



# Carson and Walker River Flooding TTX





# Agenda

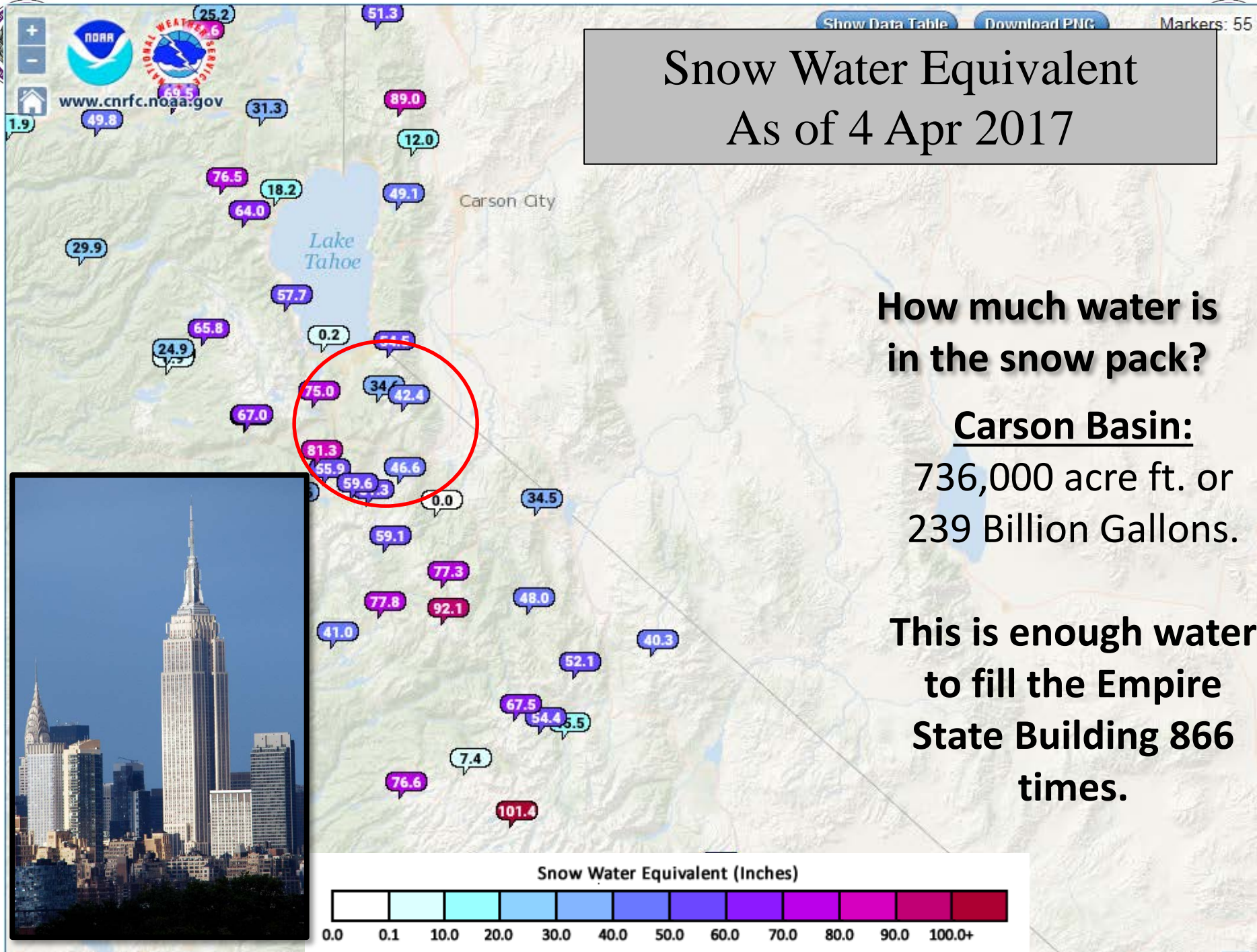
- Introduction
- Carson River Basin
  - Heavy Rain Event – Lahontan not full
  - Heavy Rain Event – Lahontan full
- Walker River Basin
  - Heavy Rain Event – Reservoirs not full
  - Heavy Rain Event – Reservoirs full
  - Night in the Country
- Conclusion



# Carson River Basin



# Snow Water Equivalent As of 4 Apr 2017



**How much water is in the snow pack?**

**Carson Basin:**

736,000 acre ft. or  
239 Billion Gallons.

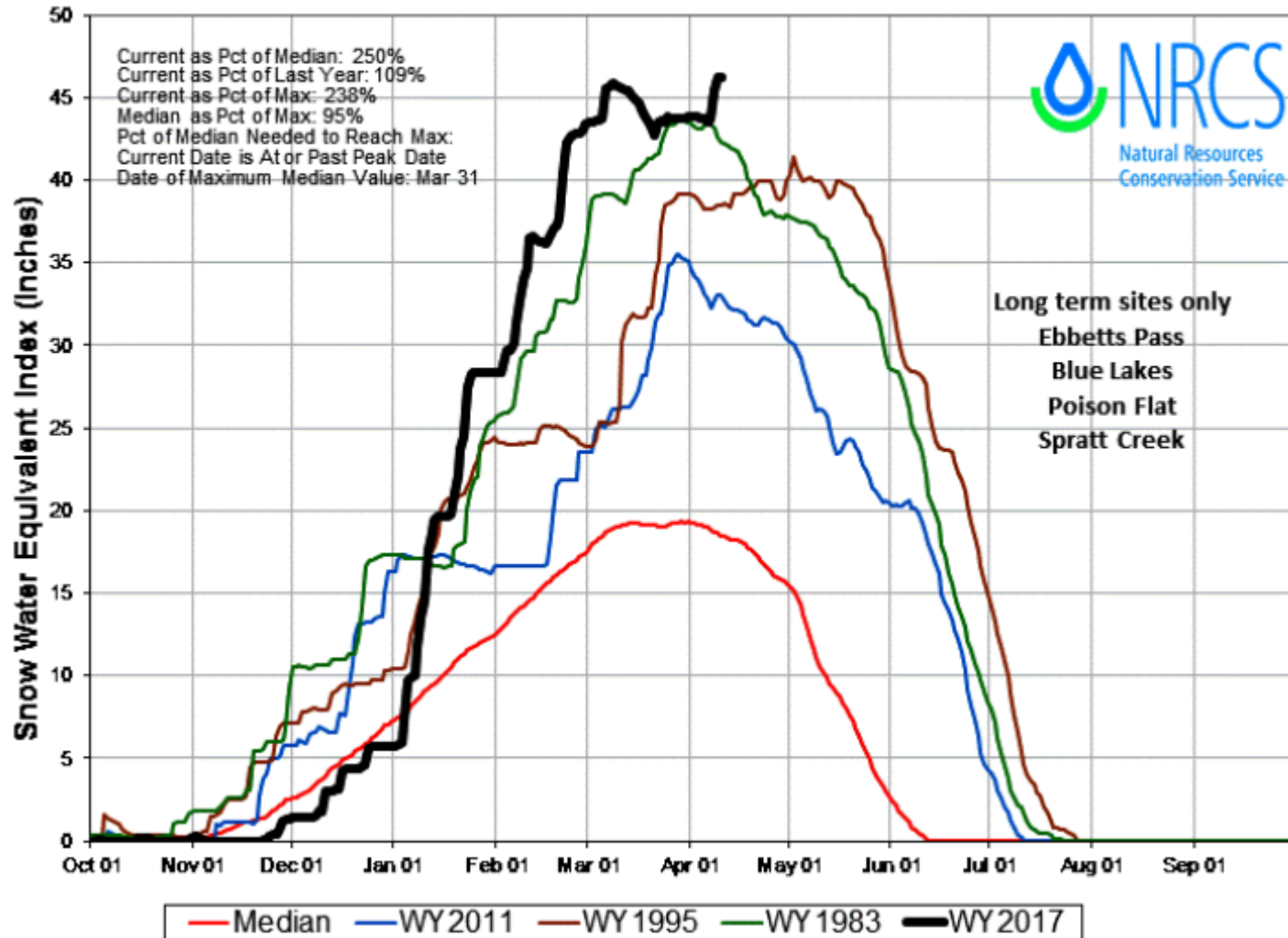
**This is enough water to fill the Empire State Building 866 times.**



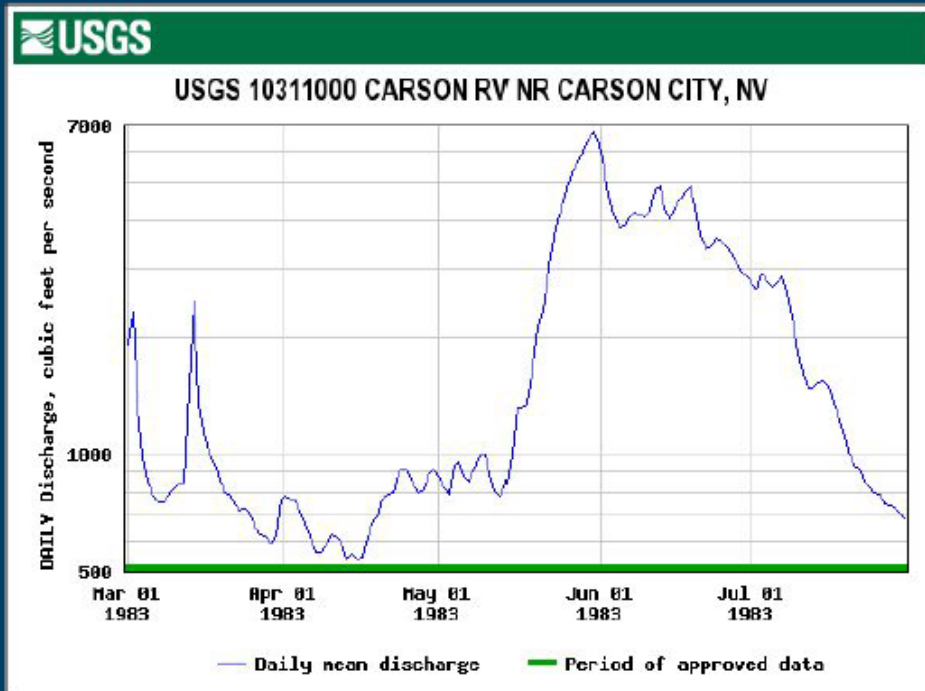


# Carson Basin

**CARSON RIVER BASIN Time Series Snowpack Summary**  
**Based on Provisional SNOTEL data as of Apr 10, 2017**



# What Does this Mean for the Carson River?



**Current flood stage - 8800 cfs**  
*plots show daily average flow, not peak*

- Minor to moderate flooding impacts likely in Carson Valley
- Minor flooding impacts possible but less likely in Carson City.
- Creating additional space and managing large projected flow into Lahontan will be key to mitigating (not eliminating) flood risks near Fallon.
- New v-line weir facilitating higher releases and faster draw-down of Lahontan.



