

Water Resources of the Virgin River Basin

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Virgin Valley Water District**

for

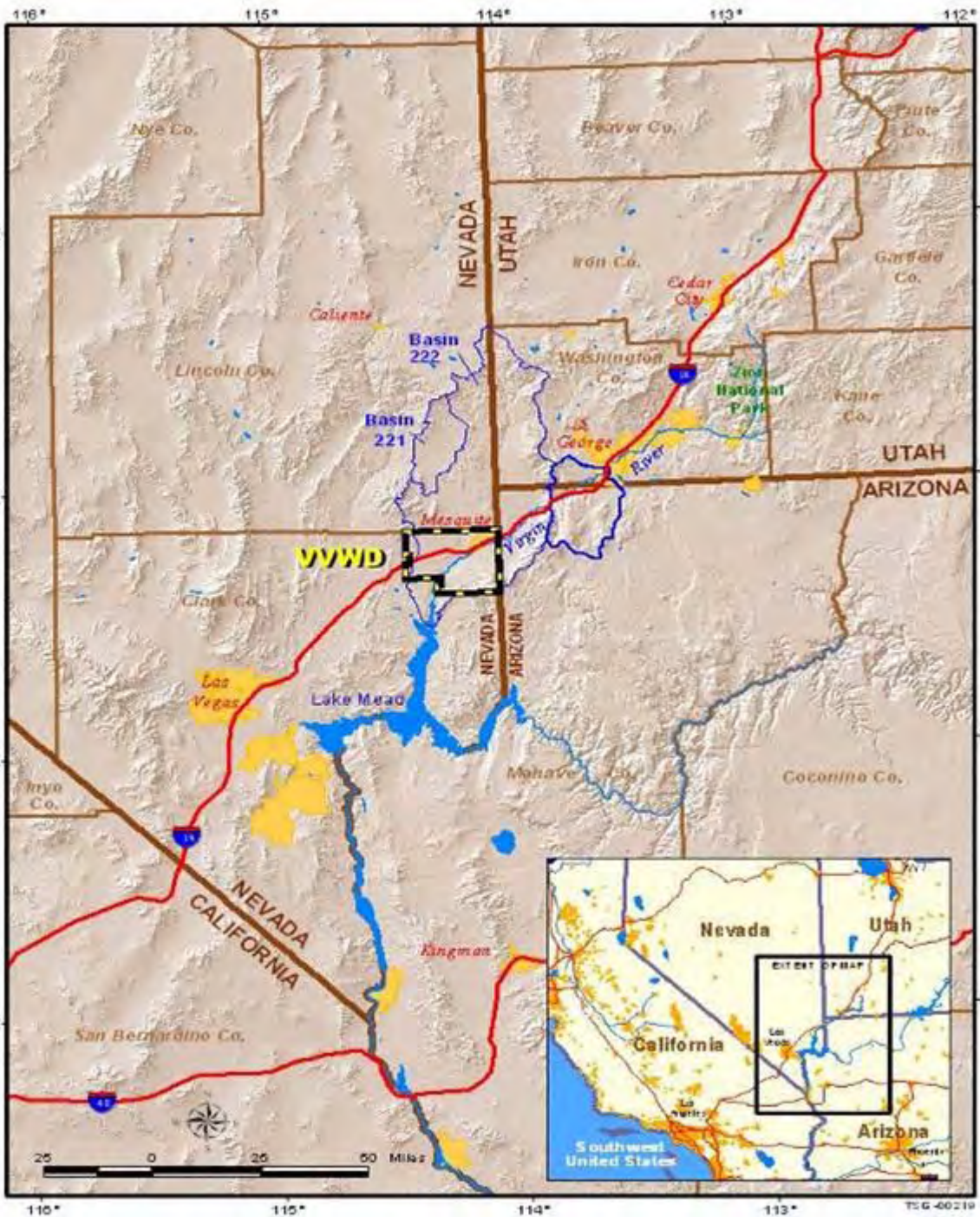
**Legislative Committee on Use, Management, and
Allocation of Water Resources**

