Water Availability from Hillsboro Canal and Storage Potential at Site 1

WATER RESOURCES TASK FORCE MEETING
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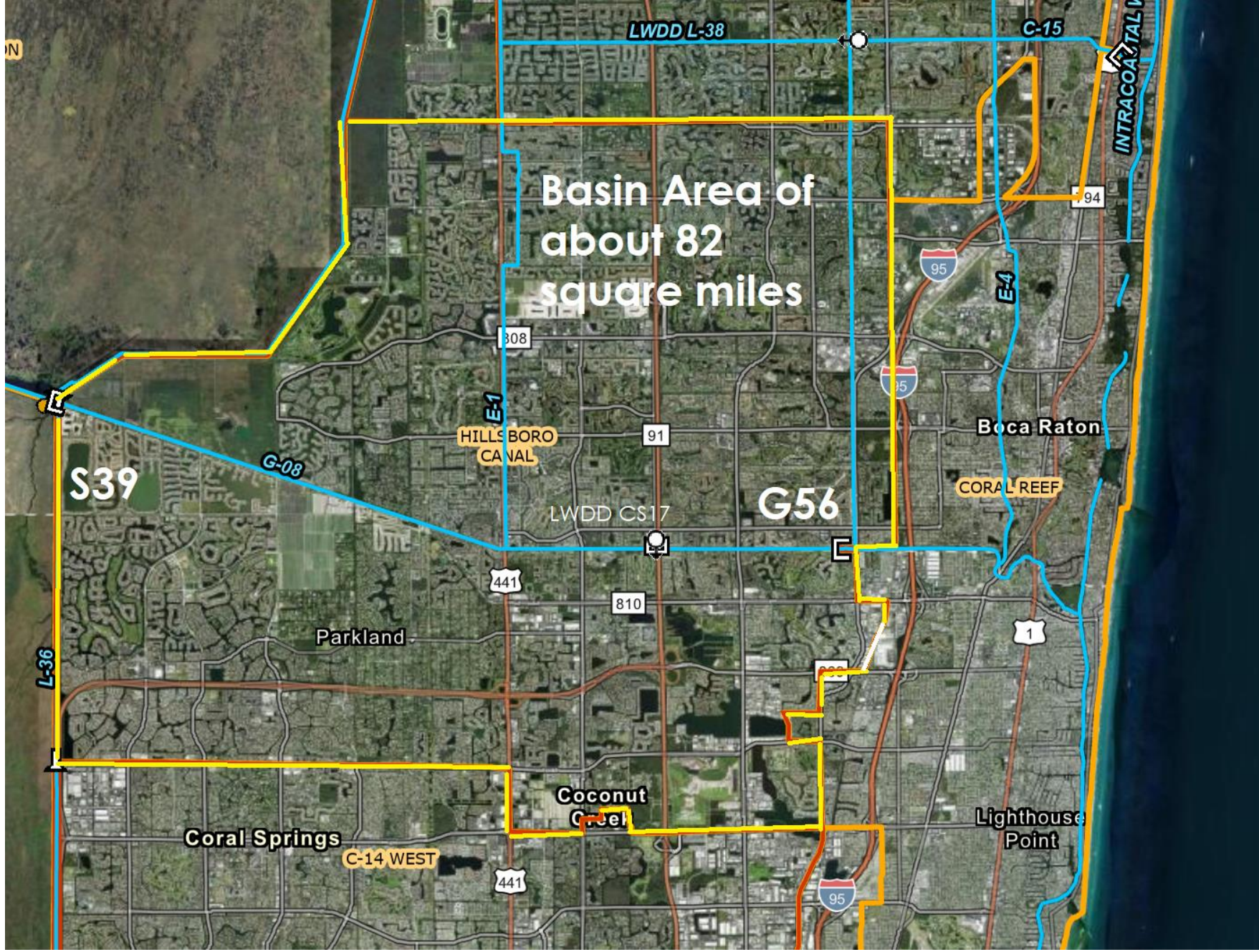
Water Availability from Hillsboro Canal

- Background Information
- Annual and Breakpoint Water Availability

Hillsboro Canal provided drainage to about 52,800 acres (82.5 square miles) with about 60% of the land in Palm Beach County and 40% in Broward County.



