

North Central Division – American Fisheries Society Rivers and Streams Technical Committee Brett Roberg – Nebraska Chapter Representative <u>brett.roberg@nebraska.gov</u>

NEWS

NE-AFS Rivers and Streams Technical Committee Meeting

The Nebraska Rivers and Streams Technical Committee (RSTC) held its annual meeting on December 3, 2019, at the Leadership Center in Aurora, Nebraska. The intent of this meeting is to provide members and organizations alike with new and current information on various things that range from current research, habitat projects, or any other water related topic in the news. In 2019, this meeting yielded over 40 attendees from various agencies including the U.S. Geological Survey, Nebraska Game and Parks, Nebraska Department and Energy, Nebraska Public Power District, Central Nebraska Public Power and Irrigation District, the University of Nebraska at Kearney, the University of Nebraska at Lincoln, and other nonprofit organizations. To date, this meeting was the highest attended RSTC meeting over the course of the last 5 years. The 2021 meeting is expected to take place around 1st week in December. Future meetings will continue focusing on providing new information and/or updates on rivers and streams to maintain the interest of our members, while also attempting to engage new audiences.



Nebraska Chapter AFS Rivers and Streams Technical Committee December 3, 2019 0900-1700 The Leadership Center 2211 Q St (E Hwy 34) Aurora, NE 68818 <u>http://tlcaurora.org/</u>

- 1. Opening remarks, news, etc.
- 2. Statewide Groundwater Update- Aaron Young, UNL
- 3. 2019 March Flooding Brenda Densmore, USGS
- 4. Missouri River Flooding, Gerald Mestl, NGPC (retired)
- 5. Upper Niobrara River Research, Evan Boohler, Wyoming Coop Unit
- 6. Lunch
- 7. Coolwater Streams Update, Brett Roberg/ Thad Huenemann/Joe Spooner, NGPC
- 8. Dry Spotted Tail Creek, Brett Roberg/Mark Porath, NGPC
- 9. River and Stream Program (update), Thad Huenemann, NGPC
- 10. Turkey Creek, Melissa Wuellner, UNK
- 11. NRSA Sampling, Erik Prenosil, NDEE
- 12. USFWS Update, Jeff Runge, USFWS
- 13. Stream Survey in Sandhill's, George Cunningham
- 14. Closing remarks

<u>Floods</u>

In the spring of 2019, a giant storm (better known as the "bomb cyclone") moved across Nebraska, dropping large quantities of precipitation along the frozen landscape, rivers, and streams. This triggered massive flooding all across the state, damaging a total of 27 state bridges, 200 miles of paved roads, numerous levees, and several dams, including the famous Spencer Dam, located in Knox County (Figure 1). Several areas along the Missouri River remained in flood stage for 172-194 days, surpassing all previous flood staging records. Similarly, thirty stream gauges, including those on the Loup, North Loup, Wood, Niobrara, Platte, and Elkhorn rivers and several creeks, reached all-time record highs.



Figure 1. A post-flood image of Spencer Dam taken by Gov. Pete Ricketts.

Platte-Republican River Diversion Project

An application has been submitted to the Department of Natural Resources (DNR) by Tri-Basin Natural Resource District (NRD) and Central Nebraska Public Power and Irrigation District (CNPPID) to divert 'excess' water from the Platte River to the Republican River when stream flows exceed the US Fish and Wildlife's target flows for Endangered Species within the Central Platte River (Figure 2). The primary objective for this action is to help ensure the state's compliance with the interstate Republican River Compact, which includes Colorado, Nebraska, and Kansas. Several organizations have filed letters of

opposition to the DNR against this application. Those agencies include the Nebraska Game and Parks Commission, Audubon Society, Governor of Kansas, Lower Loup Natural Resource District, Nebraska Chapter of American Fisheries Society, along with many more. A decision for this application will be made by the DNR in the upcoming months/years.



Figure 2. Conceptual design of the Platte-Republican diversion project in South-Central Nebraska provided by Olsson Engineering.

