Minutes

Project:	Upper Platte River Basin Water Management Plan – Single Planning Group
Subject:	Meeting #10
Date:	Wednesday, March 21, 2018 from 10:30 a.m. to 3:00 p.m.
Location:	Holiday Inn Express & Suites, North Platte, NE

I. Administration

1. **Today's meeting will offer a working lunch**
2. **This is an Open Meeting**
3. **Review of Decision-Making Process**
   - Consistent reminder of what we're all working towards
4. **January Meeting Recap**
   - Draft robust review results – First Increment not reflected
   - Updated depletion numbers
   - Estimated depletion growth through the next increment
     i. **Meeting minutes** – to be published online before the end of the week
     ii. **Key discussion / decisions**
     iii. **Follow-up items**
   - This meeting's special presentations are follow up items from January's meeting – purely educational but will inform refined Goals and Objectives
   - In May we'll discuss the elements of the draft Second Increment Plan and the identification of the Second Increment Intent
   - July will include more finalization of the Second Increment plan

II. Special Presentations

1. **Agricultural Hydrology** - Dr. Dean E. Eisenhauer, P.E.
   - Slides 7 – 58 in Power Point
   - Introduction to some of the basics of what influences the models used by NeDNR
   - Reviewed the different zones of soil hydration
     - Geologic setting can influence the thickness of these layers
   - Evapotranspiration: combination of evaporation of water from solid surface and transpiration of plant leaves
   - Relationship between crop yield, evapotranspiration, and irrigation
     - Important takeaway: there is a linear relationship between transpiration/evapotranspiration and yield

    - 0 transpiration = 0 yield
- Harvest index: the proportion of biomass that goes to grain (for example, the harvest index of corn is about 50%)
- The average precipitation in the state of Nebraska is about 22 inches/year – this controls a lot of the water balance in the state
- Irrigation efficiency: beneficially used water divided by amount of water applied
- Water gets into streams by runoff and groundwater discharge (aka baseflow)
    - Often influenced by geological setting
    - Groundwater is usually the primary contributor to stream flow – so when there is a significant depletion to groundwater it has a large impact on streams
    - Pumping decreases the connection between groundwater and surface water, disconnecting the water from the stream
    - Deep percolation of the root zone becomes a part of the recharge system for groundwater, so when pumped excessively it causes a problem
- Different types of irrigation have different impacts on efficiency
    - Return flow systems – increased efficiency
        - Requires less pumping, can divert less water
    - Sub-surface drip irrigation – increased efficiency
        - Less evaporation so groundwater and streamflow increase
    - Sprinklers
        - Less evaporation – as long as evapotranspiration is decreased, practice can put more water into system
    - Key takeaway: reducing evapotranspiration can be great for increasing water back into streamflow
        - Mulching with crop residues decreases evapotranspiration
        - Deficit irrigation decreases ET and involves purposefully stressing the plant
- Stakeholder conversations on the inconclusive correlation between evapotranspiration and rainfall
    - Research showing that water from lakes travels far
    - Irrigation can increase evapotranspiration – irrigation has stabilized the atmosphere above that irrigated crop, so thunderstorms decreased over these areas
- Stakeholder conversation on what it means to double crops in terms of water usage
    - Again, no conclusive data but increasing transpiration has helped increase yield and hybrids have developed a greater drought tolerance

2. **Conservation Study** – Marc Groff, P.E.
    - Slides 59 – 68 in Power Point
    - Using existing models
        - Cooperative Hydrology Study Model (COHYST)
        - Western Water Use Model (WWUM)
    - Within each tool set are 3 separate models: Ground Water model; Surface Water Operations model; Land Use, Watershed model (climate, land use, soils, farming practices, etc.)
    - Out of Phase 1, two conservation practices selected for evaluation:
        - Changes in Irrigation Application Efficiency (IAE)
        - Changes in Tillage Practices (Till)
    - Baseline condition (today) → to extreme condition of a possible future
        - Both scenarios are set up to be possible change analyses
        - IAE – goal is not to adjust the yields, but to reflect a change in evaporation but not transpiration
        - Tillage run scenario set up similarly – baseline conditions and actual climate, then adjusts for changes in single planting operation to represent minimum till (changes in pumping, evaporation, and return flows)
    - Evaluated by looking at *net recharge*: change in pumping or diversion, compared to change in recharge
        - If number is positive, aquifer is gaining water
        - If number is negative, aquifer is losing water
        - Numbers between two models are different because Till model looks at all land, while IAE is exclusive to irrigated land
    - IAE scenario – on average, irrigation efficiency is about 0.5 inch (positive)
    - Tillage efficiency – on average 2.25 inch (positive)
        - Study shows that Tillage efficiencies show a higher potential that IAE scenario
    - But other two tools will show the whole picture, based on location and timing impacts of changes
    - More to do outside of modeling mold (assumption, definitions, data, etc.)
    - Next steps / schedule is a current topic of discussion for NeDNR and eventually SPG
    - Stakeholder discussions
        - Farmers within NRDs started changing efficiencies and we are seeing a trend towards special farming techniques
            - This trend is being accounted for in the models
        - Data on the trends between dry land and irrigation largely falls on NRDs
        - Stakeholders interested in seeing what conservation practices were done over time, specifically their impact to transpiration and return flows

