# Hydrology, Connectivity, Biodiversity

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Eastern Mojave Conservation Collaborative

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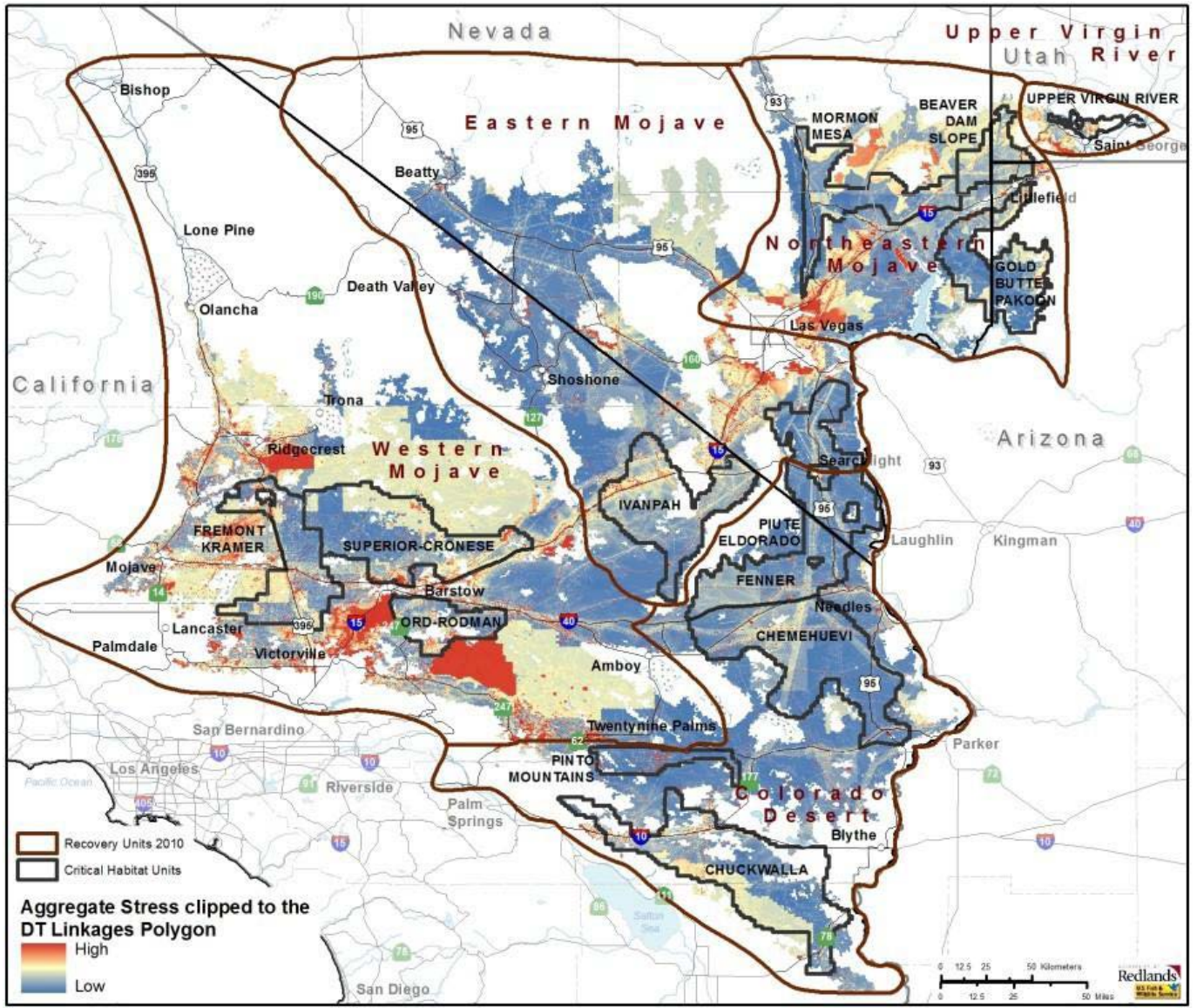
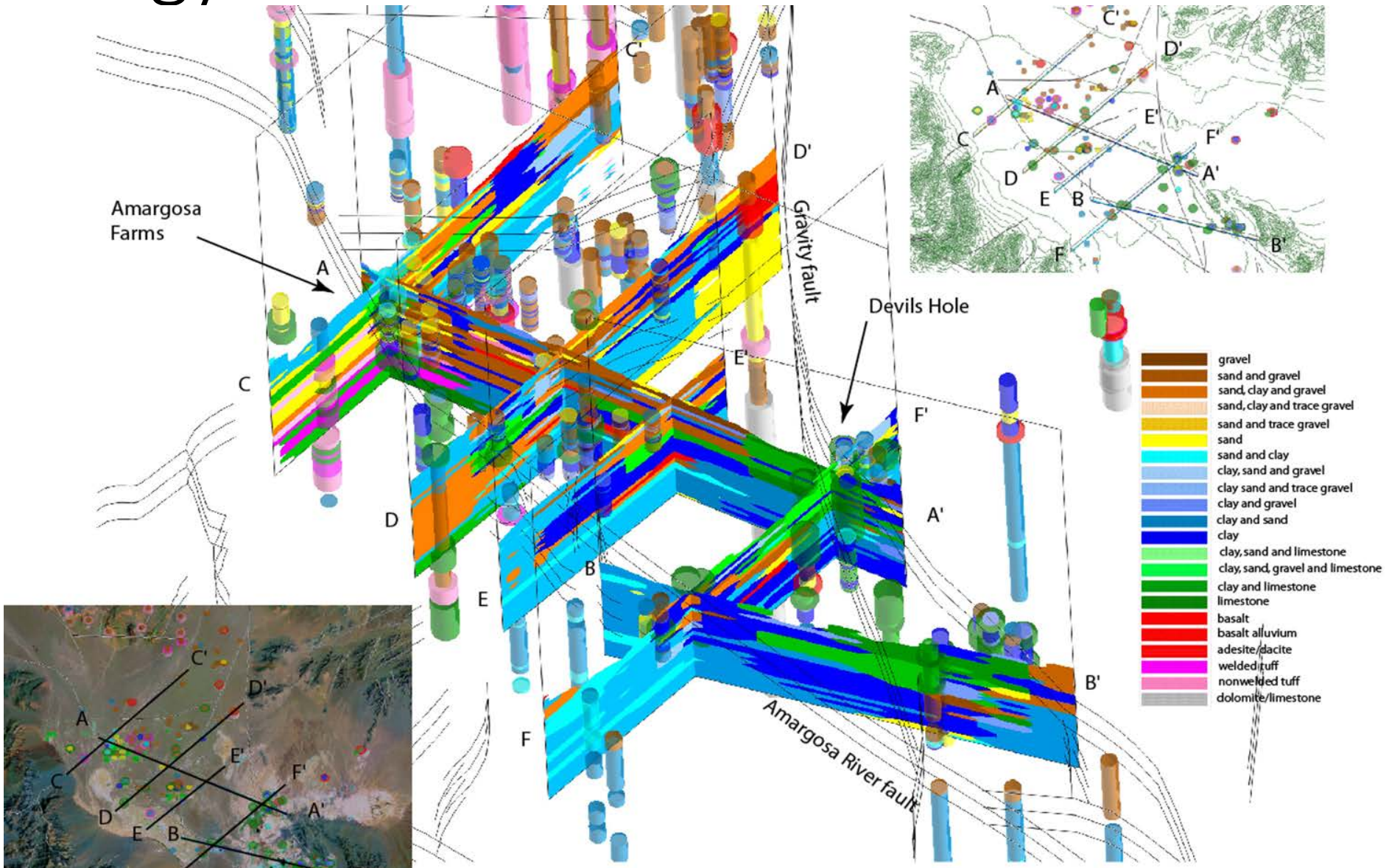
# Biodiversity

