

# US Fish and Wildlife Service



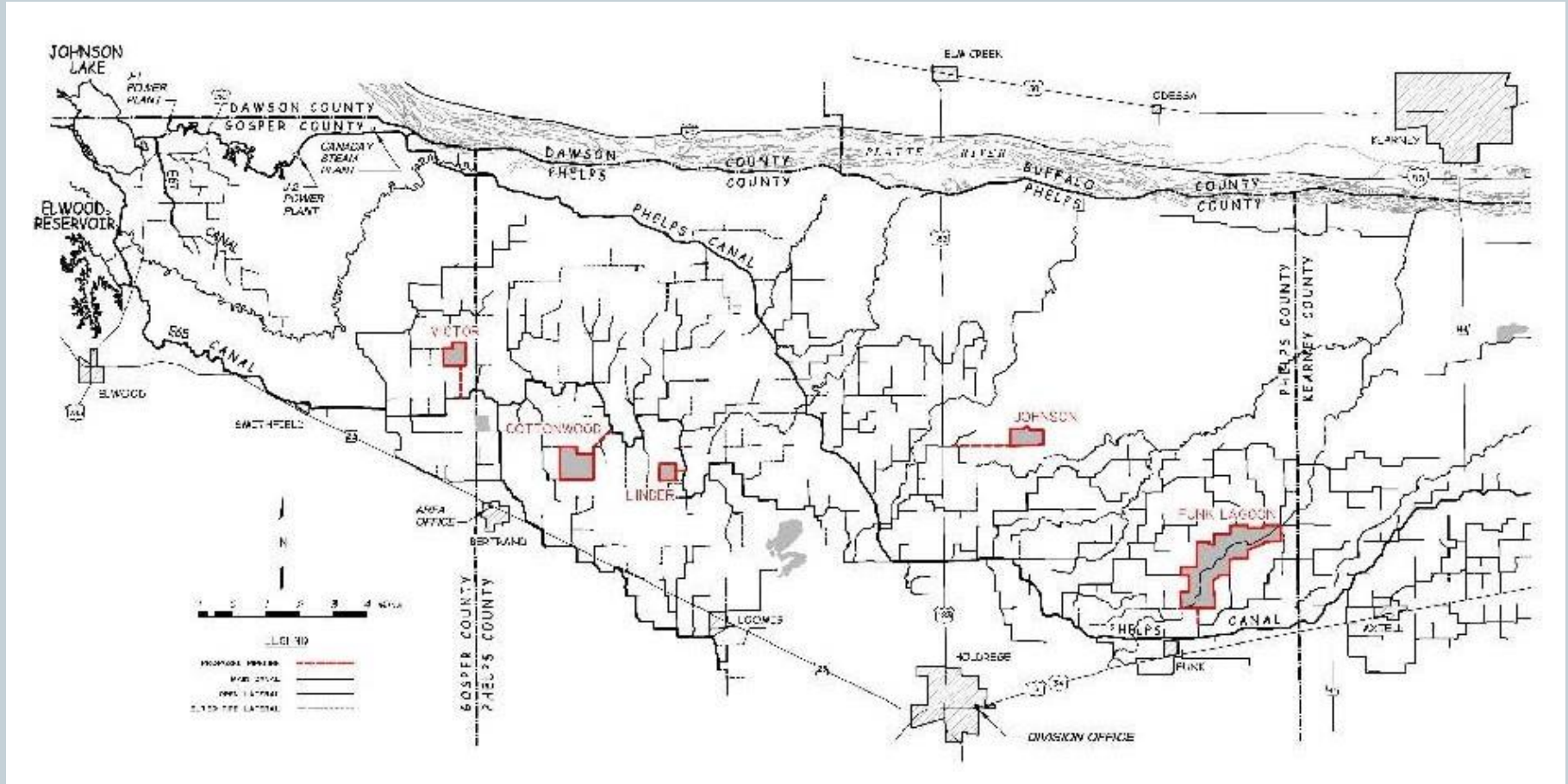
Working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.



Jeff Drahota  
Complex Biologist/Certified  
Hydric Soil Scientist  
Rainwater Basin Wetland  
Management District



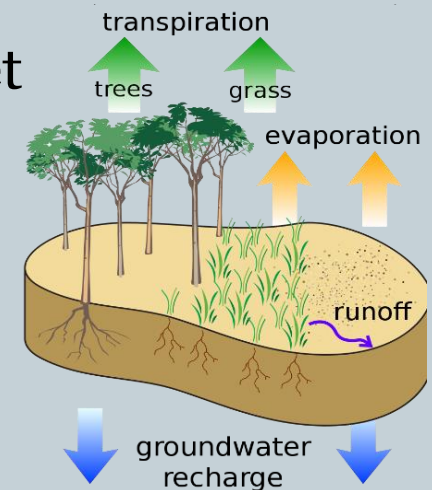
# Western Recharge Project Location Map



# Outline



- **Funk WPA**
  - Basin and Project Locations
  - Habitat Management Plan 2020-2024 and Sustainability
  - New Restoration Projects
- **Hydrology Monitoring**
  - Surface Water Methods
    - ✦ Survey, Elevation Area Capacity, Water Budget
  - Groundwater Methods
    - ✦ Well installation
- **Status and Recent Results**
  - Summary of Recharge Events



# Rainwater Basin WMD Vision



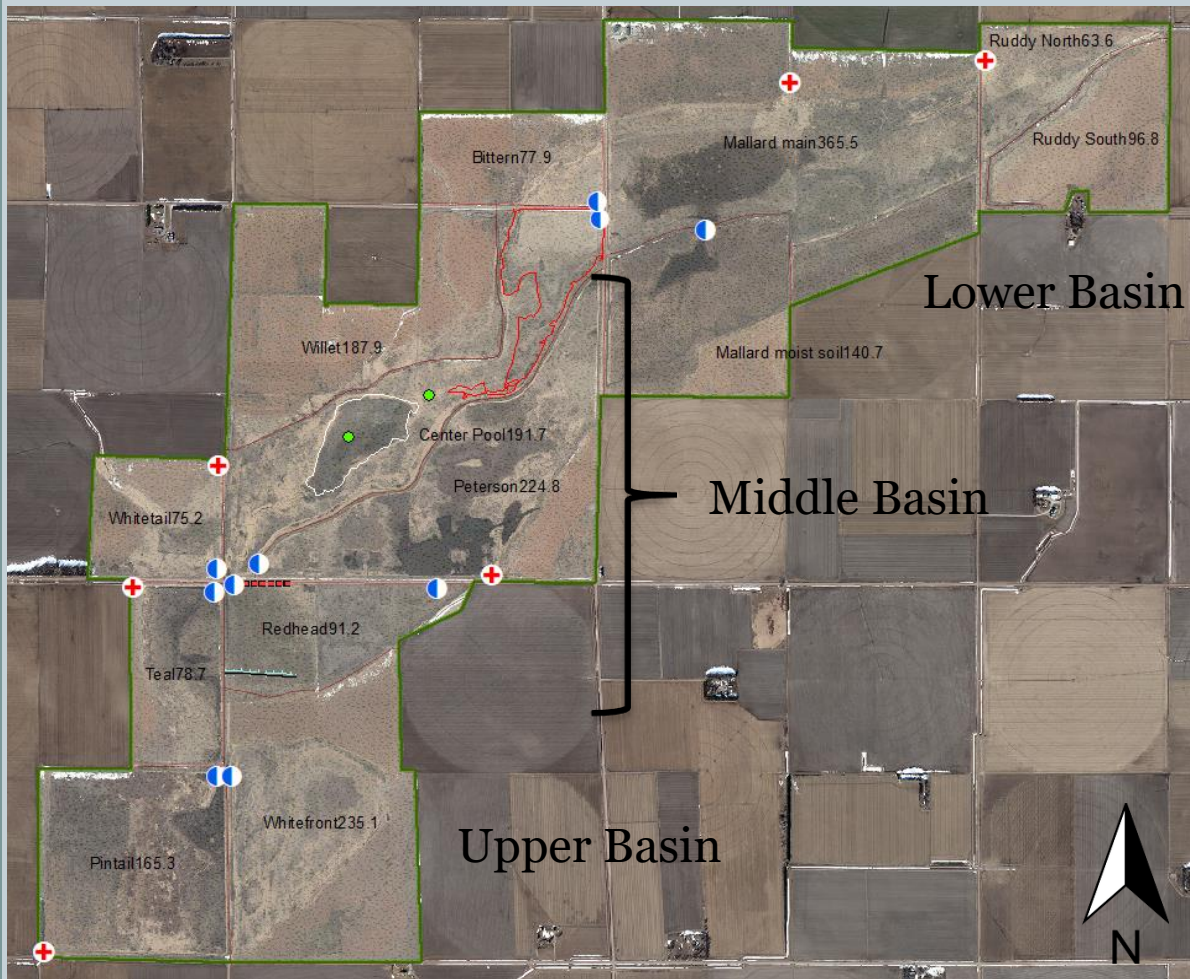
The Rainwater Basin provides **critical habitat** for millions of migratory birds.

