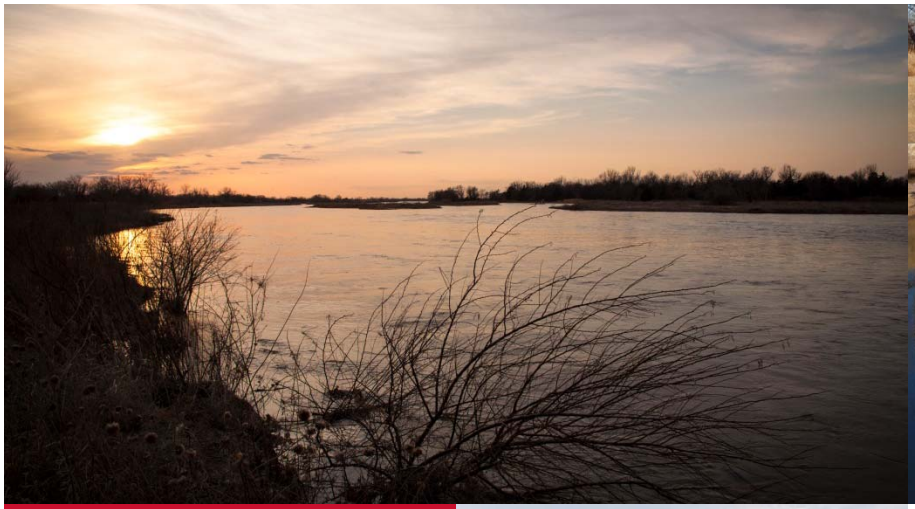
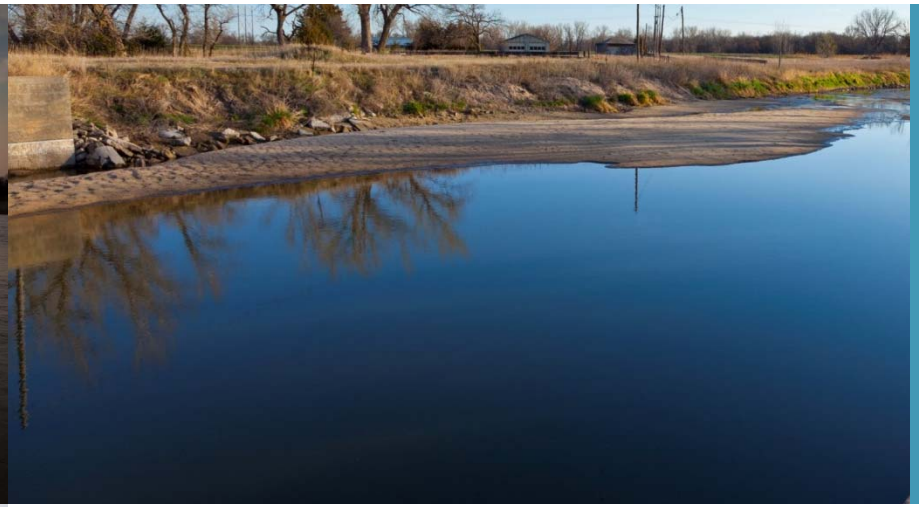
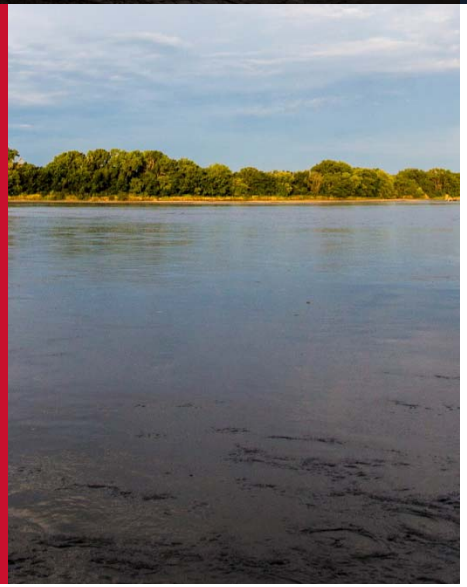






Lower Platte Basin-Wide Management Plan
Water Banking Workshop II

July 20, 2015

Today's Agenda

I. Recap

II. Basin-wide accounting methodology

III. Example applications of basin-wide accounting

IV. Next steps

V. Q/A

Purpose of Coalition

- Collectively develop a water management plan for the Lower Platte Basin that maintains a balance between current and future water supplies and demands.
- Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.
- Develop and maintain a water supply and use inventory based on the best available data and analysis.
- Avoid fully-appropriated status.

Purpose of Plan

- Define goals, objectives, and activities to allow additional water use development to occur
  - Without impacting existing or future users
  - Without the basin becoming fully-appropriated

Purpose of Water Banking and Role in Plan

- Guideline in the event that individual member NRDs decide to adopt a water bank to support water management activities.
- Could apply to banking activities between member NRDs or within an individual NRD.
- Increase the availability/reliability (with respect to time and/or locations of water use)
- One tool (of many) in manager's toolbox to have available to meet future uses

Elements of a Water Bank

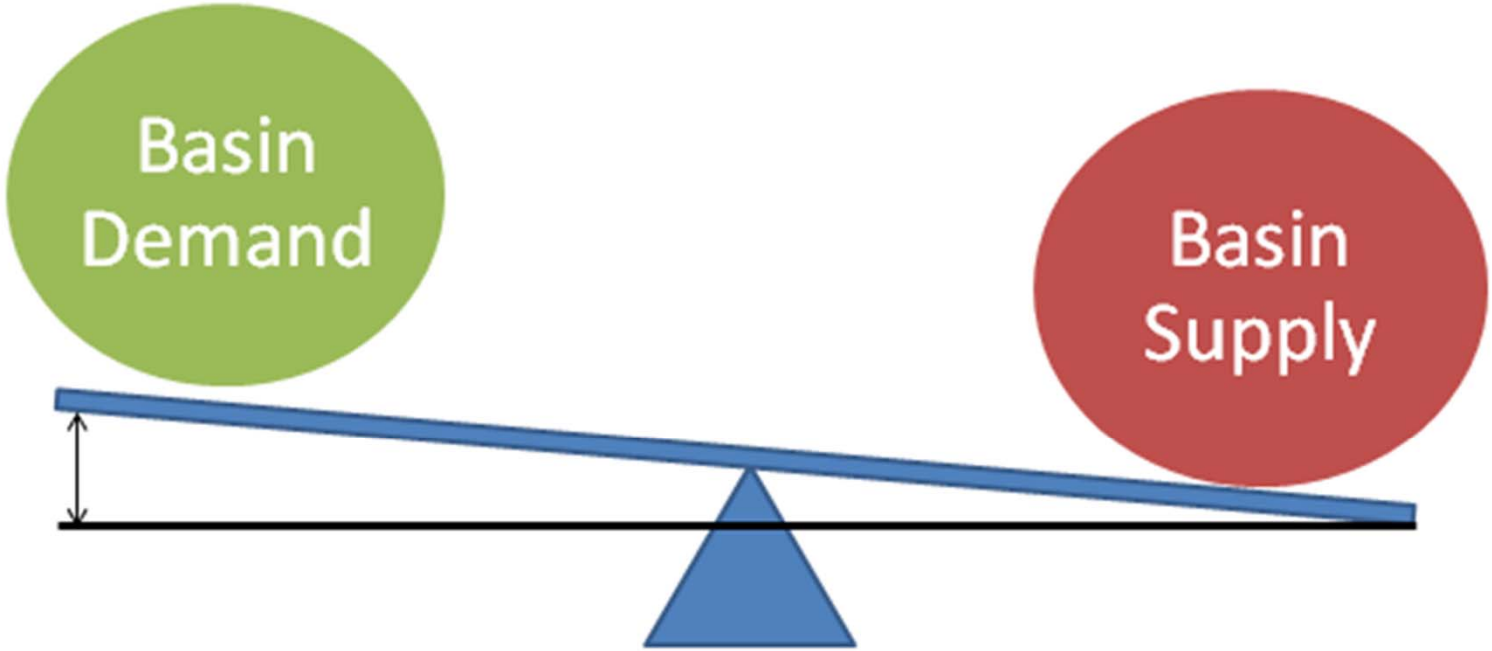
- Legal/administrative
- Operation and management
- Markets and finances
- Water accounting
- Other