# **Scenario 1 – Heavy Rain / Lahontan not full**

- **Period of high heat in late May (7 days of 85 degrees)**
- **5 Day Rain Event Similar to February Flooding**
- **Lahontan at 250k AF**
- **Lahontan releasing 2800 cfs**

**Douglas County**

**Carson City**

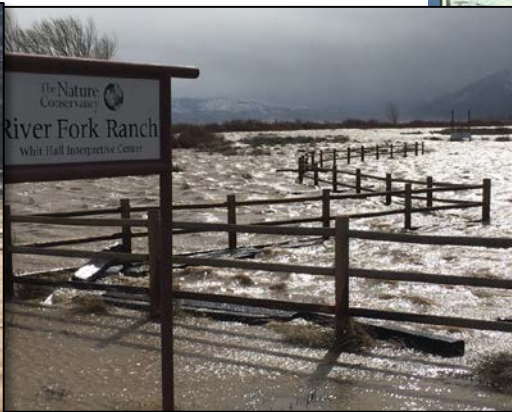
**Central Lyon**

**Churchill**



# Douglas County

- Carson Valley Country Club
- Genoa
- Aspen Mobile Home Park
- Westwood Subdivision



Looking east across the Carson Valley Golf Course in the floodplain of South Gardnerville, NV, January 1997 (Hwy 395 at top)

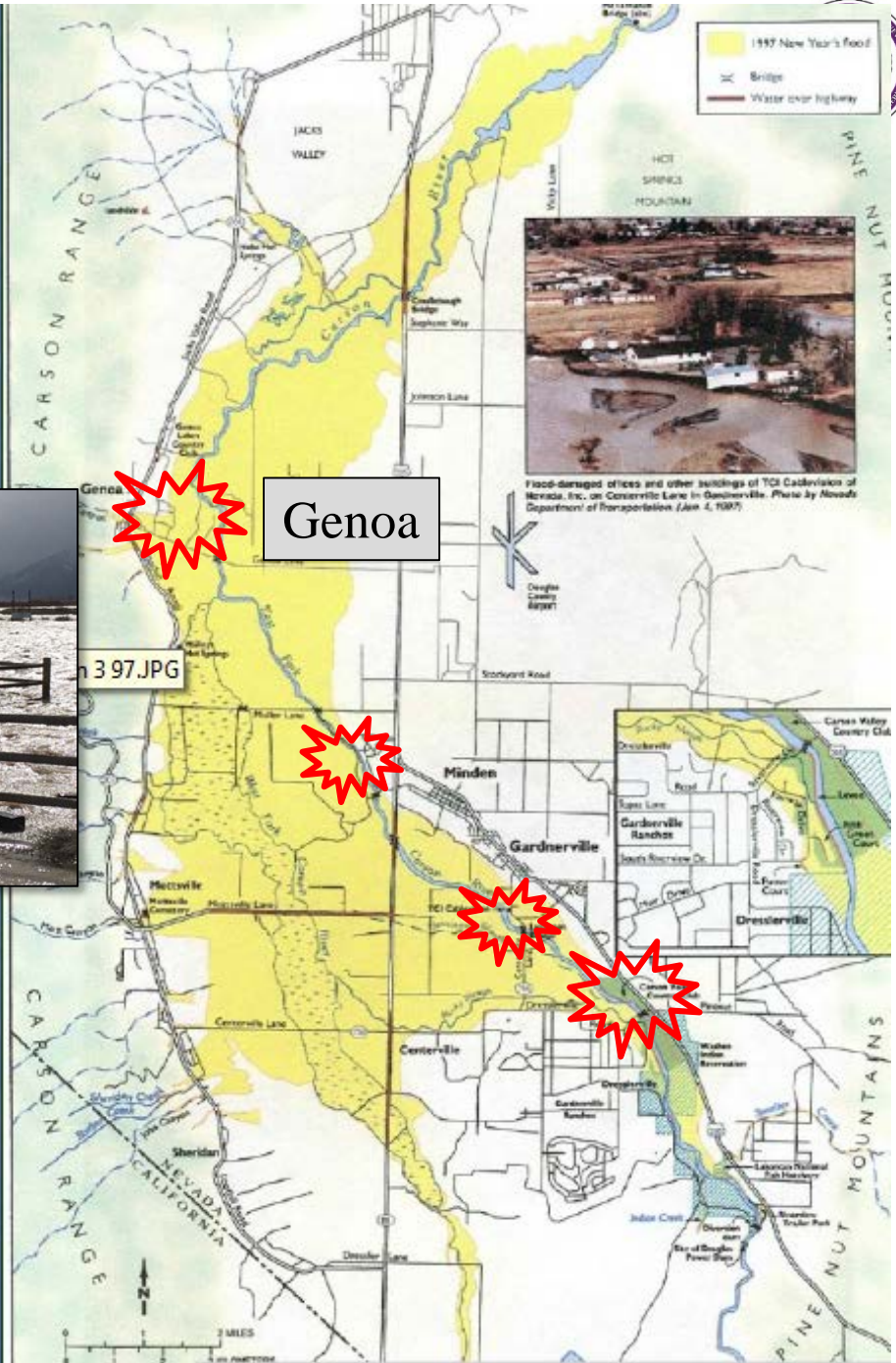


Figure 5 — Extent of the 1997 New Year's Flood in Carson Valley

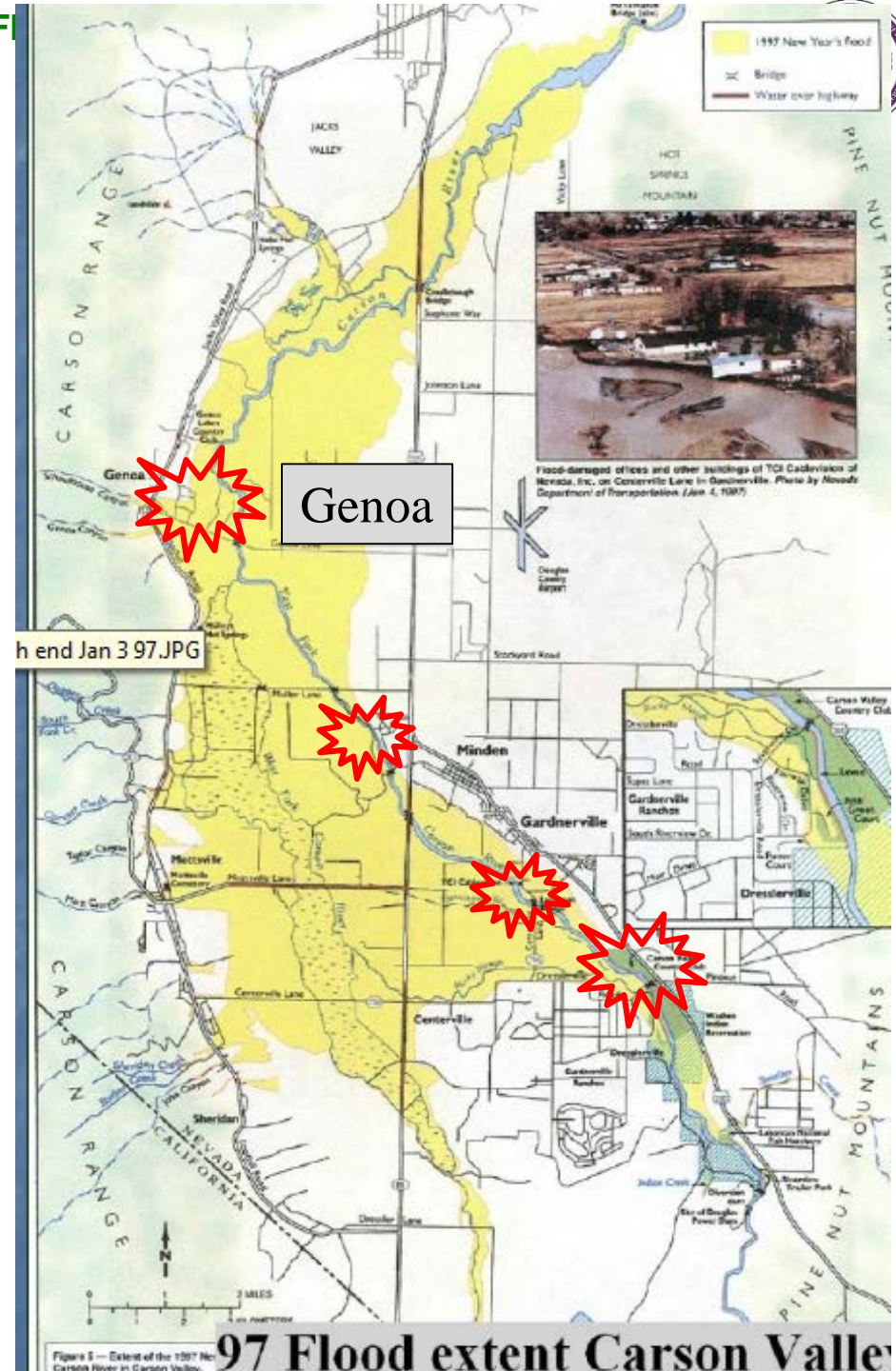
## 97 Flood extent Carson Valley





# Douglas County

- Considerations
  - Medical or in home care?
  - Assisted living
  - Reroute traffic / detours
  - Marking flooded areas
  - Security of evacuated areas
  - Utilities sandbagged / secured?
  - Individual resident sandbags
  - Impacts on schools
  - Isolated communities (Genoa)
  - Sewer impacts
  - Propane tanks
  - Shelter plan
  - Bridge clearing (debris removal)
  - Pre-stage clearance equipment?
  - Vector control





# Douglas County



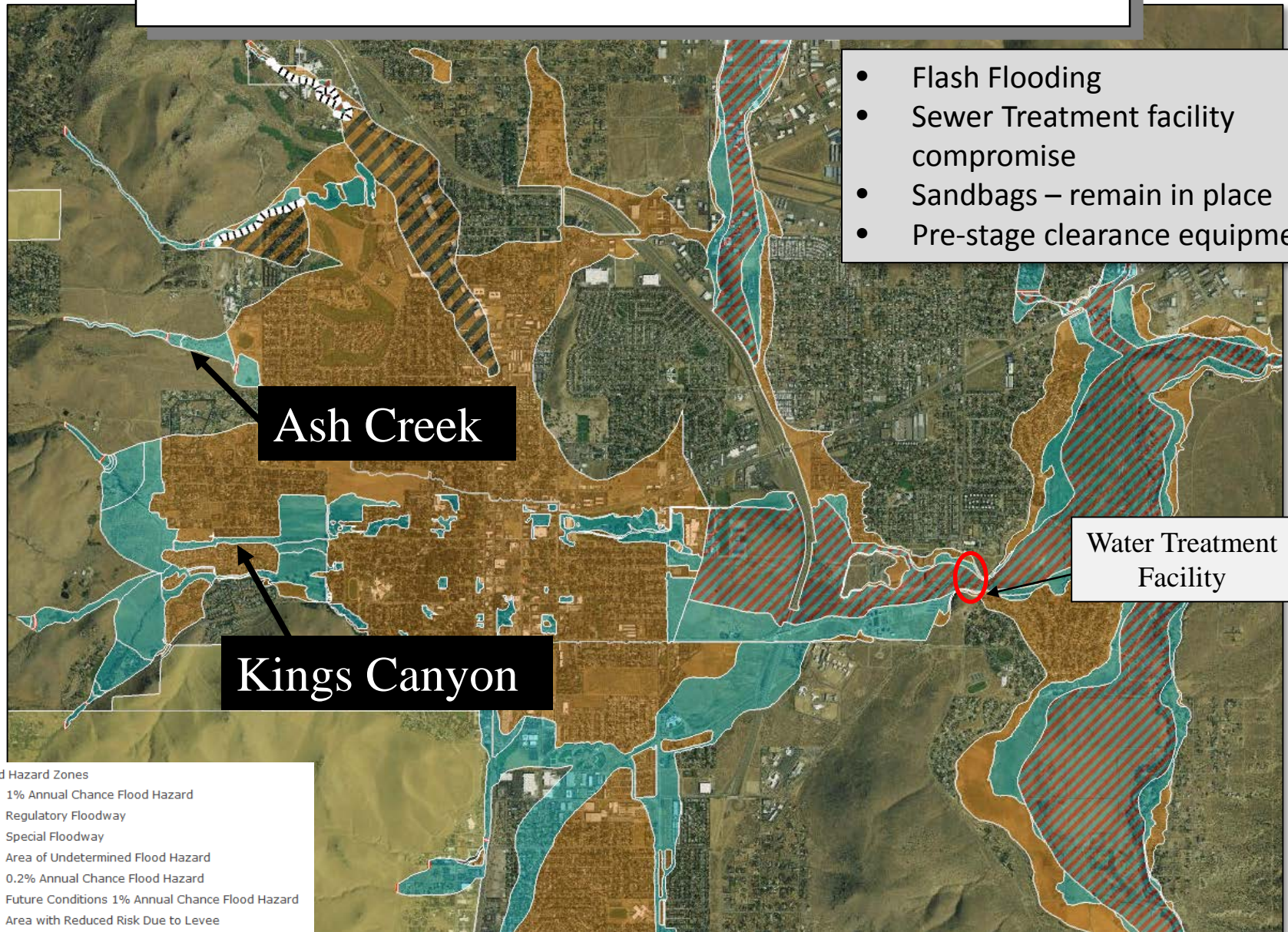
Cradlebaugh Bridge





# Carson City

- Flash Flooding
- Sewer Treatment facility compromise
- Sandbags – remain in place
- Pre-stage clearance equipment?





