

**Marais des Cygnes Basin Reservoir
Operations
2022 -2023 Drought**

**1/4/2023 Marais des Cygnes Regional
Advisory Committee**



Marais des Cygnes River Assurance District Operations Agreement

SECTION 2. OPERATION POLICIES AND RESPONSIBILITIES

The Office, the Division and the Assurance District agree to the following terms and the responsibilities of their agencies regarding the operation of Melvern, Pomona and Hillsdale lakes to maintain the municipal and industrial water supplies of the Assurance District, as well as the flows of the Marais des Cygnes River.

Assurance District Operational Triggers

- A. Operational triggers have been set at the Ottawa and LaCygne USGS gaging stations to determine the point at which increased coordination and monitoring need to begin.
- B. Operational triggers are used to indicate that low streamflow conditions exist in the basin and to coordinate use of the available water supply through direct use of Natural Flow, administration of water rights and/or supplementation of streamflow by reservoir release.
- C. The operational trigger at the Ottawa gage is 35 cfs.
- D. The operational trigger at the LaCygne gage is 85 cfs.

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82a-703c. Minimum streamflows established. In accordance with the provisions of K.S.A. 82a-703a, and amendments thereto, the legislature hereby establishes the following minimum desirable streamflows:

	J	F	M	A(a)	M(a)	J(a)	J	A	S	O	N	D
Ottawa	15	15	15	15(40)	20(50)	25(50)	25	25	20	15	15	15
LaCygne	20	20	20	20(50)	20(150)	25(150)	25	25	20	20	20	20

(a) Spawning flows to be managed if reservoirs in flood pool; otherwise use lower flows.

- Minimum desirable streamflows (MDS) are water right demand control triggers.
- Reservoir storage releases are not used to meet or maintain
- Water Rights administration possible for water rights issued after April 12, 1984 if MDS orders are issued by Division of Water Resources

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Minimum Releases

- A. Minimum Releases will be made from Melvern, Pomona and Hillsdale lakes. The Minimum Releases are established within each lake's 1985 water control manual and are based on the following schedule:

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Melvern	20	20	20	20	20	20	20	20	20	20	20	20
Pomona	15	15	15	15	15	15	15	15	15	15	15	15
Hillsdale	3	3	8	8	24	24	24	24	24	8	3	3

