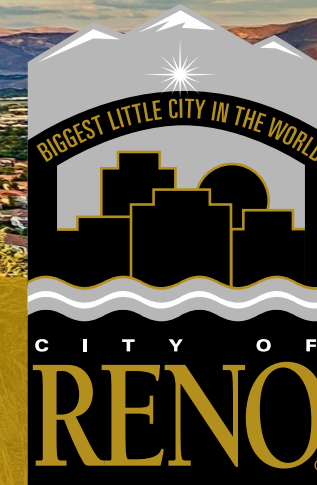




April 29, 2019

Silver Lake Status Update on Lake Rise & Protection Measures



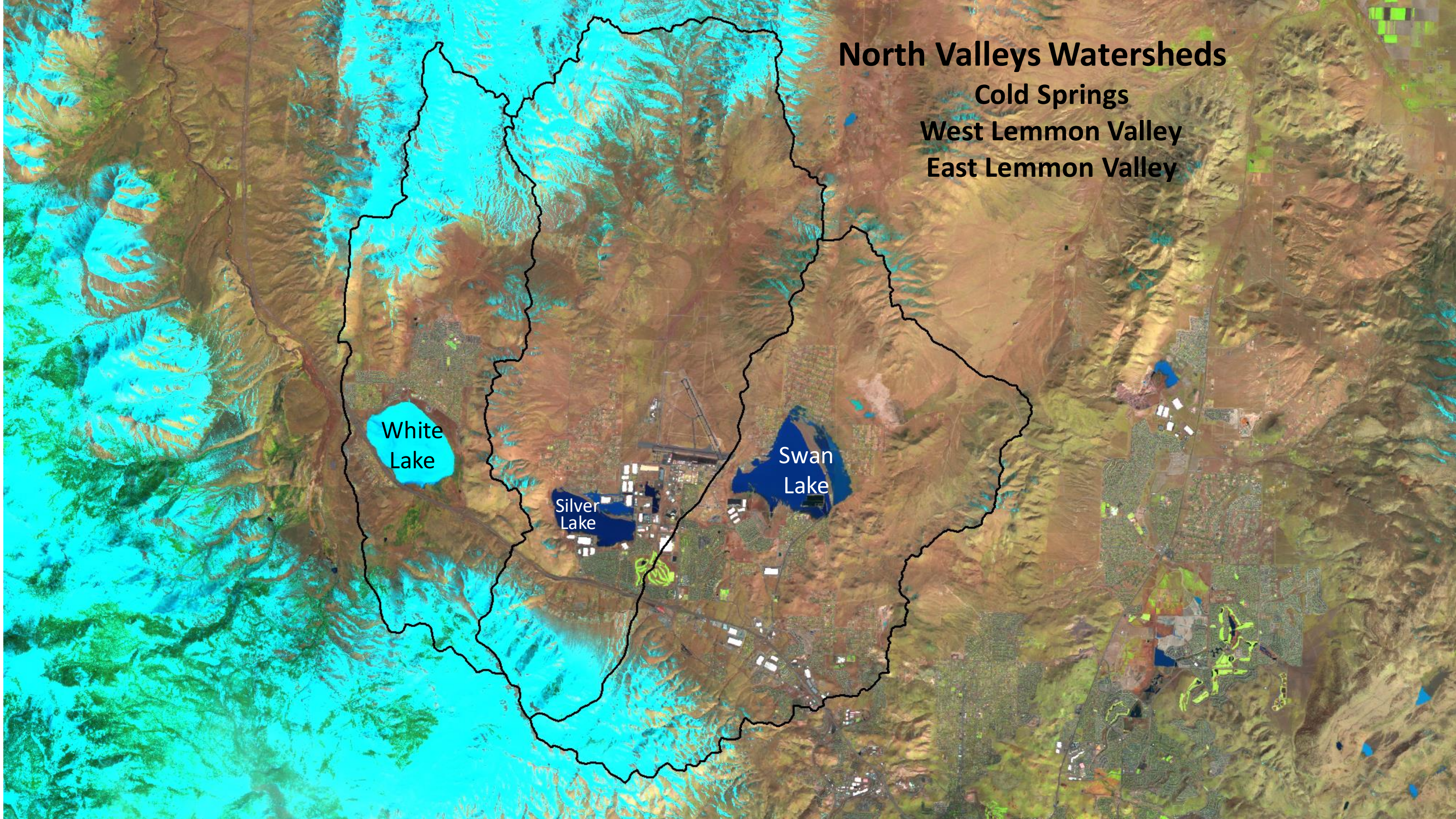


**North Valleys Watersheds**  
**Cold Springs**  
**West Lemmon Valley**  
**East Lemmon Valley**

White  
Lake

Silver  
Lake

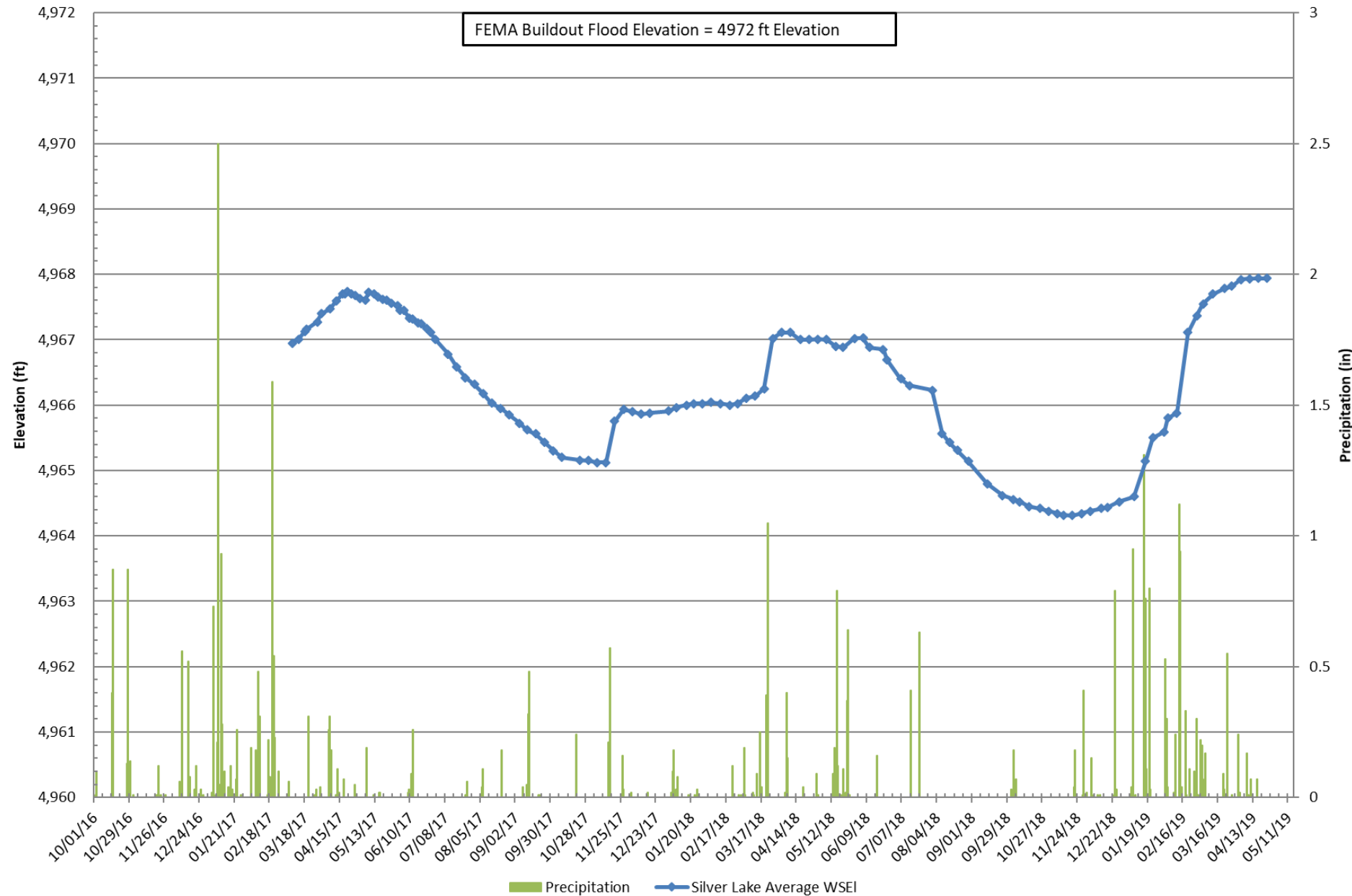
Swan  
Lake





# Overview

Silver Lake Water Elevations 2017-19



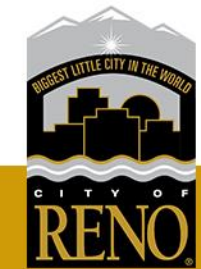
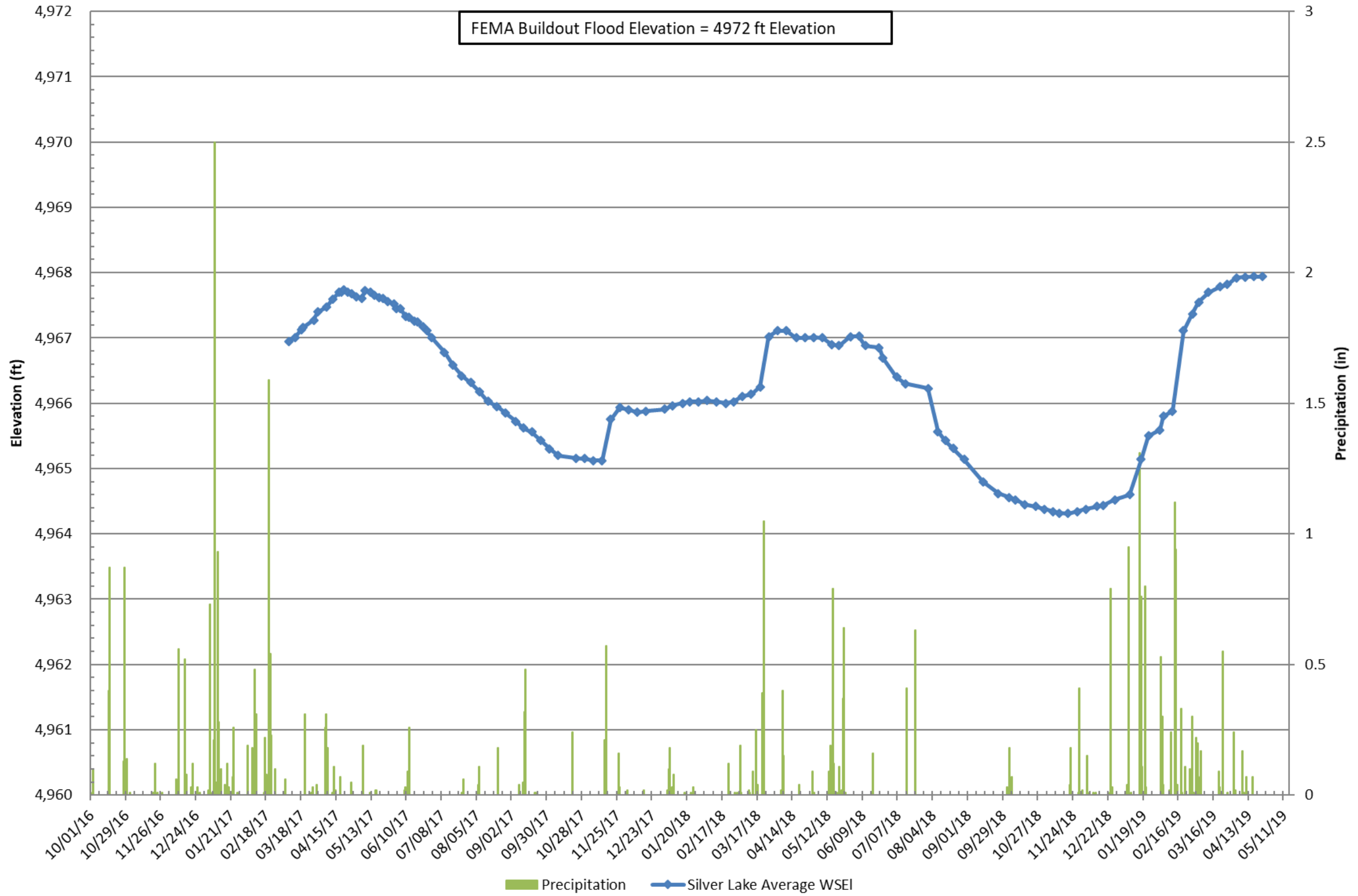
Currently 0.2 feet above the highest level reached in 2017.

At the end of February's record snows, it was feared that an Atmospheric River could push levels significantly higher.

Fortunately, the heavy precipitation stopped. No significant impacts to businesses or residents.



# Silver Lake Water Elevations 2017-19





# Overview



2017

Hesco Barriers  
Head Gate Installed  
Canal Berms Installed  
“Temp” Storm Water Pump

2019

Added Hesco Barriers  
Added Canal Berm  
Improving Previous Berm  
Permanent Storm Water Pump

Both

Sandbagging Lift Station  
Stationed Sand/Bags



# 2017 Head Gate: Separates Retention Basin





# 2019 Added Earthen Berm to Canal





# 2019 Hesco Installation, Public-Private Coop





# 2019 Hesco Installation, Public Private Coop





# 2019 Hesco Installation, Public Private Coop







# Swan Lake StoryMap

SCROLL DOWN to see how Washoe County has responded to this on-going situation.



Washoe County, along with many local and state agencies, has continually worked to monitor conditions and mitigate damage in the North Valleys since lake levels exceeded historical averages in early 2017.

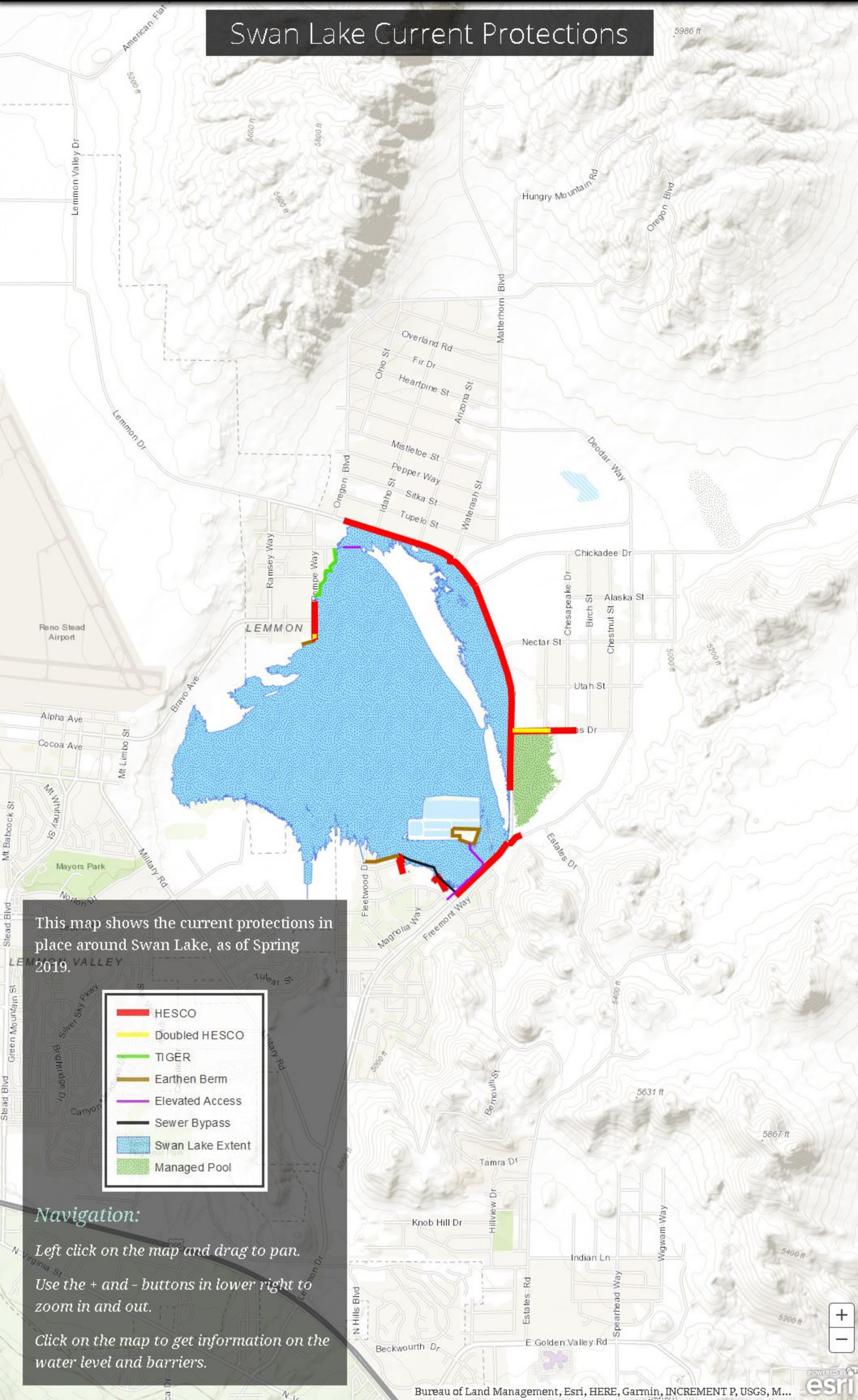


Photos of flooding in the Swan Lake area.