- The Mojave Desert
  - 250 Mojave taxa of
  - During favorable ye
    United States.
- Ash Meadows
  - 24 plants and anim
  - Four fish and one p
  - Greatest concentra
  - The second greatest in all of North America
- Amargosa River flows from Beatty, Nevac
  Death Valley into Badwater at 282 feet be
- Spring Mountains – Sky Island
  - 37 Tree species and 600 plus vascular plants
    species

# Connectivity

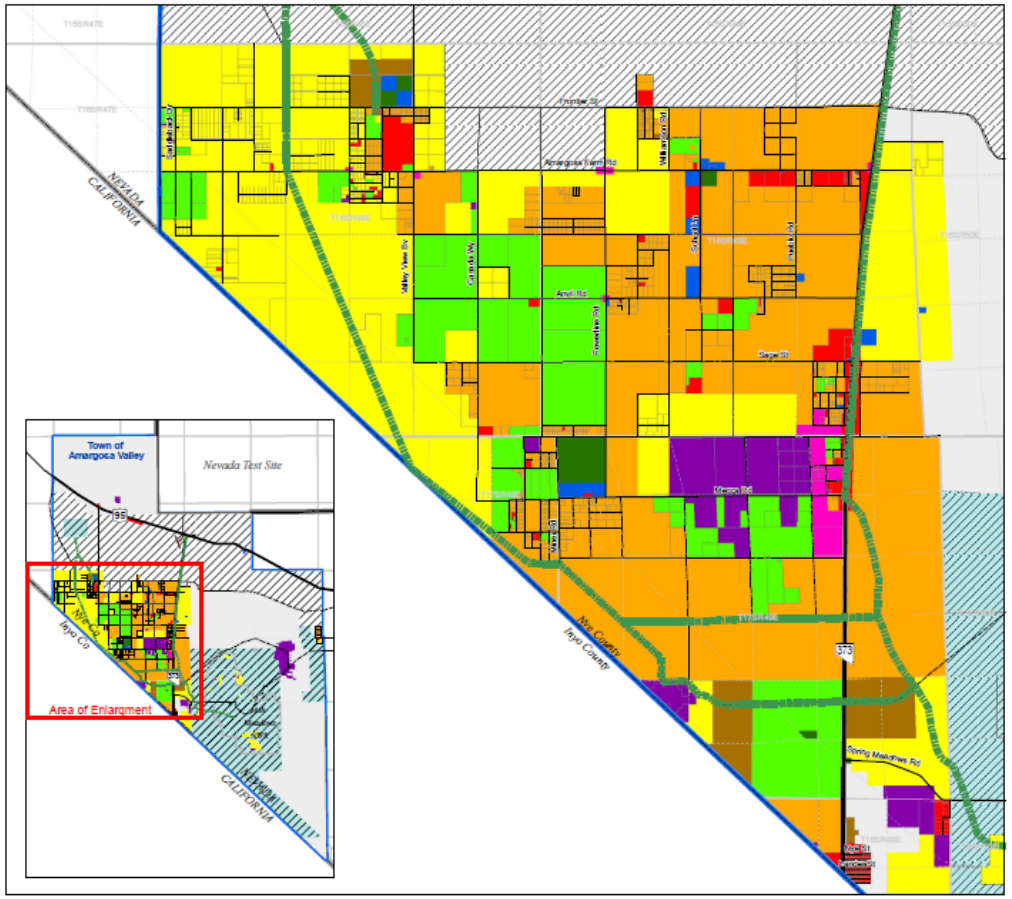


# Hydrology

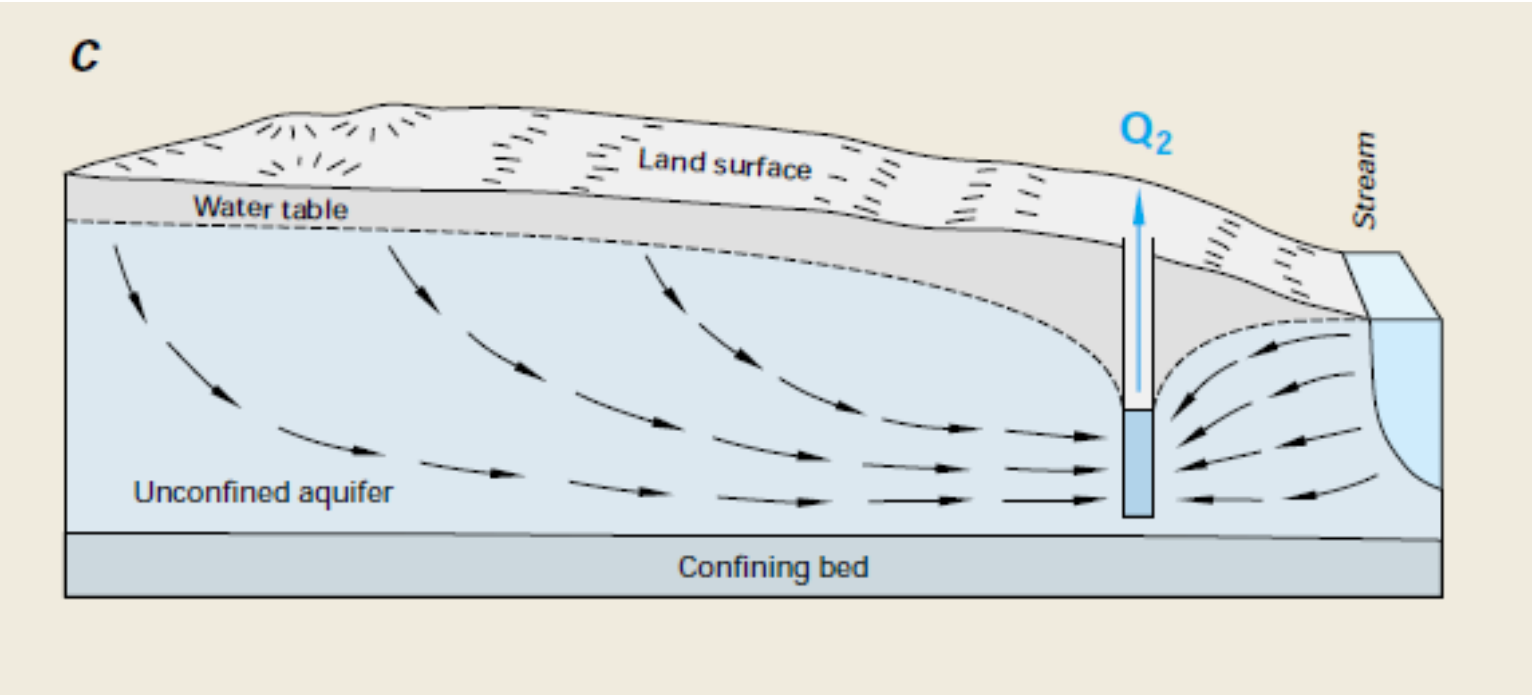

Amargosa Farms
Devils Hole
Gravity fault
Amargosa River fault
A
A'
B
B'
C
C'
D
D'
E
E'
F
F'
gravel
sand and gravel
sand, clay and gravel
sand, clay and trace gravel
sand and trace gravel
sand
sand and clay
clay, sand and gravel
clay sand and trace gravel
clay and gravel
clay and sand
clay
clay, sand and limestone
clay, sand, gravel and limestone
clay and limestone
limestone
basalt
basalt alluvium
adesite/dacite
welded tuff
nonwelded tuff
dolomite/limestone

# Reality


Photo Credit: Olin Feuerbacher


AMARGOSA VALLEY, NEVADA
AREA PLAN
Map 4
Future Land Use
FUTURE LAND USE DESIGNATION
AGP - Agricultural Production
CDR - Community Development Reserve
CUF - Community & Utility Facilities
HDR - High Density Residential
LDR - Low Density Residential