        - Particularly for surface water users (limited supply – depending on return flows from other users)
        - Has total consumptive use been influenced by conservation efforts that have been taken? – have looked into the increase in efficiencies but next steps for developing the scarce measurement data on a basin-wide level are still to be determined
        - NeDNR explained that this is a first step in terms of understanding the effect, and moving forward will determine the next steps (looking at data historically vs. looking forward)
        - Conservation vs. efficiency – term interchangeable?
        - Next steps might be worth including in Second Increment Plan
        - Cost is a huge factor, in addition to gathering a significant amount of more data

3. **Drought Planning**
    - Kelly Helm Smith (Drought Mitigation Center)
        - Slides 69 – 95 in Power Point
        - US Drought Monitor Map
            - 450 experts use numeric data and refine with on the ground observations
        - Cannot predict when drought will happen, only sure that it will happen again
            - Challenge is to channel this concern into constructive action
        - Planning process at all scales - scale matters
            - Agricultural and urban drought threats are very different
        - State drought planning
            - Nebraska has an outdated mitigation plan
            - Mitigation plan – actions ahead of time to prevent drought
            - Response plan – actions taken once drought occurs
        - Nebraska's NRDs are an important asset in the state as far as drought planning is concerned (many states divide power so excessively that it is unproductive)
        - Drought planning occurs on a federal level (drought.gov)
            - No federal water policy, primarily legislated at a state level
            - Many more water management decisions made at a local level
        - Emergency management planning (hazard planning)
            - Look at scenarios such as if the 2012 Nebraska drought had lasted years longer
        - 3 pillars involved in drought planning – 10 step process
            - What you want to protect (identify key vulnerabilities)
            - How you'll know you're in a drought
            - What to do when in a drought

- Mitigating drought includes irrigation, the use of new technologies, and more
- Recommend localities establish an operational definition of drought
- There are many different types of drought, including:
  - Meteorological (not enough rain)
  - Agricultural (not enough water in soil for crops to grow)
  - Hydrological (water in reservoirs/rivers take a while to flow)
  - Socioeconomic (caused by or contributed by society's actions related to drought)
  - Ecological (not enough to sustain ecosystems)
- Recommend establishing triggers and indicators in order to monitor drought
  - Specific actions connected to specific numeric thresholds
  - Standardized precipitation index recommended as most basic way to track status
- Mitigation actions include adopting agricultural practices that enhance soil health, enhance infrastructure for storing, etc.
- Often requires obtaining authority, political will, and stakeholder/public buy-in
  - Sub-committees based on area of impact is a very effective way to keep people involved and informing the plan
- Some drought planning has occurred in the Lower Elkhorn NRD and North Platte NRD (Tracy Zayac's presentation)
- The Montana Beaverhead Watershed Drought Resiliency Plan (2016) is a good example

- Tracy Zayac, North Platte NRD
  - Slides 96 – 103 in Power Point
  - North Platte NRD drought planning (2016 - 2017)
    - Mitigation and response plan
  - Built on 3 C's
    - Competition – tournament style, broke stakeholder group up into mixed sector groups
    - Collaboration
    - Community
  - Goal was to bring in as many different perspectives from the district as possible, these segments included:
    - Ag
    - Education
    - Public health
    - Local government
    - Emergency management
    - Etc.
  - Hosted a tournament with mixed stakeholder groups

