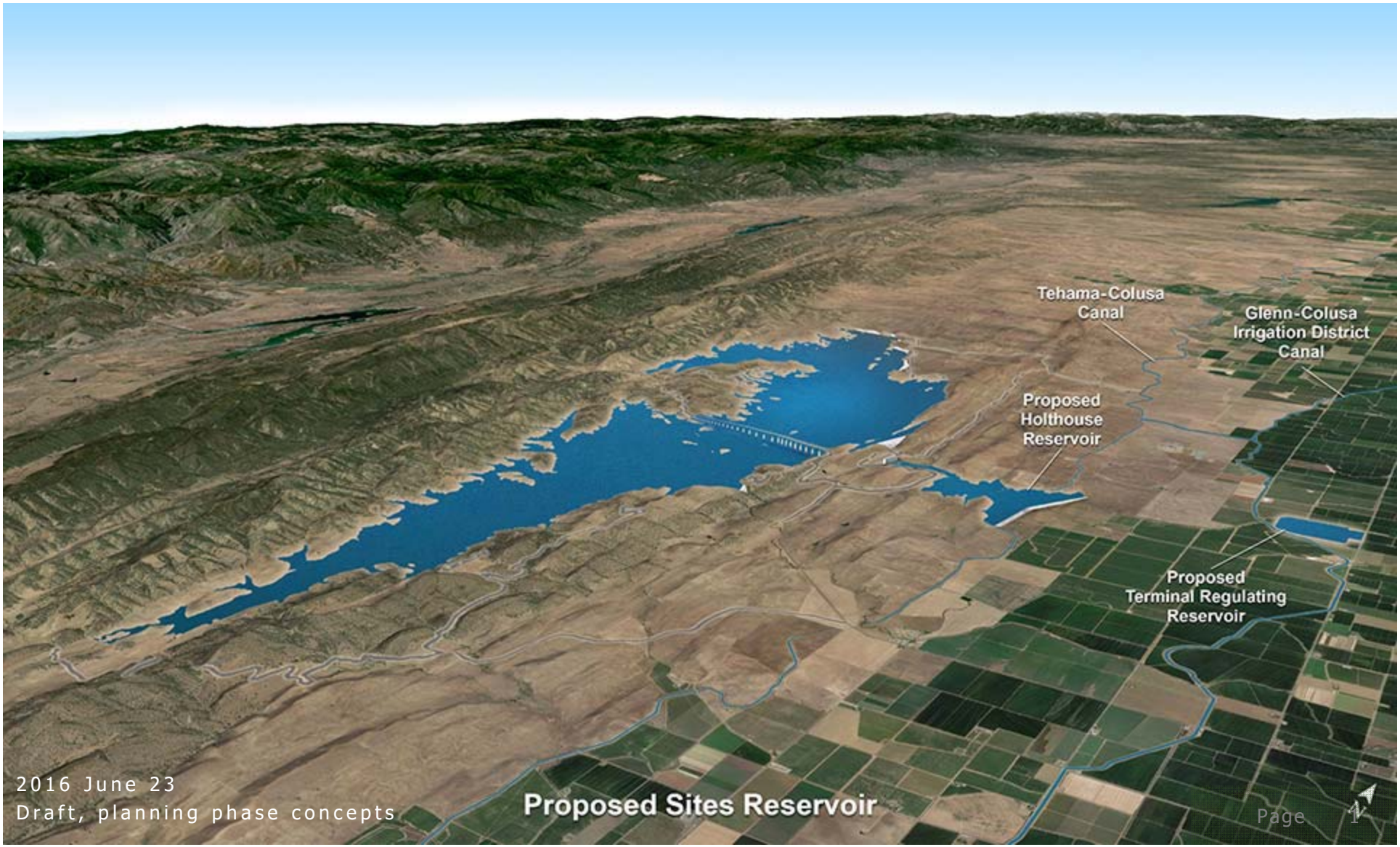
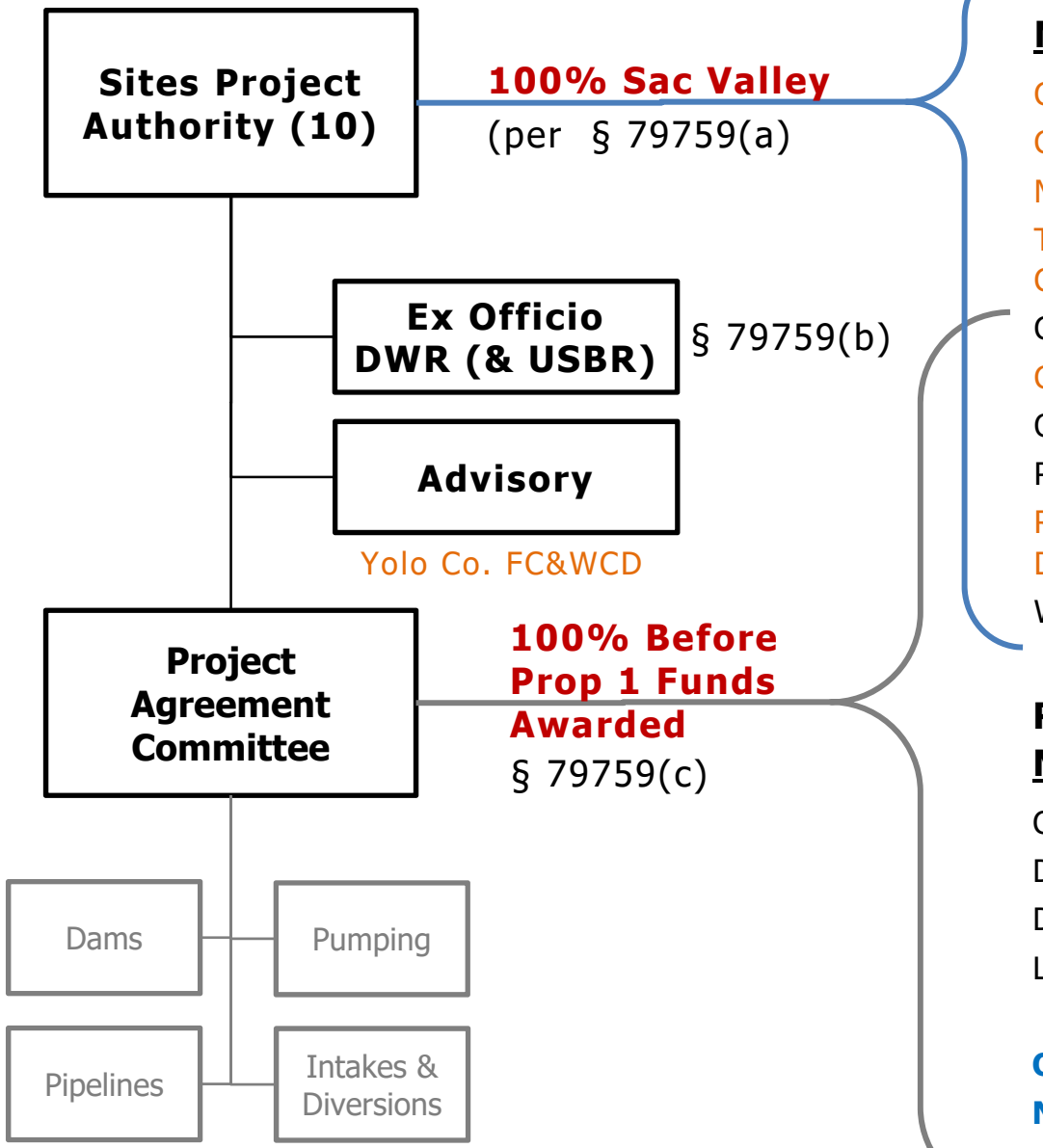
Sites Reservoir Project & Prop 1's Water Supply Investment Program



