AMENDED
~~JOINT WORK SESSION~~ SPECIAL MEETING WITH
CITY COUNCIL AND WATER COMMISSION

SPECIAL MEETING ~~JOINT WORK SESSION~~
~~TUESDAY~~ THURSDAY
OCTOBER 23, 2025

COUNCIL CHAMBERS
211 WEST ASPEN AVENUE
3:30 P.M.

All City Council Meetings are live streamed on the city's YouTube page
(https://www.youtube.com/@FlagstaffCityGovernment)

PUBLIC COMMENT

Verbal public comments not related to items appearing on the posted agenda may be provided during the "Open Call to the Public" at the beginning and end of the meeting and may only be provided in person.

Verbal public comments related to items appearing on the posted agenda may be given in person or online and will be taken at the time the item is discussed.

To provide online verbal comment on an item that appears on the posted agenda, use the link below.

ONLINE VERBAL PUBLIC COMMENT

Written comments may be submitted to publiccomment@flagstaffaz.gov. All comments submitted via email will be considered written comments and will be documented in the record as such.

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1. **Call to Order**

NOTICE OF OPTION TO RECESS INTO EXECUTIVE SESSION

Pursuant to A.R.S. §38-431.02, notice is hereby given to the members of the City Council and to the general public that, at this special meeting, the City Council may vote to go into executive session, which will not be open to the public, for discussion and consultation with the City's attorneys for legal advice on any item listed on the following agenda, pursuant to A.R.S. §38-431.03(A)(3).

2. **Roll Call**

NOTE: One or more Councilmembers may be in attendance through other technological means.

CITY COUNCIL:
MAYOR DAGGETT
VICE MAYOR SWEET
COUNCILMEMBER ASLAN
COUNCILMEMBER GARCIA
COUNCILMEMBER HOUSE
COUNCILMEMBER MATTHEWS
COUNCILMEMBER SPENCE

WATER COMMISSION:
CHAIR RON DOBA
VICE CHAIR DONALD BILLS
COMMISSIONER MATTHEW GARCIA
COMMISSIONER JOHN NAUMAN
COMMISSIONER HALEY PAUL
COMMISSIONER IAN SHARP
COMMISSIONER ROBERT VANE
COMMISSIONER KARIN WADSACK

3. **Pledge of Allegiance, Mission Statement, and Land Acknowledgement**

MISSION STATEMENT

The mission of the City of Flagstaff is to protect and enhance the quality of life for all.

LAND ACKNOWLEDGEMENT

The Flagstaff City Council humbly acknowledges the ancestral homelands of this area's Indigenous nations and original stewards. These lands, still inhabited by Native descendants, border mountains sacred to Indigenous peoples. We honor them, their legacies, their traditions, and their continued contributions. We celebrate their past, present, and future generations who will forever know this place as home.

4. **Exploring a Regional Water Supply for Flagstaff and Partners: Presentation by the U.S. Bureau of Reclamation (BOR)**

STAFF RECOMMENDED ACTION:

Discussion ~~only~~ and possible action.

5. **Informational Items To/From Mayor, Council, and City Manager; future agenda item requests**

6. **Adjournment**

CERTIFICATE OF POSTING OF NOTICE

The undersigned hereby certifies that a copy of the foregoing notice was duly posted at Flagstaff City Hall on _____, at _____ a.m./p.m. in accordance with the statement filed by the City Council with the City Clerk.

Dated this _____ day of _____, 2025.

_____
Stacy Saltzburg, MMC, City Clerk

THE CITY OF FLAGSTAFF ENDEAVORS TO MAKE ALL PUBLIC MEETINGS ACCESSIBLE TO PERSONS WITH DISABILITIES. With 48-hour advance notice, reasonable accommodations will be made upon request for persons with disabilities or non-English speaking residents. Please call the City Clerk (928) 213-2076 or email at stacy.saltzburg@flagstaffaz.gov to request an accommodation to participate in this public meeting.

NOTICE TO PARENTS AND LEGAL GUARDIANS: Parents and legal guardians have the right to consent before the City of Flagstaff makes a video or voice recording of a minor child, pursuant to A.R.S. § 1-602(A)(9). The Flagstaff City Council meetings are live-streamed and recorded and may be viewed on the City of Flagstaff's website. If you permit your child to attend/participate in a televised Council meeting, a recording will be made. You may exercise your right not to consent by not allowing your child to attend/participate in the meeting.

CITY OF FLAGSTAFF

STAFF SUMMARY REPORT

To: The Honorable Mayor and Council

From: Erin Young, Water Services Section Director - Water Resource Management

Co-Submitter: Lee Williams

Date: 10/08/2025

Meeting Date: 10/23/2025

TITLE

Exploring a Regional Water Supply for Flagstaff and Partners: Presentation by the U.S. Bureau of Reclamation (BOR)

STAFF RECOMMENDED ACTION:

Discussion ~~only~~ and possible action.

Executive Summary:

There are many advantages to the City and regional water users to participate in the U.S. Bureau of Reclamation's (BOR) facilitated federal water resource planning process. The investigations are federally funded with cost-share by participants. If there is a determination by BOR in an Appraisal Level study that there is a federal objective, such as a federal trust responsibility, it would enable additional opportunities for further Regional Project analysis and project funding. For example, partnering with regional stakeholders in a federal planning process can identify and establish economies of scale to distribute capital repayment, operation, maintenance and replacement costs, compliance with applicable laws, federal assistance, and provide for associated water management.

The City's most recent water demand analysis in 2025 concluded that the shortfall was estimated to range between 9,100 AFY to upwards of 12,000 AFY while incorporating resiliency and redundancy into the analysis. The City's current surface water system is highly drought sensitive, and water production yields within the City's existing groundwater wellfields are declining. The City is at 98% risk of wildfire of cities nationwide (wildfirerisk.org), and 76% of the City's drinking water infrastructure is sourced from forested terrain. Resiliency and redundancy in water resources, as well as securing water to meet the community's build-out water demands, are the primary drivers for exploring water security solutions.

In response to a request for technical assistance from the City to develop water supplies, BOR engaged with Flagstaff and the Navajo Nation in a federal Value Planning Study in July, 2025. The Value Planning study was conducted through participation in a week-long workshop by technical staff from the City's Water Services and Sustainability divisions and consultants, as well as staff from the Navajo Nation. Reclamation's Value Planning process incorporates decades of regional investigations that were used to identify alternatives and the most appropriate and highest-value solutions for participating partners. The BOR's Value Planning study is not a decision-making document, but is designed to identify next steps and alternatives to be evaluated during a larger Appraisal Level study that engages stakeholders and the public.

Information:

The City has made significant investments and conducted numerous investigations to evaluate and manage existing water supplies and plan for future needs. Water conservation and reuse alone are not enough to meet future needs and do not address water resiliency and redundancy factors.

The City's existing water supplies are at risk due to climate variability, wildfires, water resiliency and water security reasons. The extended drought and local wildfires have severely impacted Flagstaff's ability to rely on local surface water supplies to meet existing demands. Yields in existing groundwater wells are declining.

Most of the City's water supply is imported using infrastructure at high risk to catastrophic wildfires and supply interruptions. In 2010 and again in 2022 this became a reality for Flagstaff when fires damaged a portion of Flagstaff's water supply, rendering it inaccessible until the waterline could be repaired. Simply stated, the City and region are one wildfire away from needing the Regional Project online today.

Purchased in 2005 in response to drought and water supply uncertainty, the City's Red Gap Ranch property included two water production wells and approximately 8,500 acres of deeded land checkerboarded with approximately 15,000 acres of grazing lands leased from the Arizona State Lands Department (ASLD). Red Gap Ranch is located approximately 40 miles east of Flagstaff at an elevation that is approximately 2,000-feet lower than the City. In 2011, the City drilled 10 additional municipal wells at Red Gap Ranch for a future water supply. Extensive City, federal, tribal and private groundwater investigations have confirmed the Red Gap Ranch as a suitable regional water supply source in both quantity and quality.

Participation in the BOR water resource planning process does not impede the City in developing additional local water resources. The federal planning process provides opportunities for the City, the Navajo Nation and other regional stakeholders to participate in a comprehensive federally funded water resource investigation. The federal planning process will evaluate federal objectives and address regional water management issues, including but not limited to an analysis of economics, environmental impacts and associated technical evaluations required to develop a preferred regional water supply project plan.

Attachments: Presentation
BOR Presentation
Water History
Regional Water Supply for Flagstaff and Partners

Regional Water Supply Planning & Work with Bureau of Reclamation

City of Flagstaff Water Services

October 23, 2025

TEAM FLAGSTAFF

WE MAKE THE CITY BETTER

Purchase of Red Gap Ranch

Citizens approve Future Water Supply Bond Election

Due to multi-years of drought and impacts to Flagstaff's water supplies, a $15 million Bond was approved by 71% of voters in 2004

- Purpose to acquire and/or develop property or water rights

THE ARIZONA REPUBLIC

azcentral.com

FRIDAY, APRIL 6, 20

4 effects of climate change

DROUGHT AND HEAT

Higher temperatures change oceanic conditions, leading to more intense droughts. Changes also can worsen the Valley's heat island effect and speed us closer to the first 100-degree overnight low.

TRANSPORTATION

Big tax hike for roads argued

By Matthew Benson
THE ARIZONA REPUBLIC

Three years after Maricopa County voters OK'd a 20-year, $14 billion tax extension for road projects, another even bigger transportation tax hike is in the works.

This time, though, the scope would be statewide and the dollar figures po tentially several times larger.

Details are few at this point, with the project list and funding mix yet to be determined. But discussions have begun among key players in the busi ness community, Legislature and Gov ernor's Office. A package could be headed to the state ballot as quickly a next year, with supporters eyeing a spring special election or the Novem ber general election.

"We've never had a comprehensive statewide plan," said Martin Shultz an Arizona Public Service lobbyist an member of the coalition leading th

Southwest could become Dust Bowl, study warns

By Shaun McKinnon
THE ARIZONA REPUBLIC

Rising temperatures will fuel longer and more intense droughts across Arizona and the Southwest, according to a new climate- that the state's 12-year-old tional scientists. That report, set for release this morning in Bel gium, charts a litany of ecologic and economic threats posed by manmade greenhouse gases and concludes that, in many areas, the threats have now become real.

Near-term fire outlook

State predicts an average to above-average 10-week wildfire season.
Valley & State, B1

Purchase of Red Gap Ranch

City Council authorized the purchase of Red Gap Ranch for $7.9M for its water supply in 2005

Two Municipal-Sized Wells

Hydrological Studies & Groundwater Modeling

8,500 deeded acres +

15,000 acres State land

Total = 23,500 acres

City Investment & Due Diligence

Investment Highlights at Red Gap Ranch:

- 2005 City purchases RGR with two municipal-sized production wells, numerous monitoring and ranch wells and hydrologic studies ($7.9M)
- 2009 Jacobs Phase I alignment alternatives report and community meetings
- 2011 City drills 10 municipal-sized wells in C-aquifer
- 2013 City received Designation of Adequate Water Supply from ADWR that includes 16,500 AFY of water from Red Gap Ranch to meet future demands >20 years
- 2015 City receives $300,000 grant from BOR to complete groundwater pumping analysis with Navajo Nation & cultural and biological surveys on the RGR
- 2016 Agreement with ADOT for pipeline in I-40 right-of-way
- 2025 Jacobs Phase II regional pipeline feasibility study report
- 2025 City receives commitment from BOR to develop an appraisal study scope of work

Water Planning Evaluations

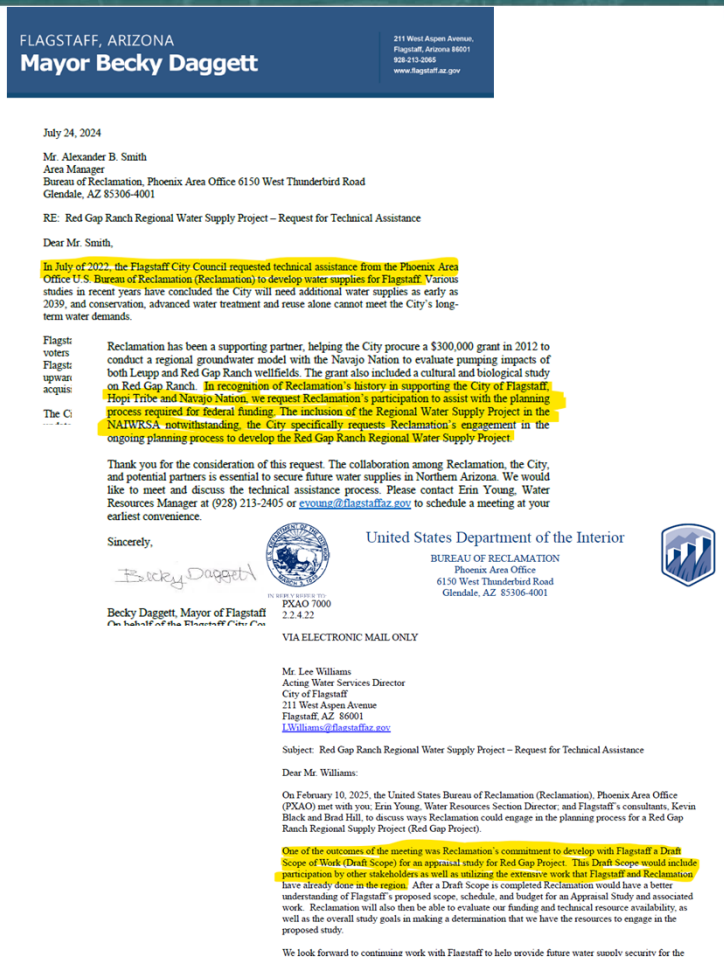
City of Flagstaff Planning

- Estimated Flagstaff's future water needs based upon population projections and land-use / zoning-based projections = ***~9,100 AF to 12,000 AF annual deficit*** at buildout

- Decades of evaluations on how to solve future water supply shortfalls
  - Flagstaff investigating and augmenting water supplies since 1919
  - Utilities Integrated Master Planning and updates since 2011
  - Comprehensive study of Red Gap Ranch - Jacobs Feasibility Phase I report (2009)
  - Water Supply Alternatives (Carollo Engineering, 2017)
  - Advanced Water Reclamation Feasibility Study (Brown & Caldwell, 2018)
  - Water Conservation Strategic Plan (Maddaus, 2020)
  - Reclaimed Water Master Plan (Brown & Caldwell, 2021)
  - Red Gap Ranch – Jacobs Feasibility Phase 2 report (2025)
  - Resiliency & Redundancy – (Arizona Water Buffalo, LLC (2025)

Timeline and Today's Presentation

1. Mayor Daggett requested technical assistance from the Bureau of Reclamation (BOR) on July 24, 2024
2. Governor Hobbs and Senator Kelly send letters to BOR Commissioner supporting Appraisal Study for regional project at RGR
3. BOR responded to Director Lee Williams March 3, 2025
4. Flagstaff prepared a Guidance Document April 18, 2025
5. Appraisal Study is consistent with NAIWRSA but not part of NAIWRSA
6. Value Planning jumpstarts Appraisal Study
7. No decisions tonight – seeking input



FLAGSTAFF, ARIZONA
Mayor Becky Daggett

211 West Aspen Avenue, Flagstaff, Arizona 86001
928-213-2065
www.flagstaff.az.gov

July 24, 2024

Mr. Alexander B. Smith
Area Manager
Bureau of Reclamation, Phoenix Area Office 6150 West Thunderbird Road
Glendale, AZ 85306-4001

RE: Red Gap Ranch Regional Water Supply Project – Request for Technical Assistance

Dear Mr. Smith,

In July of 2022, the Flagstaff City Council requested technical assistance from the Phoenix Area Office U.S. Bureau of Reclamation (Reclamation) to develop water supplies for Flagstaff. Various studies in recent years have concluded the City will need additional water supplies as early as 2039, and conservation, advanced water treatment and reuse alone cannot meet the City's long-term water demands.

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Reclamation has been a supporting partner, helping the City procure a $300,000 grant in 2012 to conduct a regional groundwater model with the Navajo Nation to evaluate pumping impacts of both Leupp and Red Gap Ranch wellfields. The grant also included a cultural and biological study on Red Gap Ranch. In recognition of Reclamation's history in supporting the City of Flagstaff, Hopi Tribe and Navajo Nation, we request Reclamation's participation to assist with the planning process required for federal funding. The inclusion of the Regional Water Supply Project in the NAIWRSA notwithstanding, the City specifically requests Reclamation's engagement in the ongoing planning process to develop the Red Gap Ranch Regional Water Supply Project.

Thank you for the consideration of this request. The collaboration among Reclamation, the City, and potential partners is essential to secure future water supplies in Northern Arizona. We would like to meet and discuss the technical assistance process. Please contact Erin Young, Water Resources Manager at (928) 213-2405 or eyoung@flagstaffaz.gov to schedule a meeting at your earliest convenience.

Sincerely,

Becky Daggett

Becky Daggett, Mayor of Flagstaff

United States Department of the Interior
BUREAU OF RECLAMATION
Phoenix Area Office
6150 West Thunderbird Road
Glendale, AZ 85306-4001

IN REPLY REFER TO:
PXAO 7000
2.2.4.22

VIA ELECTRONIC MAIL ONLY

Mr. Lee Williams
Acting Water Services Director
City of Flagstaff
211 West Aspen Avenue
Flagstaff, AZ 86001
LWilliams@flagstaffaz.gov

Subject: Red Gap Ranch Regional Water Supply Project – Request for Technical Assistance

Dear Mr. Williams:

On February 10, 2025, the United States Bureau of Reclamation (Reclamation), Phoenix Area Office (PXAO) met with you; Erin Young, Water Resources Section Director; and Flagstaff's consultants, Kevin Black and Brad Hill, to discuss ways Reclamation could engage in the planning process for a Red Gap Ranch Regional Supply Project (Red Gap Project).

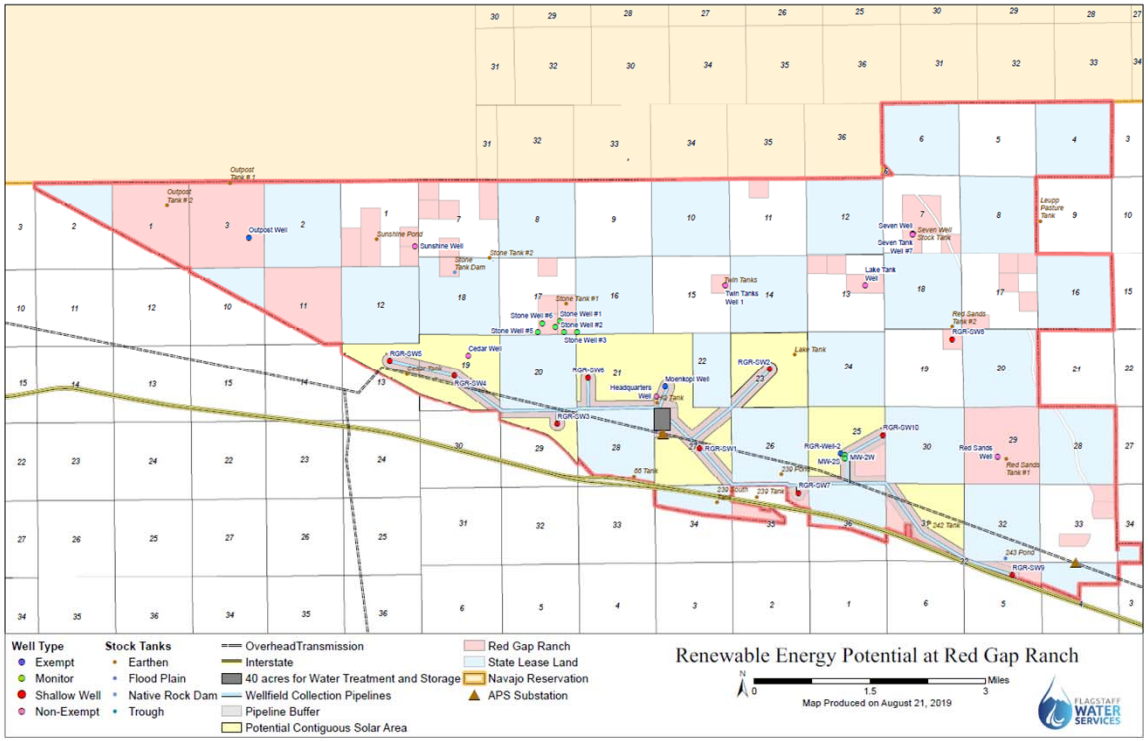
One of the outcomes of the meeting was Reclamation's commitment to develop with Flagstaff a Draft Scope of Work (Draft Scope) for an appraisal study for Red Gap Project. This Draft Scope would include participation by other stakeholders as well as utilizing the extensive work that Flagstaff and Reclamation have already done in the region. After a Draft Scope is completed Reclamation would have a better understanding of Flagstaff's proposed scope, schedule, and budget for an Appraisal Study and associated work. Reclamation will also then be able to evaluate our funding and technical resource availability, as well as the overall study goals in making a determination that we have the resources to engage in the proposed study.

We look forward to continuing work with Flagstaff to help provide future water supply security for the

Power Generation Potential

Red Gap Ranch as a Resource

- City entered agency IGA for virtual renewable power purchases (2025)
- City/APS investigated RGR for solar and wind power potential (2019)
- Possible renewable projects near RGR
  - MOU with Hopi Tribe (2015)
  - Possible Navajo Nation
  - Possible ASLD lands
  - Other developers in the region
- Possible pump-storage power generation
- Appraisal Study will investigate all power options



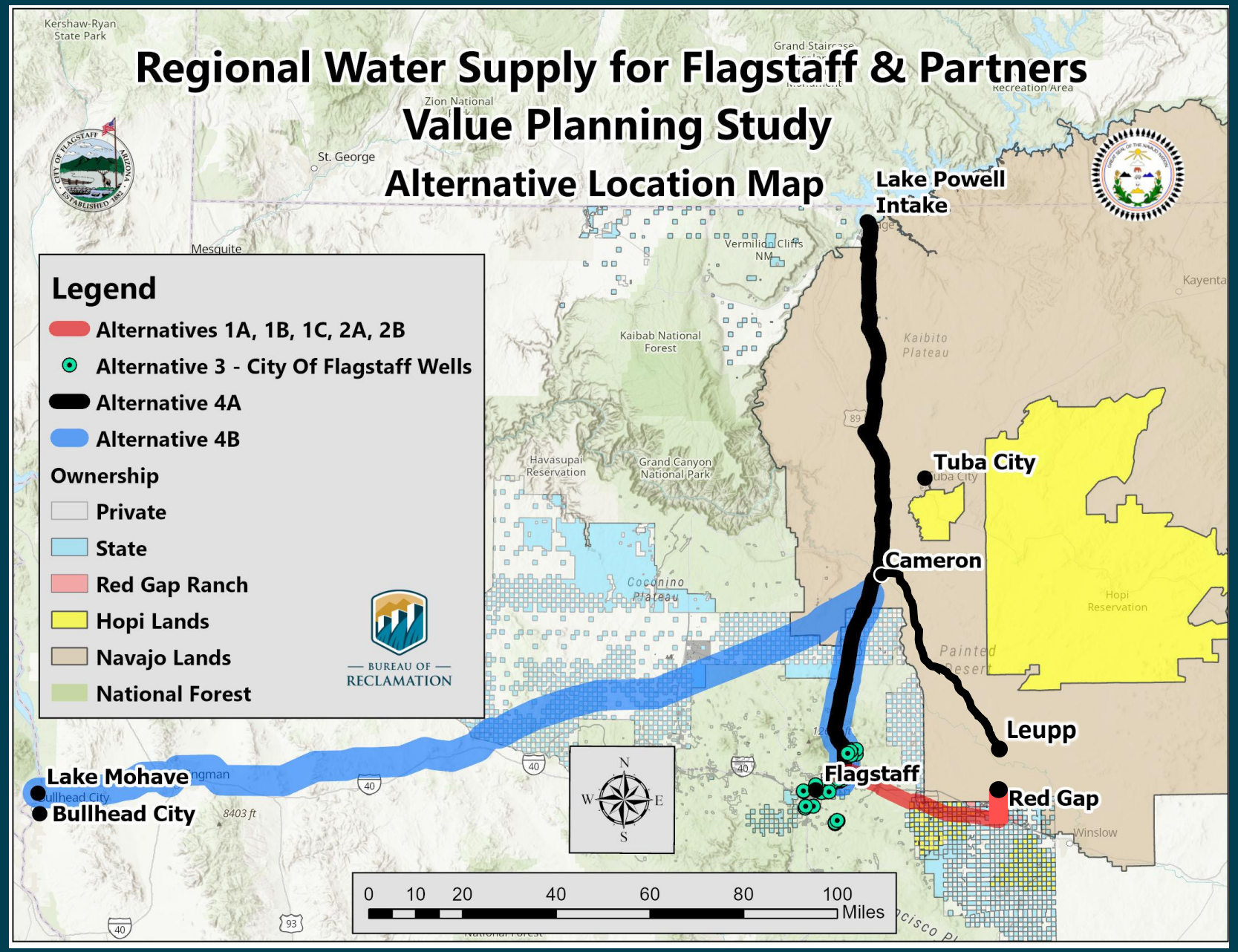
Future Regional Water Supply for Navajo Nation, Flagstaff and Other Users

Value Planning Study Conducted in July 2025

Summary of Findings to Flagstaff City Council and Water Commission

October 23, 2025

Photo by Brad Hill



Water Supply Sources for this Study

Presentation Agenda

- Background
- Reclamation Involvement
- Value Planning Process
  - Phase I: Site Visit
  - Phase II: Workshop
    - Evaluation Criteria
    - Alternative Development
    - Alternative Rankings
  - Phase III: Summary of Findings
    - Presentation
    - Report
- Next Steps

Value Planning Team

Team Members for this Study

Bureau of Reclamation

Del Smith, P.E., Acting DEC Program Manager; Value Program Manager

Valerie Swick, PH, Water Resources Planner

Sara English, Value Program Specialist

Patrick Wright, Physical Scientist, Geographic Applications & Analysis

Miguel Aria-Paic, P.E., Civil Engineer, Water Treatment

Jesse Chadwick, P.G. Engineering Geologist

Nathan Lehman, P.E., Native American Affairs Office

Kylie Pelzer, P.E., Civil Engineer, Water Conveyance

Evi Spilker, Environmental Protection Specialist

John Rasmussen, R.G. Program Development Manager

City of Flagstaff

Miranda Sweet, Vice Mayor of Flagstaff

Lee Williams, Water Services Director

Erin Young, R.G., Water Resources Section Director

Danae Presler, Climate Program Manager

Kevin Black, MBARK Consulting LLC

Brad Hill, R.G., Arizona Water Buffalo LLC

Jeff Miner, P.E., Jacobs Engineering

Doug Smith, P.E., Jacobs Engineering

Navajo Nation

Robert Kirk, Principal Hydrologist

John Leeper, P.E., WSP

Hopi Tribe (Observer)

Neil Blandford, R.G., Daniel B. Stephens & Associates

Background

- Many studies identify a water supply shortfall for Flagstaff and Navajo Nation.
- Flagstaff and Navajo Nation at high risk of catastrophic climate conditions (i.e. wildfire or long-term drought).
- Brackish groundwater is expensive to treat.

Photo: Controlled burn in vicinity of City of Flagstaff well house on USNF lands (Brian Huntzinger, City of Flagstaff Water Services, Water Production Manager)

Background (continued)

Twin Arrows Navajo Casino Resort

- Navajo Nation anticipates significant economic development along I-40 corridor.
- In 2005, Flagstaff purchased Red Gap Ranch (RGR) for future water supply.