        - Using data from National Drought Mitigation Center, built scenario and provided all contextual information
        - Groups came together to determine what to do, how to do it, and how to fund activities
        - These plans were scored and prizes were given
        - Each group elected a representative to help write the plan
        - Many ideas were used for conversation in the planning process – prioritized and discussed main vulnerabilities
    - Also used an advisory group made up of major agencies – provided information about programs and capabilities they might be able to leverage
    - Education emerged as the biggest component of the plan
        - Drought, the effects, the basics, etc.
        - Decided to add more of a drought component to existing school program / WET program
        - Work with planning / zoning commissions to include more drought mitigation efforts into landscaping
        - Annual water symposium
    - Focus on water quantity; water quality; public health; education; and more
        - Including solutions for the impacts involving mitigation activities
    - Cooperative funding and continued conversation across communities
    - Intended to be a living document – annual review process and 5 year time-table
        - Schedule of metrics for determining how the plan is working
        - Qualitative and quantitative metrics
        - Self-assessments (monitoring team)
    - Data and partnerships called out in plan
    - Clear definition of roles and responsibilities
    - Intention to increase community resiliency and sustainability
    - Scalability from North Platte NRD to Upper Platte River Basin-wide
        - Includes regional partnerships – differences on the ground
    - Helpful to have a local plan to deal with more local issues
        - Downstream vs. upstream differences
        - Local level plans are great from a response perspective, while basin-wide is a good place to start with mitigation actions
    - Didn't identify triggers in particular, but set up process for studying what triggers would be and the associated conditions

4. **Conjunctive Management** – Jesse Bradley (NeDNR)
    - Slides 104 – 124 In PowerPoint

- Conjunctive management was a tool identified at the beginning of this planning process as an implementation mechanism and to inform policies
    - Managing resources together
- Focus on water quantity and water quality
- Accomplishing conjunctive management can include:
    - Storing water when plentiful
    - Relying more on groundwater resources
    - Changing timing and location of water for more efficient use
- Conjunctive management to bring together groundwater and surface water for a more optimal outcome for both
    - Re-time and re-balance within finite water supplies
- Can work to protect existing users and maintain viability
- There is an opportunity with new water rights and in looking at the un-appropriated
- First Increment has included some examples of conjunctive management, including:
    - 2011 pilot project – saw strong diversion rates into the canals and meaningful recharge
    - 2013 flood flows – largely from a flood protection standpoint
- Different conjunctive management approaches in the First Increment have seen benefits and present opportunities
    - Created partners in infrastructure
    - More comfortable permitting and monitoring processes
    - Creating greater resiliency of system
    - Are there places we can be storing water for shared use?
- Funding
    - Investment from surface water and irrigation districts, NRDs, and NeDNR
- Opportunities for conjunctive management will continue to be looked into
- NeDNR is working to develop a decision support system, which will be a tool to assist better use of excess flows throughout the system in order to meet our Goals & Objectives
    - In addition to other conjunctive management activities
- Increasing efficiency in recharge – many different ideas being discussed
- Stakeholders expressed interest in discussing drought and conjunctive management related to one another

5. Stakeholder feedback on guest presentations

- General agreement that Dr. Eisenhauer's presentation was useful and understanding the role of evapotranspiration is important in this process
- Provided a sense of validation in the actions being taken and ideas being discussed – stakeholders feeling on the right track
    - Reductions and allocations have pushed farmers to be better

- Reiterated the importance of conjunctive management in times of flood and in times of drought
    - Want to avoid interests that are at war with each other
    - Also expressed interest in understanding how conjunctive management opportunities could work related to storage and recharging the aquifer
- Some would like to see the incorporation of climate change language in the Second Increment
- Some feel that parts of Nebraska have been facing a kind of drought for years – would like to look at drought recovery options
- Expressed appreciation for the frequent use of the term "we" throughout this meeting – acting as a common body
- Suggested approaching the next increment by looking at system comprehensively as opposed to a problem by problem basis

III. Next Steps

- Consider the possibility that we are already fully appropriated – can continue to discuss this but would like everyone to think about this concept for the next couple of months
- Stakeholders feel free to send thoughts along prior to May meeting

IV. Public Comment

- Jim Eismer with TPNRD board appreciated hearing about the conservation tillage and shared that he once was able to hear in greater detail some estimates on the savings of the evaporation side of the formula and was very surprised by the positive impacts made by using different techniques and different types of mulch
    - Irrigated acres makes a significant difference so would like to see credit given for conservation tillage taking place in NRDs
- Dr. Eisenhauer expressed that it is great to see former students working on water planning for the state
- Conjunctive management as it relates to excess flows and the fish and wildlife target flows program – changes to target flows could change the type of projects considered as part of a program extension that is identifying top priorities as a prevention service
    - Pointed out that in big flow years this likely won't make a difference, but asked that governing bodies keep this in mind moving forward

Next Meeting: May 16, 2018