# Dayton

Debris due to flash flood, 50 impacted

Carson treatment plan

Bridge Closed due to flooding / Debris pile up

- Considerations
  - Medical or in home care?
  - Assisted living
  - Reroute traffic / detours
  - Bridge Repair
  - Marking flooded areas
  - Security of evacuated areas
  - Utilities sandbagged / secured?
  - Individual resident sandbags
  - Impacts on schools
  - Isolated communities (Genoa)
  - Sewer impacts
  - Propane tanks
  - Shelter plan
  - Bridge clearing (debris removal)
  - Pre-stage clearance equipment?
  - Vector control



# Weeks

Bridge Closed due to flooding / Debris pile up  
Isolates S. Lyon County  
Contingency Routes  
Repair Options





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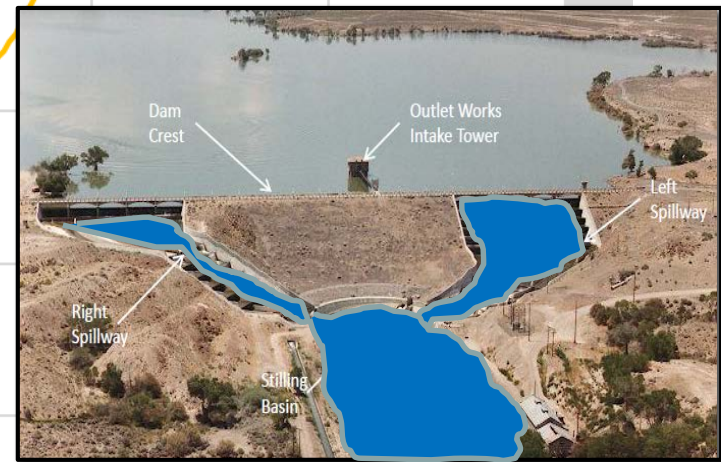
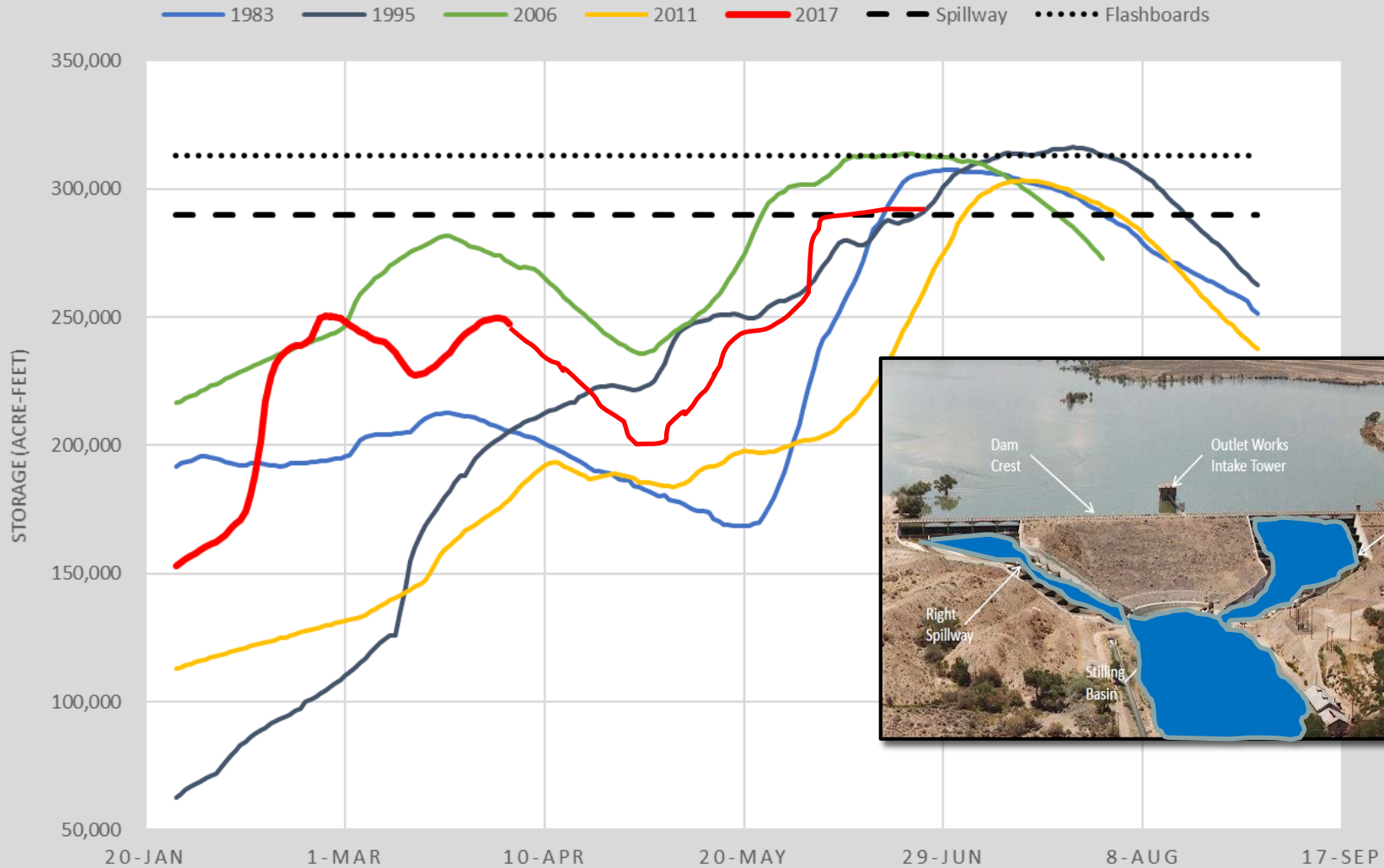


# Discussion



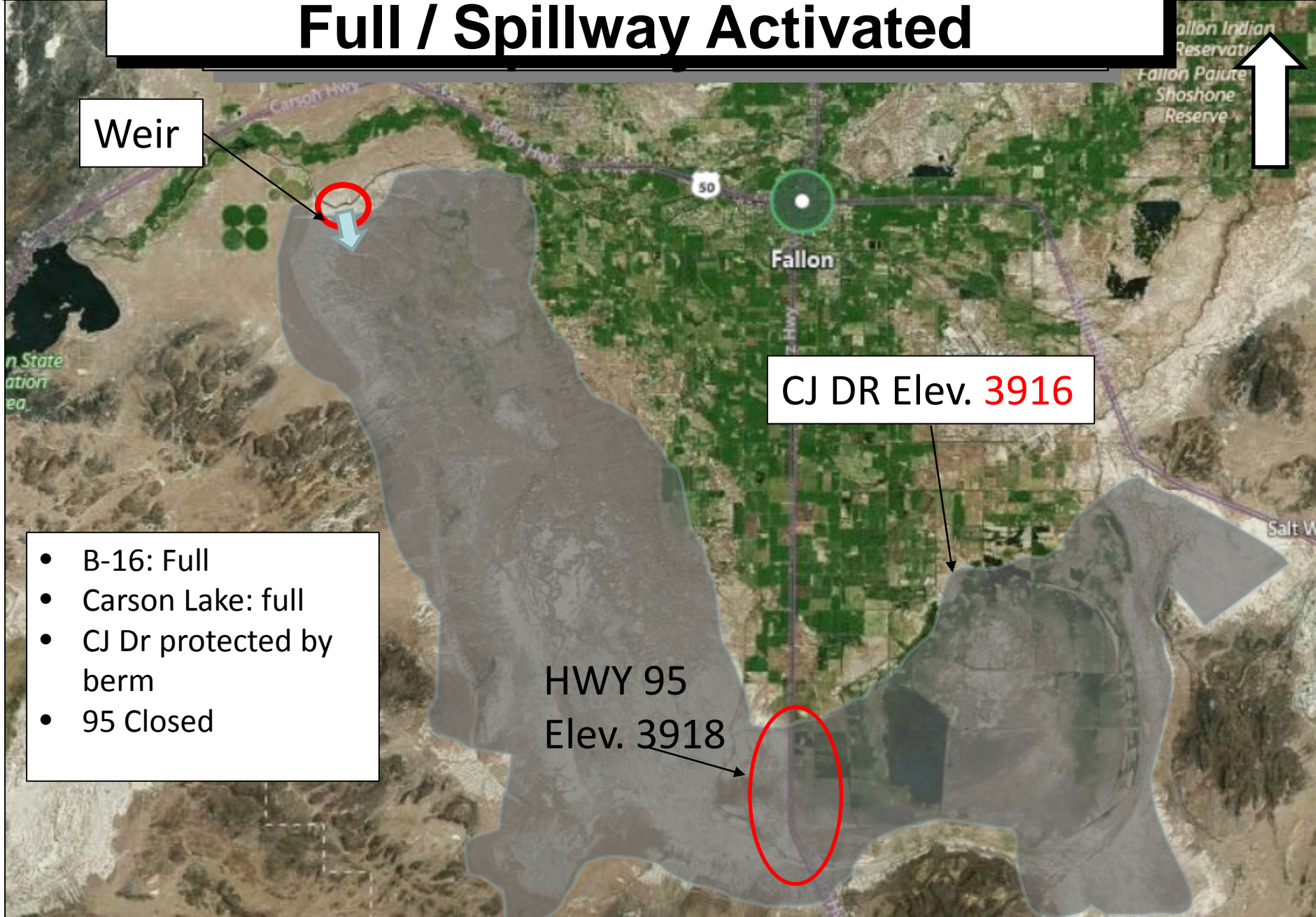
# Scenario 2 – Heavy Rain / Lahontan Full / Spillway Activated

## LAHONTAN STORAGE





# Scenario 2 – Heavy Rain / Lahontan Full / Spillway Activated



Weir

CJ DR Elev. 3916

HWY 95  
Elev. 3918

- B-16: Full
- Carson Lake: full
- CJ Dr protected by berm
- 95 Closed





# Scenario 2 – Heavy Rain / Lahontan Full / Spillway Activated

- Reservoir is full (295k AF)
- Spillway running at 2800 cfs
- Period of high heat in late June
- 5 Day Rain Event
- Carson running at 9500 cfs
  - Spillway will increase to 6100 cfs
  - Weir diverting 1500 cfs
  - ~5k cfs headed into Fallon
- Hwy 95 closed (water over top or culverts compromised)

