

Pipelines to Nowhere? Structural Responses to Climate Change and Population

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Always There™

Evolving Strategies of Water Supply Development and Management

- **Local to Regional Surface Supplies**
- **Importation**
- **Ag to Urban Transfers**
- **Groundwater – Development and Storage**
- **Demand Management**
- **Reuse and Pump-backs**

Common Theme – The Path of Least Resistance

■ **Barriers to Water Supply Development**

- Economic Protectionism – Interstate, Regional, Local
- Environment/Recreation
- Cultural – Rural vs. Urban

■ **The Law of Unintended Consequences**

- Legal Barriers – Compacts, Decrees, Land Use and Environmental Laws
- Groundwater Overdrafts and Non-Tributary Groundwater
- The Demise of Irrigated Agriculture?
- The Disconnect Between Land Use and Water Policy

Pipeline Proposals in the West – Moving Water When Other Options Fail

- **Nevada In-State Water Project**
- **Lake Powell to St. George Pipeline**
- **Peripheral Canal**
- **Flaming Gorge to Denver Pipeline**

Southern Nevada Water Authority Groundwater Development Project

Clark County

Population

1980: 528,000

2008: 1,986,146

2025: 4,500,000

Water Demands

2008 Current Resources:
565,000 acre-feet

2025 Projected Demand:
881,000 acre-feet

Southern Nevada Water Authority Groundwater Development Project

■ Sources of Supply

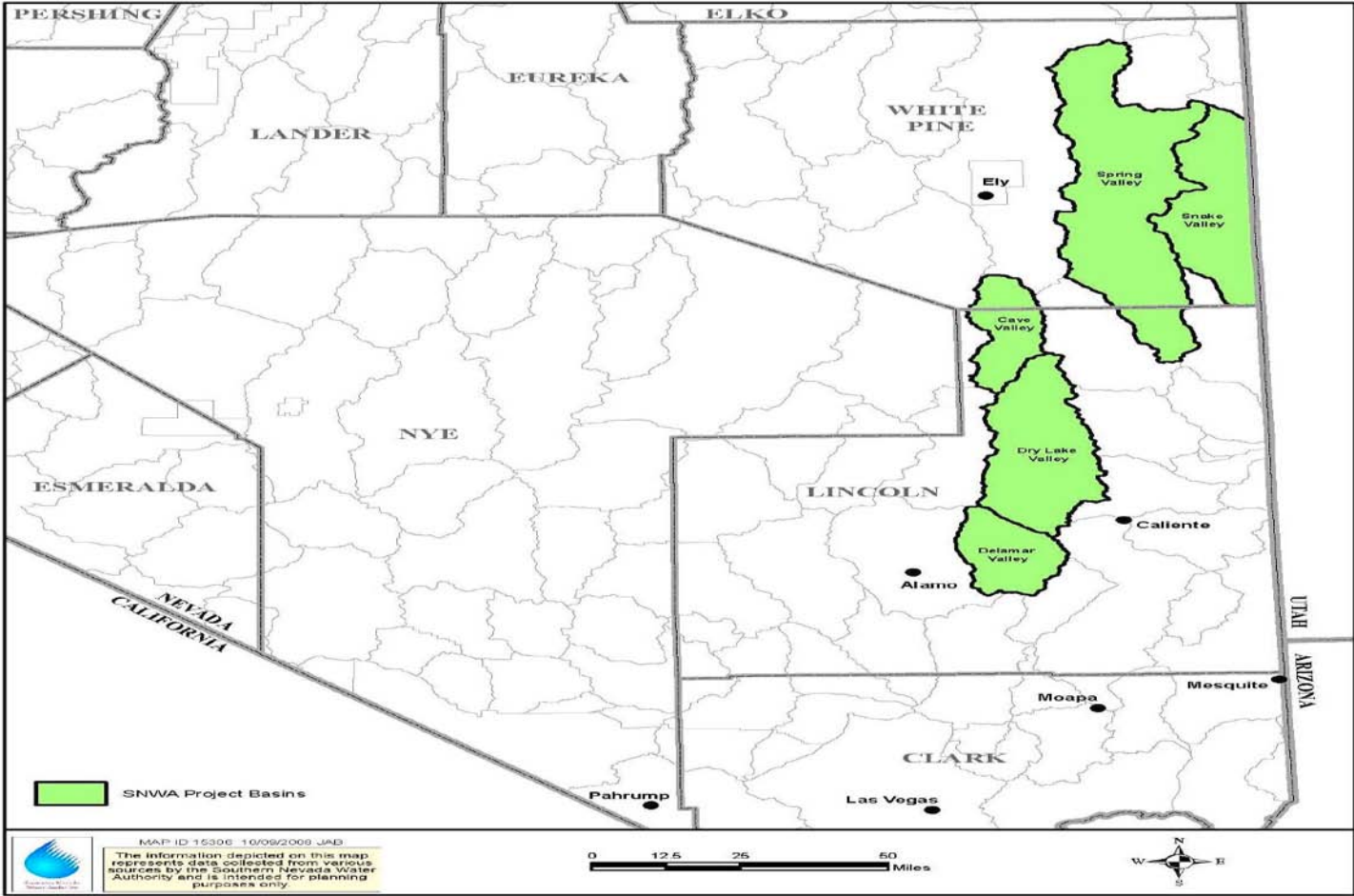
- Colorado River and Return Flow Credits
- Local Groundwater
- Reclaimed Water
- Muddy/Virgin River Ag Rights
- Conservation

