

*Update on*

# Fully Appropriated Evaluation Methodology

NRD Managers Meeting  
Papio-Missouri River NRD – Omaha, NE  
August 29, 2012



# Today's Discussion

- Project Background and Goals
- Project Activities
  - Literature Review
  - Potential Methodology Refinements and Testing
  - Recommendations
- Next Steps

# Project Background

- Project History
  - CPNRD working on IMP - need OA-FA difference
  - CPNRD approached NDNR about proposed methodology
  - NDNR: Statutes link OA-FA difference to evaluation
    - Current evaluation methodology does not provide OA-FA difference
  - Result: CPNRD and NDNR lead effort to look at methodology
  - **Goals:**
    - Best represent supplies and uses in basins
    - Link evaluation to the IMP process.

# Scope of Project

- From minor tweaks to wholesale revisions were on the table
- Possible changes to rules and procedures
- Approach:
  - Research what's being done elsewhere – not necessarily looking to reinvent the wheel
  - Identify desired elements of methodology
  - Develop methodology for testing
  - Final recommendations

# Literature Review

- Sources
  - State Statutes
  - Administrative Rules
  - Special Management Areas
  - Compacts and their accounting methods

Result = No “off-the-shelf” solution

# Methodology

- Key Desirable Characteristics of Method
  - Flexible time period – reflect cyclical nature of water budget
  - Reflect seasonal variations
  - Independently accounts for SW/GW use and supply
  - Considers variation in water supply from year to year
  - Evaluate/consider conservation measures
  - Consumptive/Non-consumptive use
  - Utilize existing datasets when possible

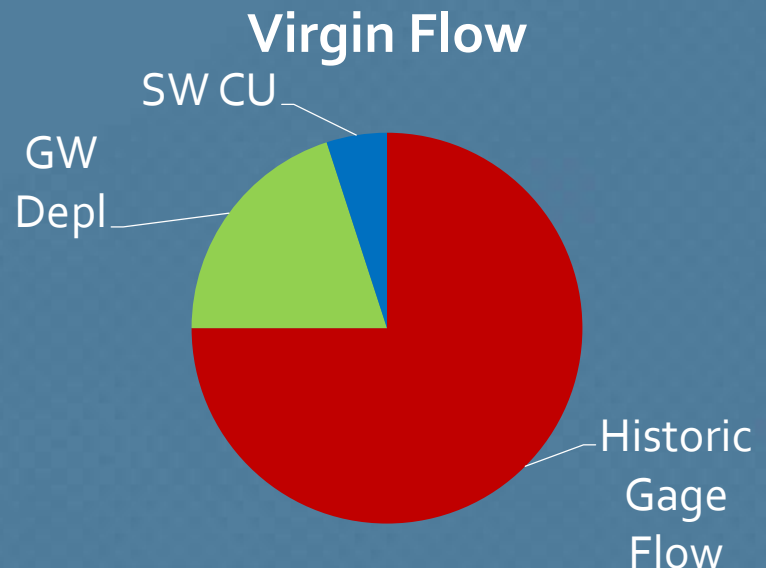
# Methodology- Overview

- Methodology for Testing
  - **Supply** - Virgin Flow Hydrograph for Supply
  - **Demand** - Identify SW and GW consumptive and non-consumptive uses
  - **SW/GW Integration** - Best available technology for SW-GW interaction (analytic, numerical modeling, etc.)
- Flexibility in tools for analysis

# Methodology - Supply

- Virgin Flow Hydrograph
  - Estimate of streamflow hydrograph “undepleted by activities of man”
  - Historic gaged flows + upstream consumptive uses:

*Virgin Flow = Historic flow  
+ historic SW CU  
+ estimated GW depletions*





# Methodology - Demands

- Differentiate between SW and GW uses

## GROUND WATER DEMANDS

Ground water irrigation (CU)  
M & I wellfields (CU)

## SURFACE WATER DEMANDS

Irrigation Canal Diversions (CU)  
Individual irrigation appropriators (CU)  
Hydropower (NonCU)  
Instream flow appropriations (NonCU)  
Reservoir evaporation (CU)

