Findings of Fact and Order

Little Rock Creek Sustainable Diversion Limit and Water Use Conflict
Morrison and Benton Counties

DATE: April 22, 2024

Names of Reviewers: Jason Moeckel and Randall Doneen, Section Managers, Dan Lais Central Region Manager, Division of Ecological and Water Resources, Minnesota Department of Natural Resources and staff.

Decision: The Commissioner has determined that authorized water use in the Little Rock Creek Area (as defined in the publication *The Sustainable Use of Groundwater in the Little Rock Creek Area: A DNR Action Plan*, September 2018) (2018 DNR Action Plan) is having a negative impact on the Little Rock Creek stream ecosystem in violation of the sustainability standard and other provisions of Minnesota Statutes section 103G.287. The Commissioner finds that a water use conflict exists among third priority water users in the Zone of Irrigation Influence (QBAA[1] Zone of Irrigation Influence on Figure 1 below) for Little Rock Creek.

The Commissioner therefore establishes the sustainable diversion limit at 15% of the August median base flow to prevent the negative impact to Little Rock Creek described herein. The 15% of August median base flow is 0.8 cubic feet per second at station H15029003, 1.1 cubic feet per second at station H15029001, and 2.9 cubic feet per second at station H1503100.

The Commissioner will withhold consideration of new irrigation permits or increases in authorized volumes for third priority water use within the Zone of Irrigation Influence until the Commissioner approves a plan for the allocation of water among the third priority water users.

FACTUAL FINDINGS

Based on the information in the administrative record and the files with the Minnesota Department of Natural Resources (DNR) and consideration of the applicable laws, the DNR finds that there is substantial evidence in the record supporting that groundwater use in the Little Rock Creek Area is having a negative impact on Little Rock Creek; that it is necessary to establish a sustainable diversion limit to protect the stream ecosystem; and that a water use conflict exists among third priority water users in the Little Rock Creek Area.

Background and Location

1. Little Rock Creek is located at the boundary of Benton and Morrison Counties in central Minnesota. The nearest cities are Rice and Royalton. Little Rock Creek originates in Morrison County, flows west, then generally southward into Benton County and Little Rock Lake and ultimately discharges to the Mississippi River via the Harris Channel at Mississippi River mile 937. Its main tributary is Bunker Hill Brook (commonly referred to as Bunker Hill Creek) which joins Little Rock Creek approximately 1.2 miles north of Little Rock Lake. Little Rock Creek is

[1] Quaternary Buried Artesian Aquifer (QBAA) is the buried sand aquifer in this area.

located in numerous sections of Morrison and Benton Counties within Townships 38N and 39N, and Ranges 30W and 31W. Little Rock Creek and Bunker Hill Creek are public waters within the meaning of Minn. Stat. § 103G.005, subd. 15. Little Rock Creek's Public Waters Inventory (PWI) identification number is 05003a. Bunker Hill Creek's PWI identification number is 05004a.

2. Little Rock Creek is approximately 23.8 miles in length and its watershed is 44,229 acres, divided between Benton County (12,590 acres) and Morrison County (31,639 acres). The mainstream segment is perennial, whereas a majority of the tributaries to the creek are either intermittent or have been excavated to function as drainage ditches.

3. Segments of Little Rock Creek and its tributary, Bunker Hill Creek, are designated trout streams as listed in Minnesota Rule 6264.0050 Subpart 4(D). These trout streams are designated as Special Management Waters as described in Minn. Stat. § 97C.005 subd. 1(2). The Little Rock Creek trout stream segment is 21.7 miles long and is managed for trout, but many other aquatic species thrive in the creek including native species adapted to cold water streams. The Bunker Hill Creek designated trout stream segment is similarly managed, has similar aquatic species, and is 4.7 miles long. Descriptions of the locations of, and restrictions on, designated trout streams can be found in Minnesota Rule 6264.0050.

4. Little Rock Creek and Bunker Hill Creek are unique bodies of water in Central Minnesota as they are cold water streams. The streams contain a diverse fish community with 28 species sampled in 1992. The most common species include White Sucker, Blacknose Dace, Johnny Darter, and Creek Chub (Barr Engineering, *Little Rock Creek Watershed Total Maximum Daily Load Report: Dissolved Oxygen, Nitrate, Temperature and Fish Bioassessment Impairments 2015*). Little Rock Creek was originally stocked with Brown Trout in 1908. Yearly stocking occurred from 1962 to 1972. Stocking resumed in 1995. Brown Trout was the primary species stocked while Brook Trout were used periodically. In 2022, the DNR stocked Brook Trout and intends to continue stocking Brook Trout, based on availability. The DNR and the Minnesota Pollution Control Agency (MPCA) periodically conduct trout population assessments, fish community assessments, and stream temperature monitoring.

5. Riparian landowners and other members of the public use Little Rock Creek for angling, hunting, and passive recreation. Two segments of Little Rock Creek are sites of DNR administered Aquatic Management Areas (AMA). These AMAs are "access easements" acquired by the State of Minnesota on private land in and along the stream that provide for public angling and DNR stream habitat management. In addition, two Wildlife Management Areas (WMA) adjacent to the creek provide public hunting and passive recreation as well as DNR wildlife habitat management. Little Rock Creek passes through the Sartell WMA which contains an impoundment of Little Rock Creek that can be managed to provide waterfowl habitat.

6. Little Rock Creek overlays a water-table aquifer and a system of buried, unconsolidated aquifers and leaky aquitards (geologic bodies that transmit water at a slow rate).

Little Rock Creek and its tributaries are fed by the water-table aquifer. The water-table aquifer is influenced by the underlying and adjacent buried aquifers and leaky aquitards. See generally, DNR, *Groundwater Flow and Groundwater / Stream Interaction in the Little Rock Creek Area, 2021* and references therein.

7. The Cities of Rice, Royalton, and Buckman pump groundwater from wells in the Little Rock Creek Area to provide water for approximately 4,000 residents (U.S. Census Bureau, 2010). Only the City of Rice has wells located within the Zone of Influence, and these wells are on the downstream edge of the zone. Approximately 1,650 residents live in the countryside and get their domestic water from private wells. Per state statute, both the City of Rice and rural residents are first priority users, to the extent that such water is used for domestic water supply. The needs of the domestic water supply must be satisfied before agricultural irrigation, which is a third priority use, and therefore DNR does not consider these first priority users to be part of the water use conflict. The City of Rice also has second priority, third priority, fifth priority and sixth priority water use. Any plan approved by or ordered by the DNR will need to account for these fifth and sixth priority uses for those uses to continue. *See* Minn. Stat. § 103G.261 (setting forth the six priority levels for water allocation).

8. Groundwater appropriation permits that currently exist in the Zone of Influence of Little Rock Creek Area include permits for agricultural irrigation (91 permits), livestock watering (one permit), municipal/public water supply (one permit), and nursery irrigation (one permit). The municipal/public water supply category consists of domestic use and other, lower priority uses.

9. Currently, there are no water appropriation permits authorizing direct withdrawal of water from Little Rock Creek. However, between 1969 and December of 2022 the DNR has issued 94 groundwater appropriation permits, for 3.7 billion gallons (“BG”) of water, used mainly for irrigation of about 12,000 acres within the Little Rock Creek Zone of Influence. Actual water use fluctuates largely dependent on rainfall.

10. There are currently four stream gages in Little Rock Creek that collect year-round stage, discharge, and water temperature data every 15 minutes. Two sites on Little Rock Creek, H15029001 (Long Term Gauge) and H15031001 (Downstream Gauge), have continuous records that date back to 2007. The DNR’s long term gaging station (H15029001) is in Benton County, in the NW1/4 of the NW1/4, Section 10, Township 38N, Range 31W, approximately 0.23 miles north of the confluence of Little Rock Creek and Bunker Hill Brook (see Figure 1). In mid-2014, the DNR installed stream gages on two additional sites on Little Rock Creek. In addition to the four stream gages (only three will be used for evaluation), the DNR measures discharge at six locations along the creek periodically throughout the year. There are also periodic discharge measurements in the DNR files for Little Rock Creek dating back to 1969. There are two monitoring locations on

Bunker Hill Creek, only one is a continuous stream gage intermittently operated by the MPCA since 2006.

11. In 2015 the MPCA published the Total Maximum Daily Load (TMDL) Report for Little Rock Creek. The TMDL report is based in part on the 2009 Benton Soil and Water Conservation District's (SWCD) Stressor Identification Report. Below are key excerpts from the TMDL report that relate directly to the actions in this Commissioner's Order. According to the TMDL report:

> "The Little Rock Creek Stressor Identification report (Benton SWCD, 2009) cites lower groundwater levels as a possible contributor to the impairments for dissolved oxygen and temperature. The data show that the dry weather and associated low flow conditions from the TMDL monitoring period (2006 through 2008) were not as severe as the 1988 drought, but the persistence of dry conditions resulted in above average pumping rates for agricultural irrigation (normalized to the drought index) for six consecutive years that may have exacerbated the flow conditions for Little Rock Creek".
>
> "The ideal combination of implementation strategies, or combinations of Best Management Practices (BMPs), would provide some or all of the following:
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> - Reductions in groundwater use will be necessary to improve conditions in the stream. A variety of potential options to reduce groundwater use should be explored, including: limits on total appropriations, improved irrigation efficiency, scheduling and technologies, identifying alternative sources, timing, proximity to the stream and other options not yet identified
> - Nutrient and organic constituent reductions
> - Creating more of a free-flowing system, while incorporating current (Sartell) Wildlife Management Area (WMA) management strategies, to improve connectivity and temperature issues during the critical conditions described in this report."

12. In 2016, DNR invited potentially affected stakeholders in the Little Rock Creek Area to share, learn, and consult with DNR to develop the 2018 DNR Action Plan. The DNR assembled and consulted with a 28-member advisory team to inform a groundwater management plan written by the DNR for the Little Rock Creek Area. The majority of the advisory team members were individuals that held water use permits in the Little Rock Creek Area. The DNR convened the advisory team 14 times to provide information about the DNR's responsibilities and to solicit stakeholder advice. The DNR also held a public, open house meeting on December 19, 2017, before finalizing the *2018 DNR Action Plan*.