■ The Need to Diversify the Portfolio

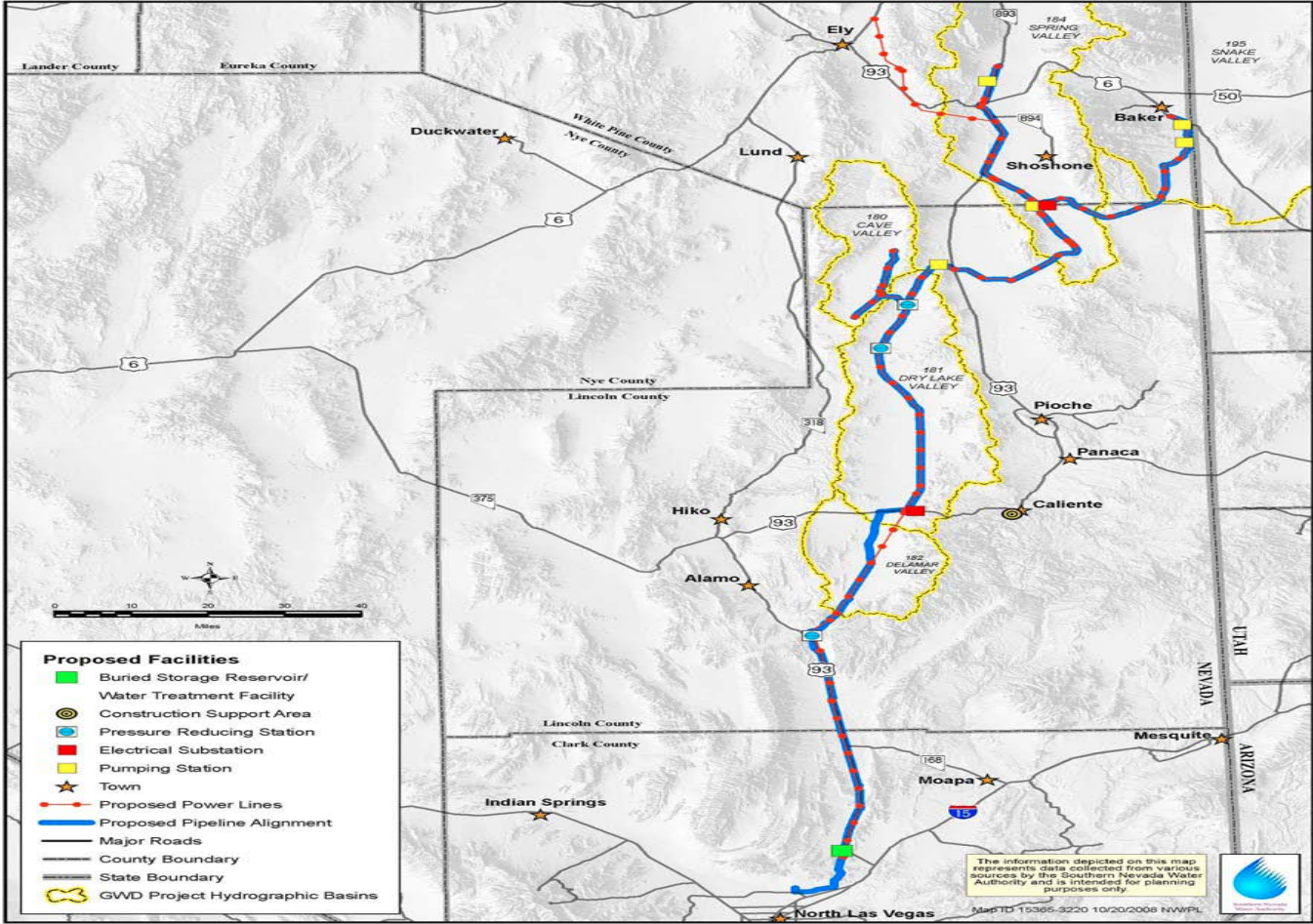
Southern Nevada Water Authority Groundwater Development Project