OST - Open Space, Parks and Trails
RAC - Rural Activity Center
RCR - Rural Cross Roads
RDR - Rural Density Residential
RUI - Rural Industrial
SDA - Special Development Area (Solar, Wind, and Other)
SDA - Special Development Area (Federal)
BOUNDARIES
Amargosa Valley Town Boundary
Parcels
Sections
Township, Range
ROADS
Paved Hwy
Paved
Unpaved
SOURCES:
Future Land Use designations automated for each parcel from inputs provided by the Amargosa Valley Mapping Group. The SDA YMP Gateway Area Concept Plan (June 2007) is available from the Nye County Nuclear Waste Repository Project Office. Parcels, road centerlines, Amargosa Valley Town boundary, and Township, Range, and Section boundaries from the Nye County GIS Repository (2008).
Miles
2 1 0 2
This information is for display purposes only.
No liability is assumed as to the accuracy of the data delineated herein.
Map updated on 6/8/09 - TSG-090027.2
Town of Amargosa Valley
Nevada Test Site
Area of Enlargment
NEVADA
CALIFORNIA
Nye County
Inyo County

# Hydrology 101



# Nevada State Water Law 101


- **NRS 533.025 Water belongs to public.** The water of all sources of water supply within the boundaries of the State whether above or beneath the surface of the ground, belongs to the public.