## Swan Lake Current Protections



This map shows the current protections in place around Swan Lake, as of Spring 2019.

- █ HESCO
- █ Doubled HESCO
- █ TIGER
- █ Earthen Berm
- █ Elevated Access
- █ Sewer Bypass
- Swan Lake Extent
- Managed Pool

### Navigation:

Left click on the map and drag to pan.

Use the + and - buttons in lower right to zoom in and out.

Click on the map to get information on the water level and barriers.

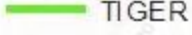
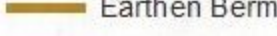
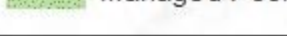


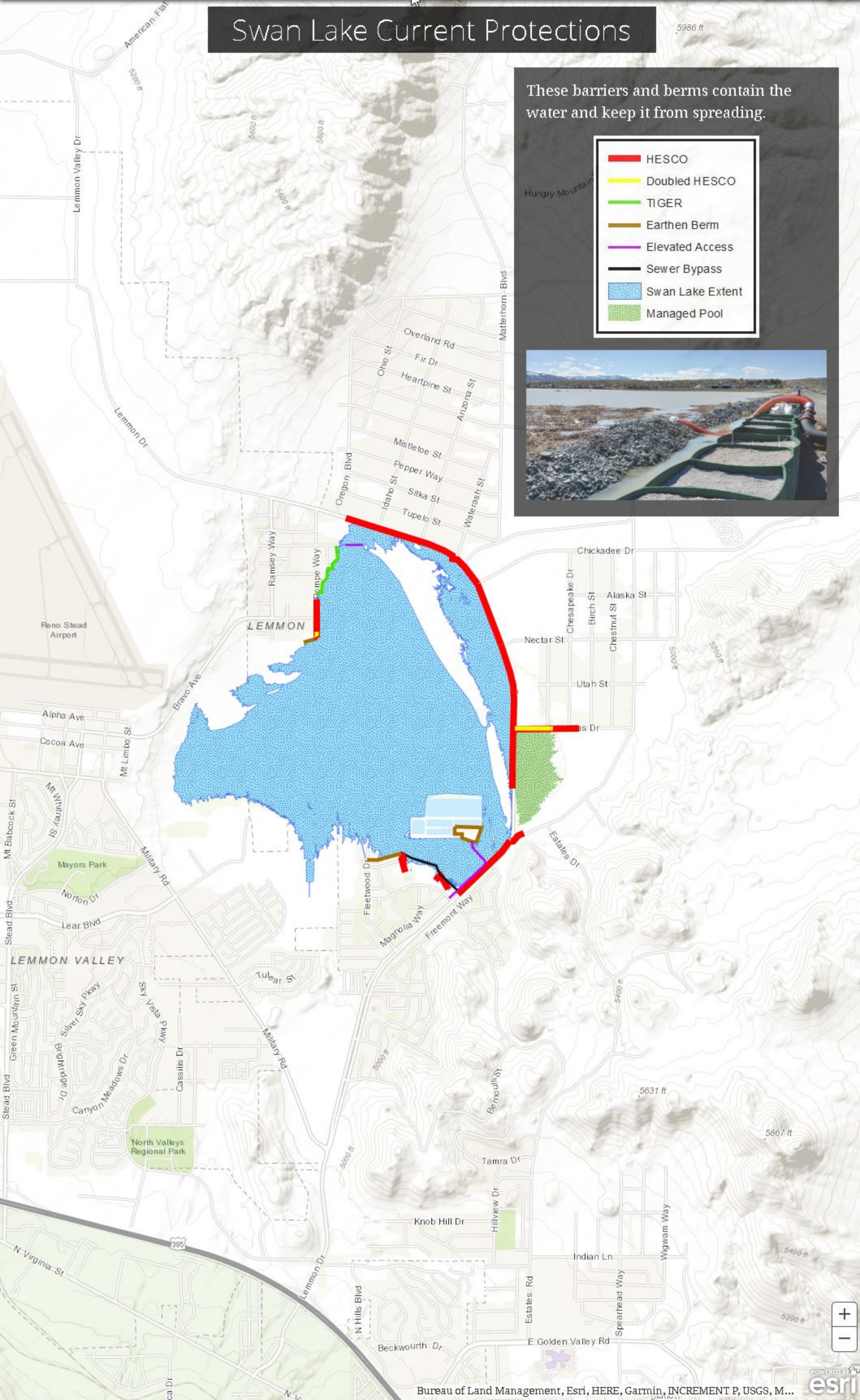


# Swan Lake Current Protections

5986 ft

These barriers and berms contain the water and keep it from spreading.

-  HESCO
-  Doubled HESCO
-  TIGER
-  Earthen Berm
-  Elevated Access
-  Sewer Bypass
-  Swan Lake Extent
-  Managed Pool



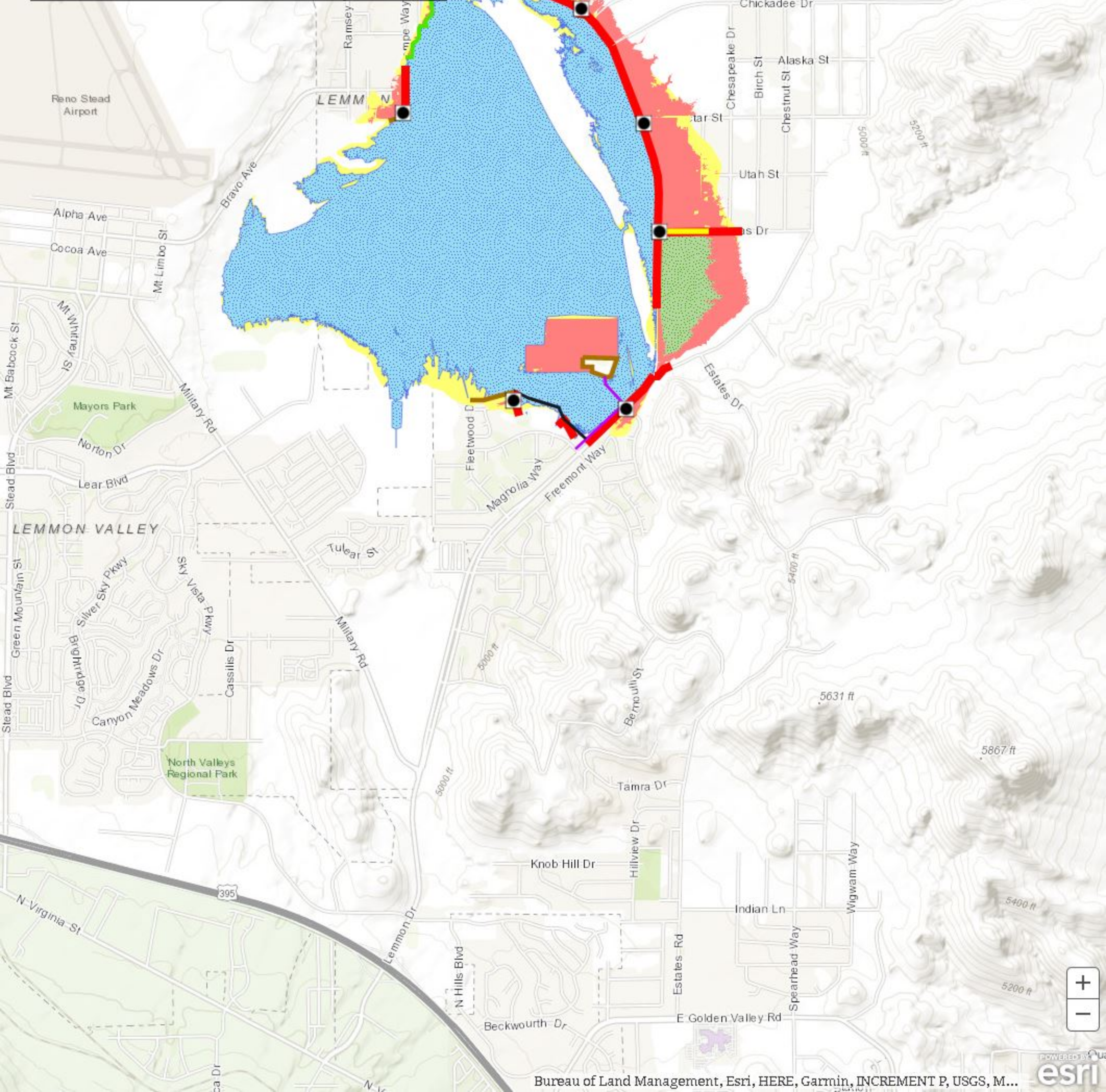


berms/barriers and place pumps as the water conditions have changed.

# Swan Lake Current Protections

5986 ft

-  Pump
-  HESCO
-  Doubled HESCO
-  TIGER
-  Earthen Berm
-  Elevated Access
-  Sewer Bypass
-  Swan Lake Extent
-  Managed Pool



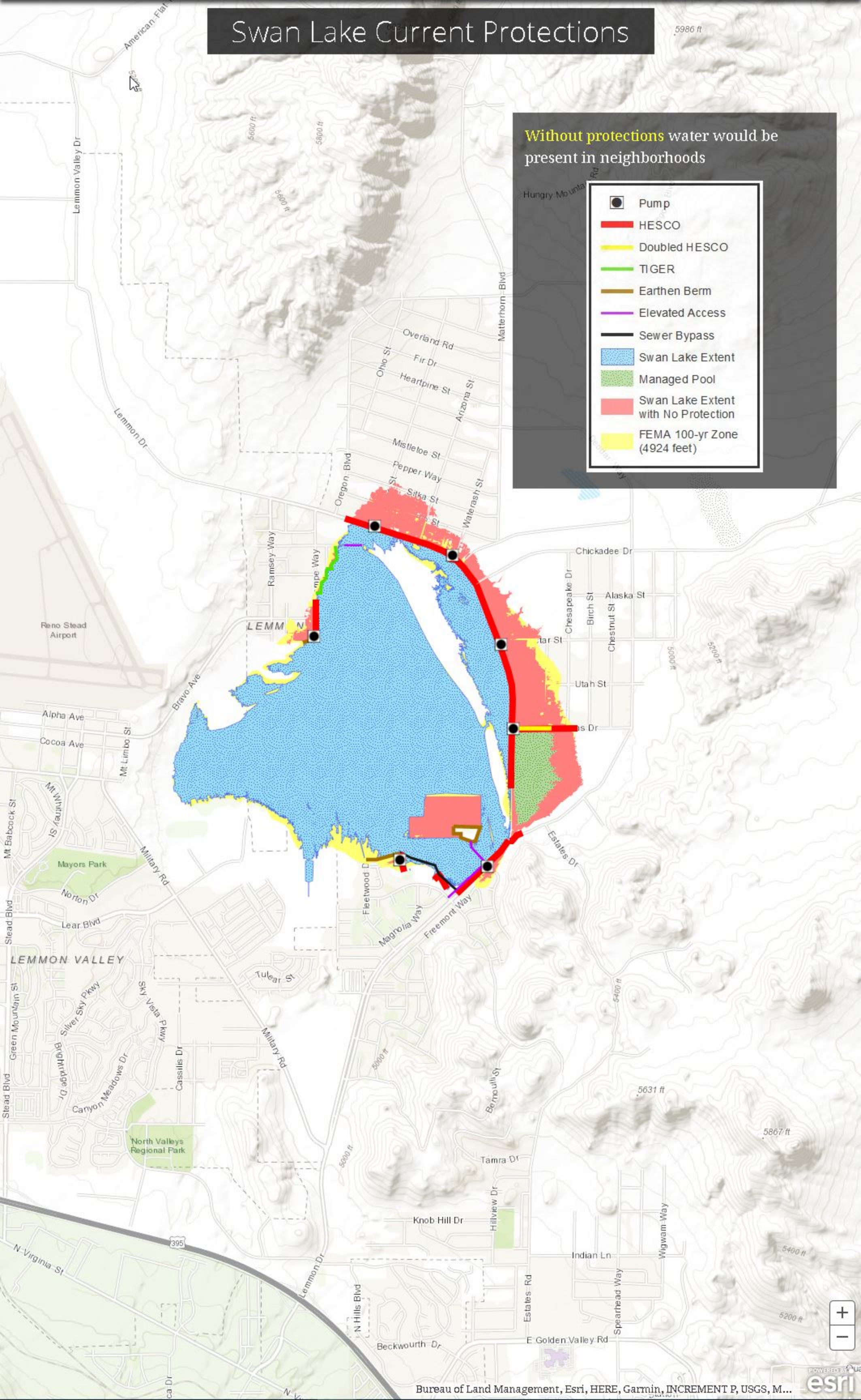


# Swan Lake Current Protections

5986 ft

Without protections water would be present in neighborhoods

- Pump
- HESCO
- Doubled HESCO
- TIGER
- Earthen Berm
- Elevated Access
- Sewer Bypass
- Swan Lake Extent
- Managed Pool
- Swan Lake Extent with No Protection
- FEMA 100-yr Zone (4924 feet)





# Water-level Fluctuations



Swan Lake under normal conditions presents no threat to homes or roads.

Swan Lake is often dry, particularly in the fall, as our region's typical, minimal summer rains allow evaporation to remove water from the lake.



# Water-level Fluctuations

When the lake does contain water, typical water levels range between 4914 and 4916 feet.



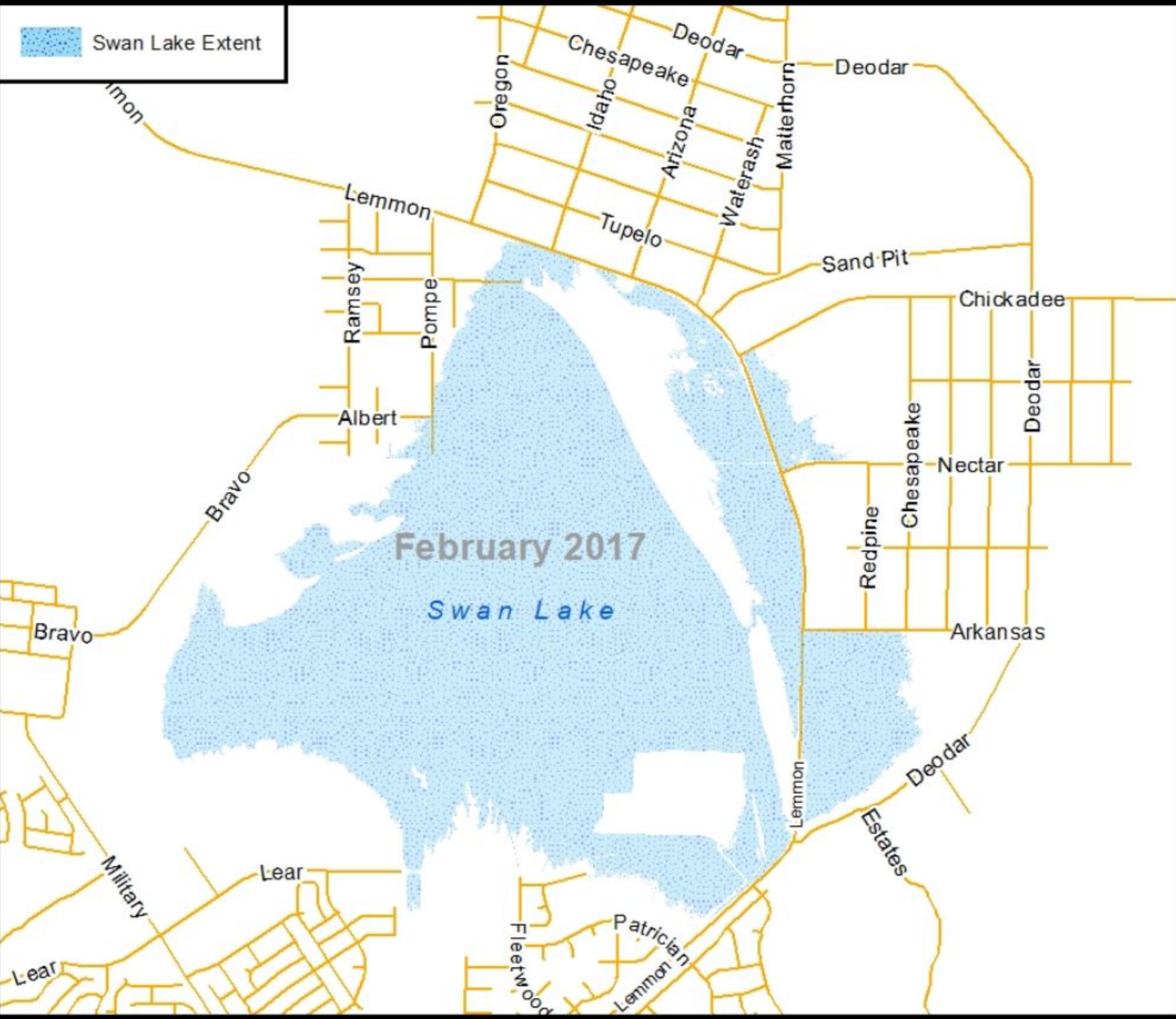
(April 2008 aerial photo)  
Photo credit: WC GIS



# Water-level Fluctuations

A series of storms in late 2016 and early 2017 caused the lake level to rise, encroaching on the surrounding roads and homes.