The basin's name reflects both the basis of its wetland hydrology and natural precipitation cycles. A network of **functioning** wetland and prairie plant ecosystems provides a **native grassland mosaic** that gives the local community a sense of pride and connection to the Great Plains flora and fauna. The lands managed by the wetland management district serve as an example of land stewardship **mimicking natural processes**, and they provide an array of wildlife-dependent educational and recreational opportunities.

It is only through **partnerships** with individuals, agencies, and organizations that this vision can be achieved and maintained.



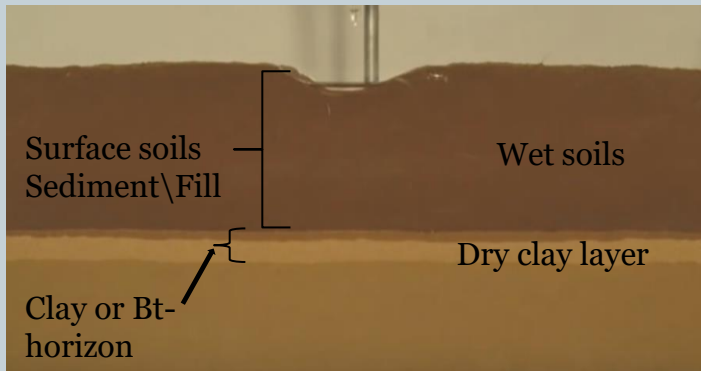
# Funk WPA



# Natural Processes - Sustainability

## Highly manipulated landscapes both increase and decrease natural processes:

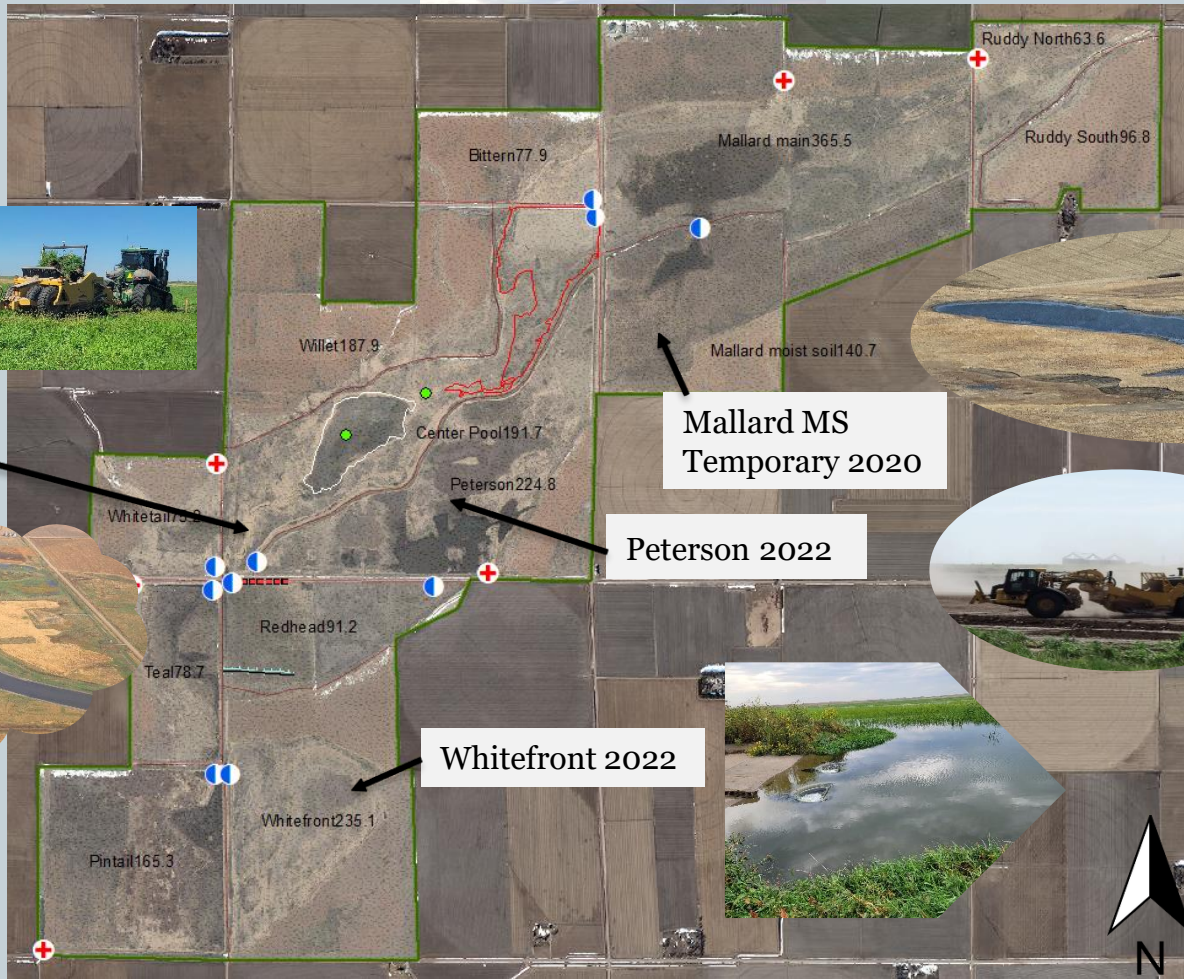
- Frequency - disturbance, deluge, dry
- Intensity - Rx, grazing
- Duration – ponding, grazing
- Sediment Accumulation - deflation



Funk Whitefront Unit at full pool, note the spoil piles are above the ponded elevation

✓ Groundwater Recharge?

