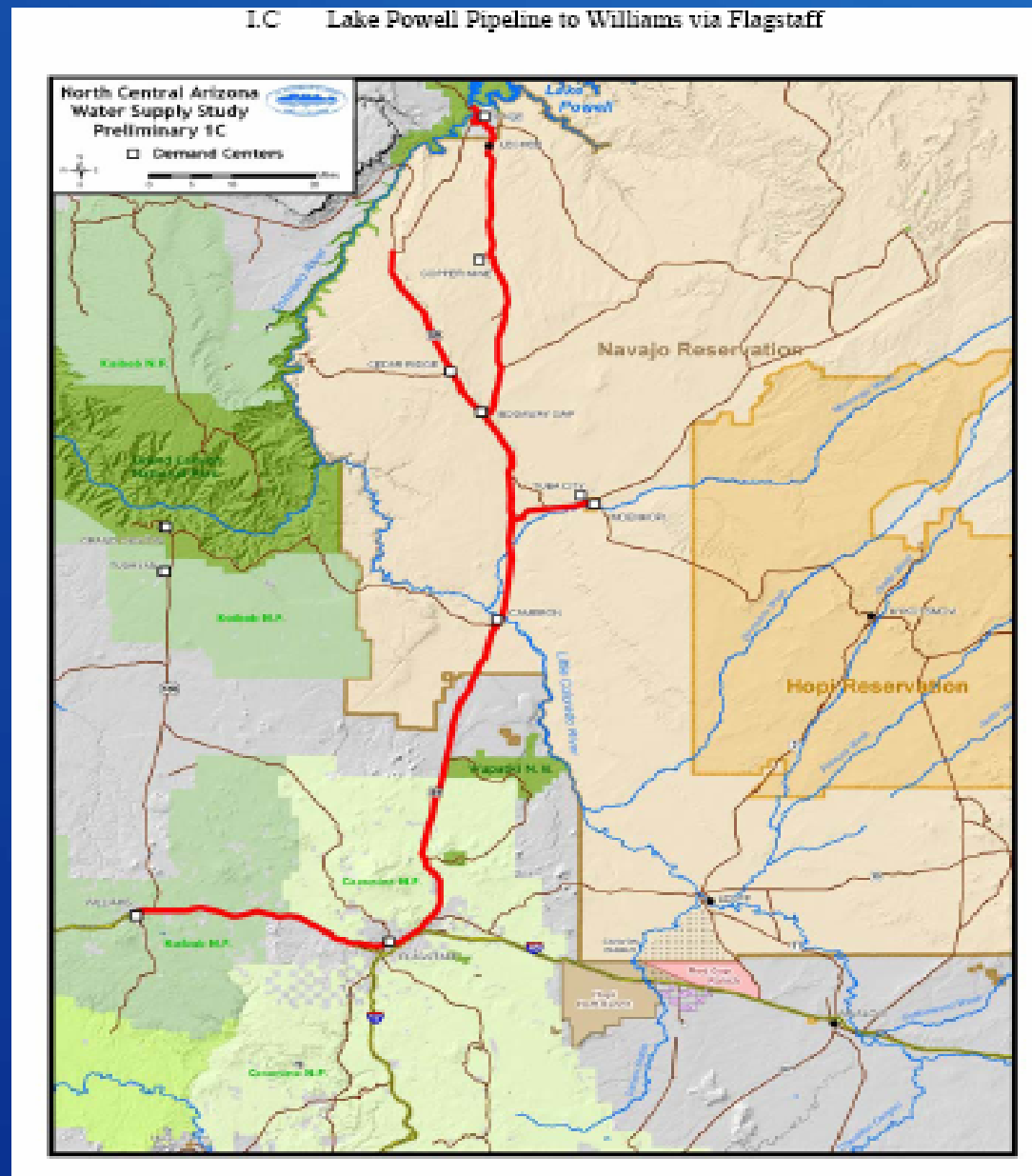
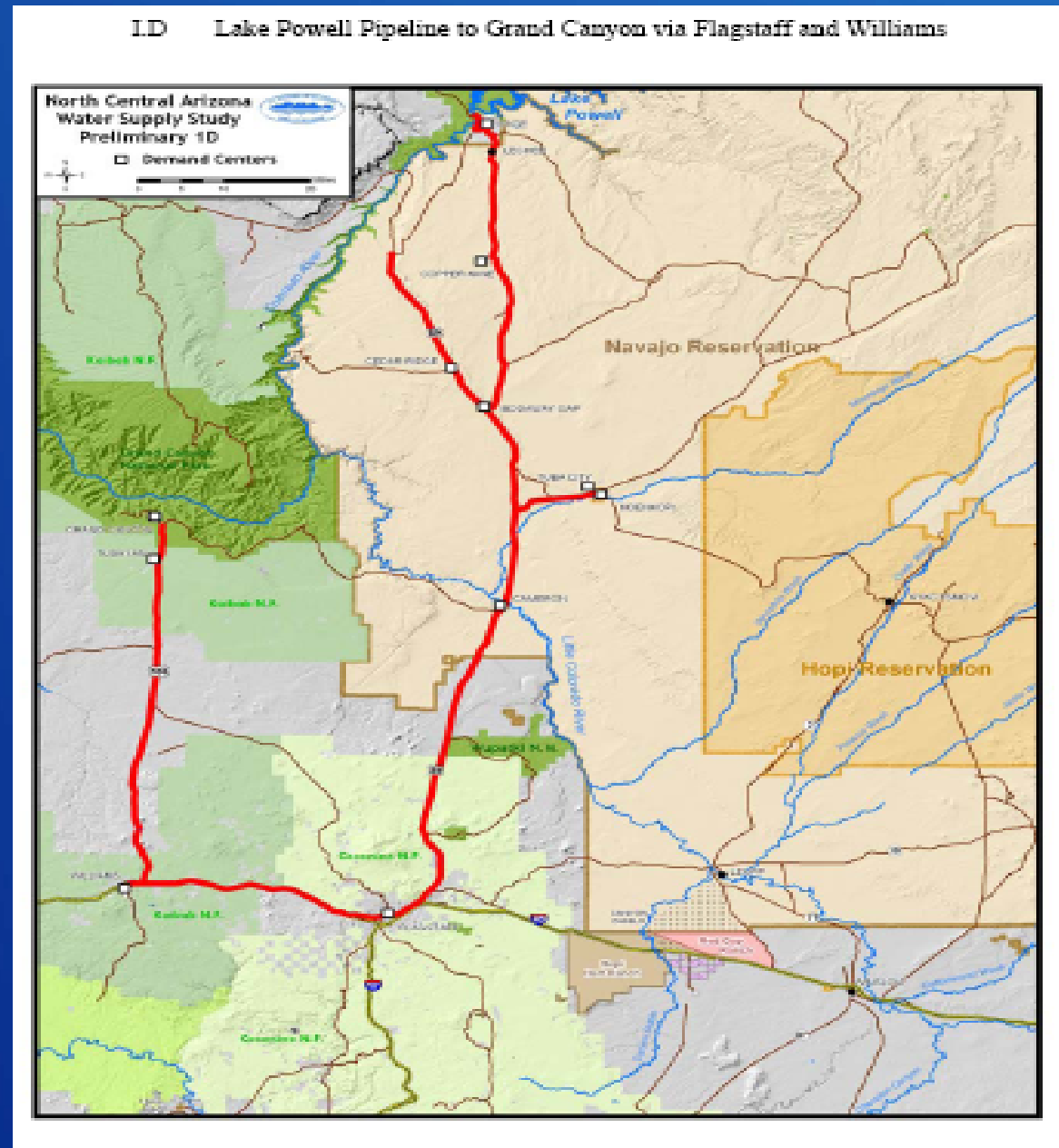