2/2/2017 Lake elevation = 4922.2 feet.

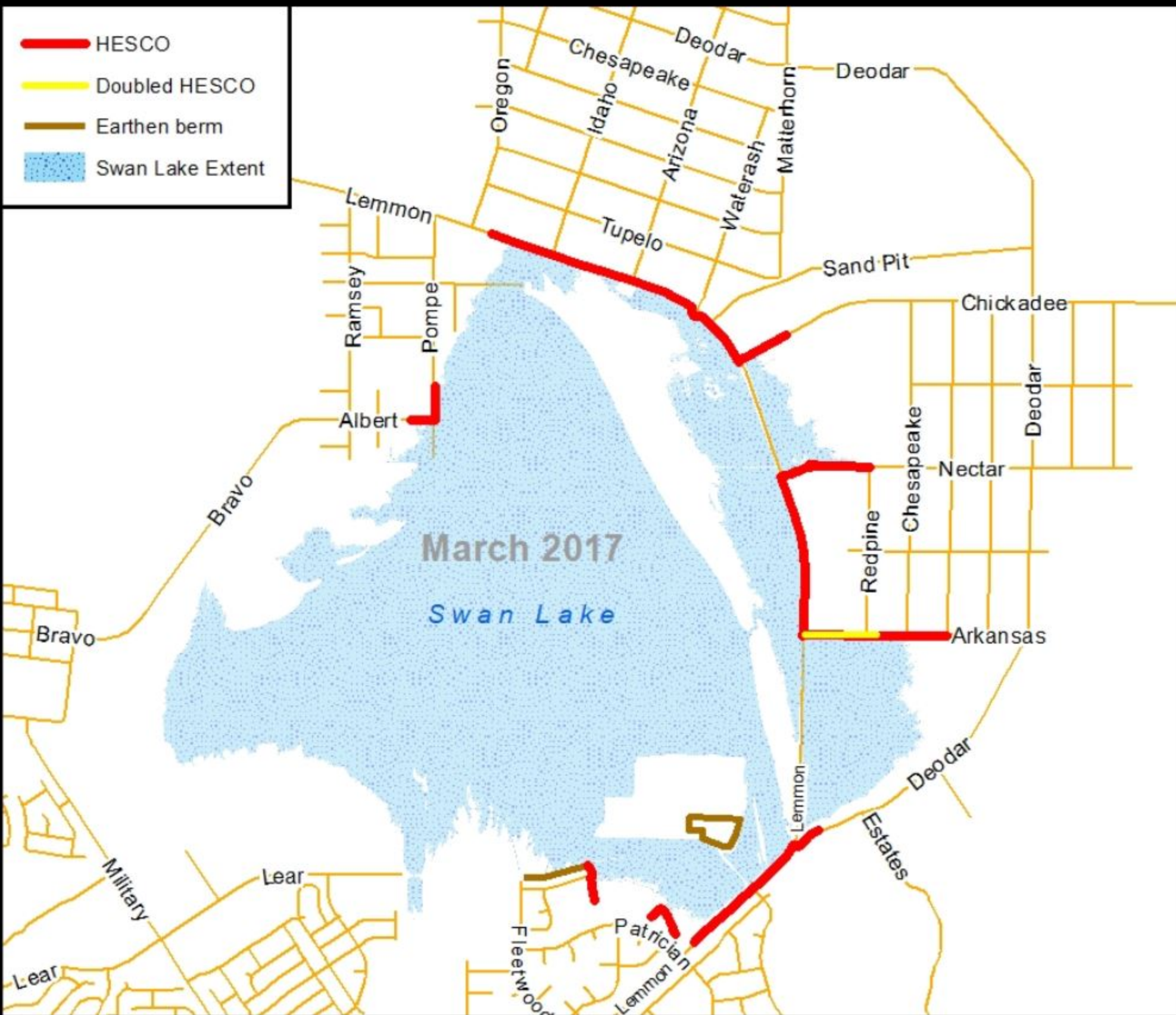




# Water-level Fluctuations

In March, Washoe County installed barriers and berms and began pumping water from affected areas.

3/21/2017 Lake elevation = 4922.6 feet.





# Water-level Fluctuations

Over the summer of 2017, evaporation lowered the lake level.

10/31/2017 Lake elevation = 4920.9 feet.

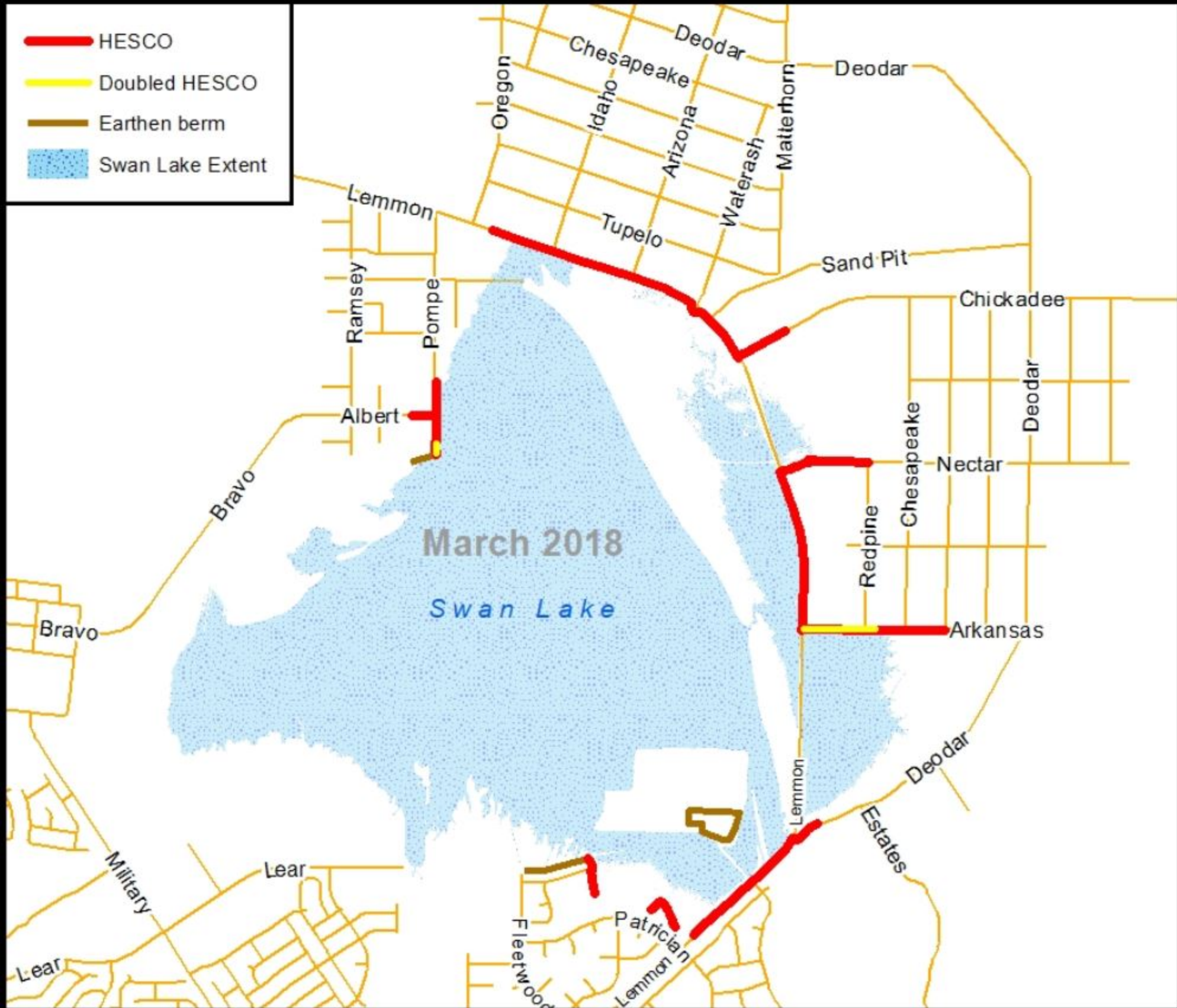




# Water-level Fluctuations

But the winter of 2017/2018 brought more water to the basin, raising lake levels again.

3/19/2018 Lake elevation = 4921.7 feet.



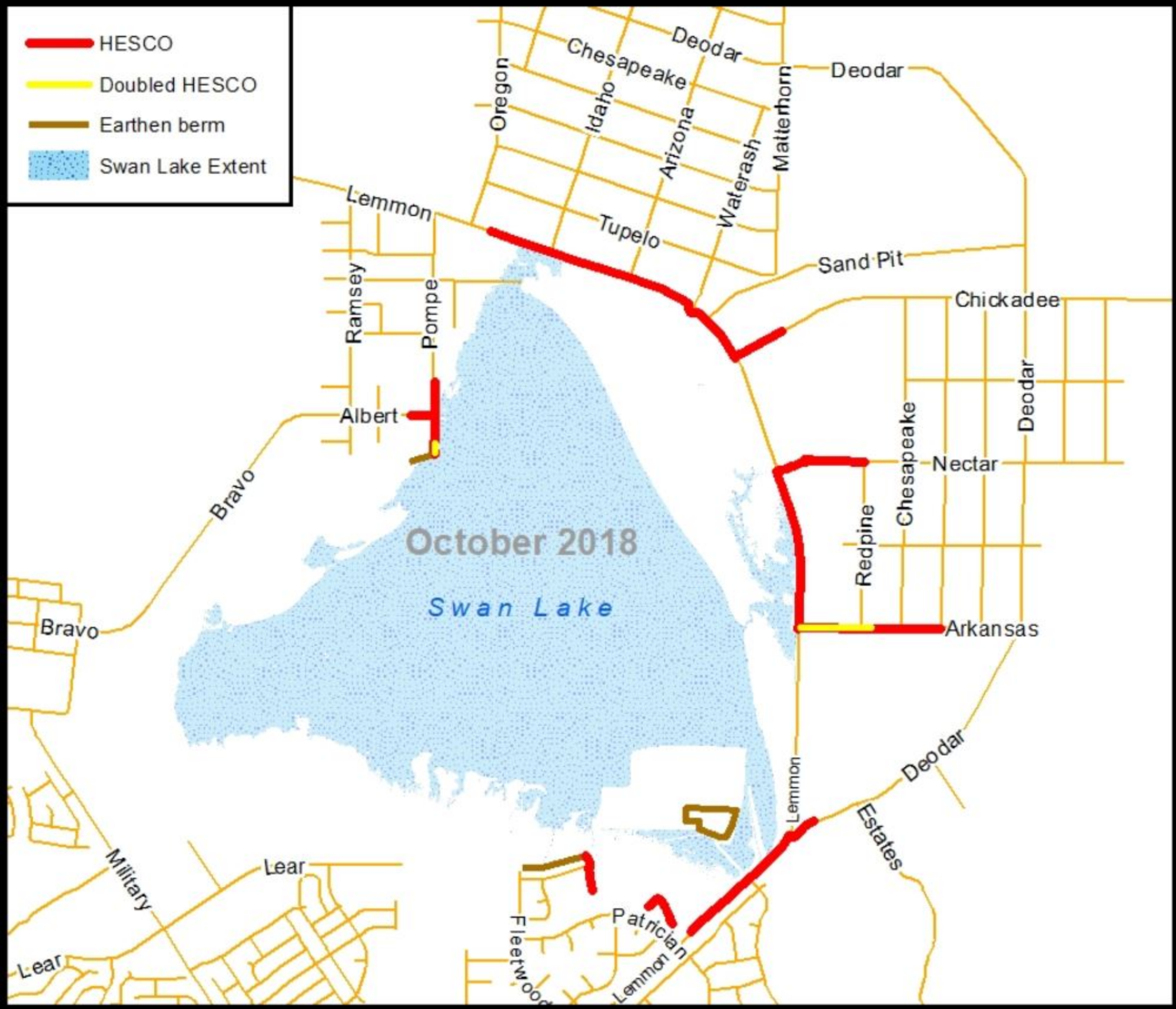


# Water-level Fluctuations

Summer 2018 again saw significant evaporation, which lowered the lake level...

10/25/2018 Lake elevation = 4919.8 feet.

(Lowest level since the initial flooding.)

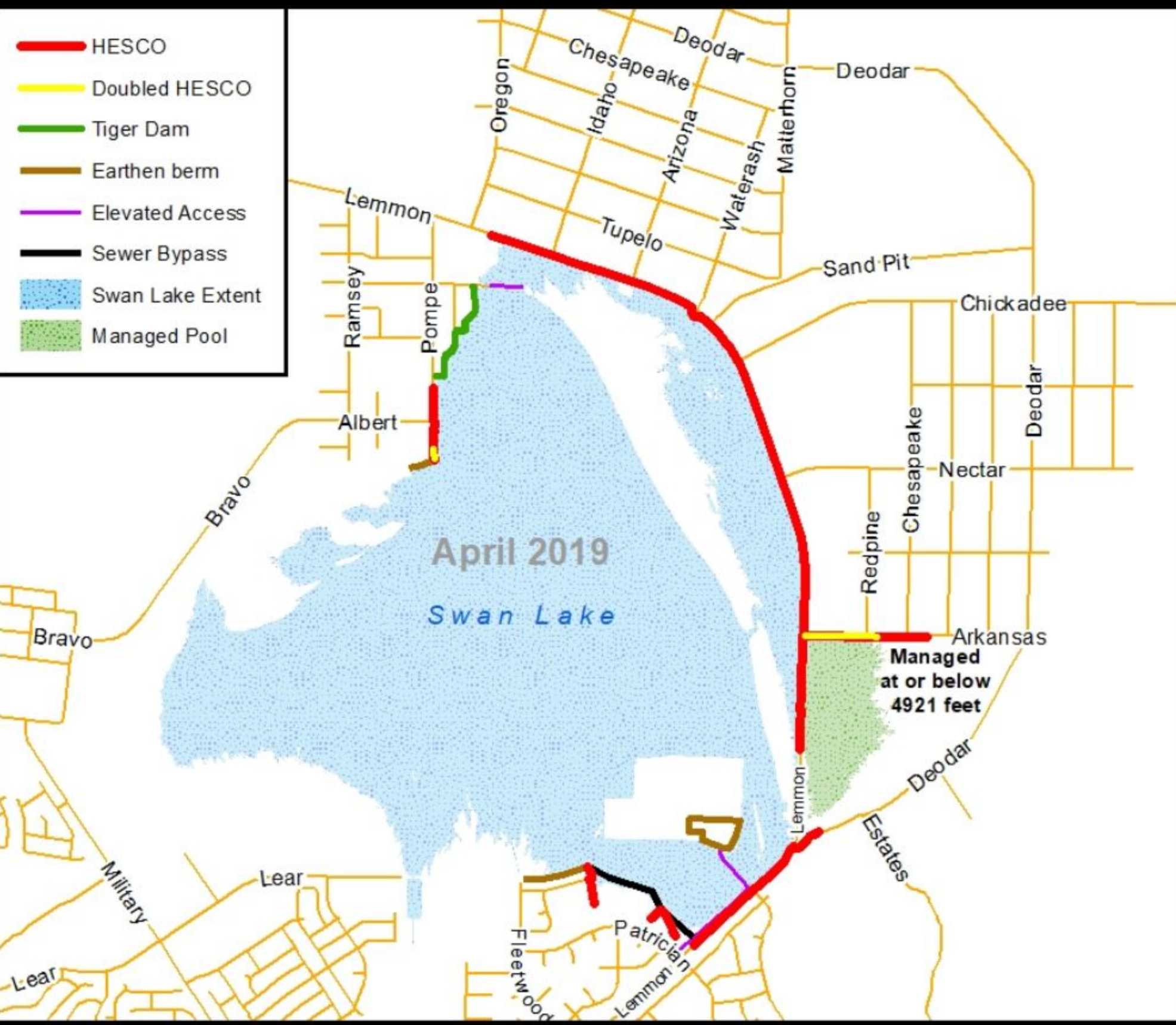




# Water-level Fluctuations

But the winter of 2018/2019 was very wet and lake levels rebounded to equal and even slightly exceed the initial 2017 level.

4/3/2019 Lake elevation = 4923.4 feet.