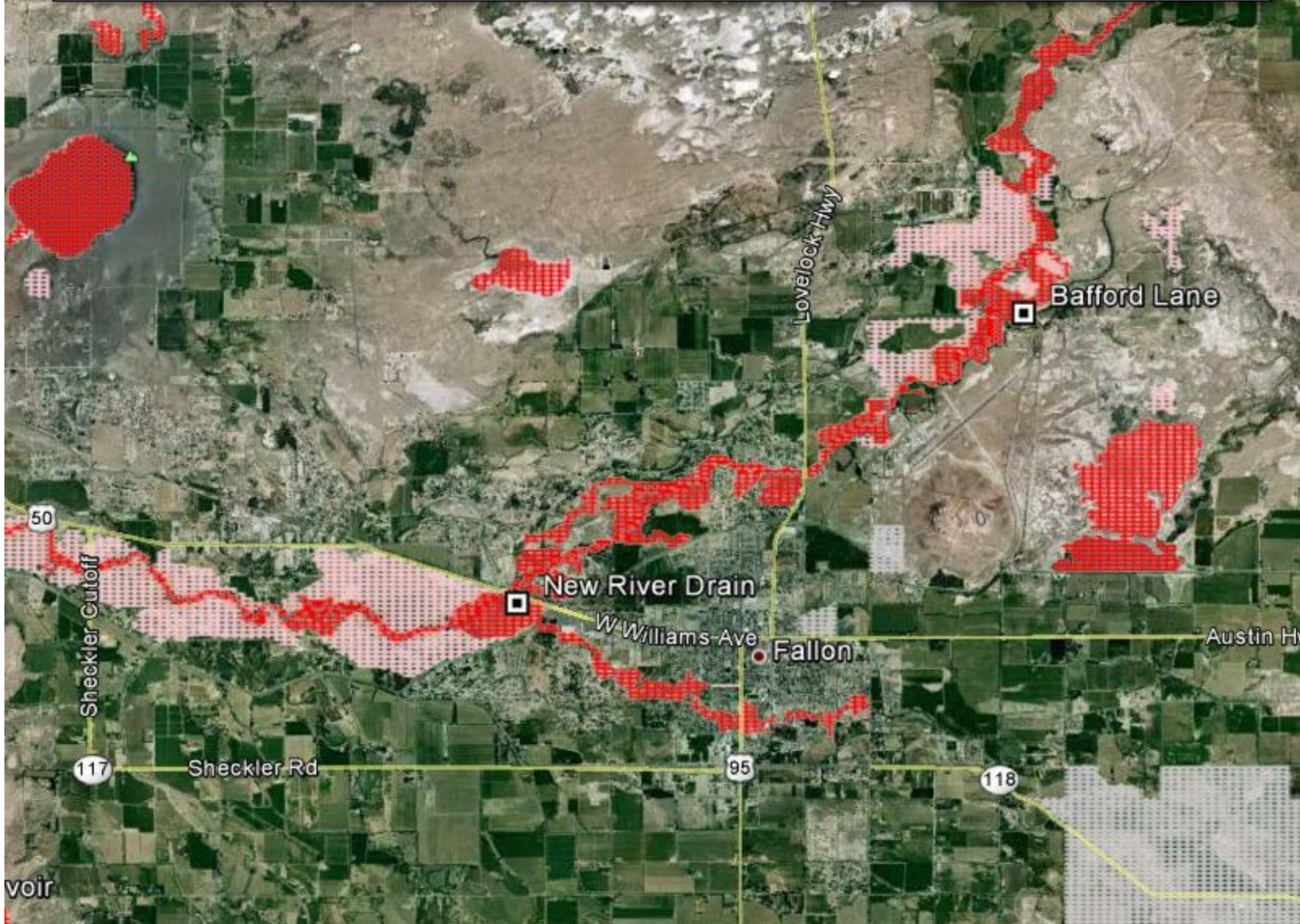


# MAJOR DECISIONS

- 1. Cut Reservoir release or continue**
- 2. Decision to evacuate & when  
- Routes**
- 3. 95 / 95A traffic detour options**



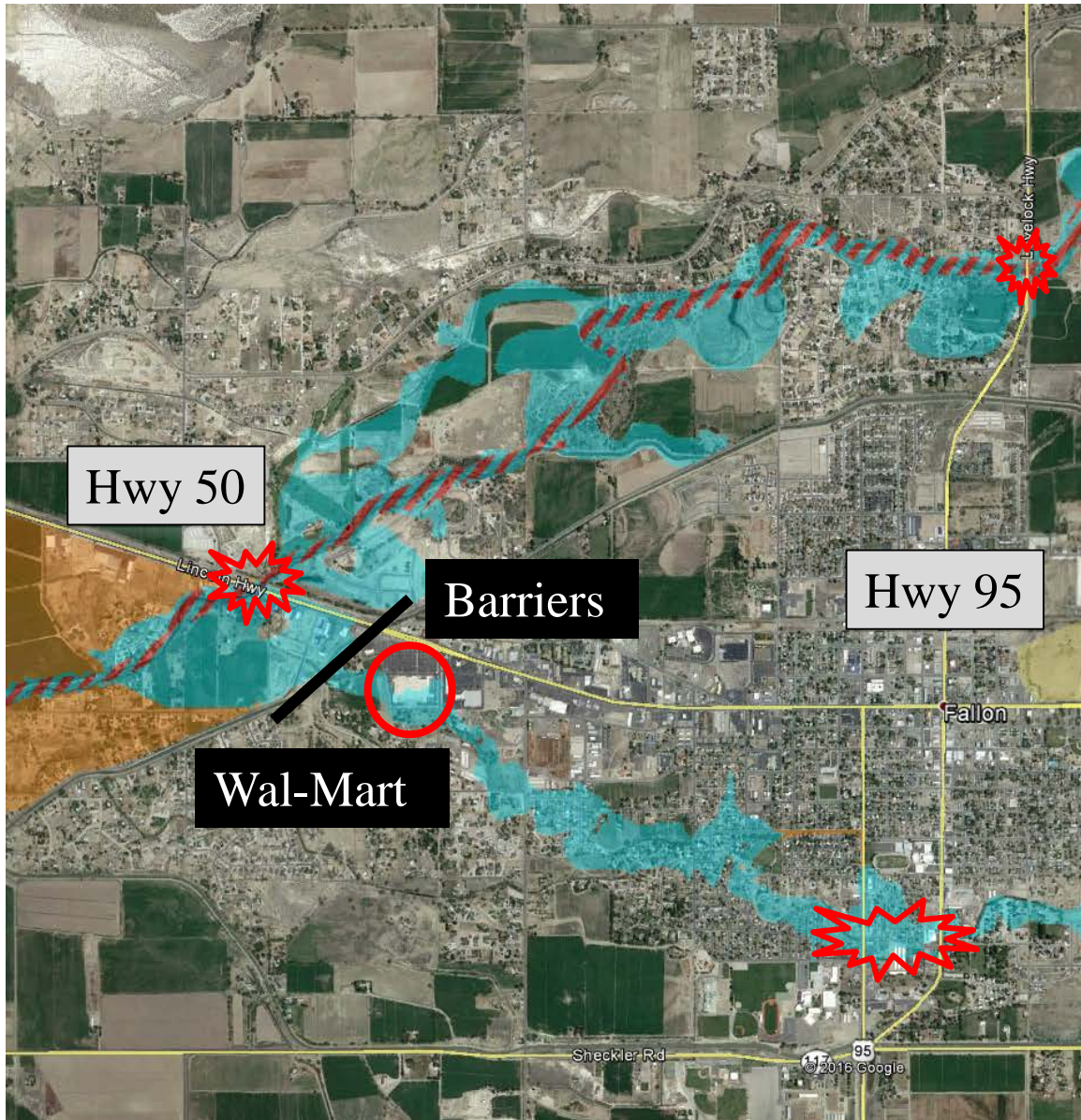
# CARSON RIVER (Fallon)



voir



# CARSON RIVER (Fallon)



- Considerations
  - Messaging/ Notification
  - Medical facilities
  - Assisted Living / Retirement home / In home care
  - Durable Medical Equip users
  - Detours / Hwy 50 & 95
  - Marking flooded areas
  - Security of evacuated areas
  - Utilities sandbagged / secured?
  - Individual resident sandbags
  - Impacts on schools
  - Isolated communities (CJ Dr)
  - Sewer impacts
  - Propane tanks
  - Shelter plan
  - Bridge clearing (debris removal)
  - Vector control



# CARSON RIVER (Fallon) HWY 50





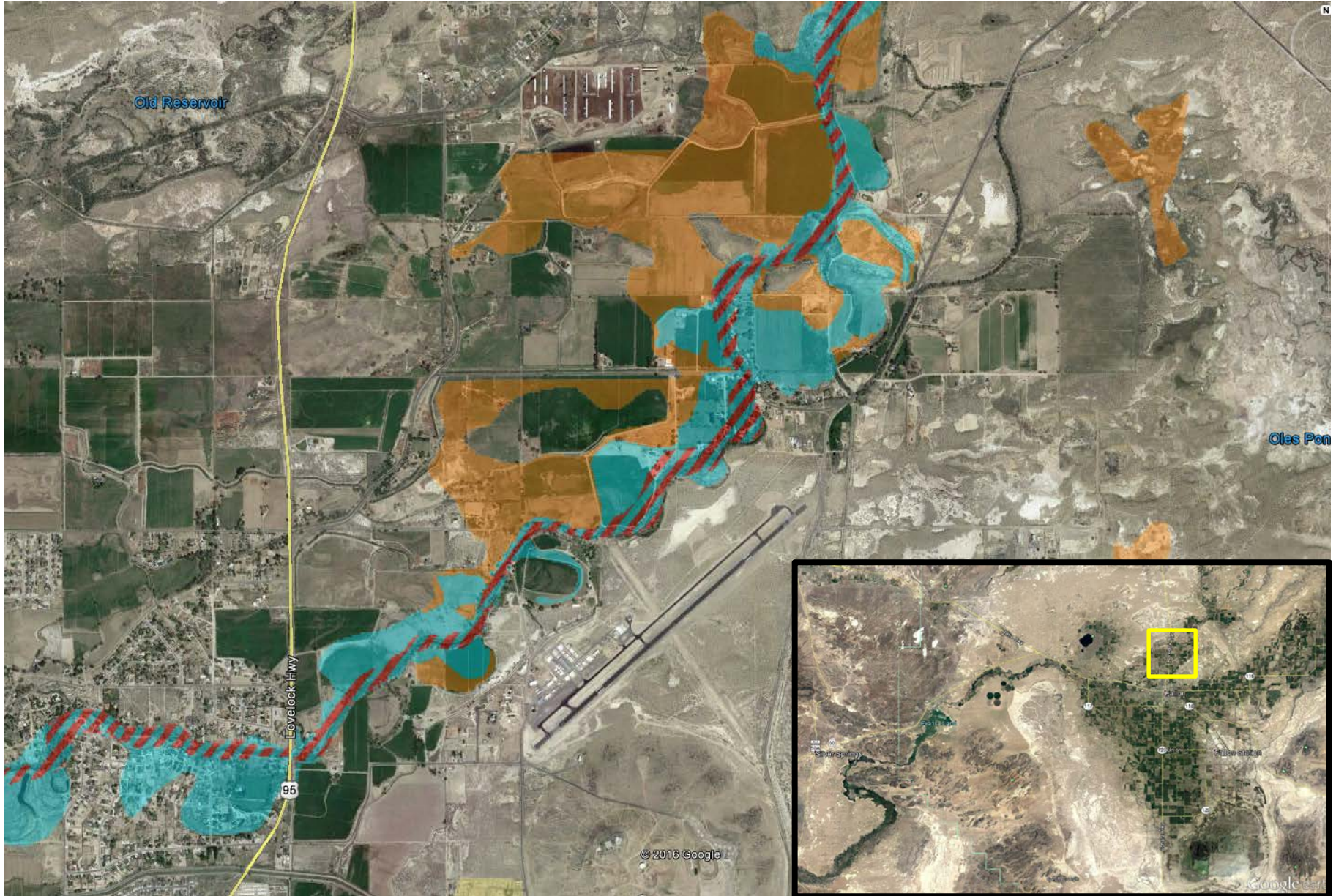
# Walmart Area





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# CARSON RIVER (Fallon)