***Surface  
Water Lake  
Powell  
Pipeline to  
Williams via  
Flagstaff  
(Hopi/Navajo/  
Flagstaff/Williams  
Demand Centers)***



RECLAMATION

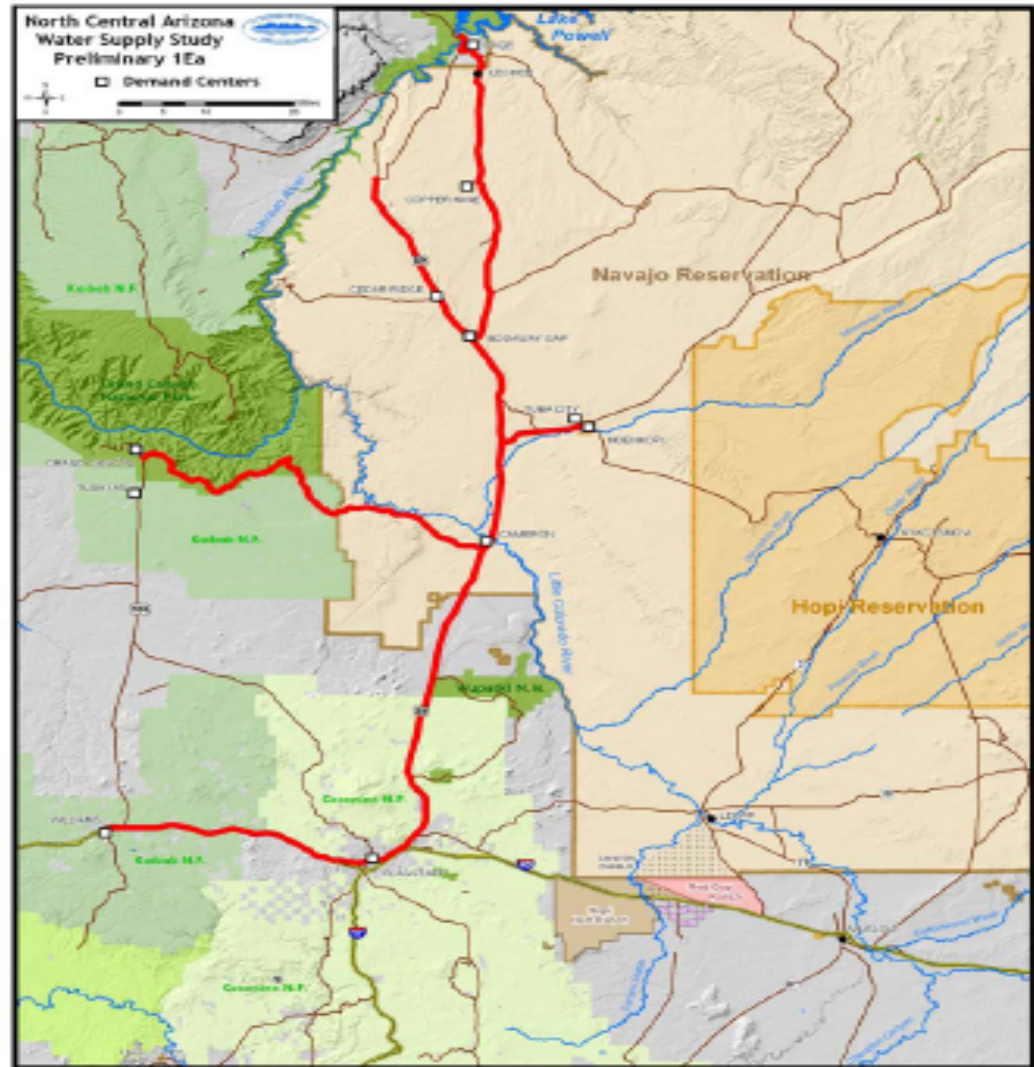
***Surface  
Water Lake  
Powell  
Pipeline to  
Grand  
Canyon via  
Flagstaff  
and  
Williams  
(Hopi/Navajo/  
Flagstaff/Williams/  
Grand Canyon  
Demand Centers)***



RECLAMATION

***Surface Water***  
**Lake Powell**  
**Pipeline to**  
**Grand**  
**Canyon via**  
**Spur from**  
**Cameron and**  
**to Williams**  
**via spur**  
**through**  
**Flagstaff**  
(Hopi/Navajo/  
Flagstaff/Williams/  
Grand Canyon  
Demand Centers)