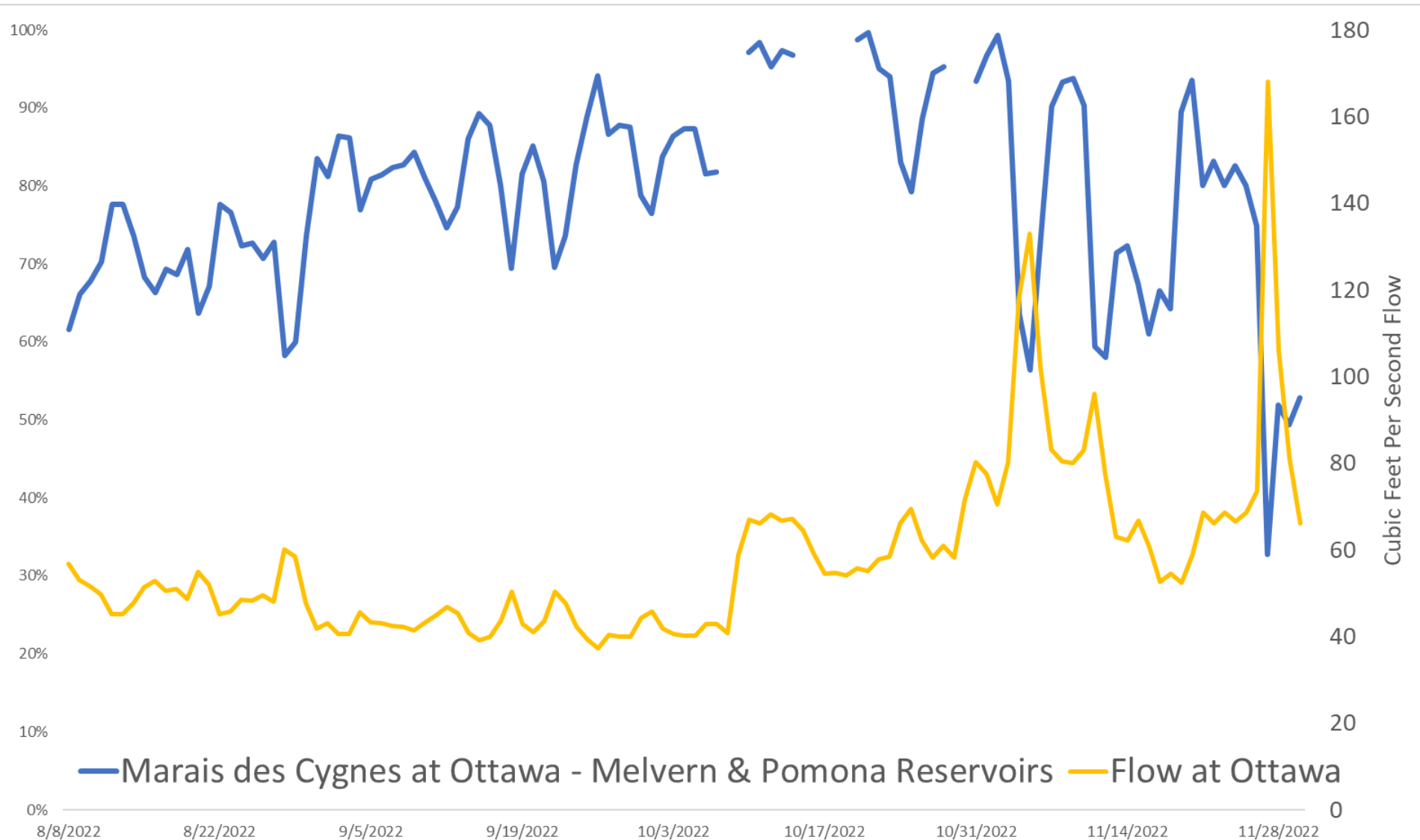
Assurance Releases

- A. Releases from Assurance Storage will be distributed proportionately between Melvern and Pomona lakes on the basis of remaining water in their respective Assurance Storages. Assurance releases will be coordinated with the Corps of Engineers to maintain as closely as possible a proportional balance between Melvern and Pomona lakes.
- B. As long as Minimum Releases are made and operational triggers met, no extraordinary operations will be necessary to change reservoir gate settings to make assurance releases.
- C. Decisions regarding releases from Assurance Storage, will be made through coordination between the Office, the Assurance District and the Division.

