

VOLUNTARY INTEGRATED MANAGEMENT PLAN, 2020 ANNUAL UPDATE



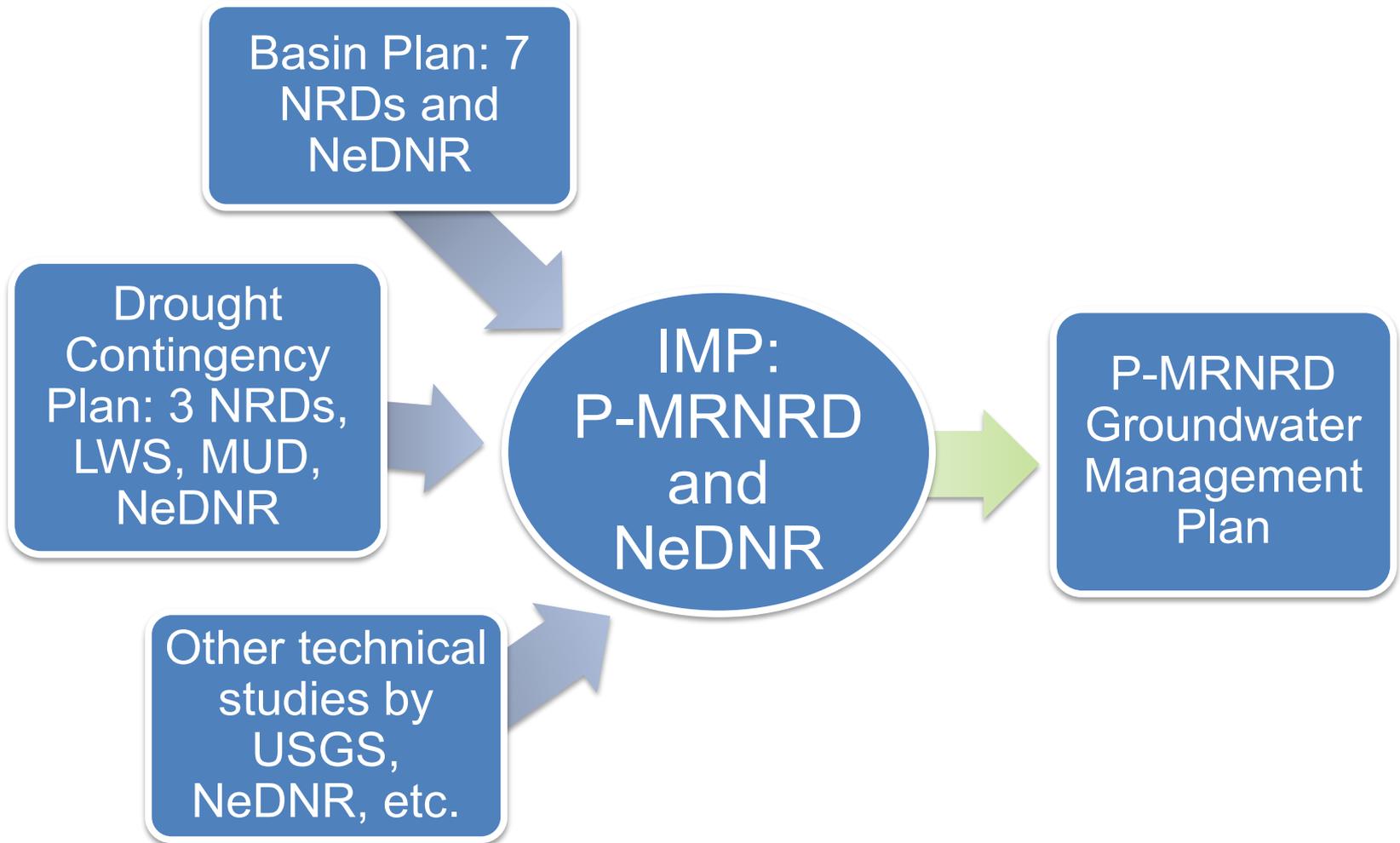
P-MRNRD PPO Meeting

Aug 10, 2021

NEBRASKA
DEPT. OF NATURAL RESOURCES



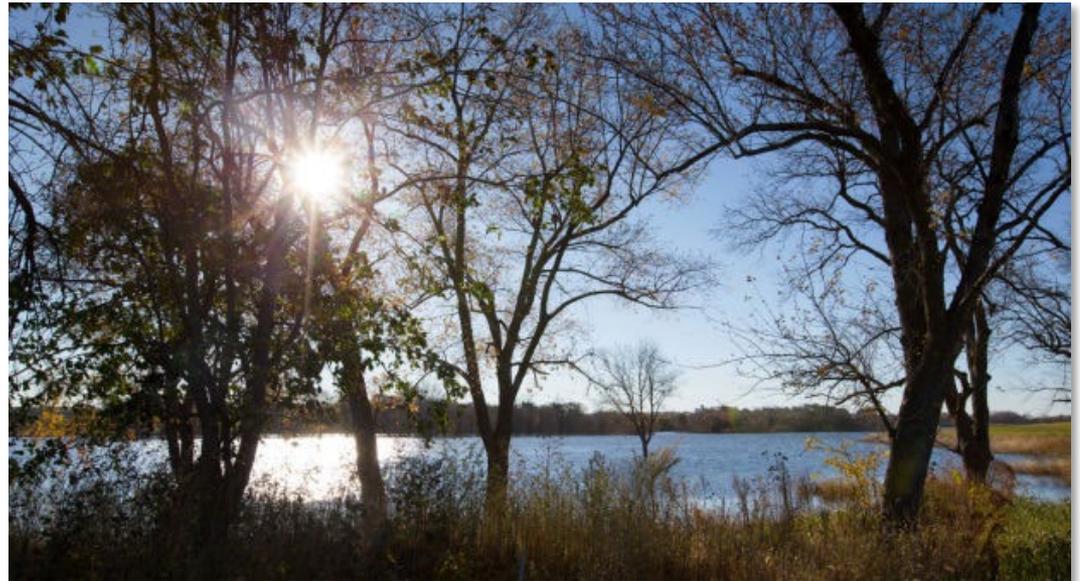
How do multiple plans work together?



An IMP is a local plan between an NRD and NeDNR to address water quantity in hydrologically connected areas.

NRD Board and NeDNR Adopted IMP in 2014

- Four Goals:
 - Water Use Policies and Practices
 - Water Supply and Use Inventory
 - Water Use Educational Programs
 - Basin-Wide Water Management Plan