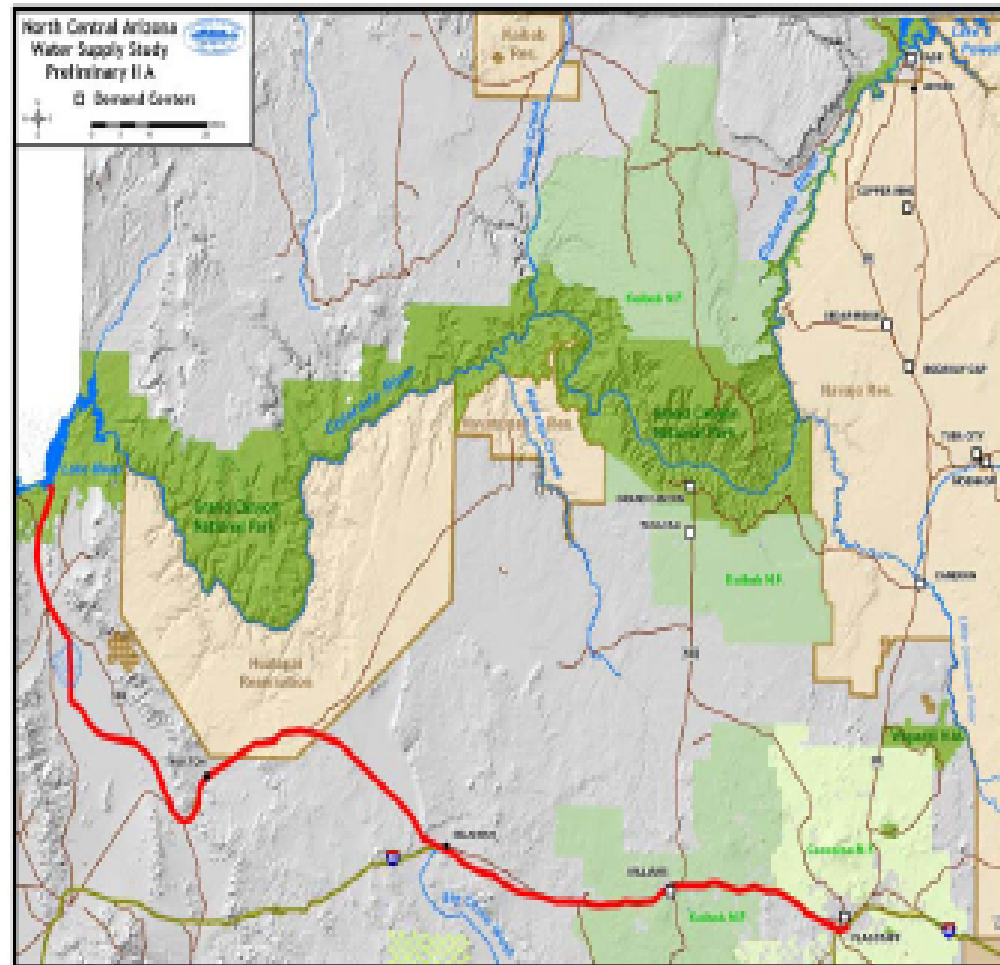
1.E Lake Powell Pipeline to Grand Canyon via spur from Cameron and to Williams via spur through Flagstaff



RECLAMATION

# *Surface Water* Lake Mead Pipeline to Williams and Flagstaff (Flagstaff/Williams Demand Centers)

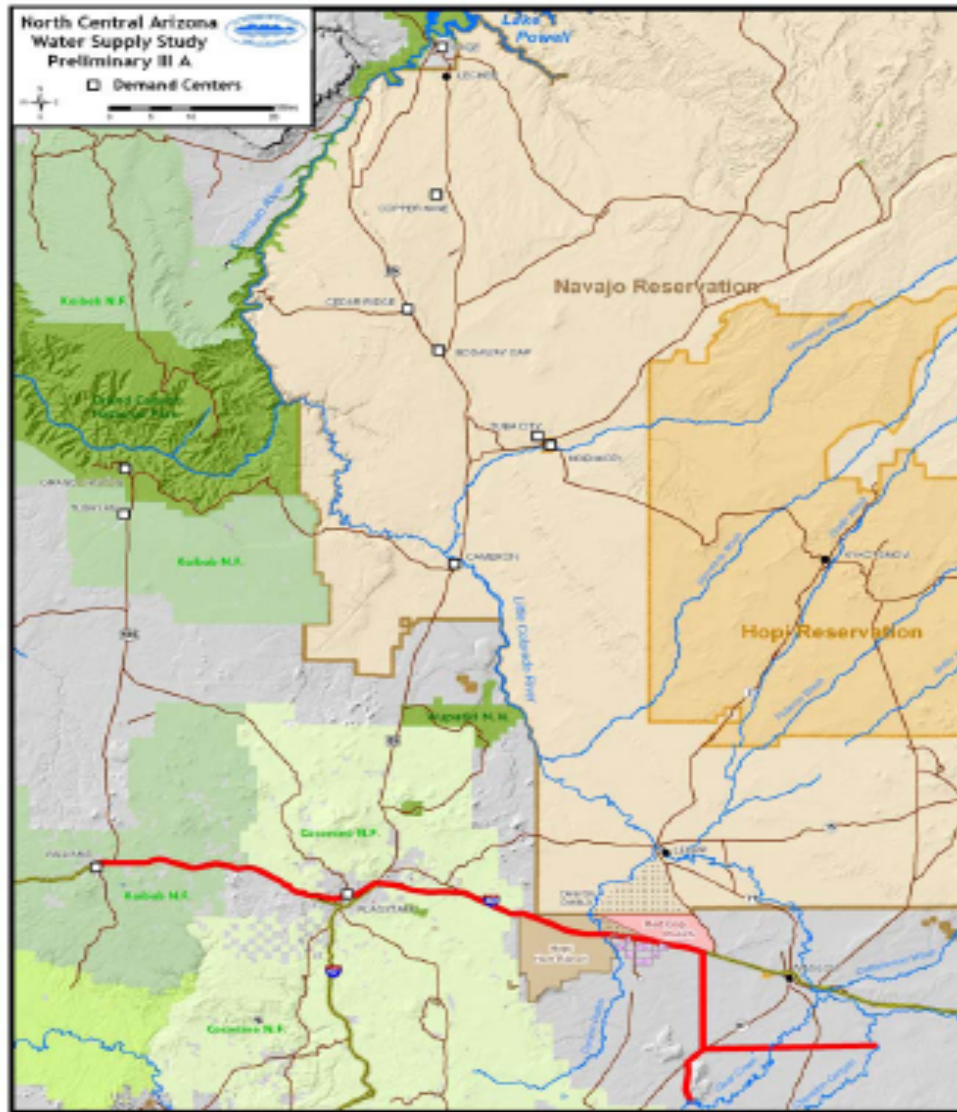
II.A Lake Mead Pipeline to Williams and Flagstaff