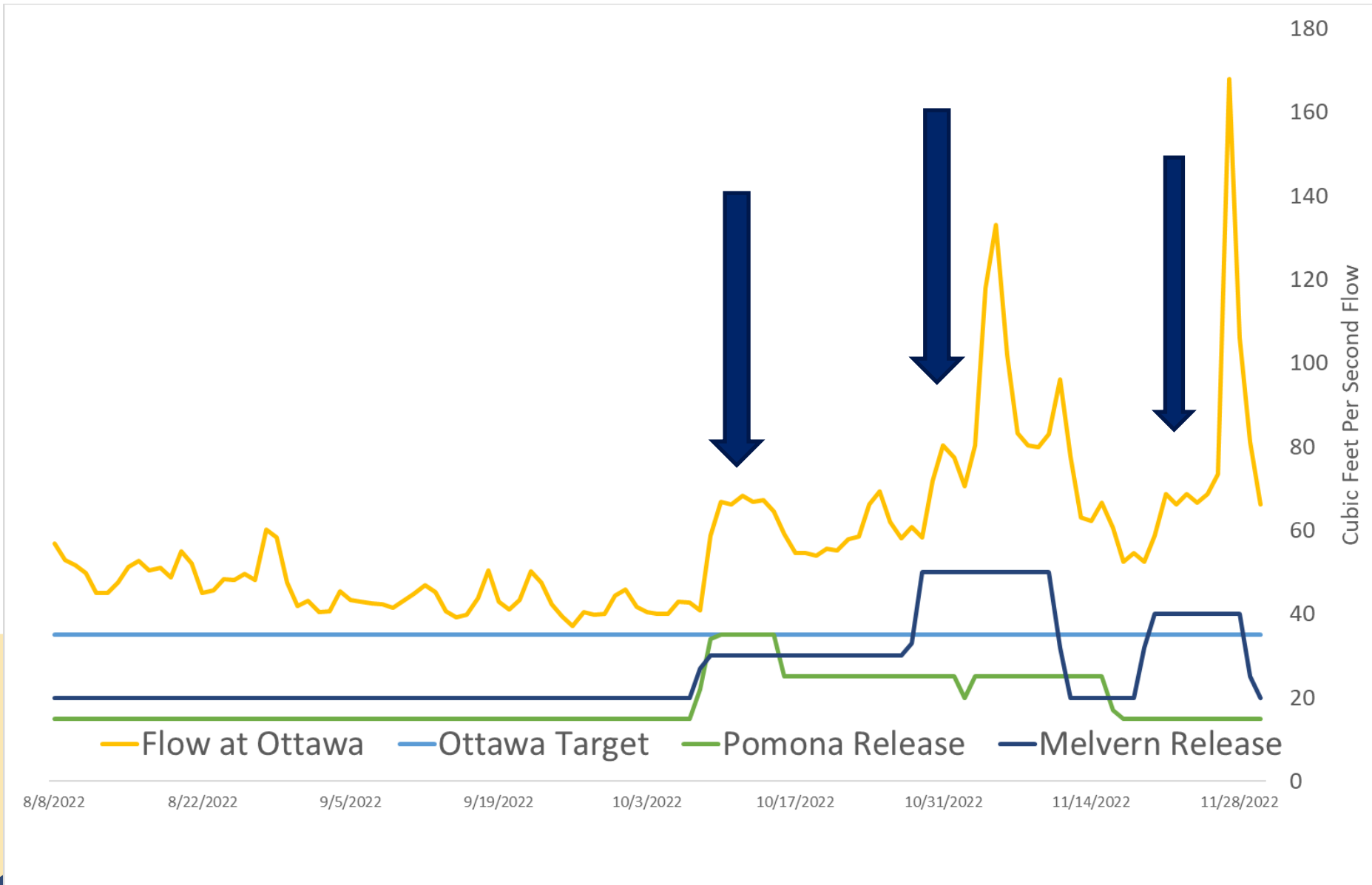
Marais des Cygnes River Operations

Dry Fall 2022, reservoir releases made up significant amount of streamflow as natural flows dwindled.

Natural Flow = flow that would be in the river without reservoirs