2016 June 23
Draft, planning phase concepts

Who Are the Members?



Authority Members (10)	Annualized Acre-Ft.
Colusa County	
Glenn County	
Maxwell ID	
Tehama-Colusa Canal Authority	
Colusa Co. WD	30,000
Glenn-Colusa ID	20,000
Orland-Artois WD	20,000
Proberta WD	3,000
Reclamation District 108	20,000
Westside WD	25,000

Represented Members	Acre-Ft.
Cortina WD	300
Davis WD	2,000
Dunnigan WD	5,000
LaGrande WD	3,000
Other Sac. Valley WD	TBD
Non-Sac Valley, M&I	TBD
Non-Sac Valley, Agriculture	TBD

What is the Sites Reservoir Project?

1. Configured to **achieve the co-equal goals** (2009 Delta Reform Act)

2. **Restore operational flexibility** to state's water system that has been lost over time

3. **Can dedicate a sizable amount of water to DFW & SWRCB** to manage to ensure State gets its return on investment

4. Can **contribute flows to meet SWRCB's pending actions**

5. Contributes to **mitigating** for the **effects of climate change**

6. Can contribute to State's **renewable energy goals**

Primary Features & Benefits

1. **500 TAF/yr annualized new storage:**
   a. **Diversions occur** when excess flow conditions exist

      After all senior water rights holders' demands have been met

   b. Does *not* require Shasta reservoir releases or spills to refill

      Refills on 3 to 5 year frequency

   c. Off-stream storage creates **more reliable carryover**

2. **Proposed Integrated Operations w/ CVP & SWP benefits all:**
   a. **Increases cold water pool** in Shasta, Oroville, Folsom, & Trinity

   b. Potential to provide **"mutual aid" to Folsom** to respond to short-term in-Delta water quality compliance

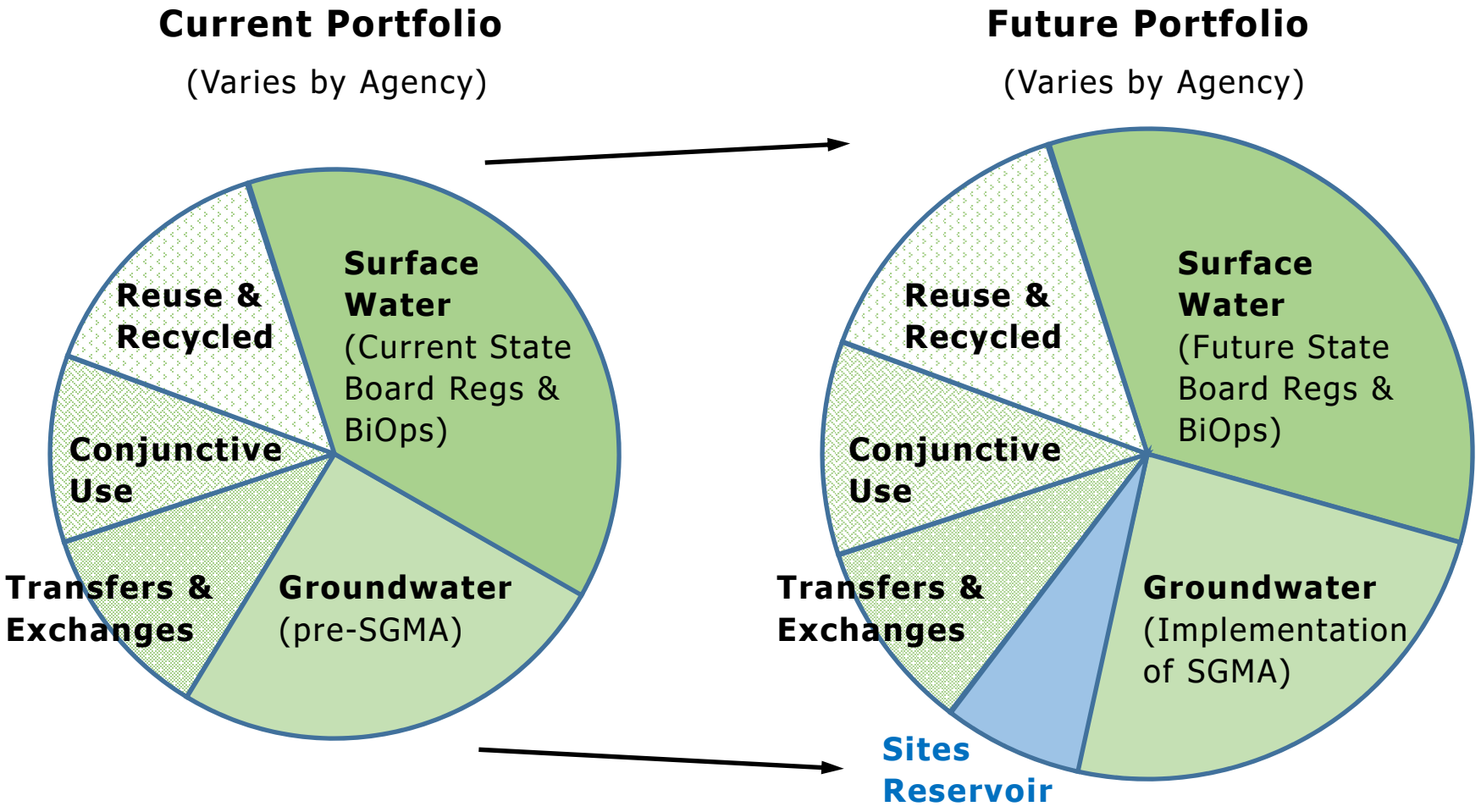
      Potential to increase storage in dry and critical years

   c. **Improve south of Delta export reliability**

      Public benefit water is <u>required</u> to improve ecological health of the Delta (CWC §79755(a)(5)(B)

      Water used to increase **Cold Water Pool can be released in fall to coincide with the fall transfer window** (or re-diverted into Sites for later use)

Why Sites?