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# Discussion



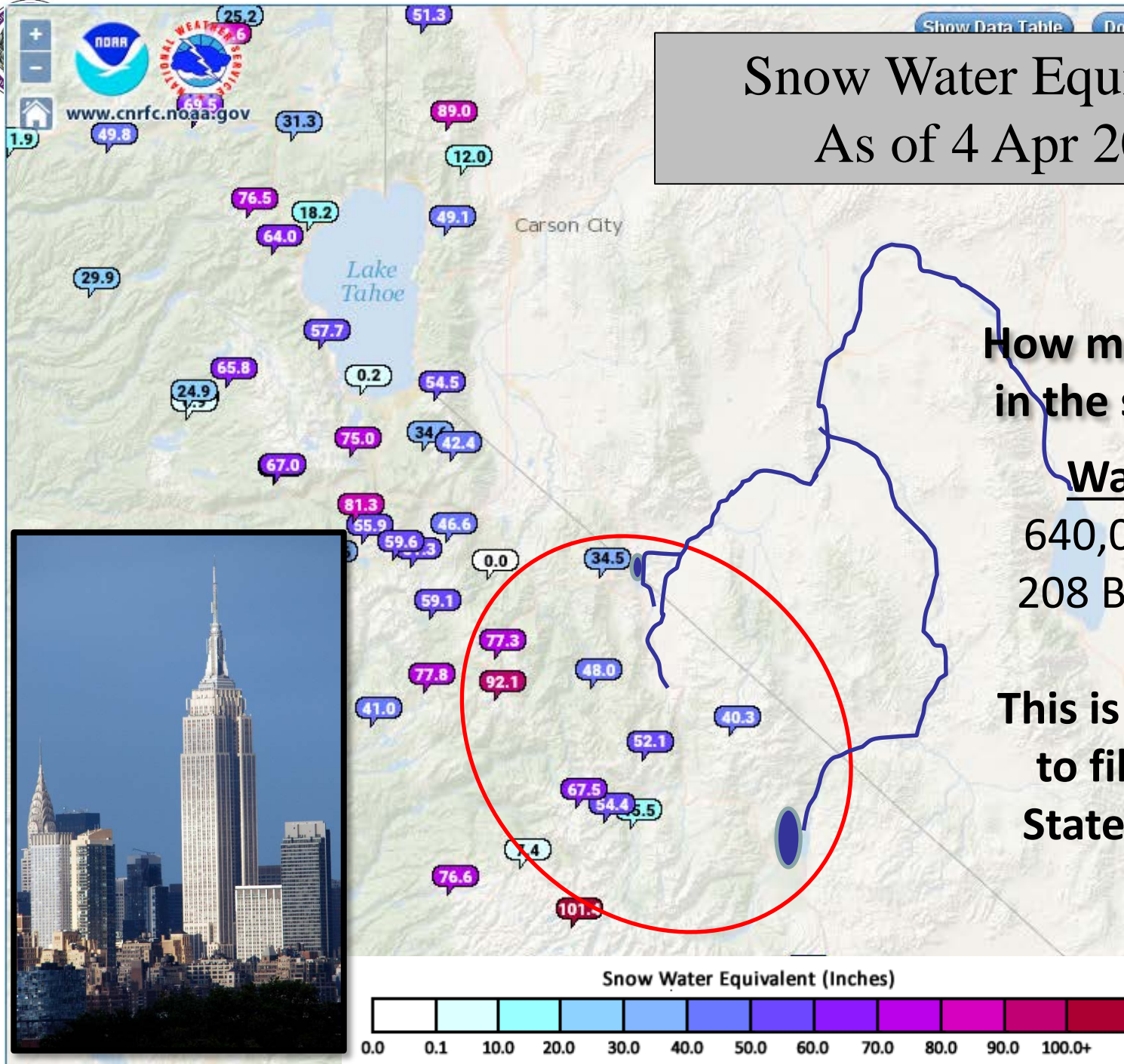


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# Walker River Basin

# Snow Water Equivalent As of 4 Apr 2017



**How much water is in the snow pack?**

**Walker Basin:**

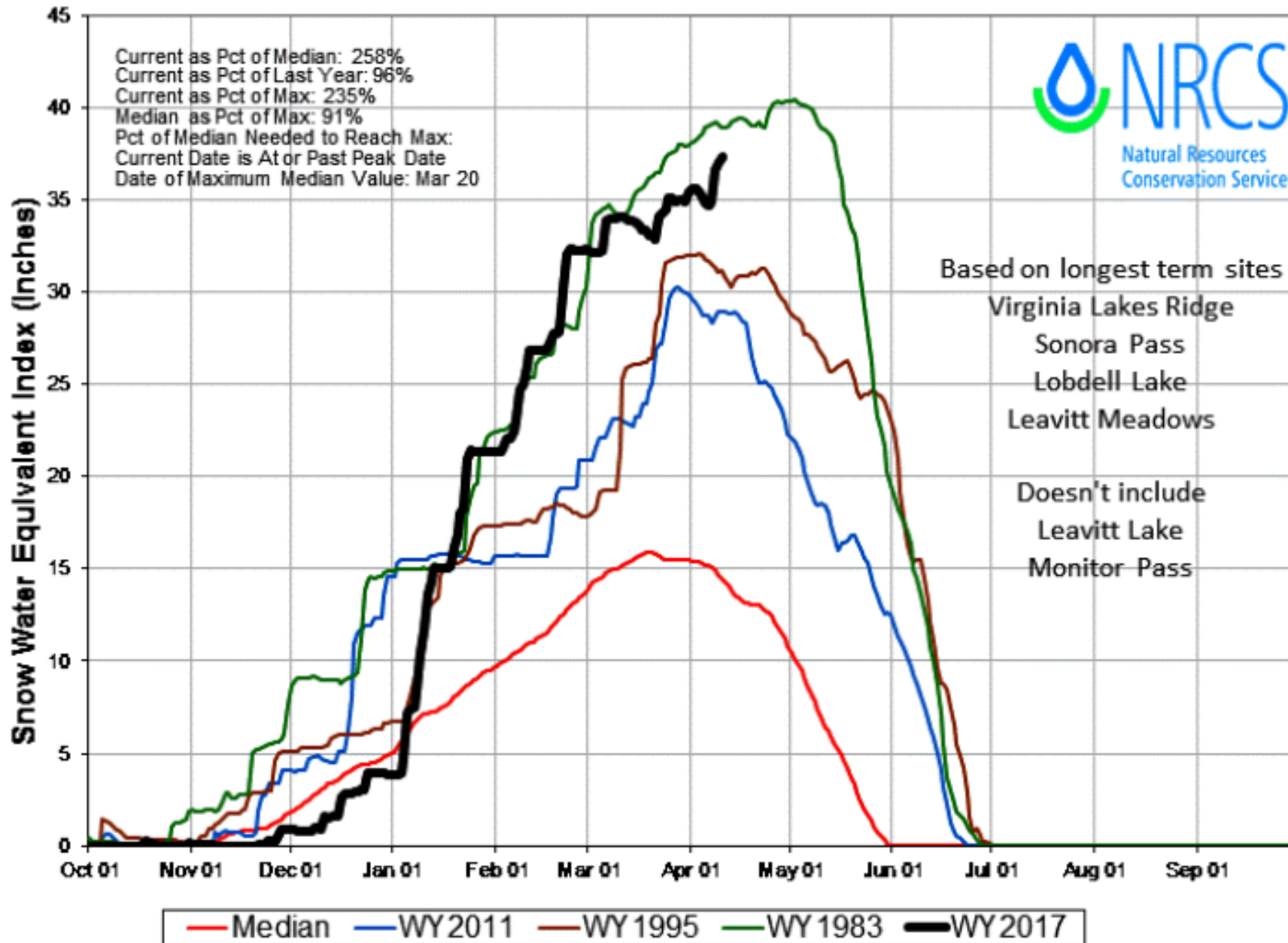
640,000 acre ft. or 208 Billion Gallons.

**This is enough water to fill the Empire State Building 753 times.**



# WALKER RIVER BASIN Time Series Snowpack Summary

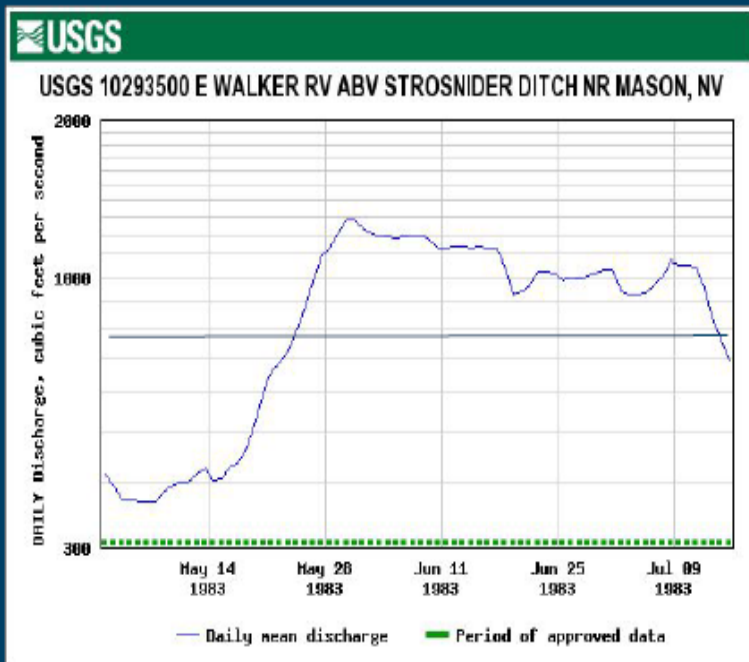
## Based on Provisional SNOTEL data as of Apr 10, 2017





# What Does this Mean for the Walker River?

- Walker Basin is the most likely major basin to experience significant and prolonged snowmelt flooding.
- Minor flooding likely in upper basin, but longer and more significant flooding likely in valley locations
- Flooding impacts will start later and could last well into July.



East Walker high elevation snow contributing to possible record spring runoff volume.