- **Groundwater rights and applications pending in basins in Clark, Lincoln, and White Pines Counties**
- **Approximately 170,000 acre-feet per year**
- **The 285-mile pipeline project is estimated to cost \$2 billion**

Affected Groundwater Basins



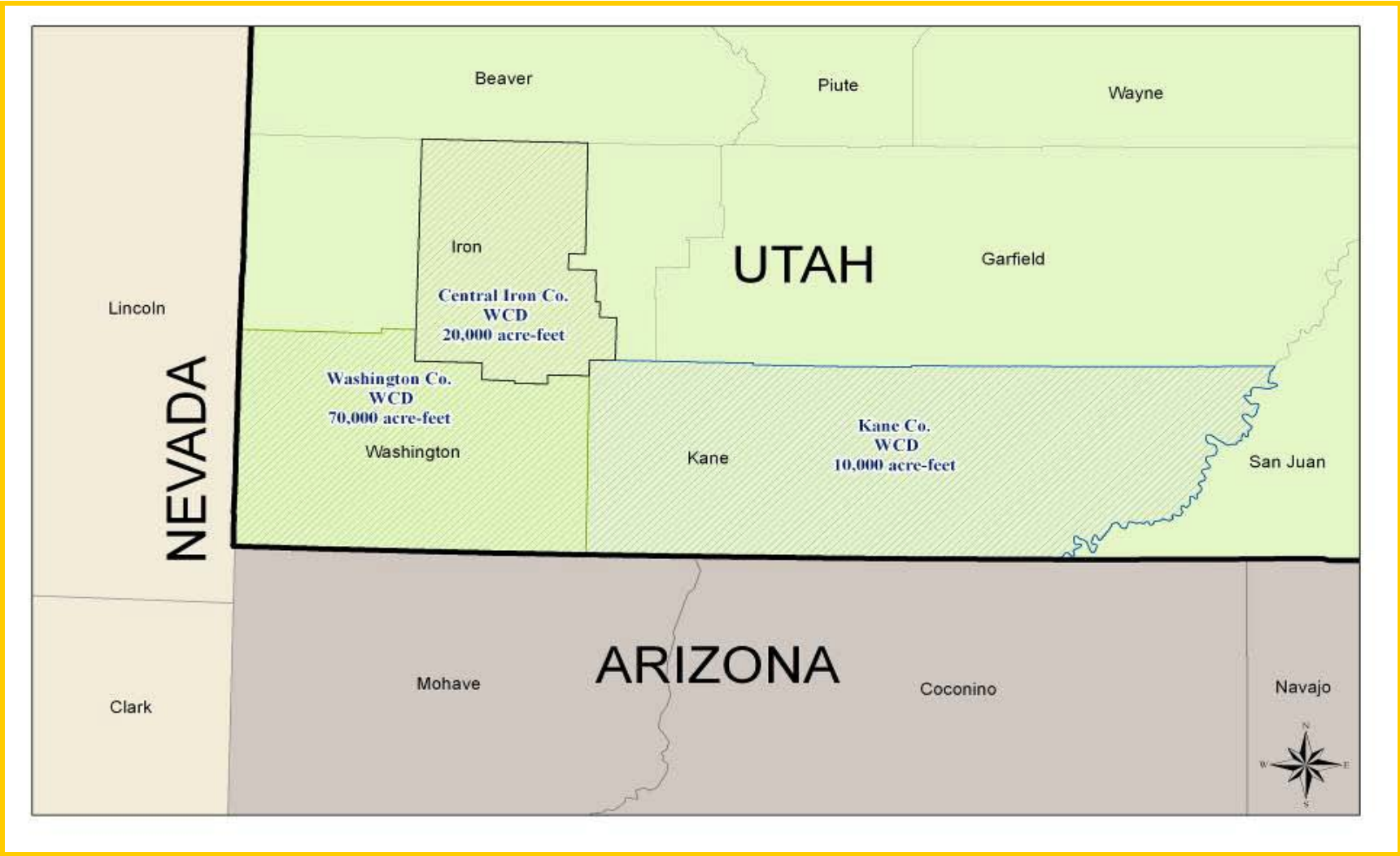