Basin-wide Accounting

Accounting fundamentals/tie to fully appropriated basin methodology

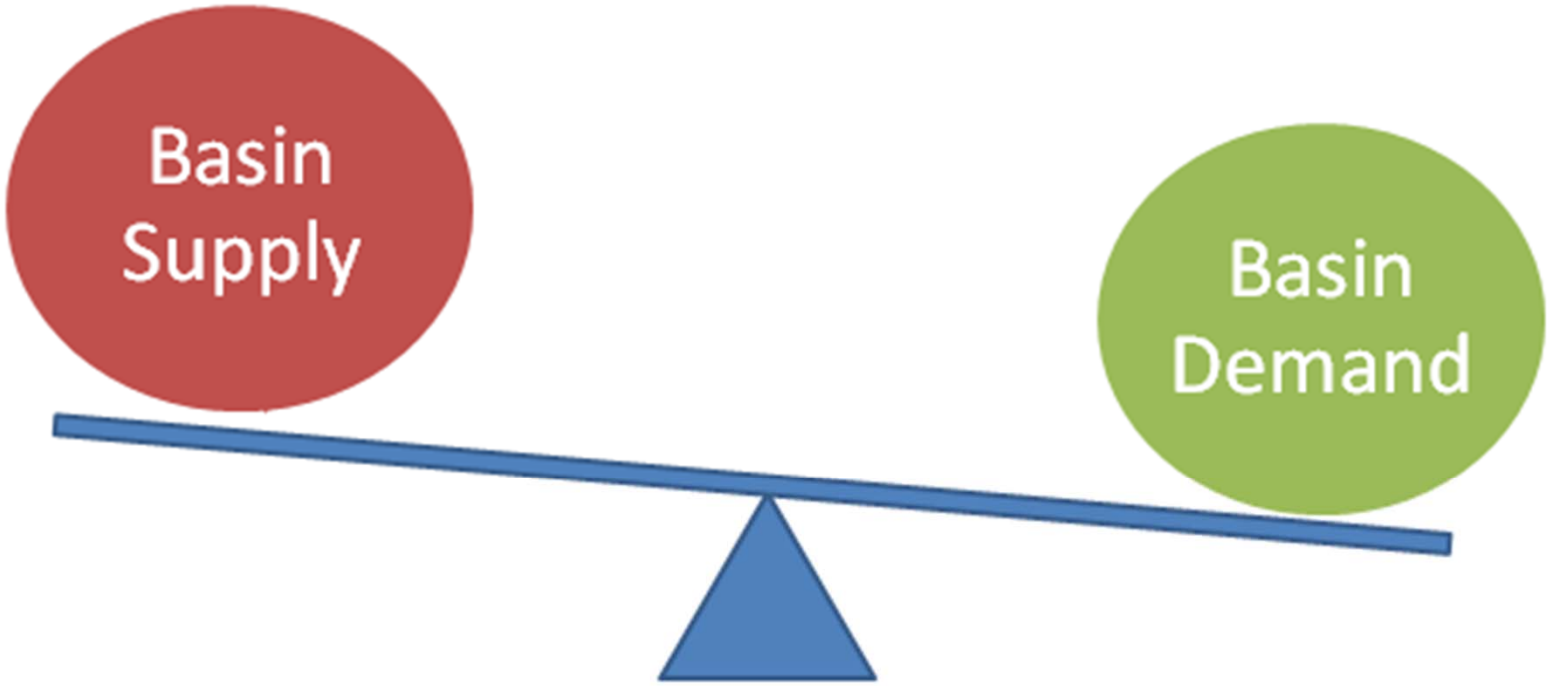
- Purpose/Goals:
  - Provide consistent basis for NRD/DNR management activities
  - Tie to Fully Appropriated Basin evaluation for consistency/limit surprises
  - Tool for monitoring/planning
  - Framework to inform individual NRD IMPs

EXCESS SUPPLY: If supply exceeds demand, then water is available for development within the basin.

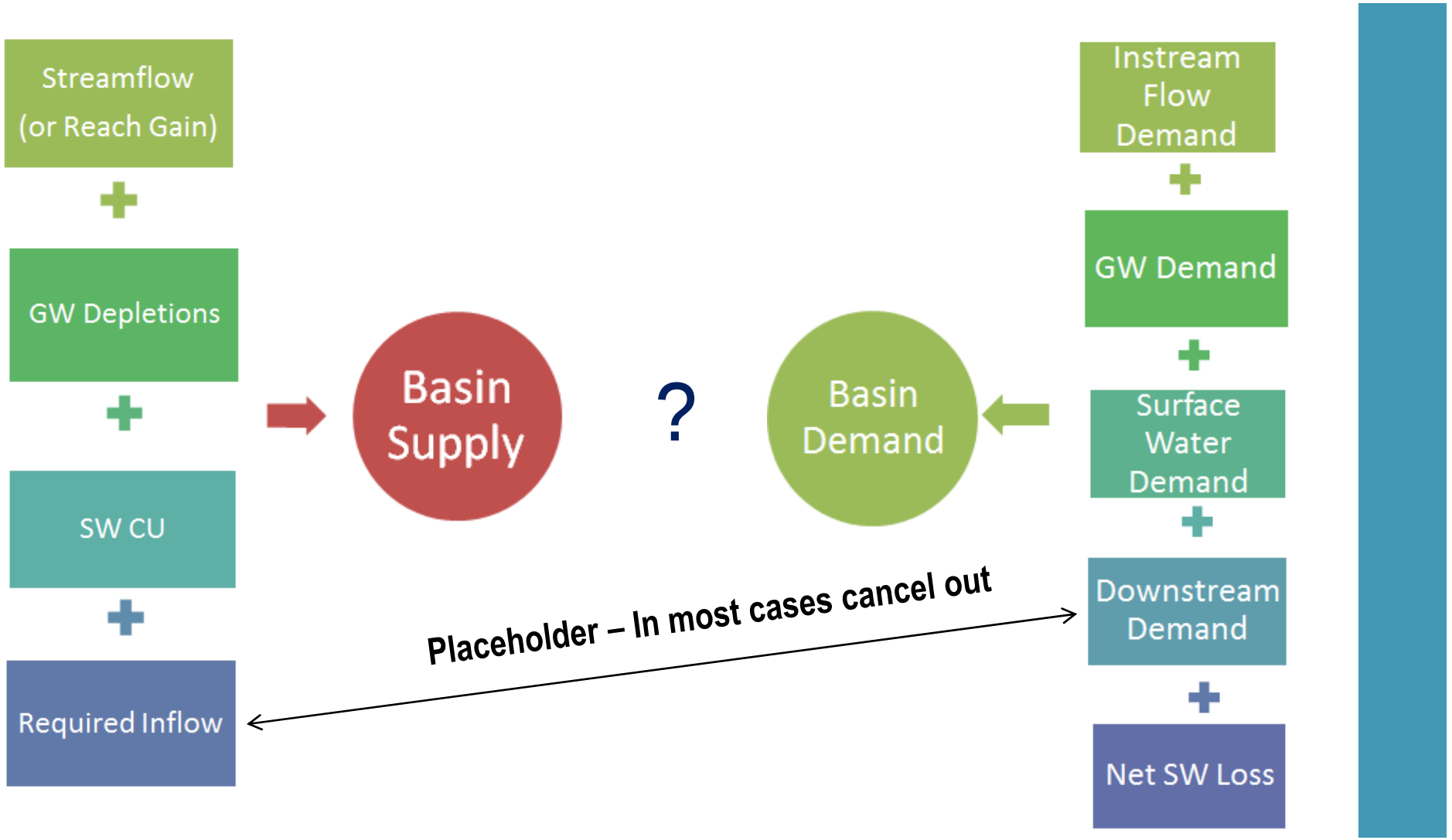


DNR FULLY-APPROPRIATED DETERMINATION:

If current demands will exceed basin supply in foreseeable future



Components of Supply and Demand

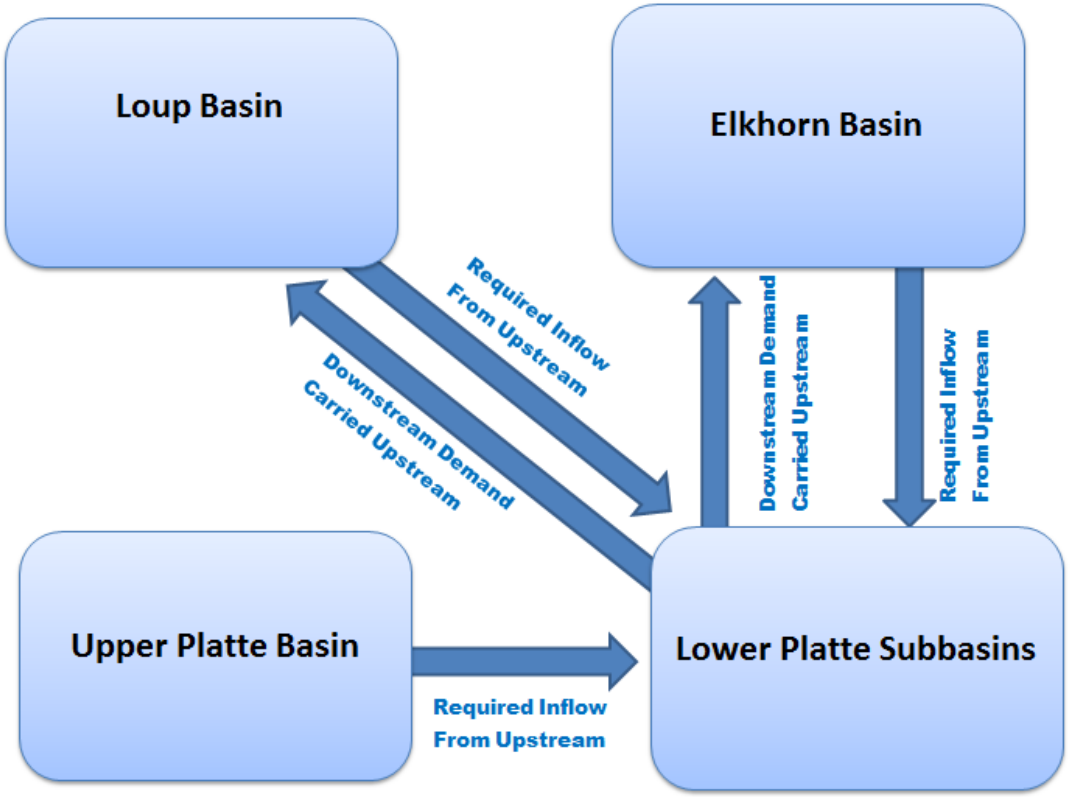

Streamflow (or Reach Gain)
GW Depletions
SW CU
Required Inflow
Basin Supply
?
Basin Demand
Instream Flow Demand
GW Demand
Surface Water Demand
Downstream Demand
Net SW Loss
Placeholder – In most cases cancel out

Downstream Demands

Why do we include them?

- Water development based on water supply that was historically available at the time the appropriation was granted.
- Used as placeholders - in the full basin these terms cancel out (with exception of contribution from Upper Platte).
- Only considers downstream mainstem surface water users (water cannot flow upstream).