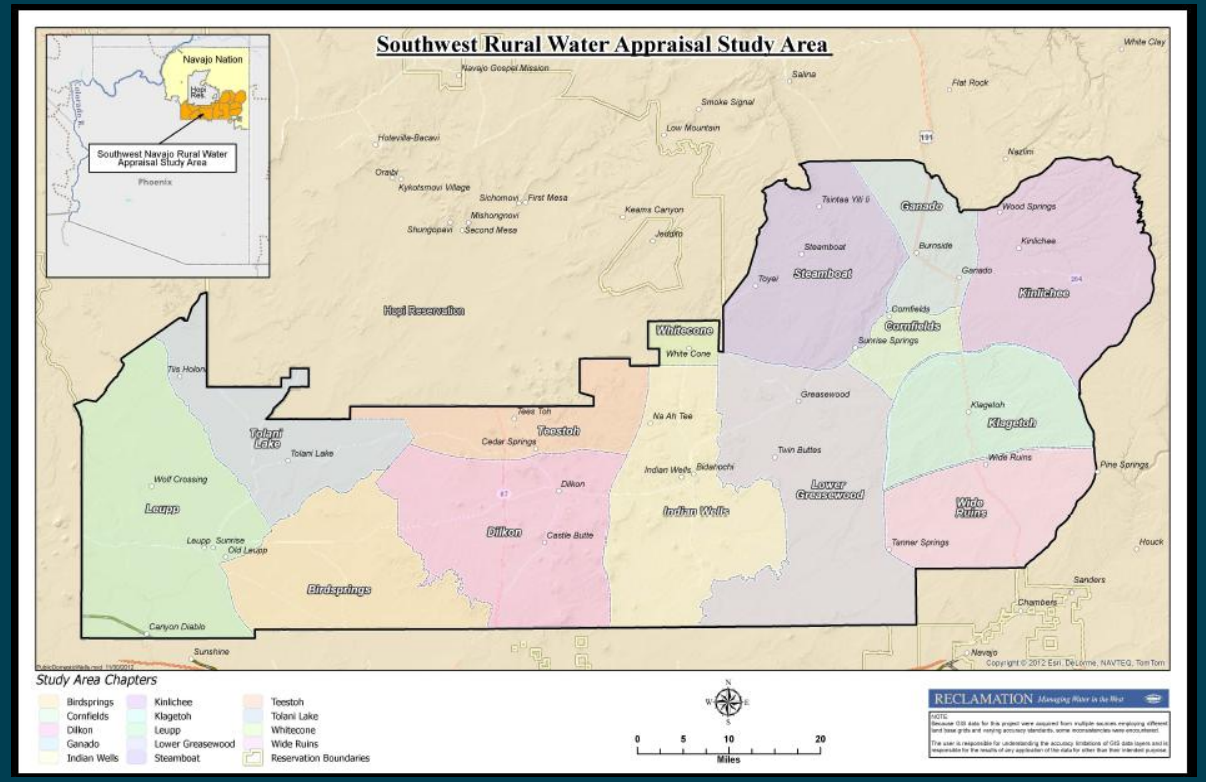
Red Gap Ranch Headquarters Area

Purpose of Analysis "GOAL"

Provide a resilient and redundant regional water supply for sustainable residential and economic development for Flagstaff and portions of the Navajo Nation in Northern Arizona.

Navajo Nation Concerns and Opportunities

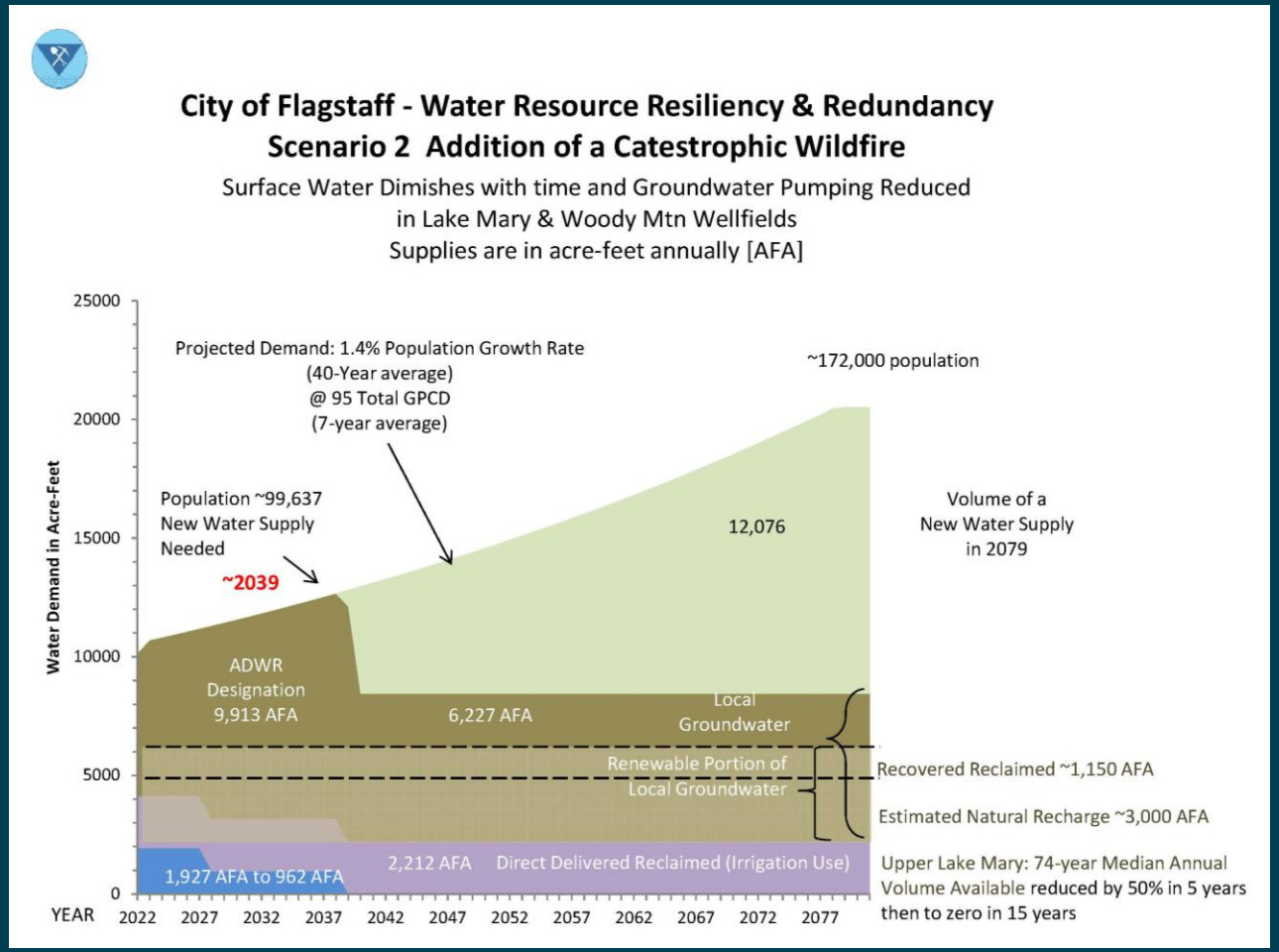
- Potential impact of RGR pumping on water supply and water quality on the Southwest Navajo Rural Water Project (SWNRWP) Service Area.
- Economically supply the SWNRWP and Twin Arrows Area from RGR Municipal Wells.
- Deliver higher water quality into the Navajo Tribal Utility Authority (NTUA) systems.



SWNRWP Service Aea

Flagstaff Concerns

- RGR is necessary to meet build-out water demand modeled at 16,500 AFY
- Flagstaff has a greater likelihood of wildfire than 99% of cities nationwide (Wildfirerisk.org)
  - 76% of Flagstaff's water infrastructure is located on heavily forested US Forest Service land
  - "One Fire Away" from a significant regional water crisis

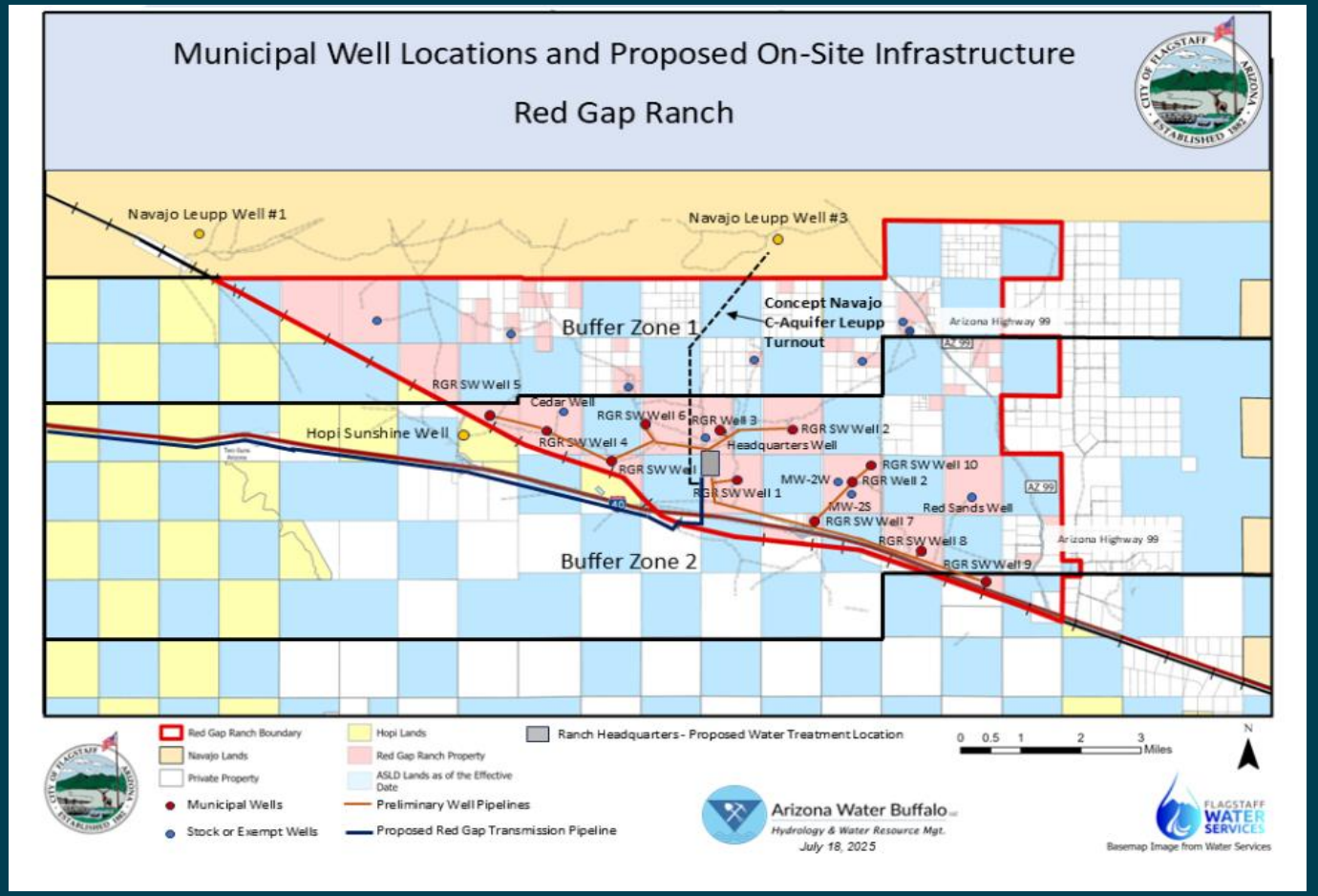


Flagstaff Opportunities

- Collaboration with Navajo Nation, Hopi Tribe and regional stakeholders.
- Supports voter-approved Flagstaff Regional Plan and Coconino County General Plan.
- Supports regional economic development.
- Potential to develop clean energy at RGR and along I-40 corridor.
- Further Flagstaff's commitment to clean energy and energy independence.
- Develop regional project consistent with Northeastern Arizona Indian Water Rights Settlement Agreement (NAIWRSA) (not yet enacted by Congress).

Regional Opportunities at Red Gap Ranch

- Design for a wellfield that utilizes the City's existing Municipal Wells at RGR that are located two or more miles south of the Navajo Reservation.
- Manage and convey water from RGR for Flagstaff and potential use by the Navajo Nation or others.
- Multi-use potential of RGR.



Reclamation Involvement

- Trust responsibilities for Native American tribes.
- In 1998, Arizona Department of Water Resources (ADWR) conducted the North Central Arizona Water Supply Study (NCAWSS), resulting in Reclamation technical assistance for a Phase I report.
- In 2000, Reclamation conducted an appraisal level regional water supply study to look at additional alternatives.
- In 2003, The Hopi Western Navajo Water Supply Study was completed.

Reclamation Involvement

- In 2005, through a Reclamation WaterSMART grant, the Coconino Plateau Watershed Advisory Council (CPWAC) was formed. (*Now called Coconino Plateau Watershed Partnership).*
- In 2005, Reclamation conducted C-Aquifer studies near Leupp to develop a groundwater model.
- In 2006, NCAWSS Report of Findings (Plan of Study) concluded that Federal Objectives and justification exist for a Feasibility Study.
- In 2010, the CPWAC requested funding under Reclamation's Rural Water Supply Program to have Reclamation conduct a Feasibility Study of alternatives.

Reclamation Involvement

- In 2015, the Southwest Navajo Rural Water Project Appraisal Study was completed.
- In 2016, the Rural Water Supply Program expired.
- In 2020, Navajo-Hopi Value Planning Study was completed.
- In 2022 and 2024, Flagstaff approached Reclamation for technical assistance to develop water supplies for Flagstaff.
- In 2025, Reclamation conducted the *Future Water Supply Study for Navajo Nation, Flagstaff and Regional Water Users* Value Planning Study.
- In 2025, Reclamation initiated scoping with Navajo Nation, Flagstaff, and regional stakeholders for the Appraisal Study.

Reclamation's Value Program - Purpose

- Satisfy Public Law, OMB A-131, and DOI Requirements
  - DOI DM 369-1: The ultimate goal is the acquisition of the most functionally effective assets, products, and programs at initial and life-cycle costs that provide best value to the government.
  - Public Law 104-106: improving performance, reliability, quality, safety, and life cycle costs.
- Make good projects better.
- Best use of taxpayer dollars.

Value Analysis (VA)

- A systematic process used by a multidisciplinary team to improve the value of a project, product, or process through the analysis of functions at the lowest overall cost." (Lawrence D. Miles Value Foundation)
- Inject creativity (imagination) into the design process
- Result of Value Analysis is to best balance the needs of the user and client to the cost.

Builds CONSENSUS

Major Benefits

- Super tool for formulating alternatives for a project
- Get projects to go with one or more alternatives
- Often get stakeholder buy-in and management support…

Silver Jack, 1969, Lloyd Lozes Goff

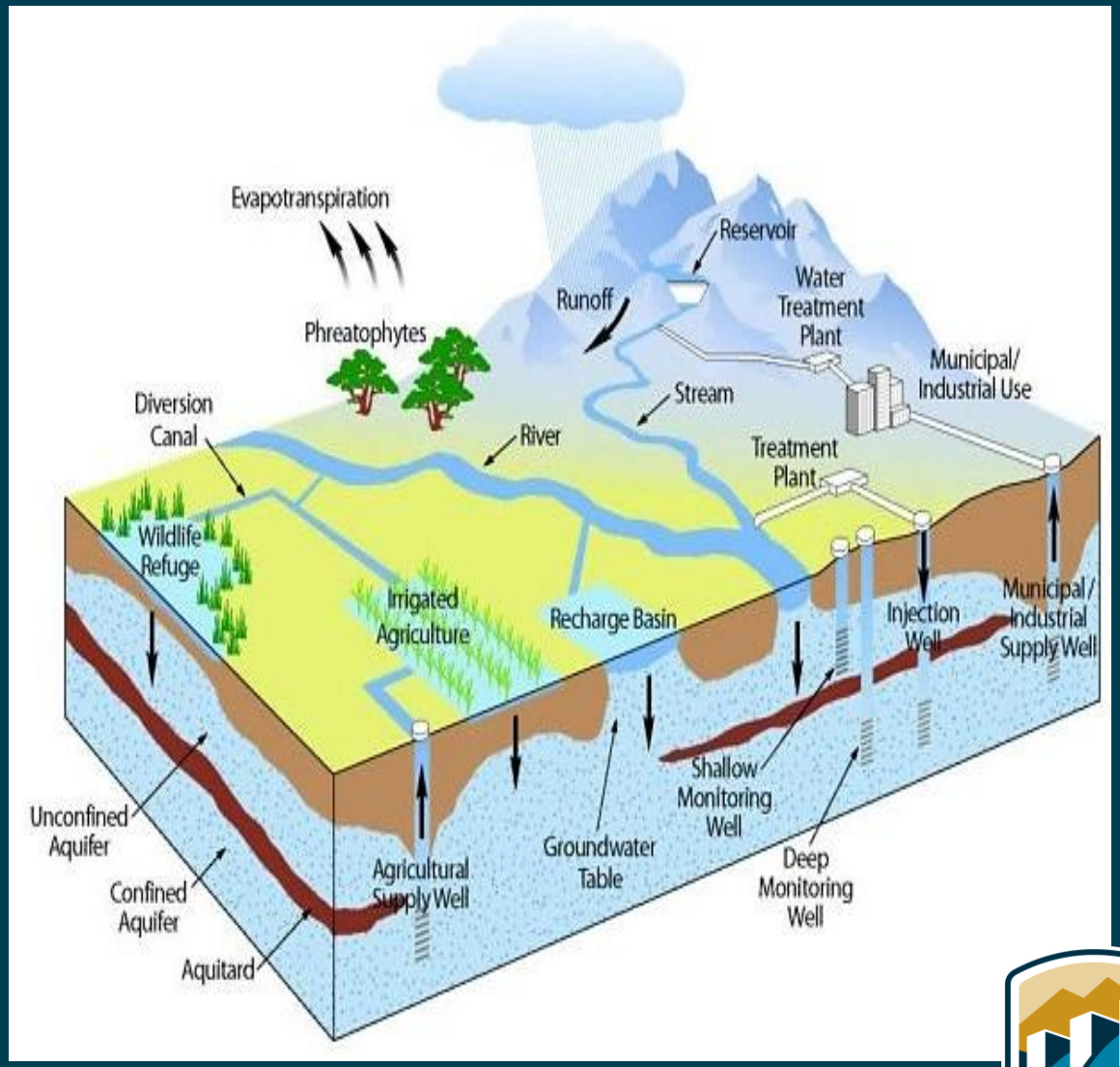
Phase II: Value Study Workshop Job Plan

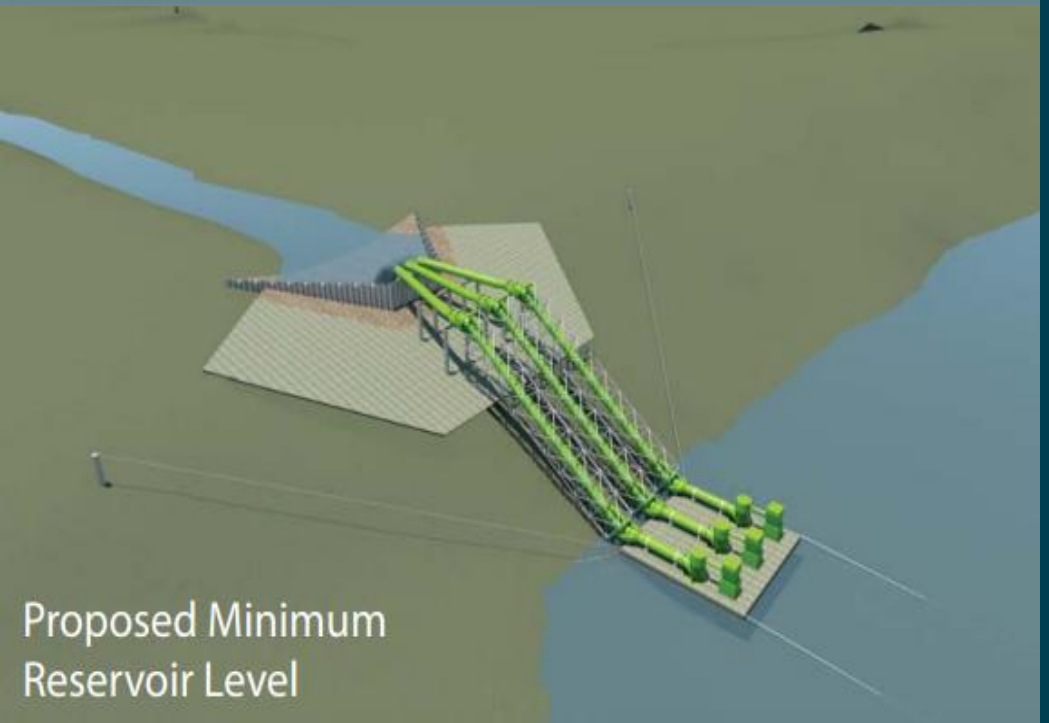
1. Preparation
2. Information
3. Function Analysis
4. Creativity
5. Evaluation
6. Development
7. Presentations
8. Implementation

Water Resources Planning

Issues center on:

- Quantity
  - How much?
- Quality
  - Temperature, Nutrients, Dissolved O2, etc.
- Timing
  - When is it available?
- Location
  - Where?





Water Resources Planning (Cont.)

- Purpose is to solve water and related resources problems – such as improving water supplies, generating hydropower, enhancing the environment, etc.

- Planning helps decision-makers identify water resources problems, conceive solutions to them, and compare the importance of competing or conflicting needs

Appraisal Study

- Identify a range of solutions that could address the problem or issue
- Determines whether Reclamation should investigate problems in more detail
- Limited in scope
- Uses existing information and data with very limited new data
- Conducted by Reclamation staff and cost-share partner(s)

Reclamation's Value Program - Objectives

- Achieve the most appropriate and highest value solution for the project.
- This Value Planning Study is not a decision document.
  - Aid in establishing where to focus design efforts in progressing forward on the project.
  - Alternatives will be presented to decision-makers for consideration.
  - The decision to accept or reject individual alternatives will be made through a combined effort between designers, managers, and project stakeholders.
  - Decisions will be documented in an Accountability Report.
  - Not a decision or position on any water rights settlement negotiation.

Value Planning Process

Phase I: Site Visit

- Preparation
- Study Team orientation
- Background information
- Site Visit

Phase II: Workshop

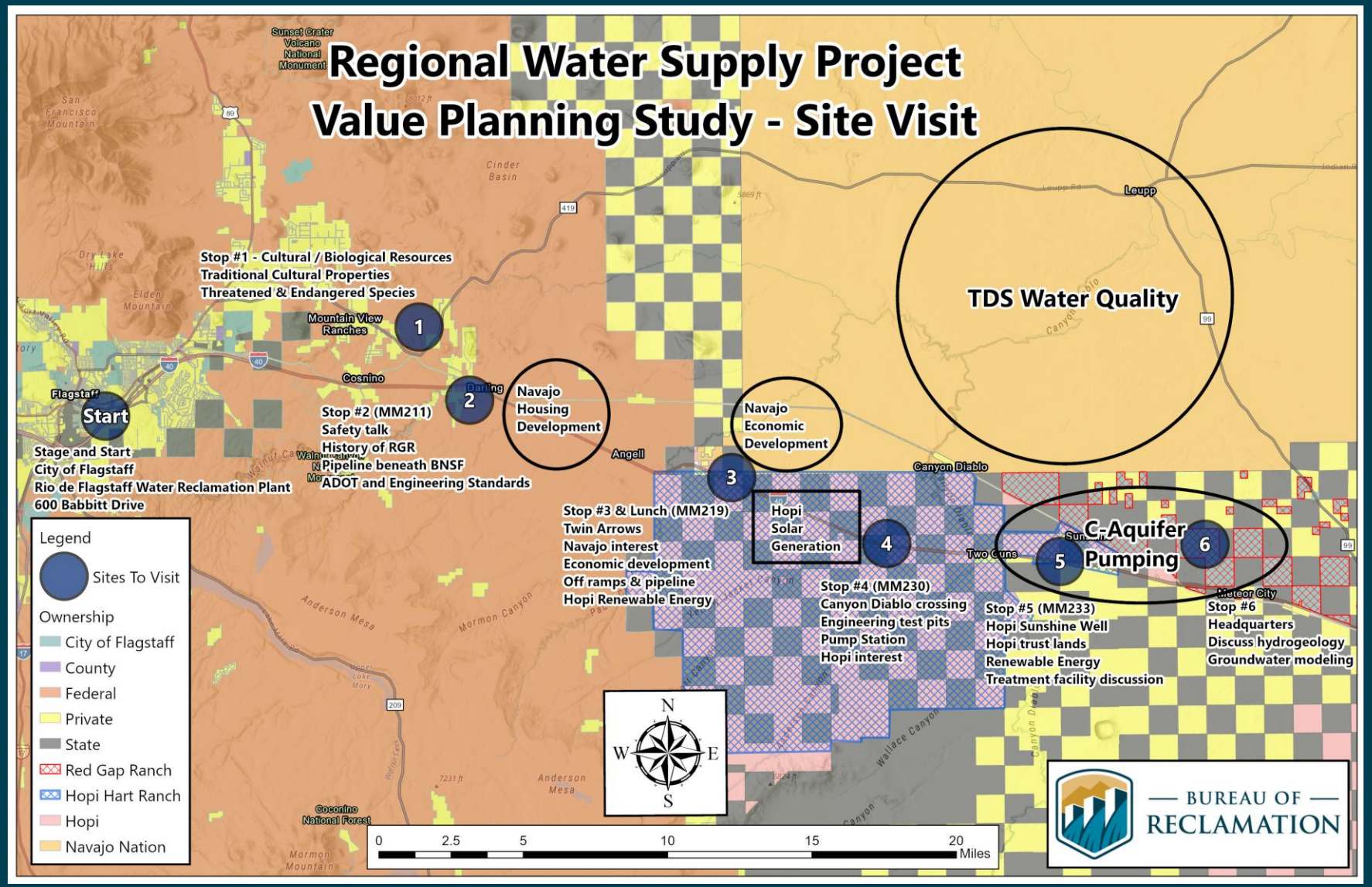
- Additional resources
- Week-Long Value Planning workshop