13. Since the plan was finalized, the DNR has held seven public meetings to update interested parties. The stakeholder meetings provided an opportunity for updates on progress implementing the plan, discussion of technical and regulatory questions, and sharing opinions

and perspectives about groundwater issues. Actions recommended by the plan include development of a groundwater flow model, which would be used in establishing a protected flow and determining a sustainable diversion limit. This Commissioner's Order addresses several recommendations of the Plan, but one recommendation is not addressed due to a statutory change. Due to revisions to Minn. Stat. § 103G.287, subd. 2, the DNR is no longer required to set a protected flow for Little Rock Creek. The DNR is instead setting a sustainable diversion limit as authorized by this statute.

14. The DNR also convened a Technical Advisory Group (TAG) during the development of the DNR's groundwater flow model. The TAG included technical staff from various governmental entities such as the Minnesota Department of Health, Minnesota Department of Agriculture, MPCA, United States Geological Survey and several environmental and engineering consulting firms. The TAG reviewed the suitability of the numerical model to predict the effect of groundwater appropriation(s) on groundwater flows and contributions of groundwater flows to base flow[2] to Little Rock Creek. The TAG members provided comments and feedback on a draft modeling report in January 2019. There was general agreement among the members of the TAG that the DNR's technical approach was suitable for the purpose of calculating cumulative stream flow diversion associated with groundwater appropriations.

15. At the stakeholder meetings, the DNR invited public feedback relating to each of the following topics that are addressed in this Commissioner's Order:

- Limiting streamflow diversions to 15% of the August median base flow at each of three gauges. This is described as the sustainable diversion limit.
- Declaring a water use conflict (Minn. Rules Chapter 6115.0740).
- Establishing a temporary moratorium on new irrigation permits and increases in authorized volumes of irrigation permits within the Zone of Irrigation Influence.

16. DNR had considered including a "temporary just cause exemption" from the application of Minn. Stat. § 103G.285 in this Commissioner's Order. The exemption is no longer necessary because Minn. Stat. § 103G.287, subd. 2 no longer requires compliance with Minn. Stat. § 103G.285 if groundwater appropriations are causing negative impacts to surface waters. In particular, groundwater appropriations with negative impacts on surface waters no longer trigger the requirement in Minn. Stat. § 103G.285, subd. 5 to limit appropriations from trout streams to temporary appropriations. The DNR presented information on the proposed Commissioner's Order at a March 16, 2023, stakeholder meeting, a GovDelivery notice to 4,779 recipients on March 27, 2023, and a notice on the project webpage. The public was invited to send a response to the DNR via email.

[2] Base flow represents an estimate of stream flow in the absence of direct runoff, largely sustained by groundwater discharges.

17. Below is a brief overview of the stakeholder feedback on each part of the proposed order. A complete copy of the stakeholder feedback is attached as Exhibit A, and DNR's Response to Stakeholder Feedback is attached as Exhibit A.

- *Limit streamflow diversions to 15% of the August median base flow at each of three gauges.*
  Respondents suggested that the 15% of the August median base flow diversion limit determined by DNR was arbitrary and recommended 20% of the August median base flow. Some respondents were skeptical of the DNR's technical analysis and believed it was unreliable due to the assumptions made, the short period of record for monitoring data, and the fact that water users overreported their water use. Some respondents disagreed with the DNR's decision to use dryland alfalfa as a "no irrigation" alternative scenario. Some recommended comparing present groundwater diversion to a landscape dominated by native vegetation.
- *Declare a water use conflict.*
  Respondents suggest that the water use conflict should be resolved by augmenting stream flow with well water. Some respondents are concerned that any decision to reduce water availability for irrigation will create damage to local economies. Some respondents believe that piping water from a distance (to supplant irrigation water) is too expensive, complicated, and unnecessary in years where rainfall is high. Some respondents believe that the Zone of Irrigation Influence is arbitrary, too wide and contradicted by hydrologic studies in other regions of the United States.
- *Declare a temporary moratorium on new permits and increases in authorized volumes within the Zone of Irrigation Influence.*
  No comments were received.

Water Quality

18. Water quality in Little Rock Creek is impaired. The Benton Soil and Water Conservation District published in September of 2009 (and revised in February of 2010) the "Little Rock Creek Stressor Identification Report" (2009 Stressor ID). This report evaluated 37 potential stressors of water quality in Little Rock Creek. Seven main stressors were identified for Little Rock Creek. In order of priority, they are: 1. Flow alteration, 2. Temperature, 3. Sediment – deposited and bedded, 4. Nitrates (toxin)/Ammonia, 5. Dissolved oxygen/Biological Oxygen Demand, 6. Connectivity, 7. Predation of trout by pike and other warmwater piscivores. The report cites lower groundwater levels as a possible contributor to the impairments for dissolved oxygen and temperature. The report recommends documenting any relationship between increased irrigation and lower groundwater levels. Barr Engineering then completed the report entitled *Little Rock Creek Watershed Total Maximum Daily Load Report: Dissolved Oxygen, Nitrate, Temperature and Fish Bioassessment Impairments (TMDL)* 2015, which was submitted to the Environmental Protection Agency by the MPCA. The TMDL report also cites lower groundwater levels as a possible contributor to the impairments for dissolved oxygen and temperature.

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Technical Findings

Hydrogeology and Groundwater Flow Analysis

19. To determine the sustainable diversion limit [Minn. Stat. § 103G.287, subd. 2] for Little Rock Creek, the DNR considered factors identified in, and the general process set out in the DNR's Report to the Minnesota State Legislature (DNR, Definitions and Thresholds for Negative Impacts to Surface Water, January 2016). The process laid out in the thresholds report was the outcome of a 2015 legislative requirement directing the DNR to develop recommendations for the calculation of thresholds for negative impacts to surface waters. This process for determining a sustainable diversion limit for natural watercourses was reviewed by aquatic resource experts both internal to and external to the DNR, including aquatic resource professionals from the U.S. Geological Survey (USGS), and the University of Minnesota.

20. As described above, the following protocol were used to determine a sustainable diversion limit:

- Develop a Water Budget: DNR used industry standard groundwater and surface models to calculate a water budget for Little Rock Creek that accounts for all water inflows into and water losses from the stream. The models are MODFLOW (Modular three-dimensional finite-difference ground-water flow model) and GSSHA (Gridded Surface Subsurface Hydrologic Analysis).
- Determine Characteristic Streamflow: DNR examined historic water level records for Little Rock Creek and evaluated the characteristic stream flows to determine the variability and range of flows that are necessary for maintaining the stream's hydrology, ecology (including fish and wildlife habitat) and in-stream uses[3].
- Determine the August Median Base Flow: DNR used established techniques in the field of hydrology to combine modeled streamflow diversions with the observed flow record, to calculate the August base flow from the resulting flow record, and to compute the median values.

[3] An in-stream use is a use made of any water body in its natural condition by natural systems, the public at large, and riparian landowners that is dependent upon maintaining sufficient water in the water body to support such uses, including recreational uses such as swimming, boating, sport fishery habitat, and skating as well as water quality, aesthetics, and electrical power generation. *See e.g.,* Mathew Levinson, *California Water: An Economic Consideration,* 12 UCLA J. of Envl. Law & Policy 183, 185 (1993); Lawrence J. MacDonnell, *Federal Interests in Western Water Resources: Conflict and Accommodation,* 29 Nat. Resources J. 389, 408-09 (1989); *National Audubon Society v. Superior Court,* 658 P.2d 709, 725-26 (Cal. 1983) (defining in-stream uses to include navigation, fishing, recreation, ecology, and aesthetics).

- Assess Appropriation Impact: DNR used the groundwater models to assess how much water existing appropriations are diverting from the system, and how those diversions might affect the stream's hydrology.
- Determine Change and Abundance of Fish Habitats Due to Groundwater Withdrawal: DNR completed an instream flow habitat characterization and analysis to calculate the loss of habitat under various low flow scenarios and establish a relationship between habitat loss and reduction in streamflow. The predicted loss in habitat is used to determine a likely change in the biological community and ecology in a manner that results in a less desirable and degraded condition, and therefore, ecosystem harm.
- Determine the Effect of Streamflow on Water Temperature: DNR completed a water temperature and streamflow analysis using dye trace techniques to evaluate time of travel, analyze temperature data from multiple stream locations over many years, and evaluate changes due to an impoundment and streamflow depletion.

21. As described in Champion, *The Evaluation of Conceptual Groundwater-use Management Actions, Little Rock Creek Area,* August 2022, the DNR used the MODFLOW model to delineate a zone of irrigation influence around Little Rock Creek. The DNR delineated a zone for the buried aquifer system (QBAA Zone of Irrigation Influence) and a separate zone for the water table aquifer (QWTA Zone of Irrigation Influence). (The term "Zone of Irrigation Influence" refers to the QBAA Zone of Irrigation Influence.) To better reflect the precision of the information and to make the boundaries more easily recognized on the ground, the zones of irrigation influence were delineated using quarter-quarter section increments. Figure 1 displays the zones of irrigation influence and the capture modeling data points used to delineate these zones. The aquifers may be thin or absent in some areas within each zone. Irrigation wells located outside of the relevant zone of irrigation influence are expected to have negligible or positive influence on base flows in Little Rock Creek at the three evaluation stations (upstream, long-term, and downstream).