# Funk Project Locations



Water Conveyance 2023



Mallard MS Temporary 2020



Peterson 2022



Whitefront 2022



# Restore Wetland Function



- Improve water conveyance
- Improve pumping efficiency
- Reduce invasives and undesirable plants
- Increase the amount of energy available to spring migrants



CNPPID helping with new culvert installment



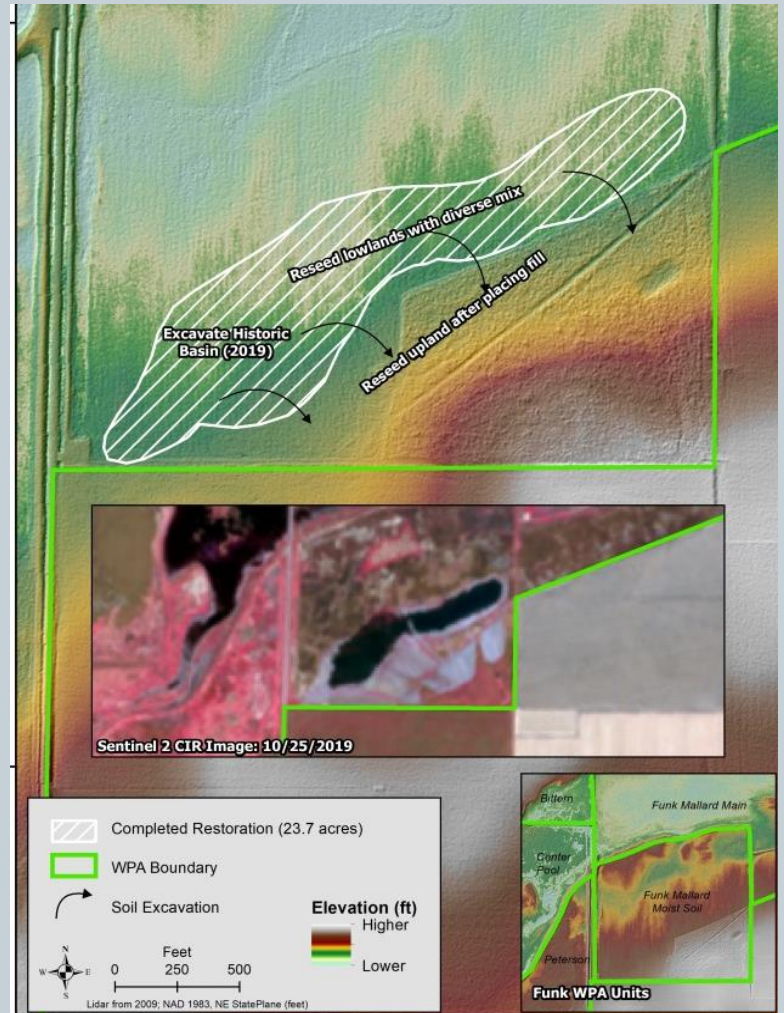


# Restore Wetland Function – Mallard MS

- Increase ponded area and ponding frequency on 26 A
- Reduce invasiveness (Canada thistle, Phrag., and reed canarygrass)
- Increase sustainability



Strategy - recreate the basin footprint by removing 60,000 c.y. of fill



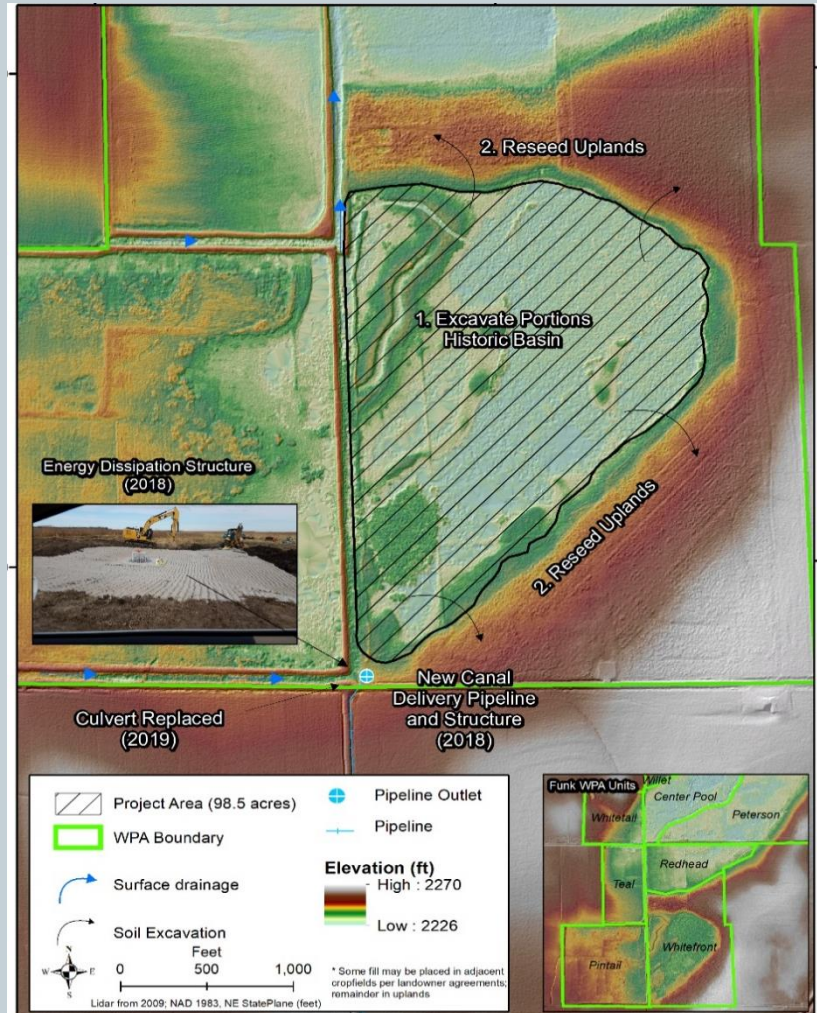
# Increase Ponded Area – Funk WF Unit



- Increase ponded area and ponding frequency on ~99 A
- Add canal water delivery system (max 54 cfs) and add water during excess flows



**Strategy - reshape the bowl-shaped depression by removing 105,000 c.y. of fill and sediment from 63 acres**



# Improve Wetland Function – Peterson



- Increase ponded area and ponding frequency on ~156 A
- Improve pumping efficiency
- Reduce invasiveness