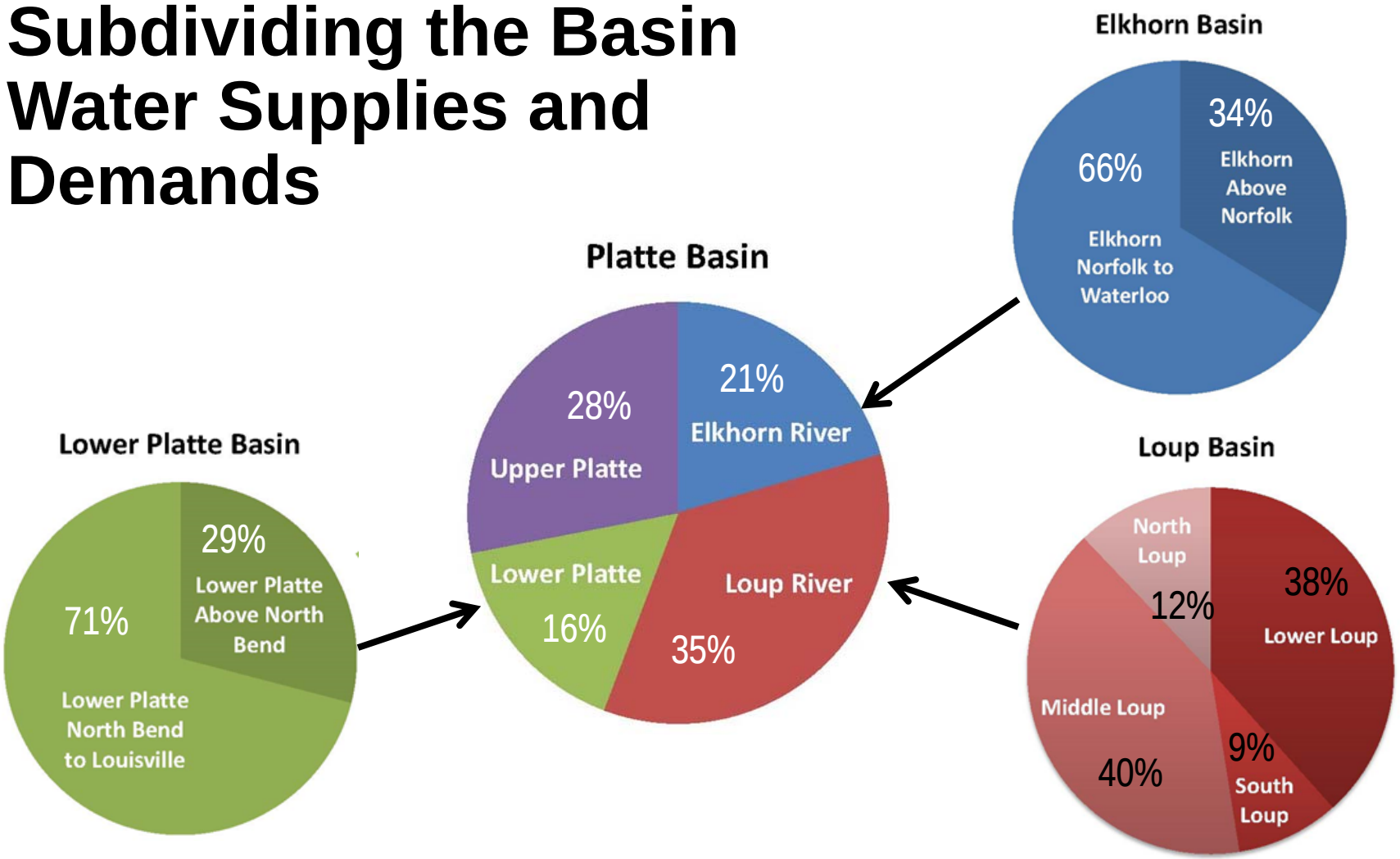
Required Inflow and Downstream Demans



Proportioning Supplies and Demands

Based on ratio of basin water supplies

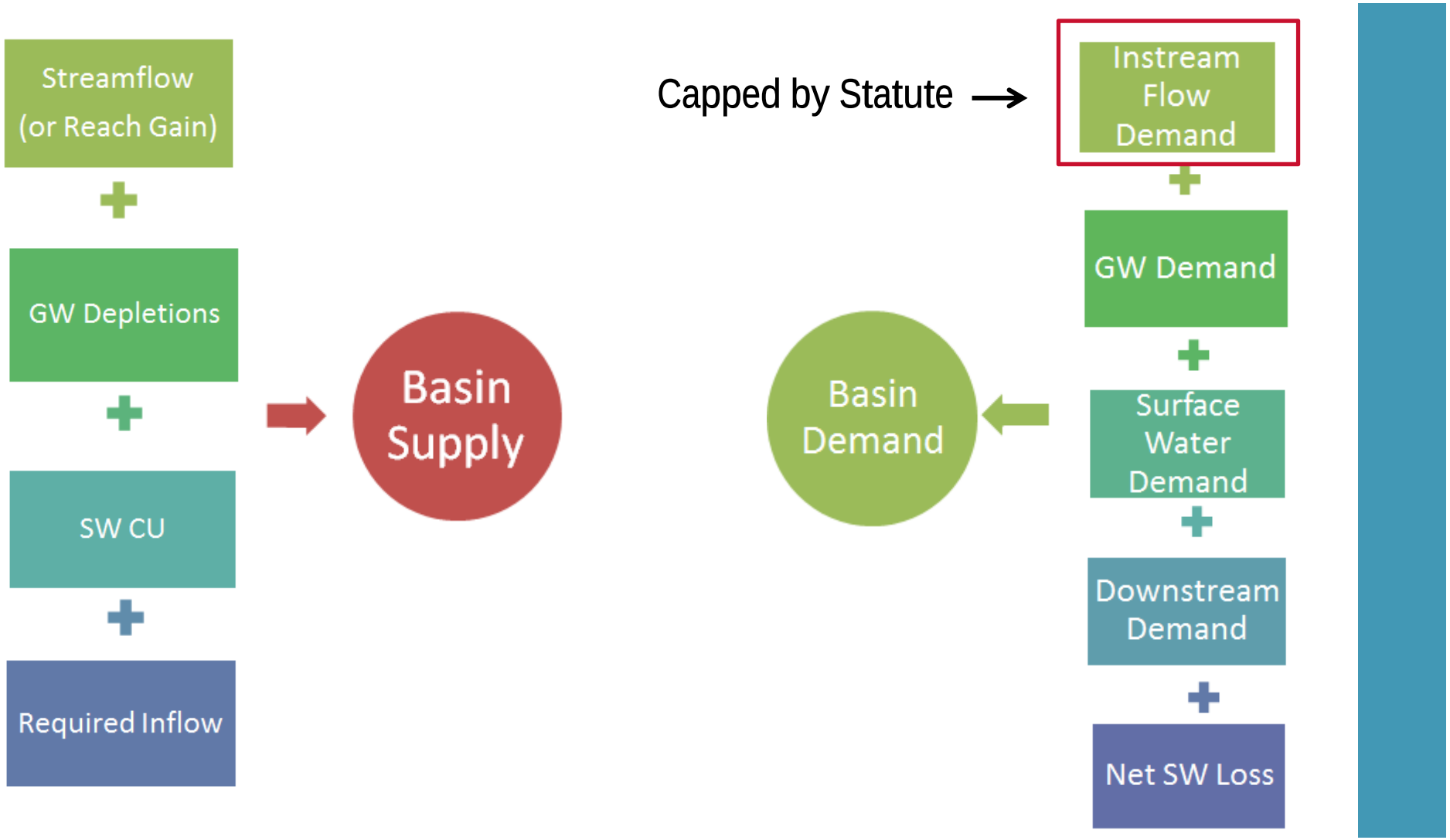
Subdividing the Basin Water Supplies and Demands



Concept for Basin-Wide Accounting

Defining the Representative Supply/Demand for Planning

- Annual, Peak Season (June through August), Non-peak Season (September through May)
- Many options: 25yr Average, Drought Period
- Downstream flow demand adjustment
- Instream Flow Demand – What does that represent?


Streamflow
(or Reach Gain)
GW Depletions
SW CU
Required Inflow
Basin
Supply
Capped by Statute
Instream
Flow
Demand
GW Demand
Surface
Water
Demand
Downstream
Demand
Net SW Loss
Basin
Demand