  [1:140:1913; 1919 RL p. 3225; NCL § 7890]

- **NRS 533.010 "Person" defined.** "Person" includes the United States, this State and any political subdivision of this State.

  [48:140:1913; 1919 RL p. 3235; NCL § 7933]—(NRS A 1985, 522; 2009, 596)

- **NRS 533.023 "Wildlife purposes" defined.** "Wildlife purposes" includes the watering of wildlife and the establishment and maintenance of wetlands, fisheries and other wildlife habitats.

  (Added to NRS by 1989, 1733; A 2009, 596)

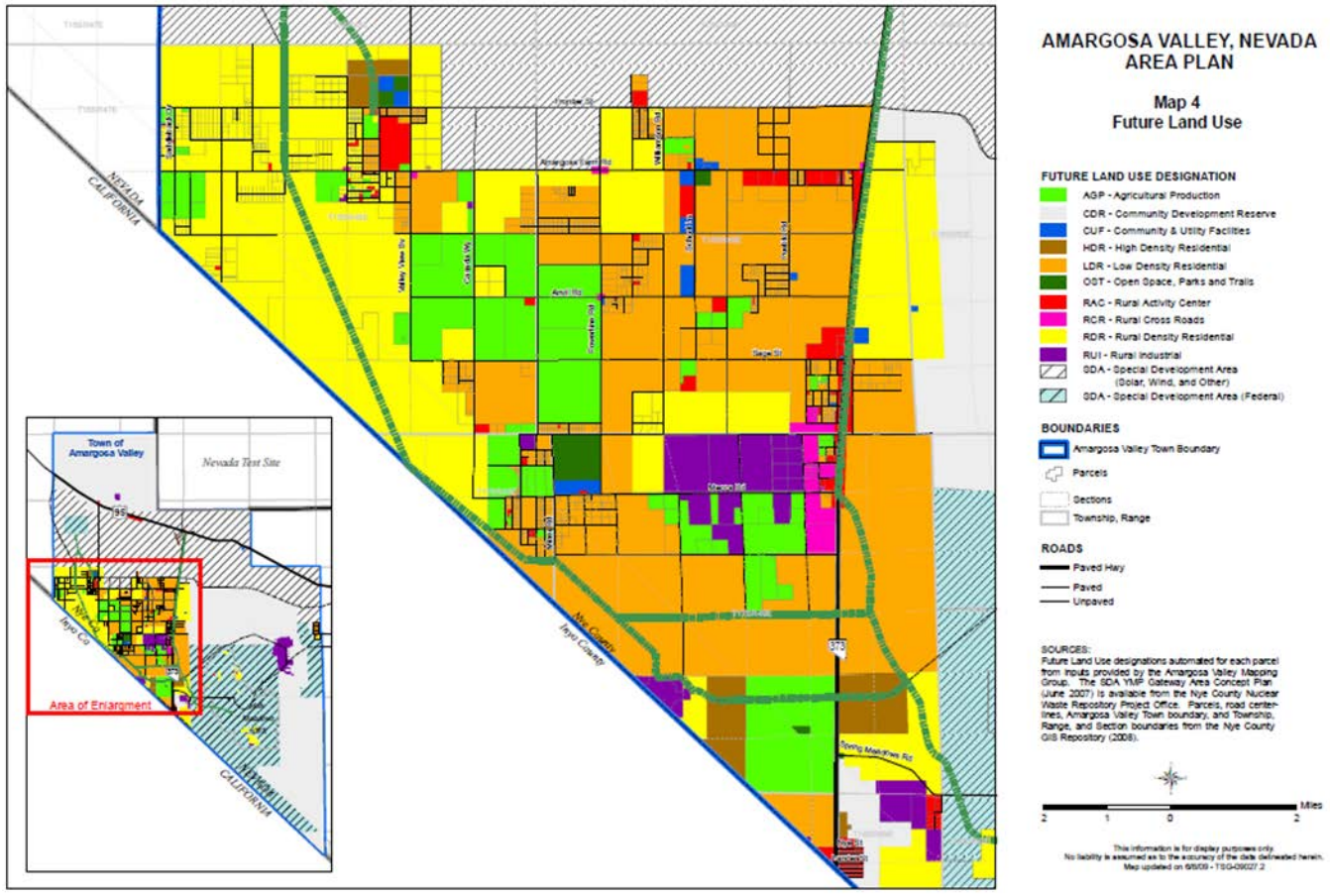
# Nevada Regulatory Statues

- **NRS 533.372 Approval or rejection of application to use water to generate energy for export.** Based upon the public interest and the economic welfare of the State of Nevada, the State Engineer may approve or disapprove any application of water to beneficial use or any application which contemplates a change in the place or beneficial use of water to a use involving the industrial purpose of generating energy to be exported out of this state.