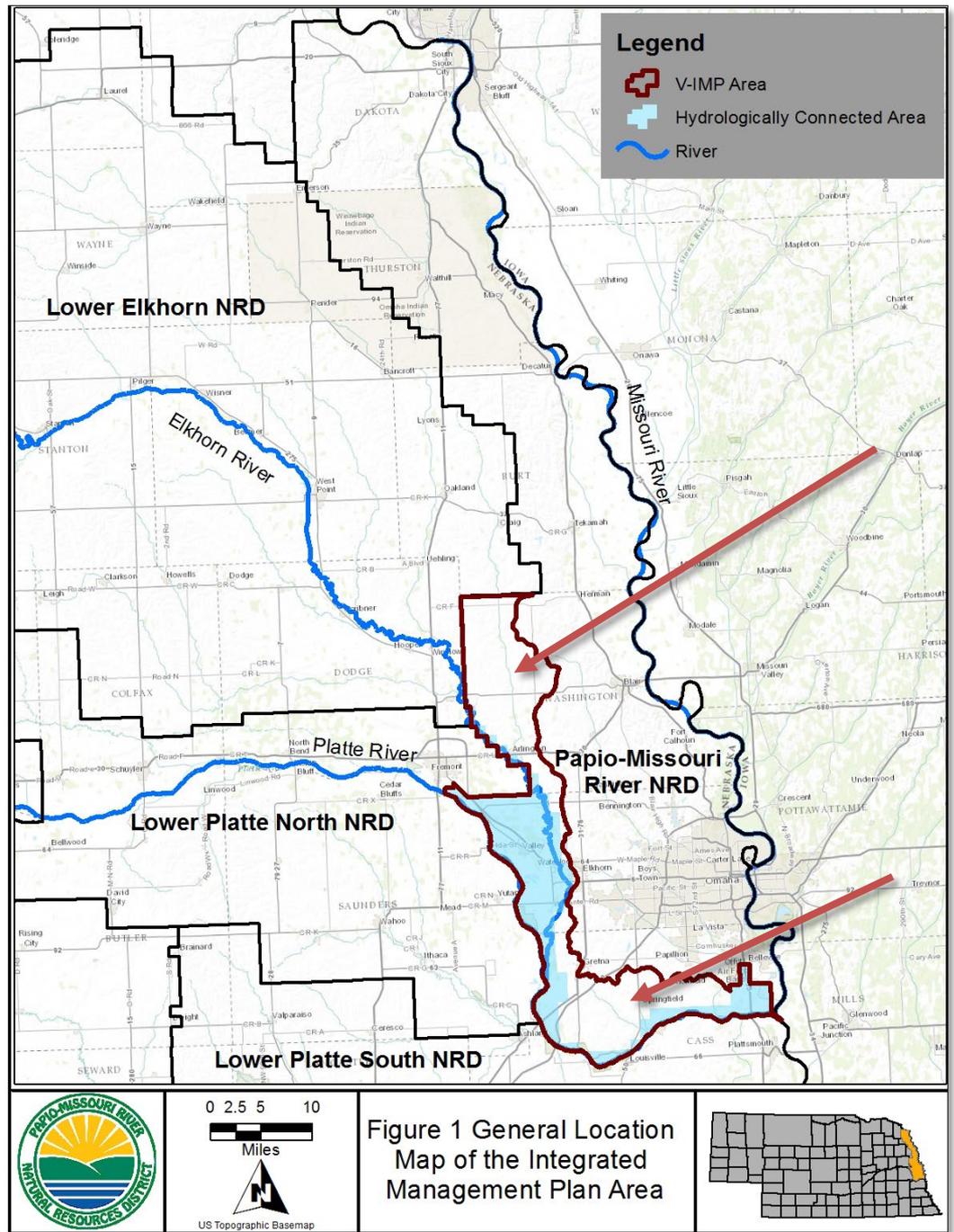


Why do we conduct IMP annual reviews?

- Joint management of hydrologically connected (HC) groundwater and surface water
 - Identify new opportunities and challenges
 - Increase understanding of HC areas (data, studies)
 - Evaluate and convey progress towards goals and objectives
 - Prioritize joint management actions for upcoming years

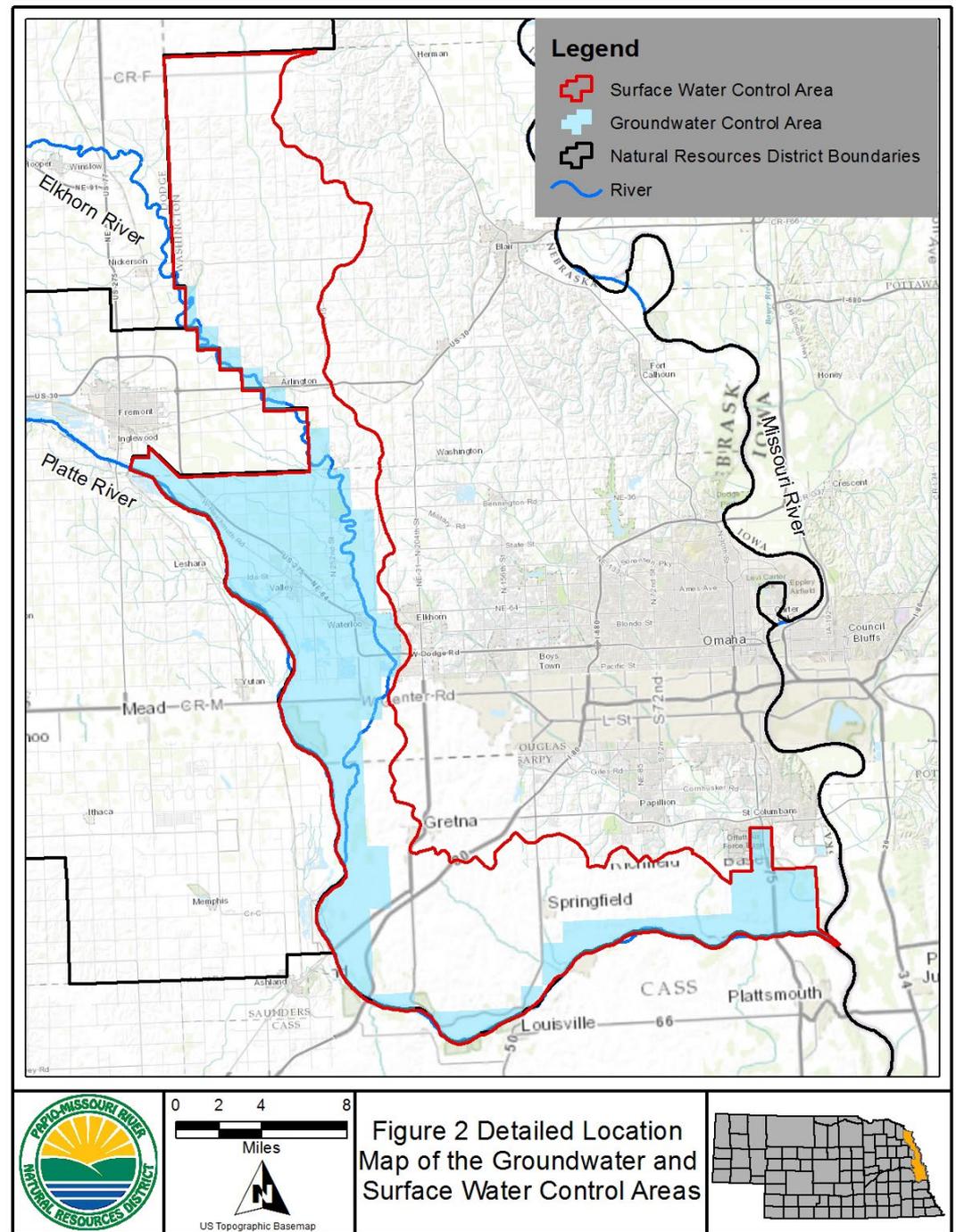


Papio-Missouri River NRD Integrated Management Plan Area



Groundwater and Surface Water Controls

- NRD Board established a limit of 2,500 acres on the annual expansion of groundwater irrigation.
- NeDNR established a limit of 1/3 the NRD's amount (834 acres) on the annual expansion of surface water irrigation.



IMP Requires Data Collection and Monitoring

- NRD Monitoring
 - Expansion of irrigated acres
 - Groundwater level measurements
 - Municipal water use
- NeDNR Monitoring
 - NeDNR stream gage measurements
 - Surface water permitting activities
 - Surface water pumpsite inspections
 - Use of surface water for irrigation