Phase III: Summary of Findings

- Presentation
- Report

House at Red Gap Ranch Headquarters Area

Phase I: Site Visit Locations



VP Study Team Site Visit

1- Preparation Phase

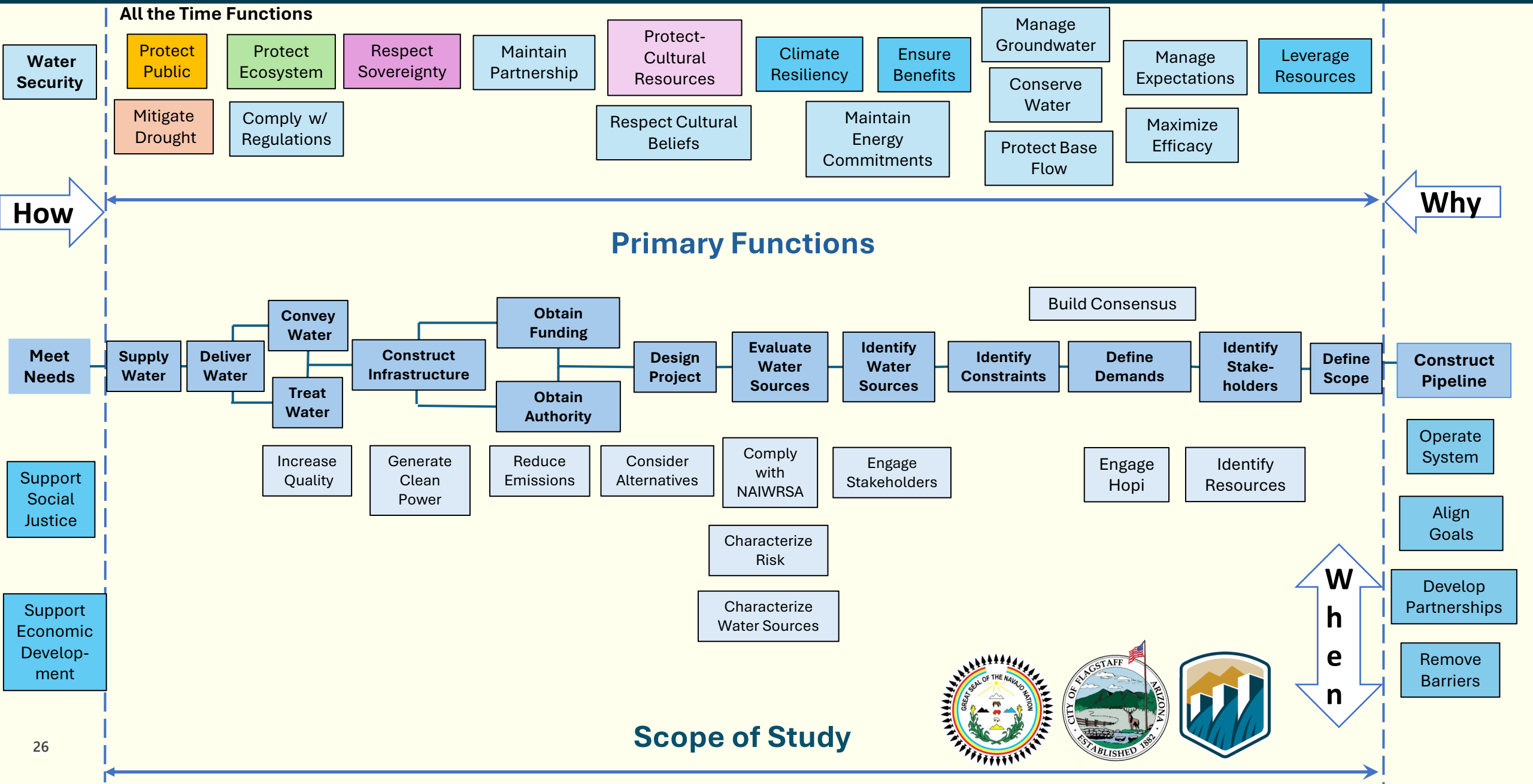
- Eleven team meetings to prepare for Site Visit and VP workshop from March through July 2025

2- Information Phase

- Navajo Nation and Flagstaff Guidance documents
- Compilation of over 30 existing reports
- ADWR, BOR, Flagstaff, and Navajo Nation have been performing studies since 1998

VP Study Team at House at Red Gap Ranch Headquarters area

3. Function Analysis -Red Gap Ranch FAST Diagram



4. Creativity: 146 Ideas Generated

Ideas

No.	Function	Idea	Appraisal	Disposition (Evaluation)
1	Define Demands	Population projection to be served per capita water use		
2	Define Demands	Population growth rates		
3	Define Demands	Land use type		
4	Define Demands	Commercial use		
5	Define Demands	Industrial use		
6	Define Demands	Tribal Land Use		
7	Identify Water Sources	Groundwater from 'C' Aquifer	Yes	
8	Identify Water Sources	Groundwater from 'R' Aquifer	Yes	
9	Identify Water Sources	Groundwater from 'N' Aquifer		Location limiting; not available
10	Identify Water Sources	Surface Water - Colorado River Water - Upper Basin	Yes	
11	Identify Water Sources	Surface Water - Colorado River Water - Lower Basin	Yes	Combine with No. 35 and 37
12	Identify Water Sources	Surface Water - Little Colorado River Water	Yes	
13	Identify Water Sources	Surface Water - Little Colorado River Tributary Projects	Yes	
14	Identify Water Sources	3 Canyon Project	Yes	Looked and found nothing
15	Identify Water Sources	Tucker Flat Project	No	Looked and found nothing
16	Identify Water Sources	Water Reuse - Indirect Potable Reuse (IPR)	Yes	
17	Identify Water Sources	Water Reuse - Direct Potable Reuse (DPR)	Yes	
18	Identify Water Sources	Lake Mary - Lining of Lake Mary Lower	Yes	Combine with conservation alternative
19	Identify Water Sources	Lake Mary - Lining of Lake Mary Upper	Yes	Combine with conservation alternative

5. Evaluation: Weighted Criteria Matrix

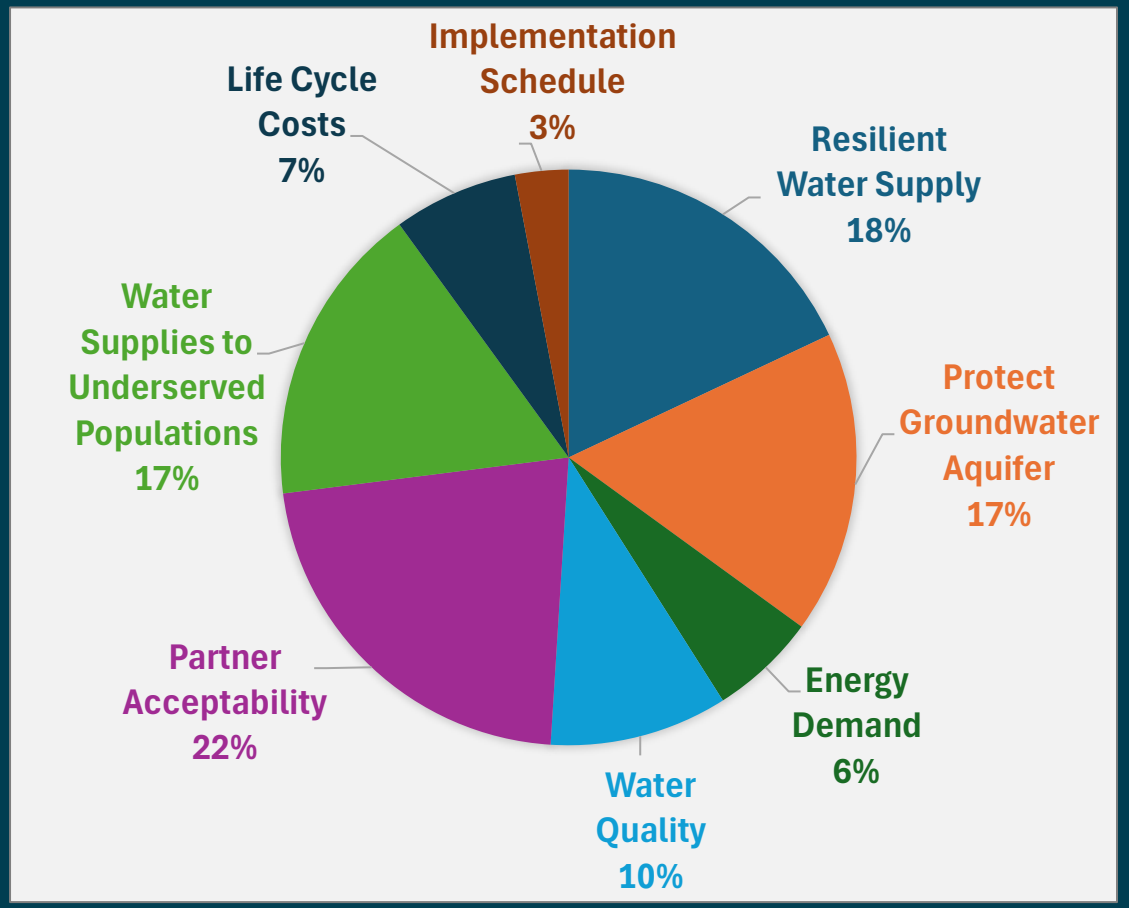
Criteria Scoring Matrix

Criteria:	Preference		Preference		Preference		Preference		Preference		Preference		Preference		*Rounded Percentage*
	A or	B	A or	C	A or	D	A or	E	A or	F	A or	G	A or	H	
A. Resilient Water Supply		1	3		2			2	1		2		3		18%
	B or	C	B or	D	B or	E	B or	F	B or	G	B or	H			
B. Protect Groundwater Aquifer	2		2			1		1	2		3				17%
	C or	D	C or	E	C or	F	C or	G	C or	H					
C. Energy Demand		3		3		3		1	2						6%
	D or	E	D or	F	D or	G	D or	H							
D. Water Quality		2		2	1		1								10%
	E or	F	E or	G	E or	H									
E. Partner Acceptability	1		2		3										22%
	F or	G	F or	H											
F. Water Supplies to Underserved Populations	1		3												17%
	G or	H													
G. Life Cycle Costs *	2														7%
H. Implementation Schedule															3%
															1
How Important: Major Preference = 3, Medium Preference = 2, Minor Preference = 1, No Preference Each = 0															100%

* Life Cycle Costs include capital and OM&R

5. Evaluation: Weighted Criteria Results

1. Partner Acceptability (22%)
2. Resilient Water Supply (18%)
3. Water Supplies to Underserved Populations (17%)
4. Protect Groundwater Aquifer (17%)
5. Water Quality (10%)
6. Life Cycle Costs (7%)
7. Energy Demand (6%)
8. Implementation Schedule (3%)



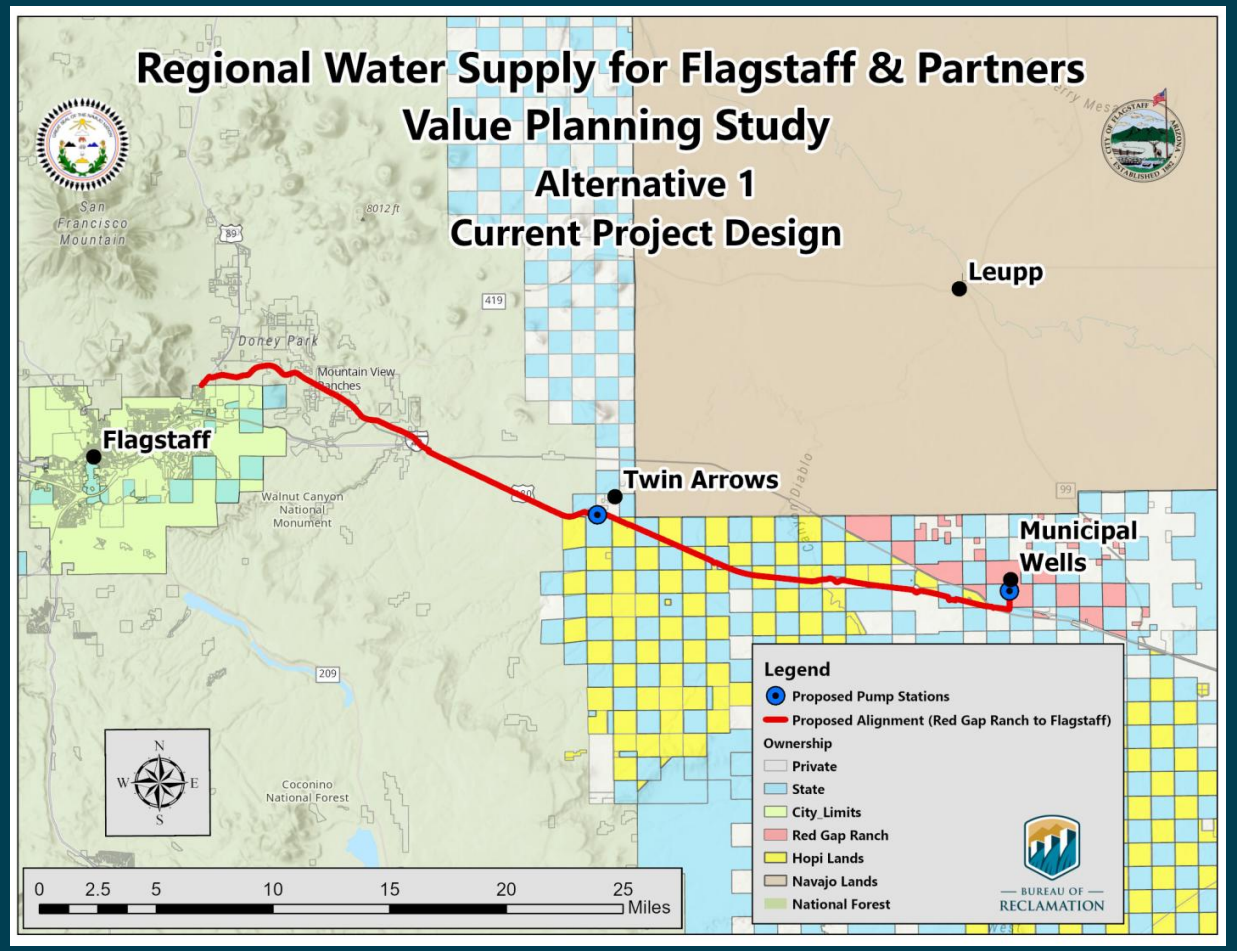
6. Development of Alternatives: Considerations

- Design - Source water, conveyance
- Partnerships – Consensus based
- Funding - Local, federal, private, joint
- Risks - Resiliency of supply, quality of supply, costs of construction and conveyance
- Water Treatment – Type, location
- Energy and Power - Source: solar, grid, wind
  Power Demand: water treatment, conveyance

Alternatives

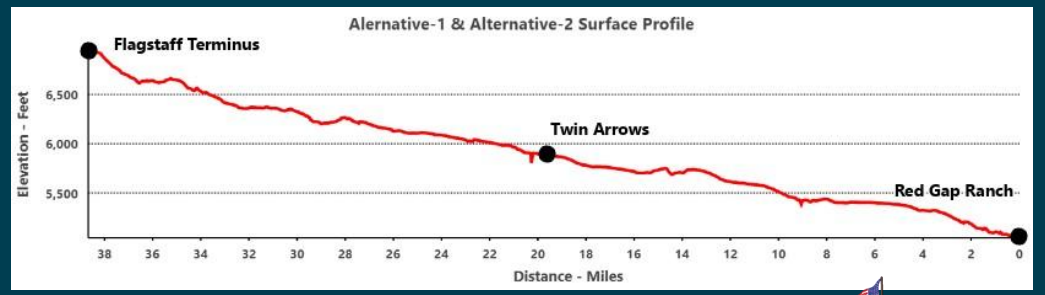
1. 1A – Pumping Municipal Wells at RGR with Treatment at Red Gap Ranch
2. 1B – Pumping Municipal Wells at RGR with Treatment at Twin Arrows
3. 1C – Pumping Municipal Wells at RGR with Treatment at Flagstaff
4. 2A – Alternative 1 with Aquifer Storage and Recovery at Red Gap Ranch
5. 2B – Alternative 1 with Aquifer Storage and Recovery at Flagstaff
6. 3 – Expand City of Flagstaff Municipal Wells Near Flagstaff
7. 4A – Colorado River Water – Lake Powell (Upper Basin)
8. 4B – Colorado River Water – Bullhead City/Lake Mohave (Lower Basin)

Alternative 1: Baseline



General Concept

- Develop municipal wells at RGR
- Groundwater treatment for Total Dissolved Solids
- Pipeline from RGR to Flagstaff (approximately 40 miles) with future turnouts
- Flagstaff manages recycled water in the City



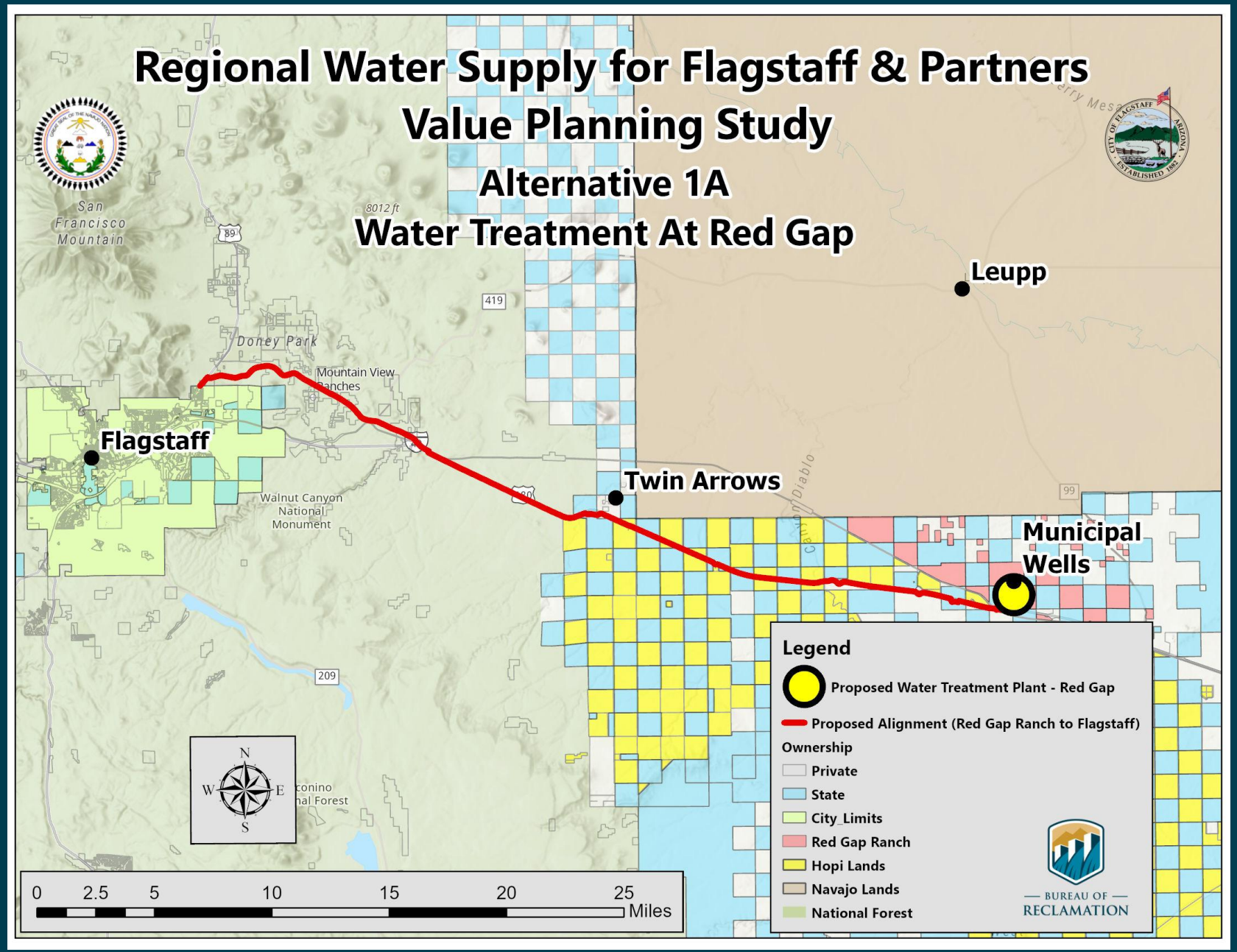
Alternative 1 – Advantages and Disadvantages

Advantages:

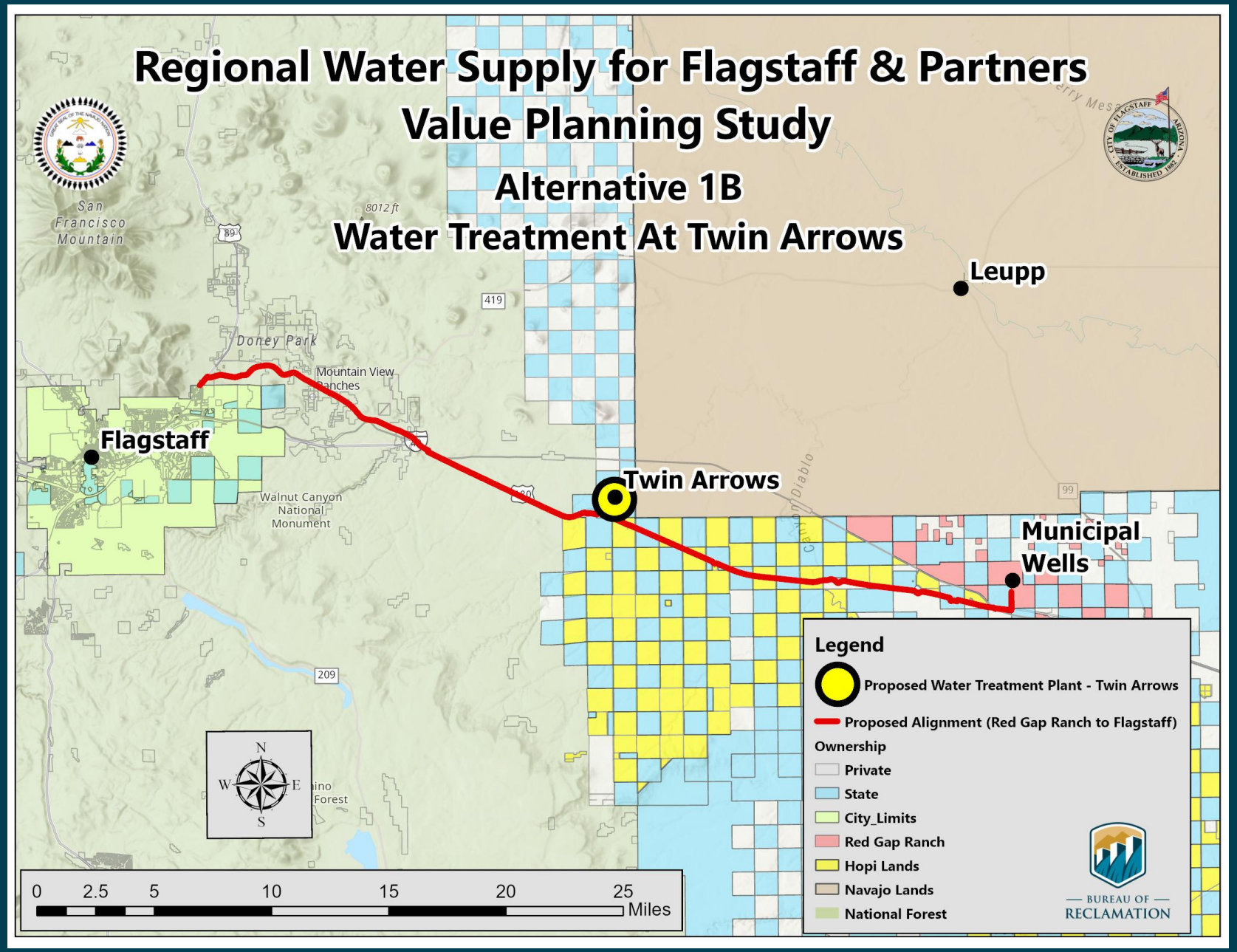
- Flagstaff owns RGR (2005)
- Resilient water supply
- Water source is close to Navajo Nation lands
- Higher-quality water
- Clean Power generation opportunities
- Manage pumping to reduce potential impacts to regional groundwater system
- 12 Municipal Wells are already drilled to C aquifer
- Flagstaff acquired ROW for the pipeline from RGR to Flagstaff
- Flagstaff Feasibility Study (10% Design) – Jacobs Phase II Report
- COF-ADOT agreement in place
- Groundwater modeling studies suggest robust aquifer conditions
- Cultural assessment conducted for RGR and along pipeline
- Biological assessment for RGR

Disadvantages:

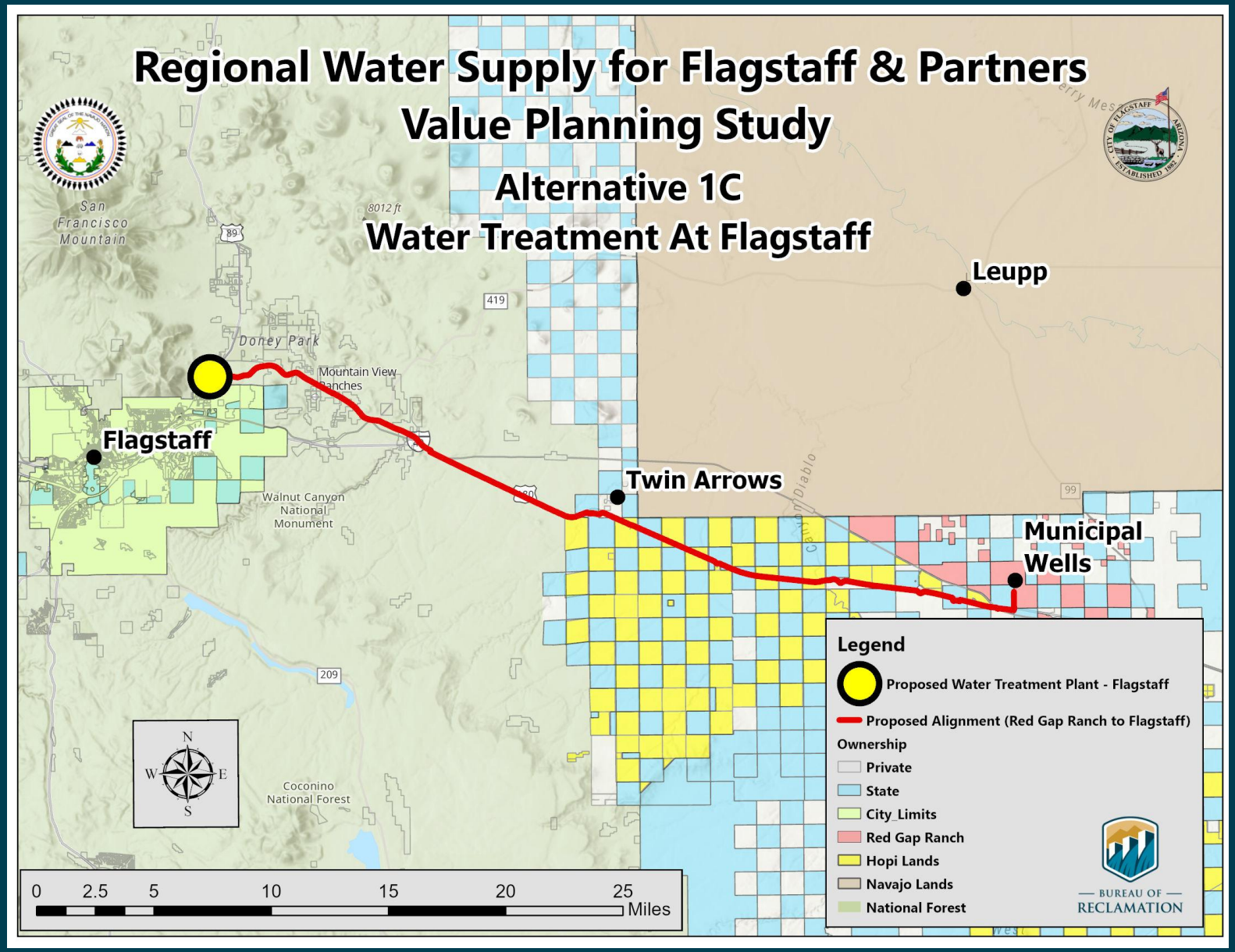
- Considerations of brine disposal
- Water volume loss with treatment of raw groundwater