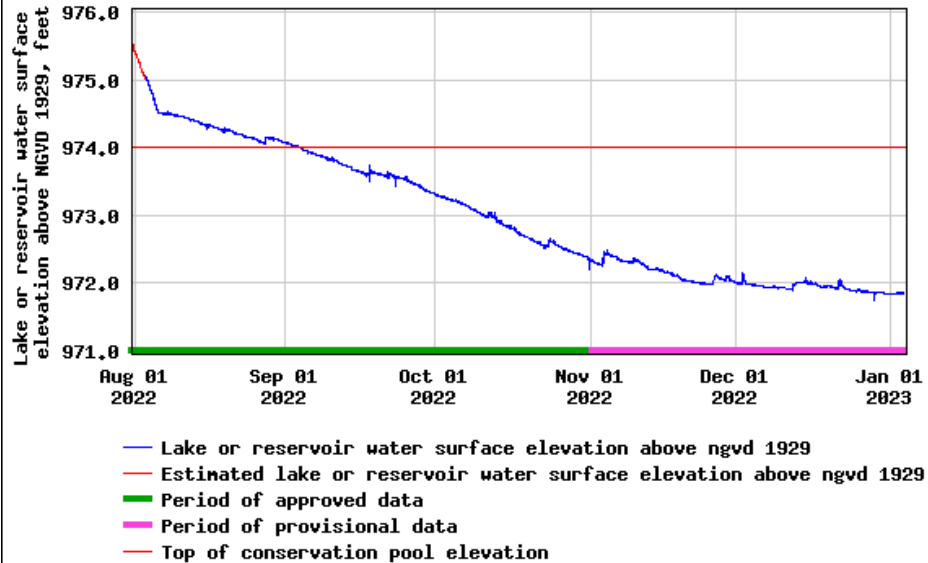
Marais des Cygnes River Operations



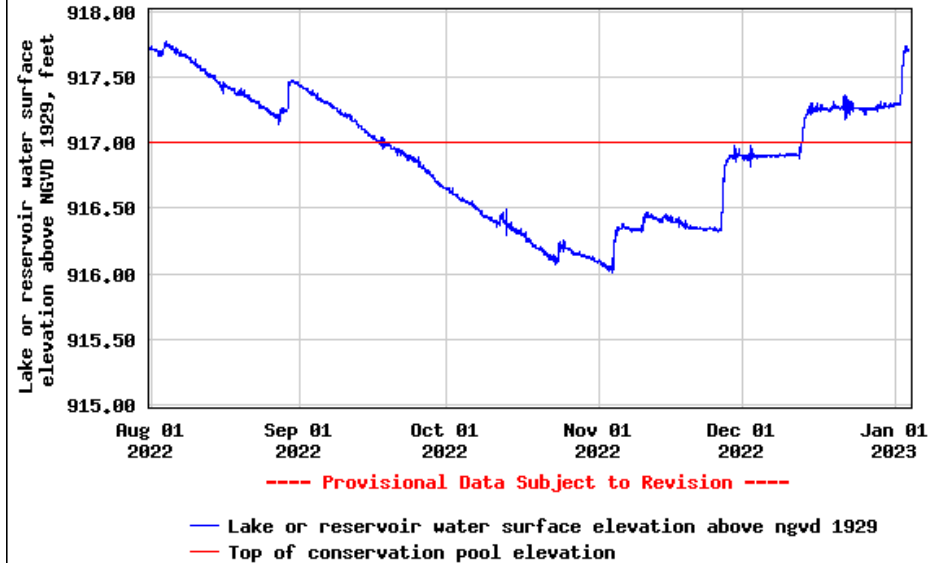
- Additional releases needed to satisfy Assurance District member needs.
- Releases protected by Division of Water Resources