Instream Flow Demands

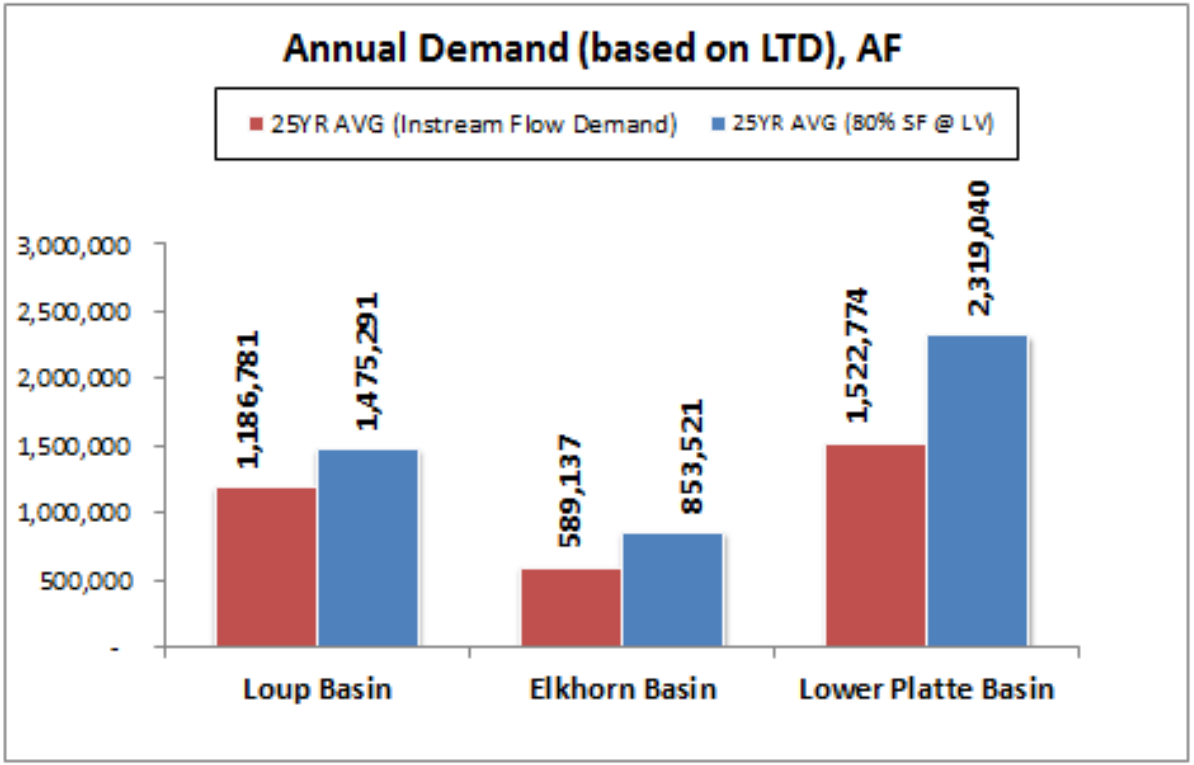
- Nebraska Revised Statutes, Section 46-713: Subbasins shall be deemed fully appropriated when ". . . *then-current at the time of approval. . .*"

- For the Lower Platte River Basin, an adjustment is made to account for the 1993 level of groundwater development. (DNR Methodology).

- This adjustment (delta, Δ) incorporates the lag effect of groundwater irrigation in the pre-1993 period.

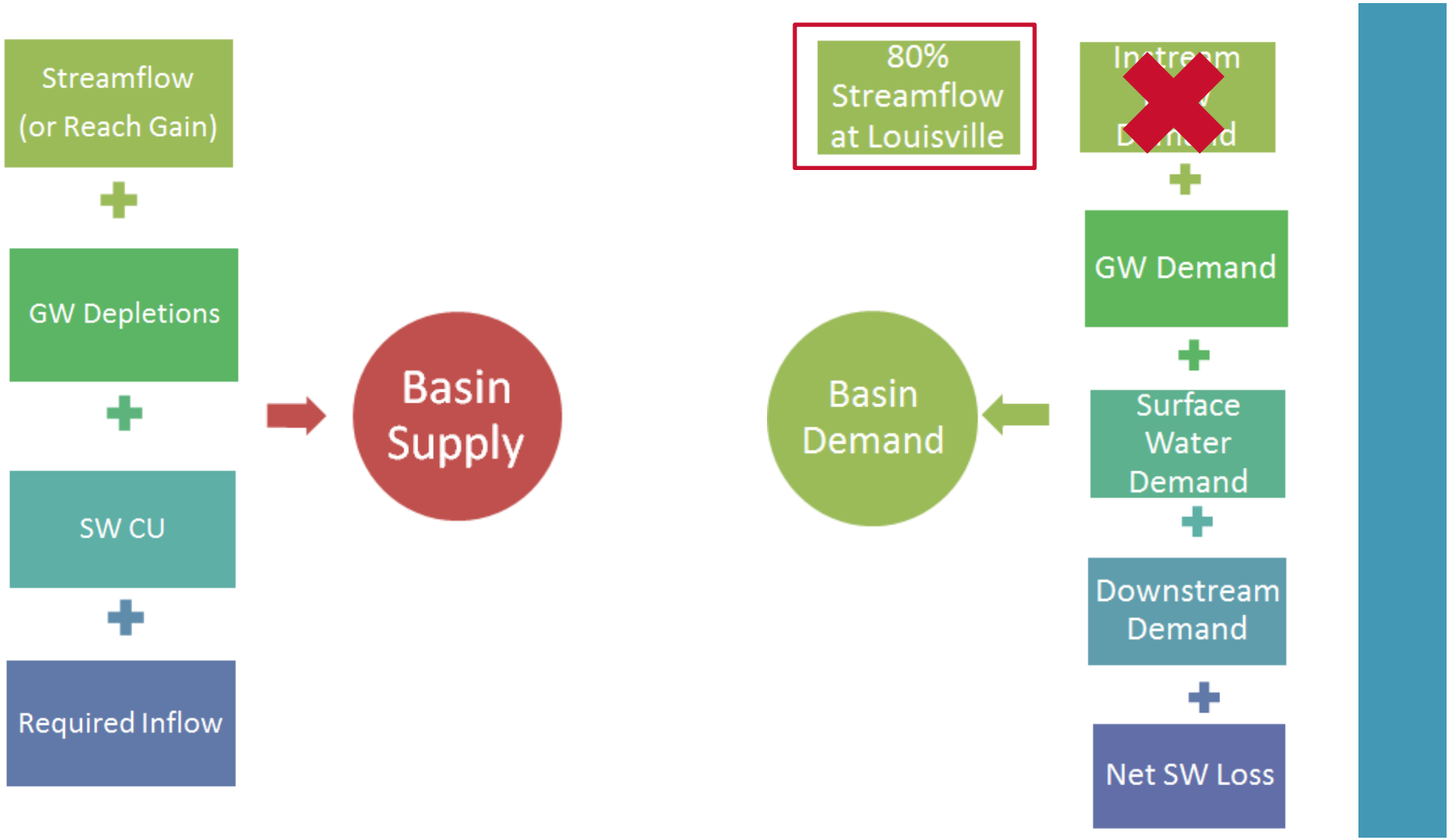
Impact of Reduced Instream Flow Demand on Basin Accounting

- This reduction in the Instream Flow Demand may result in an artificially increased “Excess Supply”



Basin-Wide Accounting Recommendation

- Replacing instream flow demand with a demand maintaining 80% Streamflow at Louisville.
- Annual development be limited to 1% per year of the 25-year average annual excess supply with a check against the Peak season (both 25-year and drought periods).
- Annual meeting to discuss activities/uses/coordinate NRD activities
- Track and account for uses
- 5-yr update on supplies

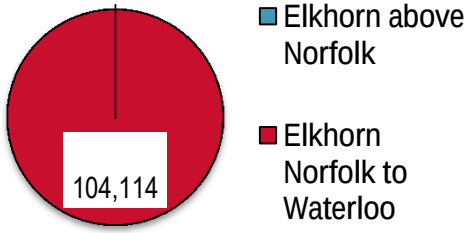

Streamflow
(or Reach Gain)
GW Depletions
SW CU
Required Inflow
Basin
Supply
Basin
Demand
80%
Streamflow
at Louisville
GW Demand
Surface
Water
Demand
Downstream
Demand
Net SW Loss

Building the Supplies and Demands

Example

SUPPLY

Required Inflow (Annual), AF



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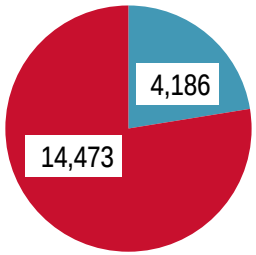
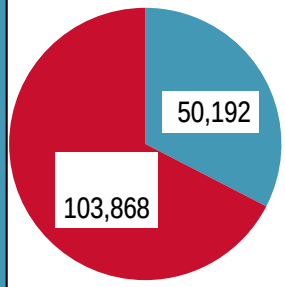
SW Demand (Annual)



GW Depl (Annual)



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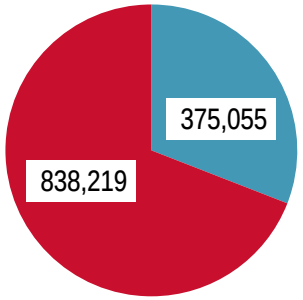
Streamflow (Annual)



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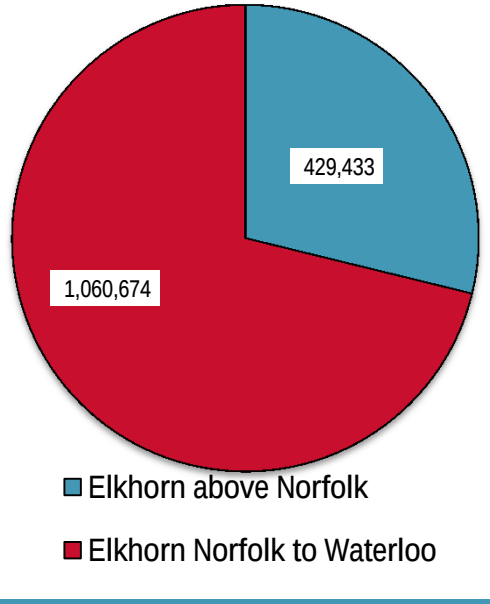
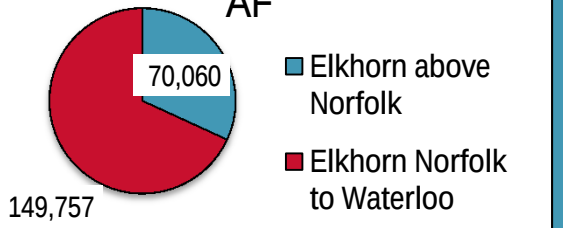
ELKHORN

