

## Explore how pumping affects streamflow with NeDNR's new interactive web application

By Hannah Atkin and Carol Flaute

NeDNR's Water Planning Division recently published the second in a series of interactive web applications to educate the public about interactions between surface water and groundwater. With this second application, users can explore how pumping groundwater affects streamflow under different hydrologic systems (Figure 1).

The new application illustrates the relationship between groundwater pumping and stream depletions. There are three interactive scenarios showing how groundwater pumping affects stream depletion in different hydrologic systems: a gaining stream, where water flows from an aquifer towards the stream, a losing stream, where water flows from the stream towards the aquifer, and a disconnected stream, where the aquifer is separated from the stream by unsaturated soil or rock. For these first three scenarios, the user can turn pumping on and off and can adjust the well's proximity to the stream. A fourth and final interactive scenario shows how pumping can cause a gaining stream to become a losing stream or even a disconnected stream over time. In this the final scenario, the user can adjust groundwater extraction rate and observe how this can change stream-aquifer connectivity.

Along with completing the new

application, NeDNR has also recently updated an existing application, which provides users with an introduction to interactions between surface water and groundwater. It now features a voice narration option and some updated descriptions and visuals. To experience both applications, please visit <https://dnr.nebraska.gov/water-planning/education>.

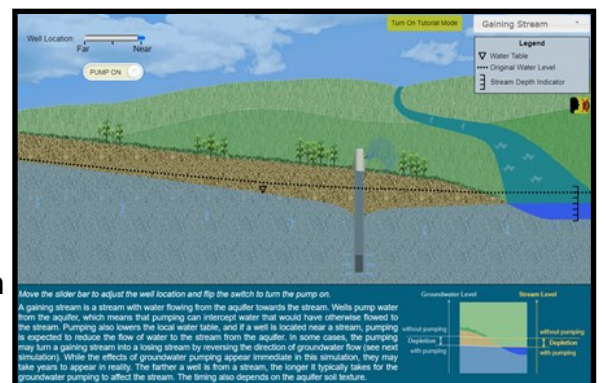


Figure 1. A screenshot of the new interactive web application. In the scenario pictured, users can explore the relationship between stream depletions and groundwater pumping at various distances from a gaining stream.

To develop these two applications, as well as a third one that is still in development, Water Planning staff worked with a team from Southern Illinois University, including graduate assistant David Xiong. David served as the project's IT developer, and he used his work on the applications as part of his dissertation.

As David has recently graduated, NeDNR wishes him success with his future endeavors.