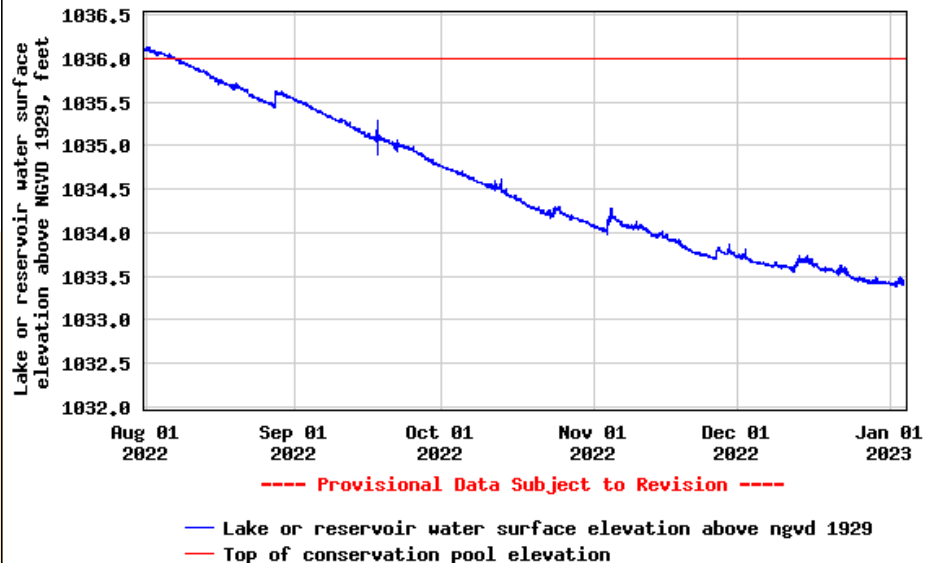
USGS 06912490 POMONA LK NR QUENEMO, KS



USGS 06914995 HILLSDALE LK NR HILLSDALE, KS



USGS 06910997 MELVERN LK NR MELVERN, KS



- Not planning to do a winter drawdown for Lake Level Management Plan at Hillsdale – save water for potential prolonged drought
- Concentrated refill/runoff pattern at Hillsdale with watershed conditions, refilled back above conservation pool.

Marais des Cygnes – Reservoir Allocations

Hillsdale Lake

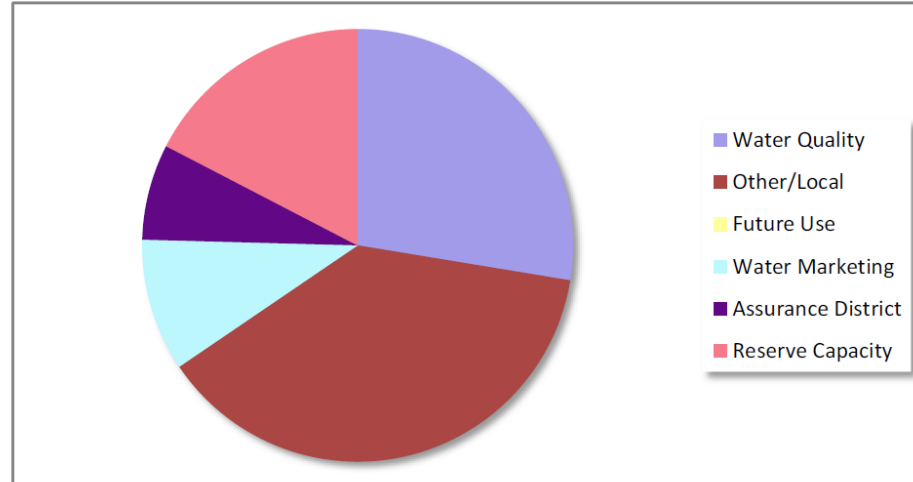
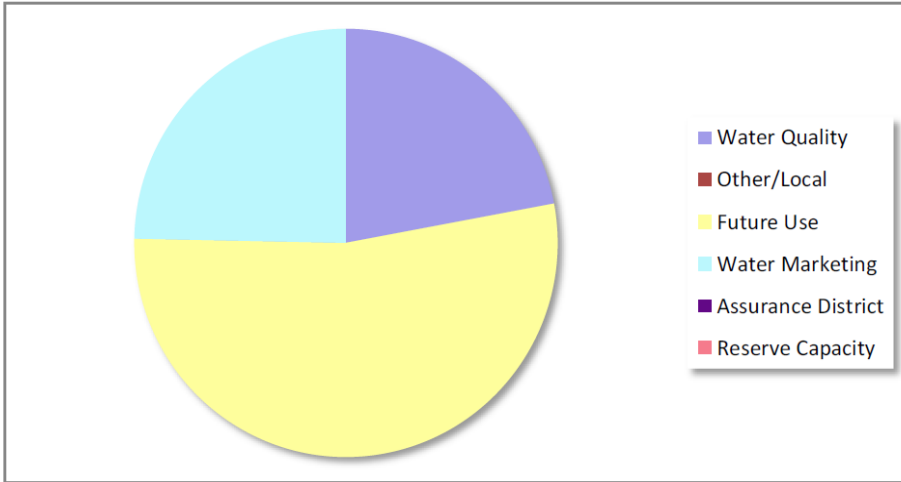
Table 1: Conservation Storage Break Out