Basin Water Supply (Annual), AF



NEAR TERM DEMAND

Proportion of Demand Representing 80% Streamflow at Louisville, AF



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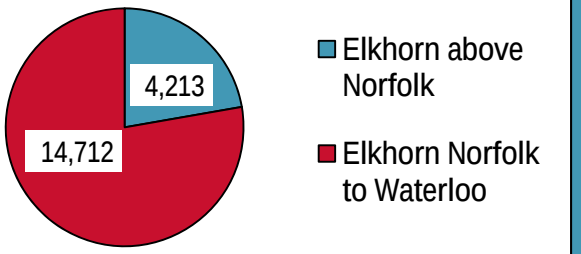
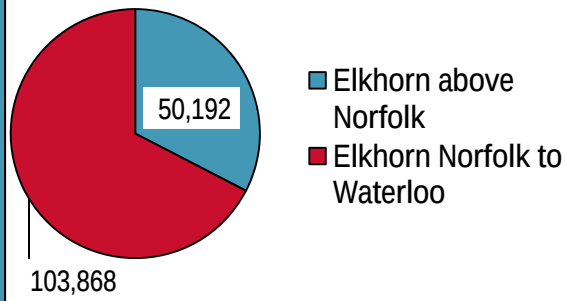
Annual SW Demand



Annual GWDepl



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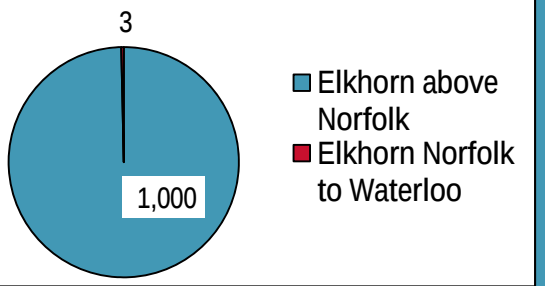
Annual DS Demand



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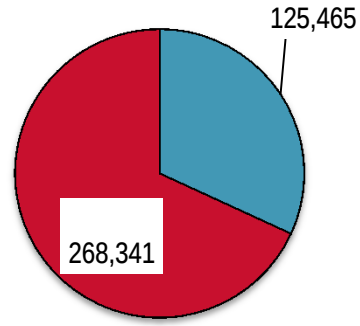
ELKHORN

Annual Near Term Demand, AF

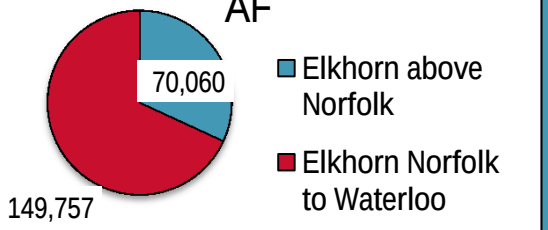


Elkhorn above Norfolk

Elkhorn Norfolk to Waterloo

LONG TERM DEMAND

Proportion of Demand Representing 80% Streamflow at Louisville, AF



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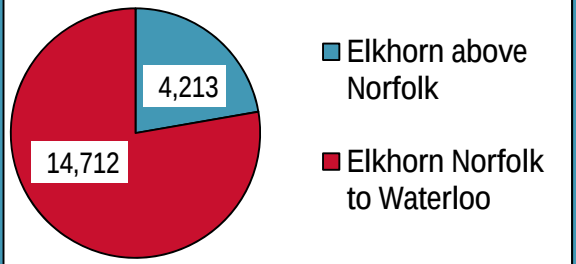
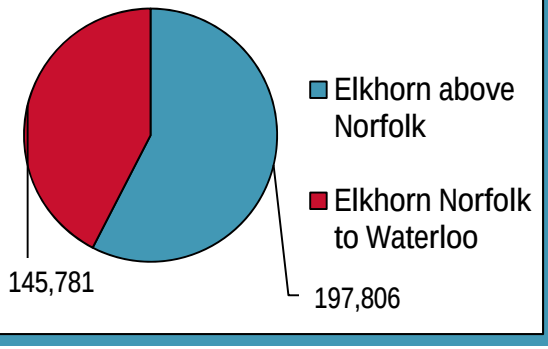
Annual SW Demand



Annual GW Demand



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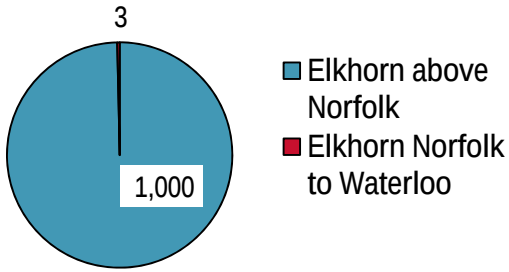
Annual DS Demand



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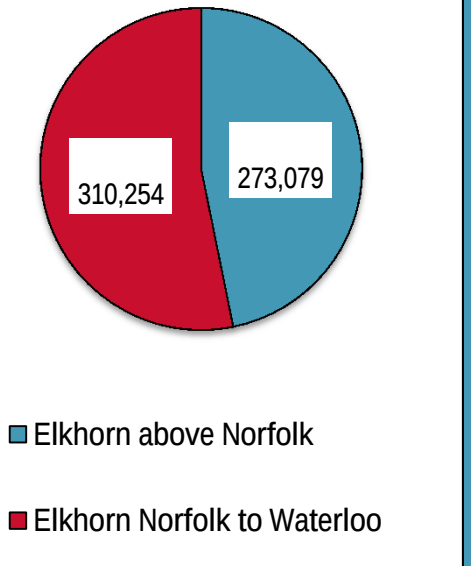
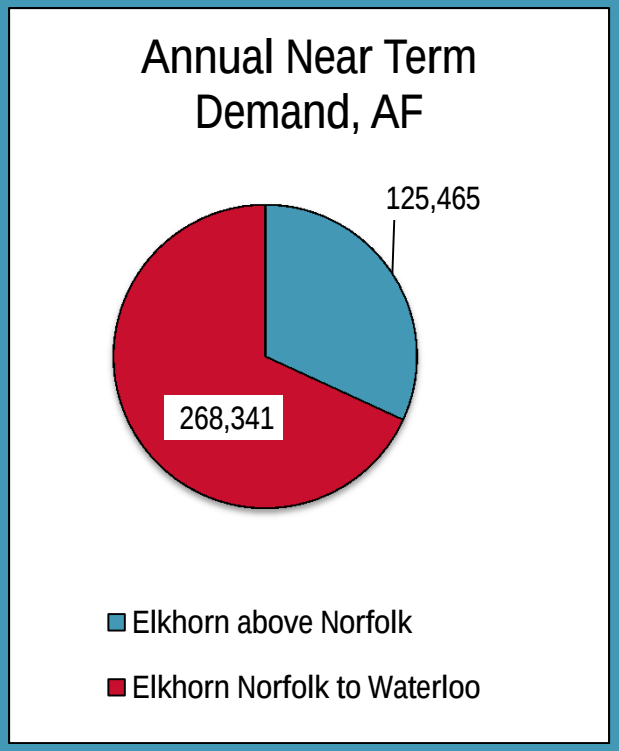
Annual Long Term Demand, AF

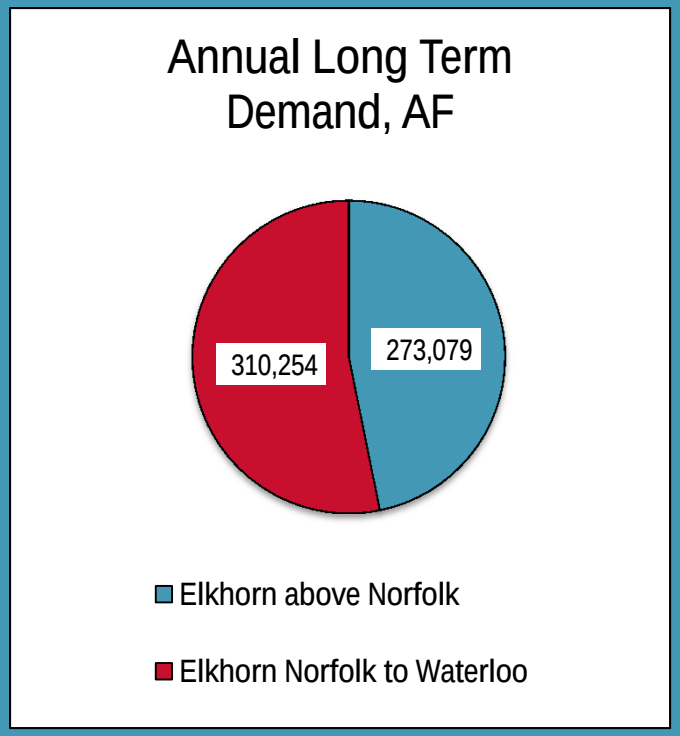


Near Term versus Long Term Demand

(Difference between GW Depletions & GW Consumptive Use)