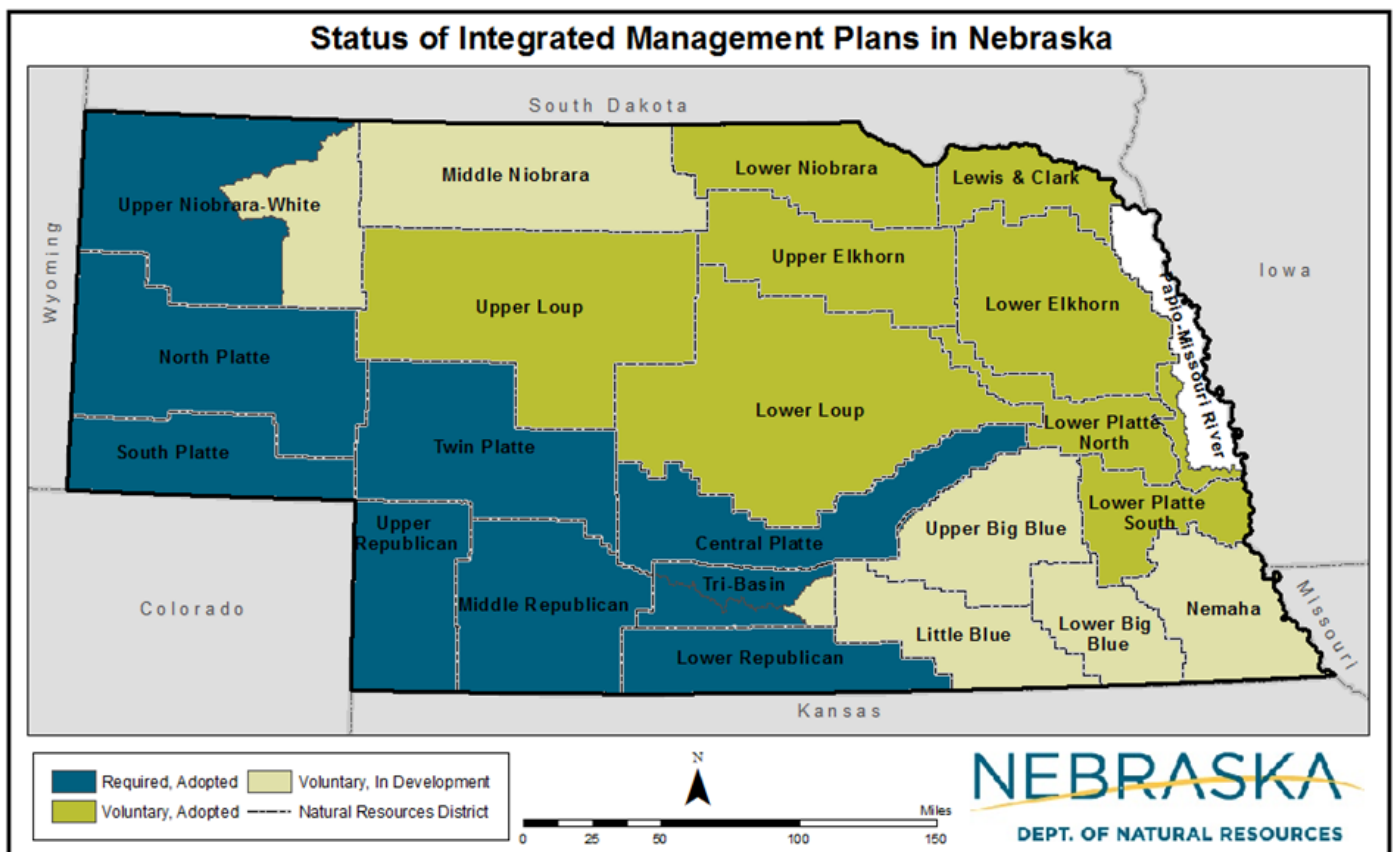
## Department Adopts Voluntary IMP with Upper Elkhorn NRD

### By Sara Nevison

The Nebraska Department of Natural Resources (NeDNR) has adopted a voluntary Integrated Management Plan (IMP) with Upper Elkhorn Natural Resources District (UENRD) in O’Neill, to jointly manage surface and groundwater. The IMP has been a year in the making and was voted into action by the UENRD Board of Directors and signed by the Department’s Director on December 17, 2018. This

new water plan became effective February 1, 2019.

Every Natural Resources District in Nebraska is either currently working or has worked with NeDNR in some capacity to create an IMP for their District to manage water uses and water demands (Figure 1). The ultimate goal of the IMP is to protect current water users while allowing for economic growth and well-being across the District. Through the IMP process, NeDNR and UENRD assessed how much



**Figure 1:** Every NRD is currently working with NeDNR in the development or implementation of IMPs, managing water use and water supplies across the state.

## Upper Elkhorn Continued

water is available, how much water is being used, and how much water could be developed in the future. As part of the planning process, UENRD and NeDNR hosted a Stakeholder Advisory Committee made up of irrigators, municipalities, and other persons interested in water management (**Figure 2**). Stakeholders played a crucial role in providing input on goals, objectives, and action items, as well as provided questions, concerns, and discussion. The Stakeholder Advisory Committee met three times between May and August 2018, and a formal Public Hearing was held in November 2018.

The IMP has four goals: (1) Understand water supplies and water uses within the District, by collecting data (static water levels, water use reporting, stream gauges, etc.), and evaluating variability in water supplies; (2) Prevent or mitigate water related conflicts within the District, by assessing impacts on current water users and by maintaining rules and regulations to enhance water management; (3) Plan for sustainable growth in water uses and demands, by determining sustainable use and evaluating new ways to improve water supplies; and (4) Inform the public of the District's water resources and efforts, by use of educational materials and public outreach.