Platte River Recovery Implementation Program

On December 30th, 2019, the Platte River Recovery Implementation Program (PRRIP) was granted a 13 year extension, providing funding through 2032, after President Trump signed two spending packages which were passed both by the House and Senate. This program provides compliance for four species listed as threatened or endangered under the federal Endangered Species Act through a basinwide effort to meet the land and water needs for these species. This stakeholder group consists of the U.S.

Department of Interior, Colorado, Wyoming, Nebraska, and various other agricultural and environmental organizations.

<u>Updates</u>

Nebraska Department of Environment and Energy, Surface Water Monitoring Programs

The Surface Water Unit of NDEE collects physical, chemical, and biological water quality samples from streams and lakes, implements surface water improvement projects, and prepare surface water quality reports. Several monitoring programs collect stream and lake samples throughout the state; however, most monitoring is focused in one to three river basins each year in conjunction with a rotating basin monitoring strategy. Targeting resources in this manner improves NDEE's ability to identify and remediate water quality problems and allows resources to be focused where they can produce the greatest environmental results. During a six-year cycle, all 13 river basins in the state are intensively monitored. Monitoring data are used to document existing water quality conditions, assess the support of beneficial uses (such as aquatic life, recreation, and public drinking water supply), and prioritize water quality problems. The current six-year basin rotation monitoring cycle is:

2020 -- Niobrara basin

In addition to the Stream Biological Monitoring Program which assesses the health of streams by evaluating the composition and numbers of resident aquatic macroinvertebrate and fish communities, NDEQ also conducts the following monitoring programs: Ambient Stream Monitoring, Basin Rotation Monitoring, Fish Tissue Monitoring, Public Beach Monitoring and Ambient Lake Monitoring. Reports and summaries of these activities can be found on NDEQ's website address: www.deq.ne.gov

Nebraska Game and Parks Commission

Coolwater Streams- In 2015/16, the Commission drafted a Coolwater Streams Management Plan. The purpose of the Cool Water Stream Management Plan is to identify goals for stewardship of cool water stream resources in Nebraska, and to develop specific, attainable and measurable action items for Nebraska Game and Parks Commission (NGPC) staff to implement to achieve the vision. Several stream restoration projects have been developed since the adoption of the coolwater stream management. Those include:

Long Pine Creek

Long Pine Creek is located in Rock and Brown Counties, Nebraska, beginning south of the town of Long

Pine and flowing north to its confluence with the Niobrara River. Long Pine Creek is one of Nebraska's

premier coolwater trout streams containing a reproducing population of both rainbow and brown trout.

Long Pine Creek is so valued because it is the site of Nebraska's first instream flow right for protection of

fish and wildlife resources. Typical of Sandhill streams, it starts out in relative flat pasture land, however it

then transforms to flowing through a unique landscape of steep oak, cedar and pine canyons. Springs

and small tributary streams add flow and keep the water cold throughout the year making it suitable for

trout. Stream velocity allows for sand transport and creation of gravel beds used by trout for spawning and for macro-invertebrate attachment. Instream vegetation consists primarily of water buttercup and elodea that aids in trapping sand, providing a current break for fish, and as attachment sites for macroinvertebrates. Large woody debris is also present in the stream that provides the same benefits as the aquatic vegetation. The objective of the habitat improvement project is to improve the overall trout habitat in two straight "runs" of stream where the stream bed and stream banks are stable. Habitat structures should provide increased pool habitat, provide current breaks for resting and feeding areas for trout (diverse range of stream velocities), narrow the stream thus adding depth, and provide improved angler access for trout fishing (Figure 3).



Figure 3. Conceptual design of the stream habitat project on Long Pine Creek, Nebraska.