Conservation Pool Elevation (ft msl)	850 - 917	Flood Pool Elevation (ft msl)	917 - 931
	Break Out of Conservation Storage		
		Current Yield (mgd)	Current Storage (acre feet)
Water Quality	22.06%	0	16,566
Other/Local	0.00%	0	0
Water Supply	77.94%	15.4	58,528
Future Use	53.26%	10.6	39,993
In Service	24.68%	4.9	18,536
Water Marketing	24.68%	4.9	18,536
Assurance District	0.00%	0.0	0
Reserve Capacity	0.00%	0.0	0

Melvern Lake

Table 1: Conservation Storage Break Out

Conservation Pool Elevation (ft msl)	975 - 1036	Flood Pool Elevation (ft msl)	1036 - 1057
	Break Out of Conservation Storage		
		Current Yield (mgd)	Current Storage (acre feet)
Water Quality	27.59%	0	40,611
Other/Local	37.93%	0	55,830
Water Supply	34.48%	8.6	50,752
Future Use	0.00%	0.0	0
In Service	34.48%	8.6	50,752
Water Marketing	9.90%	2.5	14,572
Assurance District	7.17%	1.8	10,554
Reserve Capacity	17.41%	4.3	25,626

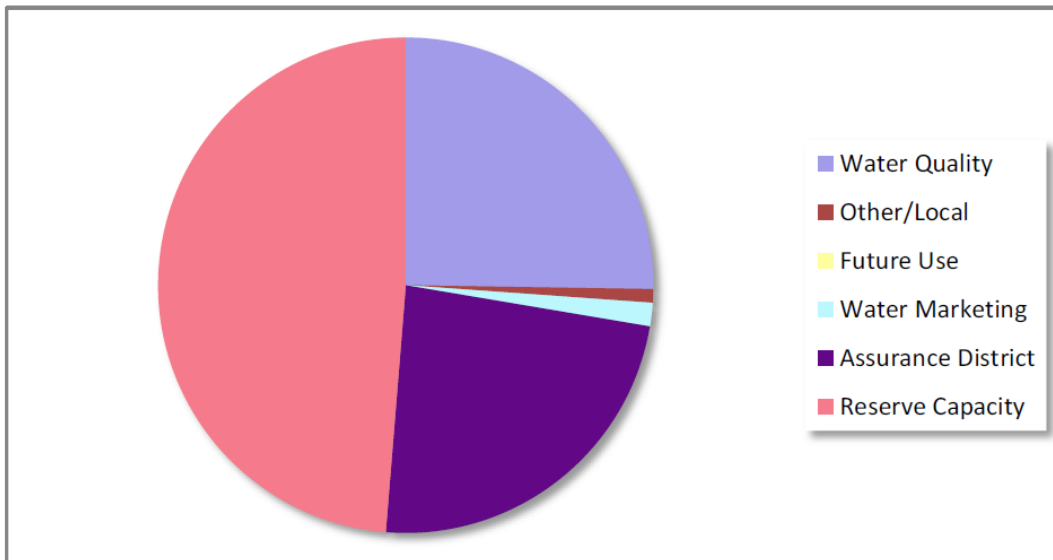


Marais des Cygnes – Reservoir Allocations

Pomona Lake

Table 1: Conservation Storage Break Out

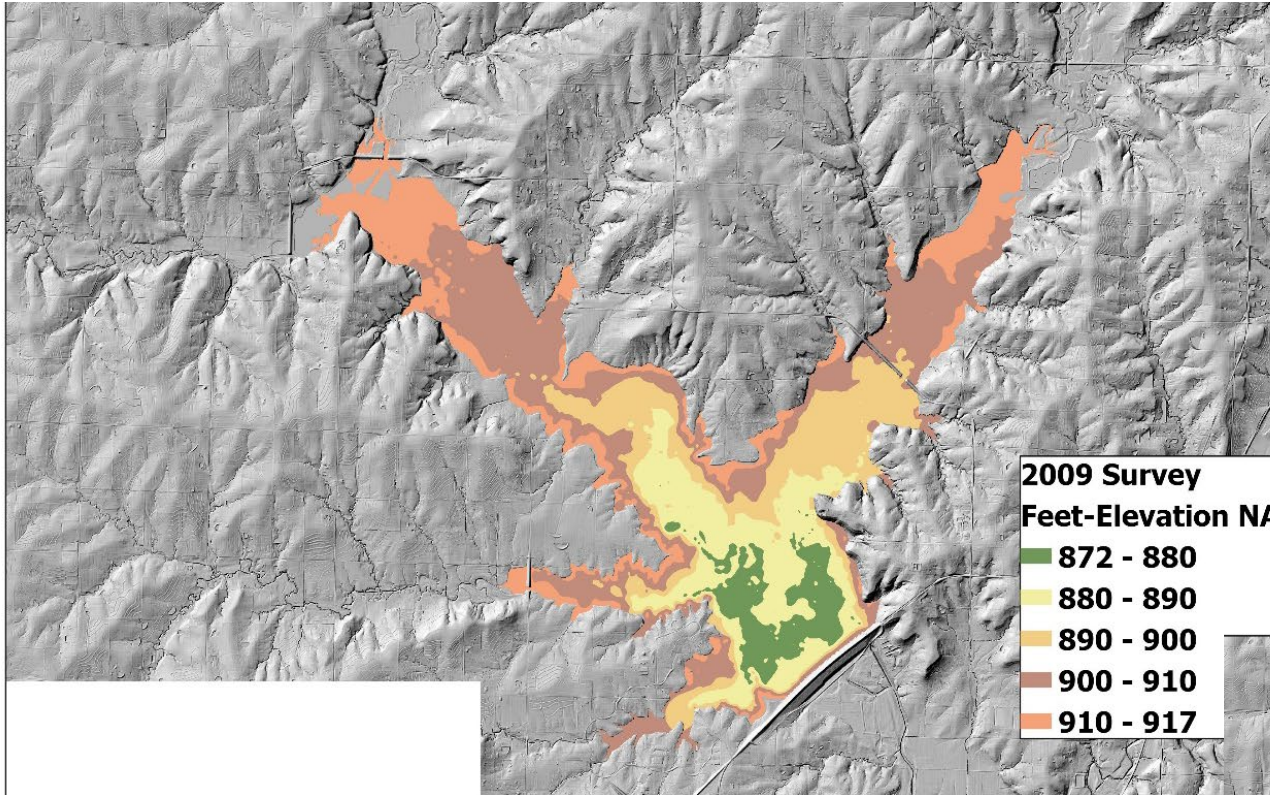
Conservation Pool Elevation (ft msl)	945 - 974	Flood Pool Elevation (ft msl)	974 - 1003
Break Out of Conservation Storage			
		Current Yield (mgd)	Current Storage (acre feet)
Water Quality	25.24%	0	12,892
Other/Local	0.89%	0	456
Water Supply	73.86%	7.7	37,719
Future Use	0.00%	0.0	0
In Service	73.86%	7.7	37,719
Water Marketing	1.52%	0.2	776
Assurance District	23.63%	2.5	12,068
Reserve Capacity	48.71%	5.1	24,876



- As additional growth or economic development occurs, will be a need to call into service Reserve Capacity and Future Use allocations
- Development of Regional Water Supply Plans to anticipate future water supply needs
- RAC feedback and input on future growth areas and economic developments that will impact long-term water supplies – share information with Planner