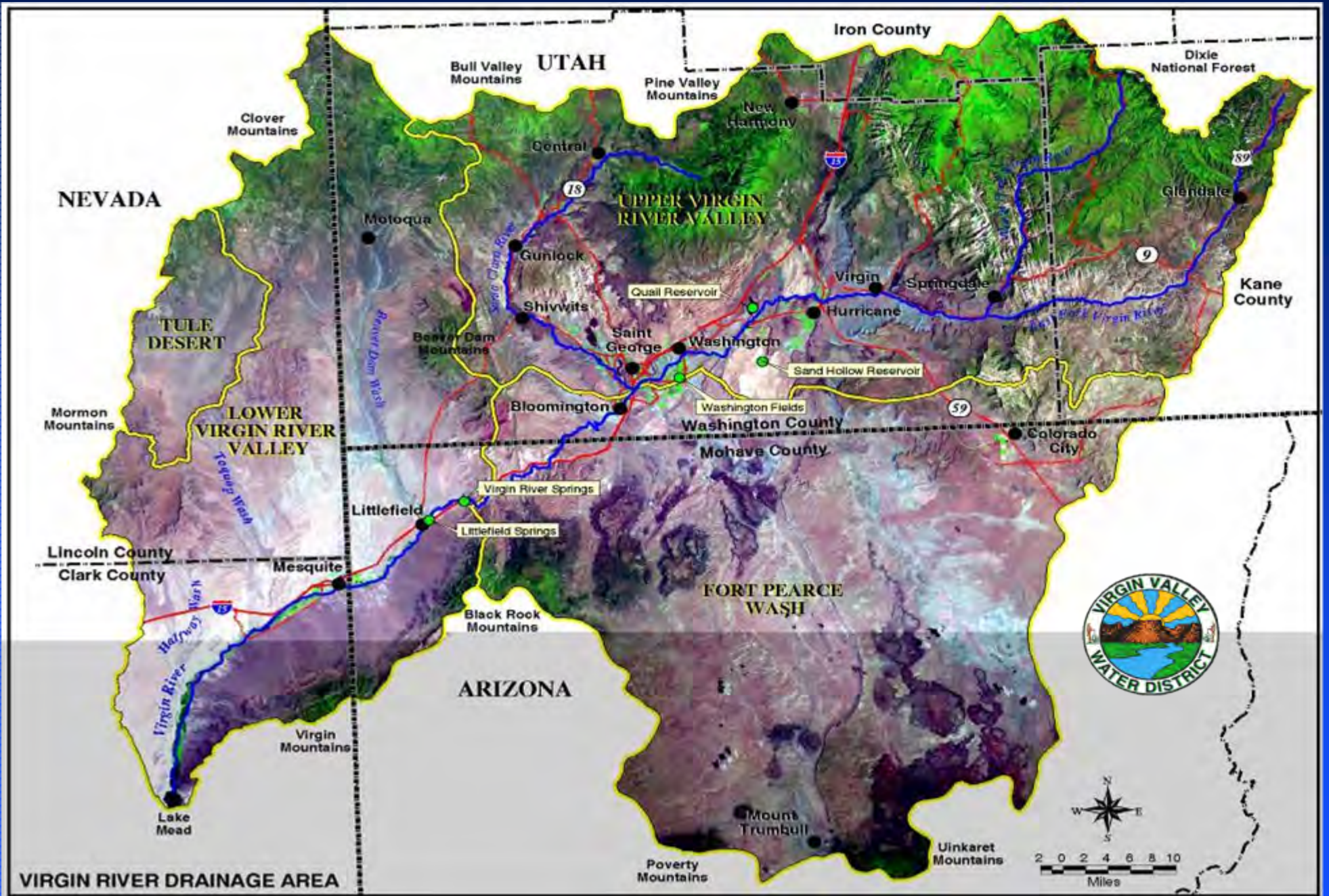
**February 15, 2006
Caliente, Nevada**



Discussion

- Virgin River Basin
- Lower Virgin River
- Ground Water Resources
- Surface Water Resources
- Population and Use
- Future Demands

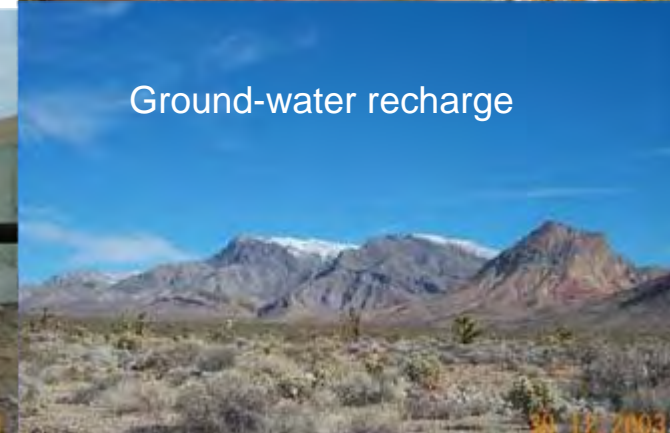
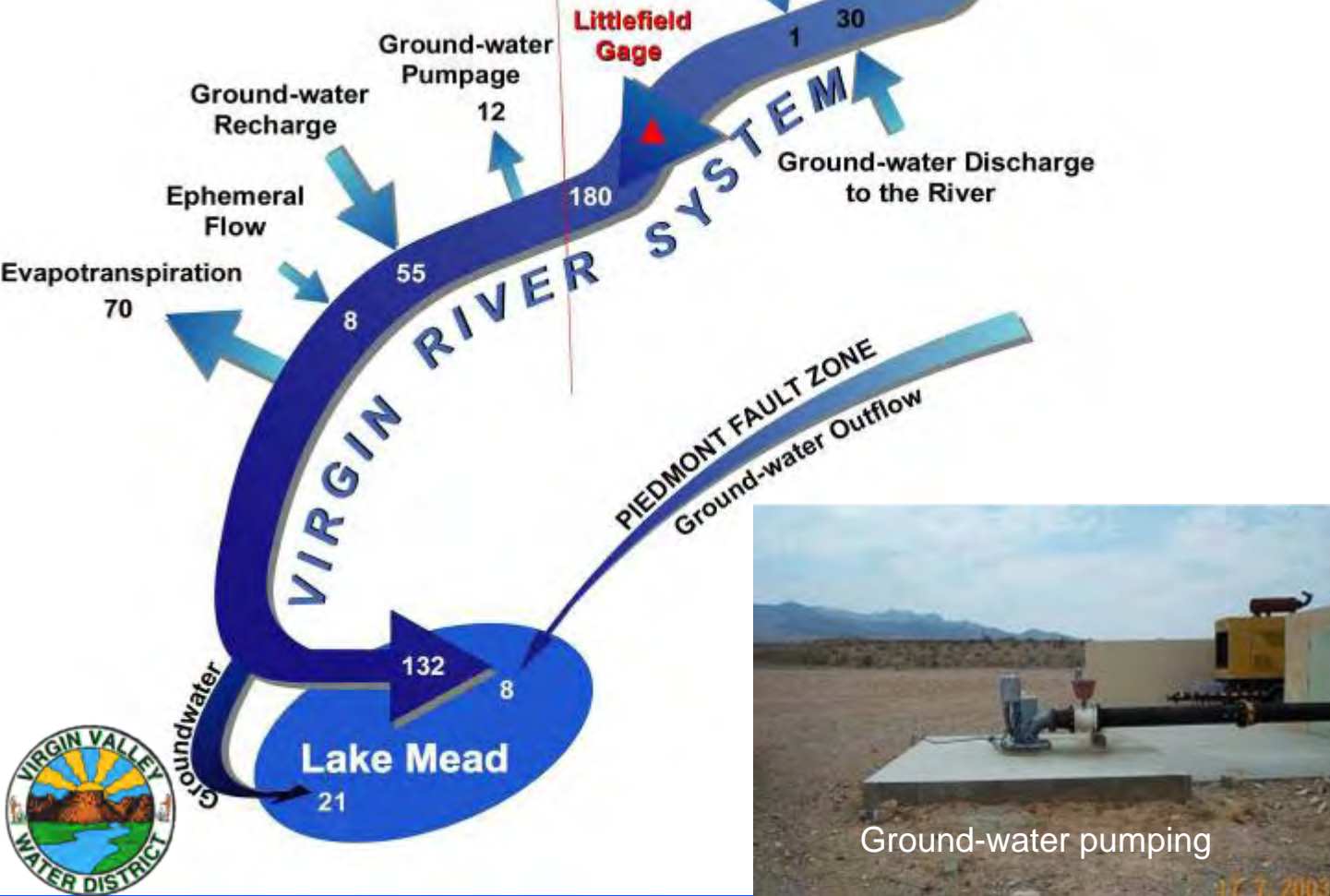