Dry Spotted Tail Creek

Dry Spotted Tail Creek, is a 13.3 mile perennial coolwater stream tributary to the North Platte River with a long history of supporting recreationally important trout and native fish communities. Over time, the high volume and velocity of irrigation return flows have straightened and incised the lower reaches, thereby

lowering the water table and adversely impacting adjacent prairie and wetland communities. Devoid of instream habitat (e.g., overhanging cover, current breaks, and coarse substrates), the current channel flows prevent upstream passage for many aquatic life forms. Even trout who are especially strong swimmers, no longer reside in this stretch and now move quickly through this featureless area rather than use it as holding habitat. This project will restore natural hydrology to the confluence of the North Platte River and Dry Spotted Tail Creek and surrounding areas by returning groundwater levels to pre-incised conditions on 140 acres and installing stream sinuosity with the in-stream habitat features needed to sustain healthy aquatic, riparian and wetland communities (Figure 4). Planned construction will; improve water quality, balance sediment transport, stabilize stream banks, install a protected buffer strip and riparian corridor, increase groundwater recharge, raise the local water table, restore historical wetlands, create in-stream habitat for trout, improve passage for native fishes and support an economically important recreational fishery with easy access to the public (Figure 5). Additionally, this project will serve as an educational tool and demonstration site illustrating the beauty of Nebraska's coolwater streams and our responsibility to restore and protect these important resources.



Figure 4. Engineered design of the Dry Spotted Tail Creek project depicting the various habitat enhancement along this publically accessible property.



Figure 5. A projected map of groundwater conditions following the completion of the stream restoration project.

Freshwater Mussel Update

Nebraska is on the western edge of most freshwater mussel species in North America. The conversion of the native prairies to agriculture with its associated stream channelization, sedimentation, etc. have negatively affected Nebraska's freshwater mussels. Several, once common, species are extirpated or nearly so. The NGPC has begun a program to spawn, rear and stock freshwater mussels into suitable waters with a goal to establish several breeding populations. We began with the Plain Pocketbook (Lampsilis cardium) which survives in one stream. After two years, a stock of some 10,000 juveniles were available and a portion of these were stocked into three watersheds.

Aquatic Invasive Species (AIS)

The Nebraska Legislature recently pass Legislative Bill 142 which allowed the Nebraska Game and Parks Commission to create the Aquatic Invasive Species (AIS) program. This program allowed NGPC to create a funding program through a \$5 fee on 3-year resident motor boat registration and a \$15 non-resident annual boat sticker, beginning in 2016 and required to have prior to launching into Nebraska waters. This

program focuses on (1) Educating the boaters and the public about AIS (2) Conduct boater surveys (3) AIS monitoring and treatments (4) Recommend regulations (5) Inspect boats (6) Decontaminate boats. The future direction of this program includes the following:

- Fill the Aquatic Invasive Species Program Manager
- More aggressive boat inspections beyond current surveys
- Educational workshops for concessionaires, boat shop owners and private lake associations
- Increase the number of boat shops that provide boat decontamination services
- Continue bait shop assessments and working with the bait industry, along with updating bait regulations



Zebra Mussel known distribution in Nebraska

Asian Carp known distribution in Nebraska



Current Research Projects

Channel Catfish in Southeastern Nebraska Rivers: Assessment of Growth and Mortality in Highly Dynamic Lotic Systems