# Scenario 1 – Heavy Rain / Moderate Flooding

- Period of high heat in late May (7 days of 85 degrees)
- 5 Day Rain Event Similar to February Flooding
- Topaz and Bridgeport at approx. 2/3rds capacity
- Bridgeport releasing 900 cfs
- Topaz releasing 600 cfs
- Mason Gauge Reading 2300 cfs
- Mason Flood Stage (Moderate – 2320 cfs)



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# WEST WALKER RIVER (Wellington)





# Wilson Canyon / Structures along River



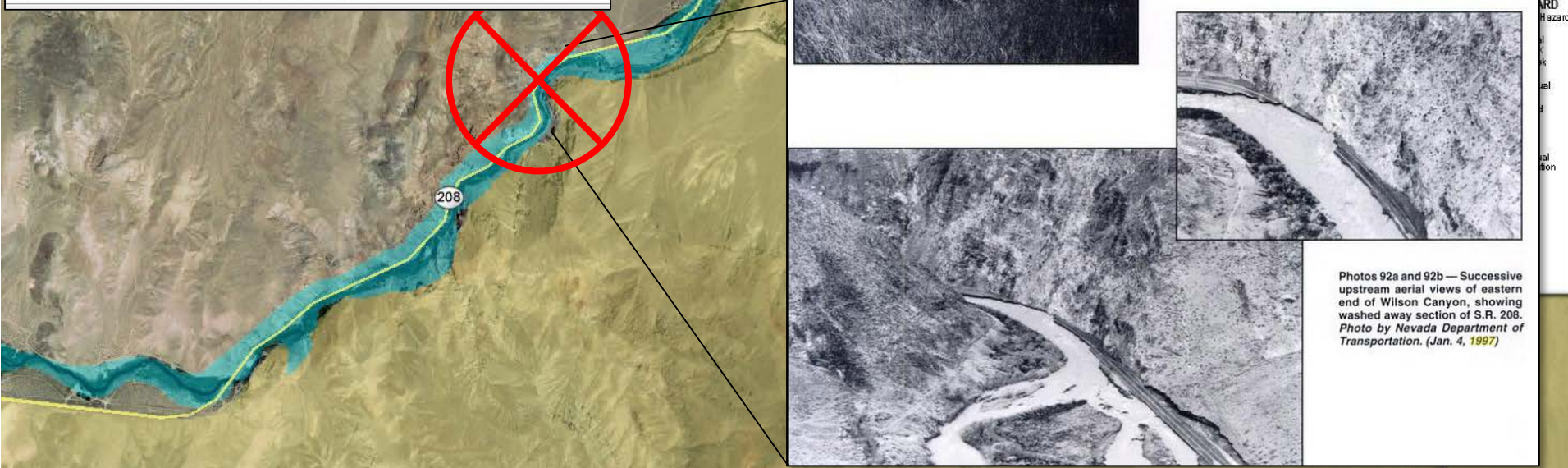
- Erosion Hwy 208 (Wilson Canyon)
- All structures along River

**REFERENCE LAYERS**

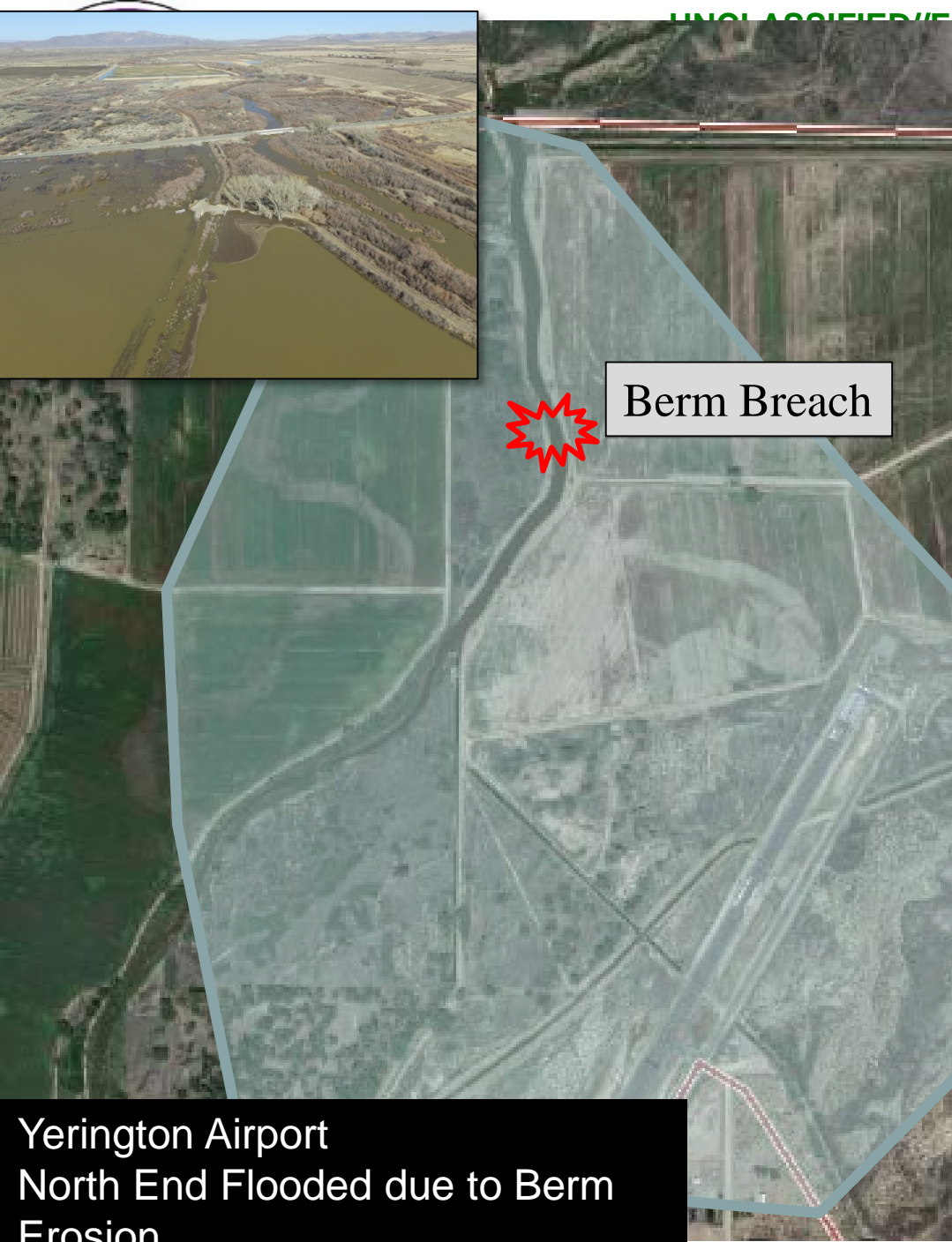
- NFHL Data Available
- FIRM Panel Boundary
- LOMR Boundary

**SPECIAL FLOOD HAZARD AREAS**

- 1% Annual Chance Flood Hazard Zone A, AE, A99, A02, AH, AR, VE
- Regulatory Floodway



Photos 92a and 92b — Successive upstream aerial views of eastern end of Wilson Canyon, showing washed away section of S.R. 208. Photo by Nevada Department of Transportation. (Jan. 4, 1997)



Berm Breach

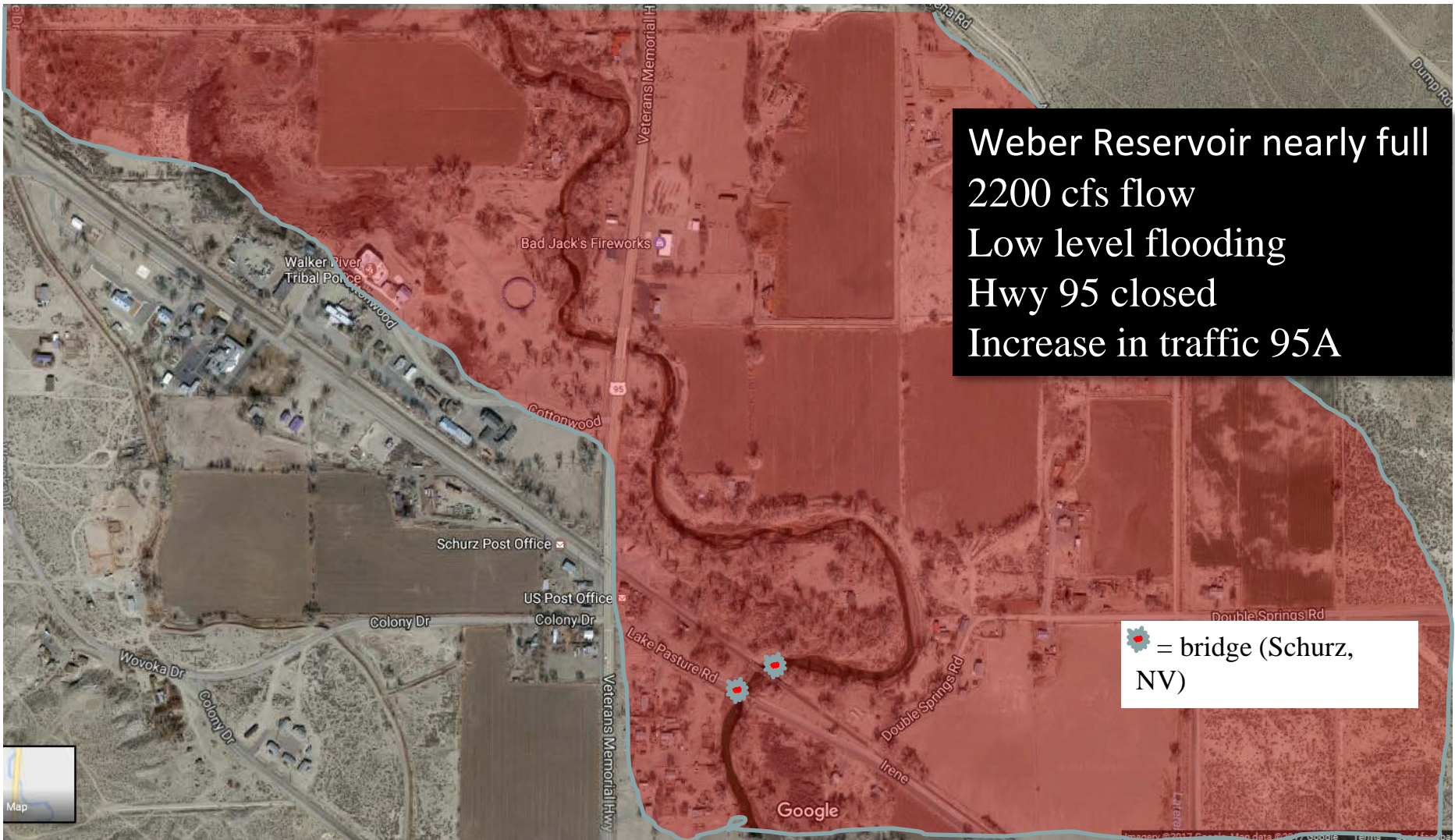
- Minor Flooding
  - Smith Valley, Mason Valley, Yerington,
    - Damage to farm and pasture lands
    - Flooding affecting structures adjacent to river
    - Miller Lane area submerged
    - Rapid reservoir increase
    - Flash Flooding from rain
    - MVWMA Flooding
    - Decision points regarding berm breaches
    - Berm erosion monitoring/repairs
    - Airport closure
    - Vector control
    - Increased traffic from 95 closure
    - Increased vehicle accident rate

Yerington Airport  
North End Flooded due to Berm  
Erosion



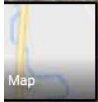


# River Impacts Schurz



Weber Reservoir nearly full  
2200 cfs flow  
Low level flooding  
Hwy 95 closed  
Increase in traffic 95A

 = bridge (Schurz, NV)