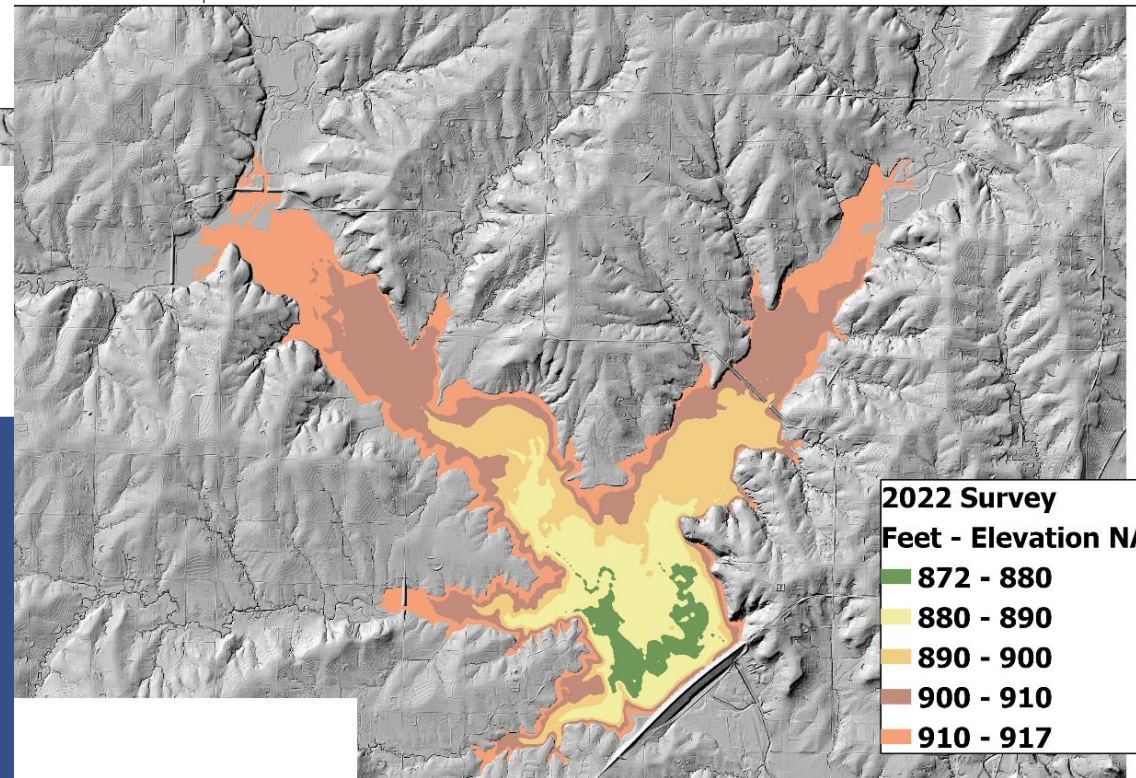
Hillsdale Reservoir 2022 Survey





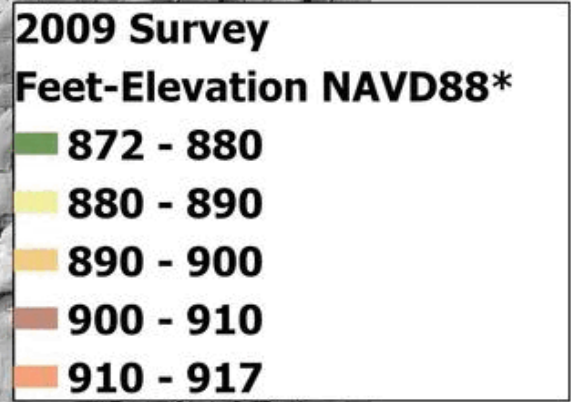
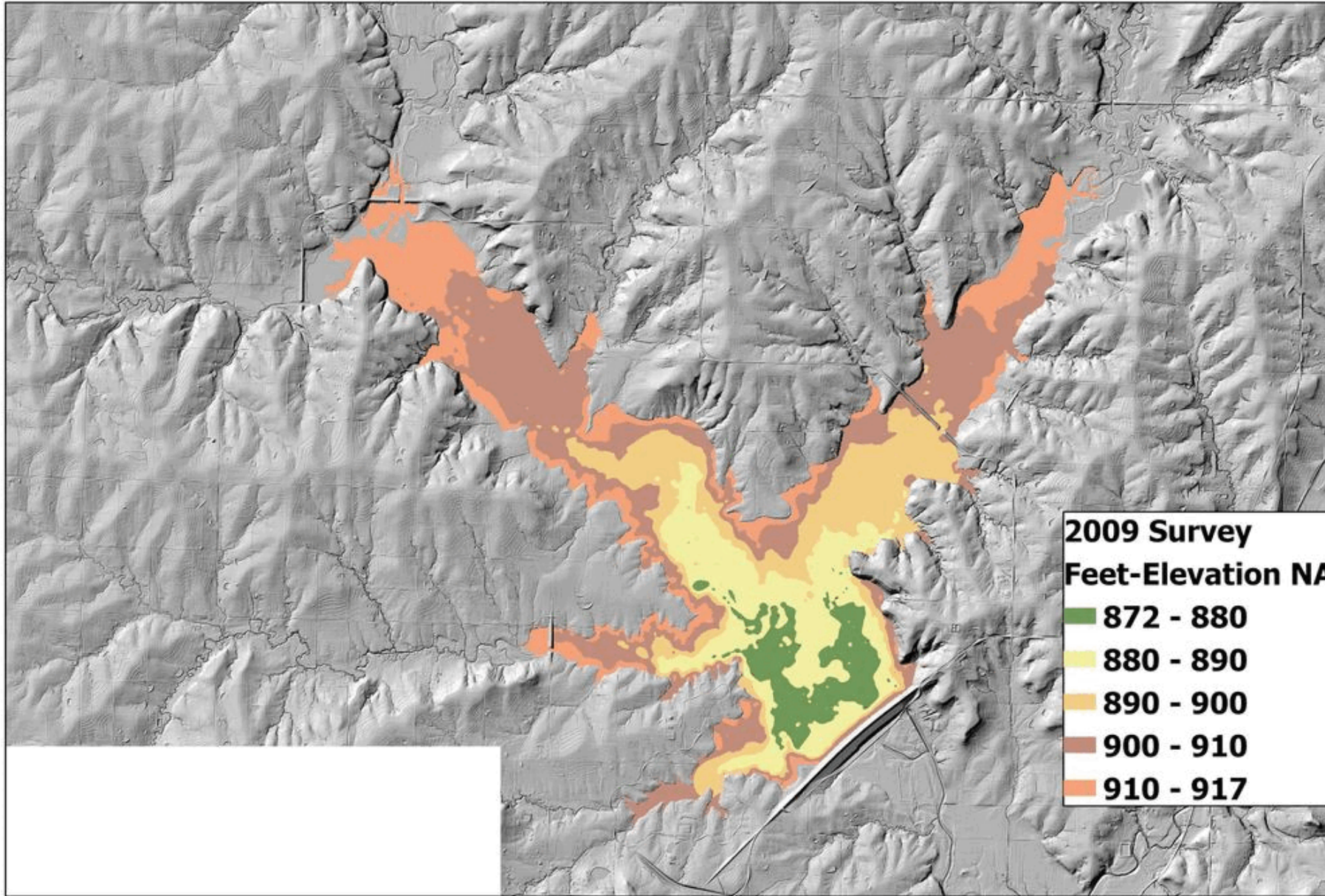
2009 Survey
Feet-Elevation NAVD88*