The IMP also has two groundwater controls and four surface water controls to meet the goals and objectives of the plan. Groundwater controls include: (1) Certification of groundwater irrigated acres; and (2) Establishing a limit on the expansion of groundwater irrigated acres. Surface water controls include: (1) Restriction on addition of surface water irrigated acres in the Lower Niobrara Basin; (2) Education requirements for new surface water users in the Upper Missouri Tributaries Basin; (3)

Limitation on expansion of surface water irrigation in the Lower Platte Basin; and (4) A temporary stay on development of surface water irrigation in the Middle Niobrara Basin.

UENRD and NeDNR developed this voluntary IMP in



**Figure 2:** UENRD's Stakeholder Advisory Committee meeting on May 30, 2018 in O'Neill, NE.

accordance with the Groundwater Management and Protection Act, particularly, *Neb. Rev. Stat. §§ 46-715 to 46-718*. To view the IMP, please visit our website at [dnr.nebraska.gov](http://dnr.nebraska.gov).

The author has strong ties to this IMP as she was the Water Resources Manager at UENRD during the stakeholder and writing process and now works for NeDNR as an Integrated Water Management Planner assisting NRDs across the state with the IMP process.

## Lower Platte Missouri Tributaries Model Complete

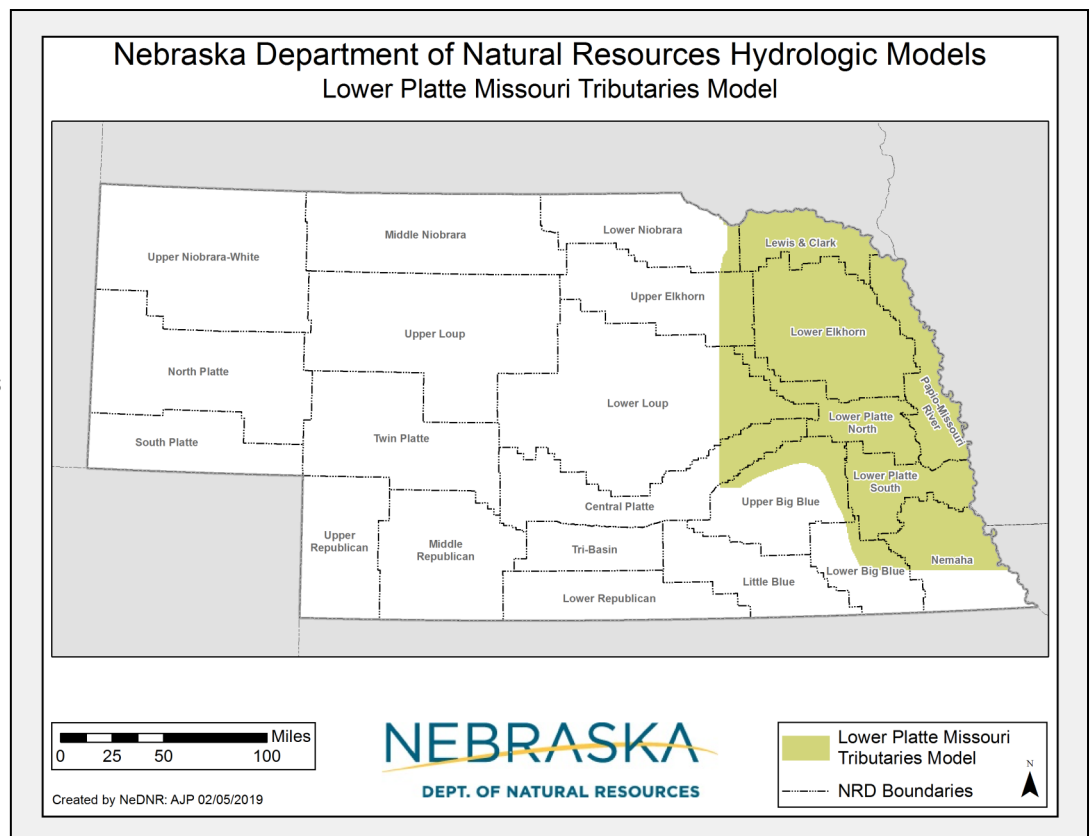
By Philip Paitz

In December of 2018, the Nebraska Department of Natural Resources completed the construction of the Lower Platte Missouri Tributaries (LPMT) Model. The LPMT model covers the northern and central portions of Eastern Nebraska, an area that previously had no regional model. The model will help the Department make informed decisions on the aquifer-stream interaction for the rivers in the area including the Missouri River, Lower Platte River, and Elkhorn River.