Proposed Route



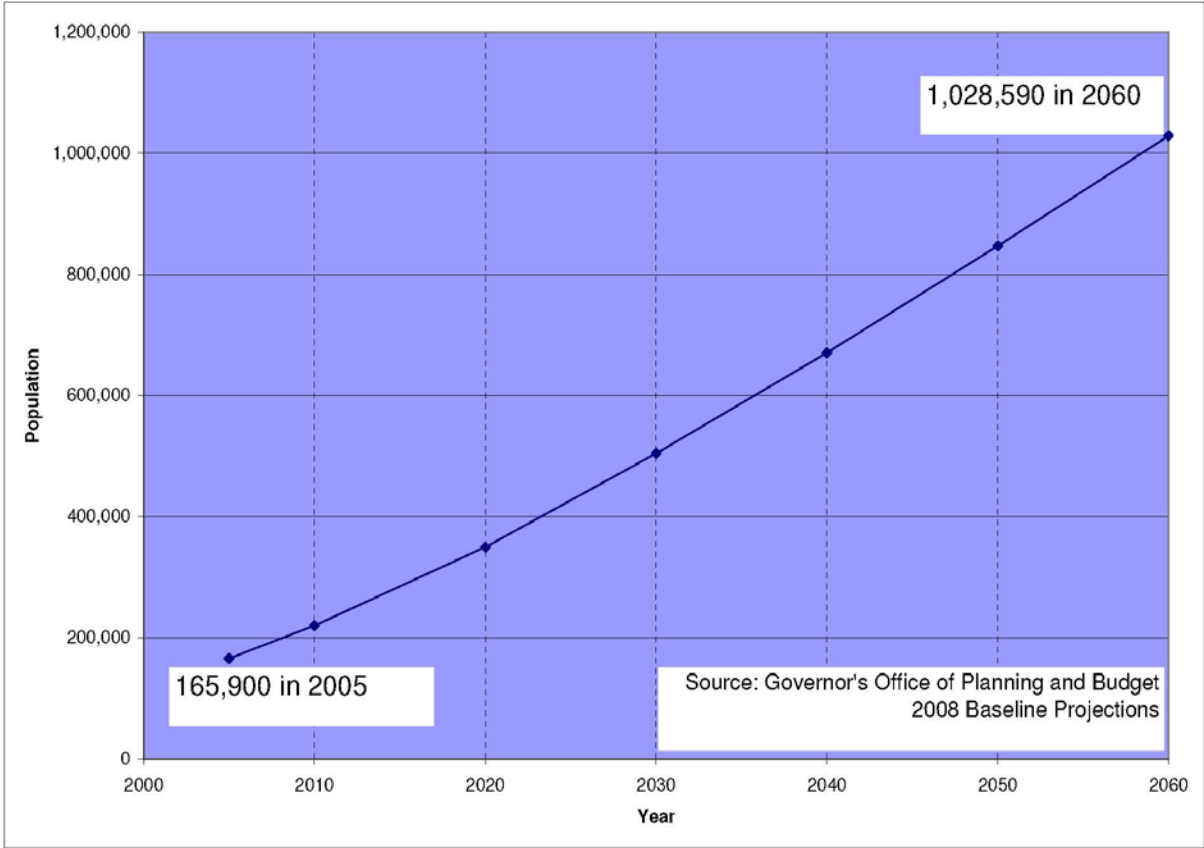
Public Opposition

- **Local interests concerned that pumping of groundwater will affect existing water supply for agriculture**
- **State of Utah**
- **Environmental**
- **Las Vegas area growth control advocates**