NRD Data Collection and Monitoring

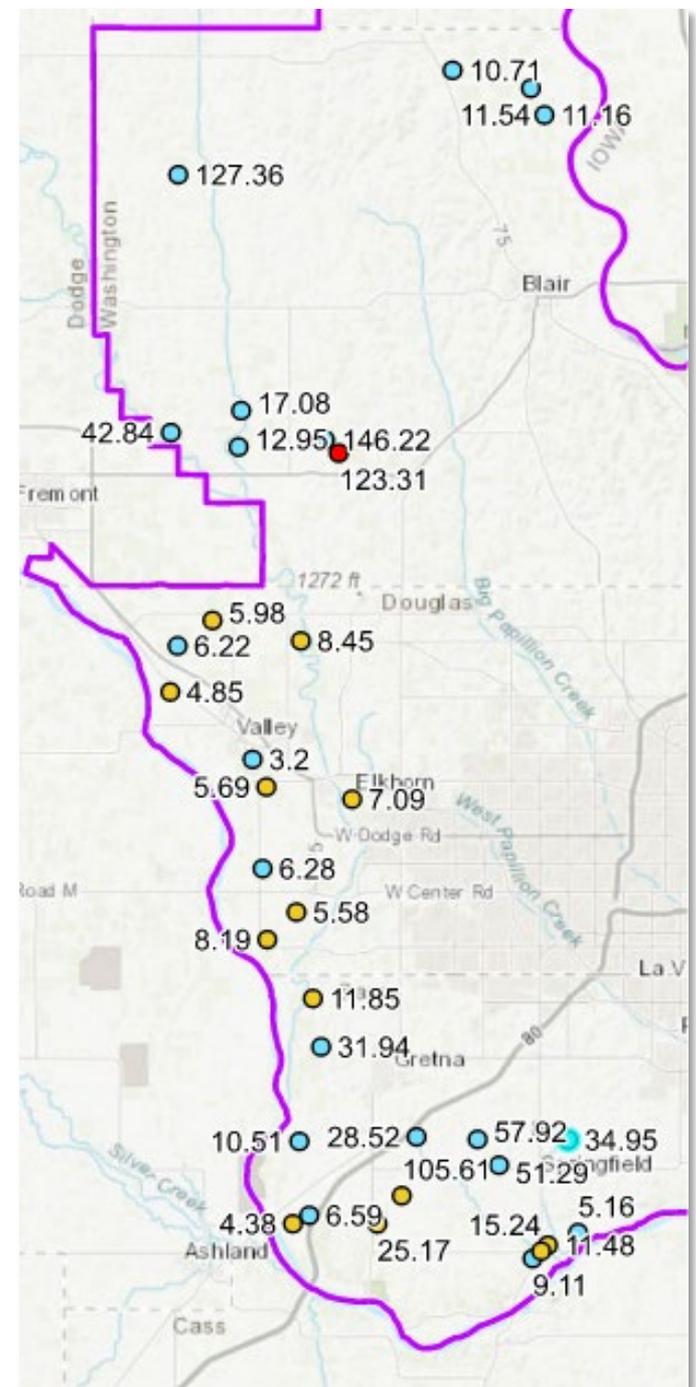
- 2020 Groundwater Level Measurements

Spring 2020 Groundwater Levels (labeled in feet below ground surface)

GW_Levels_Spring2020

% of Avg Saturated Thickness

- 5 to 10% Above
- 0 to 5% Above
- 0 to 5% Below
- 5 to 10% Below
- 10 to 15% Below



NRD Data Collection and Monitoring

- Groundwater Irrigated Acres Expansion

Year	Acres with a Variance in IMP Area*	Groundwater Peak Depletion (AF)
> July 1, 2016	0	0
2017	11	1.5
2018	0	0
2019	0	0
2020	205	28.5
TOTAL	216	30.0

NRD Data Collection and Monitoring

- Municipal Water Use in IMP area

Municipal Well Field	2016 Total Pumped (Ac-ft)	2017 Total Pumped (Ac-ft)	2018 Total Pumped (Ac-ft)	2019 Total Pumped (Ac-ft)	2020 Total Pumped (Ac-ft)
Papillion	4,326.2	4,661.1	4,482.2	4,655.4	5,807.8
Lincoln	20,451.2	22,115.1	11,866.5	8,246.5	9,007.9
MUD South	38,030.4	27,217.2	31,104.3	36,201.0	35,701.3
MUD West	8,976.2	12,225.1	10,741.7	9,861.9	12,706.1
Fremont	4,971.5	4,987.4	5,395.3	5,719.6	7,262.3
Valley	334.4	469.3	506.3	537.3	740.4
Springfield	170.8	183.8	202.3	188.7	232.0
Gretna	1,052.0	1,267.4	1,263.5	1,279.7	1,648.0
Arlington	217.4	231.3	165.8	195.3	269.7
TOTAL	83,501.6	73,357.7	65,727.9	66,885.4	67,531.7

NeDNR Data Collection and Monitoring

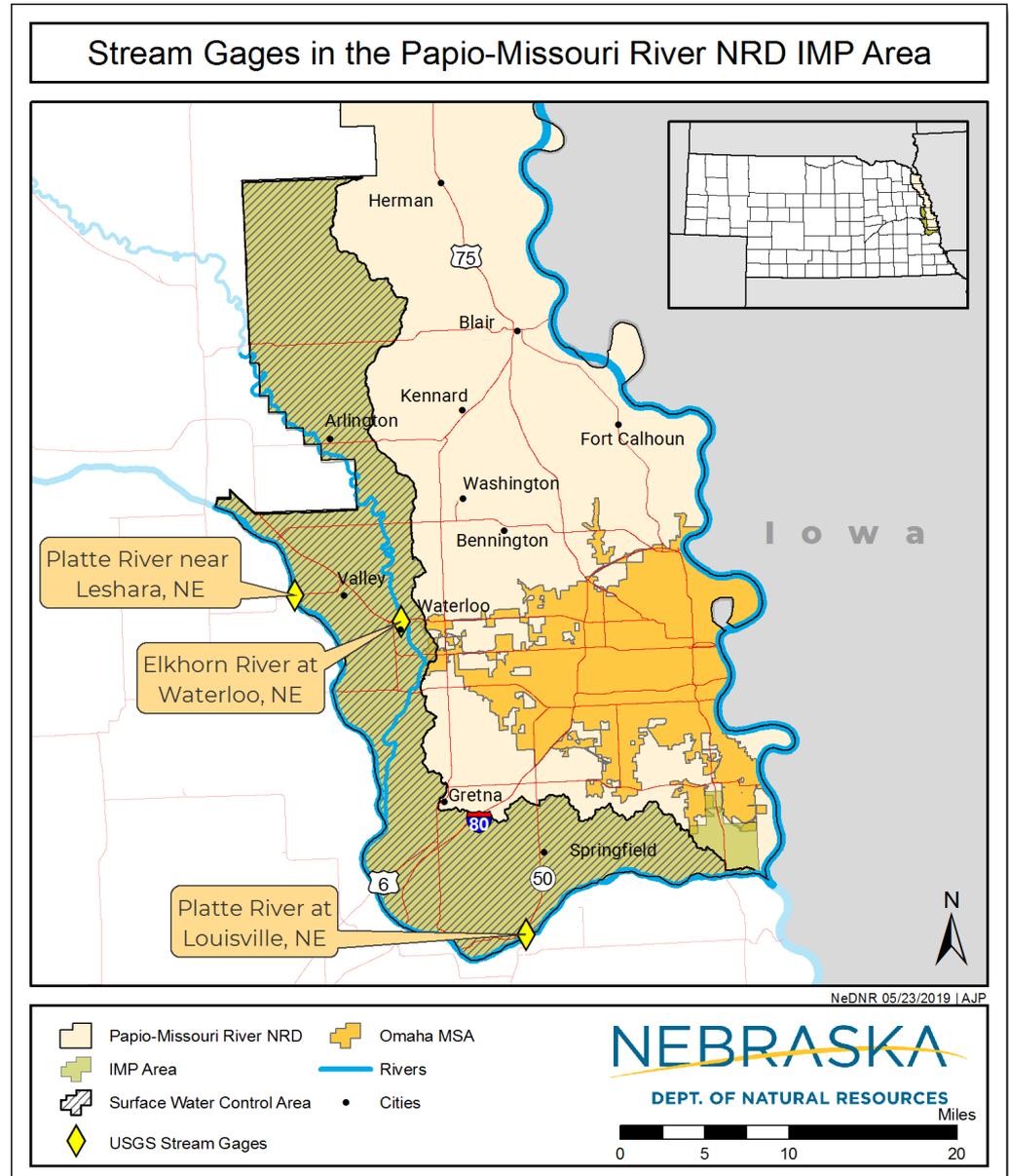
- NeDNR Surface Water Permitting Actions Within the IMP Area
 - Applications Approved: Zero
 - Appropriations Cancelled or Expired: Three

Surface Water Appropriations Expired, Cancelled-in-Part or Cancelled-in-Full in 2020 Within the IMP Area

Appropriation Number	Cancel Date	Source	NeDNR Action	Location of Diversion or Reservoir	Use	Begin Acres	Cancelled			Estimated Date of Last Use	Basis for NeDNR Action
							Acres	Grant in cfs	Grant in af		
A-18588	1/14/2020	Zwiebel Creek	Cancelled in Part	S30-T13N-R13E	DO	1.8	0.7	0.00	NA	2019	REL-7809
A-17155	1/29/2020	Steavenson Reservoir	Cancelled in Full	S16-T18N-R9E	SO	26.2	26.2	NA	34.7	2007	REL-7852
A-19671	8/29/2020	Elkhorn River	Permit Expired	18-17-10E	MF	NA	NA	0.56	10.0	2019	Temp. Permit Expired