VIRGIN RIVER DRAINAGE AREA

Lower Virgin River

Inflow and Outflow Components



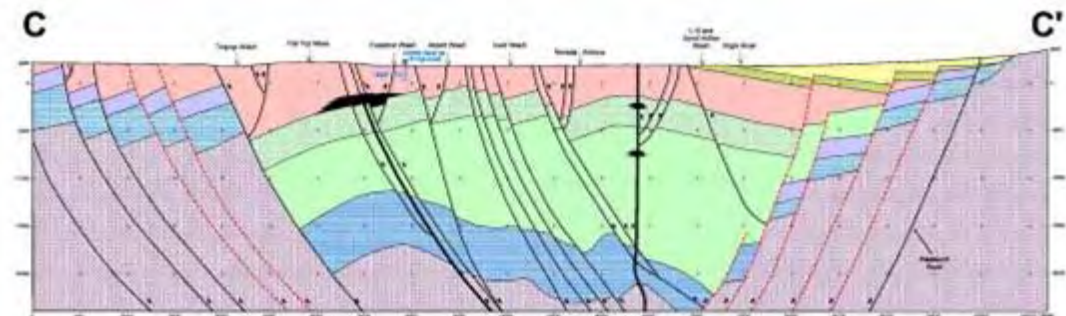
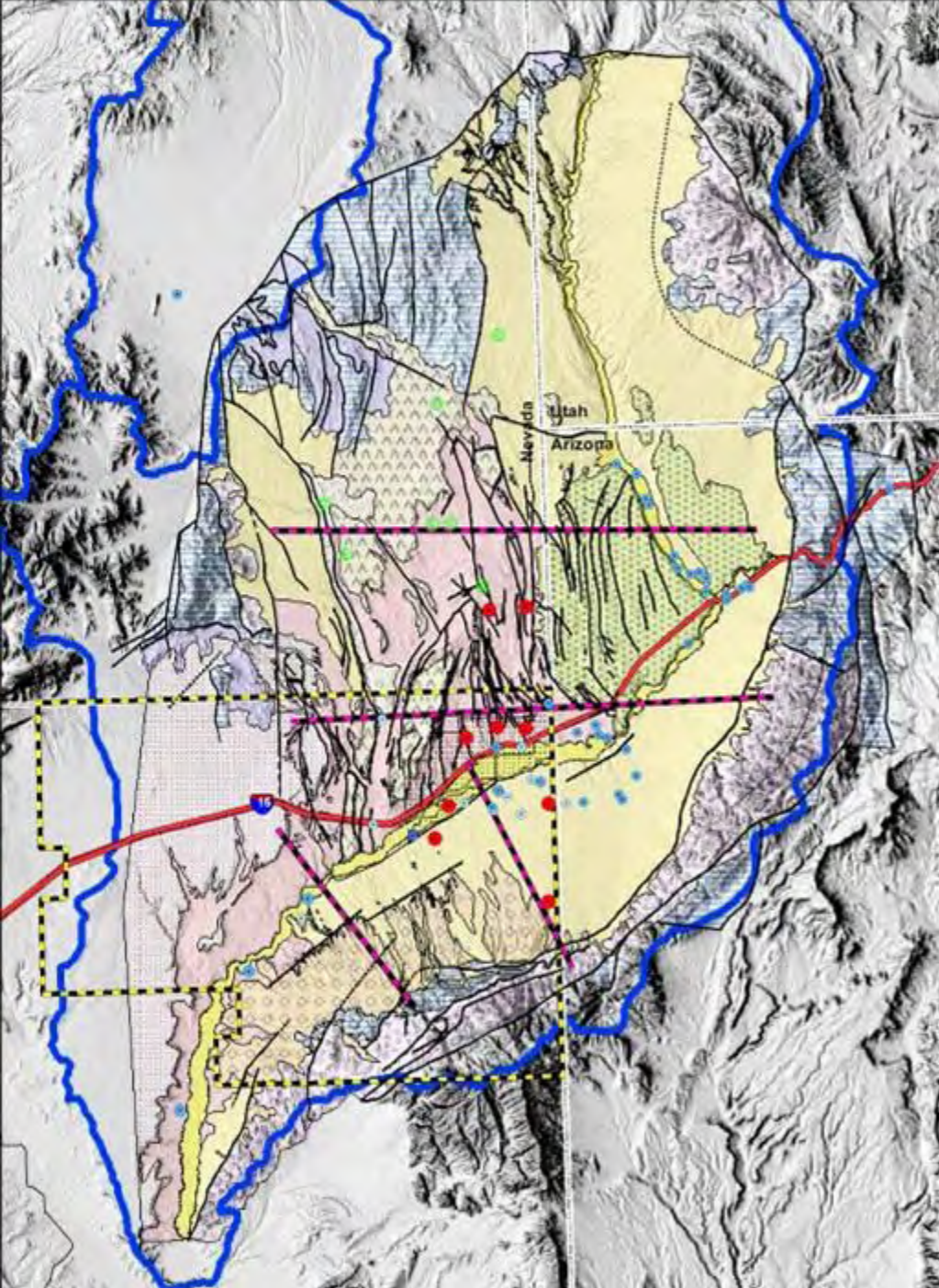
Land Use and Demands on Virgin River

- Virgin River is not governed by any interstate compact
- Individual State water rights have been permitted
- Historical use of water was agriculture
- Virgin River Basin and adjacent area is a rapidly growing region
- Change from rural-agriculture to residential-municipal land and water use
- Greater demands for water imposed by urbanization
- Balance between sustainable water resource development and habitat/species conservation

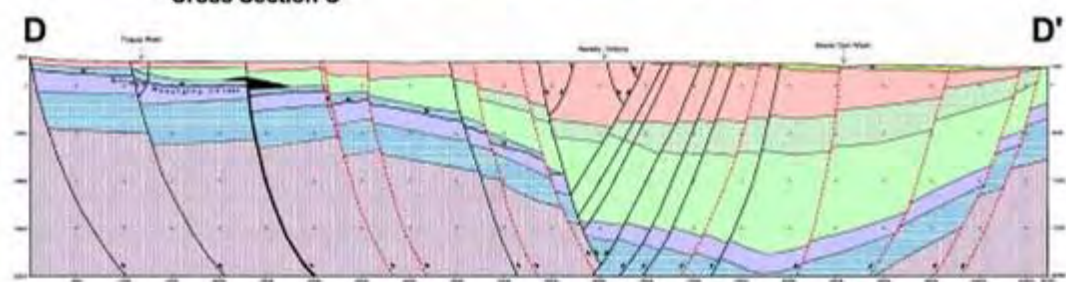
Ground Water in Lower Basin

- Estimate for VVWD by Donovan and Katzer is 85,000 based on Maxey/Eakin method and updated precipitation records
- Geologic structures control the movement of Ground Water
- Tule Desert drains and recharges the Virgin River Basin, part of the “Regional System”