Lake Powell to St. George Pipeline



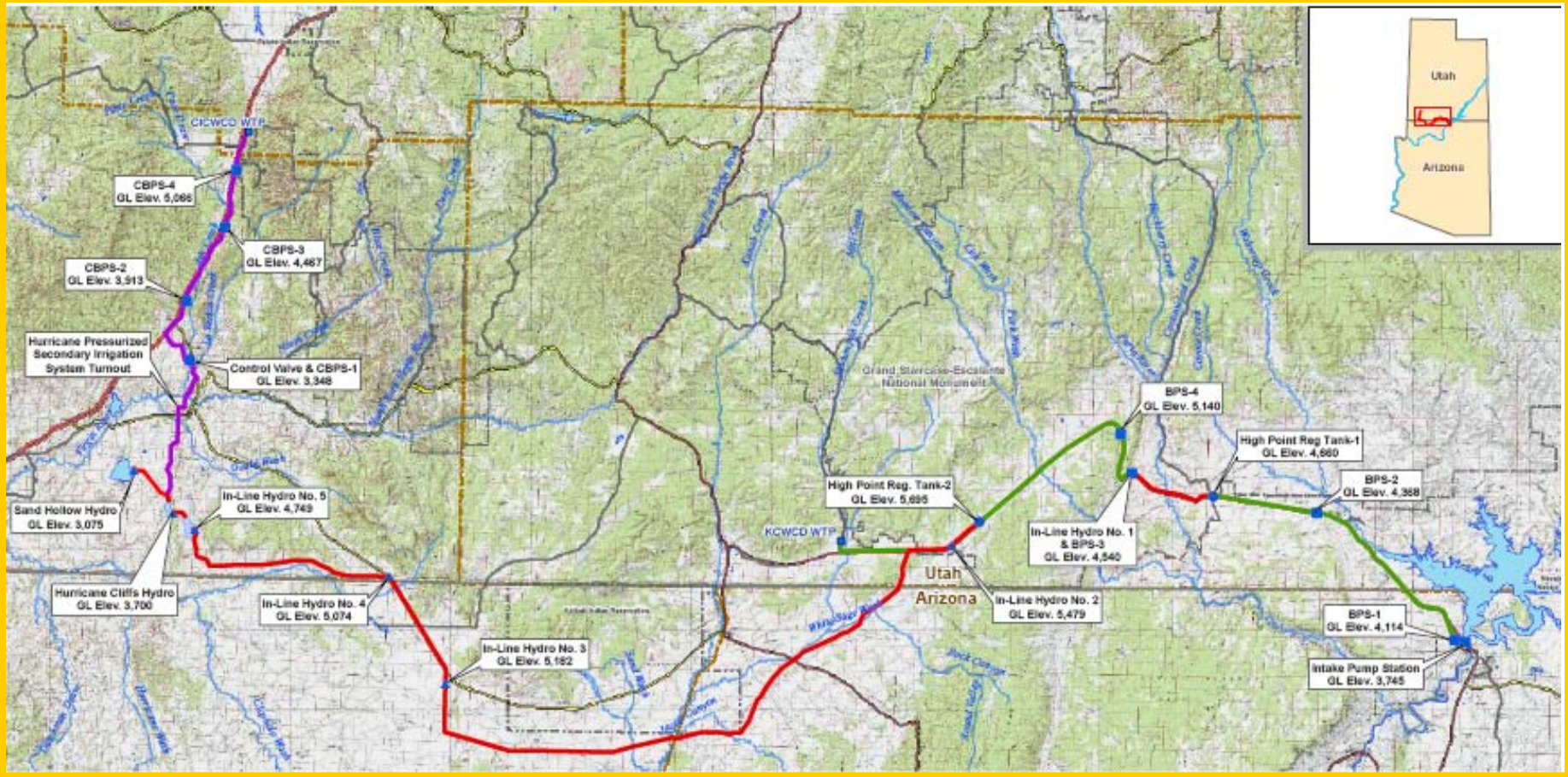
Estimated Population Growth For the Three Conservation Districts



Lake Powell to St. George Pipeline

- **139 miles of buried 69-inch pipe from Lake Powell to St. George, Utah, and 38 miles of additional pipe north to Central Iron County.**
- **Pumping facilities to provide the approximately 2,000 foot lift**
- **Hydroelectric generation facilities**
- **Sponsored by the State of Utah, and three Southwest Utah Water Conservancy Districts**
- **100,000 acre-feet of water**
- **Cost \$1 billion to \$1.7 billion**
- **FERC Licensing Application by 2010**
- **Final Design 2016**
- **Construction is estimated to be completed in 2020**