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# Discussion



# **Scenario 2 – Heavy Rain / Topaz Full / Bridgeport Spillway Activated**

- **Topaz Reservoir full – River bypassing with no controls**
- **Bridgeport within 2 foot of siphons**
- **Wellington Bridge Flooded**
- **East Walker Road cut**
- **Yerington 100 year flood & Sprague Ditch 97 repeat flood**
- **95A (Goldfield) submerged**
- **Miller Lane closed**
- **Mason 4k cfs**
  
- **Weber Spillway activated**
- **Hwy 95 bridge debris obstruction results in water backing up**
- **Hwy 95 (S. Fallon) closed**

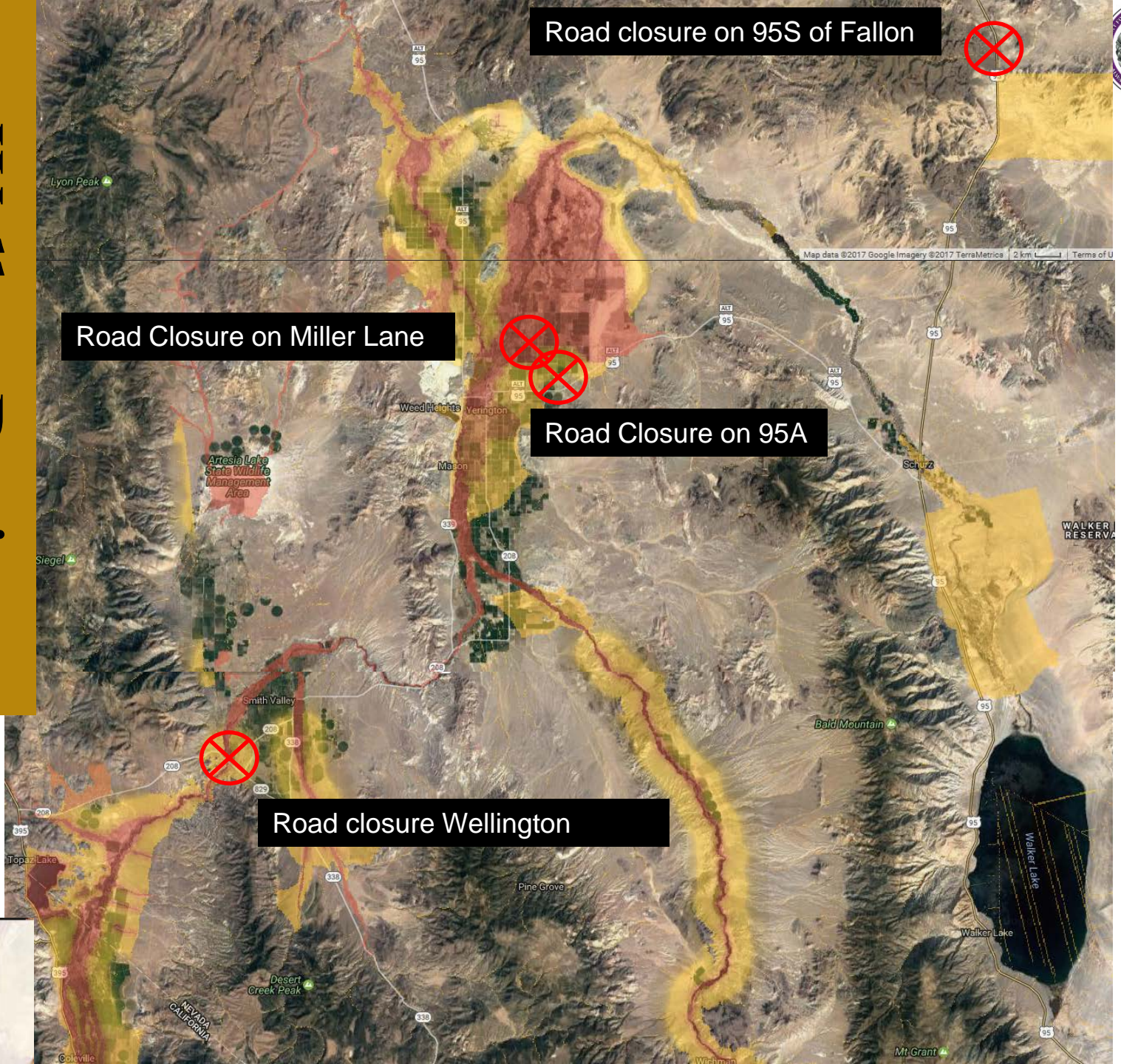


# MAJOR DECISIONS

- 1. Reduce reservoir release or continue (Bridgeport)**
- 2. Decision to close Sprague Ditch & when**
- 3. Decision to evacuate & when**
- 4. 95/95A traffic detour options**
- 5. Bridgeport dam integrity monitoring**
- 6. Life support to WRPT (isolated community)**
- 7. Mineral County commodities from S. NV**



# Walker Basin



Road closure on 95S of Fallon



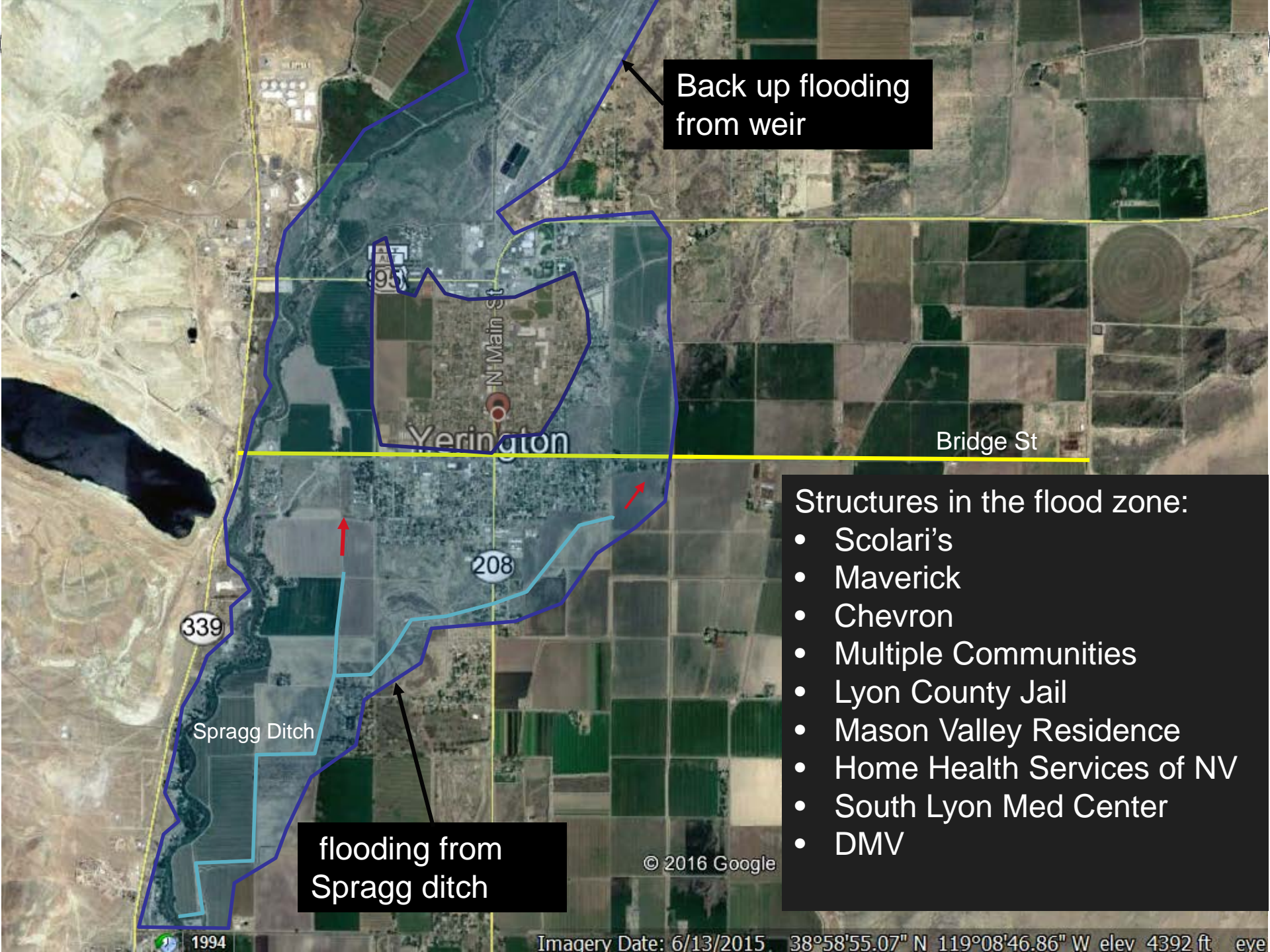
Road Closure on Miller Lane



Road Closure on 95A

Road closure Wellington



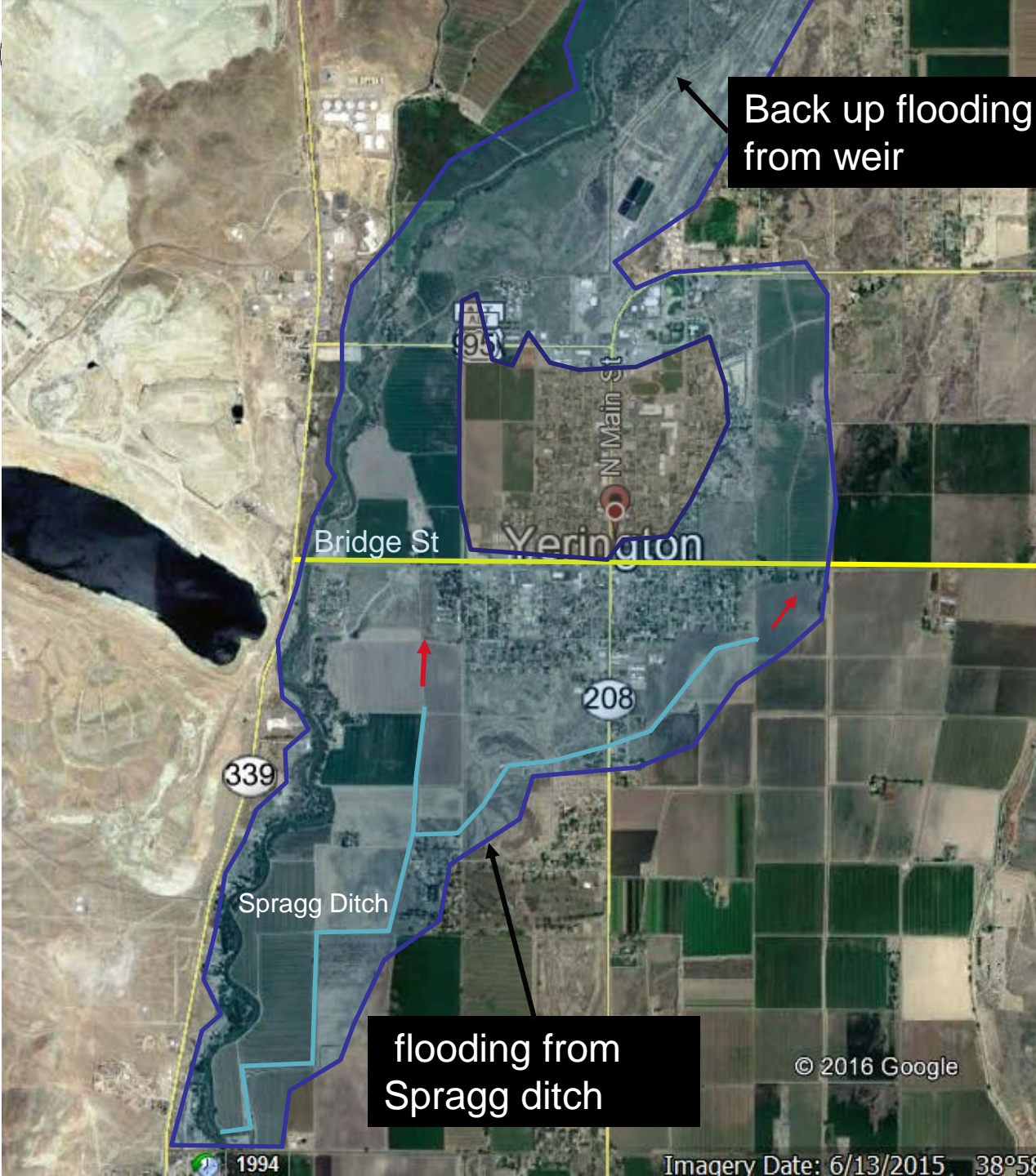


Back up flooding from weir

floodings from Spragg ditch

- Structures in the flood zone:
- Scolari's
  - Maverick
  - Chevron
  - Multiple Communities
  - Lyon County Jail
  - Mason Valley Residence
  - Home Health Services of NV
  - South Lyon Med Center
  - DMV