As expected runoff varies considerably

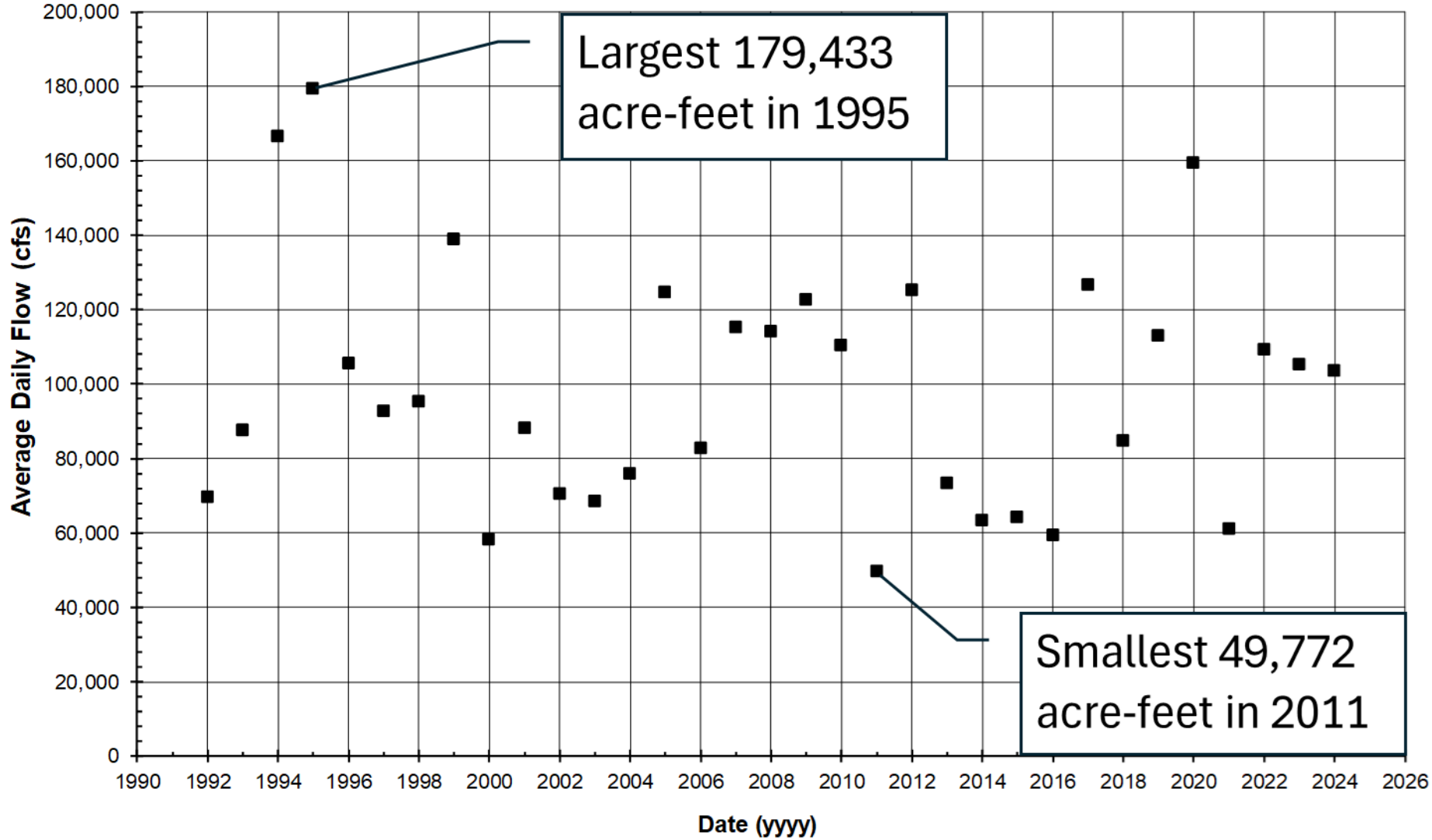


FIGURE 1
Graph of Annual Runoff from Hillsboro Basin (G56 minus S39) Based on Daily Data