  (Added to NRS by 1981, 210; A 1981, 1434; 1991, 296)

# Nevada State Engineer dilemma?

- Nevada State Engineer does not regulate pumping from residences on lot sizes larger than 2.5 Acres as long as pumping does not exceeds 2.0 afa for each residence.



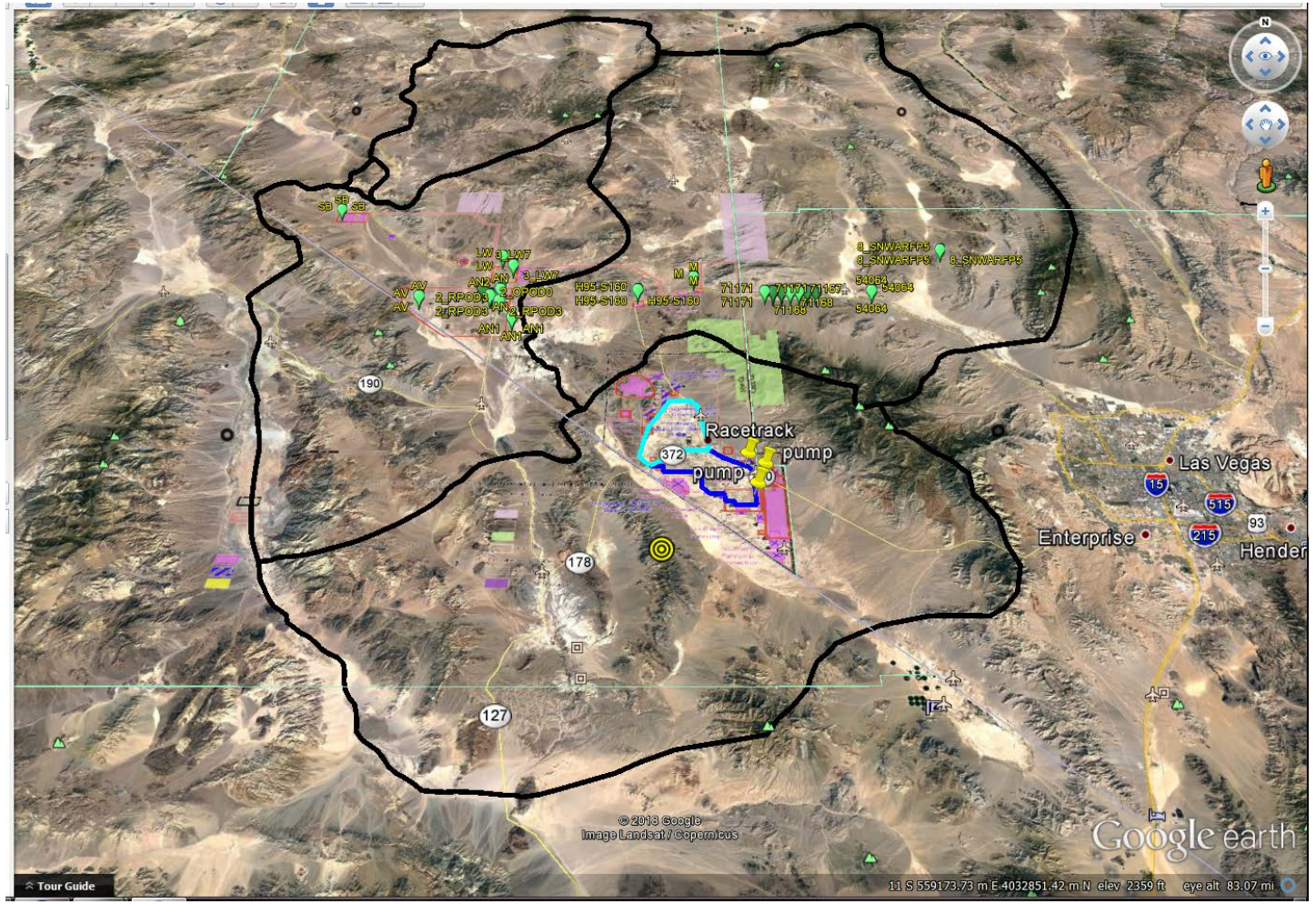
# Nevada State Engineer Order 1197

- **WHEREAS,** an administrative hearing was held on September 5-6, 2007, where evidence and testimony was received regarding the potential impacts of regional pumping on existing rights, particularly the federally reserved water right at Devils Hole? The federally reserved water right specifies a threshold water level at Devils Hole. Information provided at the hearing show the water level in Devils Hole is only 0.6 to 0.7 feet above the threshold level mandated by the U.S. District Court.
- **NOW THEREFORE,** it is ordered that, with the following exceptions, any applications to appropriate additional underground water and any application to change the point of diversion of an existing ground-water right to a point of diversion closer to Devils Hole, described as being within a 25 mile radius from Devils Hole within the Amargosa Desert Hydrographic Basin, will be denied