RECLAMATION



### III.A Mogollon Rim Tributaries to Williams and Flagstaff

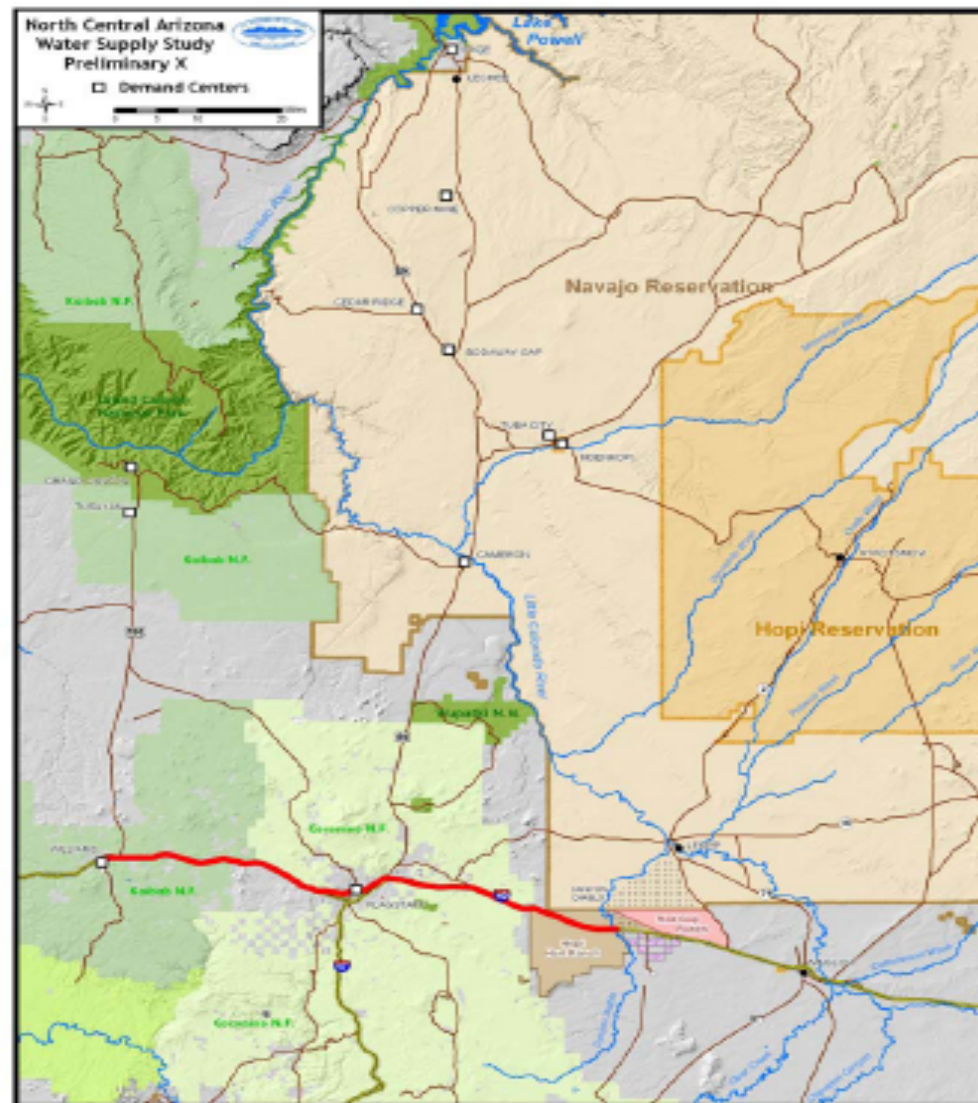


*Surface Water*  
**Mogollon Rim**  
**Tributaries to**  
**Williams and**  
**Flagstaff**  
(Flagstaff/Williams  
Demand Centers)

RECLAMATION

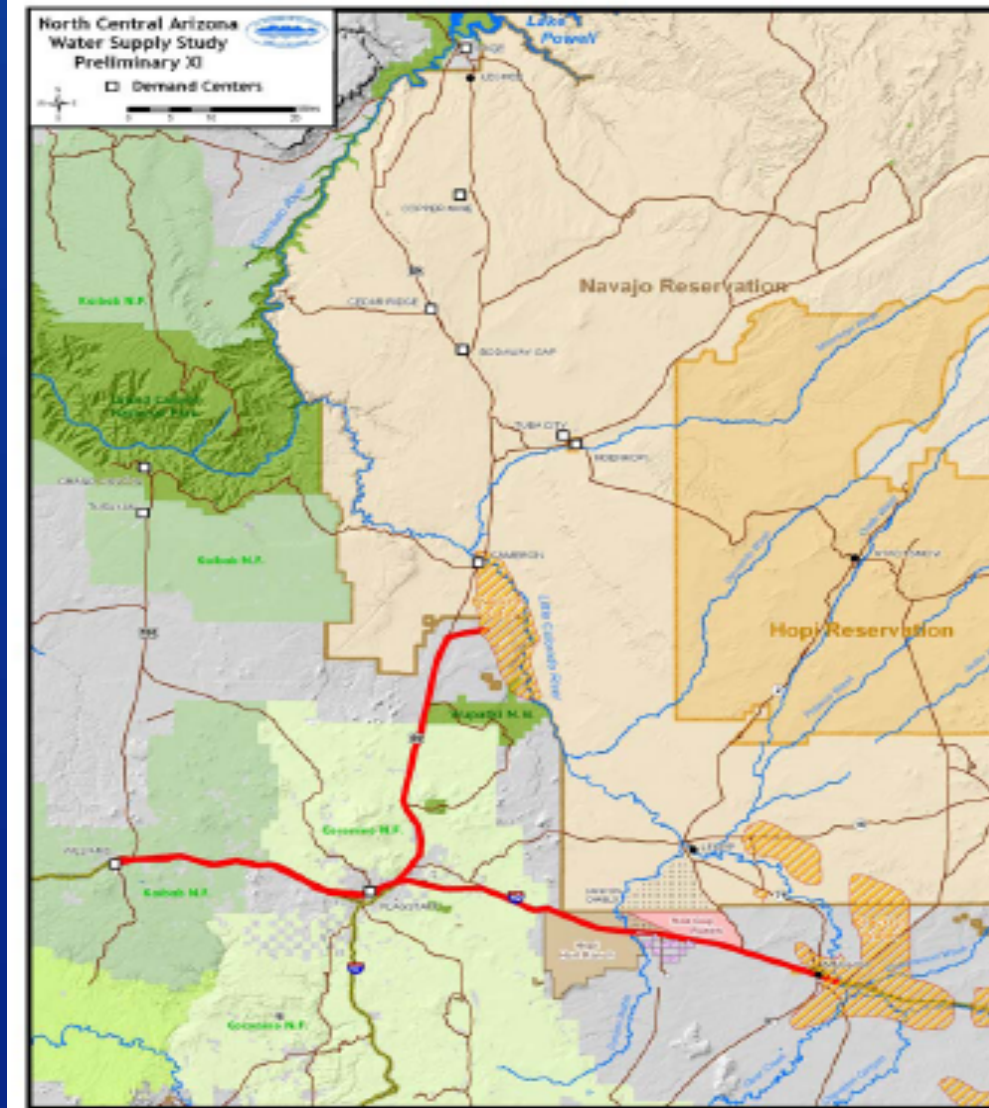
***Ground Water***  
**C-Aquifer**  
**Source to**  
**Williams and**  
**Flagstaff**  
(Flagstaff/Williams  
Demand Centers)