The LPMT Model is the result of three-and-a-half years' time and hundreds of hours work from inception to finalization. Work on the LPMT Model began in July 2014 and HDR was contracted to develop the numerical model.

The draft version of the LPMT Model was completed and reviewed by Olsson Associates in late 2016, after which several revisions were made to the model. The finalized and fully documented model incorporating the changes suggested during the review period was completed in December of 2018, and is now available on the Nebraska Department of Natural Resources website. The LPMT Model utilizes a CROPSIM based Watershed model, created by The Flatwater Group, to derive the well and recharge data utilized by the Groundwater model.

The LPMT Model is currently being used to determine hydrologic connectivity of the streams within the region, which will be released to the public in early Spring 2019. The Department is also working with our partner Natural Resource Districts in several pilot projects to make use of new data and modeling techniques with the LPMT Model. One of those is to use the data from the LPMT Model to create a local model within the Lower Elkhorn NRD. That model will incorporate Airborne Electromagnetic Survey (AEM) Flight data to see if a better prediction of the aquifer properties and extent in the area is possible. Work has also begun to add the LPMT Model to the Department's SUSTAIN GUI to aid our partners in their water planning decisions.



## Wealth of Knowledge will be Missed as Major Water Players Retire

**By Susan France**

During this last year, three major players in water management announced their retirement.

Brian Barels, Water Resources Manager for the Nebraska Public Power District (NPPD); Don Kraus, General Manager for The Central Nebraska Public Power and Irrigation District (CNPPID); and Mike Onnen, Manager of the Little Blue Natural Resources District (LBNRD) all have retired within the last year.

### **Brian Barels:**



*Brian Barels*

Brian was with NPPD for 42 years and served his company and the state.

- A Board Member of the National Hydropower Association
- A member of the Nebraska Water Policy Task Force
- Governance Committee representative for the Downstream Water Users in the Platte River Cooperative Agreement (An Agreement between Colorado, Wyoming, Nebraska and the Federal Government)
- Governance Committee representative for the Downstream Water Users in the Platte River Recovery Implementation Program (PRRIP)
- A member of the Nebraska Water Funding Task Force
- A Thermal Power Representative on the Missouri River Recovery Program Implementation Committee
- A board member of the Nebraska State Irrigation Association
- A board member of the Nebraska Water Resources Association
- A member of the UNL Water Advisory Panel
- A member of the Nebraska Natural Resources Commission
- Relicensing for NPPD's Federal Energy Regulatory Commission's License

### **Don Kraus:**

Don was with CNPPID for 47 years and served his company and the state.

- A member and Executive Committee Member of the Nebraska Water Policy Task Force
- Served on the Governance Committee, Water Committee, Land Committee, Technical Committee

## Wealth of Knowledge Continued



*Don Kraus*

and Outreach Committee of the PRRIP

- Relicensing for CNPPID's Federal Energy Regulatory Commission's License
- Platte River Cooperative Agreement
- Environmental Account for Lake McConaughy
- Officer and State President of the Nebraska Society of Professional Engineers
- Board member of the Nebraska Power Association
- Board member of the Nebraska Groundwater Foundation
- Chairman of the Nebraska Cooperative Hydrology Study
- Governance Committee representative for the Downstream Water Users in the Platte River Recovery Implementation Program (PRRIP)
- Member of the Nebraska Natural Resources Commission
- State Director of the National Water Resources Association
- Member of the Southwest Power Pool
- Member of the Nebraska Riparian Vegetation Management Task Force

### **Mike Onnen:**

Mike has been with the Little Blue NRD for 41 years and has worked with all the different statutory changes related to ground water management.

- Began career at the US Department of Agriculture Soil Conservation Service
- Joined Little Blue NRD in March, 1977
- Promoted to assistant manager in 1980
- Became general manager in 1985
- Adept at bringing all sides together on often contentious issues



*Mike Onnen*

## Engineering Staff Members and Dam Safety Team Recognized

By Shuhai Zheng

At the Engineering & Technical Services Division's employee recognition celebration held on December 14, 2018, several employees were presented with the Innovator and "On the Spot" Awards and the Dam Safety Team received the division's Teamwork Award.