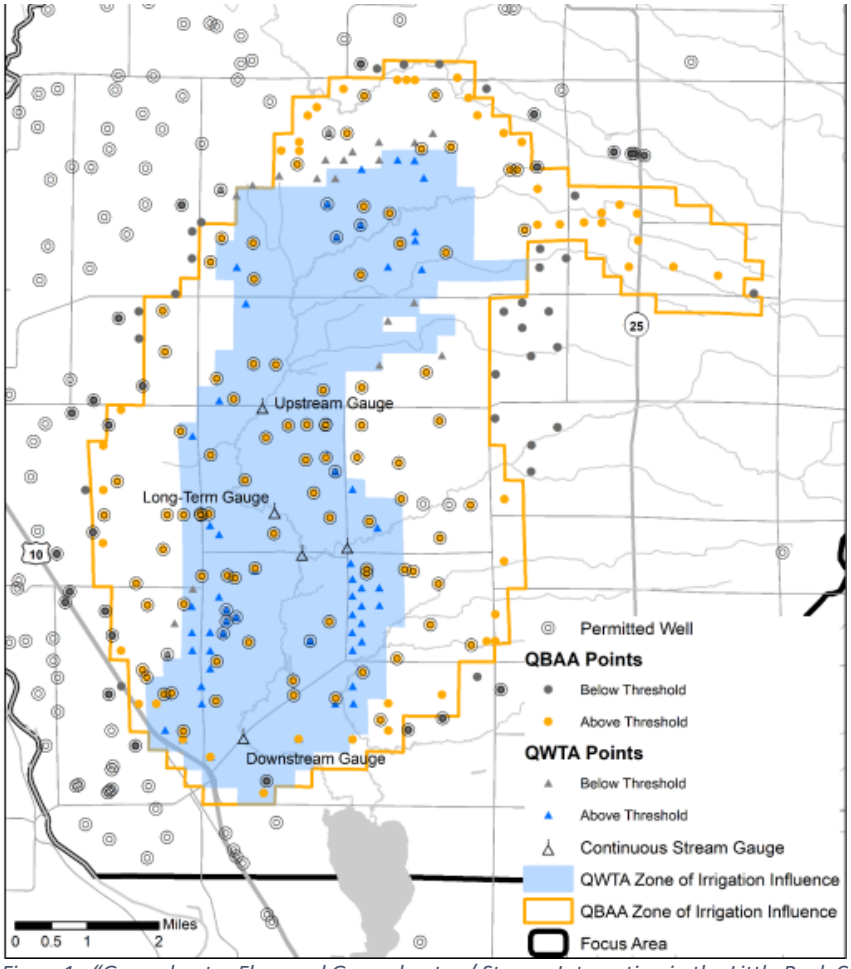


Figure1– "Groundwater Flow and Groundwater / Stream Interaction in the Little Rock Creek Area" MN DNR, 3-4-21

22. Stream flow and temperature data, observation-well data, and groundwater mapping provide substantial evidence of a direct relationship between groundwater and Little Rock Creek, including Bunker Hill Creek. The perennial flows measured in Little Rock Creek and Bunker Hill Creek support the finding that groundwater is a source of streamflow in both creeks. The relatively cool temperatures measured in Little Rock Creek under base-flow conditions during the summer months also demonstrate that groundwater is a major source of base flow. Data collected in observation wells located near Little Rock Creek show that the elevation of the water table is above the elevation of the nearby stream channel. Mapping of the water-table and buried-aquifer potentiometric heads shows that groundwater flows toward Little Rock Creek and other streams which contributes to baseflow (DNR, Benton County Part B Atlas, plate 6 and plate 8, 2012 and Morrison County Part B Atlas report, 2019).

23. Aquifer-test and observation-well data demonstrate that buried aquifers are connected to the water-table aquifer and, therefore, connected to Little Rock Creek and other surface waters. Aquifer tests performed on irrigation wells by DNR staff, in cooperation with the well owners, demonstrate that confining geologic barriers between aquifers are leaky, and pumping drawdown radiates rapidly to adjacent aquifers not screened in the pumping well, including the water-table aquifer. Nests of closely spaced observation wells screened at different depths show that, in most locations, the elevation of the water table is above the elevation of the potentiometric surface in underlying buried aquifers. This indicates that at these locations, there is a downward component to flow from the water table aquifer toward underlying, buried aquifers. In two observation-well nests located near Little Rock Creek, this relationship is reversed during ambient flow conditions. This indicates that at these locations near Little Rock Creek, groundwater leaks upward from buried aquifers toward the water table. Taken together, these facts demonstrate that buried aquifers in the area, including aquifers that are the source for water appropriation permits, are hydrologically connected to the water-table aquifer and to Little Rock Creek, including Bunker Hill Creek.

24. Groundwater pumping can reduce streamflow by decreasing groundwater discharge to streams and, in some cases, by inducing or increasing seepage out of streams. Irrigation and associated irrigated crops are land uses directly related to groundwater appropriations that can substantially affect the amount and timing of groundwater discharge to streams.

25. The continuous stream gaging record for Little Rock Creek only includes years with significant groundwater use. To assess the impacts of groundwater appropriations on streamflow, it was necessary to estimate streamflow and base flow characteristics for a reference condition using a paired watershed study. The DNR used the Rice Creek watershed, 25 miles to the southeast of Little Rock Creek that has substantially less permitted groundwater use. The Rice Creek Watershed shares many similarities, including size, climate, correlation between daily discharge values, and the existence of stream gage data.

26. The DNR completed its streamflow analysis at the long-term gage (H15029001) with continuous flow measurements in 2006, and 2008 through 2018, and periodic measurements dating back to 1978. Streamflow in Little Rock Creek follows a typical pattern in Minnesota with the highest flows measured in April, May, and June, and with summertime low flows typically in August.

27. The DNR used a commonly applied, automated method to separate base flow from total streamflow. The median August base flow at gage H15029001 during the analysis period of 2006 and 2008 through 2012 is 6.8 cubic feet per second (cfs). A full description of the base flow analysis is described in the DNR report Champion, Groundwater Flow and Groundwater / Stream Interaction in the Little Rock Creek Area, January 2021.

28. Streamflow data were extrapolated from H15029001 to upstream gage H15029003 in order to complete the habitat analysis. Prior to the beginning of continuous records at station H15029003 in July 2014, the stream gage record at station H15029003 was estimated using station H15029001 records.

29. The DNR developed a numerical, computer model of the Little Rock Creek Area hydrologic system ("LRCA model") to estimate base flows under the reference condition and to provide a tool to evaluate base flow under potential management scenarios that may be considered. See Champion *Groundwater Flow and Groundwater / Stream Interaction in the Little Rock Creek Area*, January 2021. The DNR considered available data on groundwater use, climate, land use, soils, hydrology, and geology in developing the model. The baseline model computes groundwater heads and stream base flows representing March 2006 through September 2018. The model reasonably matches observed monthly base flows outside of winter/ice-affected periods, particularly during summer low-flows, which is the focus of the evaluations using the model. As stated in paragraph 14 above, the Technical Advisory Group generally agreed that the DNR's technical approach was suitable for the purpose of calculating cumulative stream flow diversion from groundwater use.

30. Numerical groundwater flow modeling provides additional evidence of a direct relationship of groundwater and Little Rock Creek, including Bunker Hill Creek. Therefore, pumping of groundwater from nearby permitted irrigation wells is diverting water from Little Rock Creek or intercepting groundwater that would be flowing to the creek.

31. The DNR calculated base-flow diversions as the difference between computed base flows (computed groundwater-sourced discharge) in Little Rock Creek during the modeling period versus computed base flows in a reference condition without groundwater pumping or use (no-use scenario). Base-flow diversions were calculated at three continuous stream-gaging locations.

32. In the no-use scenario model, there was no groundwater pumping, and irrigated crops were replaced with non-irrigated alfalfa. Non-irrigated land covers remained the same as the baseline. DNR selected a non-irrigated agricultural crop to replace irrigated crops in the no-use scenario to isolate the effects of groundwater appropriation in an agricultural setting. DNR does not propose reverting the agricultural landscape to pre-settlement land cover nor are there any local or regional plans calling for such a change. DNR selected alfalfa as a representative crop because water use by non-irrigated alfalfa is at the upper end of the range for non-irrigated, agricultural land uses in Central Minnesota (i.e., row crops, other hay crops, small grains, and pasture) and because alfalfa is more drought tolerant than many row crops.

33. The DNR calculated estimates of streamflow under the reference condition as the sum of the computed base-flow diversions and measured streamflow. Similarly, DNR calculated estimates of base flow under the reference condition as the sum of the computed base-flow

diversions and base flows estimated directly from measured streamflow using a base-flow separation filter. This method of calculating the reference condition flows takes advantage of the best available data. The measured streamflow record and computed base flows overlap during 2006 and 2008 through September 2018, however, data were missing from the long-term gage for most of 2007.

34. The DNR assessed the sensitivity of computed base-flow diversions to key model assumptions, model parameters, and to the selected reference condition. The computed base-flow diversions were sensitive to changes in pumping volumes and the selected reference land cover but were relatively less sensitive to changes to model parameters, such as aquifer characteristics.

35. Considering the model and all other available evidence, the DNR concludes that monthly August base-flow diversions exceeded one cubic foot per second (cfs) in at least some years for the selected reference conditions during the analysis period (2006, 2008 through 2018) at the long-term stream gage (station 15029001). The reference August median base flow was determined to be 7.2 cfs at the long-term stream gaging station. The August monthly maximum diversion was calculated at 1.9 cfs (27%), and the August median diversion is 0.77 cfs (11%).

36. The DNR used the same methods to calculate reference-condition streamflow and base flow at the upstream gage (station 15029003) for input to the stream hydraulic model used in the stream habitat assessment. The reference August median base flow was approximately 5.5 cfs at the upstream gage. The August monthly maximum diversion was calculated at 1.4 cfs (25%), and the August median diversion is 0.64 cfs (12%).

37. The DNR used the same methods to calculate reference-condition streamflow and base flow at the downstream gage (station 15031001). The reference August median base flow was 19 cfs at the downstream gage. The August monthly maximum diversion was 5.0 cfs (26%), and the August median diversion was 2.3 cfs (12%).

38. The DNR conducted a water use calibration study by deploying acoustic flow meters on irrigation systems in the Little Rock Creek Area. Local landowners volunteered nine local irrigation systems for use in the calibration study during the 2018 and 2019 irrigation seasons. The DNR compared the “metered” versus reported average pumping rates for both years and total volumes for 2019 (Flow Meter Study Double blind study of calculated and reported water use in the Little Rock Creek Area 3/4/2021). Four of the systems had reported pumping rates within 10% of the measured values. Four of the systems had reported pumping rates that were more than 10 percent greater than the measured values and one system reported pumping rates that were more than 10% lower than measured values. The results suggest that reported irrigation volumes might be overestimated or underestimated depending on circumstances, methods, and age of systems.

39. To test the models' sensitivity to the potential for systematic overestimating, the DNR developed a model run with groundwater uses modified to 80 percent of the reported volumes. The result was a computed reduction in the median base flow diversion of 0.27 cfs at station 15029001. This resulted in computed monthly maximum diversion of 21%, a difference of 6% compared to using the reported volumes as described in paragraph 35.

40. This water use calibration study included 9 of the 398 permitted wells in the Little Rock Creek Area and may not be broadly representative.

41. The DNR conducted an inter-watershed comparison as an independent line of evidence on the relationship between groundwater-use rates and summer base flow. DNR staff compared concurrent records of August base flows (2008 and 2009) in Little Rock Creek with base flow in a nearby watershed (Rice Creek) with similar characteristics but where there is substantially less groundwater use. Base-flow per square mile of watershed in Rice Creek for August 2008 and 2009 was 59% and 26% greater than base flow in Little Rock Creek. The model-computed base flow in the no-use scenario was 59% and 16% greater than in the baseline model for August 2008 and 2009.