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Abstract-Catfish remain a highly sought after species in the lotic systems of Nebraska and understanding the population dynamics of these species is pertinent to maintaining quality fisheries in the interior rivers of the state. The challenges of managing highly dynamic lotic systems requires intensive sampling efforts to assess sportfish populations. However, past fisheries management in Nebraska has focused on lentic systems and the largest lotic systems (*i.e.* Missouri and Platte Rivers), leaving an opportunity for warranted additional research on interior rivers such as the Little Blue, Big Blue, Little Nemaha, and Big Nemaha Rivers in southeastern Nebraska. Herein, we aimed to characterize Channel Catfish (Ictalurus punctatus) growth and mortality in the southeast Nebraska rivers. The Big Blue and Little Blue Rivers were sampled in 2013 and 2014 and the Big Nemaha and Little Nemaha Rivers were sampled in 2015 and 2016; baited hoop nets (25-mm mesh, 1.3-m in length, equipped with four 0.5-m diameter fiberglass hoops) and barge electrofishing (5500 W/240 V generator, pulsed-DC current) were utilized in fish collection. A total of 2,863 Channel Catfish were sampled and a subsample (n = 913) pectoral spines were removed for age and growth analysis (Big Nemaha; n = 243, Little Nemaha; n = 300, Big Blue; n = 141, Little Blue; n = 229). Von Bertalanffy growth functions were calculated for the Big Nemaha (Lt = $885.6*[(1 - e^{-0.091*}(age +$ (1.029)), Little Nemaha (Lt = $1,129.3*[(1 - e^{(-0.044*(age + 1.953)))}]$, Big Blue Lt = $1,077.6*[(1 - e^{(-0.044*(age + 1.953))})]$ $0.080^{(age + 0.146))}$, and Little Blue (Lt = 763.2^{*}[(1 - e^(-0.154^{(age + 0.231))})]. Instantaneous mortality estimates were also calculated for the Big Nemaha (Z = 0.557), Little Nemaha (Z = 0.886), Big Blue (Z =0.620), and Little Blue (Z = 0.556). Current growth estimates of the Little Blue River remained similar to historical growth (1996) while the Little Nemaha River increased from 1978 estimates. Catch curves did not differ between the Big and Little Nemaha or the Big and Little Blue Rivers. The high mortality estimates of the Little Nemaha may be indicative of population migration as it is a tributary to the Missouri River. Information obtained from this study will continue to aid fisheries managers in making future management decisions pertaining to proper regulation of the catfish angling opportunities in southeast Nebraska rivers.

Cyprinid Usage of a Denil Fishway on the Cedar River, Nebraska

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Abstract-Dams are barriers to fish movement that can influence dynamics and genetic variability of populations. Fish passage structures are often constructed to allow fish to pass up- and downstream of dams. However, passage of non-sport-fish species (e.g., Cyprinid spp.) through these structures is rarely assessed. A Denil fishway was constructed on the Cedar River near Spalding, Nebraska in 2015 to support natural migratory movement of Channel Catfish (Ictalurus punctatus). This study was designed to evaluate the use of the constructed Denil fish passage by resident Cyprinid species. The objectives of this study were to: 1) describe the temporal movement of 5 Cyprinid species in the Cedar River; and 2) evaluate the rate of passage success (i.e., number of successful passages versus the number of attempts) of 5 Cyprinid species. Fish were collected in 2016-2018 and tagged with a Passive Integrated Transponder and the Denil fish passage was fitted with two (ANTENAE information here). Peak movement time periods for all 5 Cyprinid species generally occurred in May but successful fish passage attempts were recorded in April – September. Passage success was highest for Flathead Chub (100% ± 0.00% SE; n = 3) and lowest for Common Carp (79.69% + 5.33% SE; n = 243). Passage efficiency (χ^2 = 6.43, df = 4, p = 0.17) and the number of attempts ($\chi^2 = 5.30$, df = 4, p = 0.26) were similar between species however the number of successful passages differed among species ($\chi^2 = 10.70$, df = 4, p =0.03). Results from this study indicate that regional Cyprinid populations will use and successfully navigate the constructed Denil fish passage structure on the Cedar River, Nebraska. These observations can enhance the understanding of Cyprinid fish performance within fish passage structures throughout the Great Plains.

Impact of Irrigation Canal Operations on the Fish Assemblage and Biomass of a

Connected Stream

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Abstract- The influence of canal operations on the available habitat and fish community in a conjoined Great Plains streams is not well understood. Three-pass backpack electrofishing was employed over a relatively short temporal scale in the fall of 2018 to identify changes in Turkey Creek (near Kearney, NE) before and after the Kearney Canal was operational. The wetted width (t = 2.27, p = 0.04) and depth (t = 1.90, p = 0.06) significantly decreased after the canal ceased operation. Community diversity was significantly greater (t = 398.14, p < 0.001) while the canal was operational, but community composition remained similar (J = 62.9%). Changes to specific species were mostly seen in Cyprinidae and Centrarchidae species and non-native species were more abundant (z = 6.0, p < 0.001) and comprised a greater percentage of the available biomass (z = 75.7, p < 0.001) when the canal was operational. These findings should improve the understanding of fish community responses to canal operation and hopefully can improve future management of these systems.