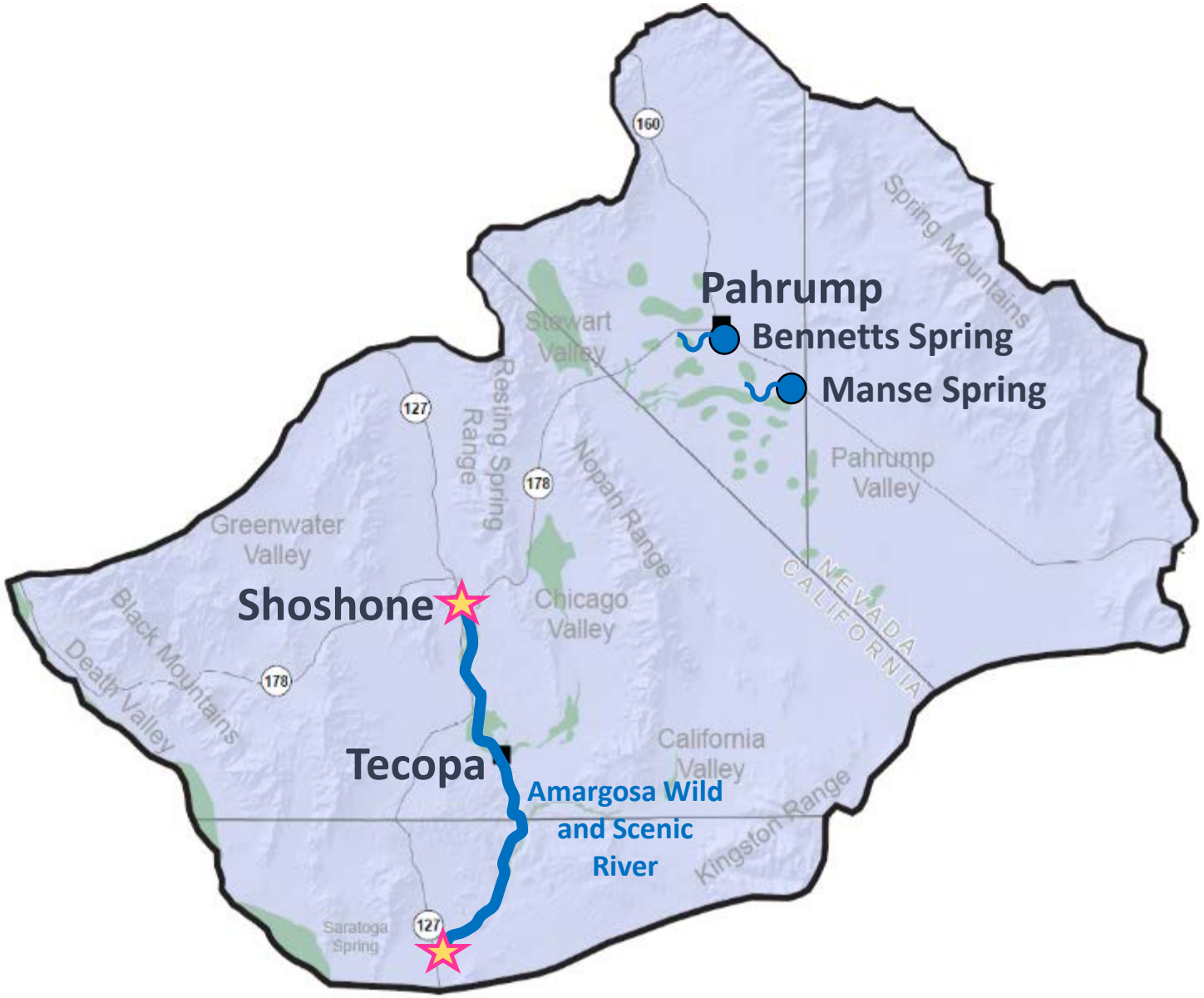
# Order 1197A Exceptions

- ~~Those applications filed which seek to appropriate 2.0 acre-feet per year or less, may be considered and shall be processed subject to NRS 533 and 534.~~
- For projects that require changes of multiple existing rights, the State Engineer may compare the net impact to Devils Hole of the proposed changes to the impacts to Devils Hole of the base rights. If the net impact of the proposed changes is the same or less than the base right impacts, as determined by the State Engineer, such change applications may be considered and shall be processed subject to NRS 533 and 534. In no such case shall new points of diversion be allowed within ten (10) miles of Devils Hole.