# Methodology - Demands

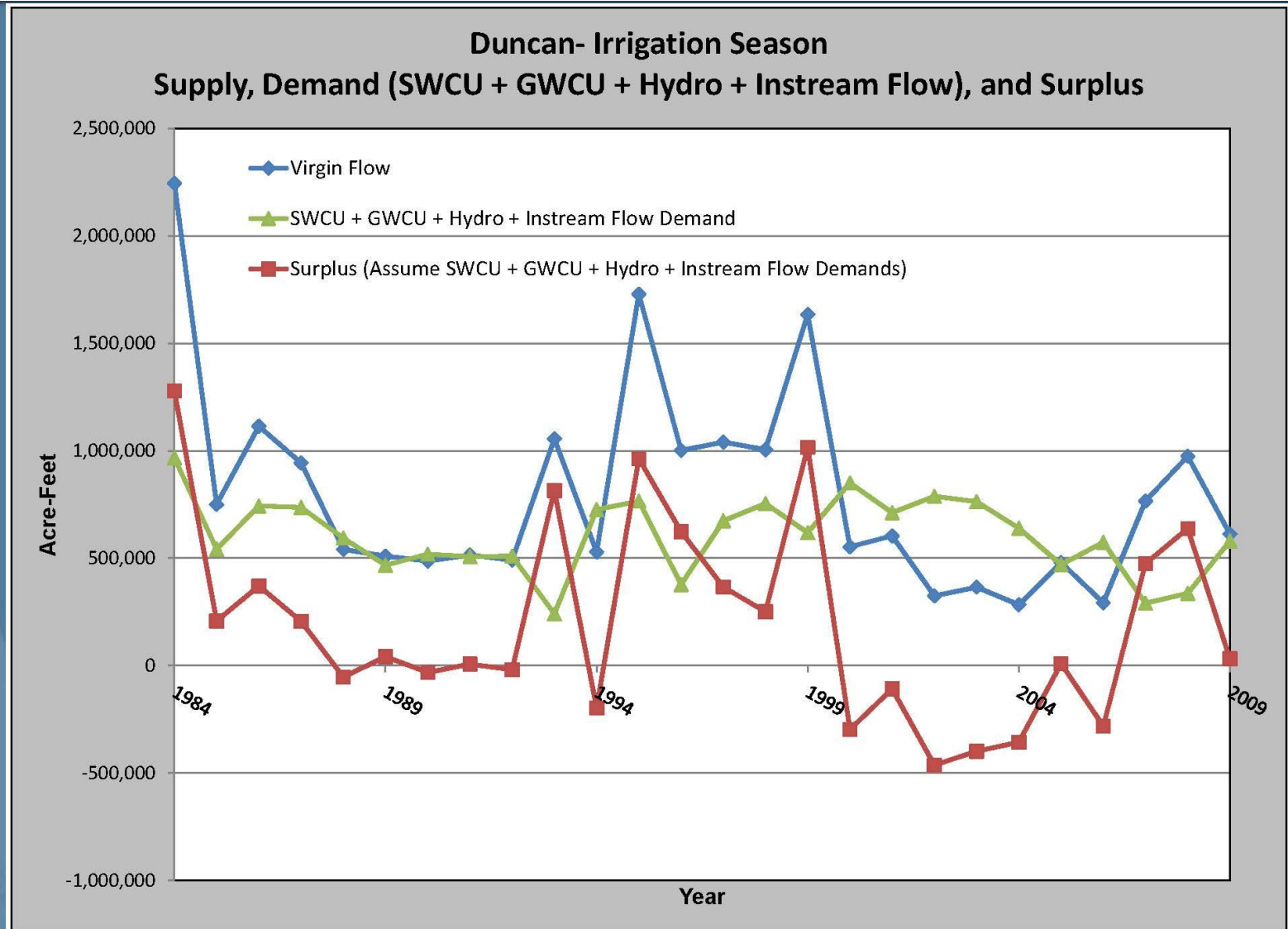
- Two levels of groundwater demands
  - 1) GW use represented by Depletions (current level of impacts)
  - 2) Full GW consumptive use (accounts for lag effect)