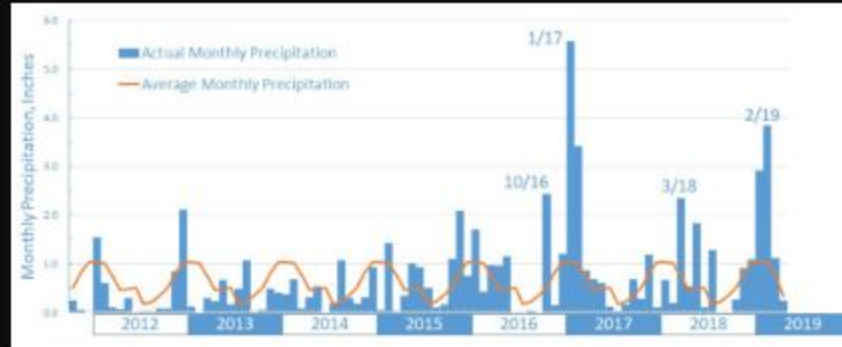




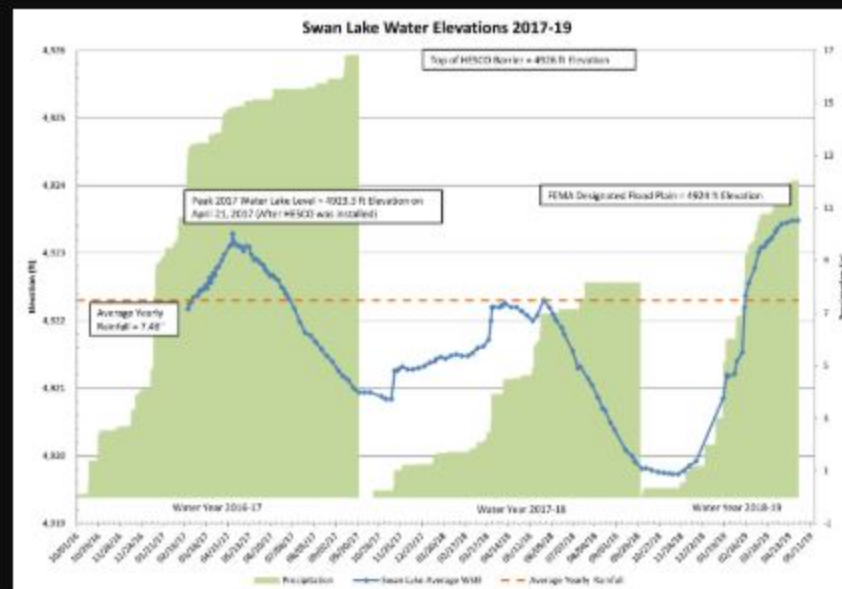
# Why So Much Water?

## Unusually Wet Winter

The winter of 2016-2017 brought heavy rains to the valleys and above-average snow to the mountains.



This influx of water resulted in immediate flooding across the region and long-term impacts to the North Valleys, including Swan Lake.



## If It Isn't Raining, It's Snowing



Heavy Snowpack



# CLOSED BASINS

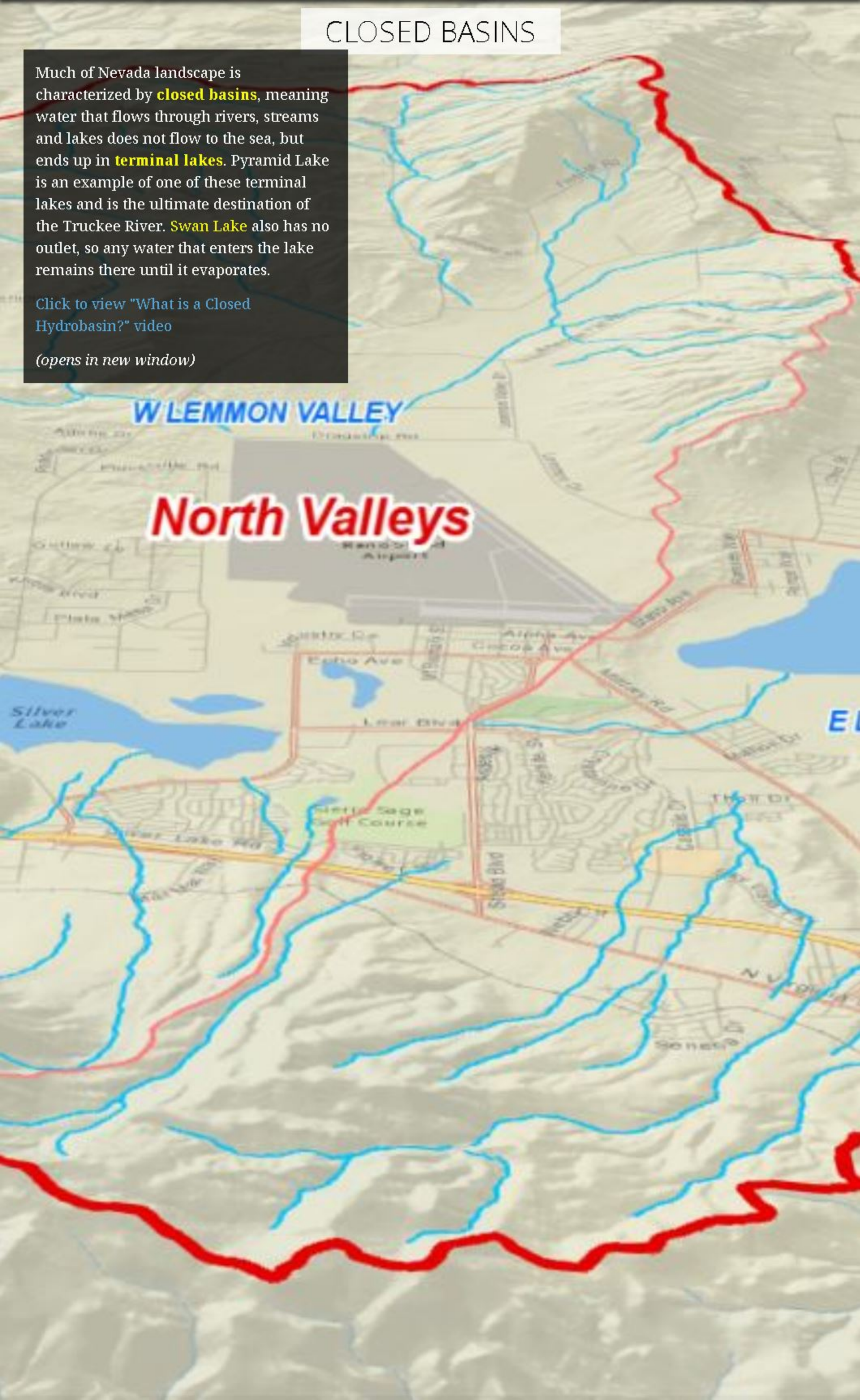
Much of Nevada landscape is characterized by **closed basins**, meaning water that flows through rivers, streams and lakes does not flow to the sea, but ends up in **terminal lakes**. Pyramid Lake is an example of one of these terminal lakes and is the ultimate destination of the Truckee River. **Swan Lake** also has no outlet, so any water that enters the lake remains there until it evaporates.

[Click to view "What is a Closed Hydrobasin?" video](#)

*(opens in new window)*

W LEMMON VALLEY

**North Valleys**







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

### COUNTY COMMISSION DIRECTIVES

#### I. Continue Area Protection Activities

- Manage the lakes within current boundaries
- Prevent water from entering homes and businesses
- Maintain open roadways/alternative roadways for emergency responders

#### II. Short-Term Actions

- Promote on-going natural evaporation
- Identify options to artificially lower Swan Lake level to provide additional storm water capacity
- HMGP –Acquisition and Demolition\*
- Assist in Lemmon Drive Widening and Raising

#### III. Longer-Term Strategies

- Closed basin mitigation plan
  - Analysis, basis and recommendations
  - Costs and funding strategies
  - Implementation strategies

\* Under review by FEMA, State and County





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins - Update

### I. CONTINUE AREA PROTECTION ACTIVITIES

#### A. Maintain current barrier systems and protective measures

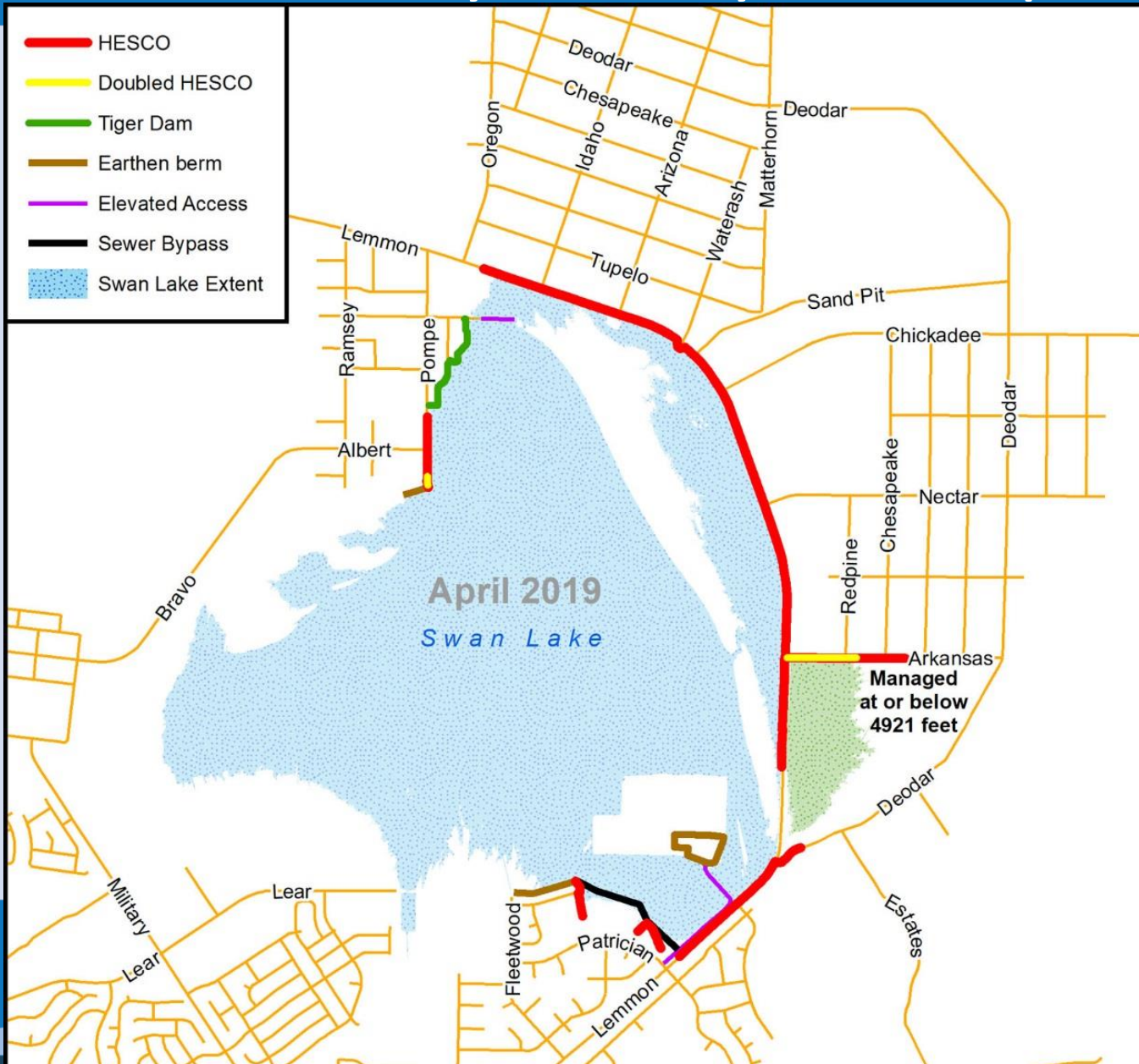
- Barriers
  - HESCO : Inflatable barriers : Berms
- Pumps
  - Storm water
  - Seepage
- Public Notification
  - Residents : Washoe 311 : Social Media : Signage
  - Emergency Responders : Stakeholders
- Lemmon Valley Waste Water Treatment
  - Access road, berms, security fencing
  - Bypass pumping for infiltration reduction (Phase 1)
  - Seepage pumping
  - Backup power and pumping
  - Water quality testing





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update







# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

### II. SHORT-TERM ACTIONS

#### A. Immediate Field Activities - 2019

In Place Within 1 to 3 Months

- Underground storm water piping along Lemmon Dr. \*
- Restripe Lemmon Drive
- HESCO adjustments
- Close/manage soil berm – developer property
- Reduce seepage along HESCO where cost effective

#### B. Planning Activities

- Restudy and Remap FEMA Designated Flood Plain and Elevations
- Lemmon Drive widening and raising
- New development permitting and conditioning





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

### II. SHORT-TERM ACTIONS – Cont.

#### C. Intermediate Field Activities\* - 2019 and on Implemented within 3 to 6 months

- Land Application
  - Utilize adjacent undeveloped land
  - High-water demand crop and native grasses
  - Pipeline(s), Pumps, Basins, Electrical Service, Security
  - Grading Efforts
- Rapid Infiltration
  - Utilize adjacent and available undeveloped land
  - Monitoring program
- Mechanical Aeration
  - Utilize areas near Washoe County Waste Water Plant
  - Use/Upgrade existing electrical service
  - Low down-ward facing dispersion aeration heads

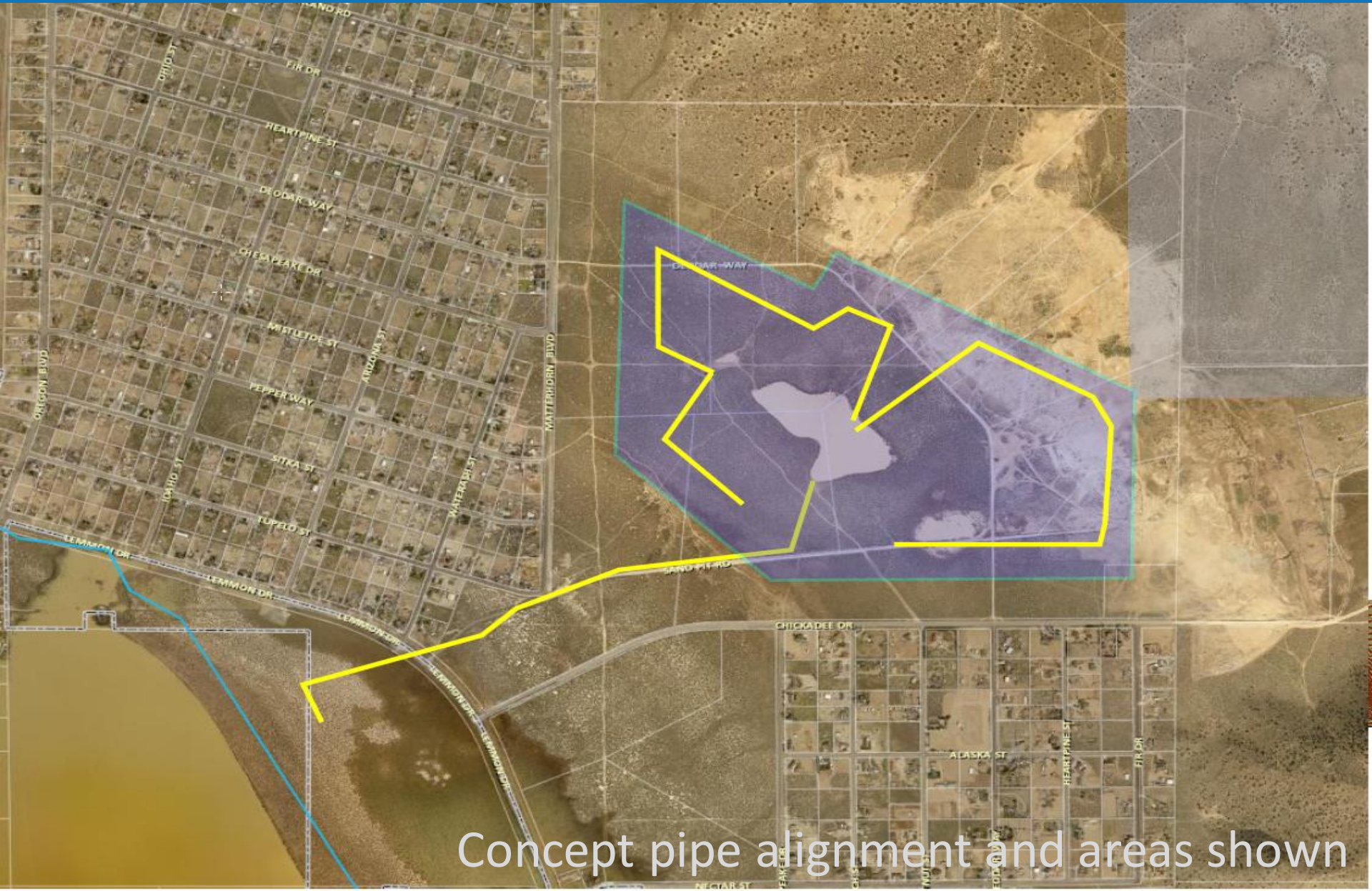
Note: Permits by State of Nevada, WCHD, Washoe County and others as required