Proposed Route



Public Opposition

- **Cost to the community**
- **Whether conservation is a better, and more cost-effective approach**
- **Whether building the pipeline will encourage more growth**
- **Whether the water supply in Lake Powell is reliable given the affect of global warming**
- **Whether each community should have the opportunity to vote on the project since they will be paying for it**

Sacramento-San Joaquin Bay Delta

- **Immense, low-lying inland region situated east of the San Francisco Bay, at the convergence of the Sacramento and San Joaquin Rivers**
- **At the core of California's two main water distribution systems—the federal Central Valley Project (CVP) and the State Water Project (SWP)**
- **Provides water to more than 23 million Californians, supports more than 300,000 acres of in-Delta agriculture, as well as 4 million irrigated agricultural acres throughout the state**

Issues Facing the Delta

- pelagic fish decline
- increasing salinity
- land subsidence
- aging levees and flood risks poor ecosystem health
- sea level rise
- increasing urbanization
- climate change
- water quality issues



California Drought Conditions

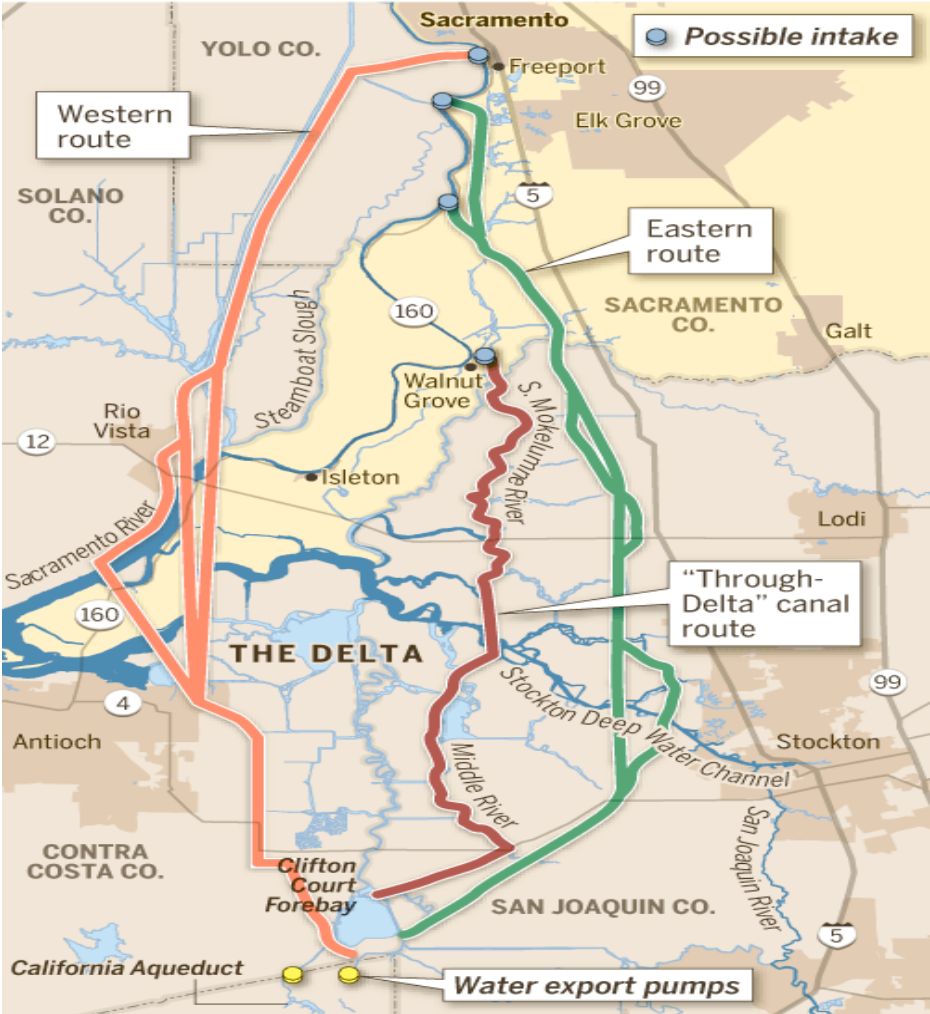
- **Statewide precipitation 70% of average since mid-2006, with some areas getting as little as 20% of normal amounts**
- **Some parts of Southern California experienced their driest year on record in the year ending July 2007.**
- **2007 Statewide runoff 53% of average**
- **2008 Statewide runoff 60% of average**
- **2009 forecast “dry” to “critically dry”**
- **Statewide reservoir levels 68% of average for this time of year. Several key reservoirs are at only 25% capacity.**