- 872 - 880
- 880 - 890
- 890 - 900
- 900 - 910
- 910 - 917

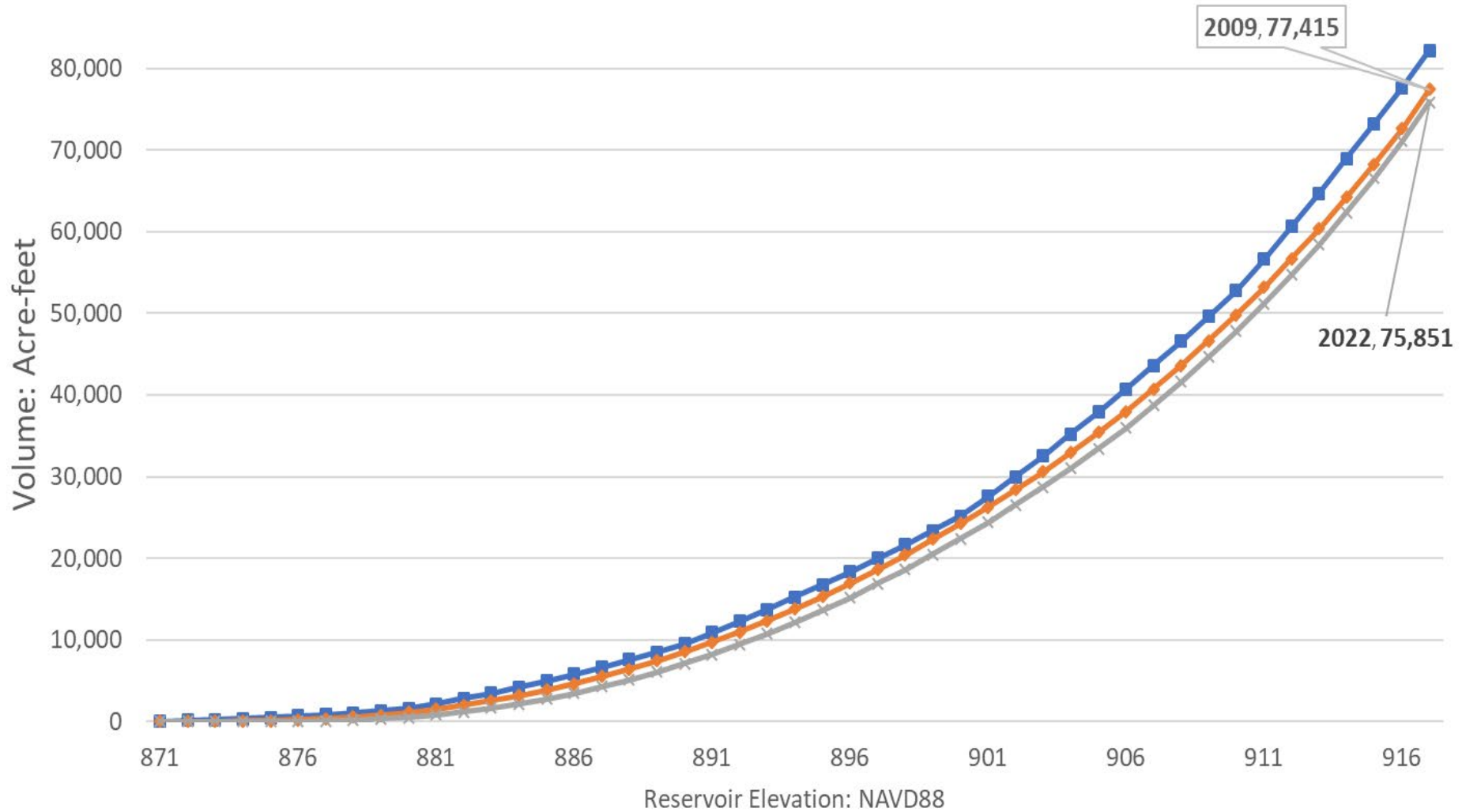


2022 Survey
Feet - Elevation NAVD88

- 872 - 880
- 880 - 890
- 890 - 900
- 900 - 910
- 910 - 917



Hillsdale Reservoir: Survey Volumes



Loss of 1,564 Acre-feet in storage since last survey

Loss of ~8% of original capacity : average of 120 acre-feet per year lost from last survey

**Previously estimated volume used in Regional Water Supply modeling for 2022:
75,095 Acre-feet**

Survey Days