Same Data in a Table

Year	Yearly Volume (acre-feet)	Year	Yearly Volume (acre-feet)	Year	Yearly Volume (acre-feet)
2011	49,772	2006	82,637	2019	112,887
2000	58,347	2018	84,588	2008	113,966
2016	59,305	1993	87,516	2007	115,277
2021	60,929	2001	88,093	2009	122,509
2014	63,365	1997	92,747	2005	124,626
2015	64,302	1998	95,392	2012	125,058
2003	68,584	2024	103,467	2017	126,558
1992	69,748	2023	105,290	1999	138,874
2002	70,452	1996	105,542	2020	159,306
2013	73,423	2022	109,135	1994	166,510
2004	75,862	2010	110,329	1995	179,433

Limitations on Capturing Water

During drier periods the SFWMD operates the eastern canals to hold water (i.e. High Range).
This means that when meaningful rain occurs and the limited storage capacity in the canal is filled the water is released.
This occurs with automatic controls which respond to water levels several times an hour (break point data).
The water is released at a high rate so capturing flow requires a combination of sufficient capacity and a lower ON stage.

Capture Rates for Actual 2011 Flows

Performed and analysis with the break point data to create a 15 minute data set for 2011.

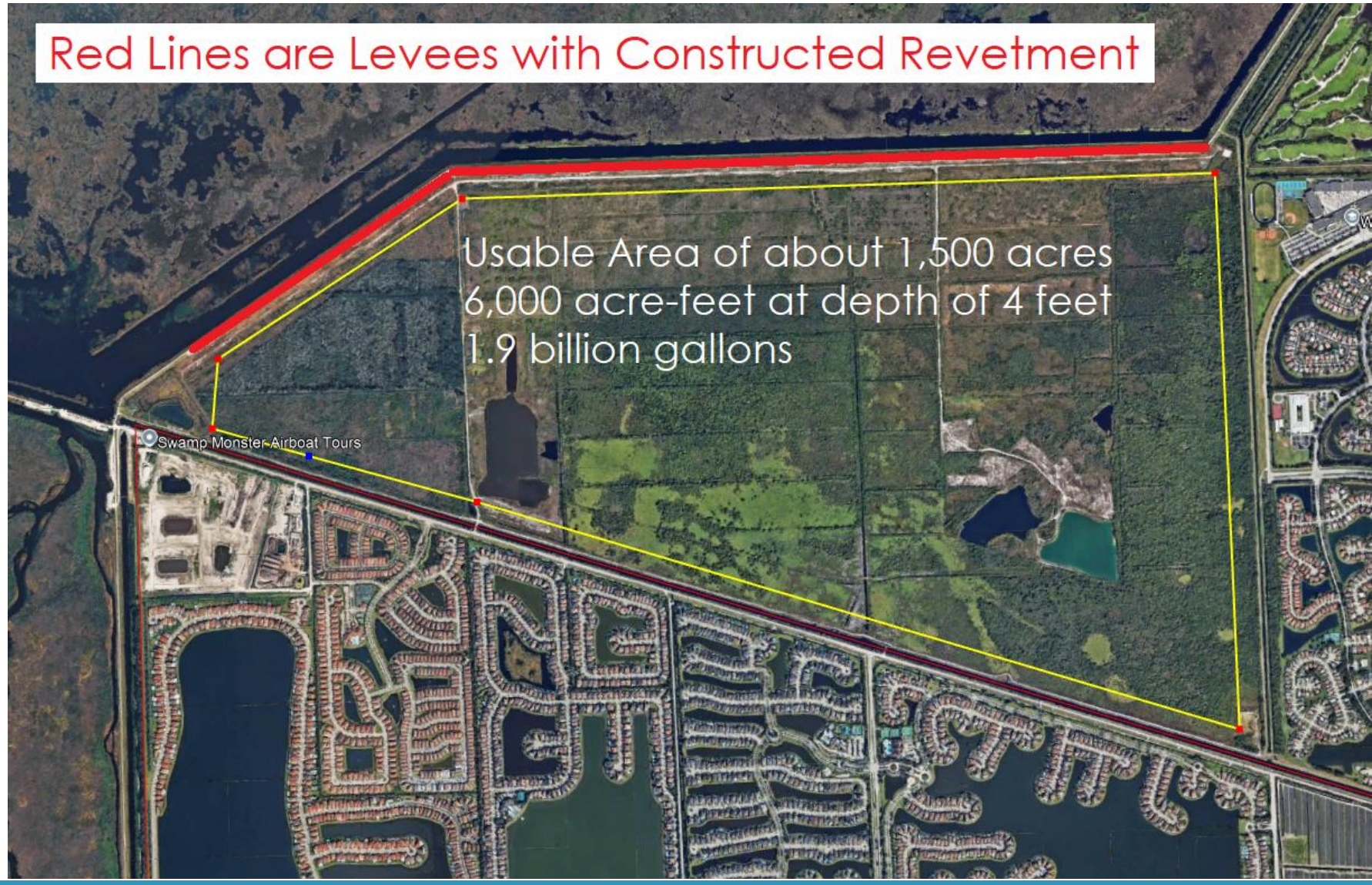
Results show best case capture rates with Pump On stage about 1 foot below G56 Open stage