Capture, Storage and Distribution Problems

- **State Water Project and federal Central Valley Project deliveries reduced by court-ordered limits on diversion from the Sacramento - San Joaquin River Delta, to protect the Delta Smelt**
- **Initial 2009 allocations from the State Water Project second lowest in history, at only 15%**
- **Recent agricultural allocation zero**
- **Governor Drought Declaration – Requests all urban water providers to reduce use by 20%**

Peripheral Canal

- **By early 1965, the proposed canal had gained wide-spread acceptance among policy-makers**
- **In 1982 voters defeated the Peripheral Canal**
- **Environmentalists helped defeat this proposal by alleging that if Southern California diverted large amounts of water from the estuary the entire Delta ecosystem would collapse.**
- **Defeated by >90% “NO” vote by voters from Santa Barbara north**



Map data: ESRI, TeleAtlas

Source: California Department of Water Resources

Sacramento Bee

Peripheral Canal Come-back

- **Recently, the California governor's top advisers in the Delta Vision committee recommended starting construction on a peripheral canal by 2011 even if it means going without approval from voters or the Legislature.**
- **This issue remains highly controversial.**



Peripheral Canal Come-back

- **Many believe that circumventing the need to pump directly from the Delta would take pressure off endangered fish species and the ailing ecosystem**
- **Others believe that removing water from the Delta would exacerbate adverse Delta conditions because as less water arrives from the east, salty water from the Bay would flow into the Delta, and agricultural runoff would remain trapped, rendering its sloughs and canals unsuitable for irrigation or drinking water.**

Colorado Front Range

- **2000 population 3.82 million people**
- **2030 population 6.21 million people**
- **2.39 million additional people**
- **SWSI estimated “water supply gap” = 507,700 acre-feet**
- **“Gap” represents only 20% of the estimated water supply need, balance is in planned projects assumed to be completed**
- **Does not account for Southern Denver Metro Tier dependence on Denver Basin non-tributary groundwater**
- **Conservation not the sole answer**

Front Range Water Supply Paralysis

- **No more transbasin diversions?**
- **No more Ag-to-Urban transfers?**
- **43 water providers competing for the same resource**
- **Uncertainty over Colorado River Compact entitlement**

Flaming Gorge to Denver Pipeline – The Silver Bullet?

- **Proposed by Million Conservation Resource Group, a private company**
- **165,000 acre feet per year of Colorado's Upper Colorado River Compact share to be diverted at or above Flaming Gorge Reservoir in Wyoming**
- **400 mile pipeline, estimated to cost approximately \$3 billion, to deliver water to Colorado's Front Range**

Flaming Gorge to Denver Pipeline – The Silver Bullet?

- **Demonstrable benefits:**
 - **physical water supply**
 - **good water quality**
 - **avoids headwaters impacts**
 - **route along I-80 appears to minimize environmental impacts**

Flaming Gorge to Denver Pipeline – The Silver Bullet?

- **Significant challenges:**
 - **Interstate issues**
 - Does Wyoming have authority to allow the diversion of Colorado's Compact share?
 - Need for Colorado's approval?
 - Need for water court decree (and satisfaction of anti-speculation doctrine)?
 - Effect of Article IX of the Upper Colorado River Compact?
 - **West slope opposition**
 - Is this the last increment of Colorado's Colorado River entitlement?
 - Should it be dedicated to solve supply issues on the East slope?

Conclusions

- **With the advent of climate change and population growth, the West faces significant water management challenges**
- **Conservation, efficiency, reuse and other “environment friendly” measures will not solve the gap between supply and demand**
- **Left to their own devices, water utilities will follow the “path of least resistance” in water supply – often turning to irrigated agriculture or non-sustainable sources such as groundwater overdraft or non-tributary groundwater**

Conclusions

- **Structural solutions, such as transbasin exports will continue to have a place**
- **The impact of such solutions can be minimized by institutional integration between utilities, and coordination between land use policies and laws with water policies and laws**
- **At some point, the diversion/importation of water from distant sources will be necessary**
- **What are the limits?**