**Strategy – remove 184,505 c.y. of fill and create a flat basin footprint by targeting high areas**



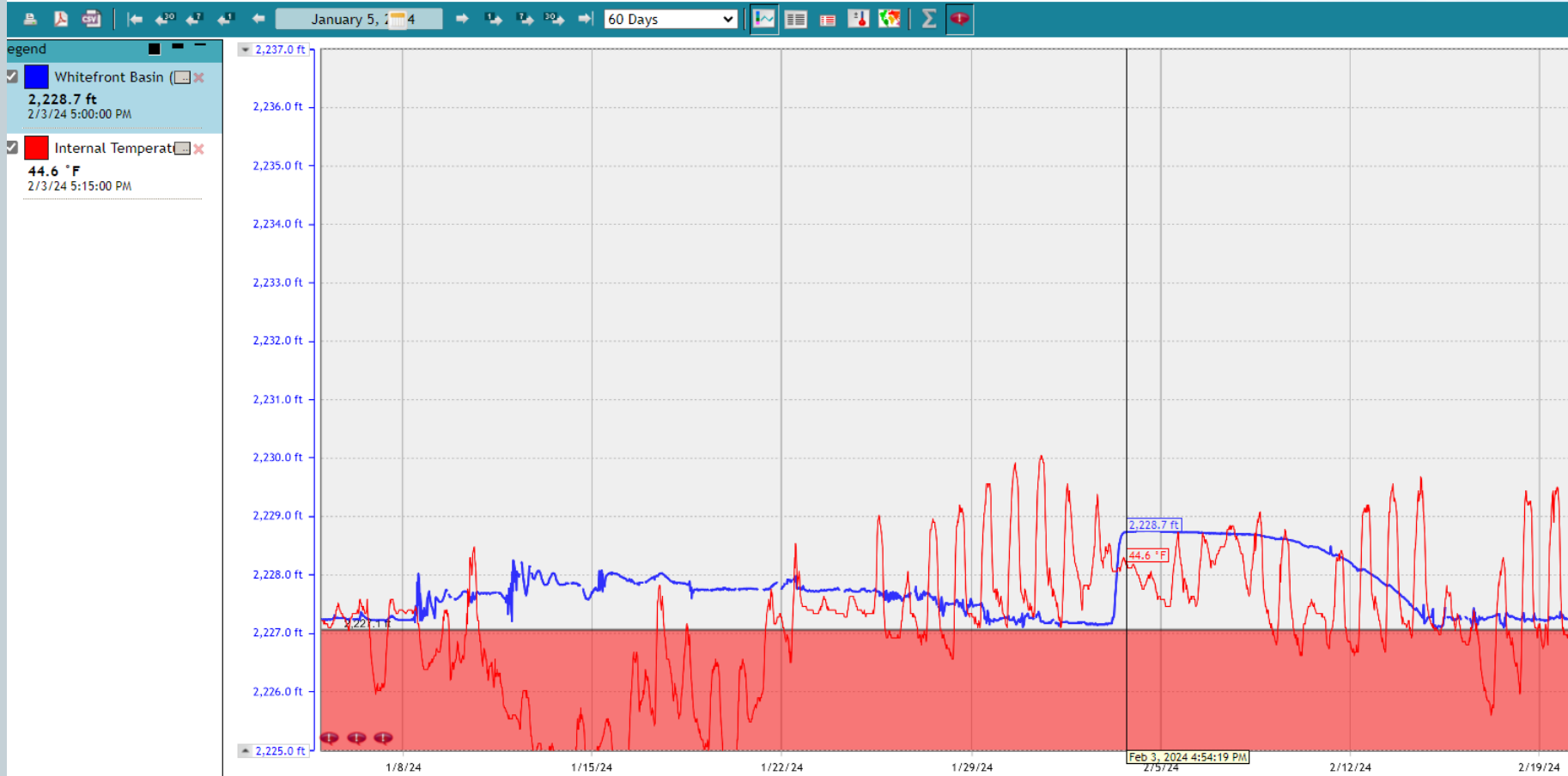
# Surface Water Data Collection



**ADCON** | addVANTAGE Pro 6.8

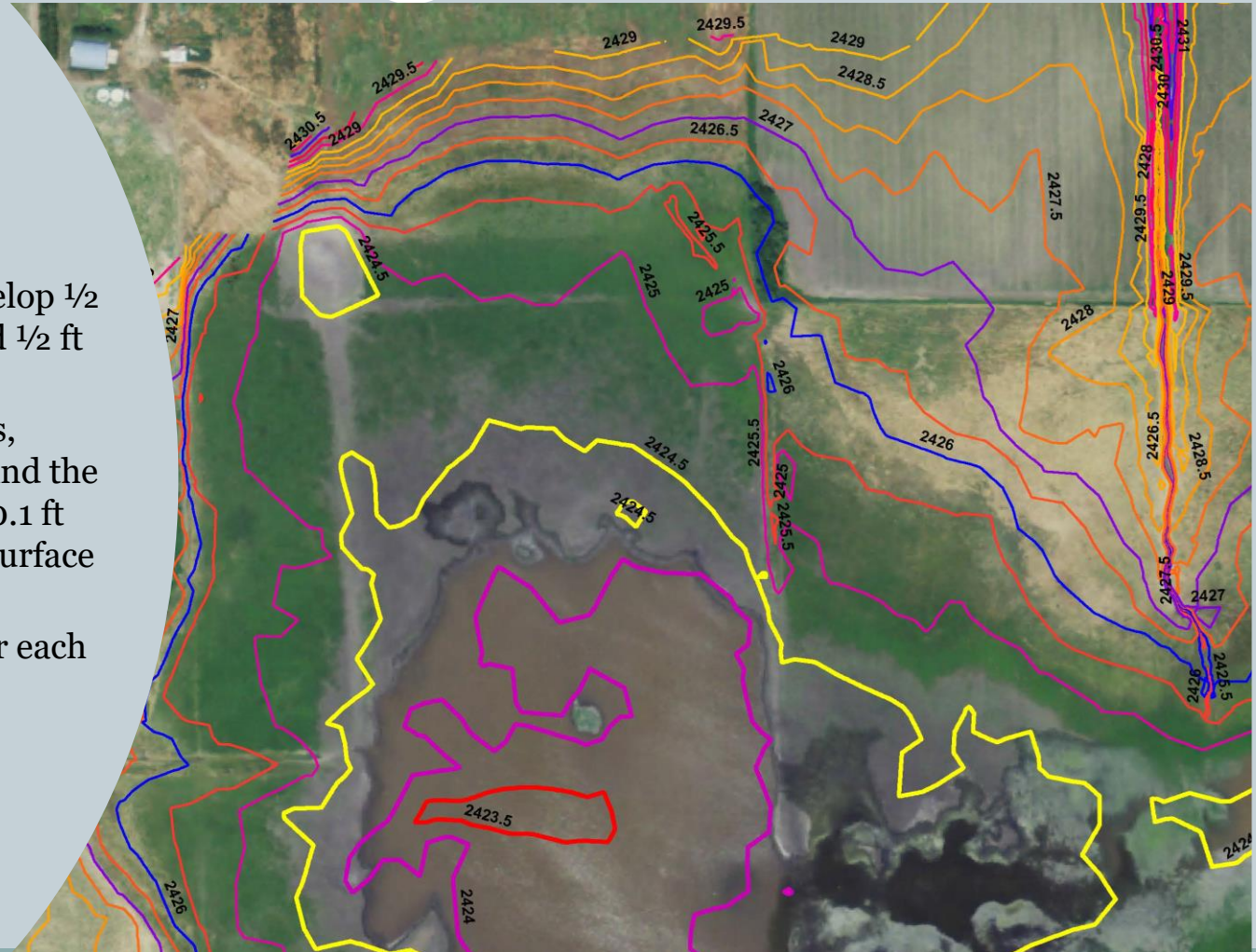
The next level of visualization

Tools | Window | Help | Logout

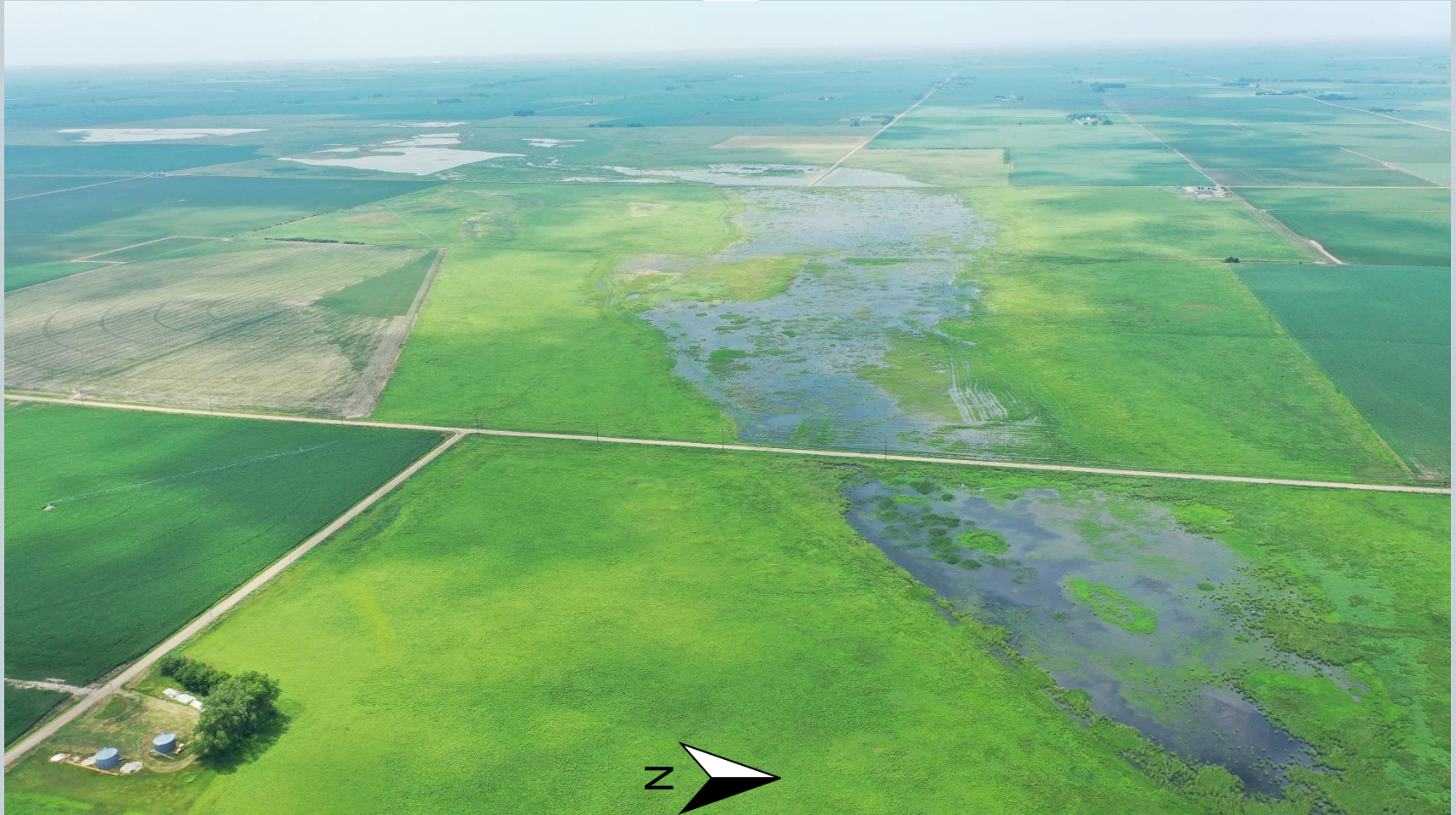


# Develop Elevation Area Capacity Curves

- Use topo survey to develop 1/2 ft contour shapefile and 1/2 ft Raster dataset
- Use ArcGIS 3D analysis, compute Surface area and the basin volume for each 0.1 ft elevation (Functional Surface – Surface Volume)
- Copy text file output for each elevation increment in spreadsheet

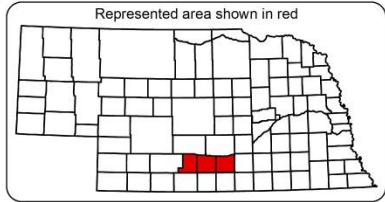