### Innovator Awards

**Bob Carnazzo** of Technical Services was nominated by Tim Gokie for the Innovator Award in recognizing his suggestion to combine the report and cover letter for dam inspections into one document. For many years, the inspection



*Bob Carnazzo*

report and cover letter had always been thought of as two separate documents and always treated as such. Each letter was individually generated to go with each report. Each letter had to be printed, an extra copy made for the file, scanned, and matched up with the correct inspection report before mailing. Because of implementing Bob's idea this year, the process that used to take 25 steps to complete, can now be completed in just 13 steps. This new process has cut the time involved with printing, mailing and filing inspection reports by 50% and reduced the time between a dam inspection and its report being mailed out.

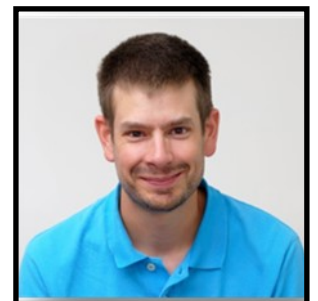
**Stefan Schaepe** of Floodplain Management is the other recipient of the Innovator Award. He has created many different tools to improve the mapping process. These tools include the aggregate polygon tool, rerun flood from cross section, basic level engineering boundary check, floodplain boundaries audit tool, cross section endpoint in floodplain check, and the custom N-FACT toolset. These tools have improved the efficiency and accuracy of our mapping products. Stefan is always willing to help, teach and train other teammates, and his positive attitude is a blessing to all.



*Stefan Schaepe*

### On the Spot Award

The first "On the Spot" award went to **Ryan Johnson** for his willingness to always take extra time to teach and train fellow teammates. Ryan spends much of his time discussing project tasks and FEMA standards with new teammates, helping and teaching teammates how to prepare FEMA submittals, building tools to create efficiencies in mapping processes, and documenting the processes in OneNote. He is always willing to share his tips and tricks for getting his work done efficiently.



*Ryan Johnson*

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## Team Recognized Continued

The second “On the Spot” award was presented to **Jamie Reinke**. Over the past year, she showed a great deal of patience, perseverance, and discernment while reviewing multiple no-rise applications for a single development. These reviews took a considerable amount of her time, but she has managed to get all the reviews done on time while still completing her other regular work.



*Jamie Reinke*

**Mark Noble** also received the “On The Spot” Award. Mark consistently and quietly goes about doing his work every day without much attention or fanfare. For 2018, he greatly exceeded expectations for all of his annual goals. He completed 56 hydrologic and hydraulic reviews for dams, more than double his assigned amount;



*Mark Noble*

developed the 2018 inspection rosters more than a month ahead of schedule; prepared all of his inspection reports, on average, 7 days before the 25-day deadline; completed his allotted review of field office reports 35 days ahead of schedule; and completed all his required training hours. For these and all the work he quietly does for the Department every day, he deserves this special recognition.

### **Teamwork Award**

The Division’s 2018 Teamwork Award went to the **Dam Safety Team**. In 2018 the Dam Safety Team reached most of their goals. They achieved 42 “Wins”, far exceeding their goal of 15. A “Win” is tallied after a major safety deficiency at a dam is corrected. The team completed inspections for all scheduled dams, and sent out inspection reports, on average, 14 days ahead of schedule. They completed 96 hydrologic and hydraulic analyses for existing dams (goal was 50). In addition, over 90% of dam applications were reviewed and approved within 90 days (goal was 80%). One of Dam Safety’s specific success stories in 2018 was the improvements to the Pokorny Dam located just above the Village of Howells. For the past several years, the Dam Safety Team has been working with the Village of Howells and the Lower Elkhorn NRD to increase the dam’s spillway capacity. A few years ago, Dam Safety completed an analysis of the dam and found it could not safely pass the required inflow design flood. With the help of the NRD and a grant from Nebraska’s Water Sustainability Fund, the Village of Howells constructed a new auxiliary spillway in 2018. The new spillway assures the earthen dam will continue to protect the village from flooding with vastly reduced risk of the dam being overtopped and eroded by flood water.

Congratulations to this year’s winners! Their contributions to improving our programs’ efficiency & effectiveness, together with other team members’ efforts have contributed to our success and made Nebraskans safer. All your hard work is appreciated.