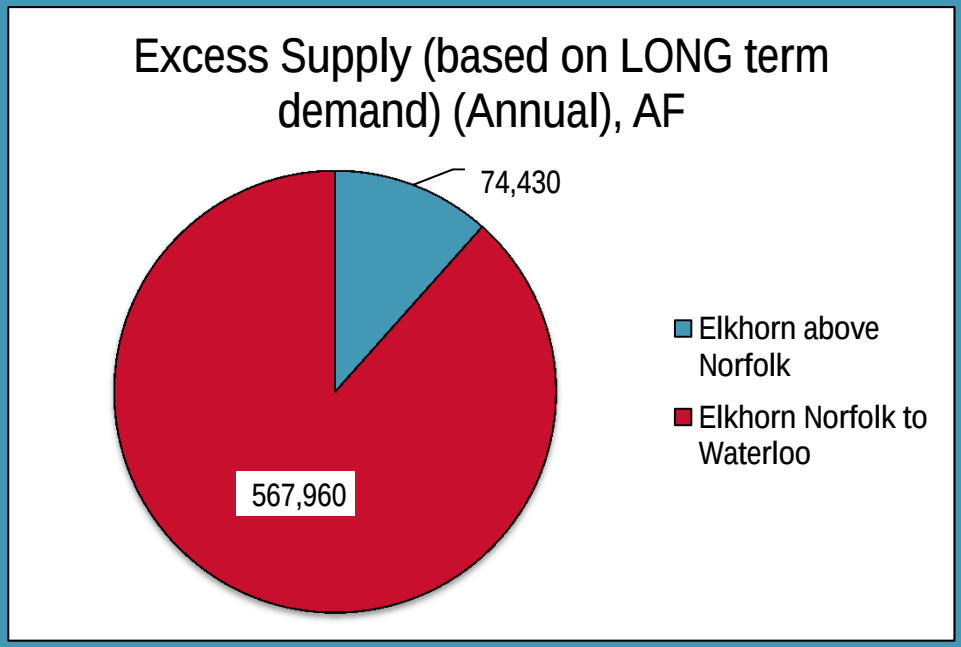


VS



“Excess Supply” = Supply less Demand

ELKHORN

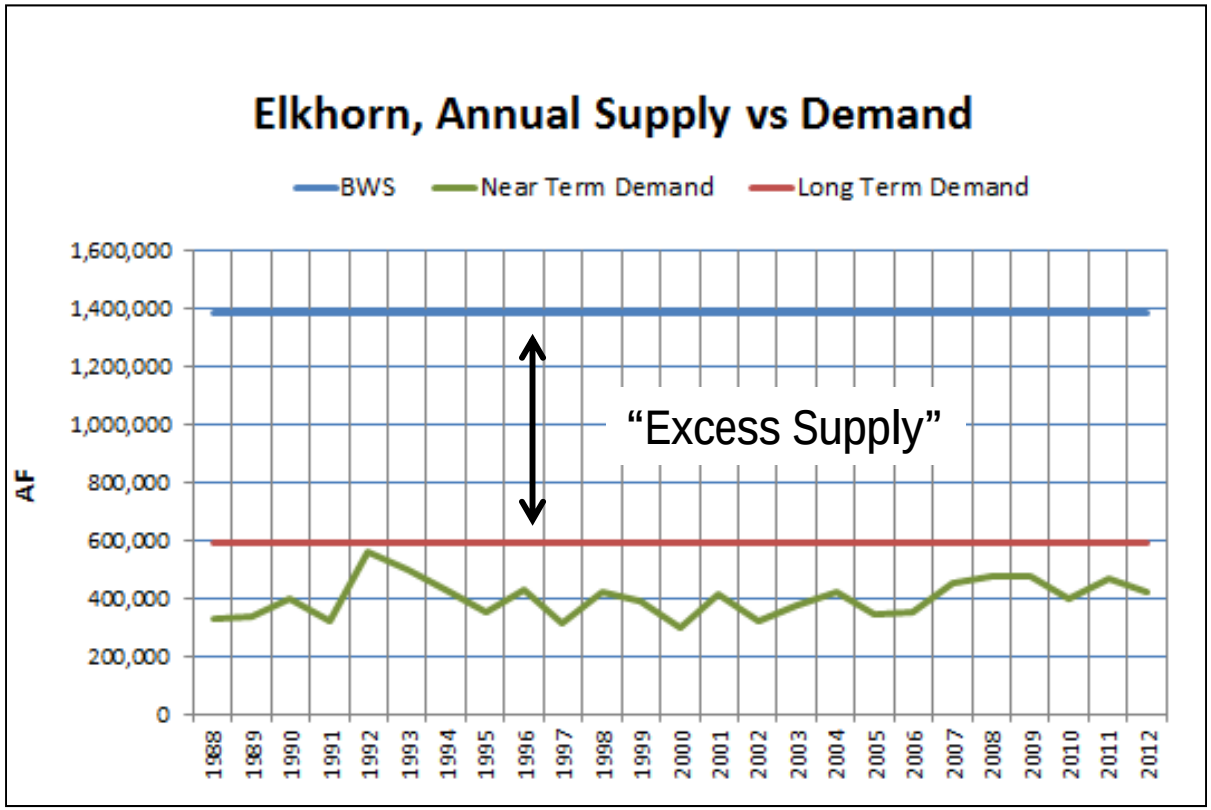


Putting it All Together

Supply vs. Demand Plots

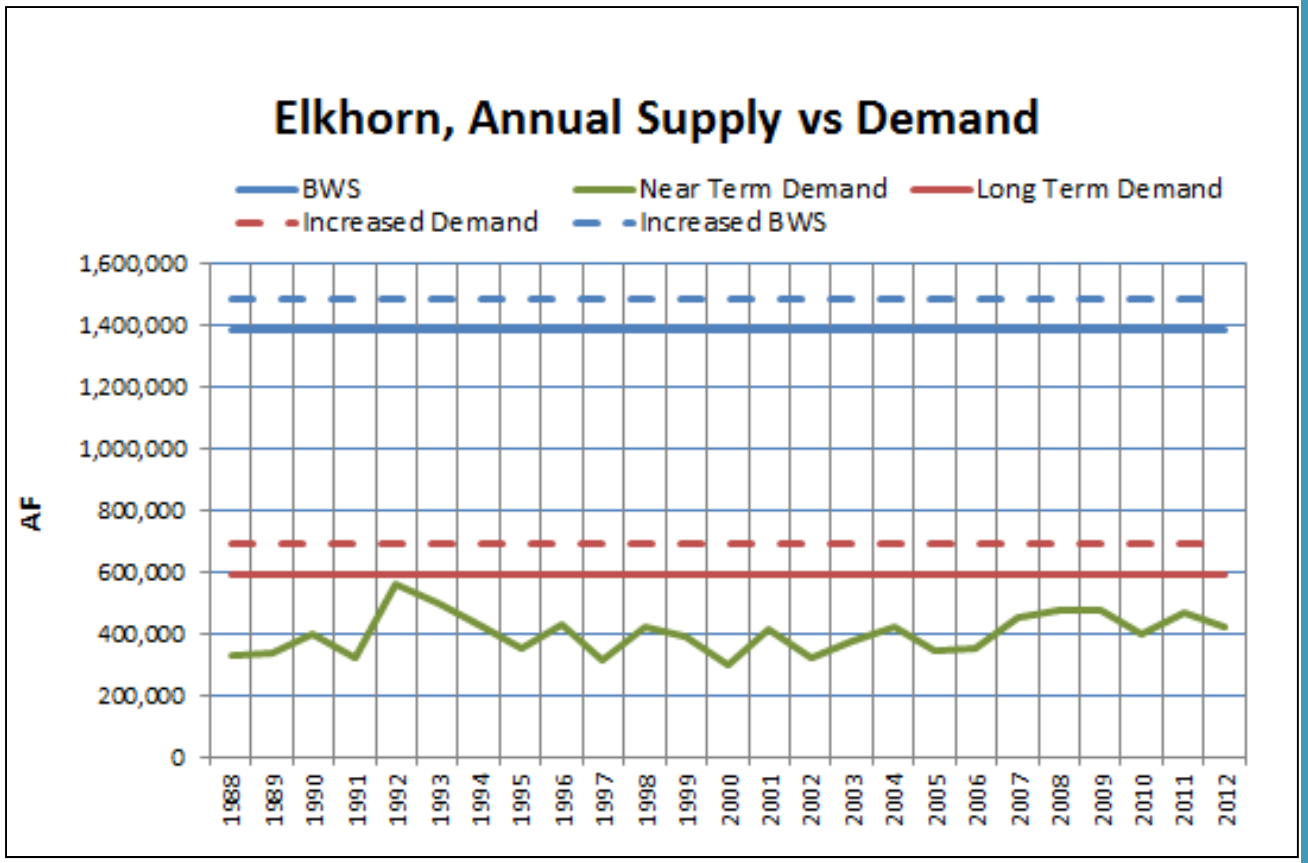
Elkhorn Basin

Annual Supply vs Near Term & Long Term Demand



Example Project increasing BWS

- If capturing/ retiming water, BWS line increases
- If use that water, the demand lines also increase



Excess Supply by Subbasin

(Results do not account for hydropower)

All units are in AF

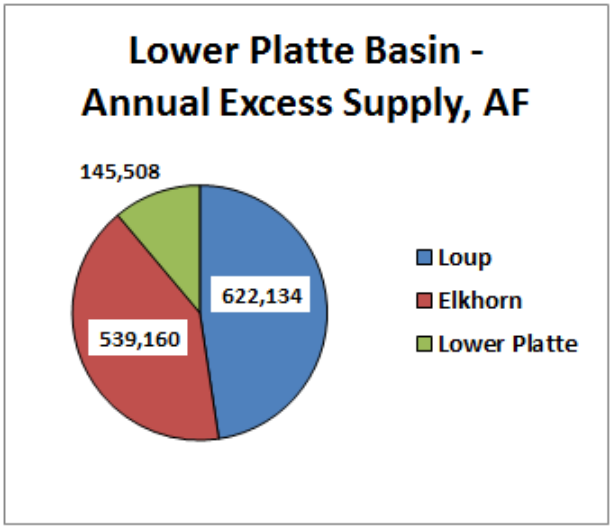
Excess Supply (25yr Avg) - Full Lower Platte Basin								
Loup			Elkhorn			Lower Platte		
Annual	NonPeak	Peak	Annual	NonPeak	Peak	Annual	NonPeak	Peak
622,134	588,708	33,426	539,160	372,699	166,461	145,508	117,163	28,345