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update



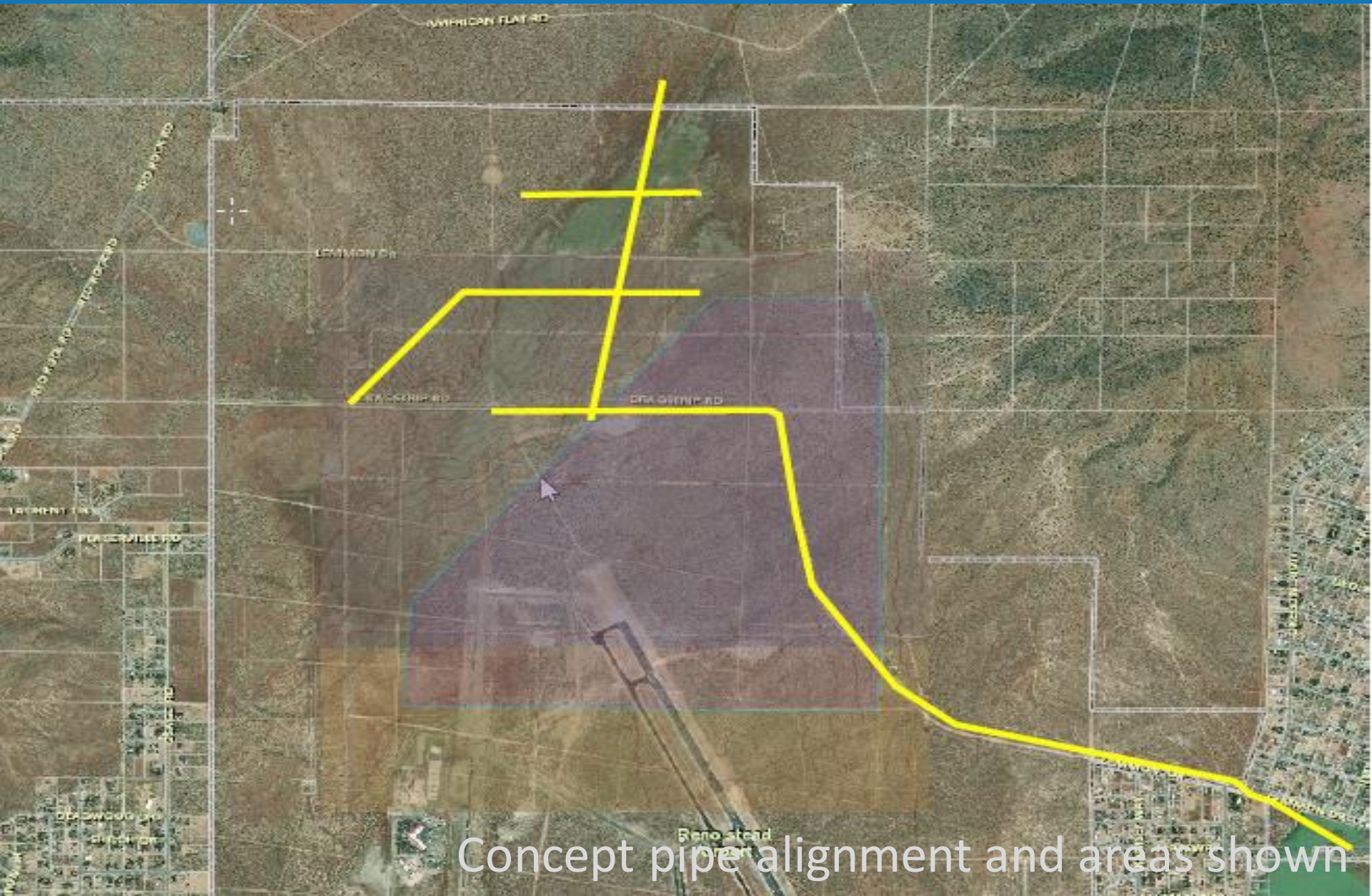
Concept pipe alignment and areas shown





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update



Concept pipe alignment and areas shown





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

LAND APPLICATION CONCEPTUAL ESTIMATE (AACE Level 5 Est.: -20% +50%)	1-FT. Additional Lake Drop per Year		2-FT. Additional Lake Drop	
	Low Est.	High Est.	Low Est.	High Est.
<b>Total Expenditure (non escalated)</b>	<b>\$ 2,000,000</b>	<b>\$ 3,500,000</b>	<b>\$ 3,600,000</b>	<b>\$ 7,300,000</b>

Costs shown are Class 5 cost estimates (H +30% to +100%, L -20% to -50%) and are shown for concept planning only.





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

### **IMPORTANT NOTE:**

If lake rises to predetermined action elevations, Flood Response Action Plan (FRAP) elements:

- Notification of Washoe County residents, WCSD, Emergency Responders, City of Reno, State of Nevada and other stakeholders
- Additional barrier constructed at Lemon Valley Elementary School
- Connect HESCO barrier along Lemmon Drive
  - Additional protections for residents 9950, 10000 Lemmon Dr.
- Add/Raise HESCO barriers including at waste water treatment plant
- Additional seepage pumps as necessary

If necessary, initiate Lemmon Valley Waste Water Treatment Plant Emergency Response Plan

1. Notification of Stakeholders (NDEP, COR, etc.)
2. Backup Power and Pumping
3. Short-term bypass to Reno Stead Treatment Plant





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins UPdate

### III. LONGER-TERM ACTIONS

- I. Regional Hazard Mitigation Plan Update
  - I. Includes Closed Basin Mitigation Plan
- II. Maintain Wildlife Habitat at Swan Lake
- III. Area Partnerships for Use of Storm Water
- IV. Washoe County Storm Water Utility (Enterprise Fund)
- V. Lemmon Valley Waste Water Treatment Plant
- VI. Regional Effluent Management
- VII. Other Closed Basins within Washoe County





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

### Regional Hazard Mitigation Plan (RHMP)

- A comprehensive and inclusive planning process
  - Required by FEMA every 5-years
- Development of mitigation strategies
  - Required as a condition of grant funding application
- Collaborative information sharing
  - Covering all 13 regional hazards, while focusing upon hazards that occurred over the last 5-years



- Community engagement and participation

Take our community survey today!

<https://www.surveymonkey.com/r/KBTQXMF>





# Concurrent Meeting – April 29, 2019

## North Valley's Closed Hydrobasins Update

# QUESTIONS?



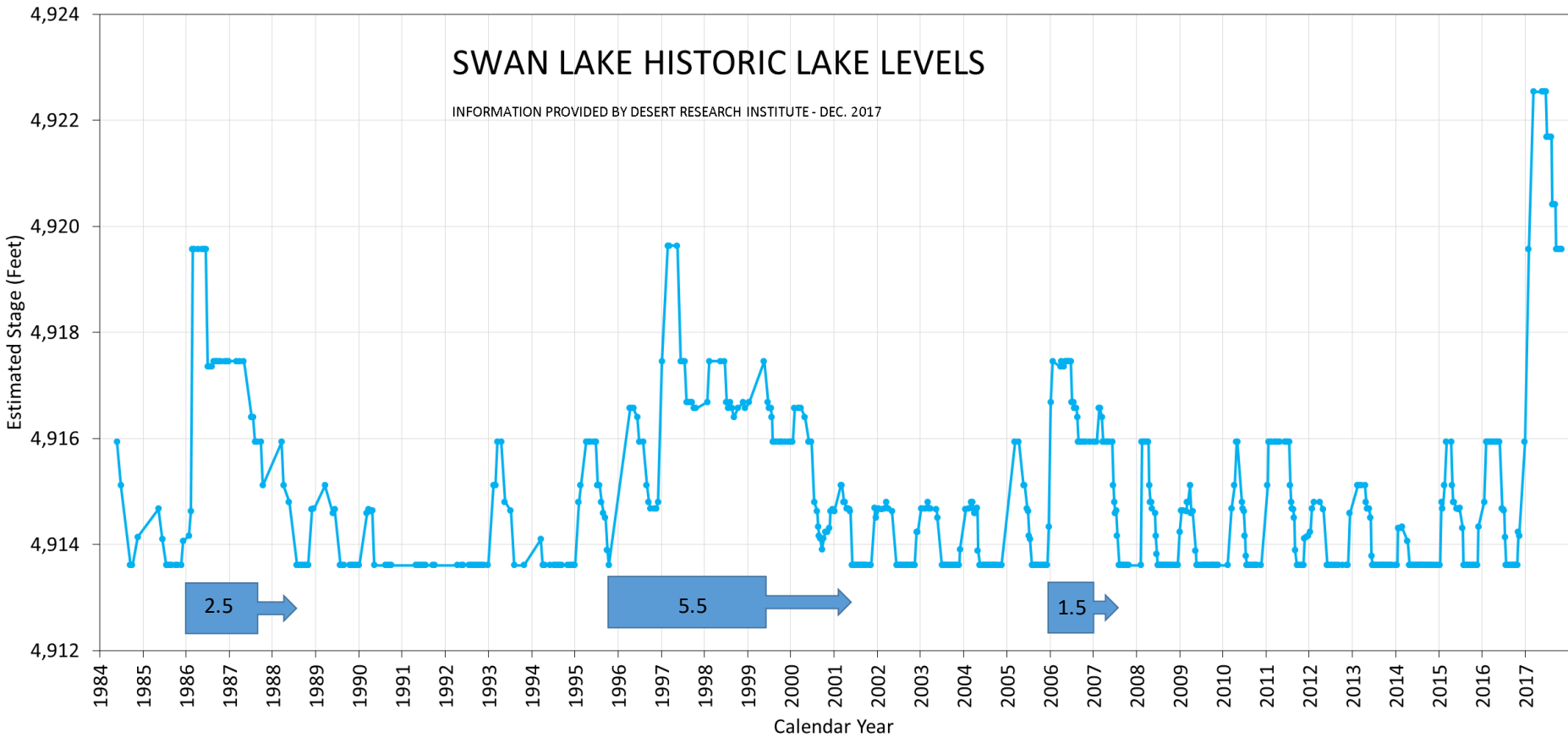




# Historic lake elevations

## SWAN LAKE HISTORIC LAKE LEVELS

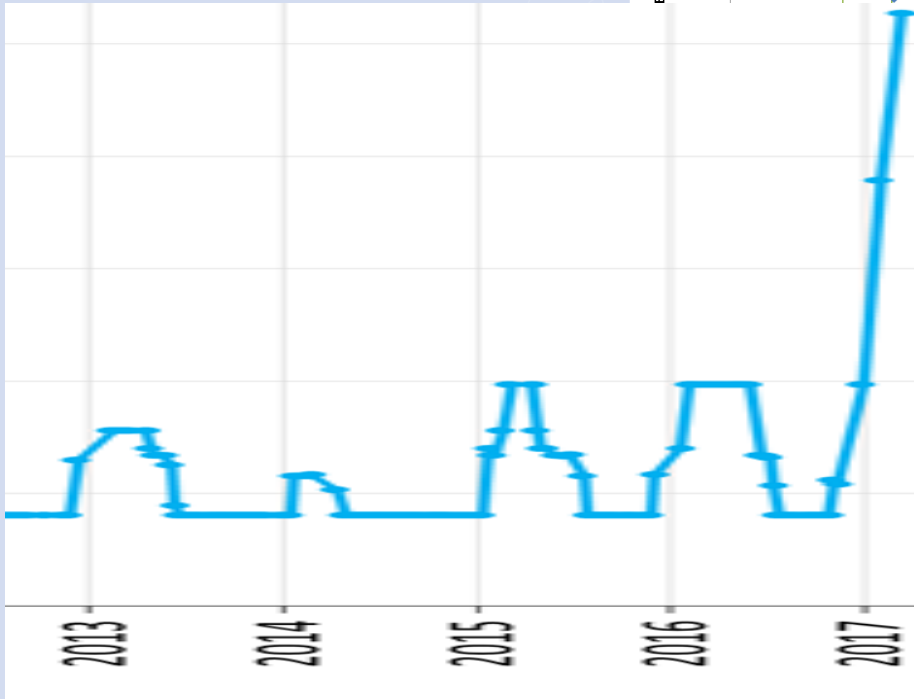
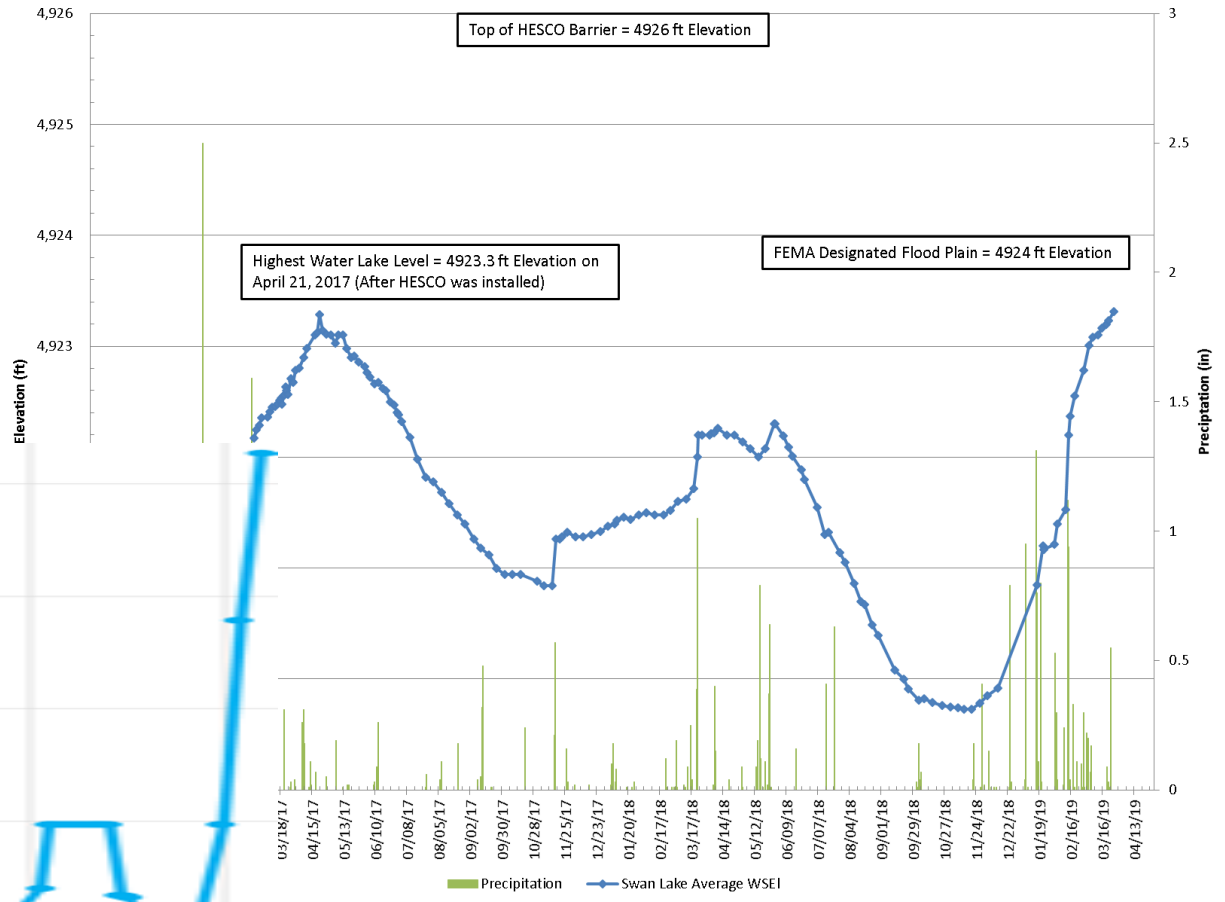
INFORMATION PROVIDED BY DESERT RESEARCH INSTITUTE - DEC. 2017







# Swan Lake Water Elevations 2017-19



4913.6'



# Lemmon Valley Operations

*Presentation by*

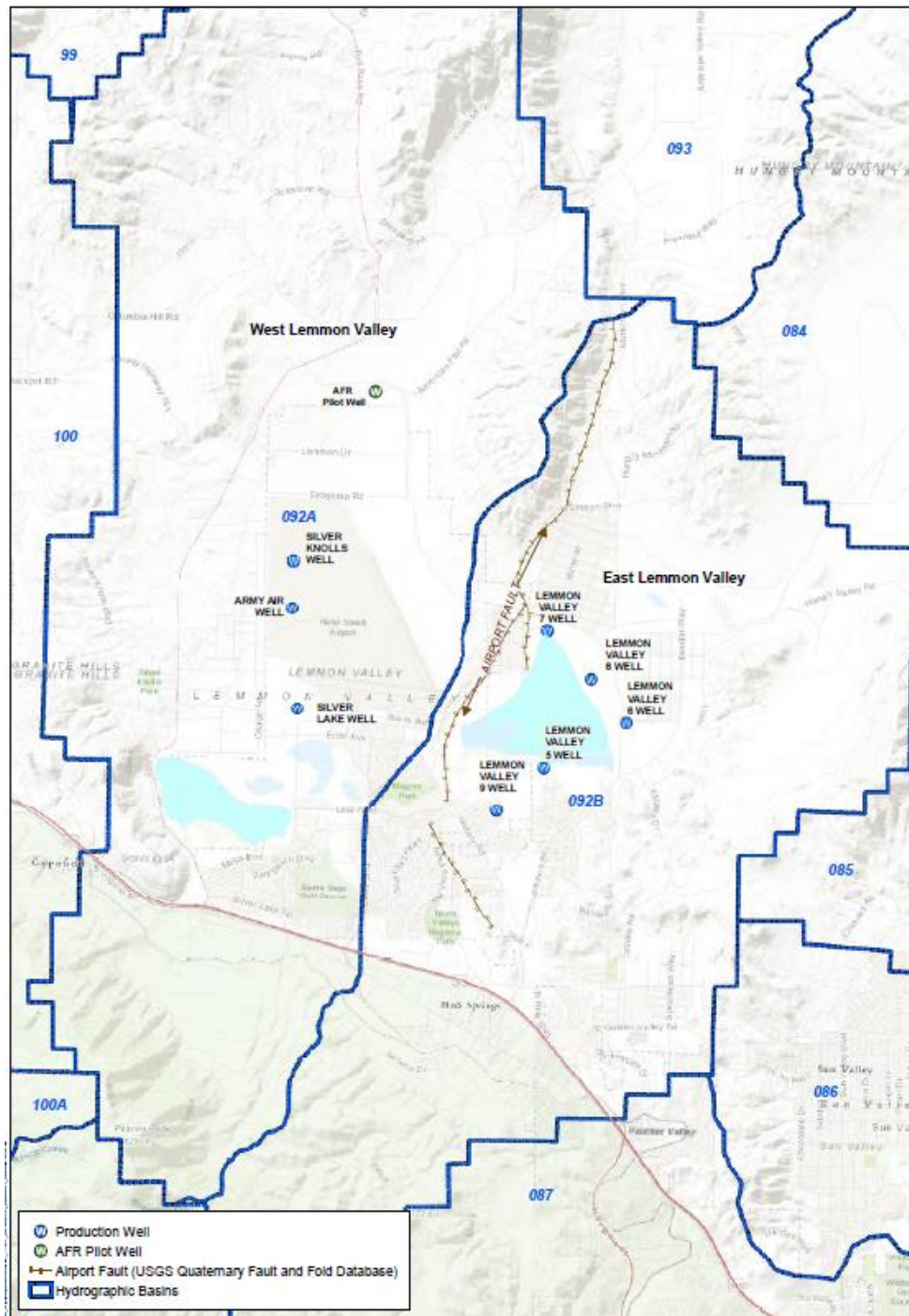
*Andy Gebhardt, Director of Operations & Water Quality*