Stream Habitat Analysis

42. The DNR used the Instream Flow Incremental Methodology (IFIM), which is a modular decision support system for assessing potential flow management schemes. The IFIM is designed to assist natural resource and water management agencies in comparing the relative habitat impacts of proposed instream flow management schemes with reference conditions. A unique feature of the IFIM is the simultaneous analysis of habitat variability over time and space, while incorporating data from streamflow gaging and groundwater modeling estimation of streamflow depletion from groundwater use.

43. The flow regime, as described by the hydrograph, is the key driver of aquatic ecosystems. All parts of the hydrograph are important. For example, high spring streamflow initiates and enables spawning, moderate flows clean substrates, and summer low flows provide habitat for growth and survival. In Little Rock Creek, groundwater pumping has the greatest effect during the low summer flows. August flows were the focus of the IFIM habitat analysis because this is a time of intense groundwater use; summer low flows are known to influence fish growth and survival, be and a limiting factor of fish abundance.

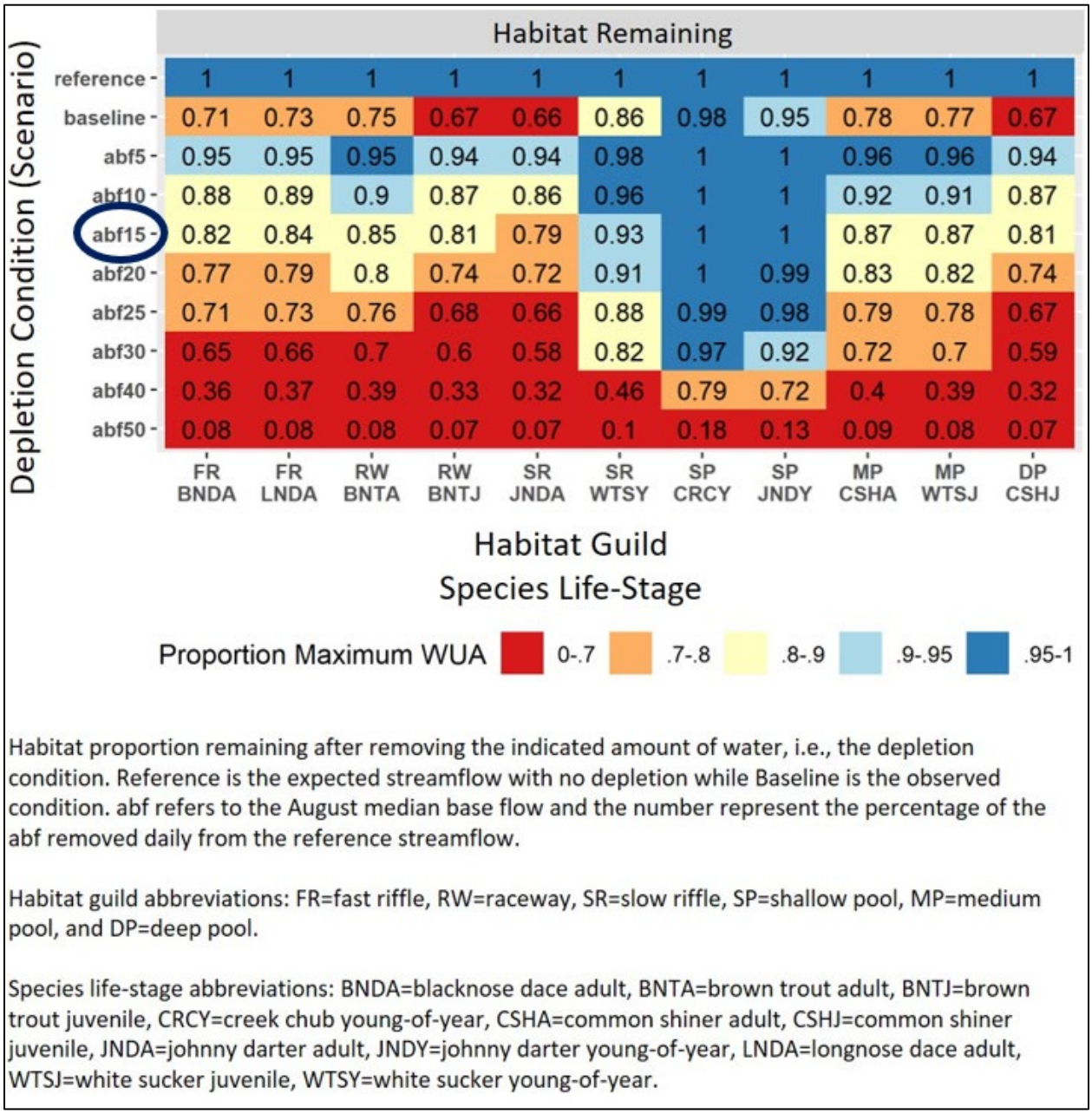
44. DNR's groundwater model quantified the change in low flows during periods of pumping and without pumping (reference period). The reduction in reference flows by 25% or more of the August median base flow ("ABF") (that is, reference flows of 75% or less of the ABF) is significant and intensifies as flows decrease. In four of the 12 years modeled, the August low flows were 35% lower and 40% more frequent with groundwater pumping.

45. Fish habitat preference criteria were developed using statewide samples and by sampling Little Rock Creek, at a study site just downstream from County Road 26, for fish and associated habitat. Microhabitat data were recorded at each sampling location, regardless of whether any fish were captured. Variables recorded with each sample included: river, site location, date, weather conditions, water and air temperature, conductivity, dissolved oxygen, sample location, gear type, three water depths, three mean column velocities, substrate types, and cover types.

46. Habitat preference values for all target species-life stages (juvenile or adult) were calculated for depth, velocity, and substrate and a habitat time series was created by merging the discharge – habitat relationship (i.e., merging specific species-life stage curves with a hydrologic time series).

47. At the current level of groundwater pumping (baseline condition in Figure 2), five of six habitat guilds lost significant (>20%) habitat as flows decreased. The habitat for all aquatic species inhabiting fast riffles, slow riffles, raceways, medium pools, and deep pools lost a significant quantity of habitat. Only shallow pool species are relatively unaffected by the decrease in low flows.

48. Scenarios of stream flow depletion and their impact on the Weighted Usable Area (WUA) of habitat guild representatives were developed, based on 5% increments of the August median base flow (e.g., 5% ABF, 10% ABF, 15% ABF).



Habitat proportion remaining after removing the indicated amount of water, i.e., the depletion condition. Reference is the expected streamflow with no depletion while Baseline is the observed condition. abf refers to the August median base flow and the number represent the percentage of the abf removed daily from the reference streamflow.

Habitat guild abbreviations: FR=fast riffle, RW=raceway, SR=slow riffle, SP=shallow pool, MP=medium pool, and DP=deep pool.

Species life-stage abbreviations: BNDA=blacknose dace adult, BNTA=brown trout adult, BNTJ=brown trout juvenile, CRCY=creek chub young-of-year, CSHA=common shiner adult, CSHJ=common shiner juvenile, JNDA=johnny darter adult, JNDY=johnny darter young-of-year, LNDA=longnose dace adult, WTSJ=white sucker juvenile, WTSY=white sucker young-of-year.

Figure 2- Habitat / Flow Relationship in Little Rock Creek.

49. At a depletion level equivalent to the 20% of the ABF, four of six habitat guilds lost significant (>20%) habitat.

50. When stream depletion is limited to no more than 15 percent of the August median base flow (highlighted as abf15 in Figure 2), habitat loss remains below the 20 percent threshold except for one species-life stage (slow riffle habitat representative), which was marginally over the threshold (21% loss).

51. The DNR's analysis shows that habitat loss for all species life stages is below the 20% threshold when stream depletion is limited to 10 percent of the August median base flow.

52. Low stream flows in Little Rock Creek are further reduced by groundwater pumping. Current pumping and use conditions reduced stream flows by more than 20% of the August median base flow in four of the 12 years of the period of record (2006, 2008-2018). The reduction in reference flow is significant and increases as flows decrease. The percent change between reference (without pumping) and baseline (with pumping) conditions was greater than 35% in low flow magnitude, frequency, duration, and recurrence. The impact of this reduction in flow corresponds to a significant loss of fish habitat. Five of six habitat guilds lose significant (>20%) habitat as flows decrease. Only shallow pool species are relatively unaffected by the decrease in low flows. Scientific literature reports that habitat loss and pollution are the primary causes of extirpation of aquatic biota in streams and rivers. On the basis of these findings and related scientific literature, the current magnitude of habitat loss during August across the majority of habitat types (5/6) equates to ecological harm. At current pumping volumes habitat loss in August due to groundwater pumping will likely alter the biological community and exceed the threshold for ecological harm (See Champion, *The Evaluation of Conceptual Groundwater-use Management Actions, Little Rock Creek Area,* August 2022).

Water Temperature Analysis

53. The Benton Soil and Water Conservation District published the Little Rock Creek Stressor Identification Report in September of 2009 and revised it in February of 2010. This report identified water temperature as one of the primary stressors present for a water quality impairment.

54. A 2015 report by Barr Engineering: *Little Rock Creek Watershed Total Maximum Daily Load Report: Dissolved Oxygen, Nitrate, Temperature, and Fish Bioassessment Impairments (TMDL)* cites the presence of the impoundment in the Sartell Wildlife Management Area (WMA) and lower groundwater levels as contributors to the impairment for temperature.

55. The DNR Division of Fish and Wildlife manages a dam and the impoundment at the Sartell WMA. The dam was installed in 1978. It is a sheet pile dam with a 48-foot-wide crest and a series of stop logs that are used to control water levels. When filled, the impoundment is a little over 20 acres in area with water depth ranging from 0.5 to 3 feet deep. When filled, the impoundment is more than 600 feet wide, which creates a large surface area for the water to warm from the sun. Periodically, the impoundment is drained to establish vegetation. During these drawdowns, the impoundment is drained and the flow of water in Little Rock Creek is largely confined to a meandering channel that is less than 60 feet wide.

56. Monitoring data shows that seasonal and daily water temperatures are distinctly warmer at sites that are downstream of the Sartell WMA impoundment. In the spring season,

daily average temperatures for all sites vary by less than one degree Celsius, but as the summer progresses, daily average temperatures differ by more than three degrees Celsius between sites upstream of the impoundment where water is cooler and downstream of the impoundment where water is warmer.