Alternative 1A – Pumping Municipal Wells at RGR with Treatment at RGR

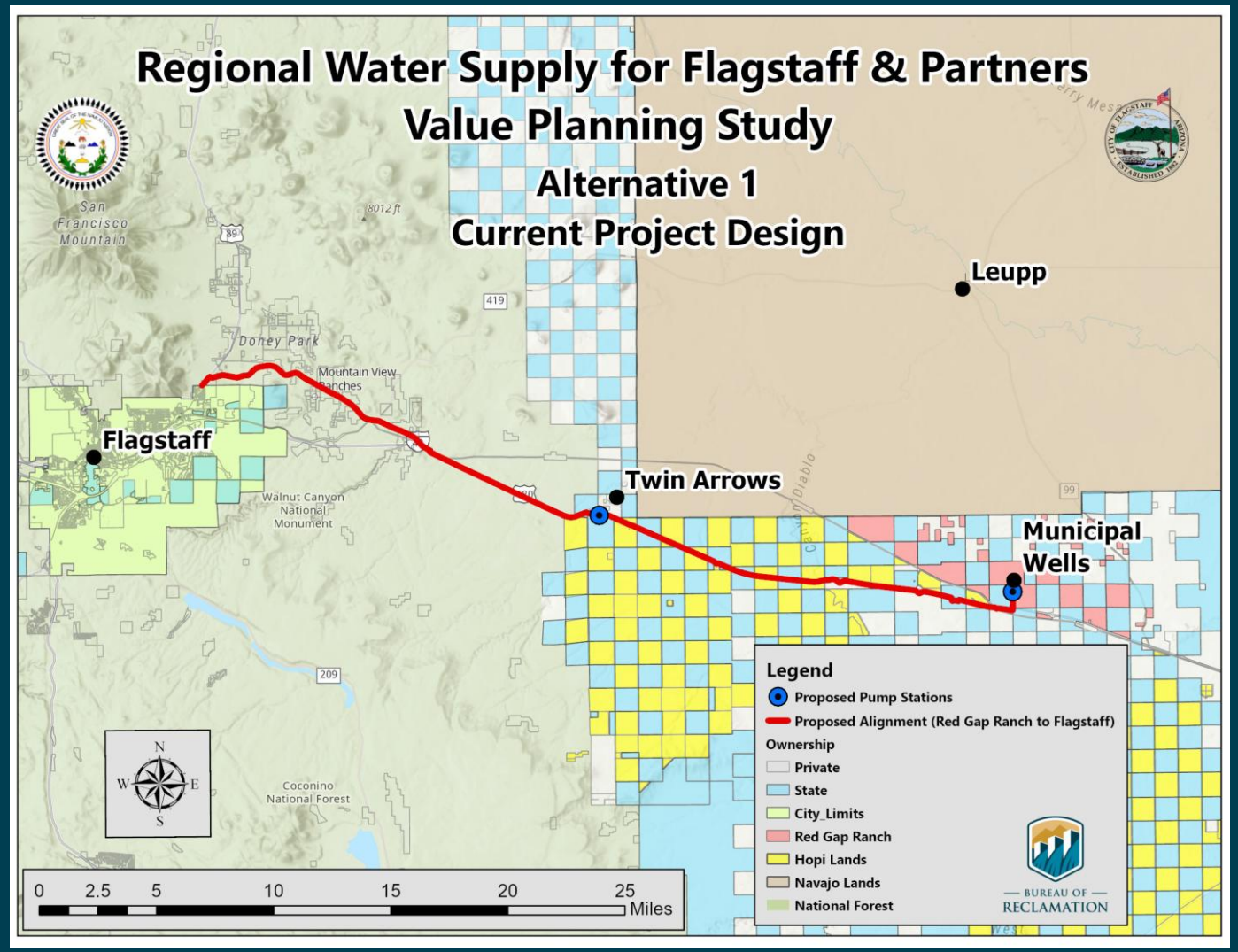


Alternative 1B – Pumping Municipal Wells at RGR with Treatment at Twin Arrows



Alternative 1C –Pumping Municipal Wells at RGR with Treatment at Flagstaff

Alternative 2 – Alternative 1 (a, b, or c) with Aquifer Storage and Recovery (ASR)



General Concept

- In conjunction with Alternatives 1A, 1B, and 1C
- Recycled water stored underground at various locations

Alternative 2 – Continued

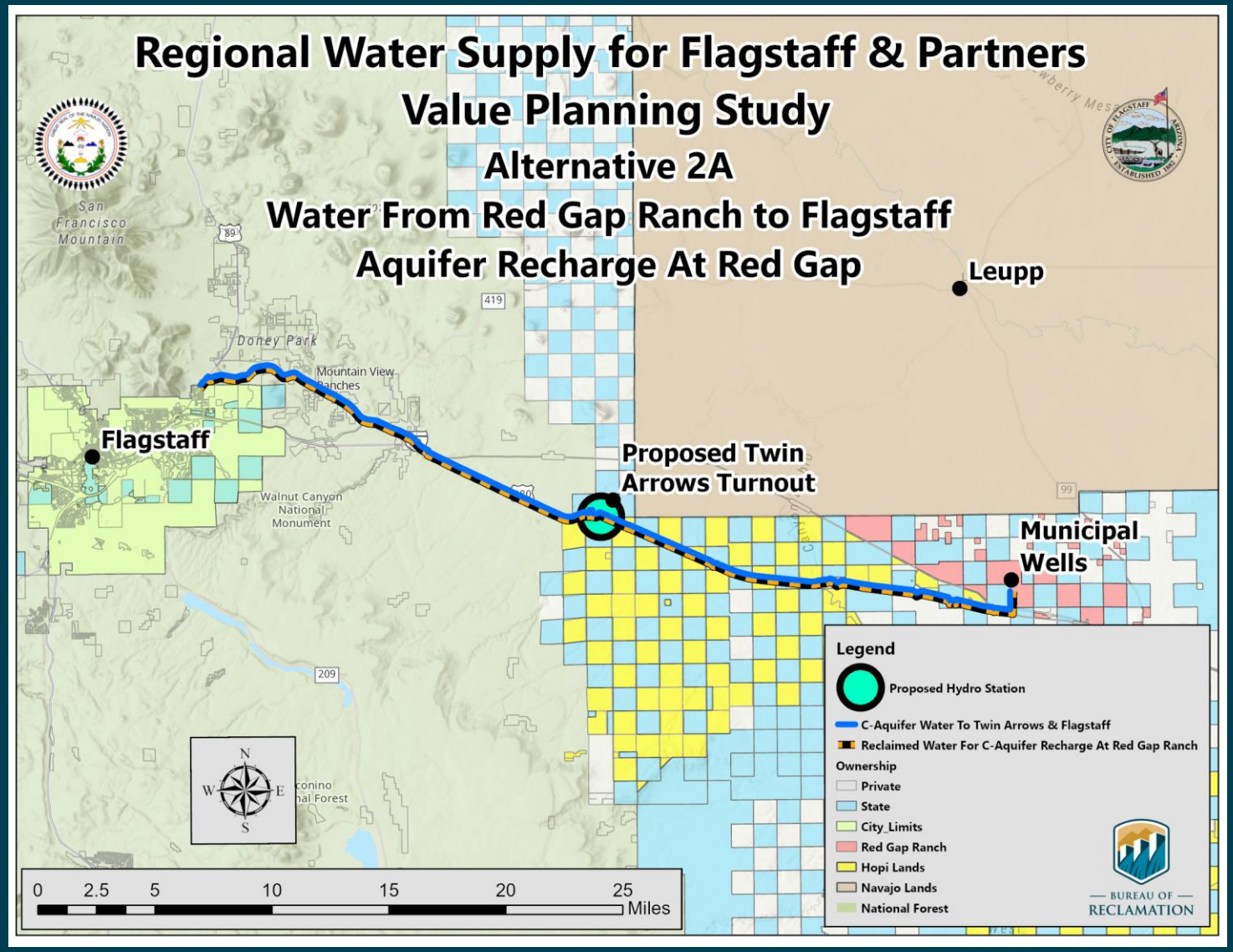
Advantages:

- Resilient water supply for Flagstaff and Navajo Nation
- Water treatment operations central to Flagstaff and existing workforce
- Water recycling projects augments groundwater resources
- Greater operational flexibility to manage C Aquifer groundwater pumping and peak demand
- Potential Operations, Maintenance, and Replacement (OM&R) cost benefits

Disadvantages:

- Higher capital and operational expense
- Power supply and demand for additional recycled water projects

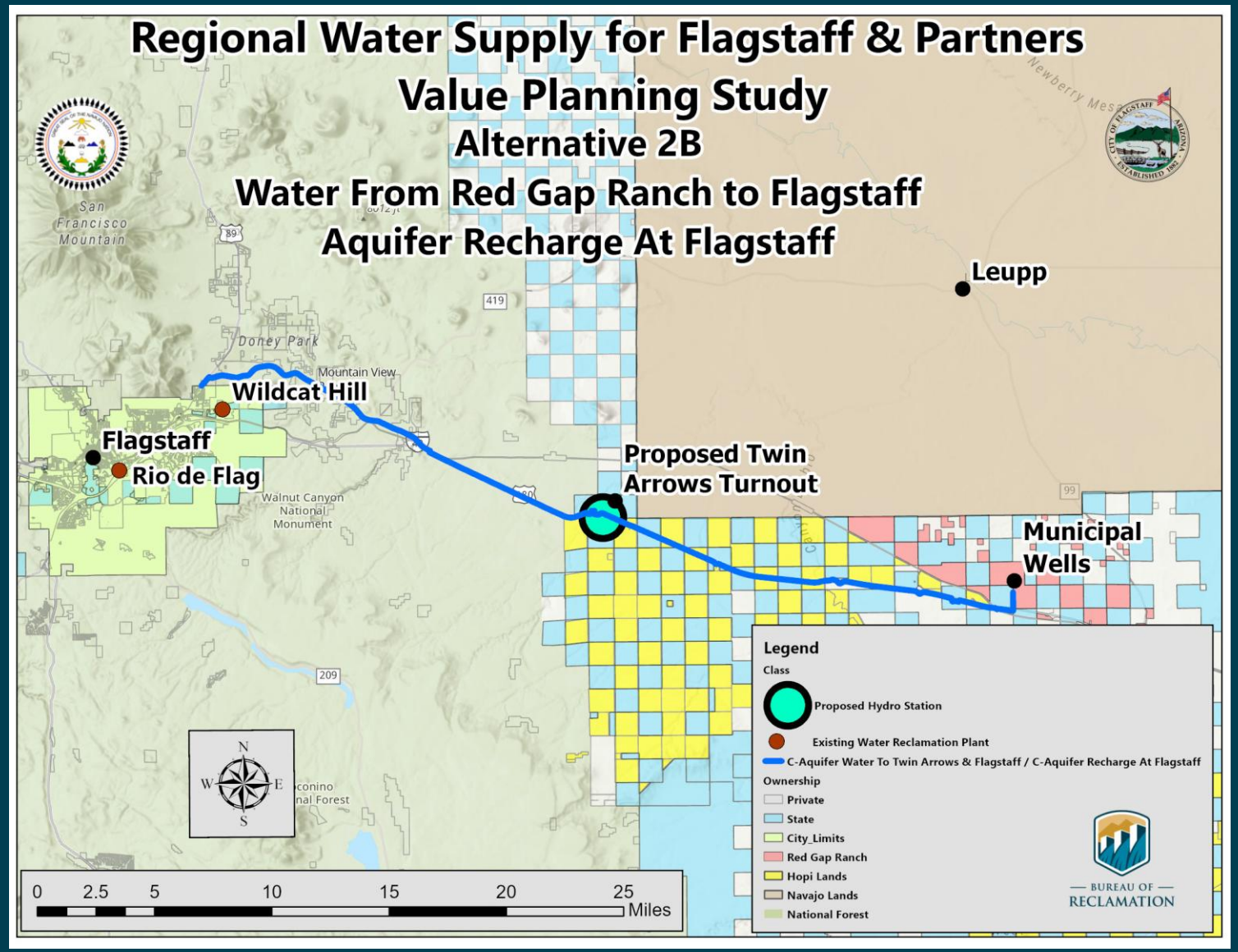
Alternative 2A – Alternative 1 with ASR at RGR



Description:

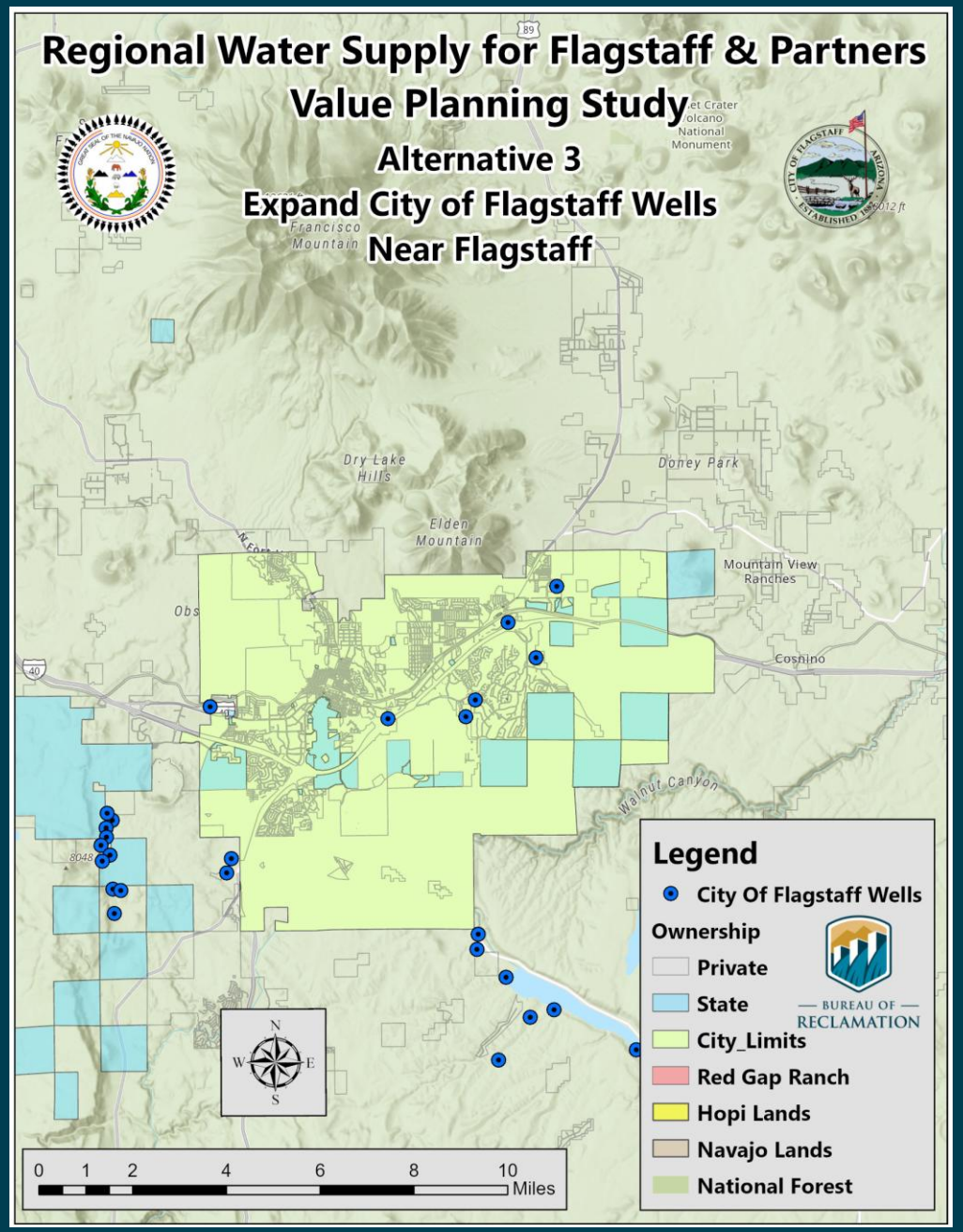
Recycled water from Flagstaff returned to RGR in separate pipe to recharge the aquifer

Alternative 2B – Alternative 1 with ASR at Flagstaff



Description:

Recycled water generated from RGR groundwater is recharged and stored underground within Flagstaff



Alternative 3 – Expand City of Flagstaff Wells Near Flagstaff

Description:

Expand existing well fields or develop new well field(s) to import additional groundwater from C Aquifer from locations closer than RGR.

Alternative 3 – Expand City of Flagstaff Wells Near Flagstaff

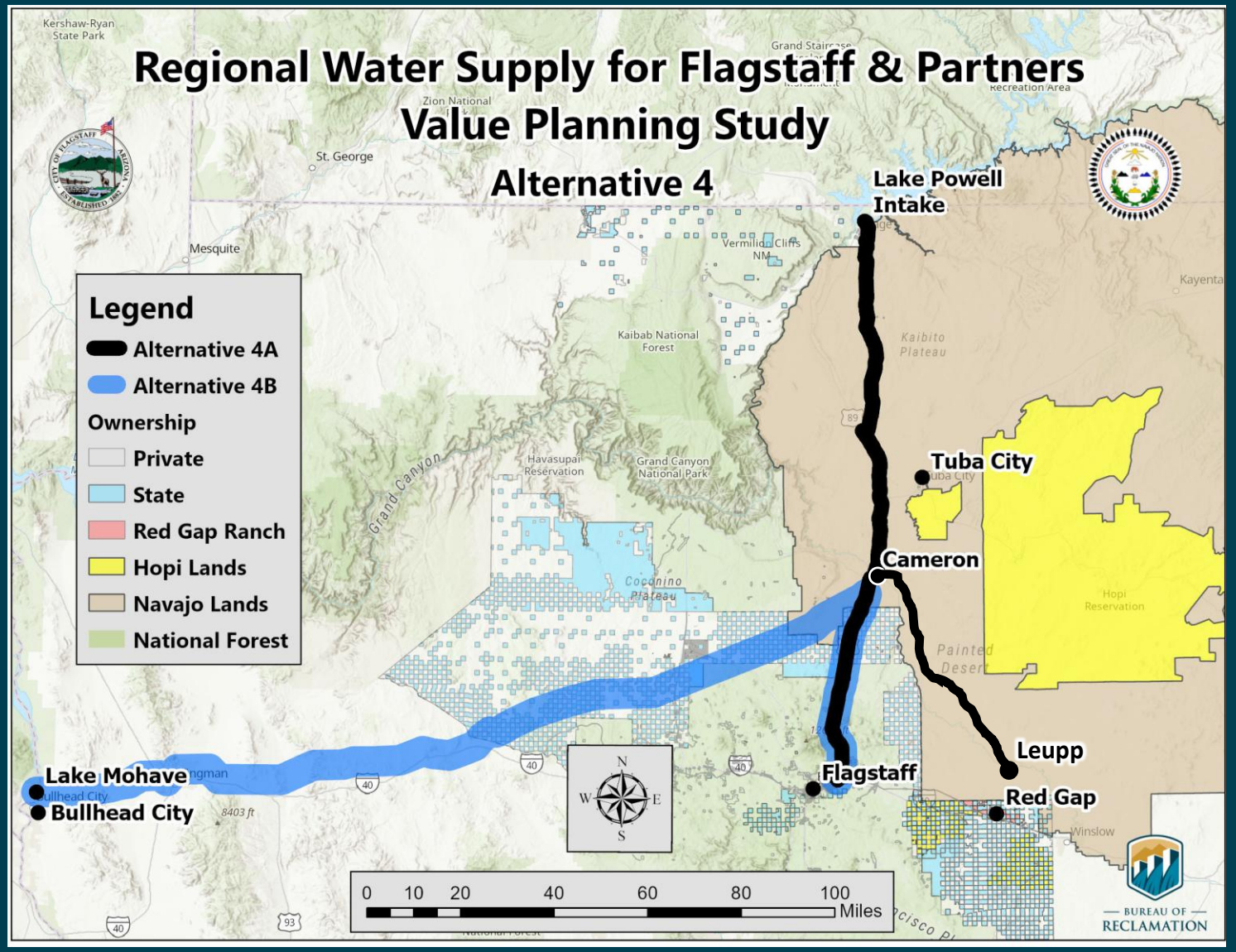
Advantages:

- Closer to Flagstaff
- Reduced travel
- Possible water hauling load-out station for County residents or others not located along RGR pipeline corridor

Disadvantages:

- Would not provide water for regional water users along I-40
- Deeper depth to groundwater; more expensive drilling projects
- OM&R expenses with wells deeper than at RGR
- Concerns regarding sustainability, resiliency and reliability
- Wells subject to Arizona Public Service Public Safety Power Shutoff events during high wind events across high-fire-risk areas
- Locating suitable land with high-yielding production wells
- Permitting or leasing costs challenges

Alternative 4 – Colorado River Water



General Concept:

Withdraw water from the Colorado River, Upper and Lower Basins, and pipe to Cameron with dual spurs to Leupp and to Flagstaff

Alternative 4 – Continued

Advantages:

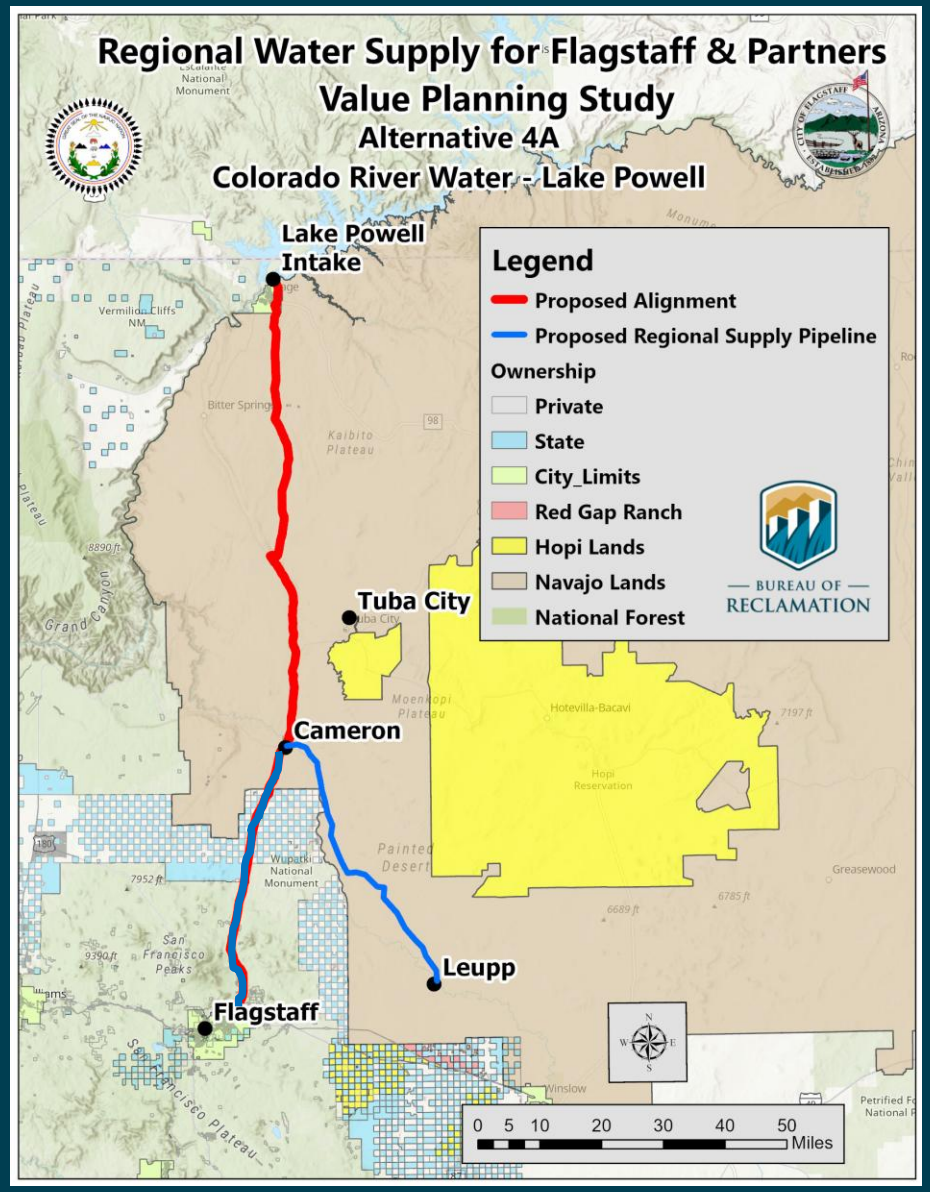
- Resilient water supply for Navajo Nation

Disadvantages:

- Anticipated long-term shortage in the availability of Colorado River water
- More expensive water supply
- Flagstaff does not have a Colorado River Contract or authority to move Colorado River water
- Leasing Colorado River water is not a permanent solution

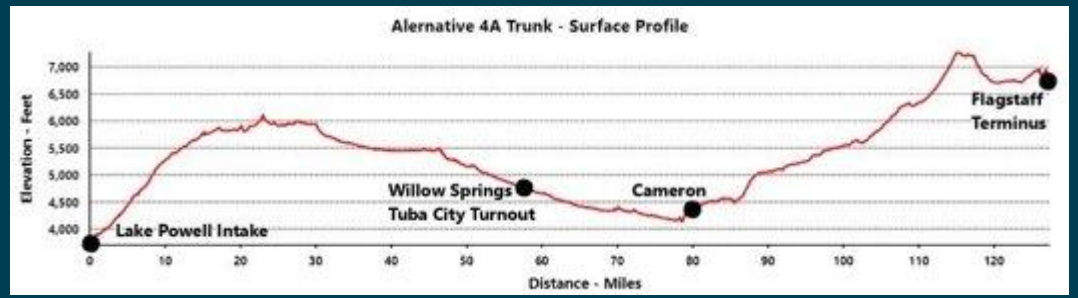
Alternative 4A – Colorado River Water – Lake Powell

(Upper Basin Water)

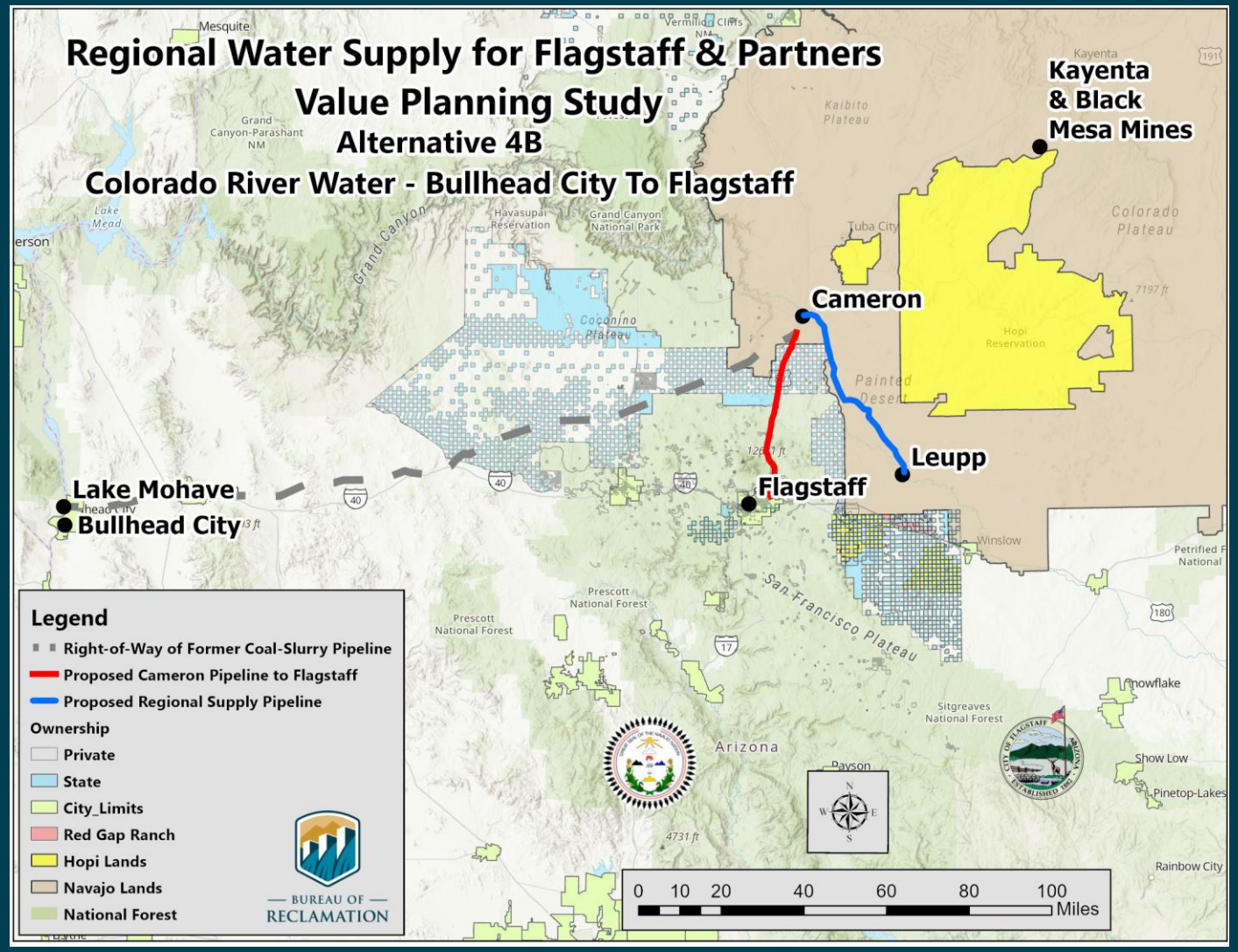


Description:

iiná bá - paa tuwaqat (pipeline) from the Upper Basin Colorado River at Lake Powell to Cameron with a spur to Leupp service area and a spur to Flagstaff Service Area