Cross Section C



Cross Section D



Virgin Valley Water District Ground Water Resources

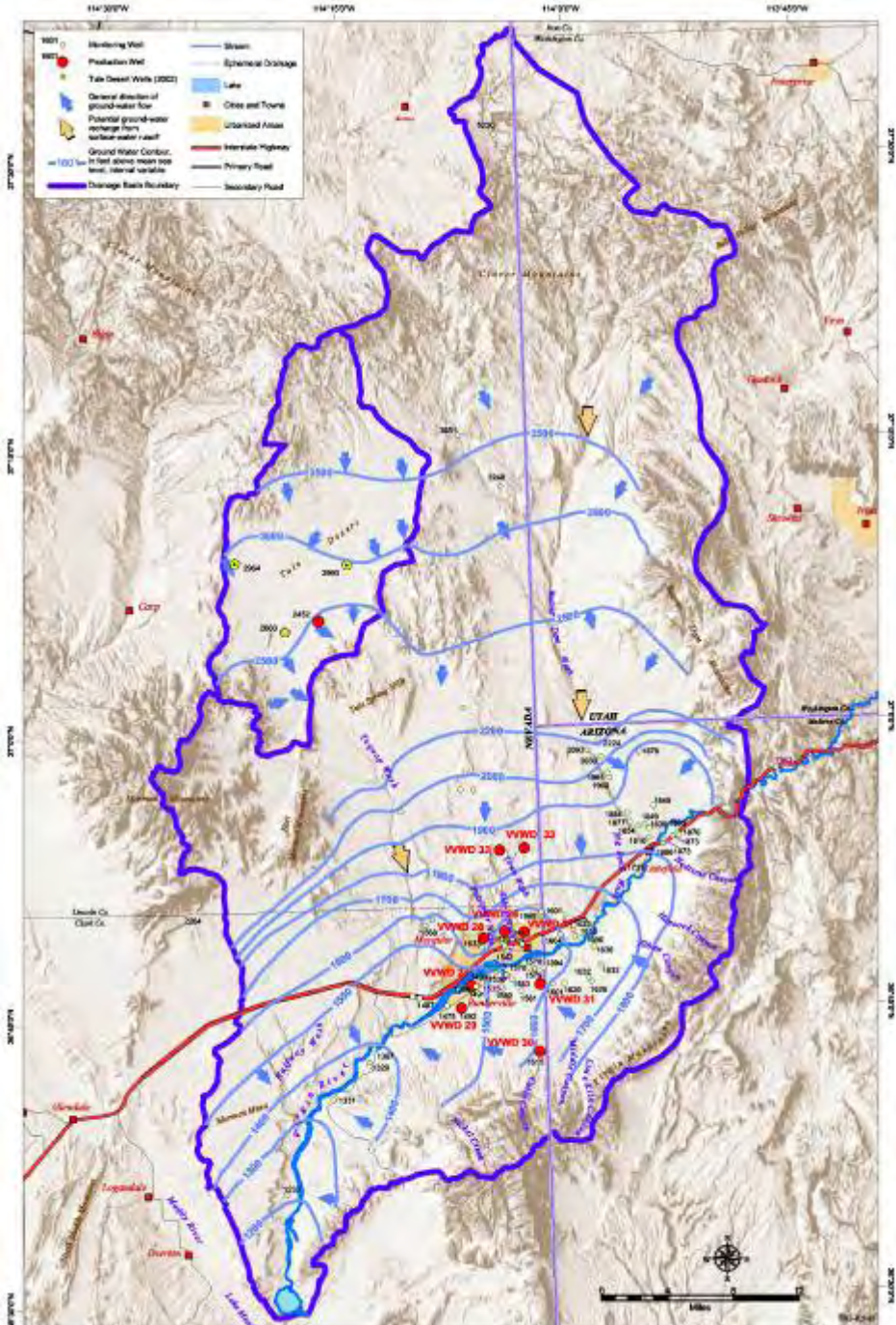


- Nine Production Wells, Deepest Well 3300 feet
- Production rate 700 to 3,000 gallons per minute, total capacity 13,000gpm 19 million gallons per day (mgd)

Total Dissolved Solids average 650 mg/L

- Arsenic $6\mu\text{g/L}$ to $80\mu\text{g/L}$
- Peak Usage 10 mgd, storage 15 million gallons





Potentiometric Surface

- Ground water flow from Northeast to the Southwest
- Primarily in Muddy Creek Formation
- No active well currently producing from the carbonate rock aquifer

Ground Water Rights in Nevada for the Lower Virgin River Basin

Permitted and Certificated Water Rights

Type of Use

Municipal & Industrial
Stockwater/Recreation

Virgin Valley Water District

12,039.0 afy

76.9 afy

12,115.9 afy

Applications

Type of Use

Municipal & Industrial

(1989-1996)

Irrigation

(1999)