# Land Uses and Land Management

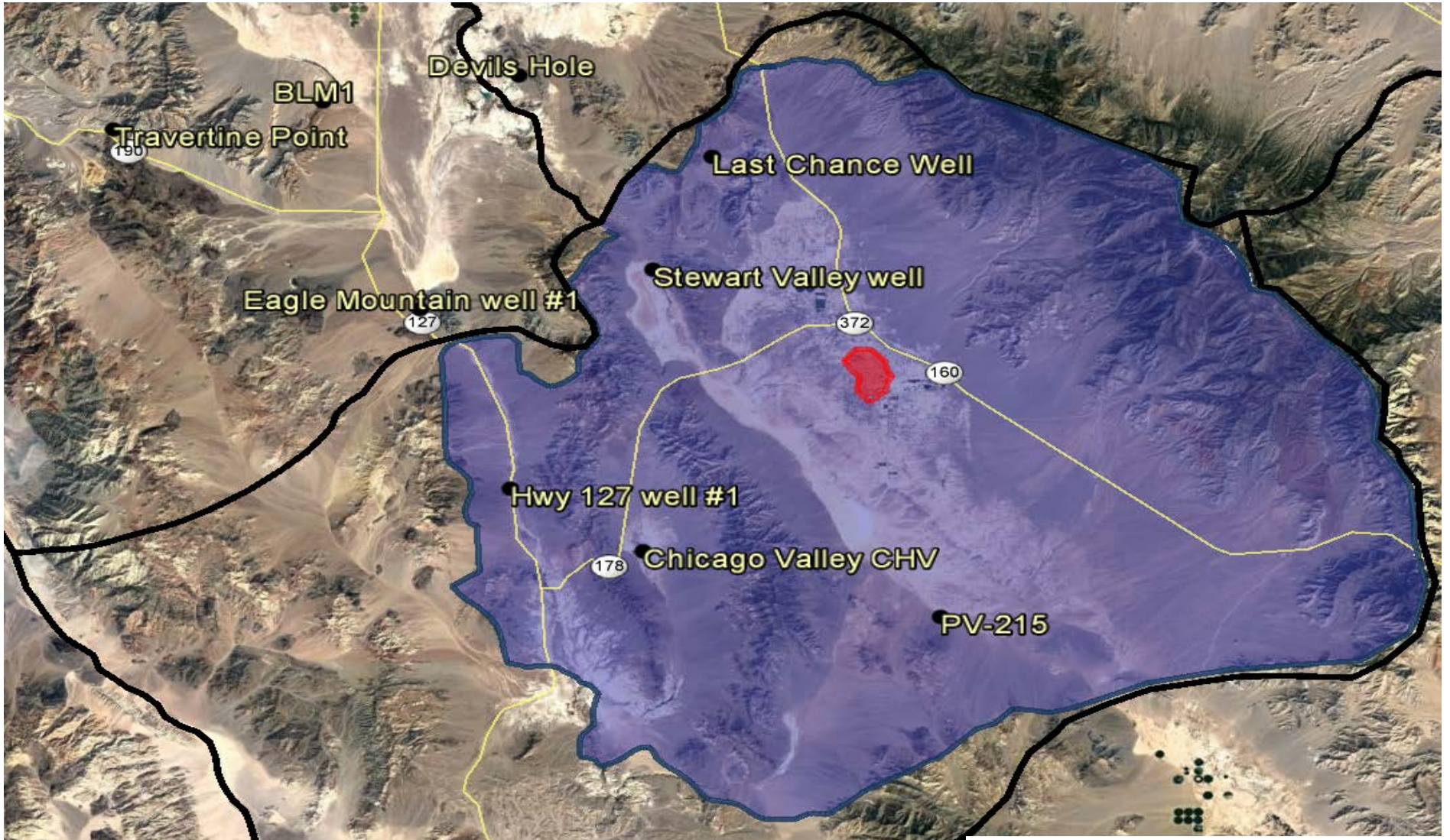


# Base Case: Pahrump to Lower Amargosa



# GROUNDWATER-FLOW PATHS TO AWSR

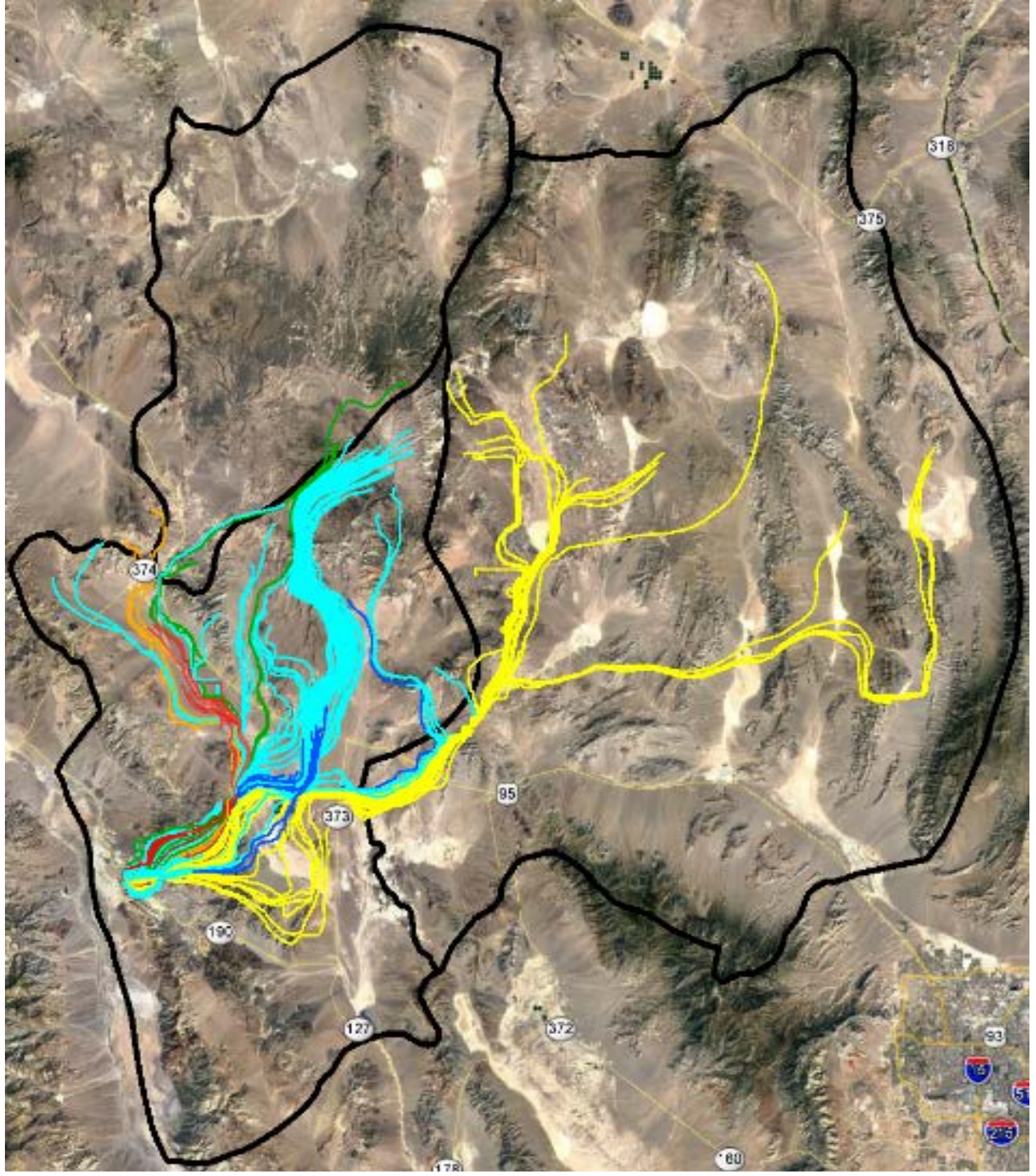
# 2100: Maximum Pumping Extent




RED: 200+ FT drawdown

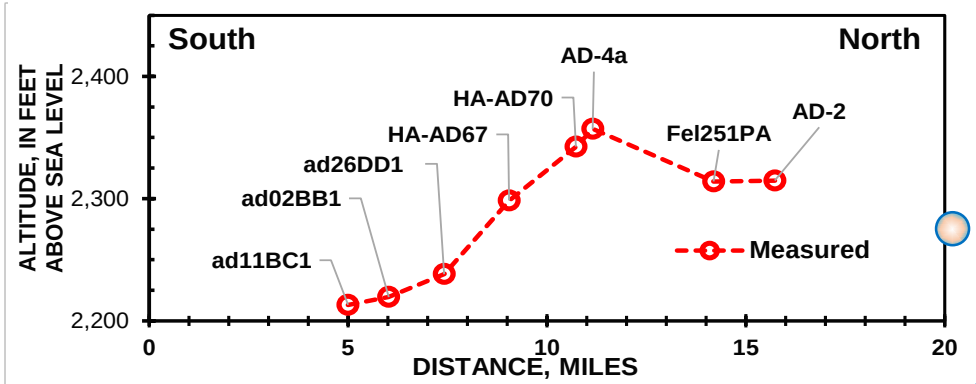
BLUE: 1+ FT drawdown

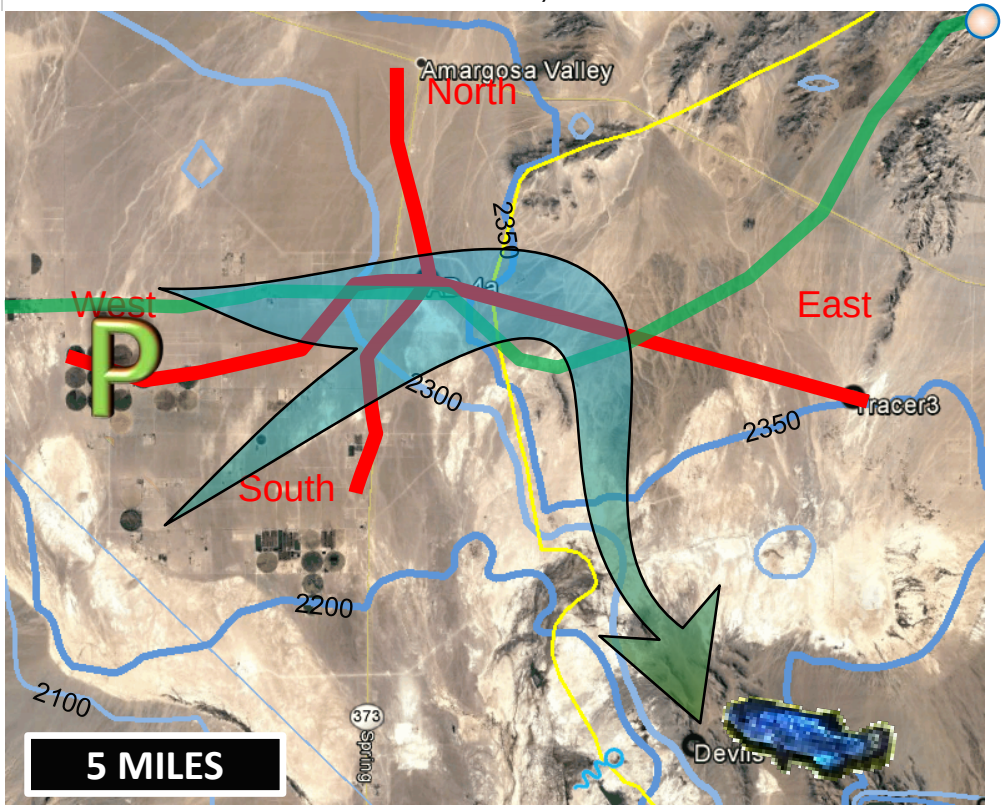
# Flow Paths to Furnace Creek



# WATER-LEVEL PROFILES

- Coarse basin fill abuts carbonate rocks
- Upwelling carbonate water supports radial flow in basin fill
- Well AD-4a corridor
  - Q = 2,000 acre-ft/yr (Fenelon et al., 2016)
  - Passes ~80% of interbasin flow
- Corridor defined  by water levels & specific capacity in basin fill
- Pumping west of well AD-4a affects water levels in Devils Hole
- Significant hydraulic feature, Needs to be simulated correctly



# Devils Hole Hydrograph