57. Four time of travel studies were conducted on Little Rock Creek to quantify the differences in travel time and stream dynamics when the impoundment is in place as well as when the impoundment is removed. Under low flow conditions, removing the dam decreased travel time from an upstream site through the WMA from 48 hours to 32 hours. The amount of time that dye was present at the site downstream of the dam decreased from 26 hours with the dam in place to 14 hours with the dam removed.

58. The temperature increases observed downstream of the Sartell WMA are a result of the impoundment slowing travel times through the WMA by more than 10 hours under low flow conditions and greatly increasing surface area at the impoundment, both of which result in increased solar warming in the WMA and downstream. The DNR has subsequently removed the stop logs at the impoundment on an experimental basis to evaluate the benefits of removing the impoundment and any potential impacts.

59. Water temperatures in Little Rock Creek above the impoundment exceeded the chronic water temperature standard most frequently in 2011, by more than 20 days at County Road 40 (upstream of the impoundment) and 40 days at County Road 26 (site farthest upstream of the impoundment), which is about twice as many days as any other year in the period of record. The impact of groundwater inflow on stream temperatures, however, is less clear. Streamflow's during the summer of 2011 represented some of the highest summer flows in the period of record, including the highest August base flows. At these higher flows, small changes in base flow due to groundwater withdrawal would be an insignificant factor in the water temperature exceedances. In contrast, 2012 experienced considerably lower flows during the month of August and above average groundwater pumping, and yet 2012 had some of the fewest exceedances of the chronic water temperature standard at the farthest upstream site (County Road 26). Our analysis did not establish a significant role for groundwater withdrawals in the temperature exceedances relative to the water temperature standard. However, it's well documented in scientific literature that localized groundwater inflow can provide important pockets of cooler water and serve as refuge habitat during periods of high temperature.

Application of Statutes and Rules

60. Minn. Stat. § 103G.255 states that the Commissioner shall administer the use, allocation, and control of waters of the state.

61. Minn. Stat. § 103G.265, subd. 1 states that "the Commissioner shall develop and manage water resources to assure an adequate supply to meet long-range seasonal

requirements for domestic, municipal, industrial, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes from waters of the state."

62. Minn. Stat. § 103G.287, subd. 5 states that "The Commissioner may issue water-use permits for appropriation from groundwater only if the Commissioner determines that the groundwater use is sustainable to supply the needs of future generations and the proposed use will not harm ecosystems, degrade water, or reduce water levels beyond the reach of public water supply and private domestic wells…"

63. Minn. Stat. § 103G.287, subd. 3 provides that the Commissioner may establish water appropriation limits to protect groundwater resources. In doing so, the Commissioner must consider "the sustainability of the groundwater resource, including the current and projected water levels, cumulative withdrawal rates from the resource on a monthly or annual basis, water quality, whether the use protects ecosystems, and the ability of future generations to meet their own needs."

Sustainable Diversion Limit

64. Minn. Stat. § 103G.287, subd. 2 states that groundwater appropriations may be authorized only if they avoid known negative impacts to surface waters. If the Commissioner determines that groundwater appropriations are having a negative impact to surface waters, the Commissioner may use a sustainable diversion limit or other relevant method, tools, or information to implement measures so that groundwater appropriations do not negatively impact the surface waters.

65. The DNR finds that authorized water use in the Little Rock Creek Area is having a negative impact on the Little Rock Creek stream ecosystem. As identified in paragraphs 44, 47 and 49, groundwater appropriations around Little Rock Creek are resulting in stream depletion of more than 20% of August median base flow. Paragraph 52 further identifies that stream diversion is causing ecosystem harm to Little Rock Creek.

66. Based on substantial evidence, limiting streamflow depletion to no more than 15% of the August median base flow protects the diversity of habitats represented in Little Rock Creek and therefore meets the statutory and rule criteria for protecting ecosystems and avoiding negative impacts to ecosystems.

67. Based on substantial evidence, DNR concludes that 15% of the August median base flow is the sustainable diversion limit for Little Rock Creek.

68. Based on the above analysis, the DNR has determined that 15% of August median base flow is 0.8 cubic feet per second at station H15029003, 1.1 cubic feet per second at station H15029001, and 2.9 cubic feet per second at station H1503100.

69. By establishing a sustainable diversion limit for groundwater appropriations, the DNR will consider groundwater-surface water interaction in determining how and when to limit water use based on limits that protect sufficient flow in Little Rock Creek, avoid negative impacts, and ensure compliance with Minn. Stat. § 103G.287.

Water Use Conflict

70. Minn. Stat. § 103G.261 establishes water use priorities in Minnesota. Minn. R. 6115.0740 defines a water use conflict. "For the purpose of these rules a conflict occurs where the available supply of waters of the state in a given area is limited to the extent that there are competing demands among existing and proposed users which exceed the reasonably available waters. Existing and proposed appropriations could in this situation endanger the supply of waters of the state so that the public health, safety, and welfare would be impaired." This rule also defines the procedures by which the Commissioner will resolve the water use conflict. More specifically, the Commissioner shall evaluate the following:

- the reasonableness for use of water by the proposed and existing users;
- the water use practices by the proposed and existing users to determine if the proposed and existing users are or would be using water in the most efficient manner in order to reduce the amount of water required;
- the possible alternative sources of water supply available to determine if there are feasible and practical means to provide water to satisfy the reasonable needs of proposed and existing users.

Minn. R. 6115.0740, subp. 2(B).

71. Based on substantial evidence, including the modeling data described above in paragraphs 7, 9 21-23, 47 and 52 the DNR concludes that there is a water use conflict in the Little Rock Creek Area because competing demands exceed reasonably available waters. In particular, as described above, "total withdrawals" for agricultural irrigation in the Zone of Irrigation Influence at times exceed "established resource protection limits" – i.e., the sustainable diversion limit for Little Rock Creek – and therefore a conflict results among third priority water users. *See* Minn. R. 6115.0740, subp. 2 and ¶¶ 47 and 52.

72. As part of its analysis of the issues addressed in this Commissioner's Order, DNR considered the reasonableness of existing water use in the Little Rock Creek Area. *See* Minn. R. 6115.0740, subp. 2(B)(1) (requiring DNR to consider whether existing and proposed water use is reasonable). Agricultural irrigation is, in general, a reasonable water use and the amounts of water DNR had authorized under each permit were typically limited to those quantities identified

in the United States Department of Agriculture Soil Conservation Service, *Irrigation Guide for Minnesota* (1976) as needed to sustain crops in this area.

73. The DNR evaluated irrigation water use efficiency improvements in the area as a method to resolve the water use conflict. *S*ee Minn. R. 6115.0740, subp. 2(B)(2) (requiring DNR to consider whether water is being used in the most efficient manner). The DNR does not have data for the efficiency measures employed by each permittee in the area. There is likely a significant variability of efficiency across all irrigation systems. Each permit contains conditions that require implementation of water conservation measures. Water use could likely be reduced by implementation of additional irrigation efficiency. DNR's technical analysis of the sustainable diversion limit determined that water use volume reductions of 50% within the Zone of Irrigation Influence would be needed to avoid a negative impact to Little Rock Creek. The DNR consulted with the University of Minnesota and the Minnesota Department of Agriculture and determined that it is unreasonable to assume that increasing agricultural irrigation efficiency would result in a 50% reduction in water use. Increasing irrigation efficiency could help resolve the water use conflict, but conservation itself would be insufficient to resolve the conflict.

74. As described in Champion, *The Evaluation of Conceptual Groundwater-use Management Actions, Little Rock Creek Area,* August 2022, the DNR applied the SWAT model (Soil and Water Assessment Tool) to assess irrigation demands in the Little Rock Creek Area for a limited set of crop rotations (including corn, soybeans, and dry beans only) and soils beginning in water year 2005 through 2018, ignoring results from the first year to initialize soil-moisture levels. The DNR then applied the resulting irrigation amounts within the Zone of Irrigation Influence to the LRCA model to simulate a hypothetical scenario in which irrigation-scheduling practices (i.e. applying water when soil moisture was low to simulate actual irrigation practices) were used for these crop-irrigation permits. These hypothetical irrigation demands resulted in reductions to computed base-flow diversions in most years. However, it is likely that irrigation scheduling would have to be paired with one or more other management actions to reduce base-flow diversions below the diversion limits in all years.

75. Surface water sources in the area are limited and would not be a suitable alternative water source for agricultural irrigation. *See* Minn. R. 6115.0740, subp. 2(B)(3) (requiring DNR to consider whether alternative sources of water supply are practical and feasible). DNR completed an Champion, *The Evaluation of Conceptual Groundwater-use Management Actions, Little Rock Creek Area,* August 2022. Part of this evaluation included a scenario where water users closer to Little Rock Creek obtained groundwater from wells outside the Zone of Irrigation Influence and piped water to the existing fields. Although a hypothetical analysis, it did show that if a relatively small number of permits (about 10 permits) import water from outside the Zone of Irrigation Influence, the sustainable diversion limit would be achieved. Further study, feasibility analysis, and landowner participation would be needed to determine if this approach could resolve the water use conflict.

76. Minn. R. 6115.0740, subp. 2(C) also provides that the DNR Commissioner shall resolve the conflict by modifying the appropriation of proposed and existing water users if possible. To resolve the conflict, water appropriations within the Zone of Irrigation Influence would need to be reduced by 50%. Any such reductions would reduce the yield of agricultural crops and limit the ability to grow some irrigated crops in the area. DNR therefore concludes that it cannot resolve the conflict through unilateral modification of existing and proposed permits without providing water users with the opportunity to participate in the development of the plan. Collaborating with water users enhances the economic, recreational, and ecological outcomes in the Little Rock Creek Area and is consistent with the DNR's mission.

77. As identified in Minn. Rule 6115.0740, Subp. 2(D)(1), the Commissioner is directed to require the proposed users and existing permitted users to develop and submit a plan which will provide for proportionate distribution of the limited water available among all users in the same priority class. The Commissioner shall withhold consideration of new applications, and shall, if the existing permitted appropriations endanger the supply of waters of the state, suspend or limit existing permits until a plan is approved by the Commissioner.

Temporary Moratorium

78. Minn. R. 6115.0740, subp. 2(D)(1) provides that DNR must withhold consideration of new applications until the plan is approved. For that reason, DNR is implementing a temporary moratorium on applications for new or increased appropriations for third priority uses in the Little Rock Creek Zone of Irrigation Influence.