Southern Nevada Water Authority
& Virgin Valley Water District

65,158 afy

Virgin Valley Water District

161,667 afy

J & J Building Supply

362 afy

Lincoln/Vidler

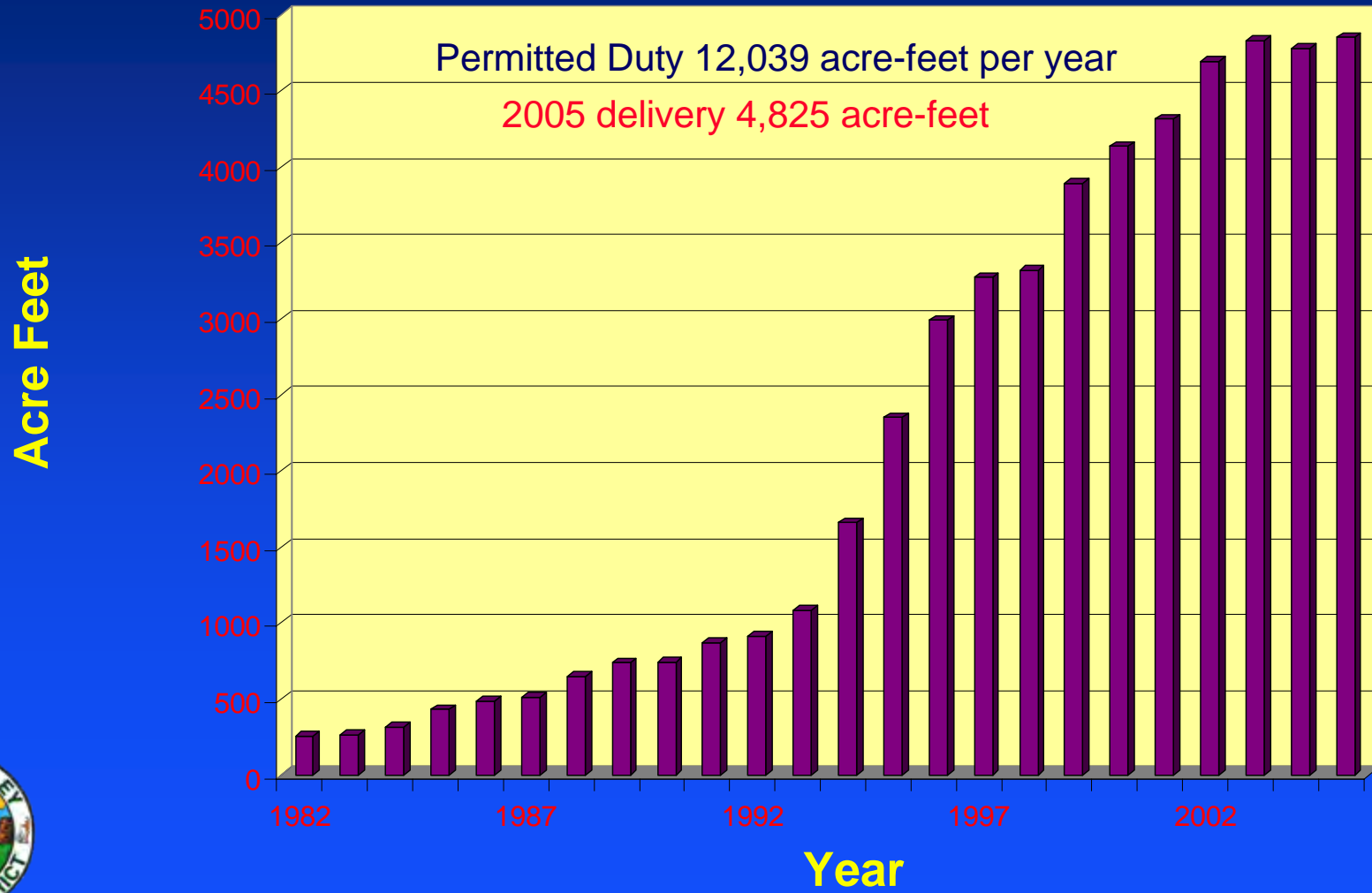
14,480 afy

241,667 afy

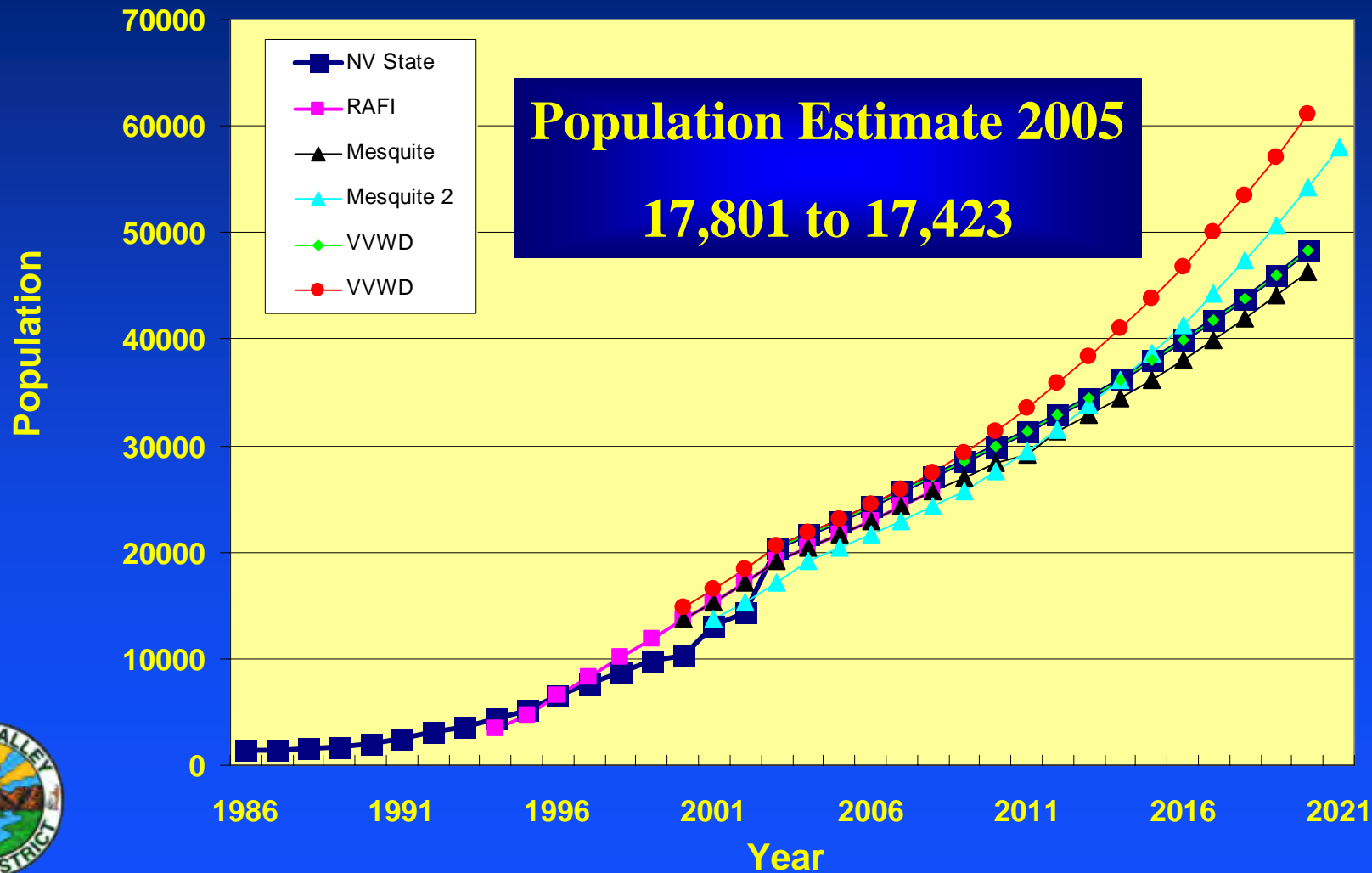
Data source Nevada Division of Water Resources



Annual Delivery of Water by Virgin Valley Water District from 1982 to 2005



Population Projections for the Service Area of the Virgin Valley Water District



Conservation

- Tiered Rate Structure to promote conservation
- Virgin River/recycled water utilized at parks and golf courses
- Secondary System for domestic use in Bunkerville