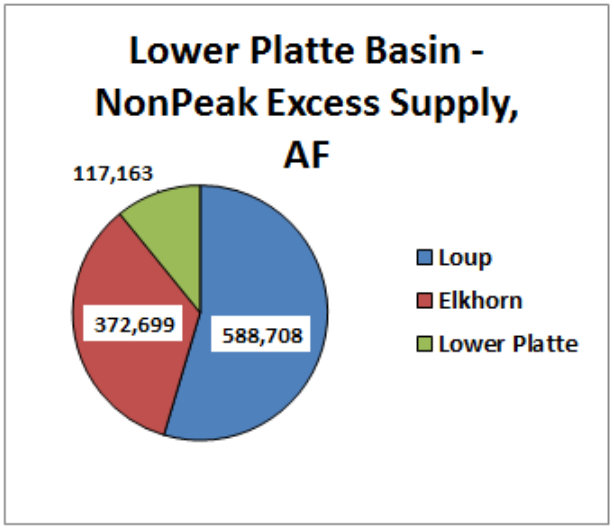
Excess Supply (25yr Avg) - Loup Subbasin											
North Loup			South Loup			Middle Loup			Lower Loup		
Annual	NonPeak	Peak	Annual	NonPeak	Peak	Annual	NonPeak	Peak	Annual	NonPeak	Peak
343,291	291,122	52,168	-	-	-	323,878	310,157	13,720	132,604	100,417	32,187

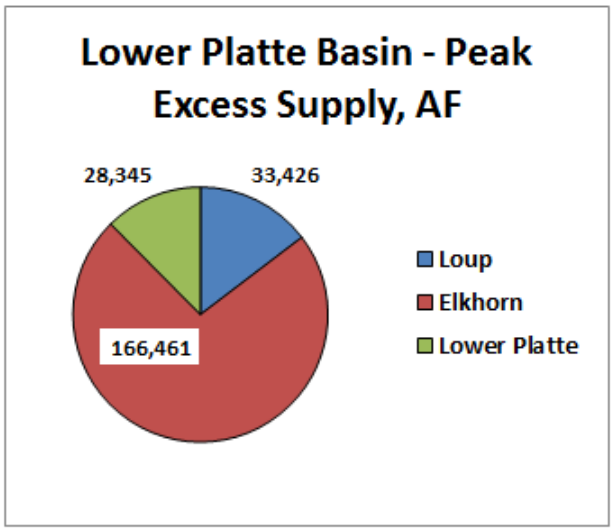
Excess Supply (25yr Avg) - Elkhorn Subbasin					
Elkhorn Above Norfolk			Elkhorn Norfolk to Waterloo		
Annual	NonPeak	Peak	Annual	NonPeak	Peak
74,430	65,047	9,383	567,960	382,710	185,249

Excess Supply (25yr Avg) - Lower Platte Subbasin					
Above North Bend			North Bend to LV		
Annual	NonPeak	Peak	Annual	NonPeak	Peak
3,796	-	49,783	154,988	161,671	-

Excess Supply – Basin Level







All units are in AF

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Loup			Elkhorn			Lower Platte		
Annual	NonPeak	Peak	Annual	NonPeak	Peak	Annual	NonPeak	Peak
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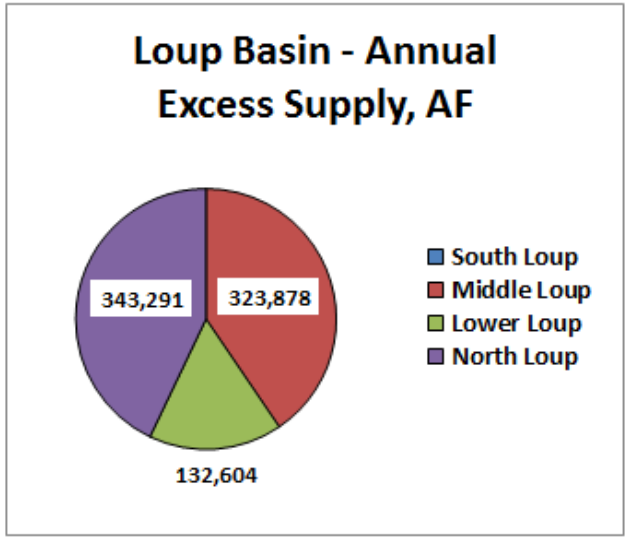
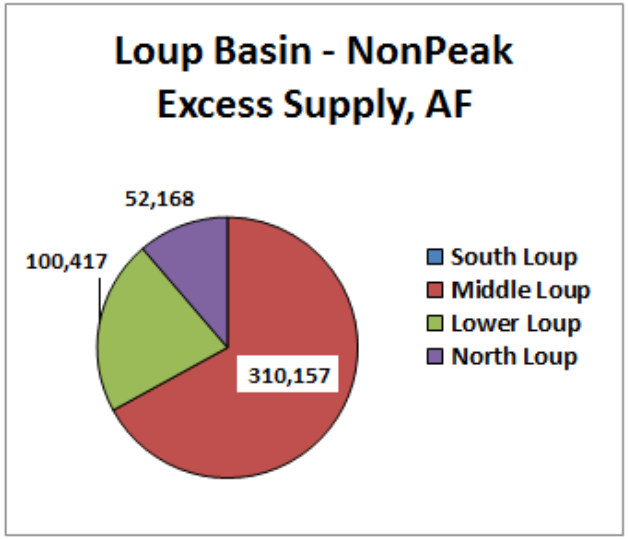
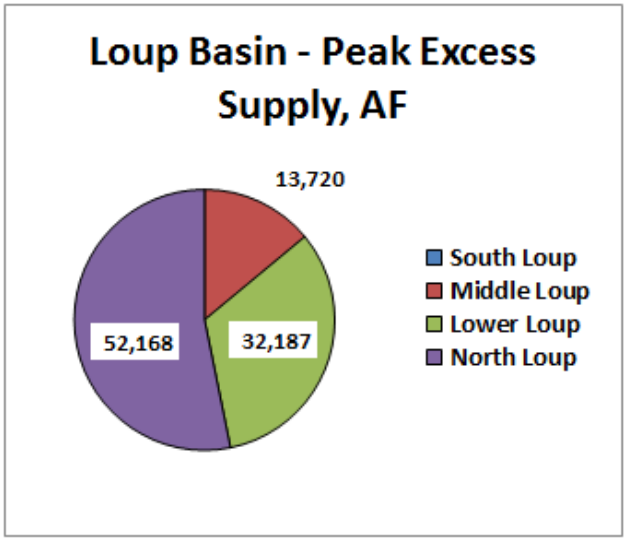
Excess Supply – Loup Basin

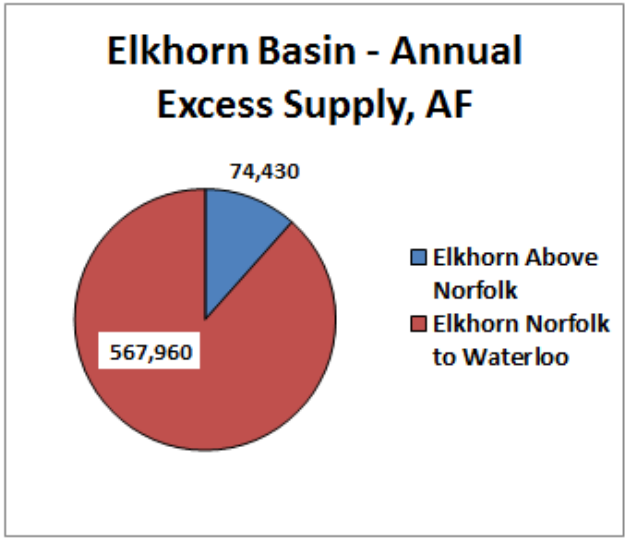


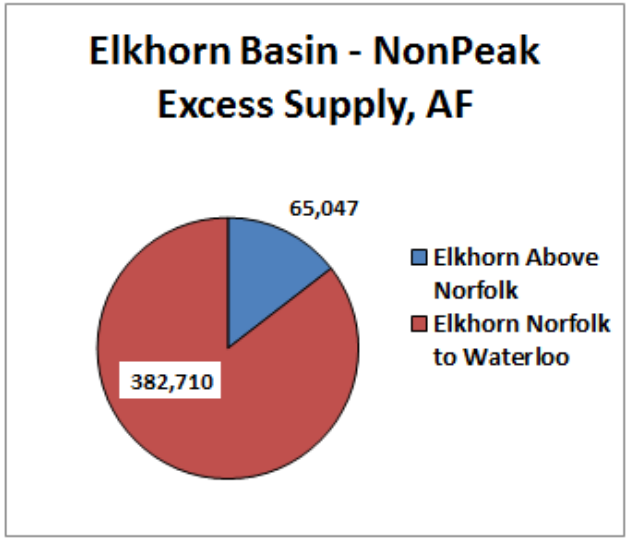


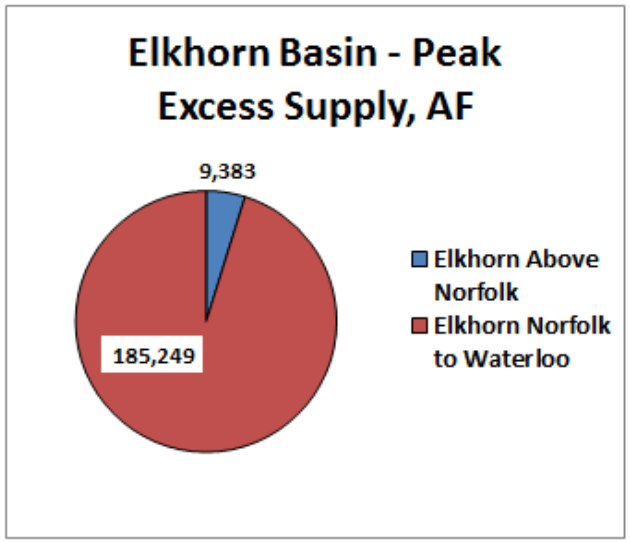


Excess Supply (25yr Avg) - Loup Subbasin									
North Loup			South Loup	Middle Loup			Lower Loup		
Annual	NonPeak	Peak		Annual	NonPeak	Peak	Annual	NonPeak	Peak
343,291	291,122	52,168	-	323,878	310,157	13,720	132,604	100,417	32,187