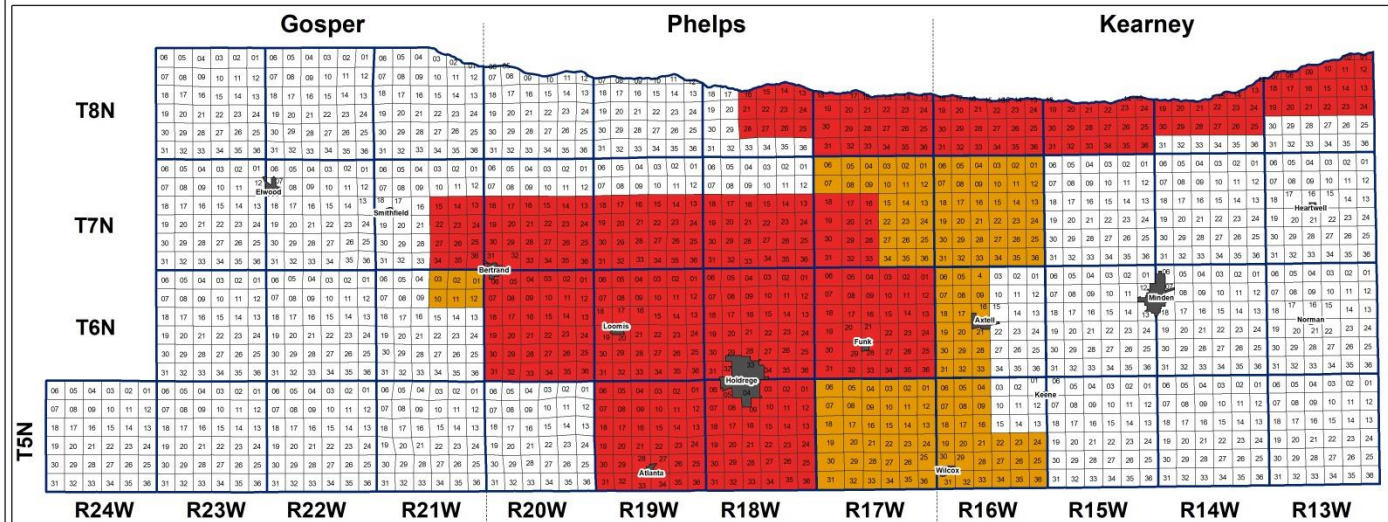


# Funk After Canal Water Delivery



# Groundwater Quality

## Tri-Basin Natural Resources District Groundwater Quality Management



- Phase I Average sampled N < 9.0 PPM.
- Phase II Average sampled N > 9.0 PPM. Producers are required to: obtain nitrogen management certification; sample soil & water; and submit crop reports. Application of nitrogen is prohibited September 1 - November 1. \*
- Phase III Average sampled N > 9.0 PPM for 15 years. All producers requirements remain the same as Phase II. Application of nitrogen is prohibited September 1 - March 1.\*

\*For more details, groundwater management rules can be found at [www.tribasin.org](http://www.tribasin.org).