Pumping Rate (cfs)	Captured Volmume (acre-feet)	Percent of Available
100	17,533	35%
200	28,854	58%
300	34,504	69%
400	37,131	75%
500	38,937	78%
600	40,382	81%
9999	49,772	100%

Where to Store the Water

Site 1 is an approximately 1,600 acre of land located at the west end of the Hillsboro Canal

With the required levees a 4 to 8 feet deep reservoir would potentially hold 6,000 to 12,000 acre-feet (1.9 to 3.8 BG)



Order of Magnitude Costs (for discussion purposes)

- Type of Reservoir – High or Low Hazard
- Pump Station costs from CERP LRWR Project Cost and C-51
- Embankment costs from C-51 Reservoir Phase 2
- Costs are for comparison purposes

Types of Reservoir

- Due to the likelihood of damaging waves and the risk to human health and safety and property damage a reservoir which has a storage depth larger than 4 feet is considered a high hazard dam.
- A high hazard dam requires larger freeboard and revetment (e.g. Roller Compacted Concrete) to handle the design storm (Hurricane) and associated wave action.

Low Hazard Reservoir Requirements

- Minimum freeboard of three feet but given the proximity of residential area and need for operational flexibility the free board will likely be twice this value.
- Combination of embankment height and operational criteria should provide storage for a 5-day rainfall event and 12 inches of additional rain.
- For the embankment cost I assumed 8 feet of free board which corresponds to a embankment height of 12 feet.

Cost of 4.3 miles of Embankment for a Low Hazard Reservoir

- The entire perimeter length is about 7.0 miles of which 2.7 miles would use the existing levee of WCA-1 which had revetment installed as part of the CERP Site 1 project.
- 4.3 miles of 12 feet high embankment would be required
- At a unit rate of $3,000,000 per mile ($3.0M per mile) the cost of the embankment would be about $13,000,000

Cost of 4.3 miles of Embankment for a High Hazard Reservoir

- Revetment protection of the interior slopes will be required for a high hazard dam.
- Assuming Roller Compacted Concrete (RCC) revetment on the interior slope and crest and a 40 feet deep seepage barrier and a levee height of 20 feet
- At a unit rate of $18,500,000 per mile ($18.5M per mile) the cost of the embankment would be about $80,000,000

Cost of Pump Station and Outflow Structures (Hardest to Estimate)

- Capacity would range from 150 cfs for only water supply to 300 cfs to provide some drainage assistance.
- At $200,000 per cfs (CERP LRWR Project) the pump station would cost would range from $30 M to $60 M
- Assume a cost of $10 M to $20 M for outflow structures

Total Cost of Reservoirs

- Low Hazard Reservoir. Cost range of $53 M to $83 M for 150 cfs to 300 cfs. Equates to about $9,000 to $14,000 per acre-feet for the 6,000 acre-fee storage capacity.
- High Hazard Reservoir. Cost range of $130 M to $160 M for 150 cfs to 300 cfs. Equates to $11,000 to $13,500 per acre-feet for the 12,000 acre-fee storage capacity.
- The unit rates show that once you trigger the high hazard criteria the storage depth needs to be 8 feet or larger to get comparable cost per acre-feet of storage.

Thank You

Questions/Discussion

Photo: Katelyn Cucinotta