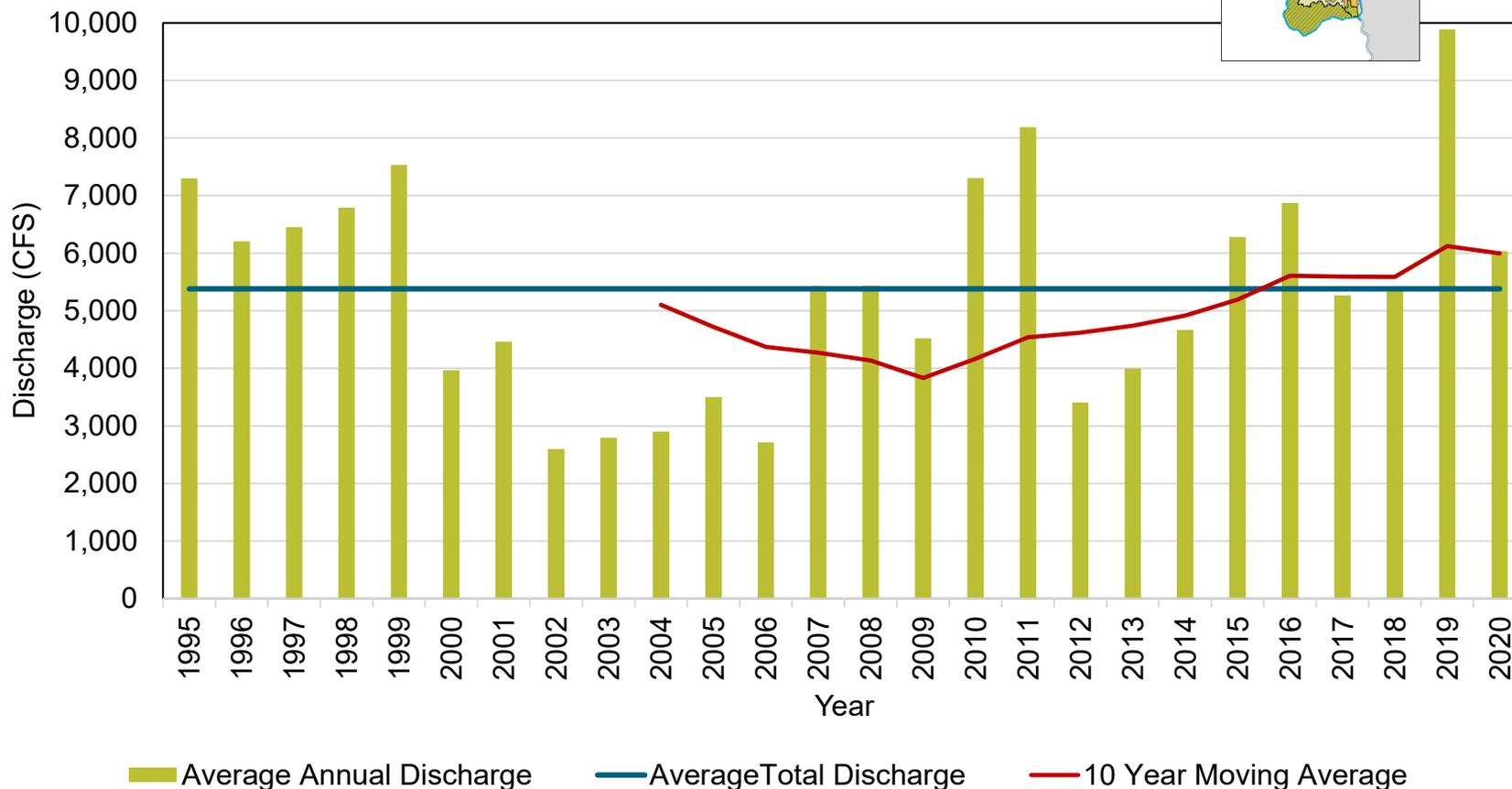
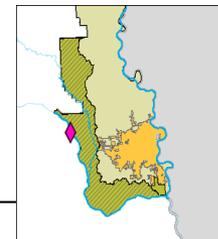
NeDNR Data Collection and Monitoring

- NeDNR Stream Gaging
 - NeDNR currently does not operate any stream gages in IMP area
 - USGS records were accessed for three stream gages for this annual review



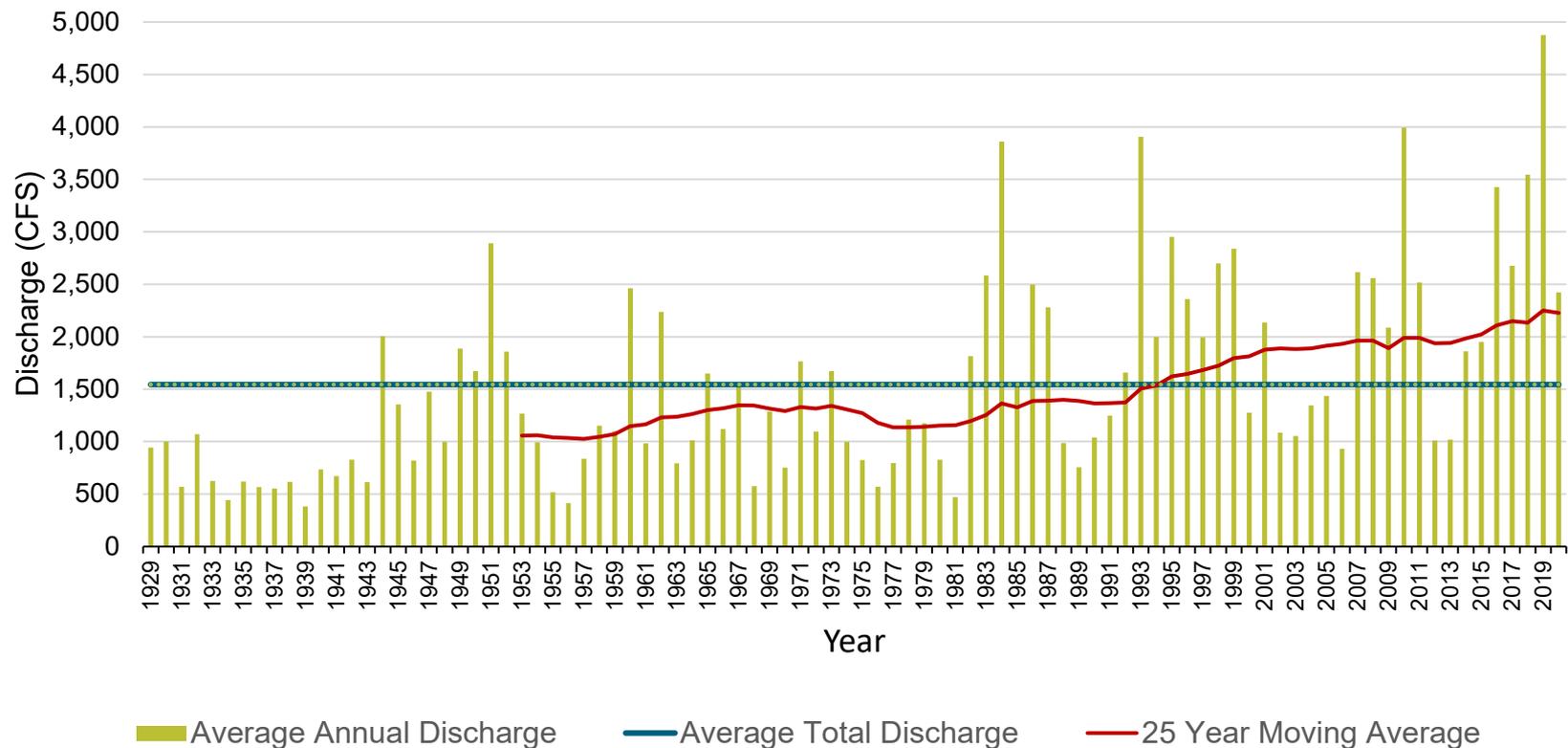
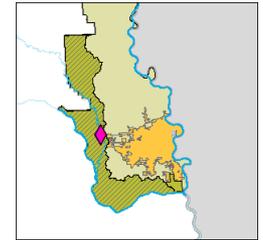
Surface Water Monitoring: USGS Stream Gages

Average Annual Discharge
Platte River at Leshara, USGS #06796500
(2020 Avg. based on provisional data)