Nebraska Legislature  
February 2019  
Tri-Basin Natural Resources District



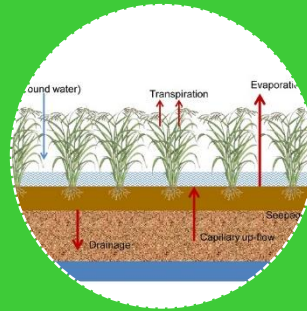
# Computing Water Budget



Basin water budget is a daily computation of inflows, outflows, and change in storage.



Inflows include Water delivery from canal and rainfall on basin plus runoff into the basin



Outflows include estimated water surface evaporation and seepage from the wetted basin



Measured daily water surface elevations are used with the EAC curves to compute the change in storage and area each day.



Results are shown in graphs.





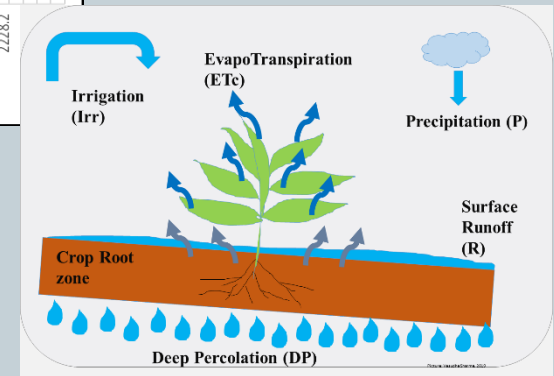
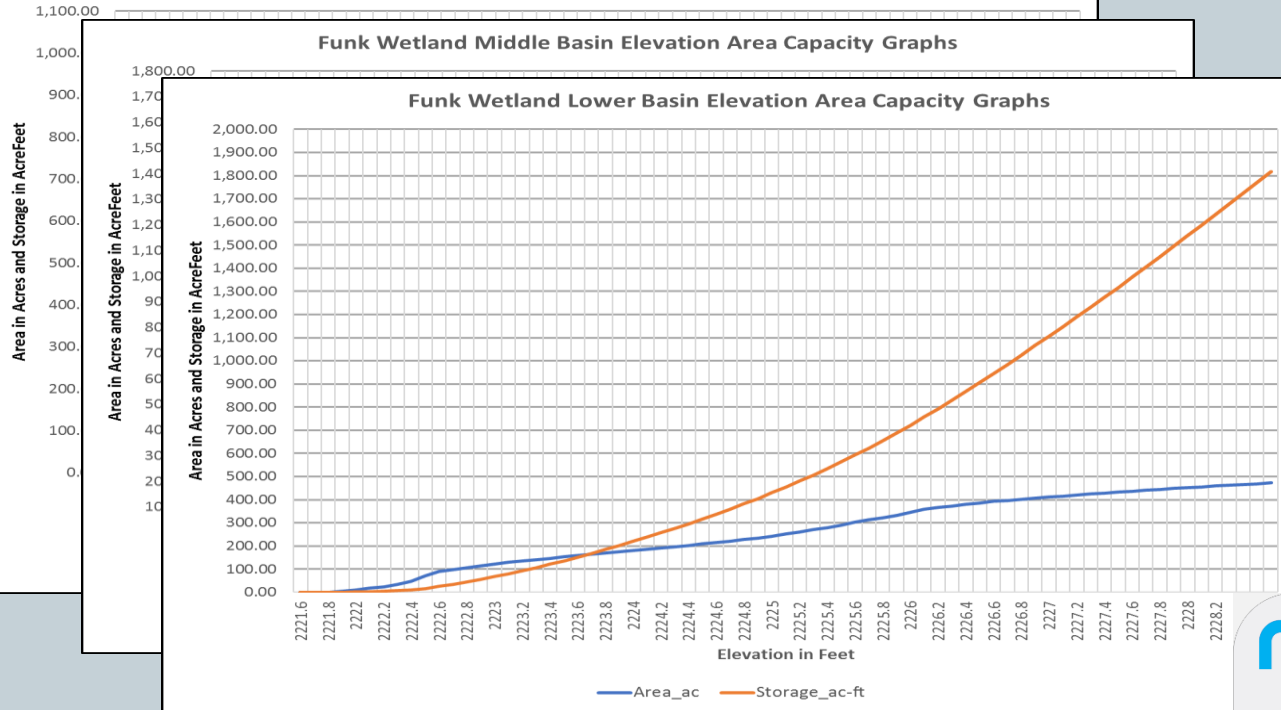
# Results – Area Capacity