Conclusions

1. The DNR has authority over the use, allocation, and control of waters of the State. Minn. Stat. § 103G.255.
2. The DNR must allocate waters based on statutory priorities for water appropriation. Minn. Stat. § 103G.261. The first priority for appropriation is the domestic water supply and some power production, the second priority is water use with a volume less than that which requires a permit, and the third priority – at issue here – is agricultural irrigation and processing of agricultural products. Minn. Stat. § 103G.261(a)(3).
3. DNR has the authority to manage appropriation of the State's waters to ensure that "groundwater use is sustainable to supply the needs of future generations and the proposed use will not harm ecosystems, degrade water, or reduce water levels beyond the reach of the public water supply and private domestic wells. . ." Minn. Stat. § 103G.287, subd. 5.

4. As identified in paragraph 52, the existing permitted water use in the Little Rock Creek Area negatively affects Little Rock Creek ecosystems by significantly reducing habitat available for aquatic organisms.
5. DNR is authorized to set a sustainable diversion limit to ensure that groundwater appropriations are not having a negative impact on Little Rock Creek. Minn. Stat. § 103G.287, subd. 2.
6. As identified in paragraph 65, limiting stream flow depletion to less than 15% of the August median base flow in Little Rock Creek at each of the three gauges is sustainable with respect to ecosystem harm as described in Minn. Stat. § 103G.287, subd. 5.
7. As identified in paragraph 66, managing groundwater appropriations in the Little Rock Creek Area so that total stream depletion is below 0.8 cubic feet per second at station H15029003, below 1.1 cubic feet per second at station H15029001, and below 2.9 cubic feet per second at station H15031001 avoids negative impacts to Little Rock Creek. DNR concludes these limits together comprise an appropriate sustainable diversion limit for Little Rock Creek.
8. The above sustainable diversion limit complies with the requirement under Minn. R. 6115.0670, subp. 3(C)(2) to limit groundwater appropriations so that they do not have negative impacts on surface waters.
9. In the Little Rock Creek Zone of Irrigation Influence, competing demands among existing and proposed users exceed the reasonably available supply as described in Minn. R. 6115.0740, subp. 1. Specifically, as described above, total appropriations at times cause exceedances of the sustainable diversion limit for Little Rock Creek. A water use conflict therefore exists in the Little Rock Creek Area.
10. More specifically, as identified in paragraph 64 and 68, a water use conflict exists among third priority water users within the Zone of Irrigation Influence of Little Rock Creek.
11. As identified in paragraph 74 modifying appropriation amounts of existing permits within the Zone of Irrigation Influence to achieve the sustainable diversion limit would have significant impacts to users in the Little Rock Creek Area. For that reason, DNR concludes the conflict cannot be resolved by unilaterally modifying the appropriations of existing and proposed users without providing water users with the opportunity to participate in the development of the plan. Minn. R.6115.0740, subp. 2(C).
12. The Commissioner is authorized to require existing and proposed third priority users to develop a plan to provide for the proportionate distribution of the limited water available to those users, after satisfying the needs of first and second priority users. Minn. R. 6115.0740, subp. 2(D)(1) & (2).

13. If the Commissioner approves the plan, she is authorized to modify water appropriation permits in the Little Rock Creek Area according to such plan. Minn. R. 6115.0740, subp. 2(D).
14. If the Commissioner determines that the proposed plan is not practical or reasonable, the Commissioner is authorized to develop a new plan for the proportionate distribution of water among the third priority users and modify water appropriation permits accordingly. Minn. R. 6115.0740, subp. 2(D).
15. Water appropriation permits are subject to modification or cancellation by the Commissioner if necessary to protect the public interest. Minn. Stat. § 103G.315, subd. 11(a)(1) & (2); Minn. R. 6115.0750, subp. 5(B).
16. The DNR is authorized to withhold consideration of new applications for water appropriations or applications for increased appropriations in the area where a water use conflict is present. Minn. R. 6115.0740, subp. 2(D).
17. Any findings of facts that are conclusions and conclusions that are findings of facts shall be considered as such.

ORDER

Based on the substantial evidence in the administrative record on file at the DNR, the requirements of the *2017 Order*, and 2023 Minn. Sess. Laws, Ch. 60, Art. 4 the DNR makes the following ORDER:

Based on the factual findings set forth in this findings of fact and the record on file with the Minnesota Department of Natural Resources, the Commissioner issues the following orders:

1. The sustainable diversion limits for Little Rock Creek (Public Water No. 05003a) are hereby set at 0.8 cubic feet per second at the upstream gage (H15029003), 1.1 cubic feet per second at the long-term gage (15029001), and 2.9 cubic feet per second at the downstream gage (15031001).

2. A water use conflict exists inside the Little Rock Creek Zone of Irrigation Influence and the DNR Commissioner requires third priority water users to develop and submit a plan to the Commissioner for review to resolve the conflict. The Commissioner will review the proposed resolution and determine if the plan is practical, reasonable, and consistent with Minnesota rules and statutes.

3. The DNR Commissioner will withhold consideration of applications for new water appropriation permits or increases in existing water appropriation permits for third priority uses in the Little Rock Creek Zone of Irrigation Influence until a plan to resolve the water use conflict is approved by the DNR Commissioner.

Findings of Fact and Order

Little Rock Creek Sustainable Diversion Limit and Water Use Conflict
Morrison and Benton Counties

Approved and adopted this 22nd day of April 2024.

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

_____

By: Jess Richards
Assistant Commissioner
Department of Natural Resources

Findings of Fact and Order

Little Rock Creek Sustainable Diversion Limit and Water Use Conflict
Morrison and Benton Counties

EXHIBIT A

DNR Response to Stakeholder Feedback - Little Rock Creek Area

April 22, 2024

The Minnesota Department of Natural Resources (DNR) asked stakeholders for feedback on a proposed Commissioner's Order relating to four proposed DNR actions to avoid negative impacts to Little Rock Creek from high-capacity pumping within the zone of influence.

Between March 24 and May 15, 2023, the public was invited to provide feedback on the proposed Commissioner's Order that would seek to:

- Limit streamflow diversions inside the zone of influence to 15% of the August median base flow at each of three gauges. This is described as the sustainable diversion limit (link to technical report)
  Purpose: this action formally adopts the DNR's technical work and will be used as the basis for actions on any permit applications and water management in the future.

- Declare a water use conflict (link to definition) inside the zone of influence.
  Purpose: The water use conflict process provides a clear path for mitigating the impact of water use and will affect only the permits of water users inside the defined zone of influence.

- Activate a "temporary just cause exemption" (link to statute) from state statutes during plan development inside the zone of influence.
  Purpose: A temporary exemption will provide a reasonable amount of time for permit holders and the DNR to work out a long-term solution.

- Communicate a temporary moratorium on new permits and increases in authorized volumes within the zone of influence.
  Purpose: Until a plan to resolve the water use conflict is approved by the DNR Commissioner, the DNR is prohibited from authorizing new or increased water use (Link to M.R. 6115.0740).

- Continue to listen to water users. The DNR Commissioner will consider a plan (see more below) from permitted water users inside the zone of influence. This plan should result in resolving the water use conflict (avoiding negative impacts to ecosystems).
  Purpose: Permitted water users know best what water use changes will be viable for their operations. While the DNR Commissioner has the final responsibility to resolve the water use conflict, collaboration with users will result in a more durable outcome.

This document includes summaries of key comments from stakeholders, along with agency responses. Stakeholder comments in their entirety are included in Exhibit A, Little Rock Area Stakeholder Feedback. The stakeholder feedback has been grouped by theme. The table at the end of this document directs the reader to the DNR's numbered response.

Findings of Fact and Order

Little Rock Creek Sustainable Diversion Limit and Water Use Conflict
Morrison and Benton Counties

NOTE: The "temporary just cause exemption" above is no longer relevant as Minn. Stat. § 103G.287 was revised during the 2023 legislative session. Section 103G.287, subdivision 2 no longer requires groundwater appropriations that have negative impacts to surface waters to comply with the provision of Minnesota Statutes section 103G.285, including the requirement that all appropriations from trout streams are temporary.

STAKEHOLDER FEEDBACK

1. Respondents encourage DNR to augment Little Rock Creek base flow with well water from a more distant source.
   DNR Response: *This potential solution will continue to be evaluated. Our initial evaluation of this alternative has identified several feasibility and policy challenges that will be difficult to overcome including, water quality and ecological impacts, compliance with statutes and rules, construction, governance, and funding. Additionally, because DNR does not have the authority to do the work to install or to operate such a system, new authorities such as an irrigation district would have to be developed and would be a first in the State of Minnesota. An additional challenge is interpretation of Minn. Statutes 103G.271. It states that "the commissioner shall, by January 31, 1994, revoke all existing permits, and may not issue new permits, for the appropriation or use of groundwater in excess of 10,000,000 gallons per year for the primary purpose of maintaining or increasing surface water levels in the seven-county metropolitan area and in other areas of concern as determined by the commissioner." The Little Rock Creek Area is one of the areas that the Minnesota DNR may identify as an area of concern.*
2. Respondents stated their belief that 15% of base flow diversion is arbitrary and recommends 20%.
   DNR Response: *Our analysis showed that low flows are significantly reduced by the currently authorized groundwater pumping. This analysis was conducted using well established and accepted scientific methods that benefitted from continuous flow measurements in 2006 and 2008 through 2018. Scenarios of stream flow depletion and their impact on habitat guild representatives were developed, based on 5% increments of the August median base flow (ABF; e.g., 5%ABF, 10% ABF, 15% ABF). At a depletion level equivalent to the 20% of the ABF, four of six habitat guilds lost significant (>20%) habitat. When stream depletion is limited to no more than 15 percent of the August median base flow, habitat loss remains below the 20 percent threshold except for one species-life stage (slow riffle habitat representative), which was marginally over the threshold (21% loss). Our analysis shows that habitat loss for all species life stages is below the 20% threshold when stream depletion is limited to 10 percent of the August median base flow.*
3. Respondent encourages flexibility to allow more pumping during wet years.
   DNR Response: *The commenter's suggestion to have different authorized volumes based on weather conditions is not feasible. For instance, increased authorized volumes may not be needed in wet years. Also, it is inherently difficult to predict future precipitation and groundwater levels, and groundwater levels changes may lag significantly after a rainfall.*

Finally, one of DNR's stated goal has been to strive for predictability in the authorized water volumes in order for agricultural businesses to effectively plan for the future.