30. 12. 2003



17. 7. 2003



6. 6. 1999

Surface Water Rights on Lower Virgin River

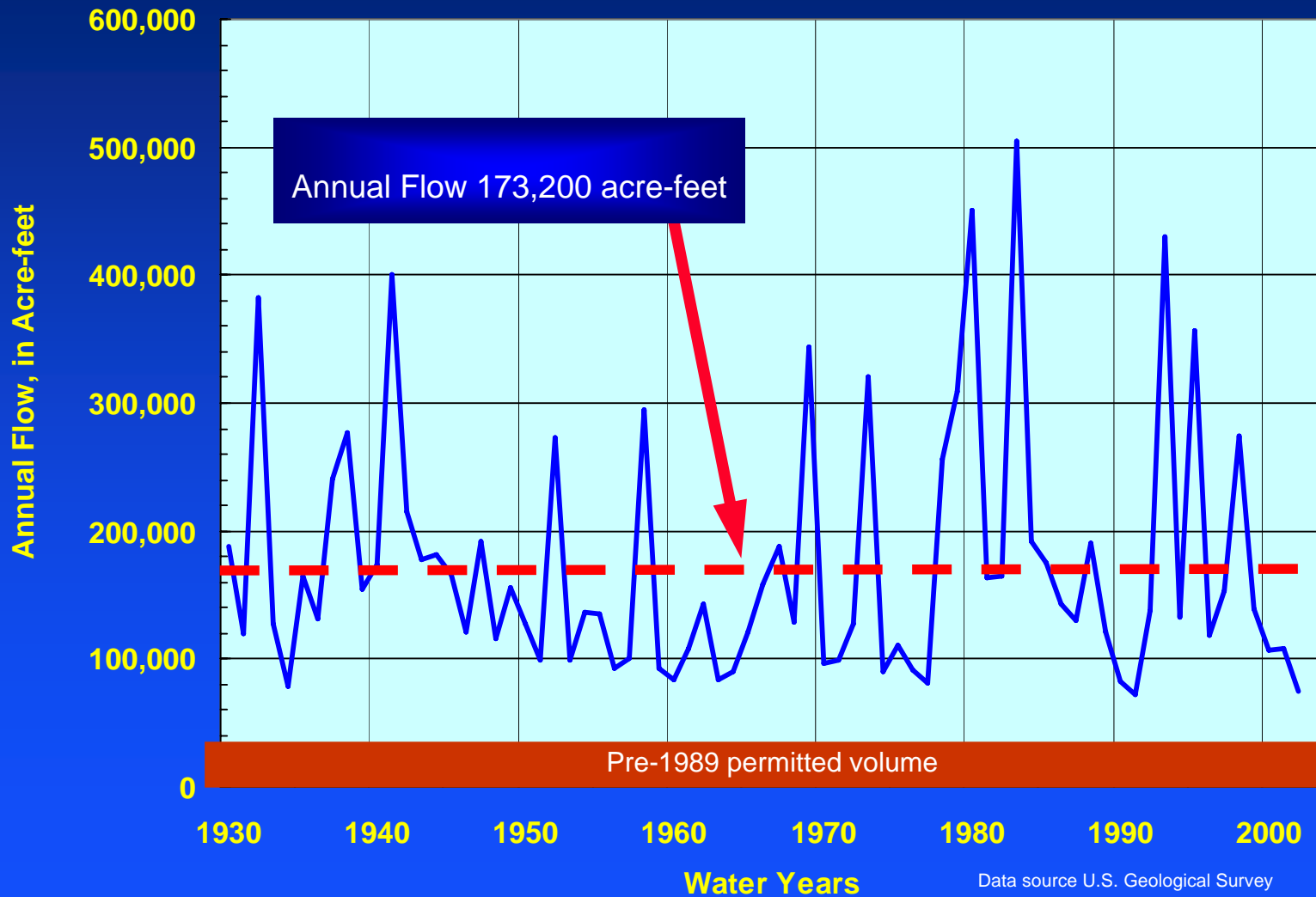
- Virgin River Decree –date 1927
 - Bunkerville Irrigation 8,116 afy
 - Mesquite Irrigation 9,670 afy
 - Priority Date 1905 17,786 afy

- Other NV permitted priority 1914 - 1956
 - Mesquite Irrigation 2,106 afy
 - Bunkerville Irrigation 1,496 afy
 - Riverside 1,916 afy
 - 5,518 afy

- SNWA 113,000 afy average annual diversion up to a maximum 190,000 afy; priority 1989