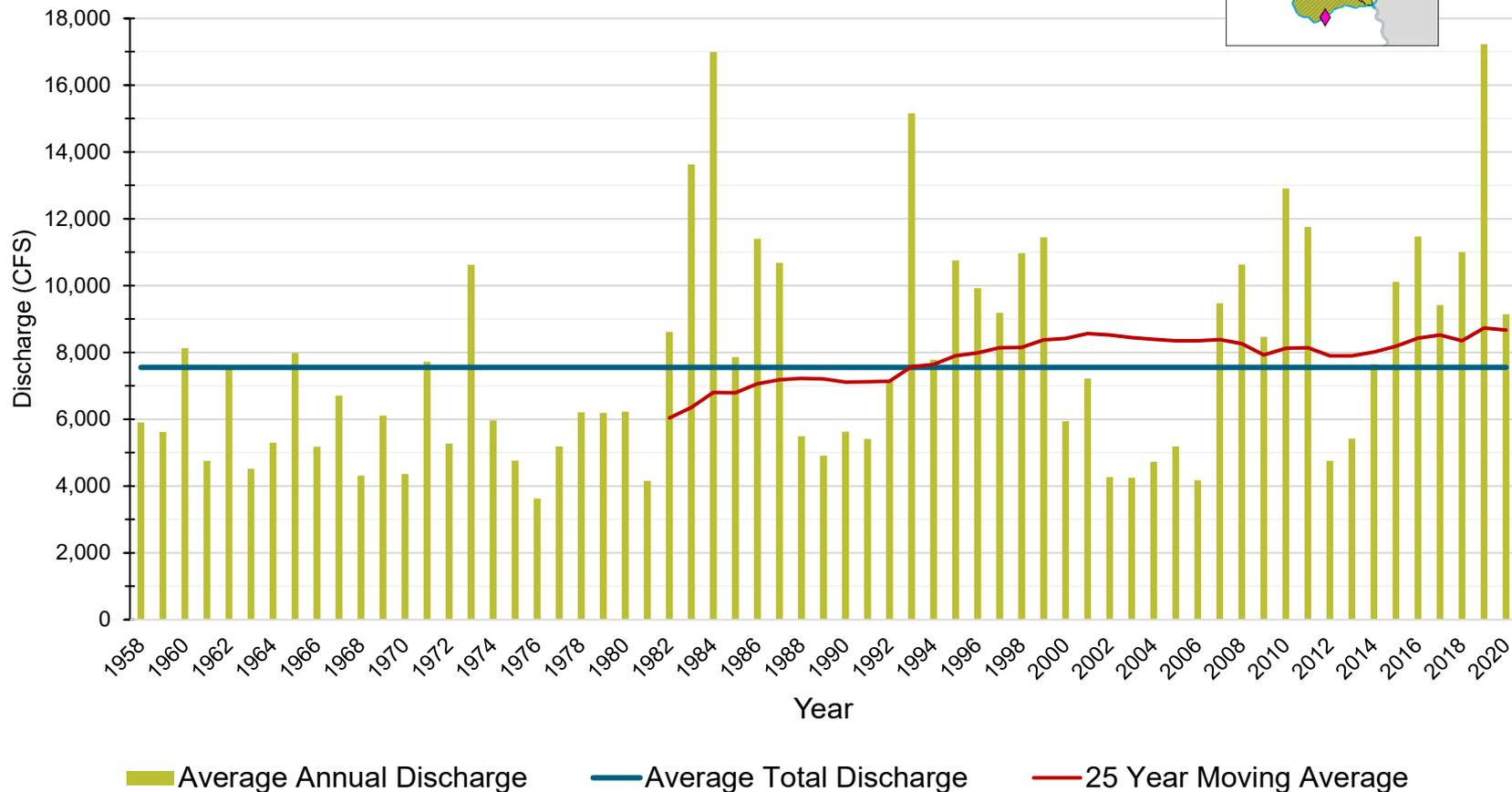
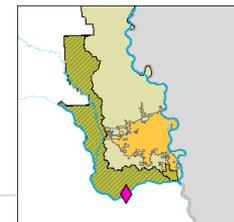
Surface Water Monitoring: USGS Stream Gages

Average Annual Discharge
Elkhorn River at Waterloo, USGS #06800500
(2020 Avg. based on provisional data)



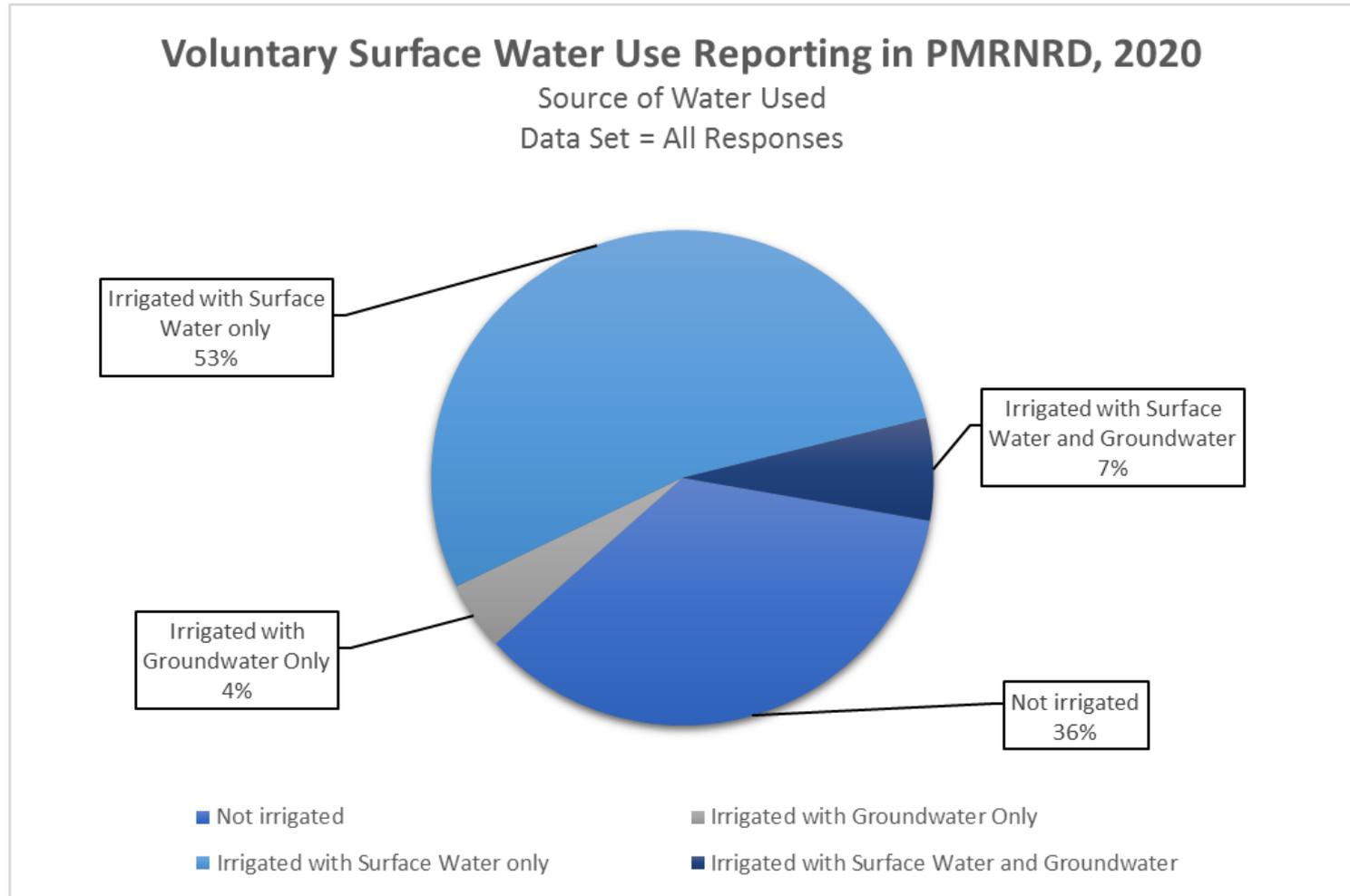
Surface Water Monitoring: USGS Stream Gages

Average Annual Discharge
Platte River at Louisville, USGS #0605500
(2020 Avg. based on provisional data)



NeDNR Data Collection and Monitoring

- NeDNR Voluntary Surface Water Use Reporting



NeDNR Data Collection and Monitoring

- NeDNR surface water pumpsite inspections

Pumpsite Inspections in P-MRNRD			
Year	SW Points of Diversion	Number of Pumps Inspected	Associated permitted Acres
2017	51	44	4,812
2018	51	49	5,213
2019	49	1	95.2
2020	53	9	448.0

- As time and conditions allow, the NeDNR field office staff visit pumpsites (as mapped) for each appropriation to check for compliance and collect various data.
- In 2020, the Department inspected 9 pumpsites, for 11 appropriations, outside of the IMP area.
- Of the sites visited, one had pumpsite set up and running utilizing a subsurface irrigation system.