Alternative 4B – Colorado River Water – Bullhead City/ Lake Mohave (Lower Basin Water)



Description:

Pipeline following the Black Mesa coal slurry pipeline alignment from the Lower Basin Colorado River at Lake Mohave to Cameron with a spur to Leupp service area and a spur to Flagstaff Service Area

Alternatives Scoring Matrix

	Resilient Water Supply		Protect Groundwater Aquifer		Energy Demand		Water Quality		Partner Acceptability		Water Supplies to Underserved Populations		Life Cycle Costs		Implementation Schedule				
Criteria	A		B		C		D		E		F		G		H		Weighted Score	Ranking	Proposal
Weight	18		17		6		10		22		17		7		3				
	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted			
Alt 1A - Pumping Municipal Wells at RGR with Treatment at RGR	4	72.4	3	50.2	4	23.5	4	39.8	4	88.7	5	83.7	3	21.7	5	15.8	396	2	Alternative 1a
Alt 1B - Pumping Municipal Wells at RGR with Treatment at Twin Arrow	4	72.4	3	50.2	3	17.6	4	39.8	4	88.7	4	67.0	2	14.5	4	12.7	363	4	Alternative 1b
Alt 1C - Pumping Municipal Wells at RGR with Treatment at Flagstaff	4	72.4	3	50.2	2	11.8	3	29.9	2	44.3	3	50.2	1	7.2	4	12.7	279	7	Alternative 1c
Alt 2A - Alternative 1 with ASR at RGR	5	90.5	5	83.7	5	29.4	5	49.8	2	44.3	5	83.7	2	14.5	3	9.5	405	1	Alternative 2a
Alt 2B - Alternative 1 with ASR at Flagstaff	4	72.4	4	67.0	4	23.5	3	29.9	3	66.5	5	83.7	4	29.0	4	12.7	385	3	Alternative 2 b
Alt 3 - Expand City of Flagstaff Wells near Flagstaff	1	18.1	2	33.5	5	29.4	5	49.8	3	66.5	1	16.7	5	36.2	4	12.7	263	8	Alternative 3
Alt 4A - Colorado River-Lake Powell (Upper Basin Water)	4	72.4	5	83.7	2	11.8	4	39.8	3	66.5	2	33.5	2	14.5	2	6.3	329	5	Alternative 4a
Alt 4B - Colorado-Bullhead City/Lake Mohave (Lower Basin Water)	4	72.4	5	83.7	1	5.9	3	29.9	3	66.5	1	16.7	1	7.2	1	3.2	286	6	Alternative 4b

Score: Excellent = 5, Very Good = 4, Good = 3, Fair = 2, Poor = 1
Total Possible Score = 500

Score 400-500
Score 350-400
Score 300-350
Score 200-300

Alternatives in Ranked Order

1. 2A – Alternative 1 with ASR at RGR
2. 1A – Pumping Municipal Wells at RGR with Treatment at RGR
3. 2B – Alternative 1 with ASR at Flagstaff
4. 1B – Pumping Municipal Wells at RGR with Treatment at Twin Arrows
5. 4A – Colorado River Water – Lake Powell (Upper Basin Water)
6. 4B – Colorado River Water – Bullhead City/Lake Mohave (Lower Basin Water)
7. 1C – Pumping Municipal Wells at RGR with Treatment at Flagstaff
8. 3 – Expand City of Flagstaff Wells Near Flagstaff

7. Presentations

- Department of Interior
  - Reclamation Management – Regional Director
  - Secretary's Indian Water Rights Office
- City of Flagstaff
  - City Council
  - Water Commission
- Navajo Nation
  - Legal and Technical Team
  - Negotiation Team
- Others
  - Coconino Plateau Watershed Partnership (CPWP)

8. Implementation (Next Steps): Potential Appraisal Study

- Develop Scope of Work (by end of 2025)
- Develop Budget and Schedule for Appraisal Study
- Obtain approval for Appraisal Study
  - Bureau of Reclamation
  - Navajo Nation
  - Flagstaff
- Develop Cost Share Agreements for Appraisal Study
- Conduct Appraisal Study

Alternative Elements recommended for Appraisal Level Investigations

- Modeling of the 'Coconino' aquifer
- Water Reuse - Indirect Potable Reuse (IPR)
- Water Reuse - Direct Potable Reuse (DPR)
- Lake Mary - Lining of Lake Mary Upper & Lower
- Expanding current well fields to private or public lands
- New Storage Reservoir
- Aquifer Storage and Recovery at different locations
- Clean energy generation opportunites
- Pump Storage
- Economic Development
- Cost of delivered water
- Volume allocations

Discussion

HIGHLIGHTS OF FLAGSTAFF'S WATER SUPPLIES AND IMPORTATION PROJECTS

1881	Old Town Spring: Developed as Flagstaff's first water supply located adjacent to Mars Hill as railroad approaches Flagstaff.
1884	Inner Basin Springs: Mayor Abineau in partnership with the Santa Fe Railroad began the City's first water importation project from outside incorporated limits using a 12 mile, six-inch clay pipeline.
1887	O'Neill Springs: Arizona Lumber & Timber Company developed a pipeline to import water from the springs near Kachina Village for lumber mill operations.
1905	Lower Lake Mary Dam: Arizona Land & Timber Company constructed a dam and pipeline as the City's second water importation project from outside incorporated limits. Capacity of reservoir is 8,617 acre feet.
1914	Shultz Pass Water Storage: Santa Fe Railroad constructed a 50-million gallon storage reservoir to hold Inner Basin water.
1921	Switzer Canyon & Fort Valley Dams: City explored siting dams in Switzer Canyon or an imported supply from a dam in Fort Valley.
1925	Purchase of Inner Basin Water Rights & Infrastructure: City voted to purchase the Inner Basin water rights and infrastructure from the Santa Fe Railroad and also included approvals to fund the installation of a new 14-inch pipeline and a second 52-million gallon storage reservoir.
1930s	Well Field Development: City drilled 26 local wells on the City owned Clark Ranch (Coconino Estates).
1941	Upper Lake Mary Dam and Water Treatment Plant: City's third importation project was to construct the dam, pipeline and water treatment plant to store, treat and deliver surface water directly to Flagstaff.
1951	Upper Lake Mary Dam Height Increase: The dam was raised an additional 10 feet to its current height with a capacity of 16,575 acre feet.
1952	Leupp Importation Project: City explores plans to use a proposed El Paso Gas Line trench to also include a water pipeline to import groundwater from the Navajo Reservation near Leupp. The project would deliver 1 million gallons per day but required a $1.8 million water revenue bond while the City could only bond for $730,000.
1954	Woody Mountain Well Field: The City began to develop its fourth water importation project outside its incorporated limits. The first Woody Mountain well was drilled in 1954.
1962	Lake Mary Well Field: City expanded its use of groundwater by starting to drill wells in the C-aquifer in the Lower Lake Mary watershed, another imported supply.
1963	Lake Mary Water Treatment Plant: A new 8 million gallon per day (MGD) treatment plant was constructed adjacent to the original 1941 facility.

1966	Effluent Reuse: City of Flagstaff enters into a 25-year reuse agreement with the Bill Johnston Golf Properties, Inc., (later becoming the Continental Golf Courses) for 2 million gallons a day of effluent water.
1969	Central Arizona Project Water Supply: City Manager Leland McPherson submitted a letter of interest to the Arizona Water Commission to import 15,040 acre-feet of Colorado River water.
1972	Harshbarger and Carollo Report: Report summarized variety of water resource development projects that had been explored by the City: • *Upper East Clear Creek Well Development (Importation)* • *Canyon Diablo Well Field Development (Importation)* • *Redwall Aquifer Well Field Development* • *Expansion of Inner Basin Project (Importation upgrades)* • *Effluent Reuse (City chose this option)* • *Mogollon Mesa Project – Wilkins Dam (Importation)* • *Lake Mary Lining* • *Weather Modification (Importation)*
1973	100-Year Water Adequacy Designation: City was designated as having an Adequate Water Supply for the first time by the State of Arizona Water Commission.
1975	Central Arizona Project Water Supply: City declined to submit a new application to obtain Central Arizona Project water expressing concerns that entering into an agreement without knowing whether an exchange for Verde River or Blue Ridge Reservoir water could be timely negotiated.
1975	Wildcat Hill WWTP Expansion: Continental Country Club began to receive reclaimed water for the golf courses from the newly expanded plant.
1990	Water Conservation: City Council adopted its first water conservation ordinance.
1997	Well Field Expansion: City began drilling wells in the C-aquifer within its incorporated limits.
2001	Regional Land Use and Transportation Plan: City implements first land use plan allowing for water resource planning efforts.
2003	Water Emergency Declared: Drought triggered the City Manager to enact the City's Water Availability Strategies when Upper Lake Mary was not available to meet peak customer demand. The declaration lasted 156 days and elevated through Level 3 (Water Emergency) of 4 levels.
2003	Conservation Plan: City adopts a Water Conservation Program to reduce water usage and to enforce the City Code.
2004	Water Bond Election: Citizens voted 71% to approve a $15M Bond for water rights and/or water development.

2005	City Purchases Red Gap Ranch: $7.9M for 8,500 acres of deeded property with two water production wells and ~15,000 acres of Arizona State Lands with grazing leases.
2006	North Central Arizona Water Supply Study: USBR funded an Appraisal level report of findings with the Coconino Plateau Water Advisory Council. Report evaluated the following imported supplies for the project partners, including Flagstaff: • Lake Powell – Colorado River • Lake Mead – Colorado River • Red Gap Ranch • Redwall-Mauv Aquifer
2008	Red Gap Pipeline Alignment Feasibility Study: City hires JACOBS Engineering to conduct a 3-Phase Study to include a proposed alignment, conceptual pipeline, booster pump and reservoir design.
2009	JACOBS Phase I Report: Jacobs completed first technical report that identified a preferred alignment for a future Red Gap Ranch pipeline water supply project.
2011	Red Gap Well Drilling: City drills 10 additional municipal wells at Red Gap Ranch.
2011	100-Year Water Adequacy Designation Modification #1: Arizona Department of Water Resources approves modification to the City's Designation to include Red Gap Ranch pumping of 16,500 AF/year.
2011	Water Resources Master Plan-Draft: Staff completes the City's water resources master plan that defined the community's long-term water needs based upon land uses within the Regional Plan and existing zoning.
2012	Water Resources Sustainability Study: The City hired AMEC Environmental to conduct a study for the City's municipal water supplies, which included its first comprehensive computer groundwater modeling effort (aka, the Flagstaff Model). The purpose was to demonstrate hydrologically, what water supplies can support existing and future water needs for 100-years.
2012-2015	U.S. Bureau of Reclamation Grant Funded 3-Part Study: City obtained a $300,000 grant from the USBR to conduct a Biological Resource Evaluation, Cultural Resources Inventory and a Groundwater Resources computer groundwater modeling study in collaboration with the Navajo Nation. The modeling study evaluated what impacts, if any, pumping from Red Gap Ranch and the proposed Navajo Leupp well field will have on the 3-Canyon area of Chevelon, Clear Creek and the Little Colorado River.
2013	100-Year Water Adequacy Designation – Modification #2: ADWR approves a second modification of the City's Designation to include Red Gap Ranch and all other water supplies that demonstrated hydrologically, which water supplies can support existing and certain (but not all) anticipated future water needs for 100-years.

2014	Water Policies: City Council adopts its first comprehensive set of water policies known as the Principals of Sound Water Management.
2014	Flagstaff Regional Plan 2030: City implements updated comprehensive land use plan after significant public input and allows City to plan for anticipated future water demands.
2016	Red Gap Ranch Pipeline Alignment Feasibility - Funding: City Council authorized funding for JACOBS to complete Phases II & III technical reports.
2016	I-40 ADOT Right-of-Way: Arizona Department of Transportation and the City enter an Intergovernmental Agreement regarding the use of the I-40 corridor as a location for a future water supply pipeline from Red Gap Ranch.
2017	Water Supply Alternative Options and Costs: City hired Carollo Engineers to complete a planning-level water supply capital and operational cost alternatives, including indirect and direct reuse options.
2018	Water Reclamation Feasibility Study: City hired Brown & Caldwell Engineers to develop planning-level costs to implement advanced treatment of reclaimed water to drinking water standards at both Wildcat Hill and Rio de Flag Water Reclamation Plants. Purpose was to assist the City in understanding costs to upgrade each plant should it elect to implement direct potable reuse to augment its water supplies.
2020	Water Services Strategic Plan – 2025: This plan developed by Division staff focuses on the future by identifying the top 10 major decisions, their risks and needed financial investment and opportunities that are likely to arise within the five (5) year time horizon.
2020	Water Conservation Strategic Plan: The City hired Maddaus Water Management to determine the appropriate investment in conservation-derived water savings to ensure that conservation dollars are invested in strategies that provide the best return on investment.
2020	Reclaimed Water Master Plan: The City hired Brown & Caldwell to conduct a master planning effort to determine the future management of the City's uncommitted reclaimed water.
2024	NAIWRSA: The City signs the Northeastern Arizona Indian Water Rights Settlement Agreement ("NAIWRSA") to resolve water rights claims of the Navajo Nation, Hopi Tribe and San Juan Southern Paiute Tribe in the Little Colorado River Adjudication. Governor executes NAIWRSA making it effective among the parties. Congressional approval of NAIWRSA is required.
2024	Regional Project/BOR: City seeks funding to further the Red Gap Ranch Regional Water Supply Project. City initiates BOR technical assistance. Governor Hobbs and Senator Kelly send letters of support to the Commissioner of the BOR to engage in Appraisal Level Study at Red Gap Ranch.

2025	NAIWRSA Update: NAIWRSA legislation is reintroduced. Congressional approval pending.
2025	JACOBS Phase II Report: Jacobs completes second technical report with conceptual design for the Regional Project.
2025	Water Demand Analysis: City hires Arizona Water Buffalo, LLC to conduct analysis of future demands with water resiliency and redundancy factors
2025	Regional Project Value Planning: BOR initiates Value Planning Study with City and Navajo Nation; participants begin draft scope of work for Appraisal Study.

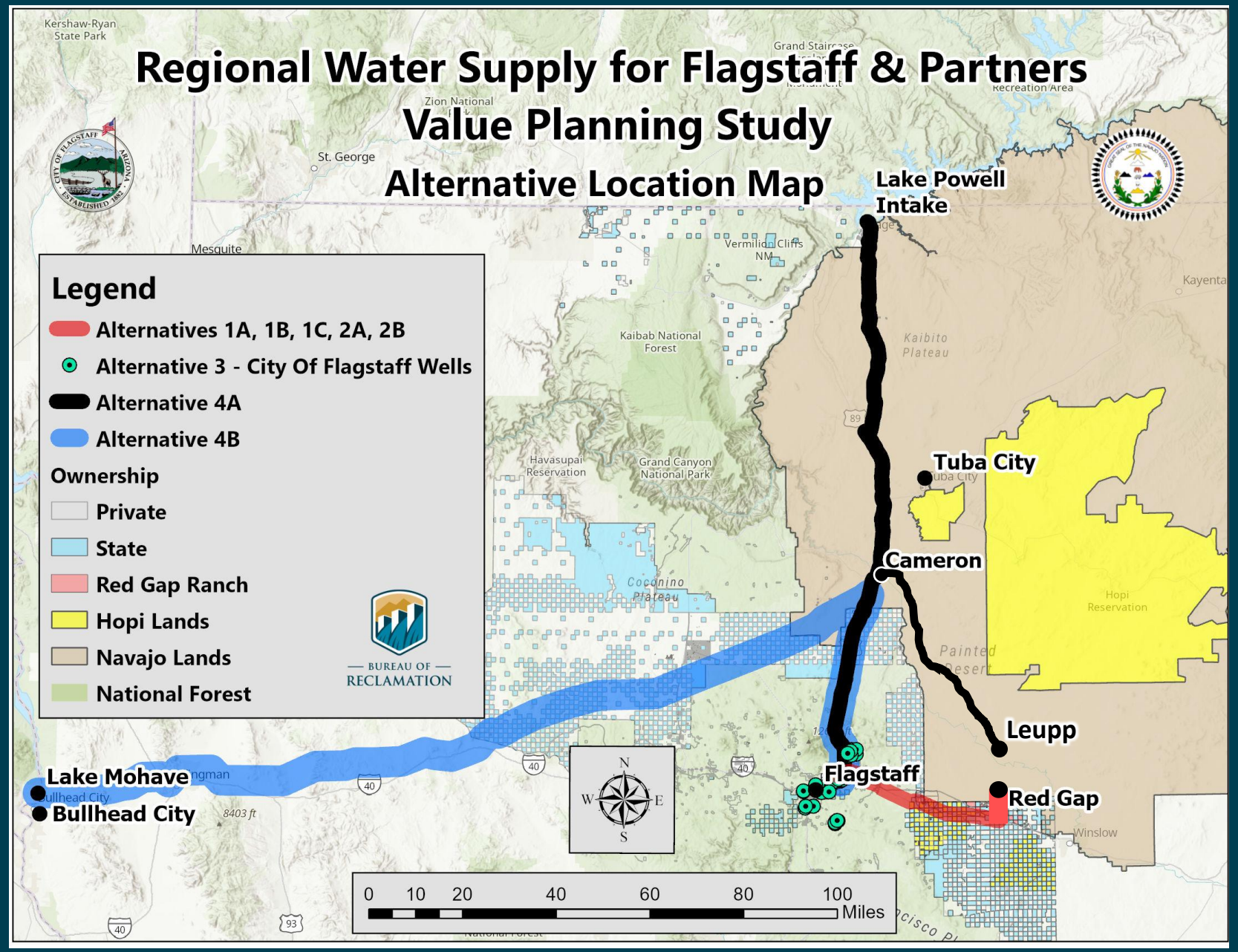
Future Water Supply for Navajo Nation, Flagstaff and Regional Water Users

Value Planning Study Conducted in July 2025

Summary of Findings to Flagstaff City Council and Water Commission

October 23, 2025

Photo by Brad Hill



Water Supply Sources for this Study

Presentation Agenda

- Background
- Reclamation Involvement
- Value Planning Process
  - Phase I: Site Visit
  - Phase II: Workshop
    - Evaluation Criteria
    - Alternative Development
    - Alternative Rankings
  - Phase III: Summary of Findings
    - Presentation
    - Report
- Next Steps

Value Planning Team

Team Members for this Study

Bureau of Reclamation

Del Smith, P.E., Acting DEC Program Manager; Value Program Manager

Valerie Swick, PH, Water Resources Planner

Sara English, Value Program Specialist

Patrick Wright, Physical Scientist, Geographic Applications & Analysis

Miguel Aria-Paic, P.E., Civil Engineer, Water Treatment

Jesse Chadwick, P.G. Engineering Geologist

Nathan Lehman, P.E., Native American Affairs Office

Kylie Pelzer, P.E., Civil Engineer, Water Conveyance

Evi Spilker, Environmental Protection Specialist

John Rasmussen, R.G. Program Development Manager

City of Flagstaff

Miranda Sweet, Vice Mayor of Flagstaff

Lee Williams, Water Services Director

Erin Young, R.G., Water Resources Section Director

Danae Presler, Climate Program Manager

Kevin Black, MBARK Consulting LLC

Brad Hill, R.G., Arizona Water Buffalo LLC

Jeff Miner, P.E., Jacobs Engineering

Doug Smith, P.E., Jacobs Engineering

Navajo Nation

Robert Kirk, Principal Hydrologist

John Leeper, P.E., WSP

Hopi Tribe (Observer)

Neil Blandford, R.G., Daniel B. Stephens & Associates

Background

- Many studies identify a water supply shortfall for Flagstaff and Navajo Nation.
- Flagstaff and Navajo Nation at high risk of catastrophic climate conditions (i.e. wildfire or long-term drought).
- Brackish groundwater is expensive to treat.

Photo: Controlled burn in vicinity of City of Flagstaff well house on USNF lands (Brian Huntzinger, City of Flagstaff Water Services, Water Production Manager)

Background (continued)

Twin Arrows Navajo Casino Resort

- Navajo Nation anticipates significant economic development along I-40 corridor.
- In 2005, Flagstaff purchased Red Gap Ranch (RGR) for future water supply.

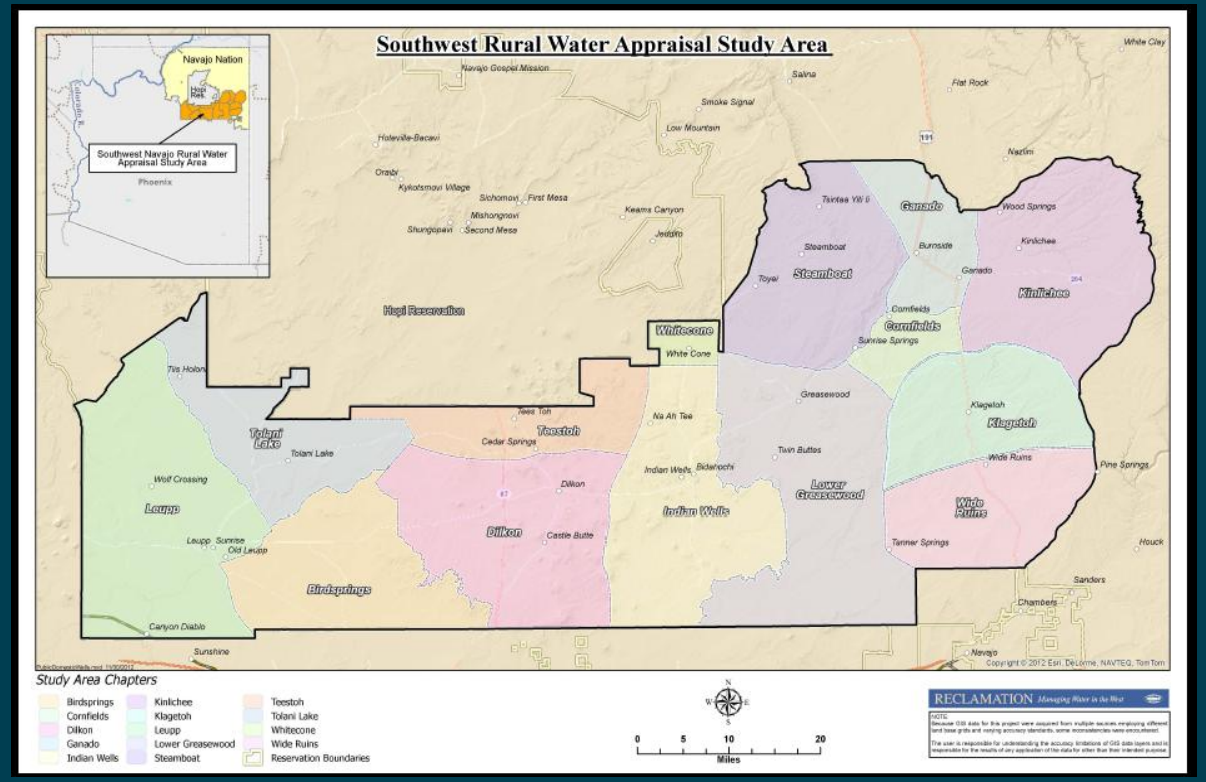
Red Gap Ranch Headquarters Area

Purpose of Analysis “GOAL”

Provide a resilient and redundant regional water supply for sustainable residential and economic development for Flagstaff and portions of the Navajo Nation in Northern Arizona.

Navajo Nation Concerns and Opportunities

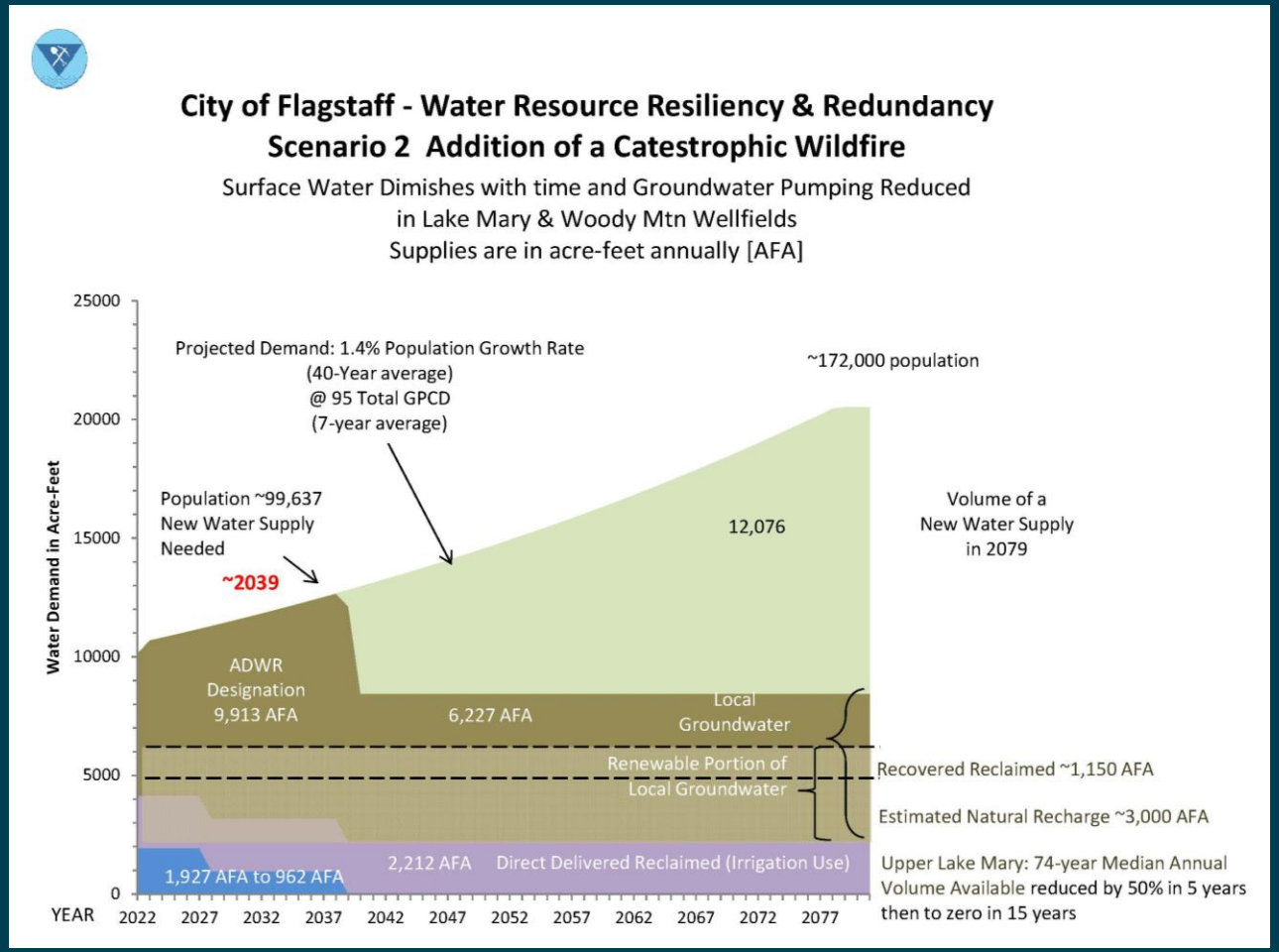
- Potential impact of RGR pumping on water supply and water quality on the Southwest Navajo Rural Water Project (SWNRWP) Service Area.
- Economically supply the SWNRWP and Twin Arrows Area from RGR Municipal Wells.
- Deliver higher water quality into the Navajo Tribal Utility Authority (NTUA) systems.