 ***Snapshot of where we are and where we are headed***

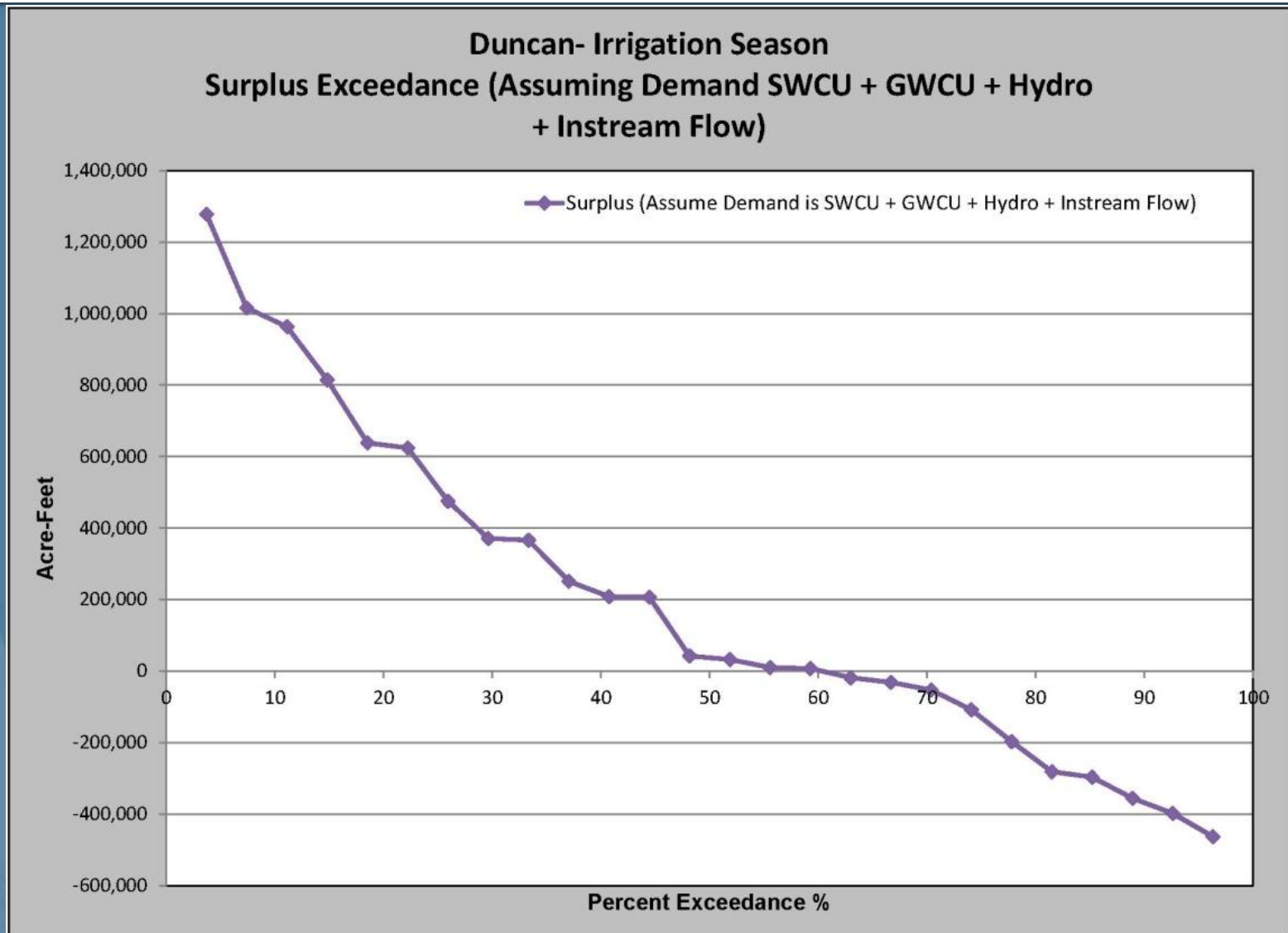
# Supply & Demand Comparison

- Because each of the 3 curves on the Supply/Demand FDC plot are rankings; time is lost
- To retain the paired supply/demand for each year surplus or deficit each year was calculated.
- This surplus was then ranked and plotted using probability curve.