Goal 1 Actions – Through 2020

GOAL 1 - Develop and implement water use policies and practices to protect existing uses while allowing for future water development.

- Continued Lower Platte Weed Management support
- Lower Platte River Basin Water Management Plan, final Dec. 2017
 - 1st Increment: 2016-2021
- Groundwater Management Plan Revised and Adopted, March 2018
- Lower Platte River Drought Contingency Plan (Consortium), adopted Dec. 2019

Goal 2 Actions – Through 2020

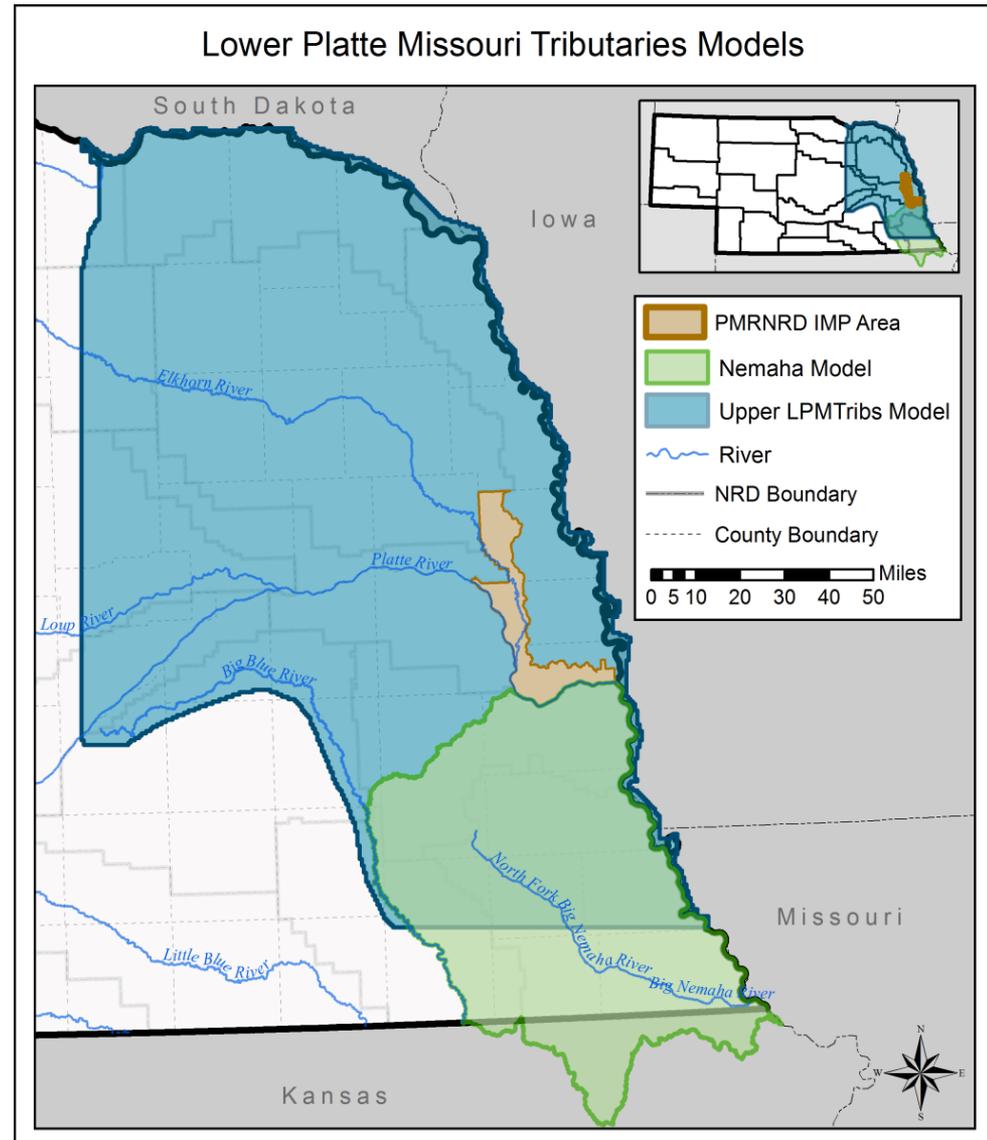
GOAL 2 - Develop and maintain a water supply and use inventory based on the best available data and analysis.

- [USGS Platte and Elkhorn River integrated monitoring study](#)
- NRD water balance study
- New basin-wide database is being developed
- Collected municipal water use data
- Enhanced weather and climate data
- NeDNR Lower Platte Missouri Tributaries (LPMT) model
- AEM 3D model data to revise LPMT model (ongoing)



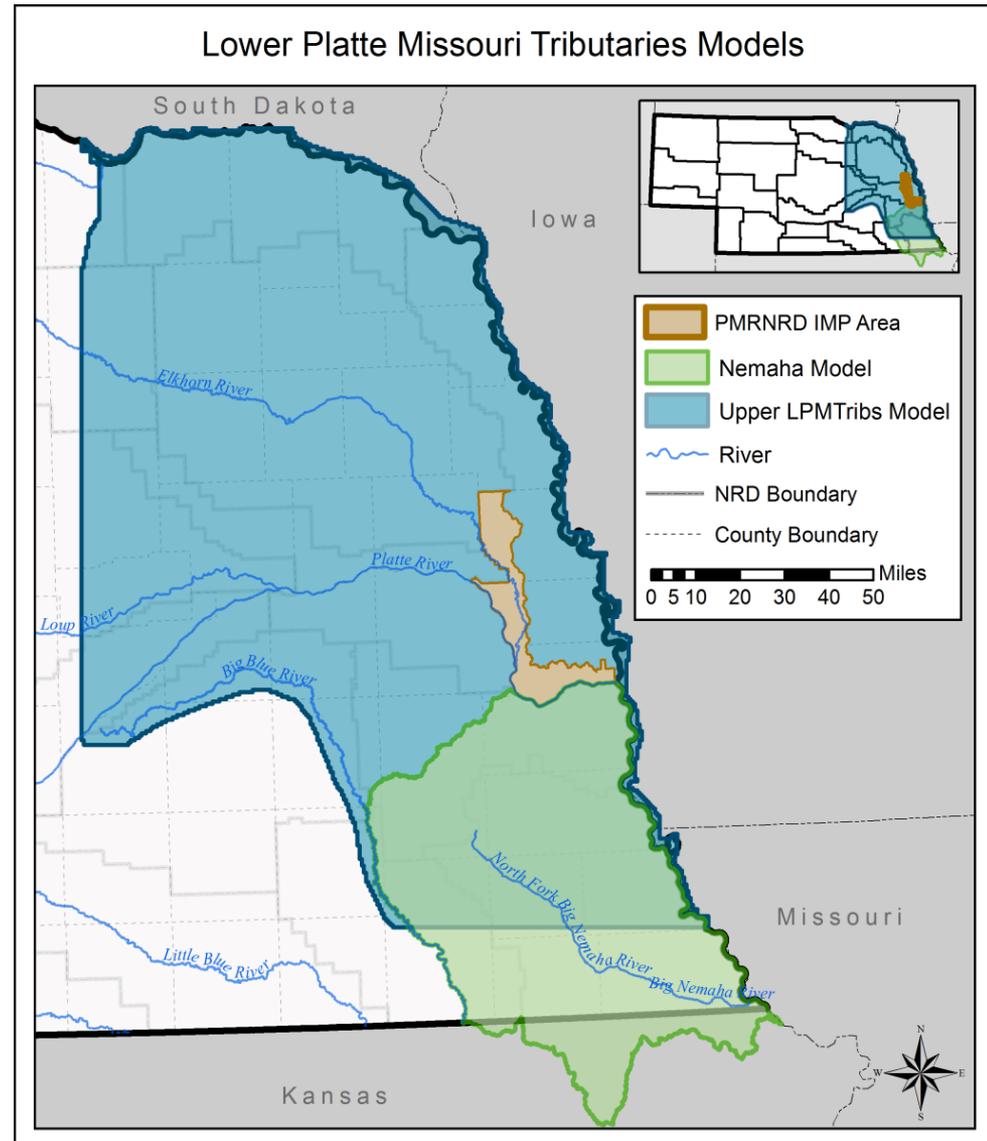
NeDNR Groundwater Model (Goal 2)

- NeDNR Lower Platte Missouri Tributaries Groundwater Model
 - Initial model development complete
 - Pilot study in LENRD on AEM data incorporation is underway
 - LPN/LPS/P-MRNRDs received a WSF grant for the creation of model data from AEM data



NeDNR Groundwater Model (Goal 2)

- Stream depletion factors
 - Model-wide
 - Watershed zones for specific tributaries
- NRD use
 - Access to model and results
 - Evaluate potential model updates using AEM data
- Nemaha model
 - Will be developed in upcoming years



Goal 3 Actions – Through 2020

GOAL 3 - Develop and implement water use educational programs that encourage conservation and effective water use.