SWNRWP Service Aea

Flagstaff Concerns

- RGR is necessary to meet build-out water demand modeled at 16,500 AFY
- Flagstaff has a greater likelihood of wildfire than 99% of cities nationwide (Wildfirerisk.org)
  - 76% of Flagstaff's water infrastructure is located on heavily forested US Forest Service land
  - "One Fire Away" from a significant regional water crisis

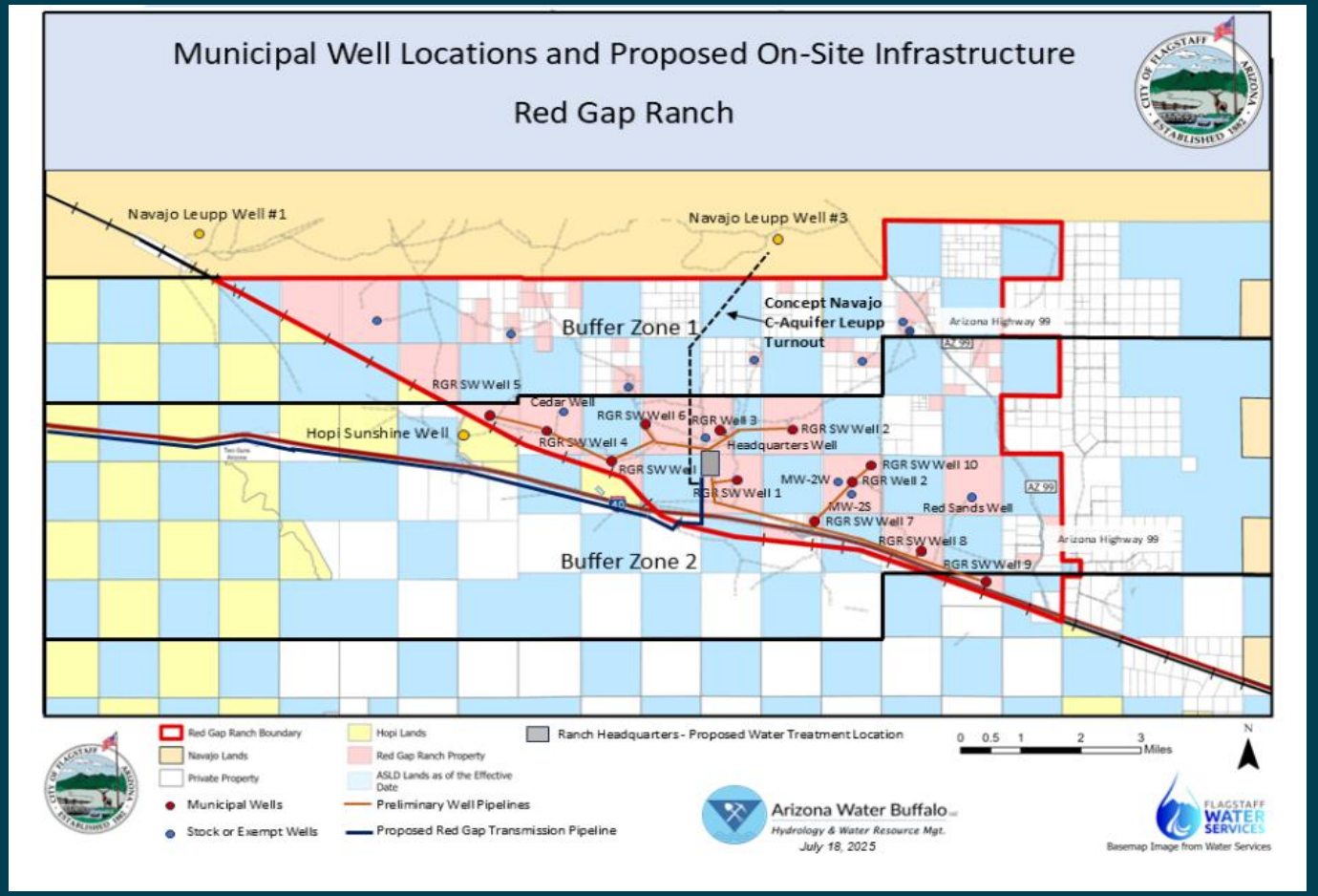


Flagstaff Opportunities

- Collaboration with Navajo Nation, Hopi Tribe and regional stakeholders.
- Supports voter-approved Flagstaff Regional Plan and Coconino County General Plan.
- Supports regional economic development.
- Potential to develop clean energy at RGR and along I-40 corridor.
- Further Flagstaff's commitment to clean energy and energy. independence
- Develop regional project consistent with Northeastern Arizona Indian Water Rights Settlement Agreement (NAIWRSA).

Regional Opportunities at Red Gap Ranch

- Design for a wellfield that utilizes the City's existing Municipal Wells at RGR that are located two or more miles south of the Navajo Reservation.
- Manage and convey water from RGR for Flagstaff and potential use by the Navajo Nation or others.
- Multi-use potential of RGR.



Reclamation Involvement

- Trust responsibilities for Native American tribes.
- In 1998, Arizona Department of Water Resources (ADWR) conducted the North Central Arizona Water Supply Study (NCAWSS), resulting in Reclamation technical assistance for a Phase I report.
- In 2000, Reclamation conducted an appraisal level regional water supply study to look at additional alternatives.
- In 2003, The Hopi Western Navajo Water Supply Study was completed.

Reclamation Involvement

- In 2005, through a Reclamation WaterSMART grant, the Coconino Plateau Watershed Advisory Council (CPWAC) was formed. (*Now called Coconino Plateau Watershed Partnership).*
- In 2005, Reclamation conducted C-Aquifer studies near Leupp to develop a groundwater model.
- In 2006, NCAWSS Report of Findings (Plan of Study) concluded that Federal Objectives and justification exist for a Feasibility Study.
- In 2010, the CPWAC requested funding under Reclamation's Rural Water Supply Program to have Reclamation conduct a Feasibility Study of alternatives.

Reclamation Involvement

- In 2015, the Southwest Navajo Rural Water Project Appraisal Study was completed.
- In 2016, the Rural Water Supply Program expired.
- In 2020, Navajo-Hopi Value Planning Study was completed.
- In 2022 and 2024, Flagstaff approached Reclamation for technical assistance to develop water supplies for Flagstaff.
- In 2025, Reclamation conducted the *Future Water Supply Study for Navajo Nation, Flagstaff and Regional Water Users* Value Planning Study.
- In 2025, Reclamation initiated scoping with Navajo Nation, Flagstaff, and regional stakeholders for the Appraisal Study.

Reclamation's Value Program - Purpose

- Satisfy Public Law, OMB A-131, and DOI Requirements
  - DOI DM 369-1: The ultimate goal is the acquisition of the most functionally effective assets, products, and programs at initial and life-cycle costs that provide best value to the government.
  - Public Law 104-106: improving performance, reliability, quality, safety, and life cycle costs.
- Make good projects better.
- Save taxpayer dollars.

Value Analysis (VA)

- A systematic process used by a multidisciplinary team to improve the value of a project, product, or process through the analysis of functions at the lowest overall cost." (Lawrence D. Miles Value Foundation)
- Inject creativity (imagination) into the design process
- Result of Value Analysis is to best balance the needs of the user and client to the cost.

Builds CONSENSUS

Major Benefits

- Super tool for formulating alternatives for a project
- Get projects to go with one or more alternatives
- Often get stakeholder buy-in and management support…

Silver Jack, 1969, Lloyd Lozes Goff

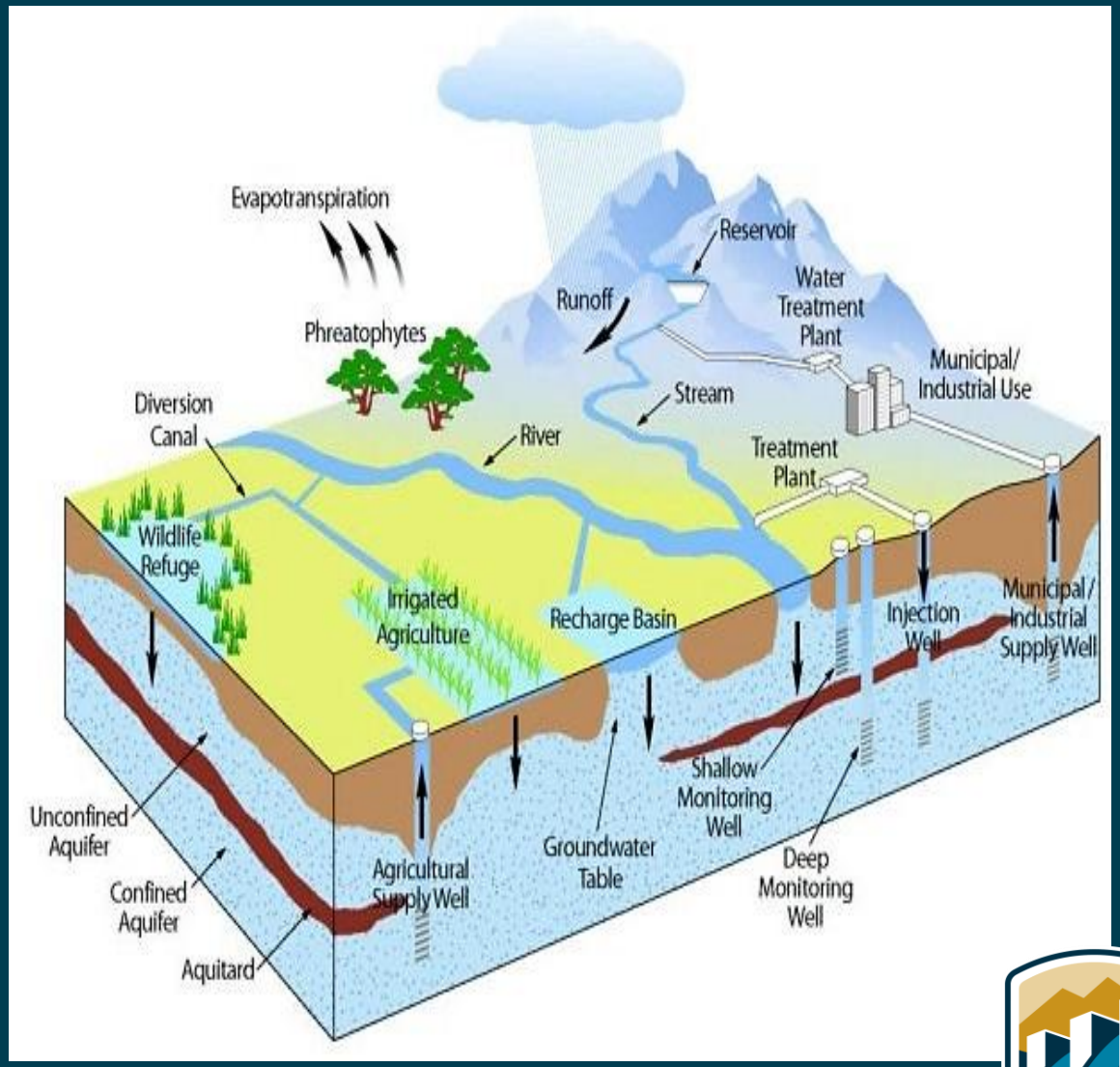
Phase II: Value Study Workshop Job Plan

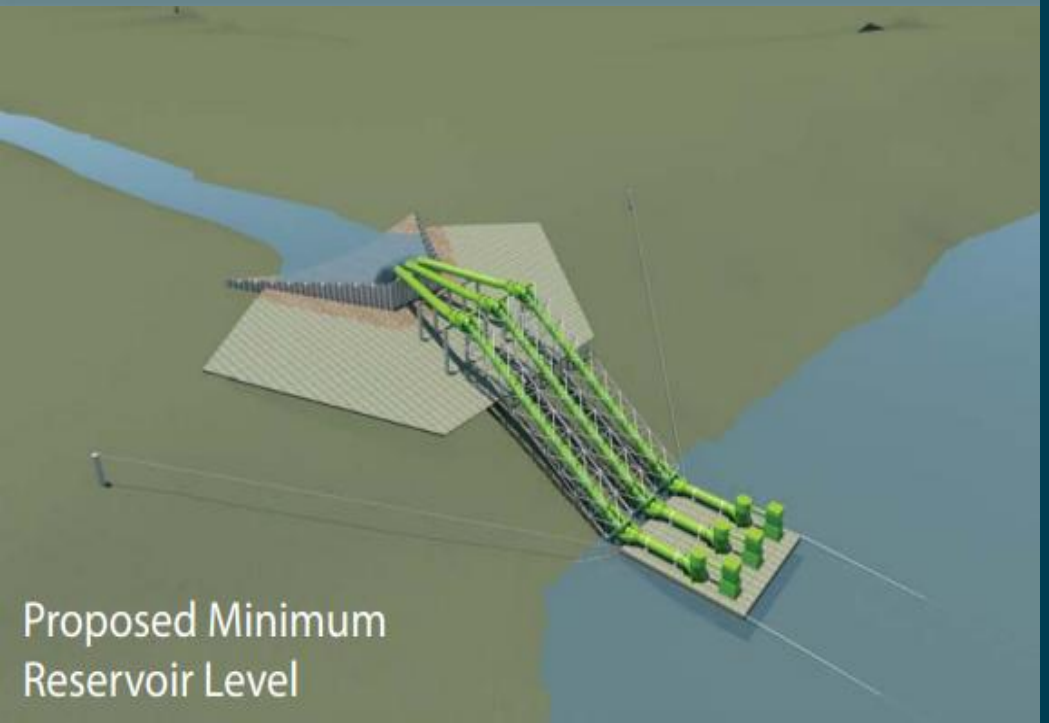
1. Preparation
2. Information
3. Function Analysis
4. Creativity
5. Evaluation
6. Development
7. Presentations
8. Implementation

Water Resources Planning

Issues center on:

- Quantity
  - How much?
- Quality
  - Temperature, Nutrients, Dissolved O2, etc.
- Timing
  - When is it available?
- Location
  - Where?





Water Resources Planning (Cont.)

- Purpose is to solve water and related resources problems – such as improving water supplies, generating hydropower, enhancing the environment, etc.

- Planning helps decision-makers identify water resources problems, conceive solutions to them, and compare the importance of competing or conflicting needs

Appraisal Study

- Identify a range of solutions that could address the problem or issue
- Determines whether Reclamation should investigate problems in more detail
- Limited in scope
- Uses existing information and data with very limited new data
- Conducted by Reclamation staff and cost-share partner(s)

Reclamation's Value Program - Objectives

- Achieve the most appropriate and highest value solution for the project.
- This Value Planning Study is not a decision document.
  - Aid in establishing where to focus design efforts in progressing forward on the project.
  - Alternatives will be presented to decision-makers for consideration.
  - The decision to accept or reject individual alternatives will be made through a combined effort between designers, managers, and project stakeholders.
  - Decisions will be documented in an Accountability Report.

Value Planning Process

Phase I: Site Visit

- Preparation
- Study Team orientation
- Background information
- Site Visit

Phase II: Workshop

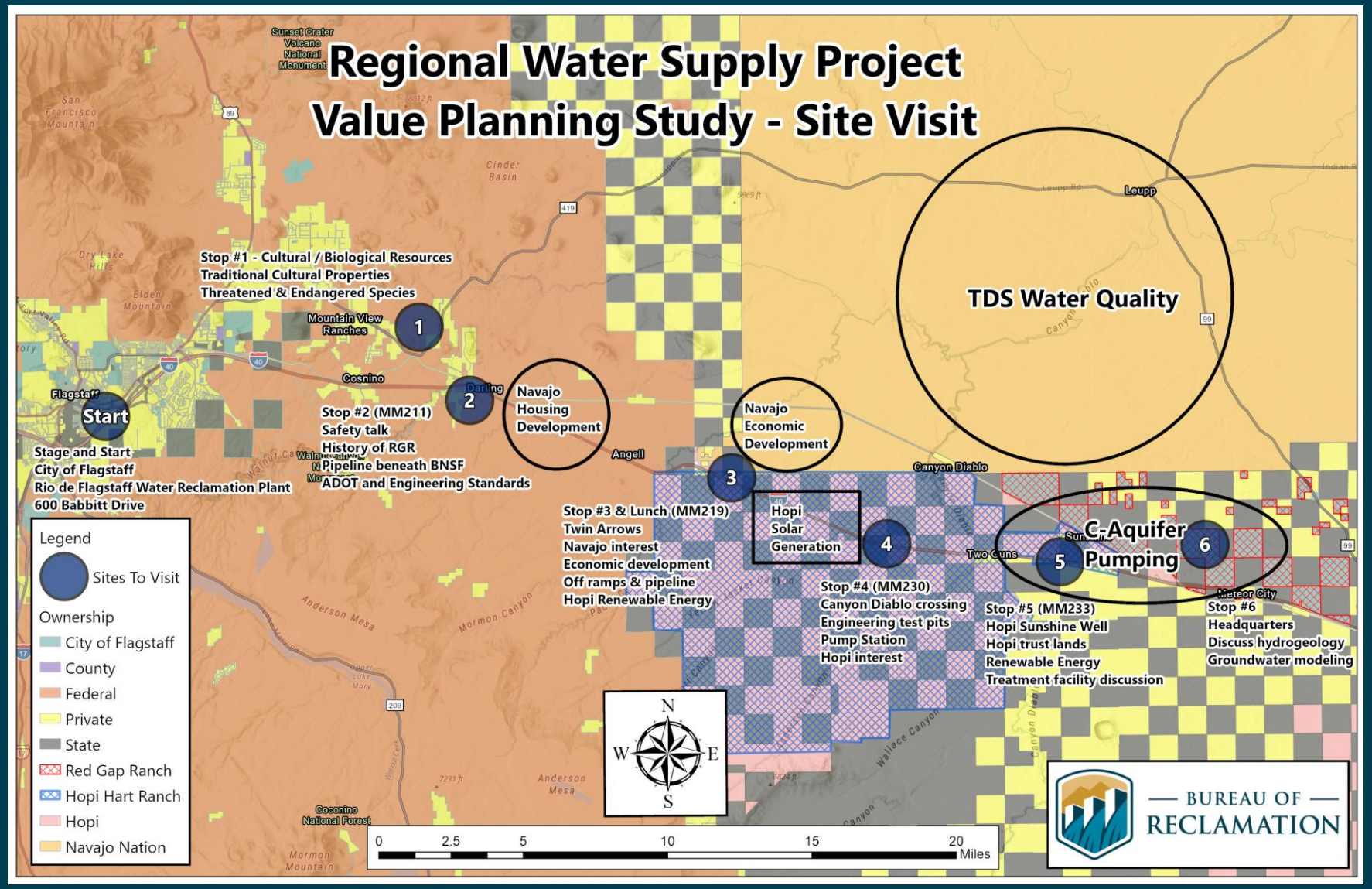
- Additional resources
- Week-Long Value Planning workshop

Phase III: Summary of Findings

- Presentation
- Report

House at Red Gap Ranch Headquarters Area

Phase I: Site Visit Locations



VP Study Team Site Visit

1- Preparation Phase

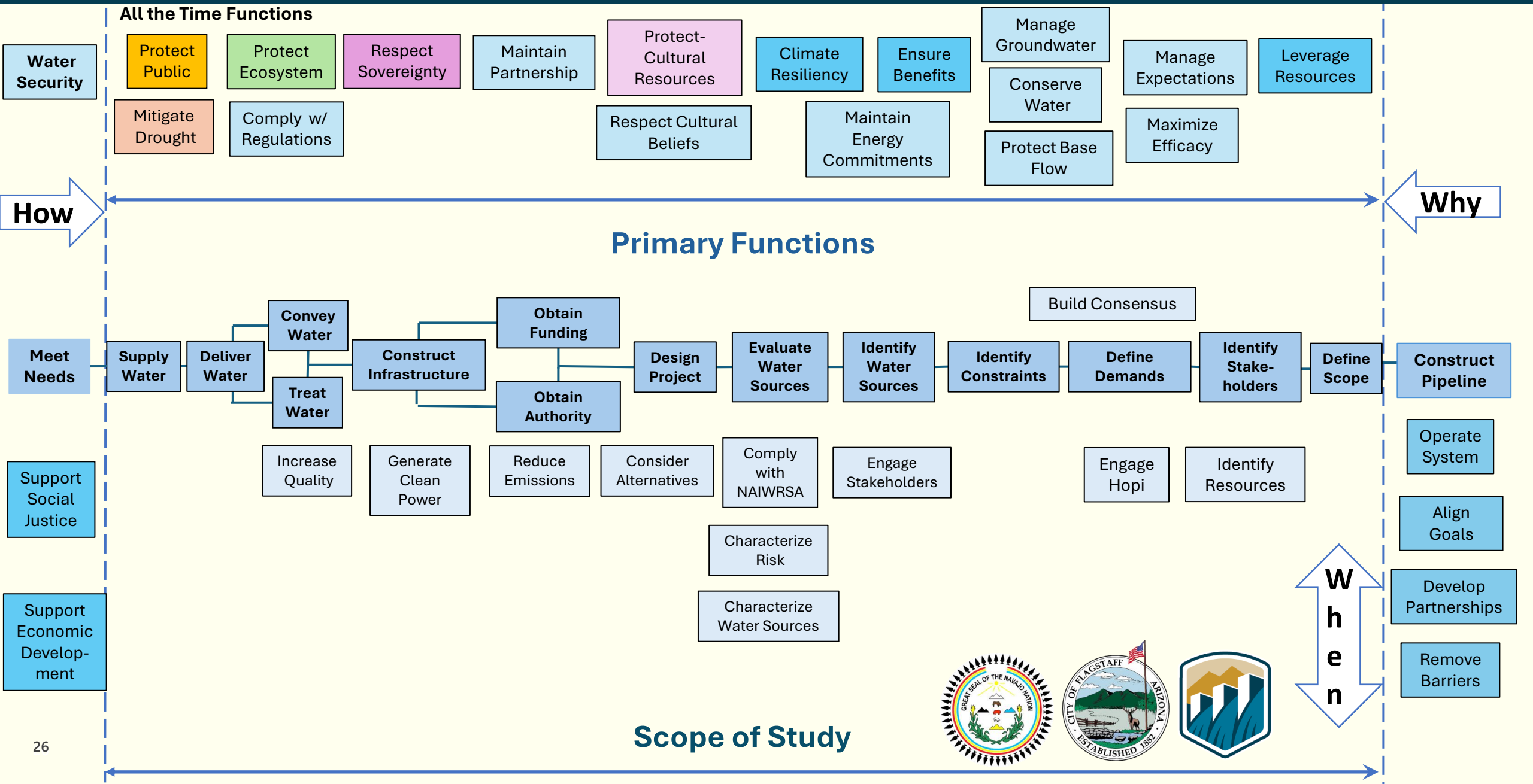
- Eleven team meetings to prepare for Site Visit and VP workshop from March through July 2025

2- Information Phase

- Navajo Nation and Flagstaff Guidance documents
- Compilation of over 30 existing reports
- ADWR, BOR, Flagstaff, and Navajo Nation have been performing studies since 1998

VP Study Team at House at Red Gap Ranch Headquarters area

3. Function Analysis -Red Gap Ranch FAST Diagram



4. Creativity: 146 Ideas Generated

VP Study Team Workshop

Ideas

No.	Function	Idea	Appraisal	Disposition (Evaluation)
1	Define Demands	Population projection to be served per capita water use		
2	Define Demands	Population growth rates		
3	Define Demands	Land use type		
4	Define Demands	Commercial use		
5	Define Demands	Industrial use		
6	Define Demands	Tribal Land Use		
7	Identify Water Sources	Groundwater from 'C' Aquifer	Yes	
8	Identify Water Sources	Groundwater from 'R' Aquifer	Yes	
9	Identify Water Sources	Groundwater from 'N' Aquifer		Location limiting; not available
10	Identify Water Sources	Surface Water - Colorado River Water - Upper Basin	Yes	
11	Identify Water Sources	Surface Water - Colorado River Water - Lower Basin	Yes	Combine with No. 35 and 37
12	Identify Water Sources	Surface Water - Little Colorado River Water	Yes	
13	Identify Water Sources	Surface Water - Little Colorado River Tributary Projects	Yes	
14	Identify Water Sources	3 Canyon Project	Yes	Looked and found nothing
15	Identify Water Sources	Tucker Flat Project	No	Looked and found nothing
16	Identify Water Sources	Water Reuse - Indirect Potable Reuse (IPR)	Yes	
17	Identify Water Sources	Water Reuse - Direct Potable Reuse (DPR)	Yes	
18	Identify Water Sources	Lake Mary - Lining of Lake Mary Lower	Yes	Combine with conservation alternative
19	Identify Water Sources	Lake Mary - Lining of Lake Mary Upper	Yes	Combine with conservation alternative