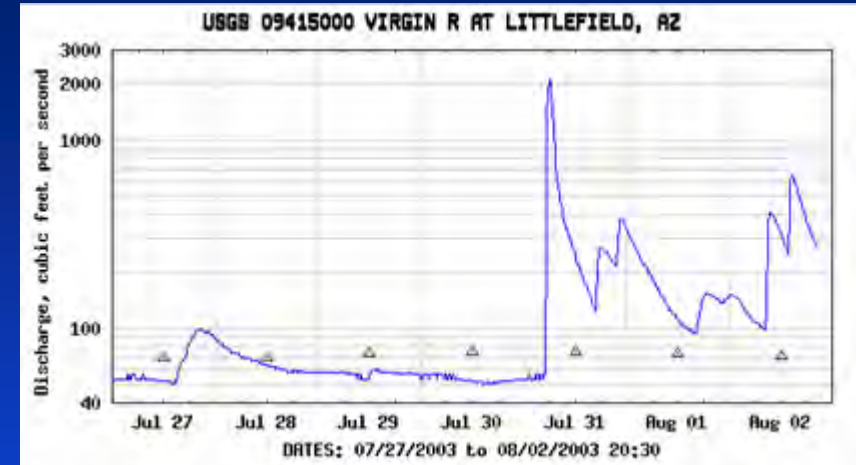


Annual Flow of the Virgin River at Littlefield, Arizona 1930 to 2002



Data source U.S. Geological Survey

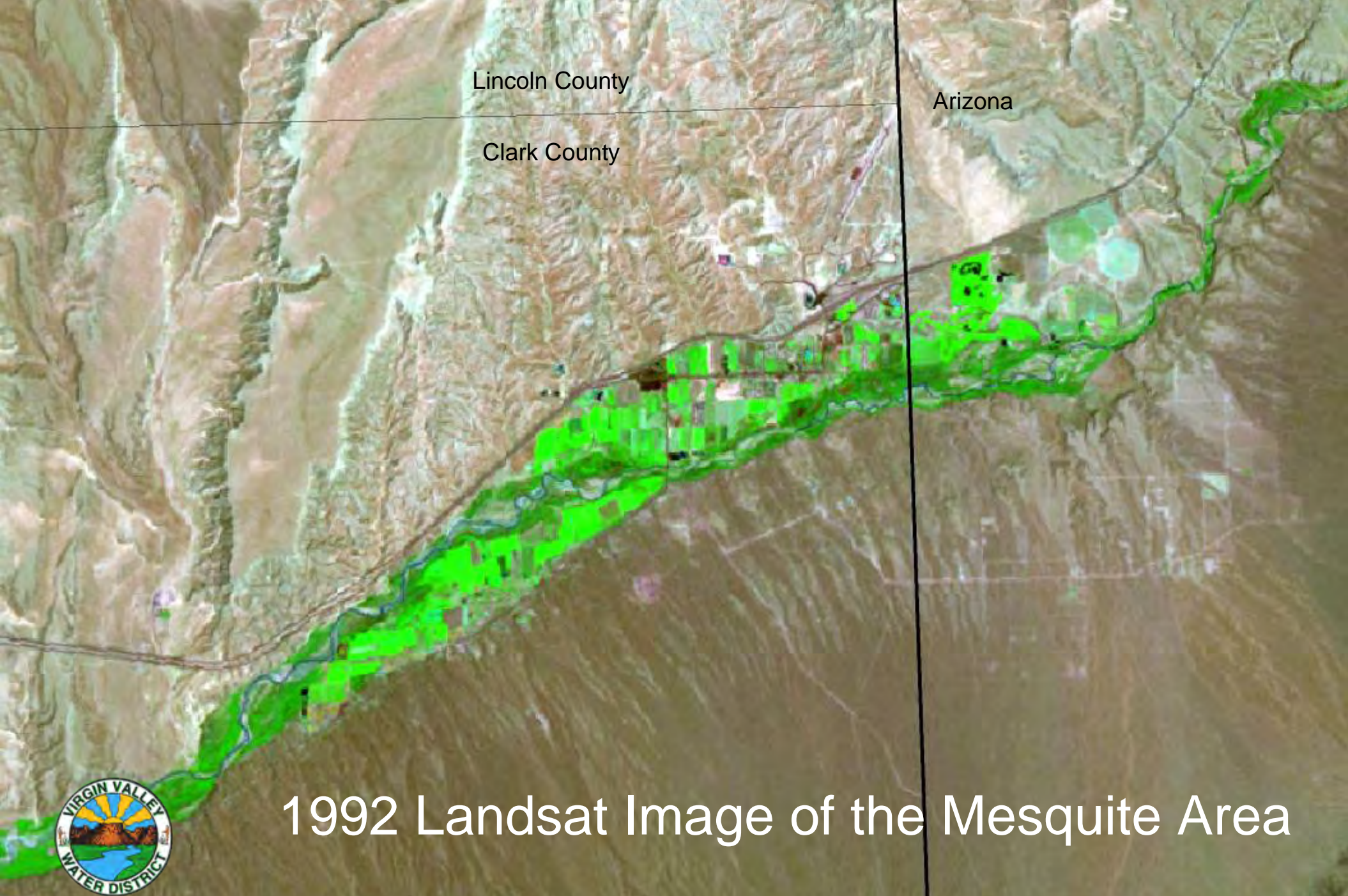
Virgin River Flow











Lincoln County

Arizona

Clark County



1992 Landsat Image of the Mesquite Area

Lincoln County

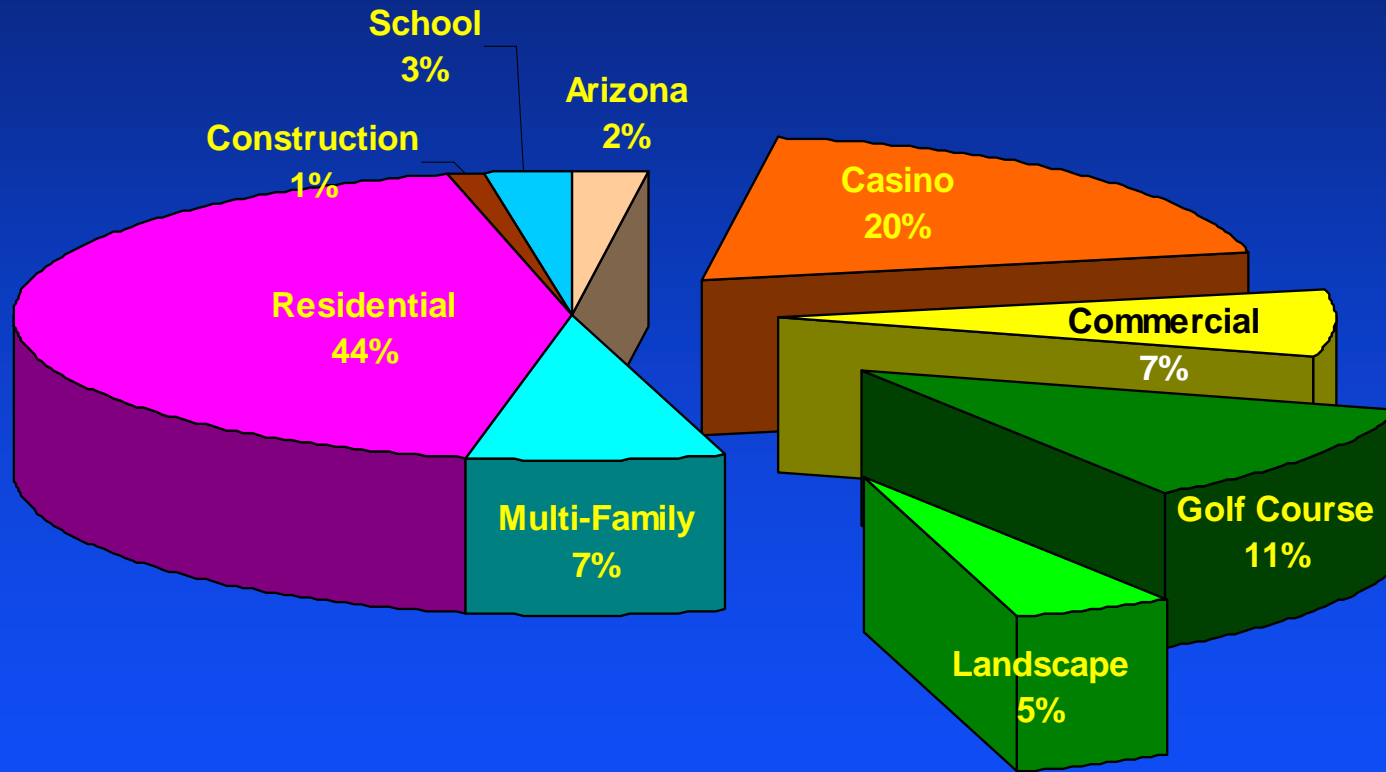
Arizona

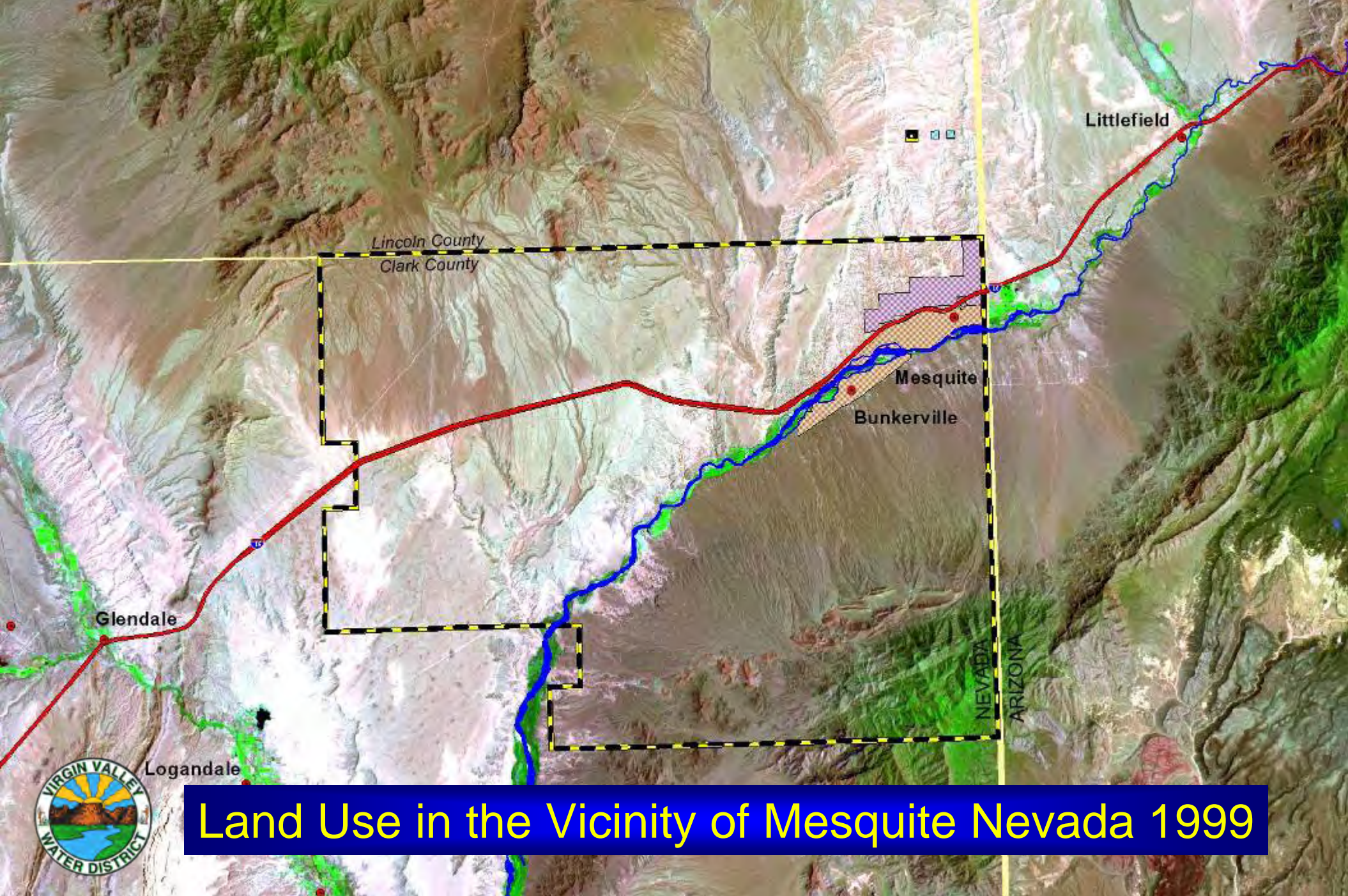
Clark County



2002 Landsat Image of the Mesquite Area

Water Use by Category in the Service Area of the Virgin Valley Water District in 2005





Lincoln County
Clark County

Littlefield

Mesquite
Bunkerville

Glendale

Logandale