- Joint participation in World O' Water public event
 - <https://www.worldwater.org/activities/>
- Urban water conservation education
- NRD adopted cost-share programs for soil moisture sensors and flow meters



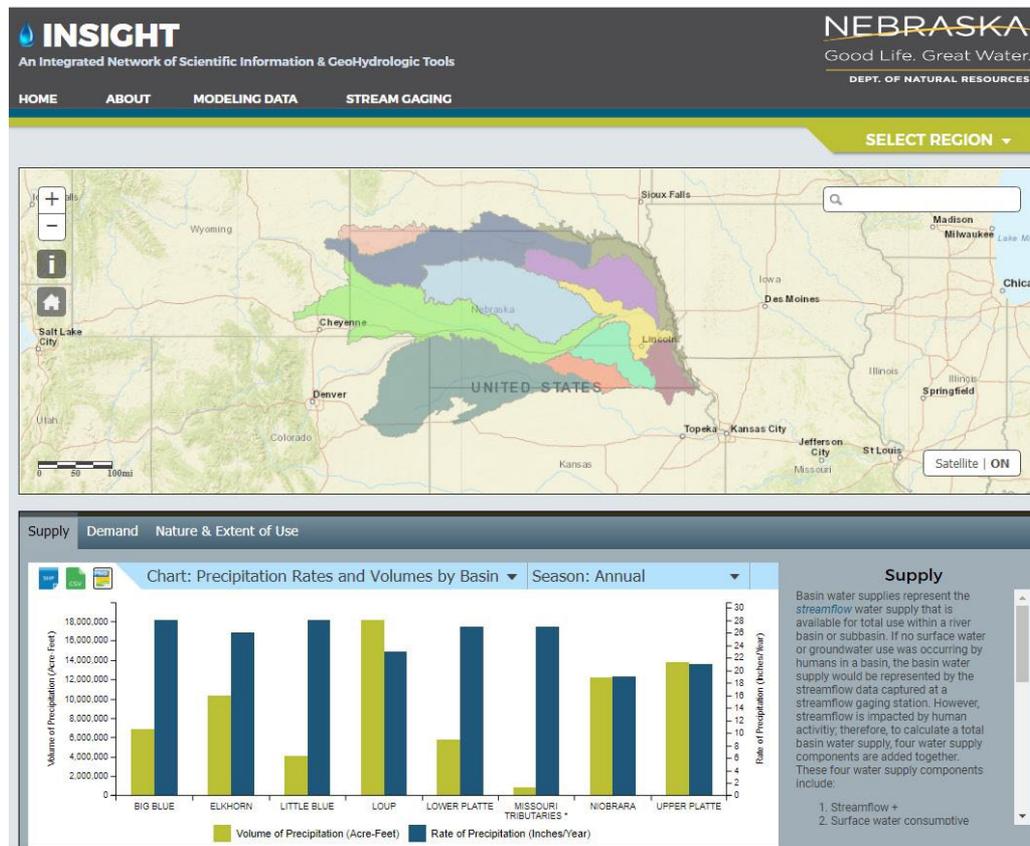
NeDNR Public Outreach (Goal 3)

- Events
 - UNL's Women in Agriculture Conference



NeDNR Public Outreach (Goal 3)

- Internet Tools
 - INSIGHT for water use, supply and balance
 - Upper Platte River Basin added in 2019
 - <https://nednr.nebraska.gov/INSIGHT/>



NeDNR Public Outreach (Goal 3)

- Internet Tools
 - Interactive web tools
 - Hydrologically connected concepts
 - <https://dnr.nebraska.gov/water-planning/education>



Goal 4 Actions – Through 2020

GOAL 4 – Work with upstream NRDs and others to collectively develop a water management plan for the Platte River Basin.

- Lower Platte River Basin Coalition Meetings, Basin Accounting, Reporting
- Participated in Lower Platte River Consortium Drought Mitigation Plan
 - Conduct annual drought monitoring coordination
 - Identify conjunctive management opportunities



P-MRNRD has applied for and received \$1,221,000 in grants for studies in IMP Area!

Jointly Identified Actions for Next Two Years

- Update Lower Platte-Missouri Tributaries groundwater model and hydrologically connected area delineations using AEM data
- Continue to participate in basin-wide and regional planning efforts such as ENWRA, the Lower Platte River Consortium (drought contingency plan), and Lower Platte River Basin Coalition (LPRBC)
 - Drought Table-Top Exercise
 - Basin Plan Technical and Management Committees
 - ENWRA annual meetings
 - UNL-CSD Geocloud work with AEM data

Jointly Identified Actions for Next Two Years

- Continue effort to develop depletion/consumptive use tracking database as a part of LPRBC
- Participate at the World O' Water public outreach event - Tentatively September 11, 2021
- NRD will complete Irrigated Acres Certification
- Review data from local studies, as available

Need to Amend our IMP?

- Lower Platte Basin Water Management Plan
 - Current GW and SW controls don't match annual depletion recommendations of Basin Plan
 - *Joint recommendation is to wait until after the first increment is completed to revise IMP controls*

Annual Example with Basin Plan Depletions

Entity	Allotted Depletion (AF) (June 2016 to Dec. 2021)	Allotted annual depletion (AF)	Net Irrigation Requirement (ft)	Average stream depletion factor	Percent peak season	Allotted Acres per year
NRD	434.5	79	0.583	0.9	0.3	~500
NeDNR	434.5	79	0.583	1.00	1.0	~135
Both	869	158	--	--		~635

Lower Platte Basin Plan Accounting at End of 2020

	PEAK SEASON 5-YR ALLOWABLE DEPLETION (AF)	2020 NRD Peak Season Consumptive Use (AF)	NRD Total Peak Season Consumptive Use (AF)	NeDNR Total Peak Season Consumptive Use (AF)	Total New Peak Season Depletions	Total New Peak Season Consumptive Use	Remaining 5-YR Allowable Depletion (AF)	Percent of Remaining 5-YR Allowable Depletion
Papio-Missouri River NRD	869.0	51.8	53.6	67.0	97.0	120.6	772.0	88.8%
TOTALS BASIN WIDE	18,807.0	1,054.6	7,049.8	1,250.0	4,491.3	8,299.8	14,315.7	76.1%