5. Evaluation: Weighted Criteria Matrix

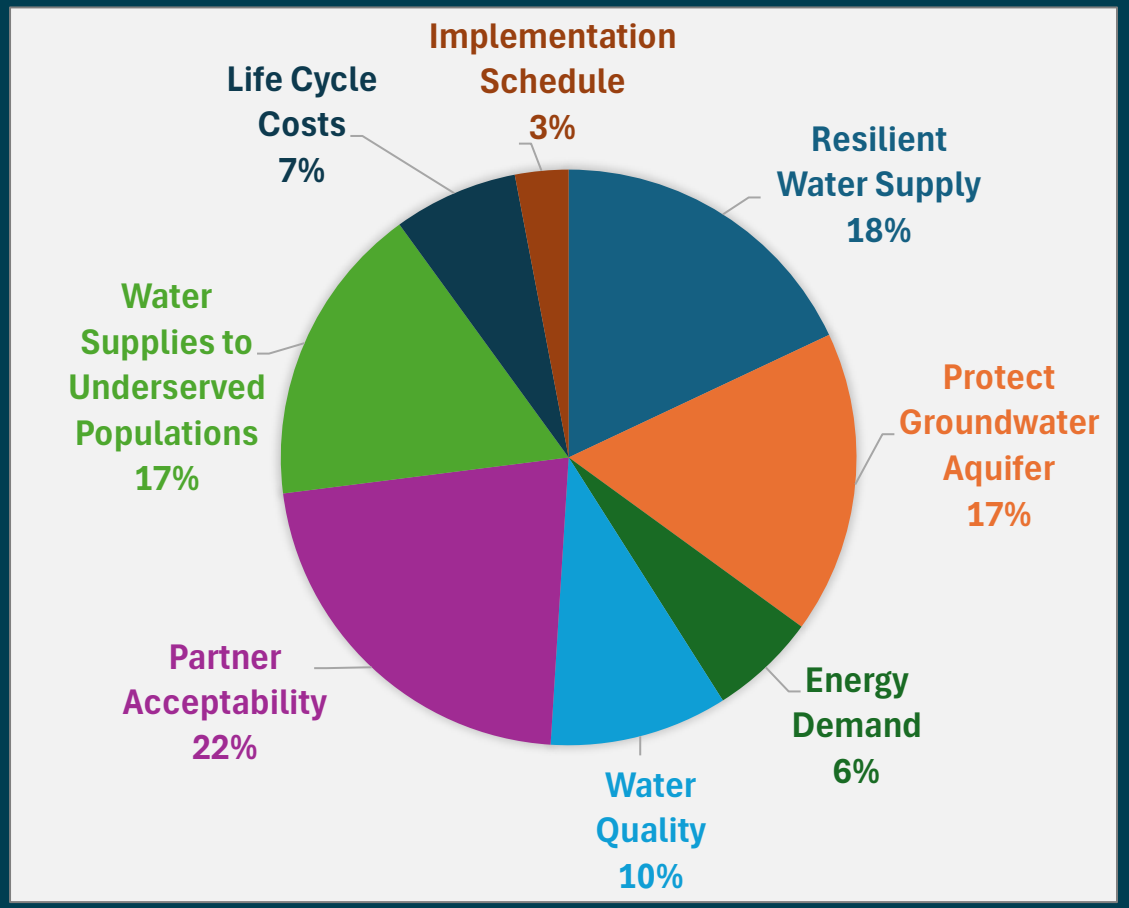
Criteria Scoring Matrix

Criteria:	Preference		Preference		Preference		Preference		Preference		Preference		Preference		*Rounded Percentage*
	A or	B	A or	C	A or	D	A or	E	A or	F	A or	G	A or	H	
A. Resilient Water Supply		1	3		2			2	1		2		3		18%
	B or	C	B or	D	B or	E	B or	F	B or	G	B or	H			
B. Protect Groundwater Aquifer	2		2			1		1	2		3				17%
	C or	D	C or	E	C or	F	C or	G	C or	H					
C. Energy Demand		3		3		3		1	2						6%
	D or	E	D or	F	D or	G	D or	H							
D. Water Quality		2		2	1		1								10%
	E or	F	E or	G	E or	H									
E. Partner Acceptability	1		2		3										22%
	F or	G	F or	H											
F. Water Supplies to Underserved Populations	1		3												17%
	G or	H													
G. Life Cycle Costs *	2														7%
H. Implementation Schedule															3%
															1
How Important: Major Preference = 3, Medium Preference = 2, Minor Preference = 1, No Preference Each = 0															100%

* Life Cycle Costs include capital and OM&R

5. Evaluation: Weighted Criteria Results

1. Partner Acceptability (22%)
2. Resilient Water Supply (18%)
3. Water Supplies to Underserved Populations (17%)
4. Protect Groundwater Aquifer (17%)
5. Water Quality (10%)
6. Life Cycle Costs (7%)
7. Energy Demand (6%)
8. Implementation Schedule (3%)



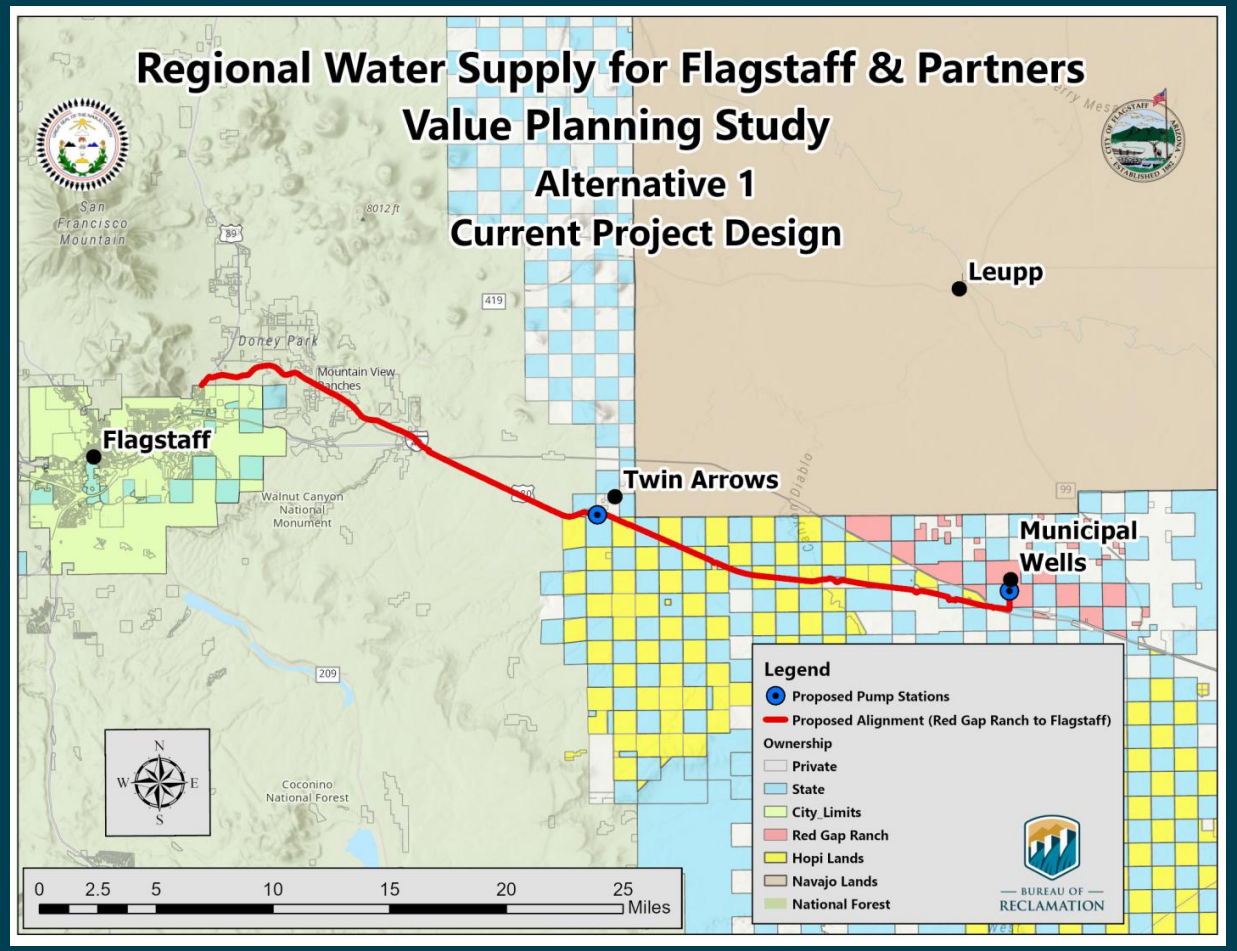
6. Development of Alternatives: Considerations

- Design - Source water, conveyance
- Partnerships – Consensus based
- Funding - Local, federal, private, joint
- Risks - Resiliency of supply, quality of supply, costs of construction and conveyance
- Water Treatment – Type, location
- Energy and Power - Source: solar, grid, wind
  Power Demand: water treatment, conveyance

Alternatives

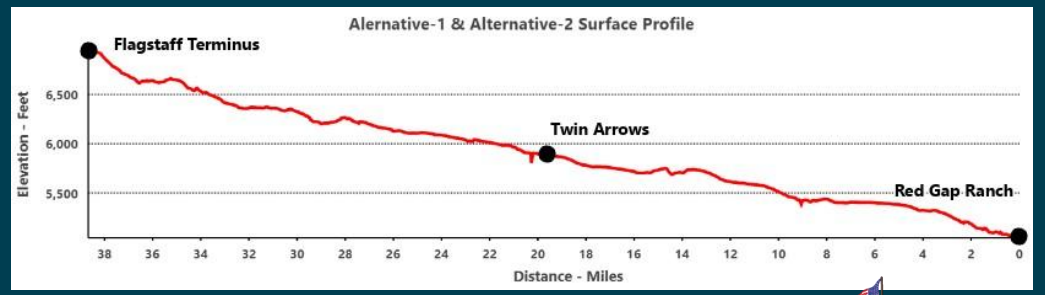
1. 1A – Pumping Municipal Wells at RGR with Treatment at Red Gap Ranch
2. 1B – Pumping Municipal Wells at RGR with Treatment at Twin Arrows
3. 1C – Pumping Municipal Wells at RGR with Treatment at Flagstaff
4. 2A – Alternative 1 with Aquifer Storage and Recovery at Red Gap Ranch
5. 2B – Alternative 1 with Aquifer Storage and Recovery at Flagstaff
6. 3 – Expand City of Flagstaff Municipal Wells Near Flagstaff
7. 4A – Colorado River Water – Lake Powell (Upper Basin)
8. 4B – Colorado River Water – Bullhead City/Lake Mohave (Lower Basin)

Alternative 1: Baseline



General Concept

- Develop municipal wells at RGR
- Groundwater treatment for Total Dissolved Solids
- Pipeline from RGR to Flagstaff (approximately 40 miles) with future turnouts
- Flagstaff manages recycled water in the City



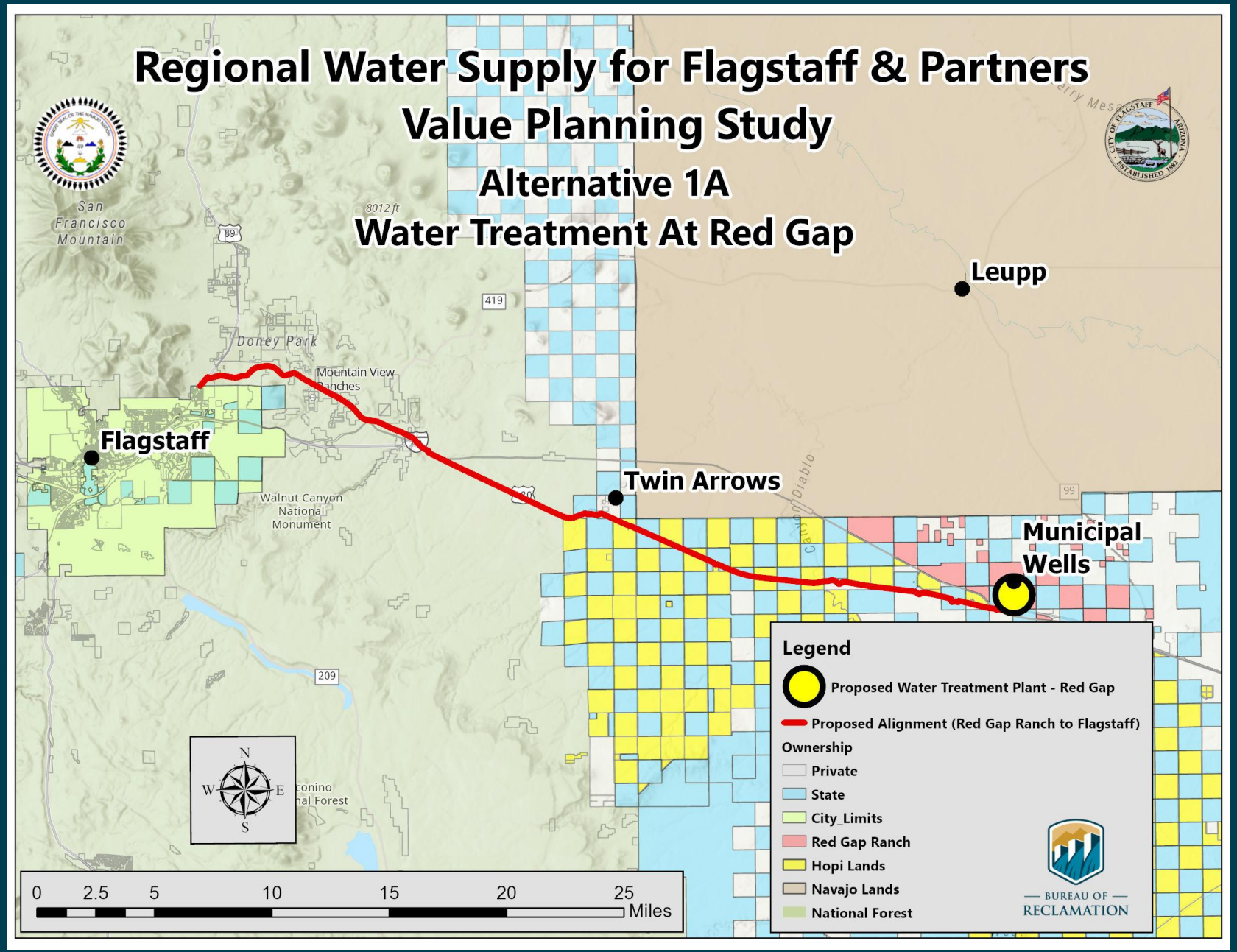
Alternative 1 – Advantages and Disadvantages

Advantages:

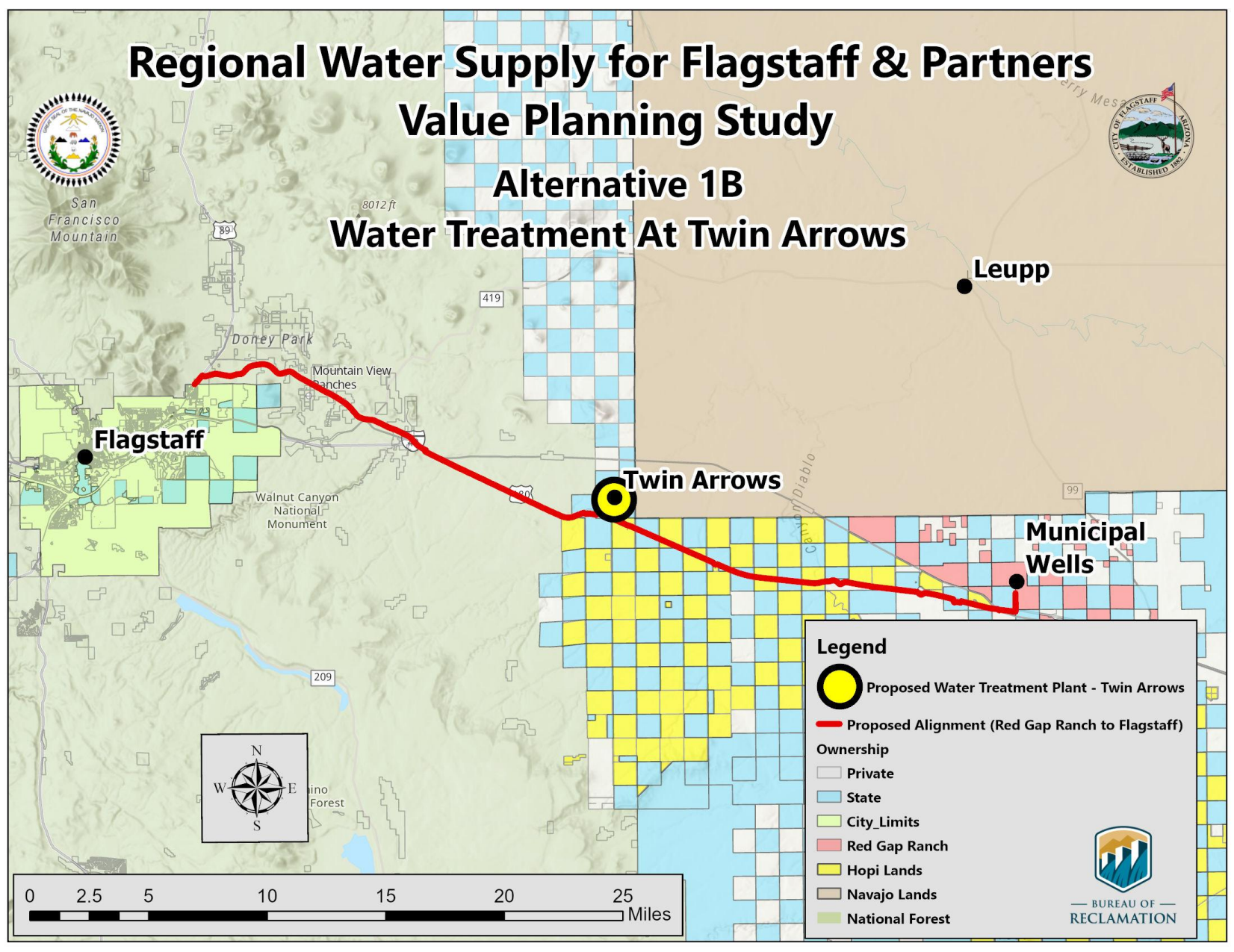
- Flagstaff owns RGR (2005)
- Resilient water supply
- Water source is close to Navajo Nation lands
- Higher-quality water
- Clean Power generation opportunities
- Manage pumping to reduce potential impacts to regional groundwater system
- 12 Municipal Wells are already drilled to C aquifer
- Flagstaff acquired ROW for the pipeline from RGR to Flagstaff
- Flagstaff Feasibility Study (10% Design) – Jacobs Phase II Report
- COF-ADOT agreement in place
- Groundwater modeling studies suggest robust aquifer conditions
- Cultural assessment conducted for RGR and along pipeline
- Biological assessment for RGR

Disadvantages:

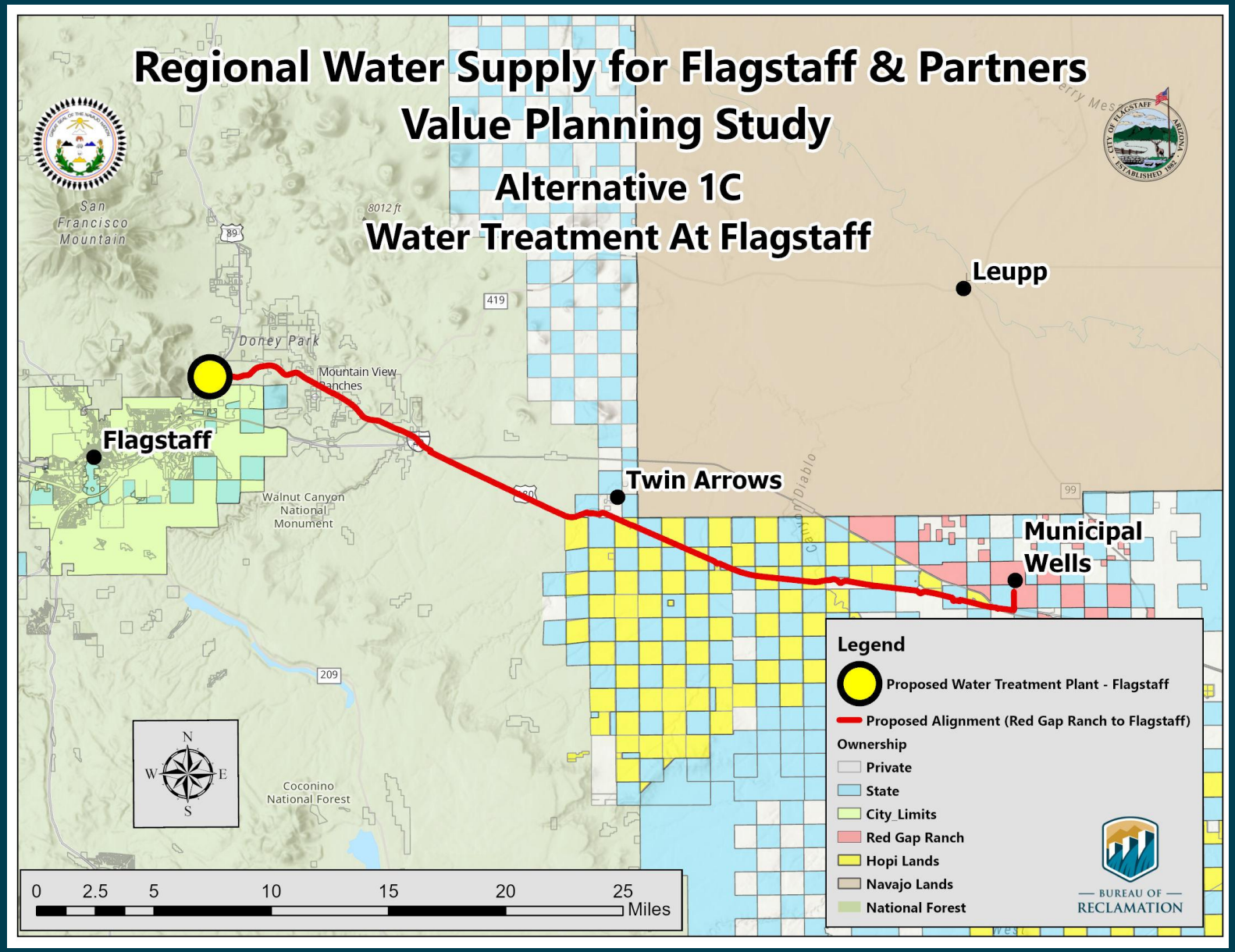
- Considerations of brine disposal
- Water volume loss with treatment of raw groundwater



Alternative 1A – Pumping Municipal Wells at RGR with Treatment at RGR

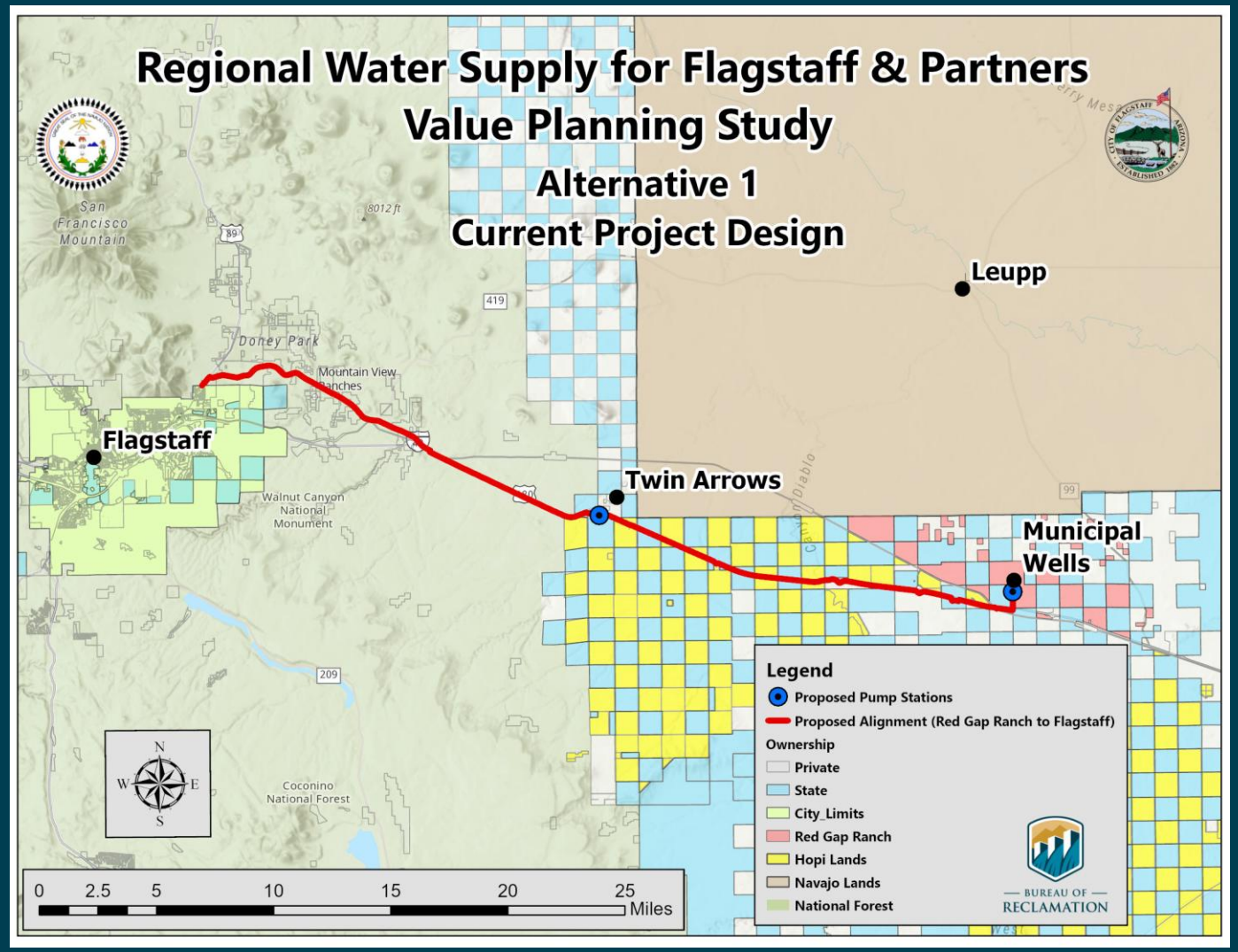


Alternative 1B – Pumping Municipal Wells at RGR with Treatment at Twin Arrows



Alternative 1C –Pumping Municipal Wells at RGR with Treatment at Flagstaff

Alternative 2 – Alternative 1 (a, b, or c) with Aquifer Storage and Recovery (ASR)



General Concept

- In conjunction with Alternatives 1A, 1B, and 1C
- Recycled water stored underground at various locations

Alternative 2 – Continued

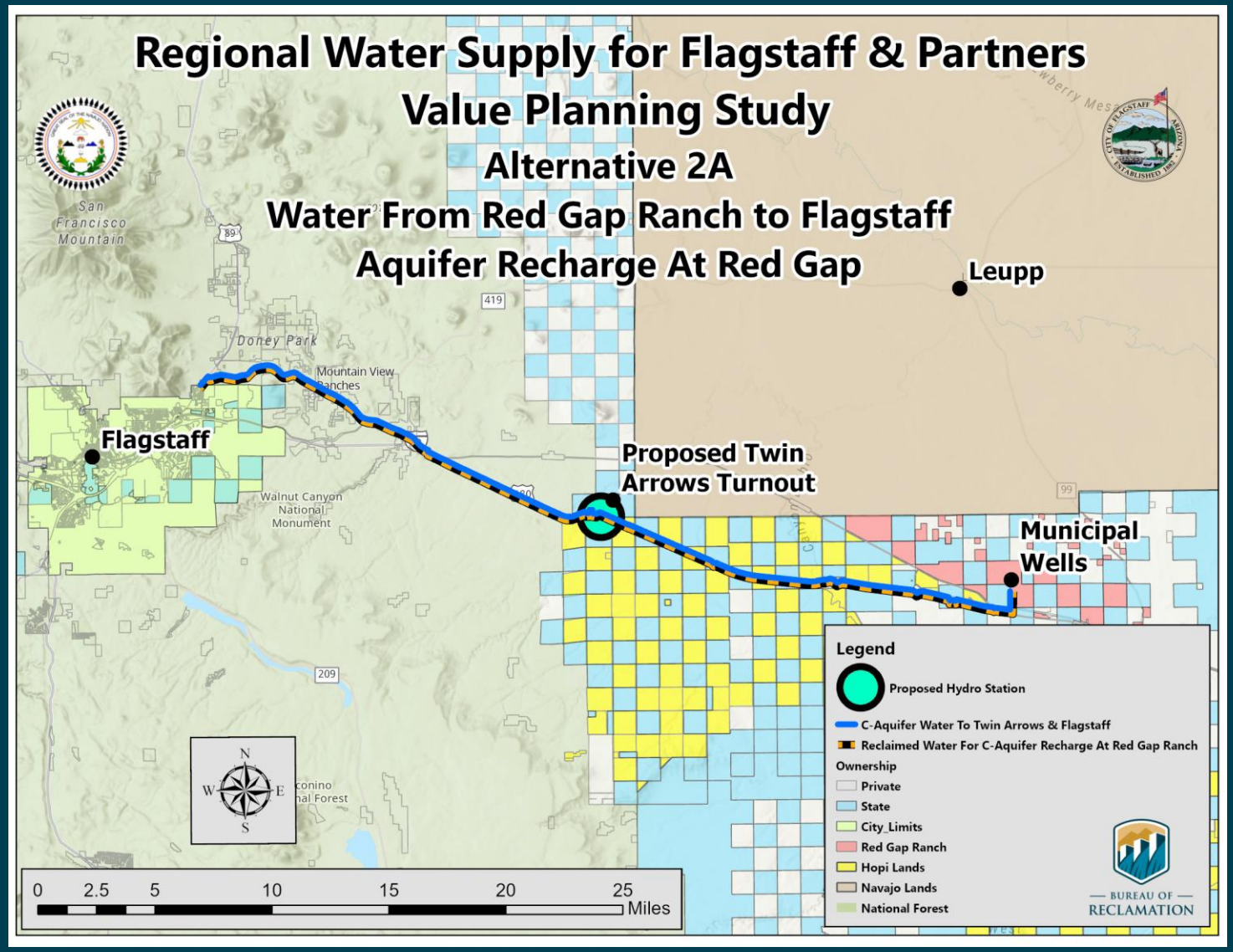
Advantages:

- Resilient water supply for Flagstaff and Navajo Nation
- Water treatment operations central to Flagstaff and existing workforce
- Water recycling projects augments groundwater resources
- Greater operational flexibility to manage C Aquifer groundwater pumping and peak demand
- Potential Operations, Maintenance, and Replacement (OM&R) cost benefits

Disadvantages:

- Higher capital and operational expense
- Power supply and demand for additional recycled water projects

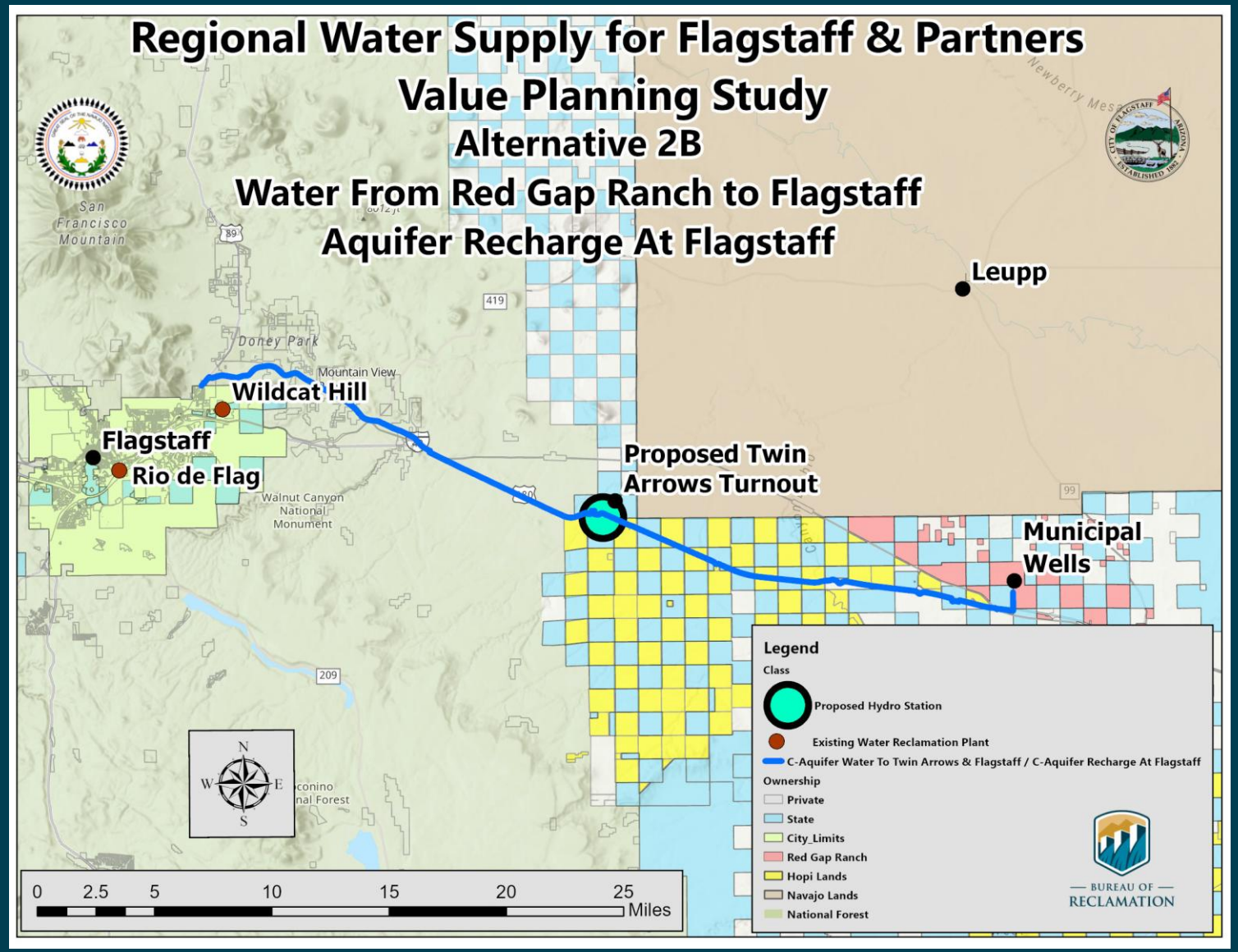
Alternative 2A – Alternative 1 with ASR at RGR



Description:

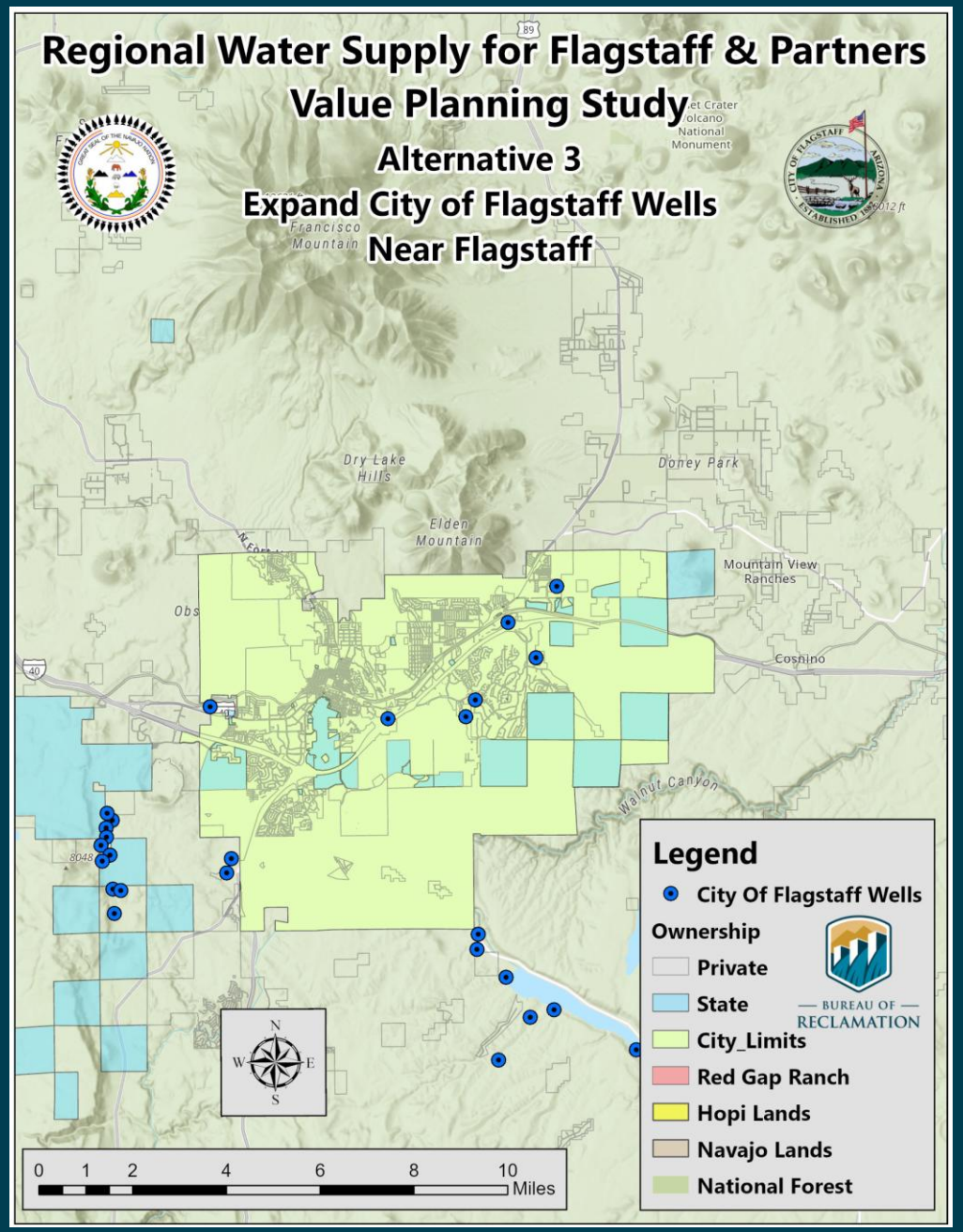
Recycled water from Flagstaff returned to RGR in separate pipe to recharge the aquifer

Alternative 2B – Alternative 1 with ASR at Flagstaff



Description:

Recycled water generated from RGR groundwater is recharged and stored underground within Flagstaff



Alternative 3 – Expand City of Flagstaff Wells Near Flagstaff

Description:

Expand existing well fields or develop new well field(s) to import additional groundwater from C Aquifer from locations closer than RGR.

Alternative 3 – Expand City of Flagstaff Wells Near Flagstaff

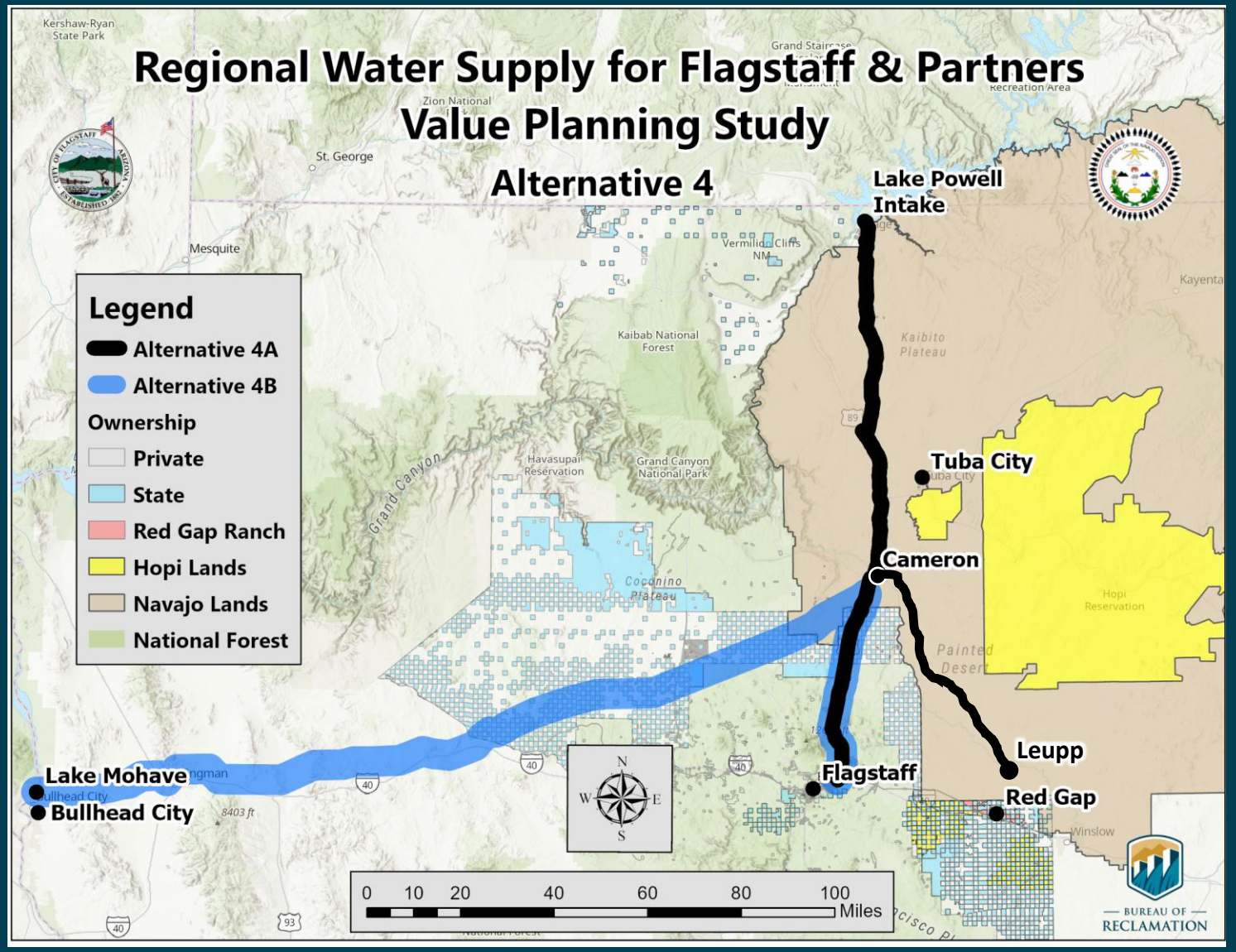
Advantages:

- Closer to Flagstaff
- Reduced travel
- Possible water hauling load-out station for County residents or others not located along RGR pipeline corridor

Disadvantages:

- Would not provide water for regional water users along I-40
- Deeper depth to groundwater; more expensive drilling projects
- OM&R expenses with wells deeper than at RGR
- Concerns regarding sustainability, resiliency and reliability
- Wells subject to Arizona Public Service Public Safety Power Shutoff events during high wind events across high-fire-risk areas
- Locating suitable land with high-yielding production wells
- Permitting or leasing costs challenges

Alternative 4 – Colorado River Water



General Concept:

Withdraw water from the Colorado River, Upper and Lower Basins, and pipe to Cameron with dual spurs to Leupp and to Flagstaff

Alternative 4 – Continued

Advantages:

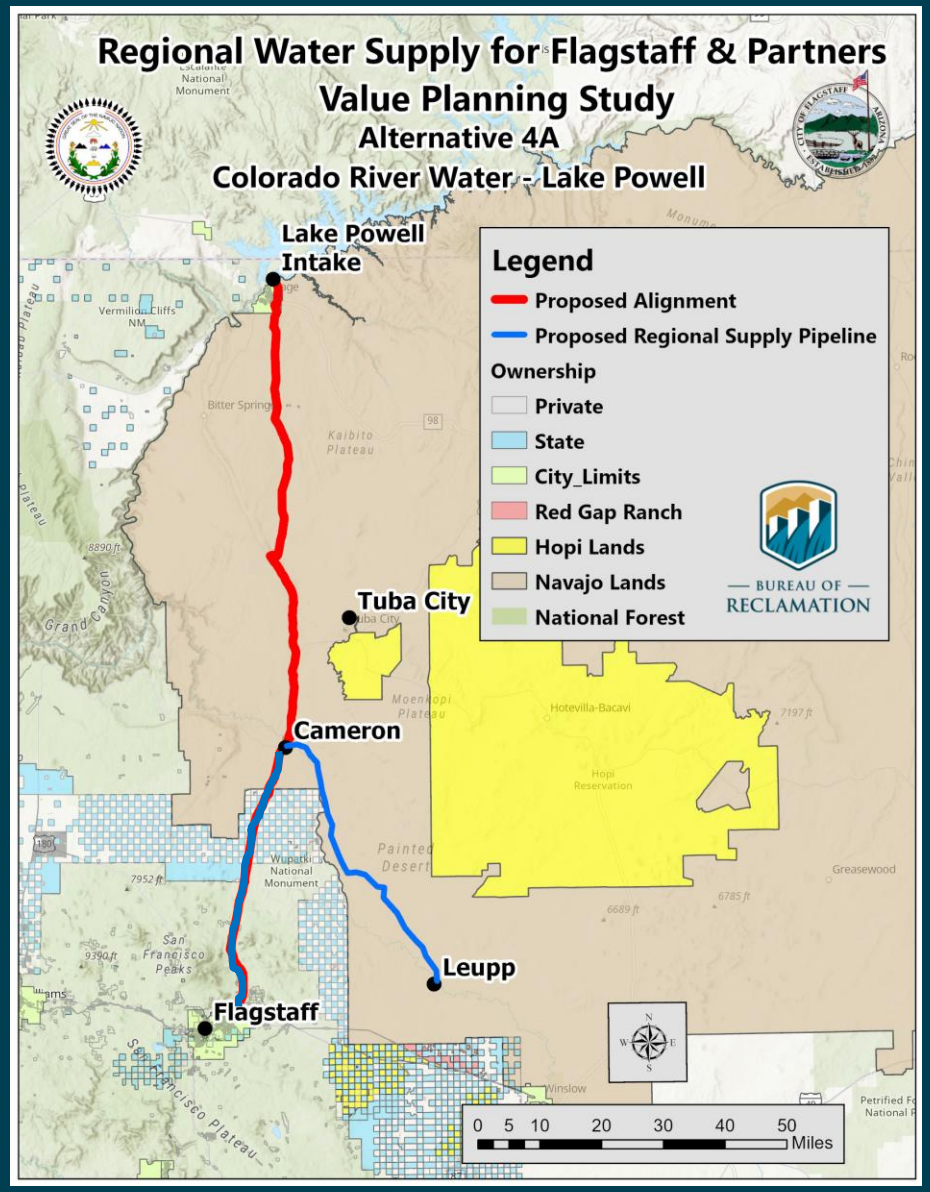
- Resilient water supply for Navajo Nation

Disadvantages:

- Anticipated long-term reduction in supply of Colorado River water
- More expensive water supply
- Flagstaff does not have a Colorado River Contract or authority to move Colorado River water
- Leasing Colorado River water is not a permanent solution

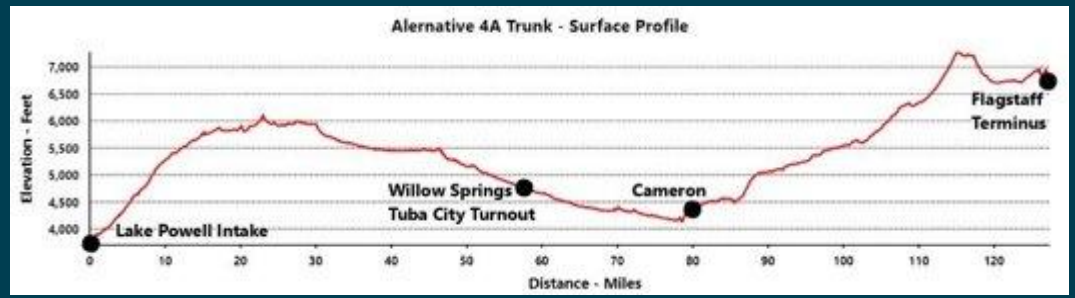
Alternative 4A – Colorado River Water – Lake Powell

(Upper Basin Water)

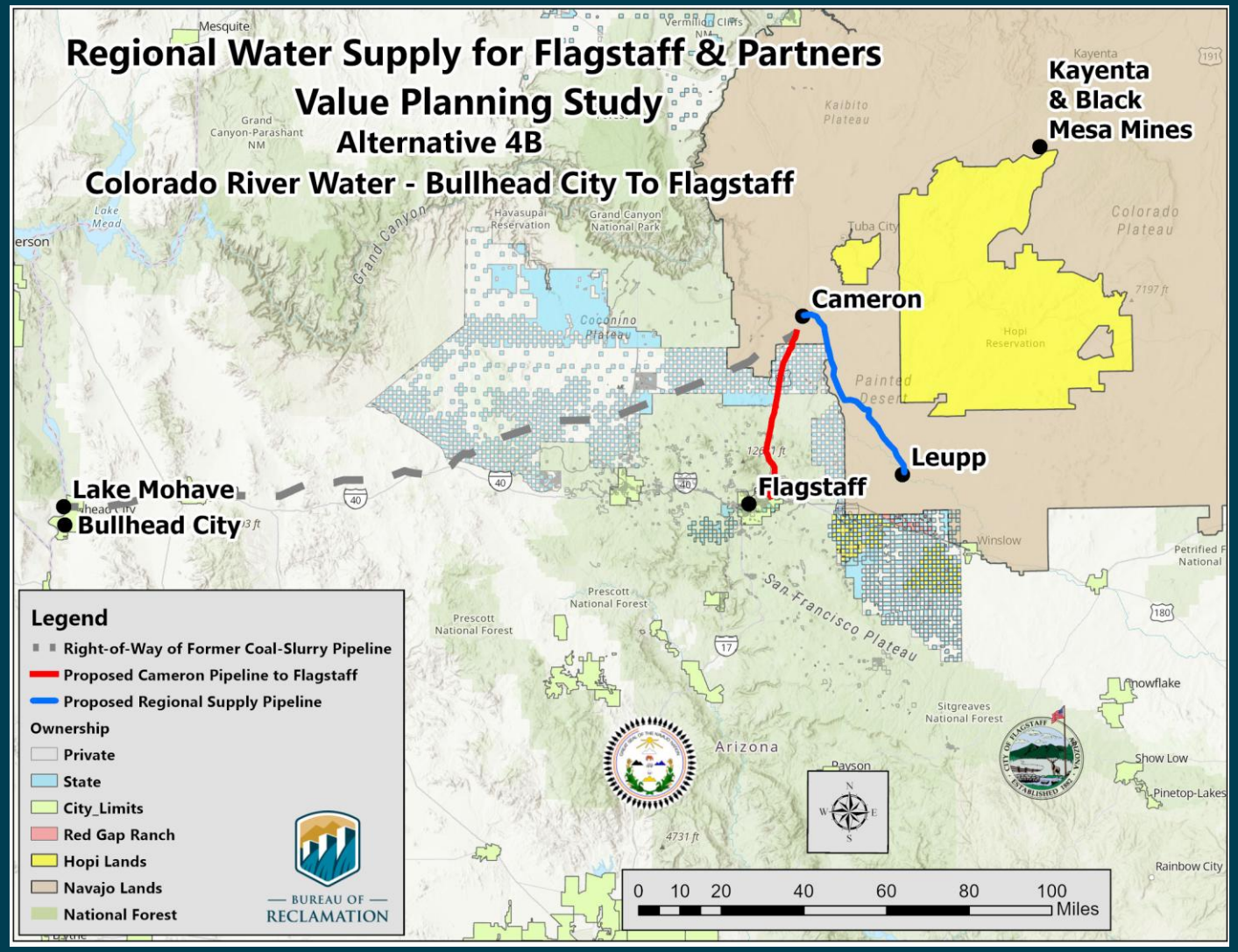


Description:

iiná bá - paa tuwaqat (pipeline) from the Upper Basin Colorado River at Lake Powell to Cameron with a spur to Leupp service area and a spur to Flagstaff Service Area



Alternative 4B – Colorado River Water – Bullhead City/ Lake Mohave (Lower Basin Water)



Description:

Pipeline following the Black Mesa coal slurry pipeline alignment from the Lower Basin Colorado River at Lake Mohave to Cameron with a spur to Leupp service area and a spur to Flagstaff Service Area

Alternatives Scoring Matrix

	Resilient Water Supply		Protect Groundwater Aquifer		Energy Demand		Water Quality		Partner Acceptability		Water Supplies to Underserved Populations		Life Cycle Costs		Implementation Schedule				
Criteria	A		B		C		D		E		F		G		H		Weighted Score	Ranking	Proposal
Weight	18		17		6		10		22		17		7		3				
	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted			
Alt 1A - Pumping Municipal Wells at RGR with Treatment at RGR	4	72.4	3	50.2	4	23.5	4	39.8	4	88.7	5	83.7	3	21.7	5	15.8	396	2	Alternative 1a
Alt 1B - Pumping Municipal Wells at RGR with Treatment at Twin Arrow	4	72.4	3	50.2	3	17.6	4	39.8	4	88.7	4	67.0	2	14.5	4	12.7	363	4	Alternative 1b
Alt 1C - Pumping Municipal Wells at RGR with Treatment at Flagstaff	4	72.4	3	50.2	2	11.8	3	29.9	2	44.3	3	50.2	1	7.2	4	12.7	279	7	Alternative 1c
Alt 2A - Alternative 1 with ASR at RGR	5	90.5	5	83.7	5	29.4	5	49.8	2	44.3	5	83.7	2	14.5	3	9.5	405	1	Alternative 2a
Alt 2B - Alternative 1 with ASR at Flagstaff	4	72.4	4	67.0	4	23.5	3	29.9	3	66.5	5	83.7	4	29.0	4	12.7	385	3	Alternative 2 b
Alt 3 - Expand City of Flagstaff Wells near Flagstaff	1	18.1	2	33.5	5	29.4	5	49.8	3	66.5	1	16.7	5	36.2	4	12.7	263	8	Alternative 3
Alt 4A - Colorado River-Lake Powell (Upper Basin Water)	4	72.4	5	83.7	2	11.8	4	39.8	3	66.5	2	33.5	2	14.5	2	6.3	329	5	Alternative 4a
Alt 4B - Colorado-Bullhead City/Lake Mohave (Lower Basin Water)	4	72.4	5	83.7	1	5.9	3	29.9	3	66.5	1	16.7	1	7.2	1	3.2	286	6	Alternative 4b

Score: Excellent = 5, Very Good = 4, Good = 3, Fair = 2, Poor = 1
Total Possible Score = 500

Score 400-500
Score 350-400
Score 300-350
Score 200-300

Alternatives in Ranked Order

1. 2A – Alternative 1 with ASR at RGR
2. 1A – Pumping Municipal Wells at RGR with Treatment at RGR
3. 2B – Alternative 1 with ASR at Flagstaff
4. 1B – Pumping Municipal Wells at RGR with Treatment at Twin Arrows
5. 4A – Colorado River Water – Lake Powell (Upper Basin Water)
6. 4B – Colorado River Water – Bullhead City/Lake Mohave (Lower Basin Water)
7. 1C – Pumping Municipal Wells at RGR with Treatment at Flagstaff
8. 3 – Expand City of Flagstaff Wells Near Flagstaff

7. Presentations

- Reclamation Management – Secretary's Indian Water Rights Office, Regional Director
- Flagstaff City Council
- Flagstaff Water Commission
- Navajo Nation Legal and Technical Team
- Navajo Nation Negotiation Team
- Coconino Plateau Watershed Partnership (CPWP)
- Others

8. Implementation (Next Steps): Potential Appraisal Study

- Develop Scope of Work (by end of 2025)
- Develop Budget and Schedule for Appraisal Study
- Obtain approval for Appraisal Study
  - Bureau of Reclamation
  - Navajo Nation
  - Flagstaff
- Develop Cost Share Agreements for Appraisal Study
- Conduct Appraisal Study in 2026

Alternative Elements recommended for Appraisal Level Investigations

- Modeling of the 'Coconino' aquifer
- Water Reuse - Indirect Potable Reuse (IPR)
- Water Reuse - Direct Potable Reuse (DPR)
- Lake Mary - Lining of Lake Mary Upper & Lower
- Expanding current well fields to private or public lands
- New Storage Reservoir
- Aquifer Storage and Recovery at different locations
- New solar/wind generation facilities
- Pump Storage
- Economic Development
- Cost of delivered water
- Volume allocations

Discussion