4. Respondents requested DNR engineering expertise and cooperation with landowners to install wells and pipelines for either augmentation or supplanting irrigation water.
   DNR Response: *The DNR has committed funding to develop independent conceptual designs and cost estimates for potential solutions in the Little Rock Creek Area. The work will further clarify what may be needed to implement the proposed solutions laid out in the Sustainable Use of Groundwater in the Little Rock Creek Area Plan. This is an important next step to understand how irrigation water can be supplied while maintaining healthy ecosystems in Little Rock Creek. This new work will build on years of DNR studies on how groundwater moves near Little Rock Creek and how groundwater pumping can affect ecosystems in the creek. However, there are additional types of analyses needed that require different kinds of knowledge and expertise. For instance: conceptual engineering plans, estimates of implementation costs and funding needs, governance and operational considerations, development schedules, and economic evaluations of lost revenue. The DNR heard from stakeholders about the importance and timeliness of getting this work done and has identified funding within its budget. The DNR is currently drafting a Request for Proposals (RFP) that would cover all the items listed above with designs and cost estimates likely available in 2025. Input from irrigators and other interested parties is important and will be one of the tasks called for in the RFP.*
5. Respondents stated their concern that any decision to reduce water availability for irrigation will create severe economic damage to local economies.
   DNR Response: *We have heard stakeholder comments about the importance of irrigation to individuals, families and communities. We recognize the value of irrigation to individual operators and local economies. We have collaborated with stakeholders and developed a list of possible water use scenarios so that reducing authorized volumes is used only as a last resort. The RFP will include an economic analysis of reducing pumping volumes.*
6. Respondents would have liked to have reviewed the actual DNR Commissioner's Order before commenting.
   DNR Response: *All of the permittees that are potentially affected, all of the past participants in the planning process, all previous meeting participants and all GovDelivery recipients have been informed of our technical analysis, statutory obligations, and intentions for ensuring sustainable groundwater use in the Little Rock Creek Area. Both the agency actions included in the order and the technical evidence supporting those actions has been made available to the public.*
7. Respondents disagreed with many of the assumptions and inputs in the technical analysis including DNR's decision to use dryland alfalfa as a "no irrigation" alternative scenario and recommend comparing present water use to a pre-European settlement condition of grassland and forest.
   DNR Response: *The current Little Rock Creek Area landscape is highly altered compared to the native vegetation that existed pre-European settlement. Those changes have and will*

likely continue to influence the ecology of Little Rock Creek. However, the DNR does not regulate land use changes in the Little Rock Creek Area and does not envision that future land use will revert to pre-European settlement conditions. The DNR has not stated or implied that our intention was to duplicate the very original or historic flow levels. We have consistently said that state law directs us in this situation to determine if the permitted water use is changing the flow regime of Little Rock Creek, and to determine if those changes in the flow regime are having a negative impact on the stream ecosystem. We assume that this area is now, and will continue to be, an agriculturally dominated landscape. Our analysis simply compares the flow regime unaffected by groundwater use to the flow regime affected by groundwater use. Alfalfa is a deep-rooted agricultural crop that is more resistant to drought than many other crops and represents how much water may be used by crops in an unirrigated baseline. The term natural flow regime implies an entirely different land use than is currently represented throughout the watershed. Estimating such a flow regime would have many unknowns and require a lot of assumptions that would make any analysis unreliable. Evaluating habitat conditions under that flow regime would also require measurements of the stream channel, the width, depth, substrate, and water velocity; none of which are available.

8. Respondents were concerned that the DNR issued "limited" permits for water use.
   DNR Response: *DNR is required to limit the amount or timing of appropriations when it determines that a groundwater appropriation will have an adverse impact on surface waters. Minn. R. 6115.0670, subp. 3(C)(3). Issuing limited permits allowed groundwater use to continue while the technical analyses were completed. Currently available information suggests groundwater use in the Little Rock Creek Area may not be sustainable because high volume use of groundwater is contributing to water quality impairments in Little Rock Creek and its tributaries. The DNR conducted hydrogeologic and stream habitat analyses to determine if permitted use is sustainable. DNR determined that changes in permitted water use were needed to remain in compliance with state statutes.*
9. Respondents believed that each well should be assigned a proportionate responsibility for base flow diversion rather than all wells within the zone of influence being considered to be equally responsible.
   DNR Response: *Agricultural irrigation is classified as a third priority use under Minn. Statutes section 103G.261. The DNR needs to consider the cumulative impacts in addition to individual permit impacts. Potential solutions can consider proportional benefits of changes to specific wells, but the responsibility to avoid negative impacts to Little Rock Creek is still shared.*
10. Respondents believed that DNR's technical analysis was unreliable due to the assumptions made, the short period of record for the monitoring data evaluated, and water use overreporting by water users.
    DNR Response: *We heard stakeholders' general concerns about using a model to show how water is moving in the Little Rock Creek Area. A numeric MODFLOW model is necessary and commonly used where measurement of groundwater movement within the soil is not possible. We believe that our analysis fairly represents the conditions in and around Little*

Rock Creek. Independent industry experts from various state, federal and private organizations reviewed the suitability of DNR's numerical model to predict the effects of groundwater appropriation on groundwater flows and contributions of base flow to Little Rock Creek. There was general agreement among the members of the TAG that the DNR's technical approach was suitable for the purpose of calculating cumulative stream flow diversion from groundwater use.

The model was history matched (parameters adjusted to fit observation data) to water years 2006 through 2014. The model period was then extended through water year 2018 without making changes to model parameters. The fit to base flows does not meet all of the goal statistics for the add-on period in isolation (water years 2015 through 2018). The statistics goals are met for summer base flows (July through September) during the add-on period at all three evaluation stations except for percent bias slightly above the goal at the upstream gage. Although the goals for base-flow fit are not met for all compared data, the base-flow fit goals are met for the non-winter periods computed for the whole model period (2006 through water year 2018) at the two gaging stations with measurements that span most of the model period (long-term gauge and downstream gauge). The results indicate an adequate fit of modeled base flows during summer low flow periods, the focus of evaluations that use the model.

We went further by conducting an inter-watershed comparison as an independent line of evidence on the relationship between groundwater-use rates and summer base flow. We compared the stream flow calculated by the Little Rock Creek model to a nearby watershed that had fewer irrigation systems and we found that there was a high level of agreement between the two.

We also heard from stakeholders that the estimated water use volumes reported by irrigators may well be higher than actual volumes used. The suggestion was that if the DNR used volumes that more accurately reflected water use it would show a lower impact to stream flow from irrigation. Irrigators and the DNR collaborated on a two-year water use calibration study of nine irrigation systems and found that it was common to report irrigation volumes that are more than 10 percent greater than actual pumping volumes. This study cannot be relied upon as being representative of all water users in the area as it only included 9 wells out of over 300 permitted wells in the area. However, to understand how much of difference over-reporting may affect the analysis, the DNR developed a model run with groundwater uses modified to 80 percent of the reported volumes. The result was a computed reduction in the median baseflow diversion of 0.27 cfs at station 15029001 as compared to the reference median baseflow at this station of 7.2 cfs. With this information the DNR modeled sustainable diversion limit used the actual reported volumes.

11. Respondents did not agree with the proposed solutions to avoid negative impacts to Little Rock Creek. They believe that piping water from a distance is too expensive, complicated,

and unnecessary in years where rainfall is high.
DNR Response: *The feasibility of this potential action has not yet been evaluated. The RFP that DNR will be issuing will provide more context on potential solutions. The evaluation of this and other potential actions from proposed water users will be considered as part of the water use conflict resolution.*

12. Respondents believed that beaver dams could increase recharge and that DNR has not shown why this approach would not work.
DNR Response: *Beaver will build dams on streams to impound water. In the past, beaver have been active at the site of the Sartell Wildlife Management Area, creating a pool. The DNR installed a permanent structure to increase assurances that a pool would persist for waterfowl habitat. As described in the Findings of Fact, this has increased the temperature of Little Rock Creek, contributing to the high temperature impairment below the Sartell WMA. Our in-stream analysis confirms this and is consistent with the findings in the Little Rock Total Maximum Daily Load (TMDL). We have temporarily removed the dam to promote colder downstream temperatures and are monitoring the temperatures below the dam. Any impoundments on the stream, whether constructed by people or beaver, will carry the risk of increasing both temperatures and the likelihood of negative impacts to ecosystems.*
13. Respondents believe that other water impoundments in the watershed could increase baseflow.
DNR Response: *Creating impoundments, wetland restorations, or other ways of storing water away from the stream may have the effect that the respondent suggests. However, the effect is very difficult to predict, and even if implemented, this option would likely not significantly increase available water for irrigation.*

The amount of groundwater recharge from any impoundment is highly dependent on the local site conditions. This makes analyzing this potential solution highly uncertain. In addition, the impounded water would likely come from spring runoff or from more frequent rainfalls that occur in May and June. Depending on where the impoundment is located, that water may find its way to the stream and to Little Rock Lake long before it would have been needed for irrigation.

