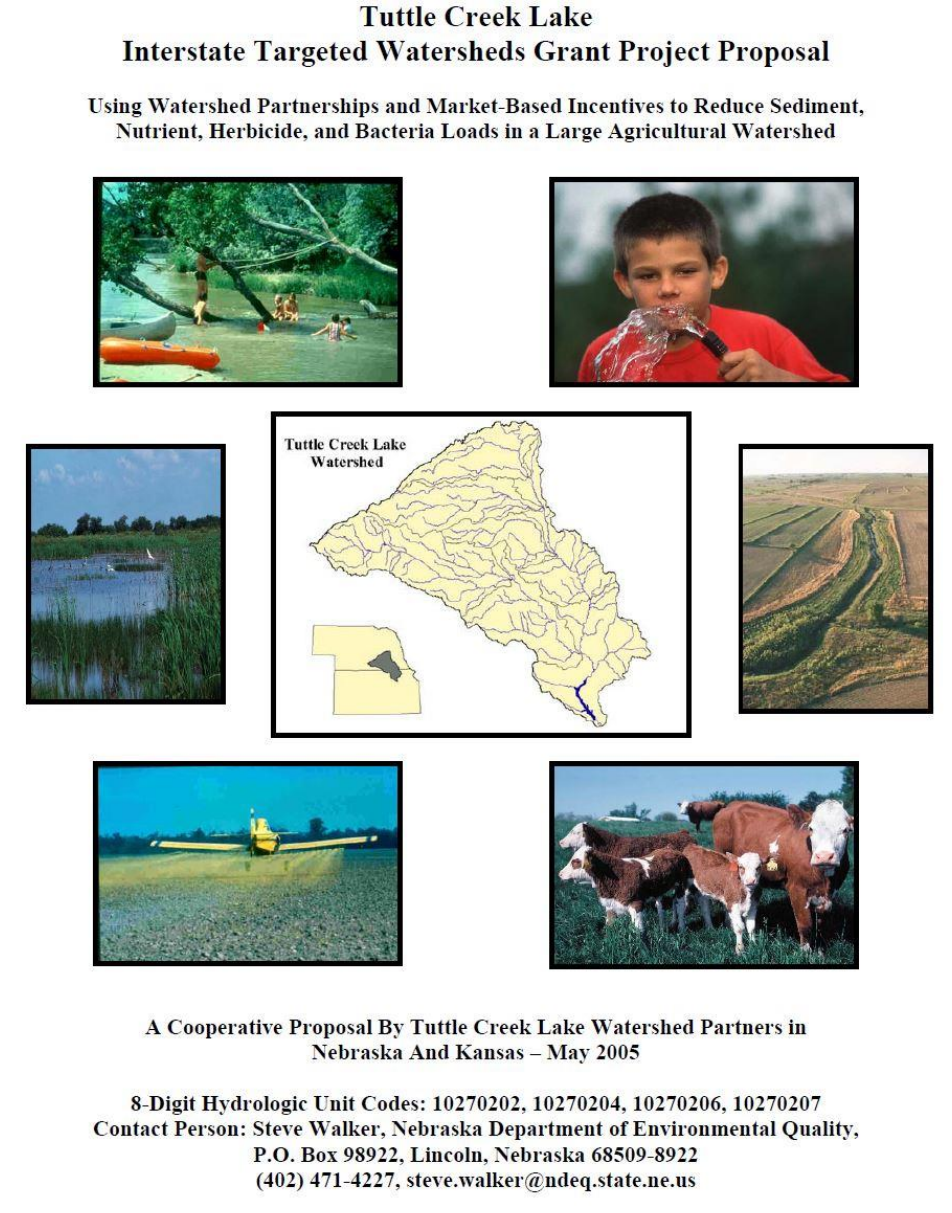


Figure 6: Community public water supply systems with requirements for arsenic, nitrate, and uranium. (Source: NDEE Drinking Water and Groundwater Division, 2022).

Impact of BIL / IRA Funding in Nebraska:

NDEE has applied for or anticipates applying for approximately $245 million in IRA/IIJA grants over the next year or so. This includes, but not limited to, grants for water infrastructure, energy efficiency and resiliency, and Superfund. We are carefully evaluating federal grants to see if the purpose/intent fits with our mission and that there is a need for the funds in Nebraska, but we have to balance that with staff resources to efficiently manage and oversee the grant requirements.

Previous Effort of a Joint Nebraska / Kansas Project:



Tuttle Creek Lake
Interstate Targeted Watersheds Grant Project Proposal

Using Watershed Partnerships and Market-Based Incentives to Reduce Sediment, Nutrient, Herbicide, and Bacteria Loads in a Large Agricultural Watershed

A Cooperative Proposal By Tuttle Creek Lake Watershed Partners in Nebraska And Kansas – May 2005

8-Digit Hydrologic Unit Codes: 10270202, 10270204, 10270206, 10270207
Contact Person: Steve Walker, Nebraska Department of Environmental Quality, P.O. Box 98922, Lincoln, Nebraska 68509-8922
(402) 471-4227, steve.walker@ndeq.state.ne.us

Figure 7: Screenshot of the Cooperative Proposal – Tuttle Creek Lake Watershed Partners – May 2005 – This proposal is available upon request.