TABLE 2 - PEAK SEASON DEPLETIONS AND CONSUMPTIVE USE

NRD	PEAK SEASON 5-YR ALLOWABLE DEPLETION (AF)	NRD - Peak Season Depletion (AF)	NeDNR Reported Depletion (AF)	NRD Prior Years Peak Season Consumptive Use (AF)	2020 NRD Peak Season Consumptive Use (AF)	NRD Total Peak Season Consumptive Use (AF)	NeDNR Total Peak Season Consumptive Use (AF)	Total New Peak Season Depletions	Total New Peak Season Consumptive Use	Remaining 5-YR Allowable Depletion (AF)	Percent of Remaining 5-YR Allowable Depletion
Upper Loup NRD	2768	417.9	369.6	1033.8	35.7	1069.5	369.6	787.5	1439.1	1980.5	71.6%
Lower Loup NRD	5883	362.4	481.0	1619.6	-69.1	1550.5	481.0	843.4	2031.5	5039.7	85.7%
Upper Elkhorn NRD	1504	220.0	85.0	398.4	111.4	509.8	85.0	305.0	594.8	1199.0	79.7%
Lower Elkhorn NRD	4514	1093.7	180.4	1619.3	596.8	2216.2	180.4	1274.1	2396.6	3239.9	71.8%
Papio-Missouri River NRD	869	30.0	67.0	1.8	51.8	53.6	67.0	97.0	120.6	772.0	88.8%
Lower Platte South NRD	993	23.6	67.0	30.2	0.0	30.2	67.0	90.6	97.2	902.4	90.9%
Lower Platte North NRD	2276	1093.8	0.0	1292.2	328.0	1620.2	0.0	1093.8	1620.2	1182.2	51.9%
TOTALS	18,807	3,241	1,250	5,995	1,055	7,050	1,250	4,491	8,300	14,316	76%

Papio-Missouri River NRD Basin Plan Accounting, End of 2020

Depletion Desc.	Peak Season Depletion (AF)	Balance (AF)
2016 – 2021 P-MRNRD Allowable Depletion		869
2016-17 New NRD GW Depletion	1.5	867.5
2016-17 New NDNR SW Depletion	67.3	800.2
2018 New NRD GW Depletion	0.0	800.2
2018 New NDNR SW Depletion	0.0	800.2
2019 New NRD GW Depletion	0.0	800.2
2019 New NDNR SW Depletion	10.0	790.2
2020 New NRD GW Depletion	28.5	761.8
2020 New NDNR SW Depletion	-10.3	772.1
TOTAL Depletion	97.0	772.1

QUESTIONS?

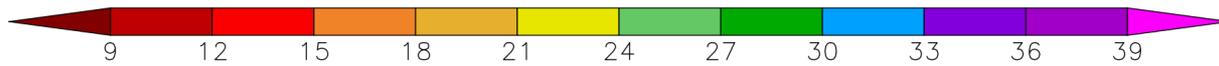
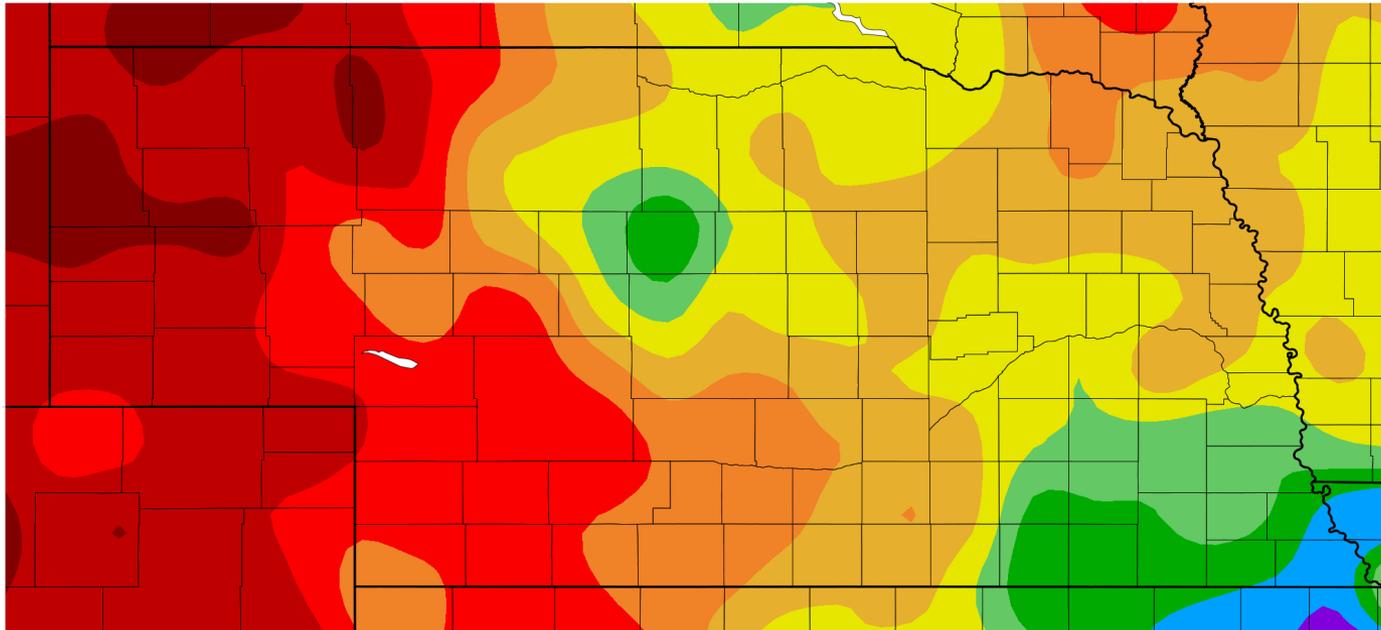


Voluntary Integrated Management Plan



Precipitation (in)

1/1/2020 – 12/31/2020

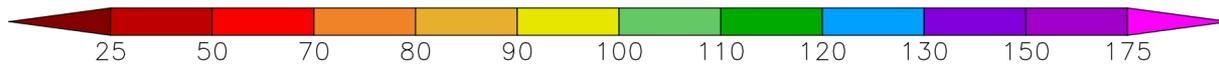
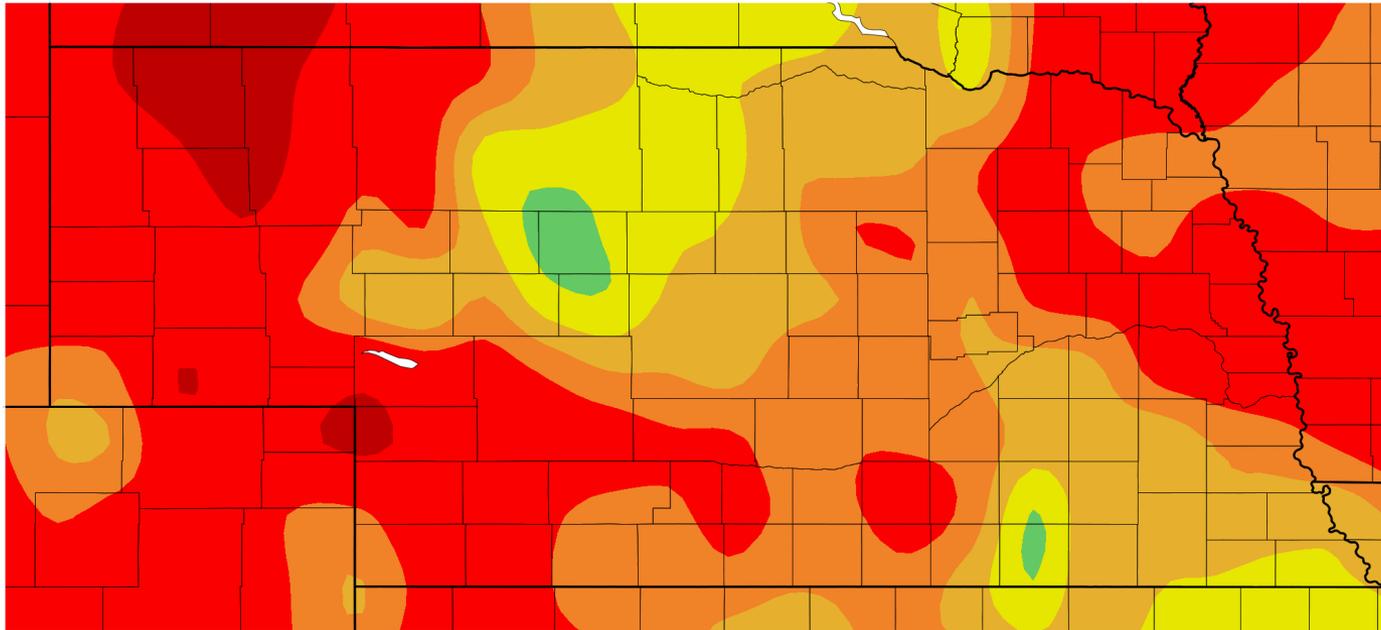


Generated 1/20/2021 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)

1/1/2020 – 12/31/2020



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NOAA Regional Climate Centers

Departure from Normal Precipitation (in)

1/1/2020 – 12/31/2020