*Christian Kropf, Senior Hydrogeologist*

*April 29, 2019*







-  Production Well
-  AFR Pilot Well
-  Airport Fault (USGS Quaternary Fault and Fold Database)
-  Hydrographic Basins



# More Pumping Than Recharge

YEAR	ARMY AIR WELL			SILVER LAKE WELL			SILVER KNOLLS WELL			SUM (MG)	SUM (AF)
	AAW (PUMP)	AAW (RCHG)	AAW (NET)	SLW (PUMP)	SLW (RCHG)	SLW (NET)	SKW (PUMP)	SKW (RCHG)	SKW (NET)		
1999	-	-	-	-	-	-	-	-	-	-	-
2000	-	-	-	-	-	-	-	-	-	-	-
2001	(134.22)	78.87	(55.36)	(80.29)	48.53	(31.76)	-	-	-	(87.12)	(267.35)
2002	(76.85)	66.82	(10.03)	(100.45)	28.54	(71.91)	-	-	-	(81.94)	(251.47)
2003	(69.22)	58.57	(10.65)	(101.29)	27.02	(74.27)	-	-	-	(84.92)	(260.60)
2004	(36.52)	51.04	14.52	(121.21)	27.30	(93.91)	-	-	-	(79.39)	(243.65)
2005	(47.44)	44.67	(2.76)	(120.69)	30.38	(90.31)	-	-	-	(93.07)	(285.63)
2006	(62.10)	52.96	(9.14)	(137.11)	47.79	(89.31)	-	-	-	(98.46)	(302.16)
2007	(59.54)	44.39	(15.15)	(209.31)	44.46	(164.85)	(81.91)	-	(81.91)	(261.91)	(803.77)
2008	(1.00)	38.34	37.34	(211.67)	55.97	(155.71)	(41.06)	10.53	(30.53)	(148.90)	(456.94)
2009	(95.39)	34.58	(60.82)	(48.79)	62.30	13.51	-	6.27	6.27	(41.04)	(125.95)
2010	(62.56)	48.81	(13.75)	(12.58)	62.49	49.91	(37.77)	42.59	4.83	40.99	125.79
2011	-	32.42	32.42	(48.49)	28.99	(19.51)	-	42.42	42.42	55.33	169.79
2012	(83.05)	26.52	(56.53)	-	20.61	20.61	(21.11)	38.52	17.41	(18.52)	(56.84)
2013	(5.85)	38.03	32.18	(10.33)	28.37	18.03	0.13	53.42	53.55	103.76	318.44
2014	(4.27)	27.86	23.59	(143.51)	24.73	(118.78)	(0.08)	37.25	37.18	(58.01)	(178.04)
2015	(82.72)	39.44	(43.29)	(88.66)	38.26	(50.41)	-	52.46	52.46	(41.24)	(126.55)
2016	-	35.46	35.46	(38.87)	33.32	(5.54)	-	20.60	20.60	50.51	155.02
2017	-	-	-	(71.35)	1.07	(70.28)	(7.26)	-	(7.26)	(77.54)	(237.95)
2018	-	-	-	(11.39)	32.62	21.23	(7.63)	0.12	(7.51)	13.72	42.11
SUM (MG)	(820.73)	718.75	(101.98)	(1,555.98)	642.73	(913.25)	(196.68)	304.17	107.48	(907.74)	
SUM (AF)	(2,518.74)	2,205.77	(312.96)	(4,775.15)	1,972.48	(2,802.67)	(603.60)	933.46	329.86	(2,785.78)	(2,785.78) ACRE-FEET
CHECK											(2,785.78) ACRE-FEET

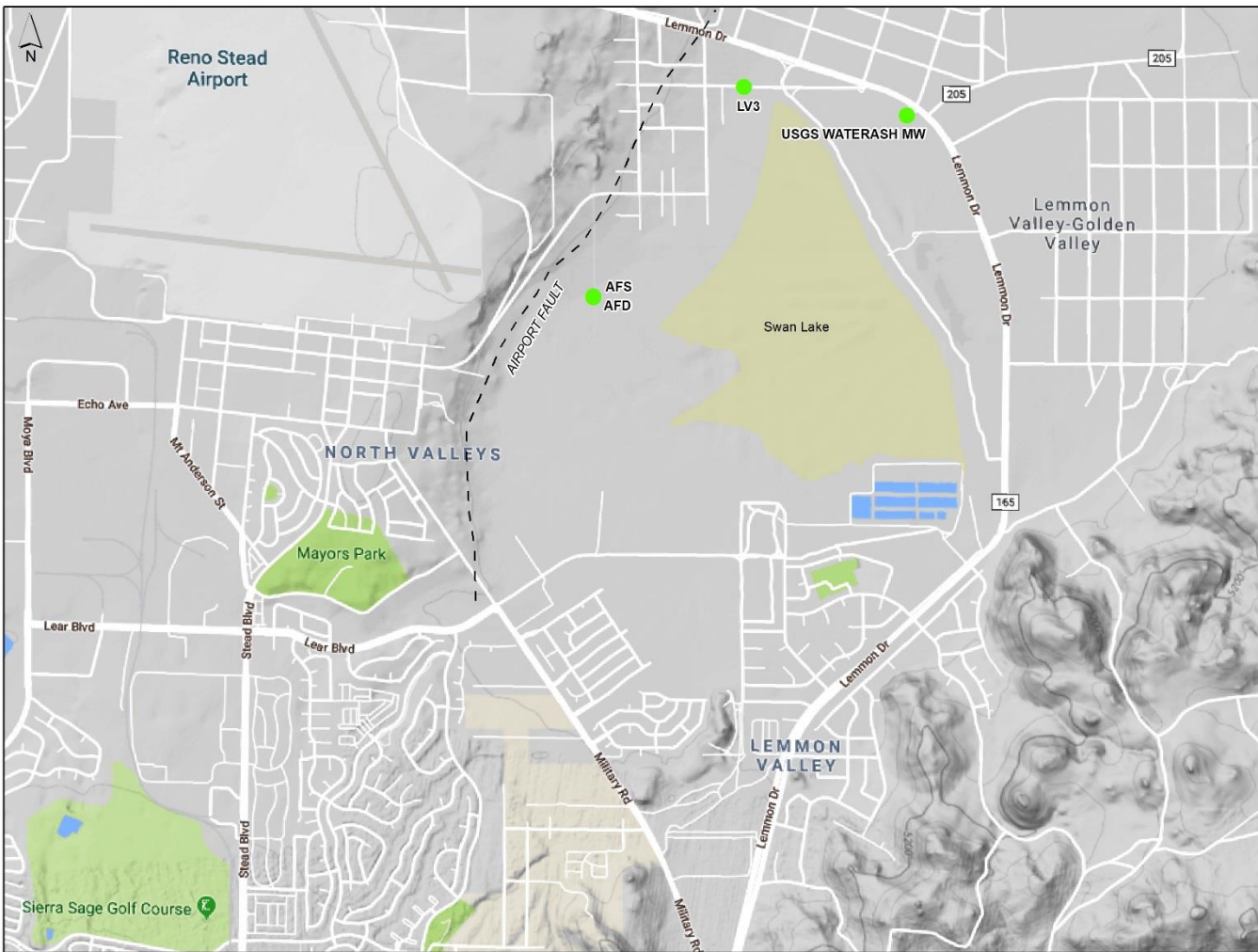


## Outline

- West Lemmon Valley ASR Program
- Why are East and West Lemmon Valley Distinct Basins?
- Groundwater Flow in East and West Lemmon Valley
- Water Level Responses to Pumping and Recharge
- Water Level Changes Near the Airport Fault
- Water Levels in East Lemmon Valley in Relation to Playa