Funk Wetland Upper Basin Elevation Area Capacity Graphs

Funk Wetland Middle Basin Elevation Area Capacity Graphs

Funk Wetland Lower Basin Elevation Area Capacity Graphs

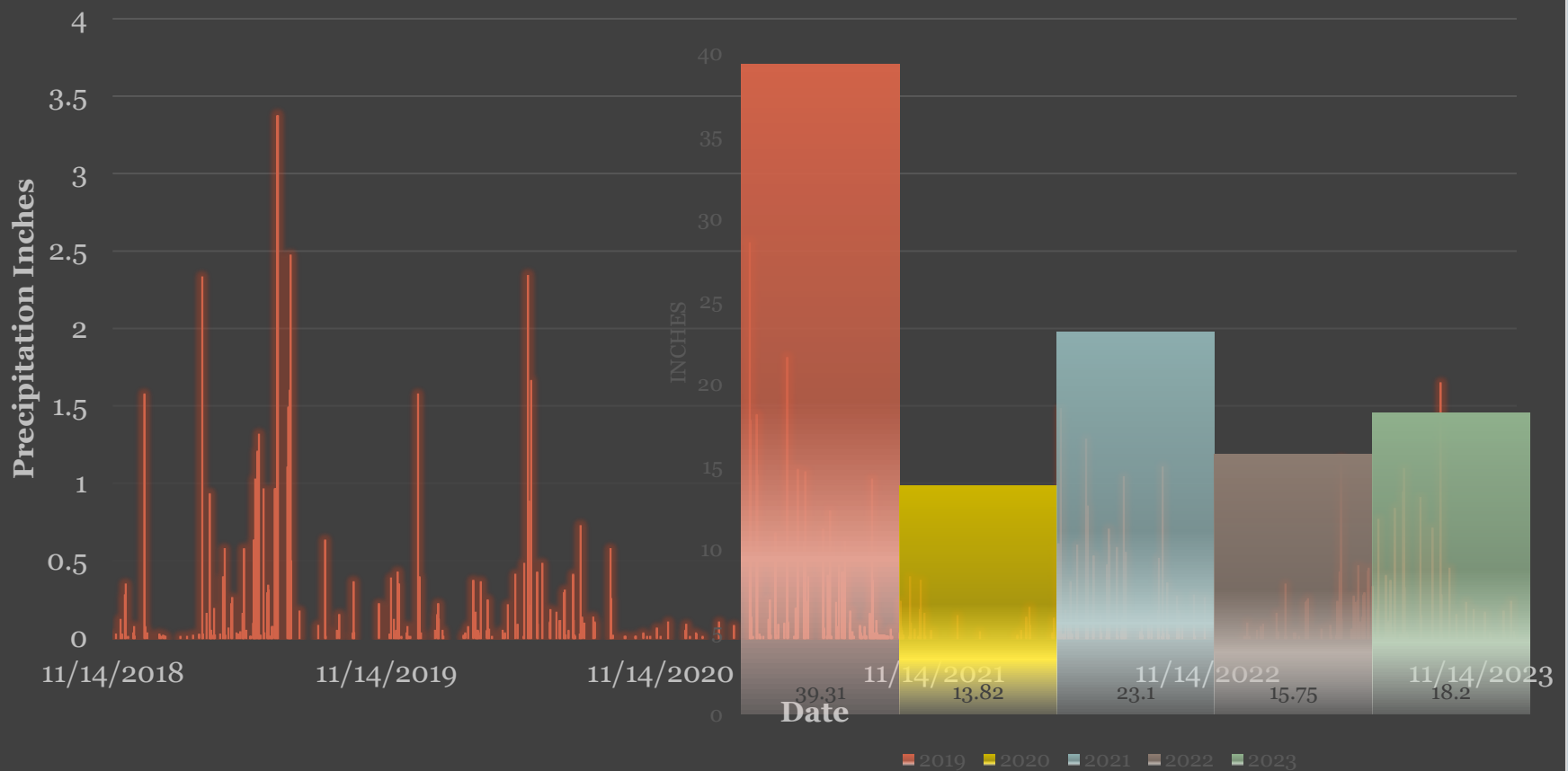


# Results - Precipitation



## TOTAL PRECIPITATION

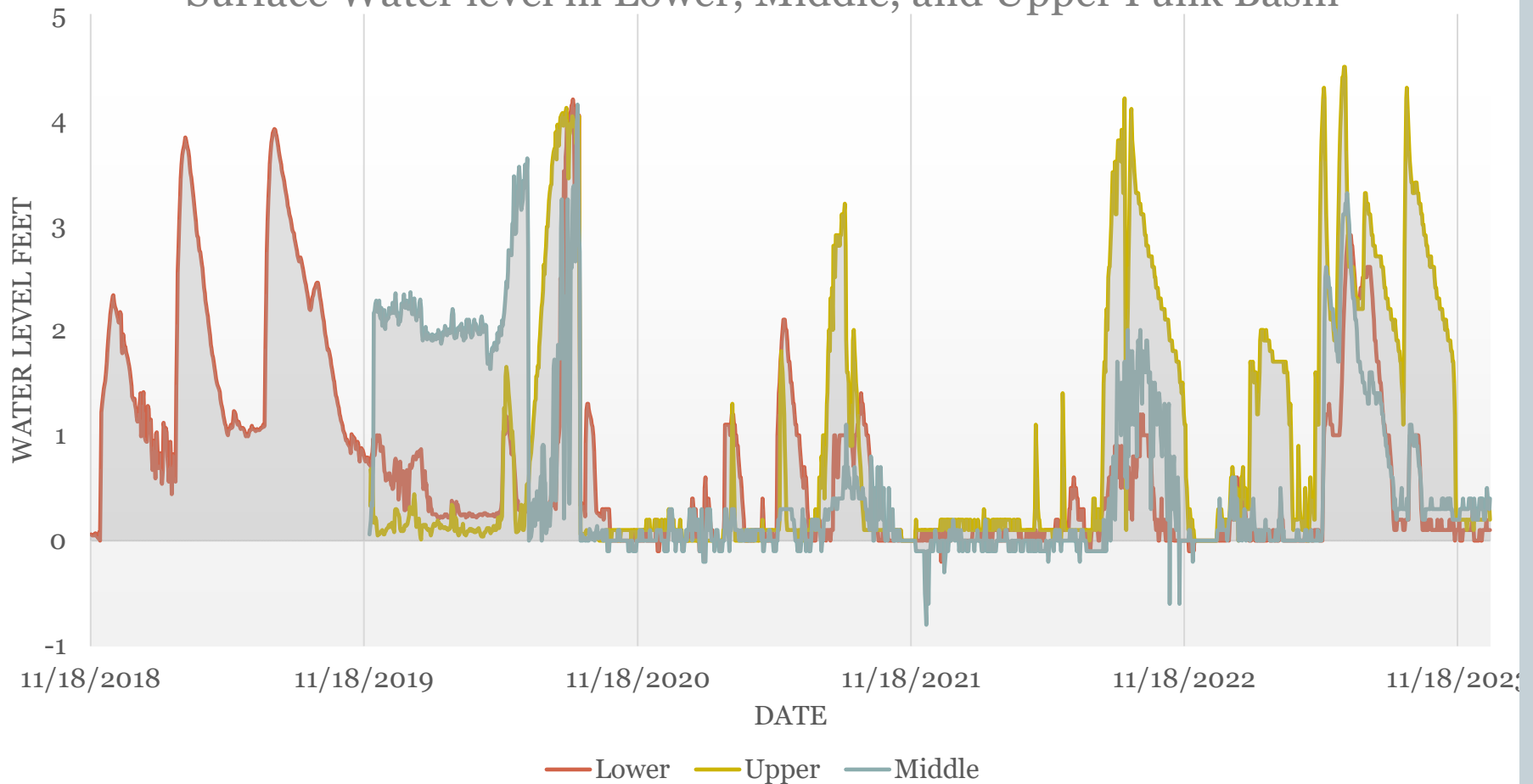
### Daily Precipitation in Lower Basin area at Funk