Excess Supply – Elkhorn Basin

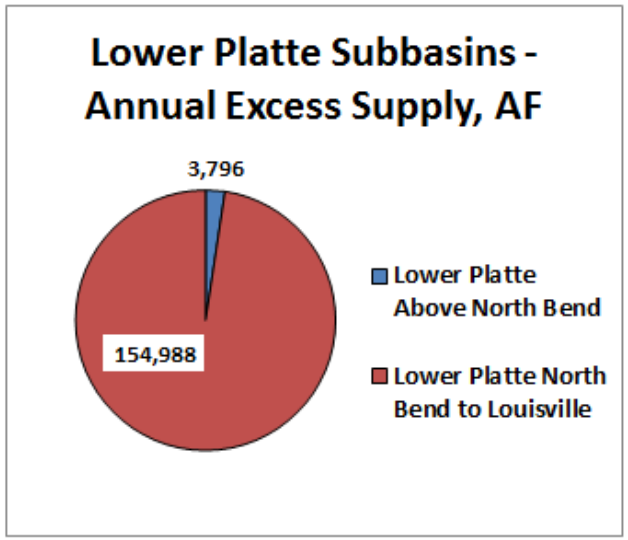


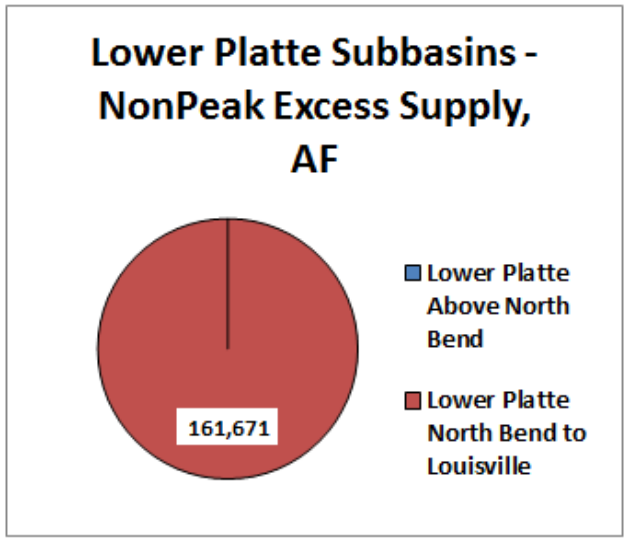


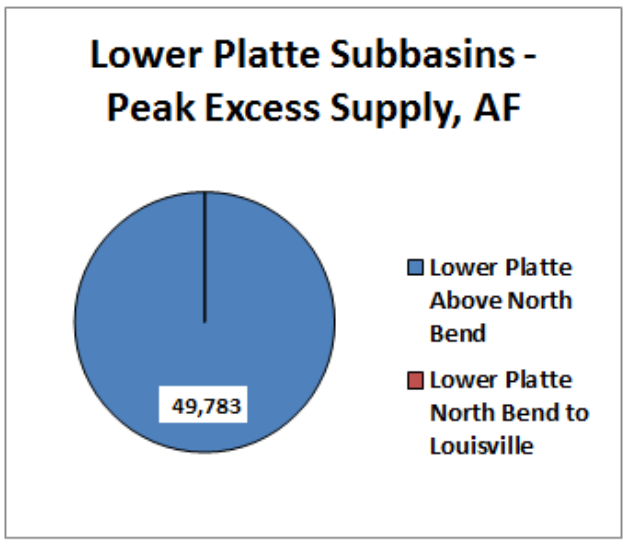


Excess Supply (25yr Avg) - Elkhorn Subbasin					
Elkhorn Above Norfolk			Elkhorn Norfolk to Waterloo		
Annual	NonPeak	Peak	Annual	NonPeak	Peak
74,430	65,047	9,383	567,960	382,710	185,249

EXCESS SUPPLY – LOWER PLATTE SUBBASINS







Excess Supply (25yr Avg) - Lower Platte Subbasin					
Above North Bend			North Bend to LV		
Annual	NonPeak	Peak	Annual	NonPeak	Peak
3,796	-	49,783	154,988	161,671	-

Excess Supply Under Proposed Accounting – Basin Level

(Results do not account for hydropower)

All units are in AF

Subbasin	Annual Avg. Excess (Based on 80% LV)	1% of Excess	Σ 1% (Over 5-yrs)	Drought (80% of LV) (2002-2005)	Peak (80% of LV) (25yr Avg)
Loup Basin	799,772	7,998	39,989	78,655	98,075
Elkhorn Basin	642,389	6,424	32,119	148,792	194,632
Lower Platte Subbasins	158,784	1,588	7,939	86,621	49,783

Excess Supply Under Proposed Accounting – Subbasin Level

(Results do not account for hydropower)

All units are in AF

Subbasin	Annual Avg. Excess (Based on 80% LV)	1% of Excess	∑ 1% (Over 5-yrs)	Drought (80% of LV) (2002-2005)	Peak (80% of LV) (25yr Avg)
North Loup	343,291	3,433	17,165	63,864	52,168
South Loup	-	-	-	-	-
Middle Loup	323,878	3,239	16,194	14,791	13,720
Lower Loup	132,604	1,326	6,630	-	32,187
Elkhorn Above Norfolk	74,430	744	3,721	-	9,383
Elkhorn Norfolk to Waterloo	567,960	5,680	28,398	148,792	185,249
Above North Bend	3,796	38	190	86,621	49,783
North Bend to LV	154,988	1,550	7,749	-	-

Level of Conservatism

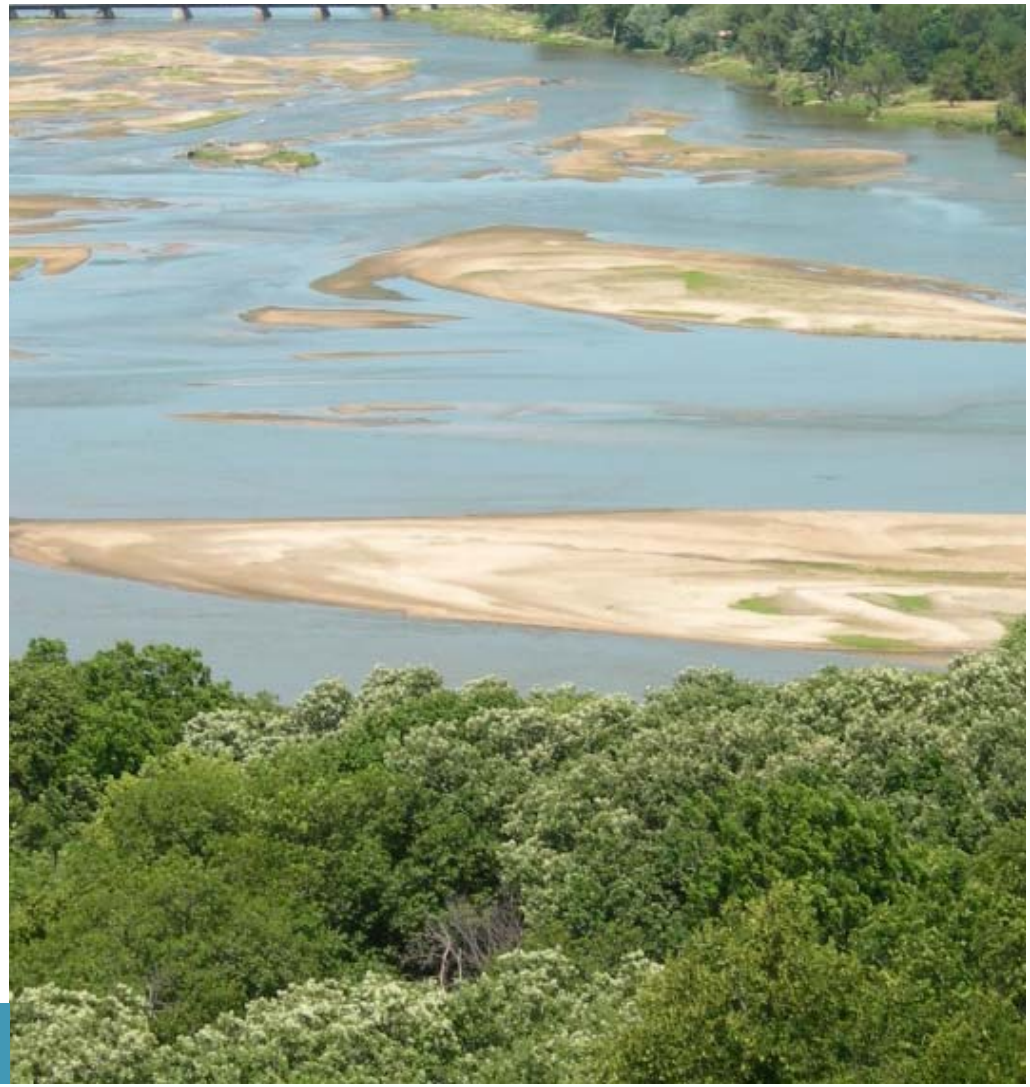
- Ignores “pass-through” water from Loup Hydropower demand as supply to Lower Platte Subbasins
- Limits to 1% of Excess Supply
- Limits to lesser of Peak Season 25-year Avg. or Peak Season Drought
- Uses demand representing 80% Streamflow at Louisville instead of Instream Flow Demand

CAVEAT

By ignoring Loup Hydropower, water that would have been used to meet this demand is included in the “Excess Supply” for the Loup Basin. Loup Basin would need to work with Loup Hydropower on agreements to develop this water.

Summary

- Purpose of Coalition
- Purpose of Plan
- Goals of Water Bank
- Basin-Wide Accounting Methodology



Next Steps


QUESTIONS?