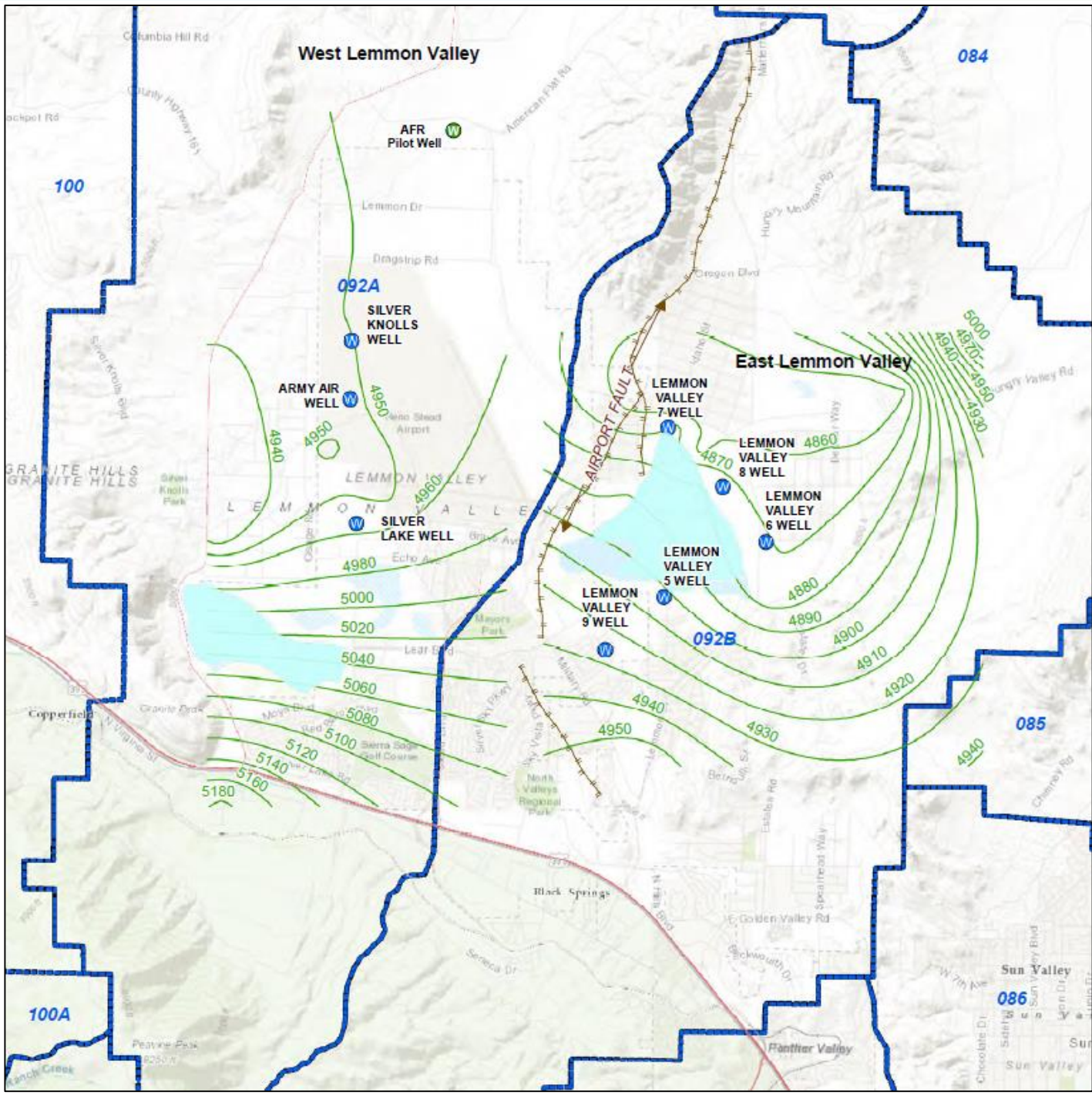


# Why are there two basins?



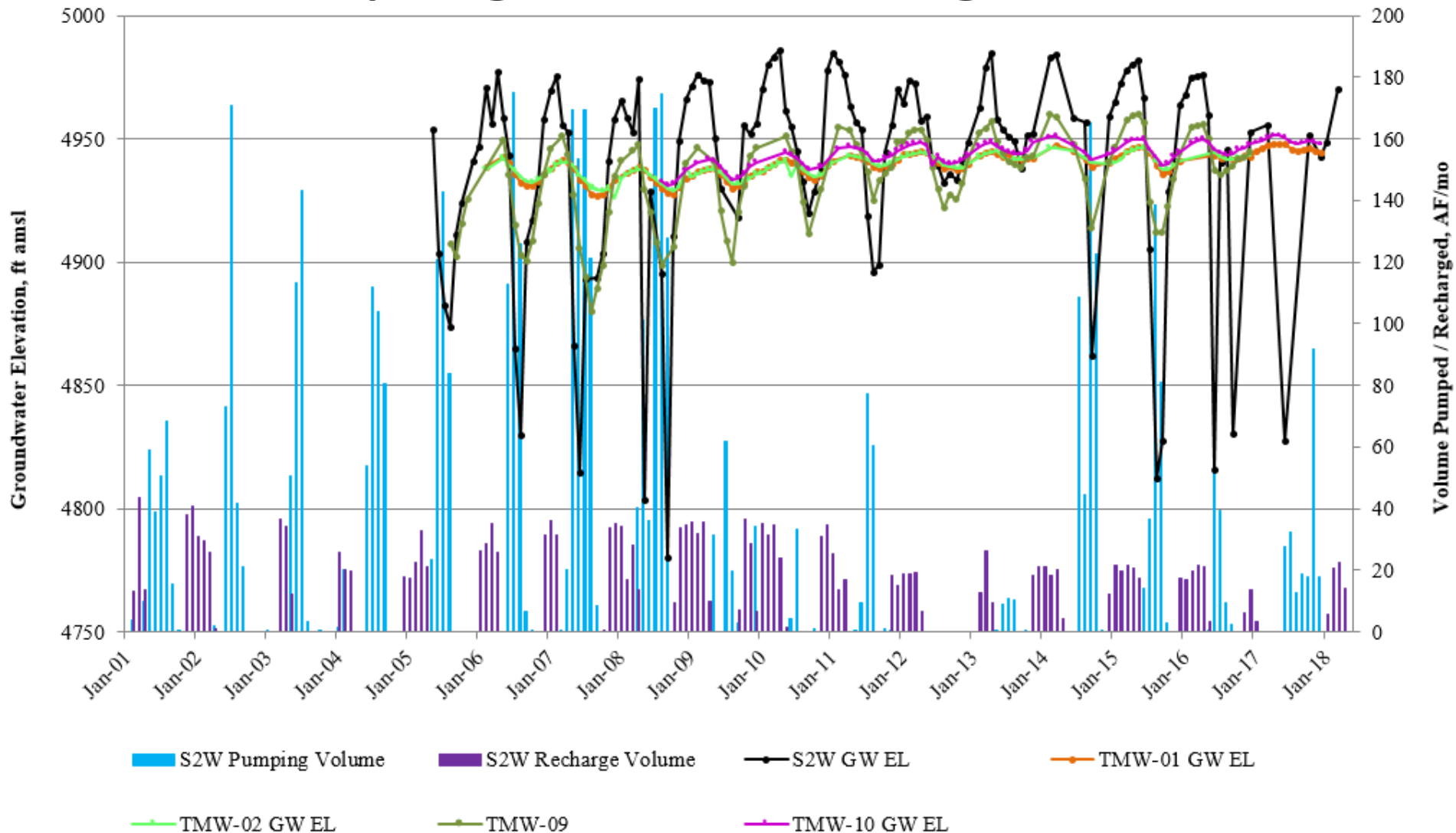


# Groundwater Flows to Center of Each Valley



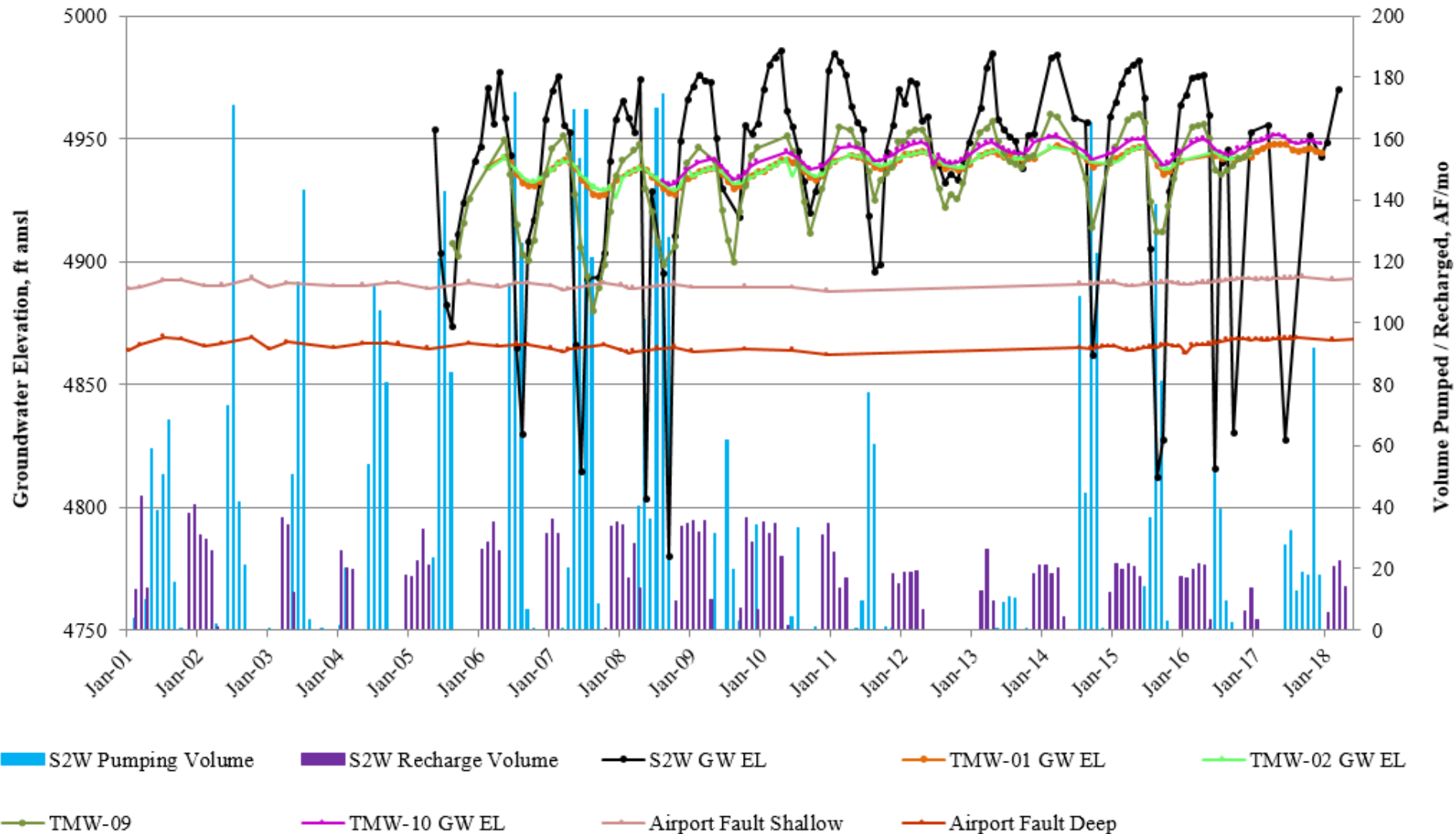


# Water Level Response to Pumping and Recharge - WLV





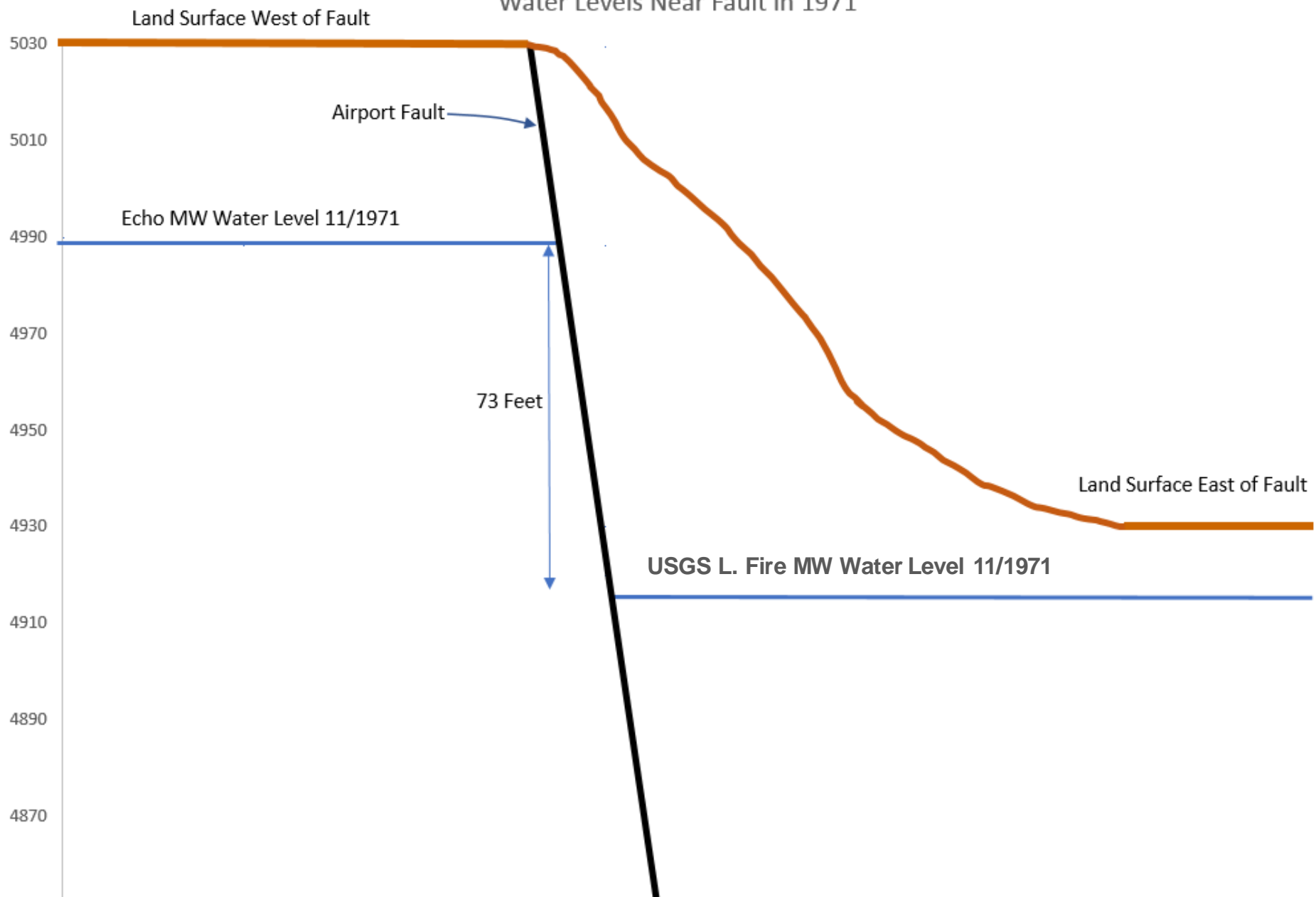
# Water Level Response to Pumping and Recharge - ELV





# Airport Fault Remains an Effective Barrier to Flow Between Basins

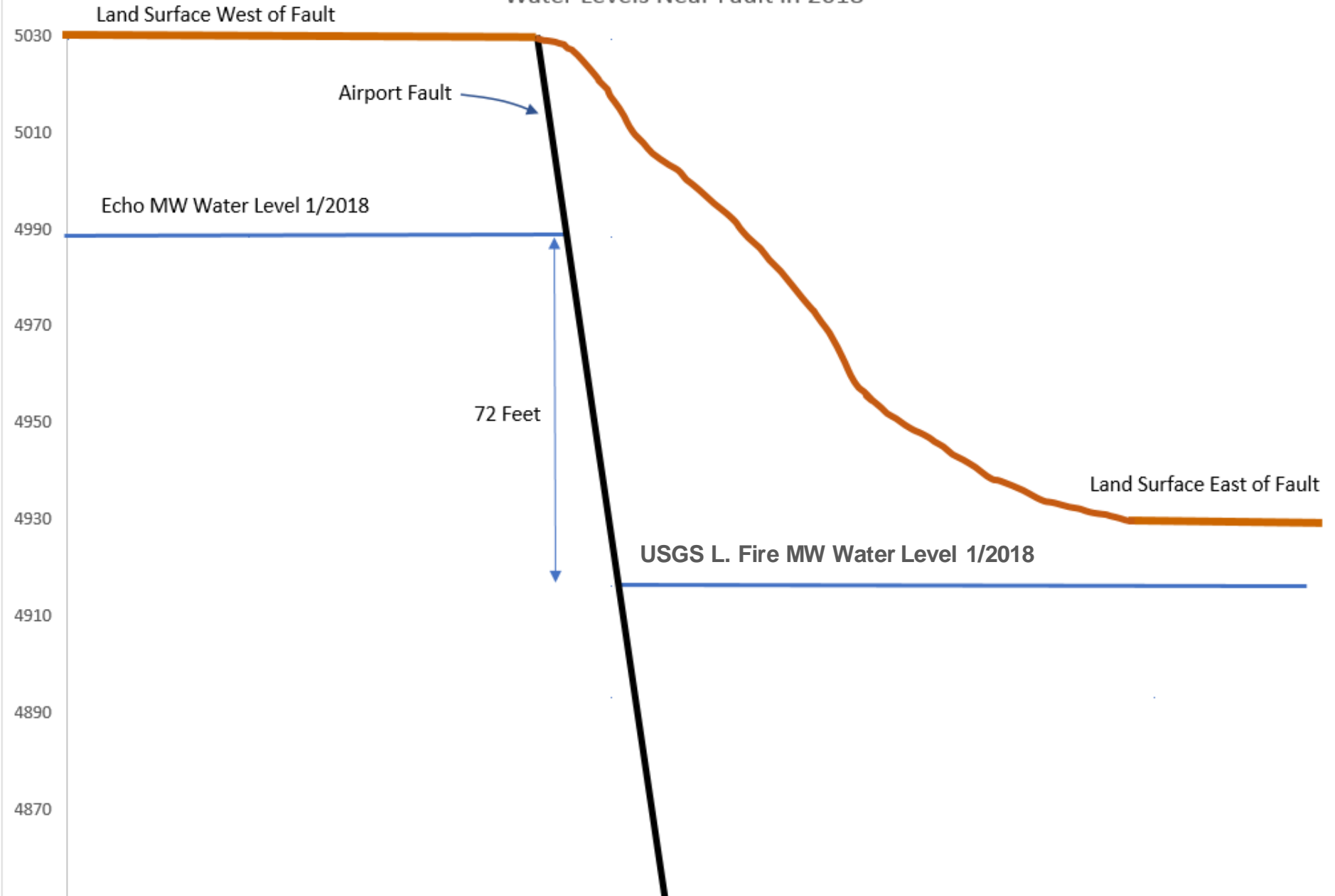
Water Levels Near Fault in 1971





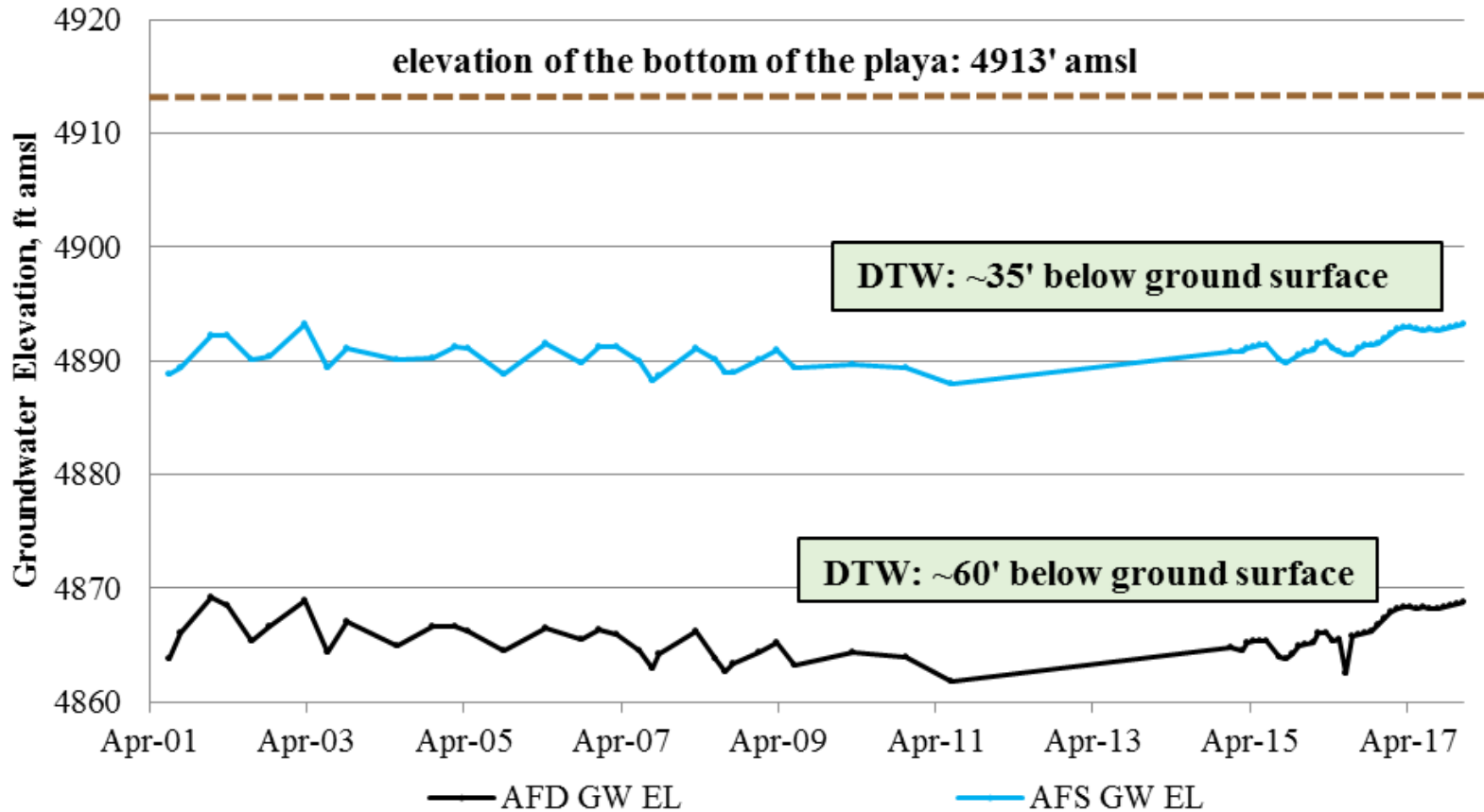
# Airport Fault Remains an Effective Barrier to Flow Between Basins