# Results – Funk Water Levels



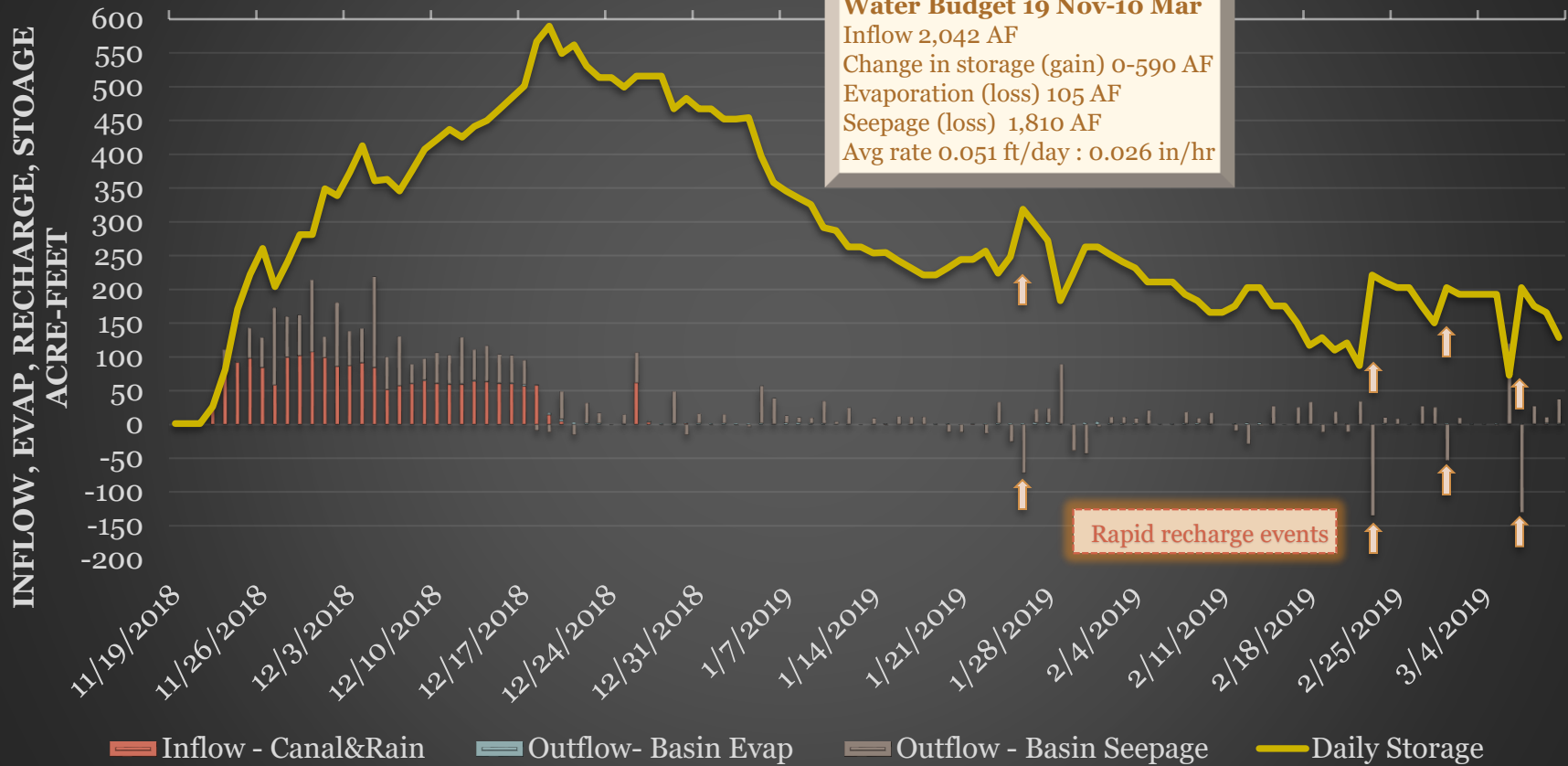
## Surface Water level in Lower, Middle, and Upper Funk Basin



# Results – Daily Water Budget



## Funk WPA Daily Water Budget

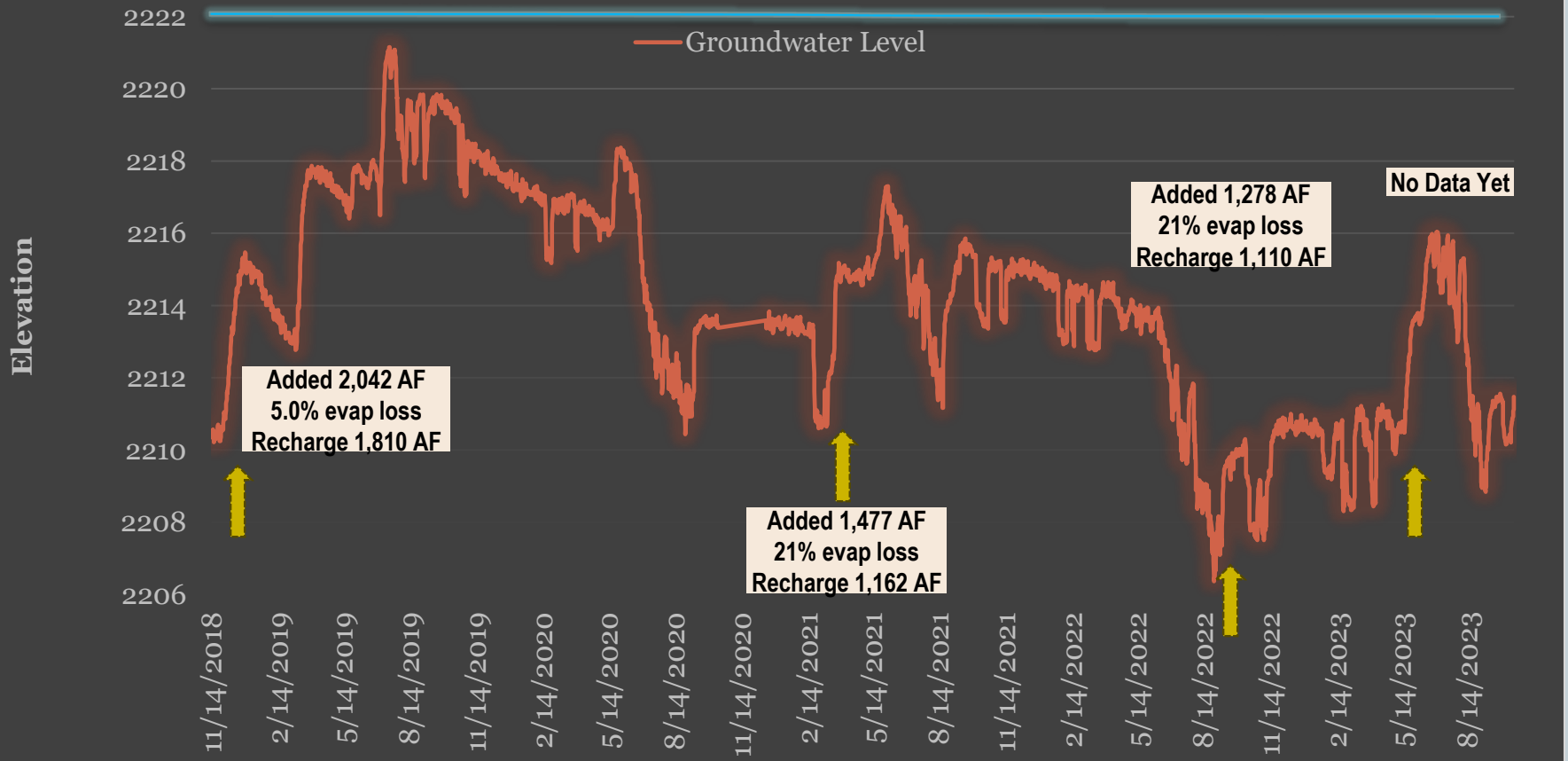


# Results – Lower Basin Groundwater Elevation

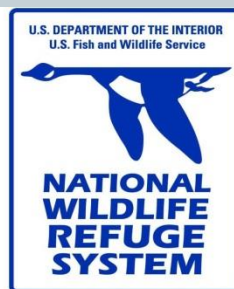
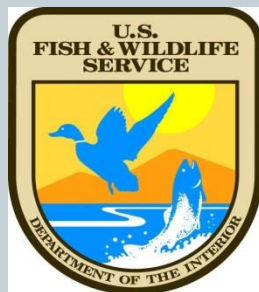


Basin surface elevation

## NENE 10-6N-17W P-148 Funk Lagoon – Peterson, Elev. 2229.8 ft



# We Thank Our Partners



Photos by J. Drahota and Doug Steinke

# Questions