Land Use in the Vicinity of Mesquite Nevada 1999

Lincoln County Land Act
13,500 acres

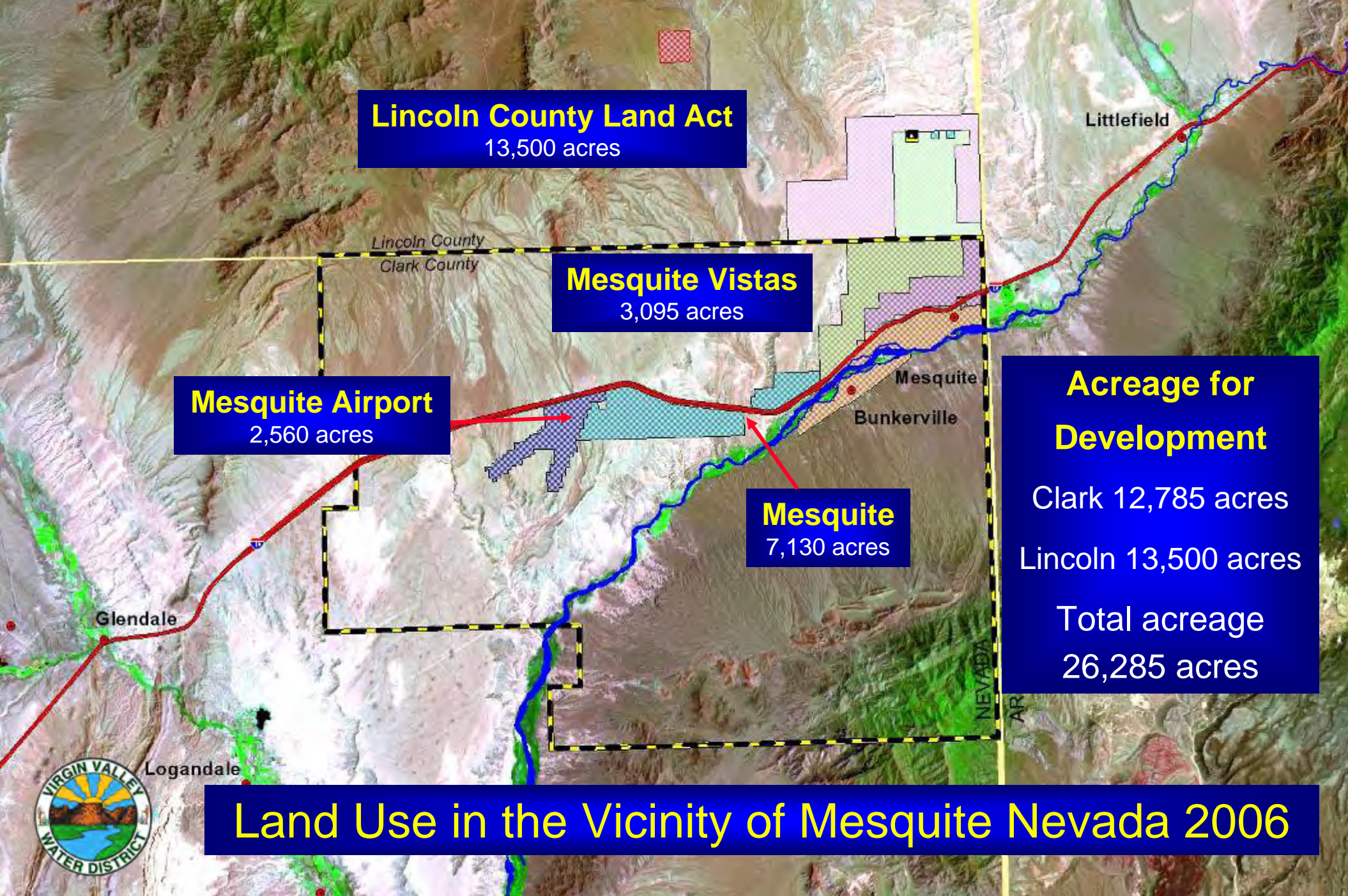
Mesquite Vistas
3,095 acres

Mesquite Airport
2,560 acres

Mesquite
7,130 acres

Acreage for Development
Clark 12,785 acres
Lincoln 13,500 acres
Total acreage
26,285 acres

Land Use in the Vicinity of Mesquite Nevada 2006



Challenges for Development in the Lower Virgin River Valley

- Water Quality,
 - new Arsenic standard of 10 $\mu\text{g/L}$,
 - Desalination of Virgin River water
- Growth and infrastructure development
- Environmental Issues, NEPA and ESA compliance associated with land acts
- Competing water resource demand with Arizona and Utah