Water Levels Near Fault in 2018

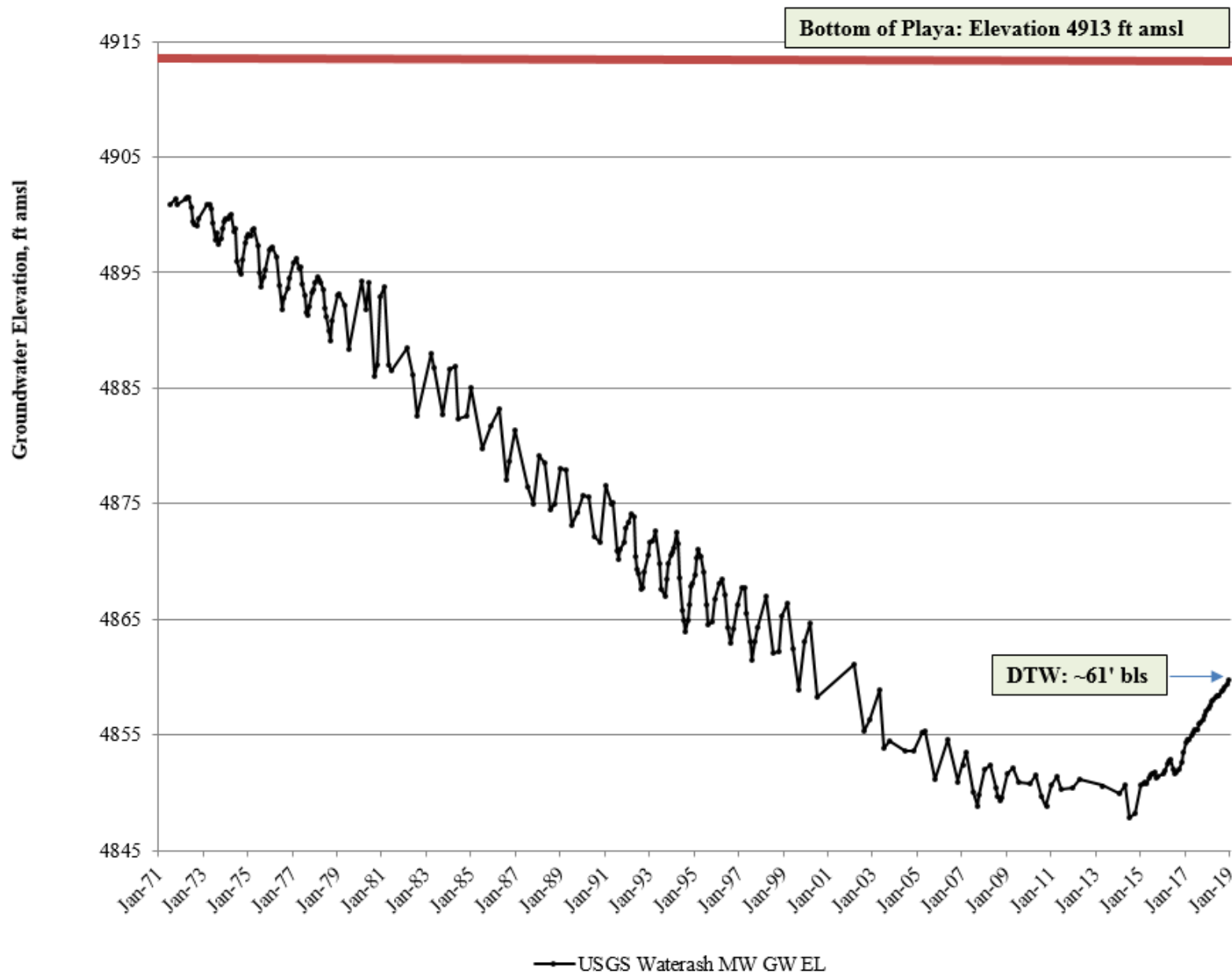




# Groundwater elevations remain consistent below the playa.

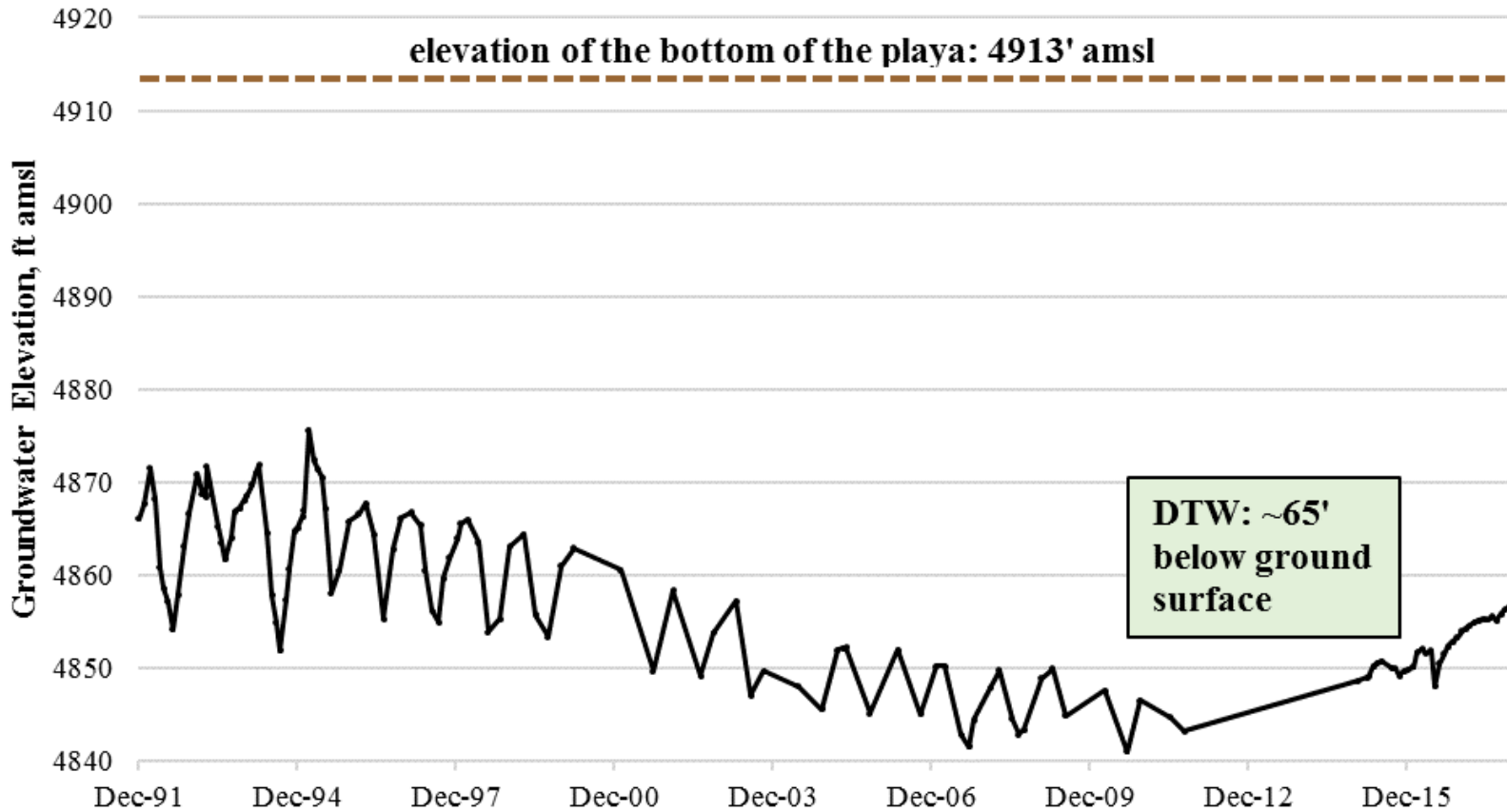


# Groundwater Levels Remain Below Playa in East Lemmon Valley





# Groundwater elevations are 65' below the playa @ LV3



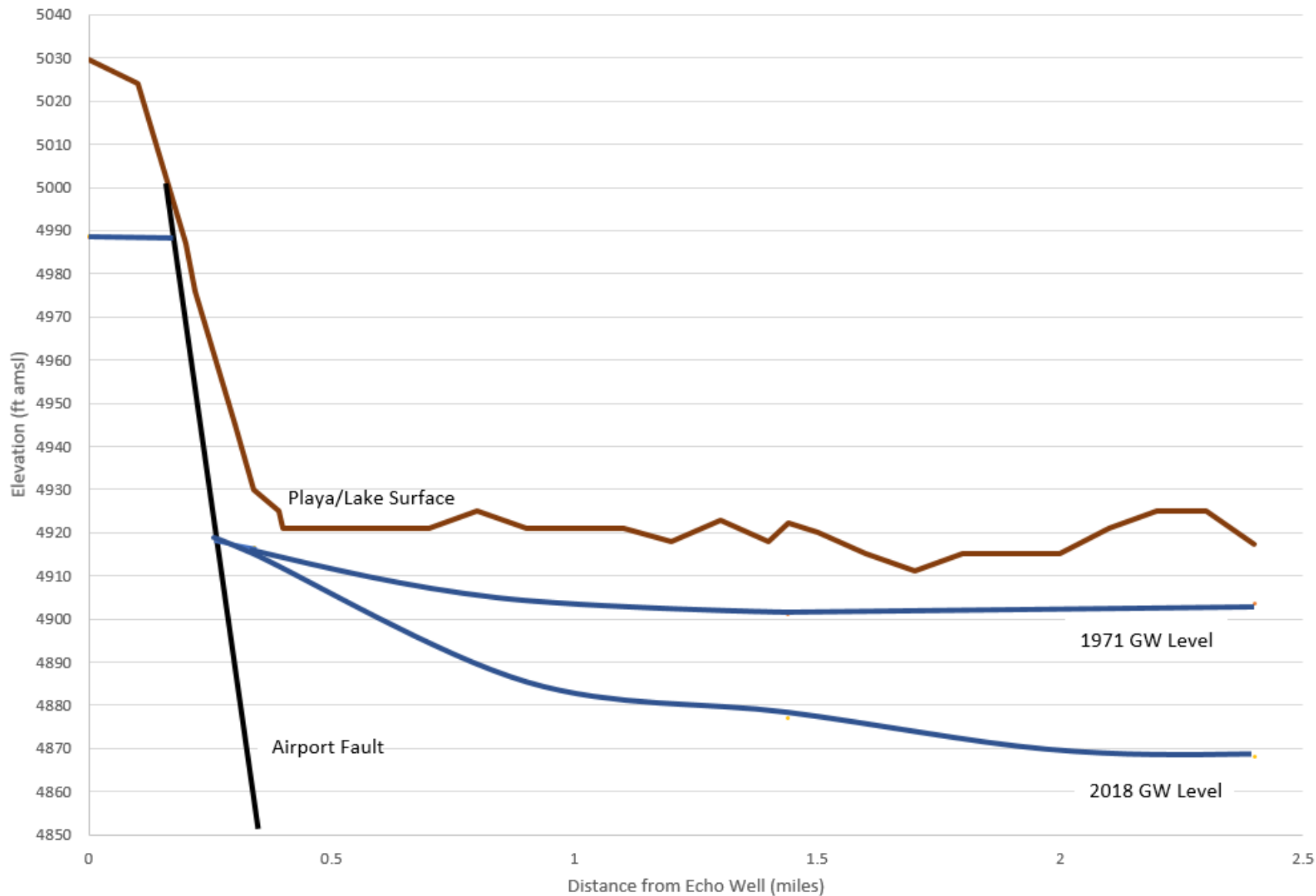
# Cross-Section Depicting Groundwater Below Playa





# Groundwater levels have dropped further below playa in 47 years

## Echo to Deodar Cross-Section



## Recap

- The airport fault acts as an underground dam that separates groundwaters in West Lemmon Valley from groundwaters in East Lemmon Valley
- Groundwater flows towards the center of each basin towards domestic and public pumping centers
- Pumping and Recharge activities in West Lemmon Valley show no signal in East Lemmon Valley
- Groundwater levels near the airport fault have changed little in 47 years
- Groundwater levels have remained below the playa
  - (10'-30' below in 1971 and 20'-40' below in 2018)
- Vertical downward gradients at the playa show that groundwater is trying to get deeper, not rise to the surface



**Thank you!**  
Questions?



LEMMON VALLEY

ITEMS	DESCRIPTION	ADVANTAGES	DISADVANTAGES	TIME TO COMPLETE	LONG/SHORT TERM	FEDERAL FUNDING	WHAT STATE AGENCY MAY NEED TO BE INVOLVED	WHAT FEDERAL AGENCY MAY NEED TO BE INVOLVED	WILL IT REQUIRE A PERMIT
Natural Evaporation	Allow natural forces to evaporate the basin.	No additional costs. Lowers water level approx. 2.5 ft per year (~3500 acre feet of water)	Requires ongoing maintenance and operations related to existing barrier system.	Dependent on climate/weather conditions. Research related to past natural evaporation shows a timeframe of roughly 6-8 years for complete evaporation.	Long Term	N/A	N/A	N/A	No
Mechanical Evaporation	Rent large evaporators to increase the evaporation rate. (This option was considered assuming they would run during daylight hours and is based on the manufacturer's information for evaporation rates. The surface area of the lake is currently approximately 1,200 acres.)	Lowers water level in the basin.	Need 120 evaporators working for 1 year to evaporate an additional 1 foot of water. (One machine evaporates 10 acre feet of water in 12 months.) Will require substantial electrical infrastructure all around the lake.	Based on the information provided to Washoe County and depending on the number of units used, one unit can remove approximately 10 acre feet of water in one 12 month period.	Short Term	Potential	(NDEP) Nevada Department of Environmental Protection	N/A	Yes
Truck Water out of Basin	Truck the water to a different location.	Lowers water level in the basin.	Adds traffic to the roadway network. Discharge permitting will be problematic. Takes too long. (Natural evaporation is quicker.)	Using one fill station to fill twelve, 1,200 gallon water trucks per hour with a haul time of 20 minutes (just out of the hydrographic basin) to remove 1 vertical foot of water (1,200 acre feet or 391 millions gallons of water) will take 2.5 years hauling 24 hours a day.	Short Term	N/A	(NDEP) Nevada Department of Environmental Protection	N/A	Yes
Drill/Infiltrate	Drill into the aquifer and drain the water into it. (The lake sits above a thick clay layer that does not allow the water to infiltrate into the ground, and therefore into the aquifer.)	Storage of storm water in an aquifer for later use as groundwater.	Injection of water into the aquifer cannot physically be done in a rapid manner. NRS 445A.490 prohibits injection of water that has the potential to degrade underground sources of drinking water. Permitting of injection wells will be problematic.	This process could take multiple years to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection	(BLM) Bureau of Land Management (property owner)	Yes
Excavate/Dredge	Dredge the bottom of the lake to create more capacity. (Mitigation of 1 vertical foot of water elevation at the current lake level (4922') would equate to approximately 1.8 million cubic yards of export material from the lake bottom.)	Can mitigate and create excess volume.	Excavation on federal land would enact a possibly lengthy environmental permitting process. Clay materials are not useful for construction so a location to deposit the material would need to be found. Excavation increases storage volume, but since it does not increase surface area, it does not improve natural evaporation.	This process could take multiple years to complete because it will require lowering of the lake level prior to being able to excavate in the lake bottom.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife	(BLM) Bureau of Land Management (property owner)	Yes
Levee/Elevate Lemmon Drive	Build a levee around the lake in connection with an elevated roadway.	Maintain existing wetlands.	Environmental and visual impacts. High cost and liability to maintain levees. Risk of levee failure. Would require additional drainage infrastructure and pumping to manage stormwater across the levee. These infrastructure and pumps must be perpetually maintained. Reducing lake area with levees also reduces natural evaporation.	This process could take multiple years to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife; Nevada Department of Dam Safety	(BLM) Bureau of Land Management (property owner) - (FEMA) Federal Emergency Management Administration - possible Army Corps of Engineers	Yes
Pumping	Pump the water out of the hydrographic basin. (The approximate amount of water to remove 1 vertical foot of water level is 391 million gallons or 1200 acre feet of water.)	Maintain existing wetlands.	Determination of final location for water needs to be determined, but additional flow/water could create new problems in a new location.	This process could take multiple years to complete.	Long Term	N/A	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife	(BLM) Bureau of Land Management possible (BIA) Bureau of Indian Affairs	Yes
Buy Homes	FEMA Hazard Mitigation Grant for purchase of properties in the area to remove the future impact of a repeat event.	Removes select homes from harm. Maintains greater surface area of the lake, thus improving natural evaporation.	Housing costs may not allow those in the program to purchase in the area.	The HMGP program requires completion within 2 years. Upon award from FEMA all efforts will be made to complete within 12 months.	Long Term	Yes	(NDEM) Nevada Division of Emergency Management	(FEMA) Federal Emergency Management Administration	No
Elevate Homes/Septic system and Roadways	Raise homes to keep the water out of them.	Home is raised above the floodplain. (All homes built after 1984 are built above the floodplain.)	Many of the homes in the area are on individual septic systems, many of which cease to function when the ground is saturated with water. Access to the home from the street and driveway was not possible as was seen early in 2017 where many homes were islands. Does not raise the property, only the home.	This process could take approximately 6-12 months.	N/A	Unknown	(NDEP) Nevada Department of Environmental Protection; (NDEM) Nevada Division of Emergency Management	(FEMA) Federal Emergency Management Administration	Yes
Diversion of Upstream Flows	Capture stormwater flows from the slopes of Peavine Mountain and re-route to the Truckee River Basin and away from the closed hydrobasin.	Alleviates rise in lake level attributed to stormwater flows from Peavine Mountain.	Diverts water that traditionally recharges the hydrobasin aquifer. Does not allow some stormwater to reach Swan Lake. Routing these flows to the Truckee River may have adverse water quality impacts to the river and may be opposed by the State and/or Pyramid Lake Paiute Tribe. Does not address other flows from the hydrobasin that contribute to the lake.	This process could take multiple years to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife	(FS) Forest Service (property owner)	Yes
Reno Sparks Indian Colony use of water	The Reno Sparks Indian Colony representatives have discussed the potential to utilize water from Swan Lake and Wastewater Treatment facilities on their property in Hungry Valley.	Potential long term use of treated effluent.	Early stages of discussion related to use. Unsure if adequate supply of stormwater exists. Not sure about the amount of water necessary or exactly where the use would occur.	This process could take multiple years to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife	Possible (BIA) Bureau of Indian Affairs	Yes
Reservoir - City of Reno West Side	Installation of a dam for retention of effluent.	Storage of water to alleviate rise in lake.	Project has been assessed for storage of effluent associated with the Reno/Stead Wastewater Treatment Plant.	This process could take multiple years to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife; Nevada Department of Dam Safety	(BLM) Bureau of Land Management	Yes
Reservoir - East Side	Installation of an approximate 90' tall dam for storage of approximately 2,800 acre feet of water.	Storage of water to alleviate rise in lake. Could lower the lake level by approximately 2' - 3'.	There are many unknowns due to the early stages of review related to long term potential.	This process could take 12 months to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife; Nevada Department of Dam Safety	(BLM) Bureau of Land Management	Yes
Infiltration Basins	Creation of rapid infiltration basins to accept water pumped from the lake.	Removes water to allow reduction of lake elevation.	Unknown at this time how quickly the water can be infiltrated, and whether the water would infiltrate below the clay layer and not end up back in Swan Lake.	This process could take 12 months to complete.	Long Term	Potential	(NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife	N/A	Yes

BCC Concurrent 4-29-19  
Washoe County