14. Respondents believe that DNR largely ignored the analysis that MPCA used to develop the TMDL.
DNR Response: *We took very seriously the conclusions of the TMDL, especially where recommendations were made to place limits on total appropriations in the area. Providing permits for water appropriation is a core function of the Minnesota Department of Natural Resources. Our staff reviewed the MPCA's analysis. We then built a model that was specifically designed to determine the effect of groundwater use on streamflow. The DNR's analysis incorporated the most up to date water use locations for new and previously unreported wells, water volumes, and the ability run various pumping scenarios. Our analysis used reported water use over 12 years while the TMDL study used data over four years, ending in 2010.*

15. Respondents believe that DNR has engaged in unpromulgated rule making by analyzing cumulative use and should have instead evaluated each permit on a case-by-case basis.
DNR Response: *The DNR's analysis evaluated individual water use impacts as well as cumulative use impacts. In order to understand the full impact to Little Rock Creek, DNR needed to analyze all permitted uses. Reported volumes and locations and depth of each permitted well were used for DNR's analyses. The DNR is acting consistently with Minn. Statute 103G.287, Subd. 3 that directs DNR to evaluate cumulative water uses. DNR's actions are also consistent with the water use conflict rule, Minn. R. 6115.0740, which requires the agency to consider total withdrawals.*
16. Respondents believe that DNR did not follow existing rules which would direct the DNR commissioner to resolve the water use conflict, rather than asking stakeholders for their input first, which is what happened.
DNR Response: *The DNR evaluated amending permits to reduce authorized water volumes to resolve the water use conflict and determined that the reductions required would have resulted in significant impacts to the agricultural community. Before taking these steps, the DNR has opted to collaborate with water users to find a solution that balances the economics of water appropriation with the ecology of the stream. Minnesota Rules direct DNR to evaluate viable alternative sources of water. To that end, we have committed funding to develop independent conceptual designs and cost estimates for potential solutions in the Little Rock Creek Area. This is an important next step for us and the agricultural community to understand how irrigation water can be supplied while maintaining healthy ecosystems in Little Rock Creek. This new work will evaluate conceptual engineering plans, estimates of implementation costs and funding needs, governance and operational considerations, development schedules, and economic evaluations of lost revenue.*
17. Respondents believe that the zone of influence is arbitrary, too wide and contradicted by other studies that show a much narrower zone of influence.
DNR Response: *The Zone of Influence boundary was a result of extensive analysis of present water use, aquifer structure, and location and depth of the wells in the Little Rock Creek Area. The boundary is a function of the hydrogeology, land use, water use and topography and will vary between landscapes. Other geographies can have either wider or narrower zones of irrigation influence based on the variation in these factors.*
18. Respondents believed that DNR's historic stocking of non-native Brown Trout created environmental issues.
DNR Response: *Stakeholders have submitted information to DNR that reports the loss of native trout species in some western U.S. streams due to competition from brown trout. In those situations, brown trout are directly competing with native trout species. A close inspection of those studies reveals that many of those streams have a limited number of other fish species present. By contrast, Little Rock Creek monitoring from 2017-2019 identified 12 species of fish. There is no evidence to support the conclusion that brown trout are causing harm to Little Rock Creek. While brown trout are not native to Little Rock Creek, they are not causing the widespread loss of other species. It's our view that the risk of brown*

trout to the ecology of Little Rock Creek is low compared to other stressors, especially habitat loss (including sedimentation) and water quality degradation. Little Rock Creek is similar to other trout streams in central Minnesota. Brown trout have been stocked in Little Rock Creek at fairly low numbers for decades. Brown trout are not reproducing with any regularity in Little Rock Creek. In 2022 the DNR switched from stocking brown trout to the Minnesota native strain of brook trout in Little Rock Creek and will continue to do so, depending on the availability of brook trout from the DNR hatchery.

STAKEHOLDER FEEDBACK

Little Rock Creek Area Proposed Commissioner's Order

The table below contains stakeholder feedback from the proposed commissioner's order relating to Little Rock Creek. Public comments were received from 3-15-23 to 5-15-23. Each stakeholder response may contain more than one topic. Individual topics have been assigned a unique number for reference.

Responder	Comment Text	DNR Response #
Sufka/Gilbertson	The best and most equitable solution to solving base-flow diversion in the LRCA is streamflow augmentation	1
Sufka/Gilbertson	The DNR should design and construct the two augmentation wellfields to supplement the streamflow in LRC with groundwater pumped from the regional aquifer	1
Sufka/Gilbertson	Stream augmentation with groundwater is the best approach to supplement LRC streamflow	1
Parkins	Our proposed solution to the purported stream flow deficit in Little Rock Creek ("LRC") is the augmentation of stream flow by dedicated wells placed more than ½ mile from the creek	1
Skroch	[Augmenting flow in] the creek should be done immediately to save the life of the trout.	1
Schlichting	The most durable and cost-effective outcome that will maintain the viability of food production in this region's specialty soil is augmentation	1
Hard	I would favor the idea of augmenting the stream flow during the times of low flow. I would also like the study group to look at the possibility of putting some type of "soaker hose" in the bottom of the streambed in the areas that are deemed necessary to augment the flow.	1
Schlichting	The 15% diversion proposed by the DNR is arbitrary. Scientific evidence suggests 20% is a more reasonable diversion limit.	2
IAM	The DNR recommendations specify a set limit of acceptable August baseflow diversions (model simulated values) at each of three stream gauges	3

	on LRC. The limits would presumably be set at the same specified flow rate every year, regardless of the water supply and aquifer water levels in any given year or month. DNR's recommendation should contain flexibility to allow more pumping in years where greater water supply provides sufficient flow for irrigation, environmental and ecologic needs	
Parkins	I solution is expected to require the cooperation, engineering expertise and assistance of the DNR with engineering of the system chosen, work with landowners on obtaining easements for wells and pump locations, pipeline right of ways and electrical power	4
Sufka/Gilbertson	Any decision to reduce water allocations of permits located inside the proposed zone of influence, especially those at the farthest edges of the zone (i.e., 1½ miles from the stream), will result in severe unnecessary economic damage to landowners including me.	5
Schlichting	Any solution to the modeled Little Rock Creek habitat concerns that reduces the sustainability of specialty farming in this area has extreme implications to both the local farms and the rural community.	5
MCGA	The Department has not provided a copy of the actual order it proposes to issue or the proposed factual findings on which such order would be based.	6
MCGA	Because the Department has not published its proposed findings to support any such order, the Minnesota Corn Growers Association cannot determine whether there is sufficient evidence available to establish a "conflict" in the area surrounding Little Rock Creek.	6
Sufka/Gilbertson	The study done by the DNR has not been done for a long enough time period and does not reflect on the natural condition of the creek.	7
Schlichting	We disagree with many of the assumptions and inputs in the technical report being relied on to	7

	establish the base flow, diversion limits, and therefore allowable water use including; Use of dryland alfalfa as cover to represent the natural flow regime without irrigation results in an inaccurate baseflow to use for comparison. Dryland alfalfa is not a realistic alternative to the current cropping rotation.	
Schlichting	The DNR flow meter study on compatible systems indicated water use is being over reported by at least 20%. This should be reflected in the model for predicting future irrigation water use and its impact on Little Rock Creek.	10
IAM	The appropriate reference condition should be based on forested conditions replacing all agriculture (not just irrigated) in the area as it naturally existed.	7
MCGA	MCGA is deeply concerned that the Department of Natural Resources has been issuing "limited" water appropriation permits for the past few years	8
Sufka/Gilbertson	Rather than taking a shotgun approach that all wells in the proposed zones are equally responsible for base-flow diversions, basic fairness should require measuring the stream depletion factor of each well to determine proportionate responsibility for base-flow diversion.	9
Benton/Morrison	Not only does it strongly appear that the model being used to come to these conclusions has a high margin of error…	10
Schlichting	final modeled baseflow as compared to WHAT model "observed" baseflow results did "not meet the goals" for accuracy (DNR, 2021). It is logical then, to conclude, that a model with+/- 15% uncertainty cannot accurately predict the impacts of a 15% diversion limit	10
Schlichting	additional field study and an extended validation period to improve both the inputs into the model and the accuracy of the outputs before proceeding with a water use conflict or any	10

	solutions to the modeled concerns in the Little Rock Creek watershed	
IAM	During this verification period errors (differences between model simulated and stream gauge estimated) baseflows were several times larger than the recommended August baseflow diversion limits	10
IAM	The DNR recognized the uncertainty and potential overestimation of its representation of historic and existing irrigation pumping rates in model simulations. The simulated baseflow diversion is sensitive to these estimates. Those simulated baseflow diversions also directly impact conclusions of the analyses. The DNR should further investigate irrigation pumping in the area and integrate the improved understanding into model simulations and recommendations	10
Sufka/Gilbertson	Modifying Permits to Reduce Water Allocations is the Wrong Approach	11
Benton/Morrison	But that the suggested solutions presented to growers at the recent public meeting were not reasonable solutions	11
Benton/Morrison	placing the final responsibility on the affected growers will only result in a small group of individuals infighting amongst neighbors for a benefit we are not yet convinced of	11
Parkins	the solution is expected to require the cooperation, engineering expertise and assistance of the DNR with engineering of the system chosen, work with landowners on obtaining easements for wells and pump locations, pipeline right of ways and electrical power	11
Parkins	Any system selected is going to be expensive to install which will require substantial governmental assistance in the form of grants likely from state and county sources and the DNR is expected to be an integral part of assisting with the obtaining of such grants	11

Schlichting	The DNR's preferred solution of importing water to several irrigation systems near the creek would require substantial cost, land use, maintenance and ongoing governance of a complex system. Importing water to irrigation systems would be an every year, full season possible fix to a modeled concern occurring only every fourth year with a duration of only a few weeks	11
Klaphake	Beaver dams create additional wetlands that create additional biodiversity. Wetlands are well documented to be important sources for habitat biodiversity. When dams are built on streams, they create additional wetlands that usually remain year-round	12
Klaphake	a question was asked why excess water could not be collected in times of high water, and then be used when needed? Your response was that it just wasn't feasible because of the large area that would be consumed by the reservoir, and that land gradient levels were insufficient to allow for such as process. But could that reservoir be the large riverbed itself	13
Zimmerman	One area of concern is the model does not credit the water impounded by the Rice/Skunk Lake dam	13
Benton/Morrison	MPCA and many others to develop a TMDL for the same biological concerns seem to have been largely ignored	14
MCGA	Unadopted rule - But these terms of the proposed order would constitute a "statement of general applicability and future effect," rather than a case-by-case determination of whether (and under what conditions) to issue or deny a particular permit, and would therefore be a "rule" under the Administrative Procedures Act. *See* Minn. Stat. § 14.02, subd. 4 (2022)	15
MCGA	There is no indication that the Department has analyzed or evaluated the reasonableness or efficiency of existing uses or determined whether alternative sources of water are available to	16

	address these issues. There is similarly no indication that the Department has attempted to resolve these issues itself. Instead, it appears that the Department is proposing to ignore the first steps of the regulatory process and instead immediately issue an order declaring a conflict and requiring users to come up with their own plan to address the issue	
Sufka/Gilbertson	The proposed boundary limits are arbitrary, unsupported by sound evidence, and contradicted by other water management studies	17
Sufka/Gilbertson	Zone of Irrigation Influence Boundaries are Too Wide - other studies have concluded that a zone of irrigation influence is more likely far narrower than three miles, much less six miles	17
Sufka/Gilbertson	The technical report's LRC Area Zone of Irrigation Influence (Pg. 39, Figure 2), which the DNR admits is highly nonempirical, is too wide. LRC streamflow depletion by identified wells within the zone is unsupported by any dependable specific data	17
Klaphake	Brown Trout removal will leave at least 25% more oxygen, food, and habitable spaces for the native fish. This percentage is more than what the model is showing is being diverted from crop irrigation	18