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Back up flooding from weir

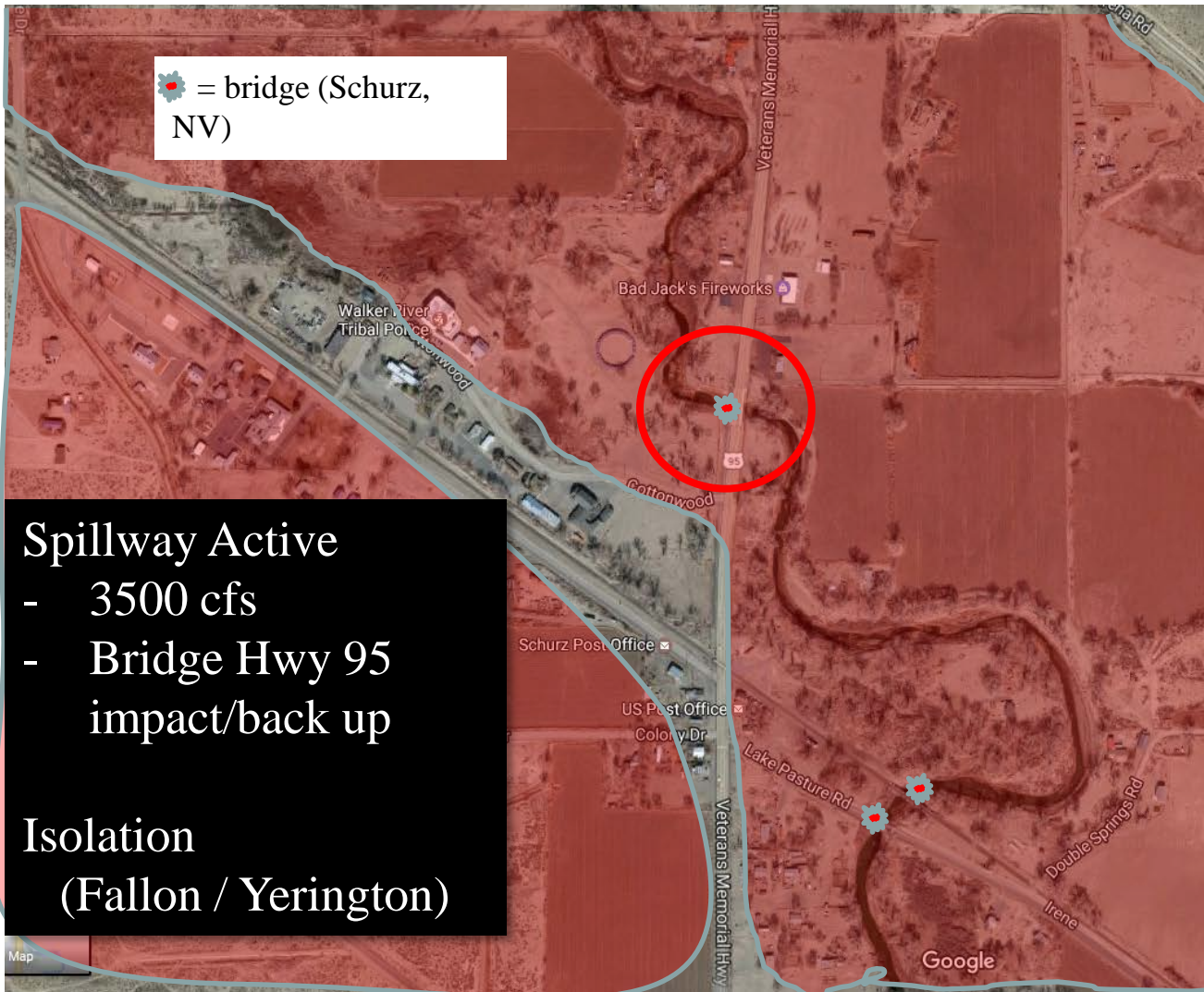
flooding from Spragg ditch

- Considerations
  - Messaging/ Notification
  - Dispatch center COOP
  - Jail Evacuation Plan
  - Evacuation Decision
  - Medical facilities
  - Assisted Living / Retirement home / In home care
  - Durable Medical Equip users
  - Alternate Gas Plan
  - Alternate food plan (Scolaris closed)
  - Detours / Hwy 95A & 95
  - Marking flooded areas
  - Security of evacuated areas
  - Utilities sandbagged / secured?
  - Individual resident sandbags
  - Sewer impacts
  - Propane tanks
  - Shelter plan
  - Bridge clearing (debris removal)
  - Vector control
  - Animals/Pets
  - Health & Welfare checks



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# Schurz



- Considerations
  - Messaging/ Notification
  - Police Station COOP
  - Evacuation Decision
  - Assisted Living / Retirement home / In home care
  - Durable Medical Equip users
  - Isolated (North side) residents
  - Alternate Gas Plan
  - Alternate food plan
  - Alternate Medical Care / Hospital Access
  - Detours / Hwy 95A & 95
  - Marking flooded areas
  - Security of evacuated areas
  - Utilities sandbagged / secured?
  - Individual resident sandbags
  - Sewer impacts
  - Propane tanks
  - Shelter plan
  - Bridge clearing (debris removal)
  - Animals/Pets





# Messages



- Flood Resources
  - Sandbag Locations
  - Emergency Contact information
  - Resource Contact information
- Be prepared - two weeks worth of supplies to include food and medications (especially if dwelling is along the river)
- **Travel bag** to include medications, important documents, and non-replacable keepsakes
- Pet plan
- Shelter locations
- Flood Forecast – **know when to react**
- Flood Insurance
- It is going to flood and what it may look like



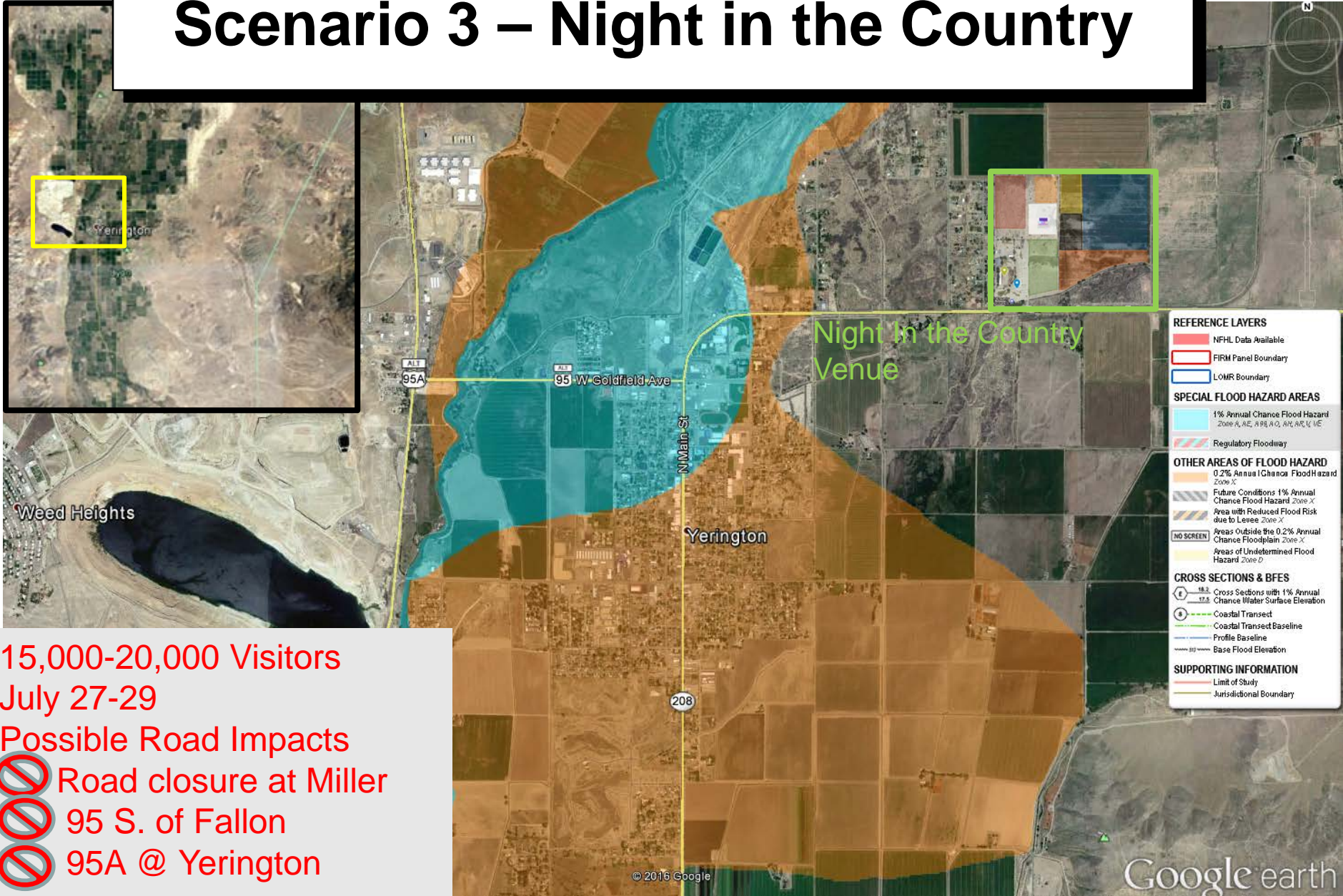
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# Discussion



# Scenario 3 – Night in the Country



Night in the Country Venue

15,000-20,000 Visitors  
 July 27-29  
 Possible Road Impacts

- Road closure at Miller
- 95 S. of Fallon
- 95A @ Yerington



# Possible Scenarios / Decisions

- 1. Miller Lane Closed**
  - Traffic impacts in Yerington
  - Traffic impacts with 95 (S. Fallon) closed
  
- 2. June/Early July Major Flood in Yerington  
(Recovery Mode)**
  
- 2. Threat of heavy rain / flooding just prior to event  
(preventative cancellation)**
  
- 3. Threat of heavy rain / flooding during event  
(MAJOR evacuation)**



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# Discussion



# Summer is Coming