X. C-Aquifer Source to Williams and Flagstaff



RECLAMATION

XI. Impaired C-Aquifer Source to Williams and Flagstaff



*Ground Water*  
**Impaired C-  
Aquifer  
Source to  
Williams and  
Flagstaff**

RECLAMATION



# Initial Filtering of Source Alternatives

- Further evaluation of the use of low quality C-aquifer source was not considered at this time because of the substantially higher projected cost in relation to higher quality alternative sources.
- Further evaluation of the use of Mogollon Rim surface water sources as a supply source for a regional solution were not considered at this time due to the recent developments related to the Arizona Water Settlement Act, making this source uncertain until adjudicated.
- LCR alluvium was dropped from further consideration because of the significantly limited unreliable supply of very low quality water.
- The Yield of C-aquifer was determined to be sufficient to only meet the Flagstaff Demand center.

RECLAMATION



## Alternative 1:

**Hopi/Navajo Demand Center – Supplied via Lake Powell Pipeline**

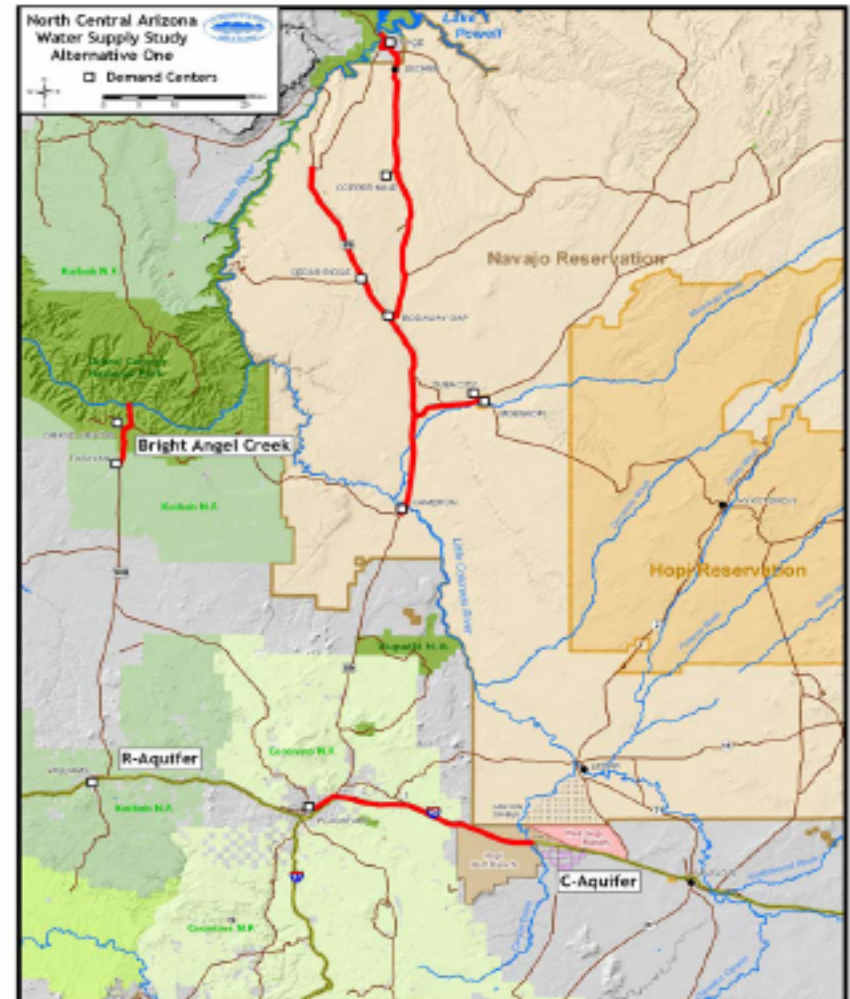
**Flagstaff Demand Center – Supplied via pipeline from C-Aquifer**

**Williams Demand Center – Supplied from local R Aquifer wells**

**Grand Canyon/Tusayan Demand Center – Supplied from Roaring Springs via pipeline diverting Phantom Ranch infiltration gallery**

ALT.1)

Hopi/Navajo Demand Center – Supplied via Lake Powell pipeline  
Flagstaff Demand Center – Supplied via pipeline from C Aquifer pipeline  
Williams Demand Center – Supplied from local R Aquifer wells  
Grand Canyon/Tusayan Demand Center – Supplied from Roaring Springs via pipeline diverting from Phantom Ranch infiltration gallery