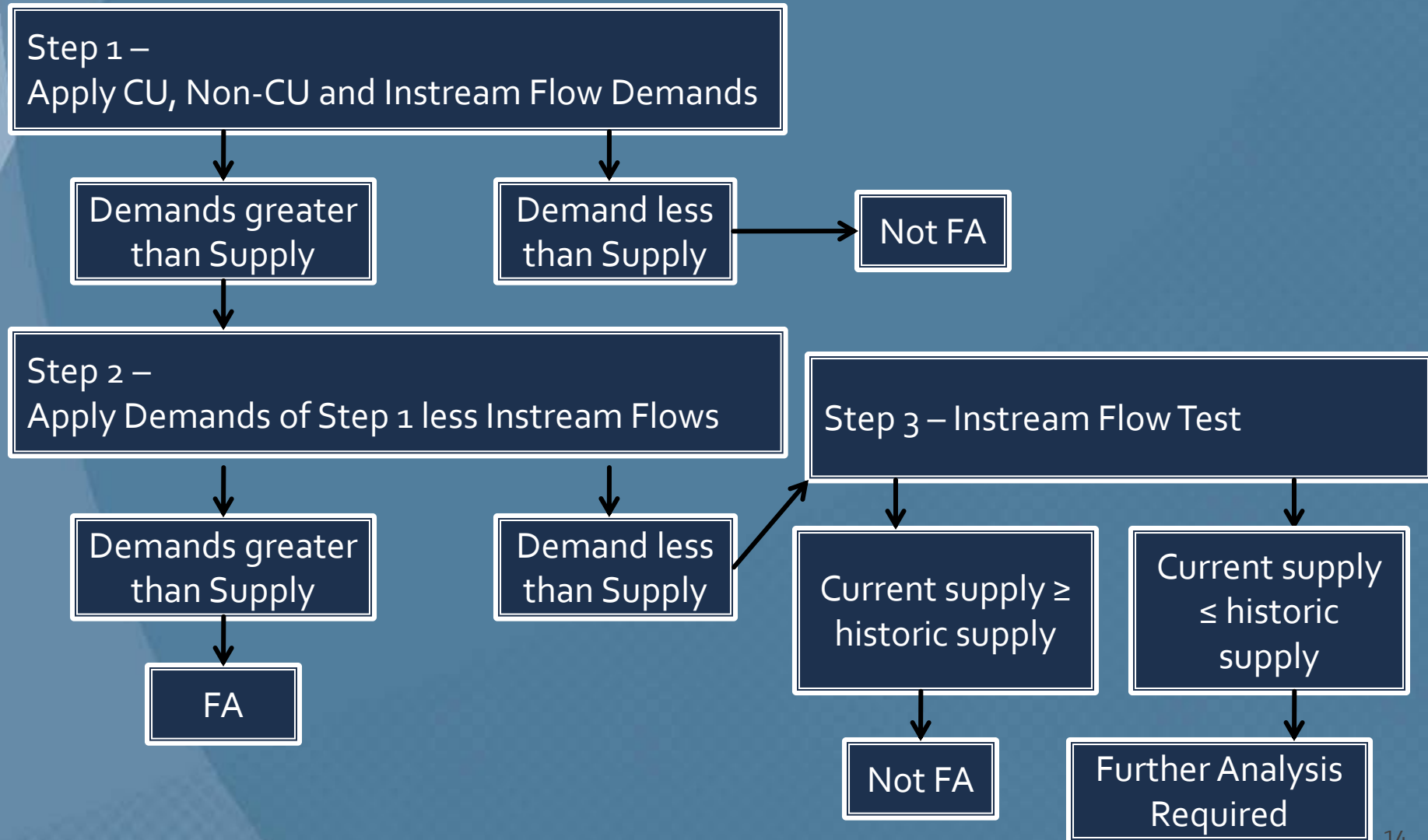
# Supplies, Demands, and Surplus



# Building the Surplus Probability



# Methodology – Process

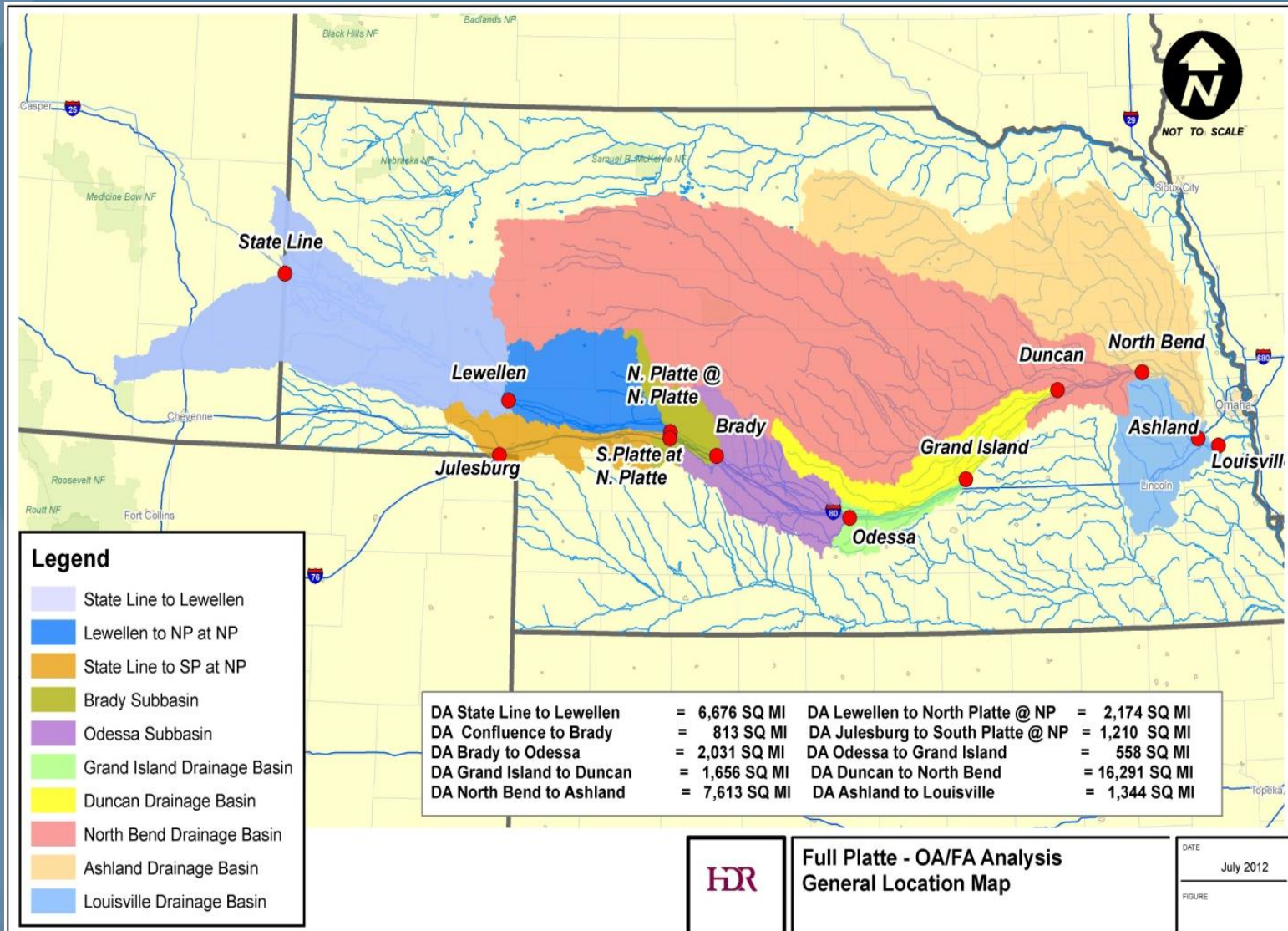


# Methodology- Instream Flow Test

- Statute ties appropriation to that available at time of granting.
- Two time periods (chosen by statistical analysis)
  - 1) Analysis Period Prior to Water Right Issued
    - Corrections made to account for level of development at time water right issued.
  - 2) Current Analysis Period
    - Correction made to account for current level of depletions.
- Lesser of adjusted flows (“reasonably expected”) or instream flow appropriation.



# Full Platte Analysis





# Full Platte Analysis

- Addition of areas upstream of Overton
  - Estimate Virgin Flow at State Line
  - Addition of Irrigation Canals
  - Addition of Lake McConaughy

# Full Platte Analysis

- Testing of Additional Refinements
  - Kingsley Hydropower
  - Large storage reservoir with multiple operational scenarios
  - Partitioning demands to North and South Platte Rivers

# Next Steps

- Finishing the Full Platte River Analysis
- Final Recommendations
- Begin the rulemaking process

Questions?