RECLAMATION

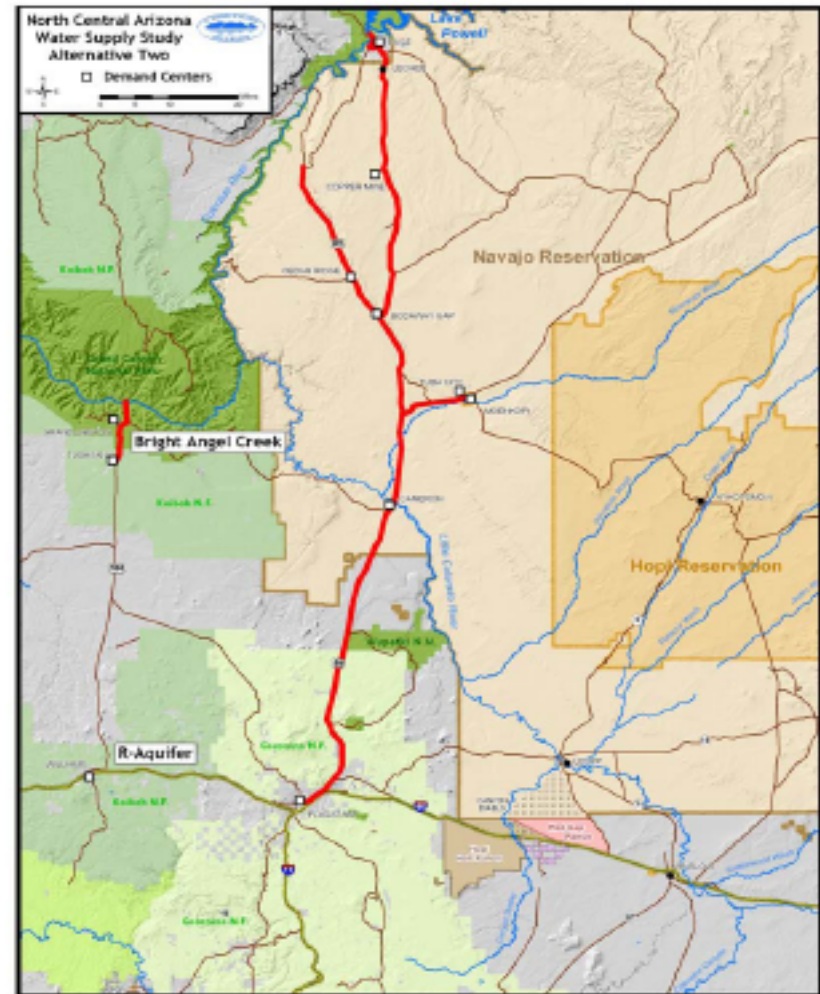
## Alternative 2:

**Hopi/Navajo/Flagstaff  
Demand Centers-  
Supplied via Lake Powell  
pipeline**

**Williams Demand Center-  
Supplied from local R-  
Aquifer wells**

**Grand Canyon/Tusayan  
Demand Centers-  
Supplied from Roaring  
Springs via pipeline  
diverting from Phantom  
Ranch gallery**

ALT.2) Hopi/Navajo/Flagstaff Demand Centers – Supplied via Lake Powell pipeline  
Williams Demand Center – Supplied from local R-aquifer wells  
Grand Canyon/Tusayan Demand Center – Supplied from Roaring Springs via pipeline diverting from Phantom Ranch infiltration gallery



# RECLAMATION

ALT. 3) Hopi/Navajo/Flagstaff/Williams/Grand Canyon/Tusayan Demand Centers –  
Supplied via Lake Powell pipeline<sup>117</sup>



## Alternative 3:

Hopi/Navajo/Flagstaff/  
Williams/Grand  
Canyon/ Tusayan  
Demand Centers –  
Supplied via Lake  
Powell pipeline

# RECLAMATION



## Alternative 4:

Hopi/Navajo Demand Center – Supplied via Lake Powell pipeline

Flagstaff/Williams Demand Center – Supplied by pipeline from R-Aquifer wellfield

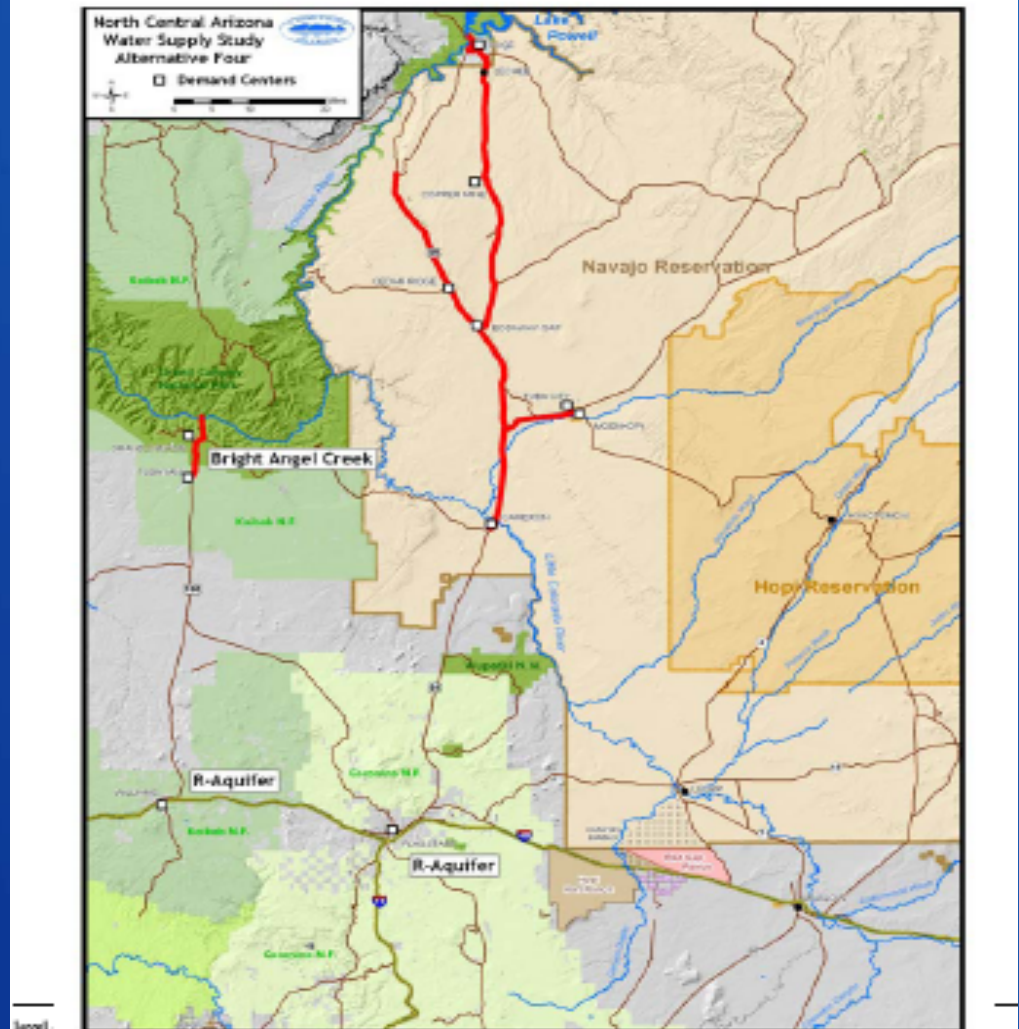
Grand Canyon/Tusayan Demand Centers- Supplied from Roaring Springs via pipeline diverting from Phantom Ranch gallery

ALT. 4)

Hopi/Navajo Demand Center – Supplied via Lake Powell pipeline

Flagstaff/Williams Demand Center – Supplied by pipeline from R. Aquifer well field

Grand Canyon/Tusayan Demand Center – Supplied from Roaring Springs via pipeline diverting from Phantom Ranch infiltration gallery



# RECLAMATION



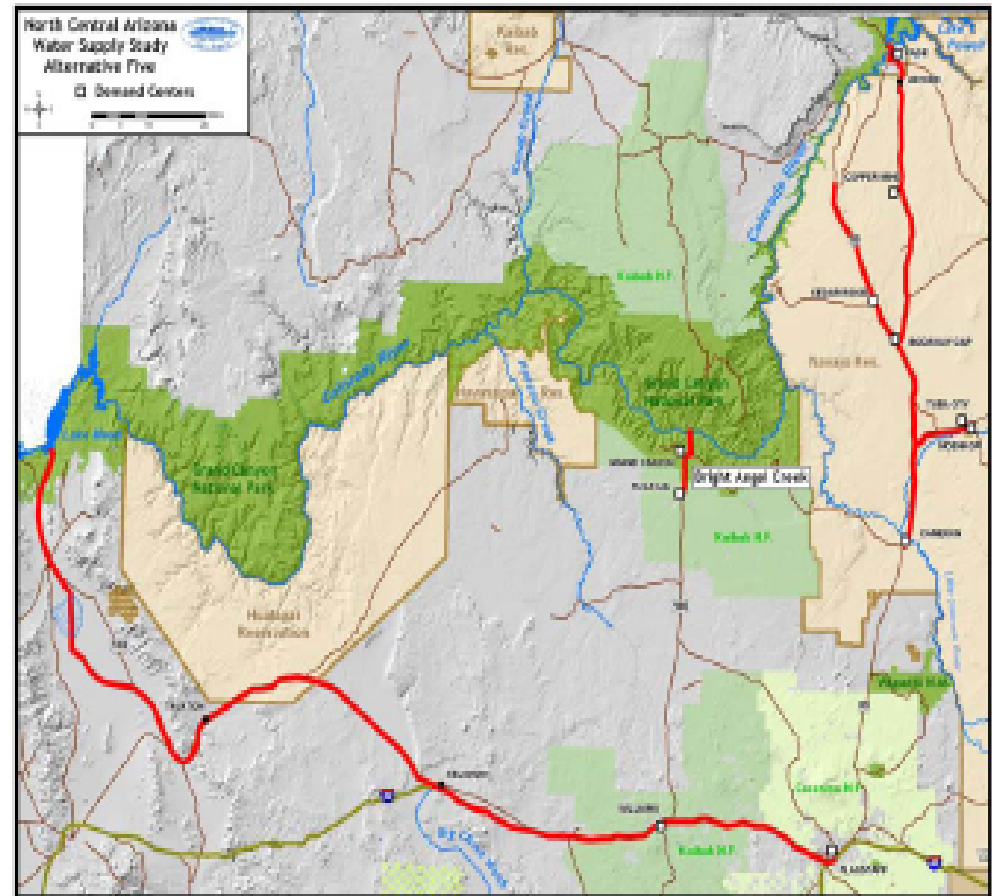
## Alternative 5:

**Hopi/Navajo Demand Centers – Supplied via Lake Powell Pipeline**

**Flagstaff/Williams Demand Center – Supplied by pipeline from Lake Mead**

**Grand Canyon/Tusayan Demand Centers- Supplied from Roaring Springs via pipeline diverting from Phantom Ranch infiltration gallery**

ALT. 5)  
Hopi/Navajo Demand Centers – Supplied via Lake Powell pipeline  
Flagstaff/Williams Demand Center – Supplied by pipeline from Lake Mead  
Grand Canyon/Tusayan Demand Center – Supplied from Roaring Springs via pipeline diverting from Phantom Ranch infiltration gallery



RECLAMATION

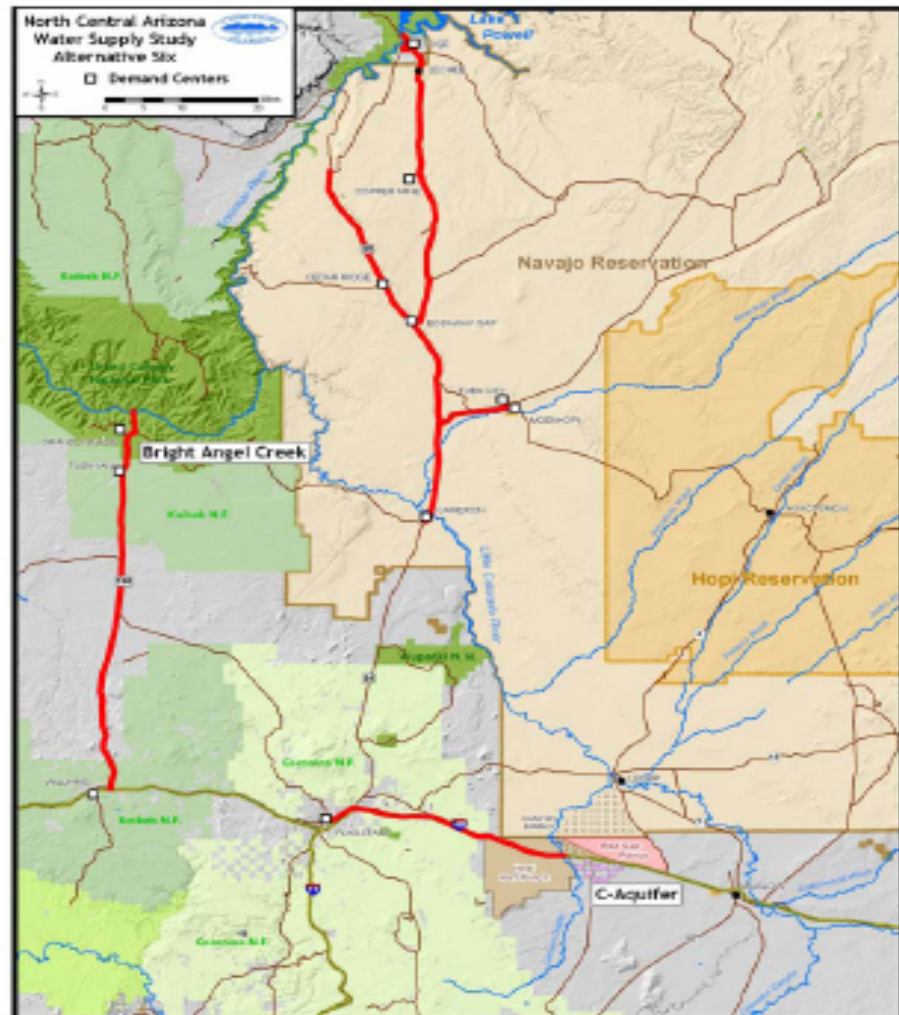
## Alternative 6:

Hopi/Navajo Demand Center – Supplied via Lake Powell Pipeline

Flagstaff Demand Center – Supplied via pipeline from C-Aquifer

Williams/Grand Canyon/ Tusayan Demand Centers – Supplied from Roaring Springs via pipeline diverting from Phantom Ranch gallery

ALT. 6)  
Hopi/Navajo Demand Centers – Supplied via Lake Powell pipeline  
Flagstaff Demand Center – Supplied via pipeline from C Aquifer pipeline  
Williams/Grand Canyon/Tusayan Demand Centers – Supplied from Roaring Springs via pipeline diverting from Phantom Ranch infiltration gallery



# RECLAMATION

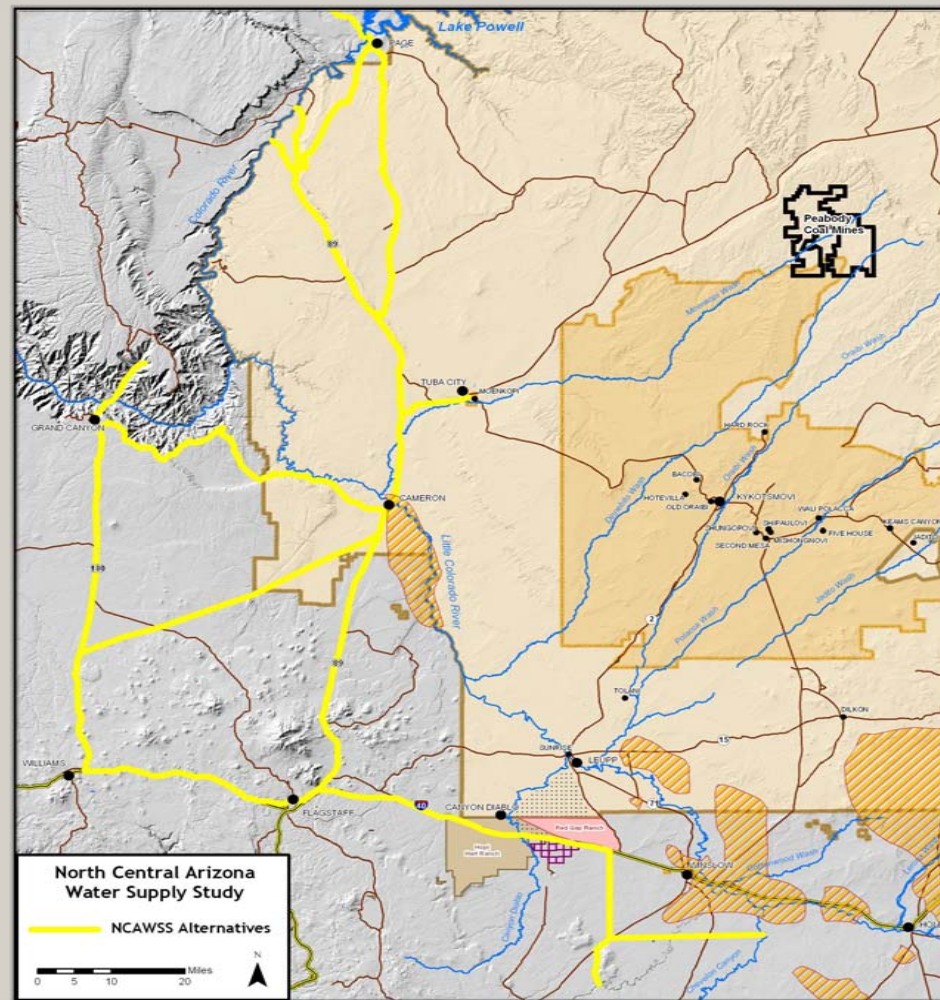
# The Alternatives were Evaluated for:

**Completeness** – a Project that includes all the necessary parts and actions to produce the desired results.

**Effectiveness** – the extent to which a Project solves the stated problem and meets the goals and objectives of the WAC.

**Efficiency** - a Project that minimizes cost and is cost effective.

**Acceptability** - an acceptable Project to all decision makers and the public and is compatible with existing laws, regulations and public policies.



# RECLAMATION



# Results of Evaluation

- Alternative 5 was flawed by its exceptionally high cost compared to the other alternatives and therefore failed the efficiency test.
- For Alternative 6 a significant completeness issue was identified. While it was theorized that sufficient water was potentially present from Roaring Springs to meet Williams demand, GCNP has no statutory authority to provide water to Williams. This was the only feature that distinguished alternative 1 from Alternative 6 and therefore it was dropped from further consideration at this time.
- Alternative 4 was dropped from further consideration at this time due to the large uncertainties associated with the yields of the R-aquifer well fields. This was the only feature that distinguished alternative 4 from alternative 2.

RECLAMATION



# North Central Arizona Water Supply Study

## Important Points

- Not a part of water rights negotiations.
- Does not result in a commitment of the United States to fund any subsequent level of investigation or construction.
- Assumptions found in the record and adopted in this study are not necessarily assumed in the water rights negotiations.
- Stakeholders must seek Congressional Support for further study.

RECLAMATION

# Feasibility

- The TAC has recommended that an EIS be completed as part of the Feasibility Evaluation
- The emphasis will be on the components of alternatives 1 thru three, but all alternatives will be reevaluated during the Feasibility Study and may be elevated in status.
- Expansion of the study area to include other demand centers such as Hopi Villages can also happen during the Feasibility Study.

RECLAMATION