NOTE: Additional 'drivers' affecting an agency's water portfolio that may affect the relative supply distribution include responses due to the effects of (a) changes in water demand, (b) changes in regulations or state policy and (c) effects of climate change.

Sacramento Valley Watershed:

Water source

Unregulated tributaries

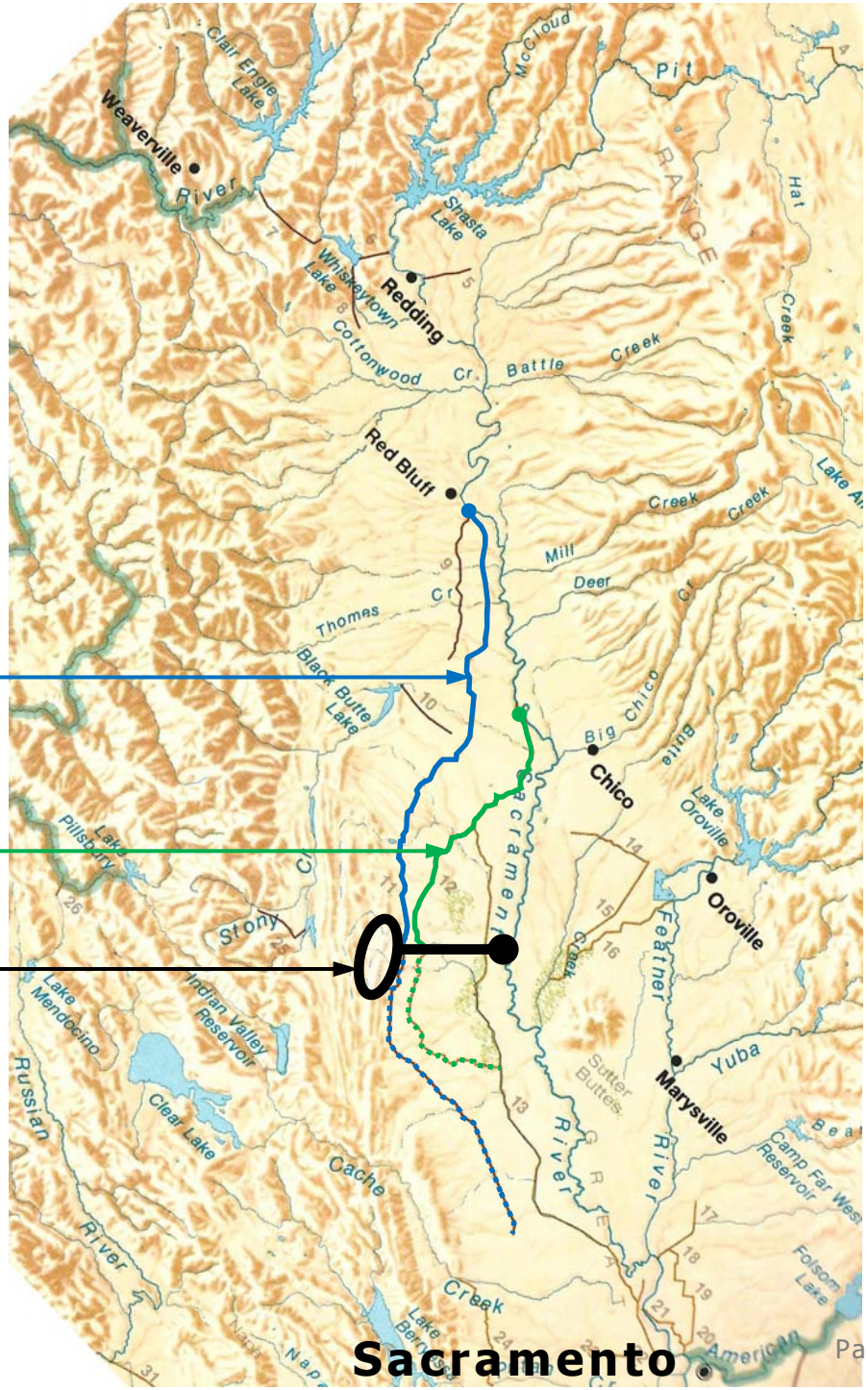
1977 Water Rights application

Proposed Sites Reservoir

- 1957 Water Plan as a local storage project
- Offstream Storage
- Integrated Operations

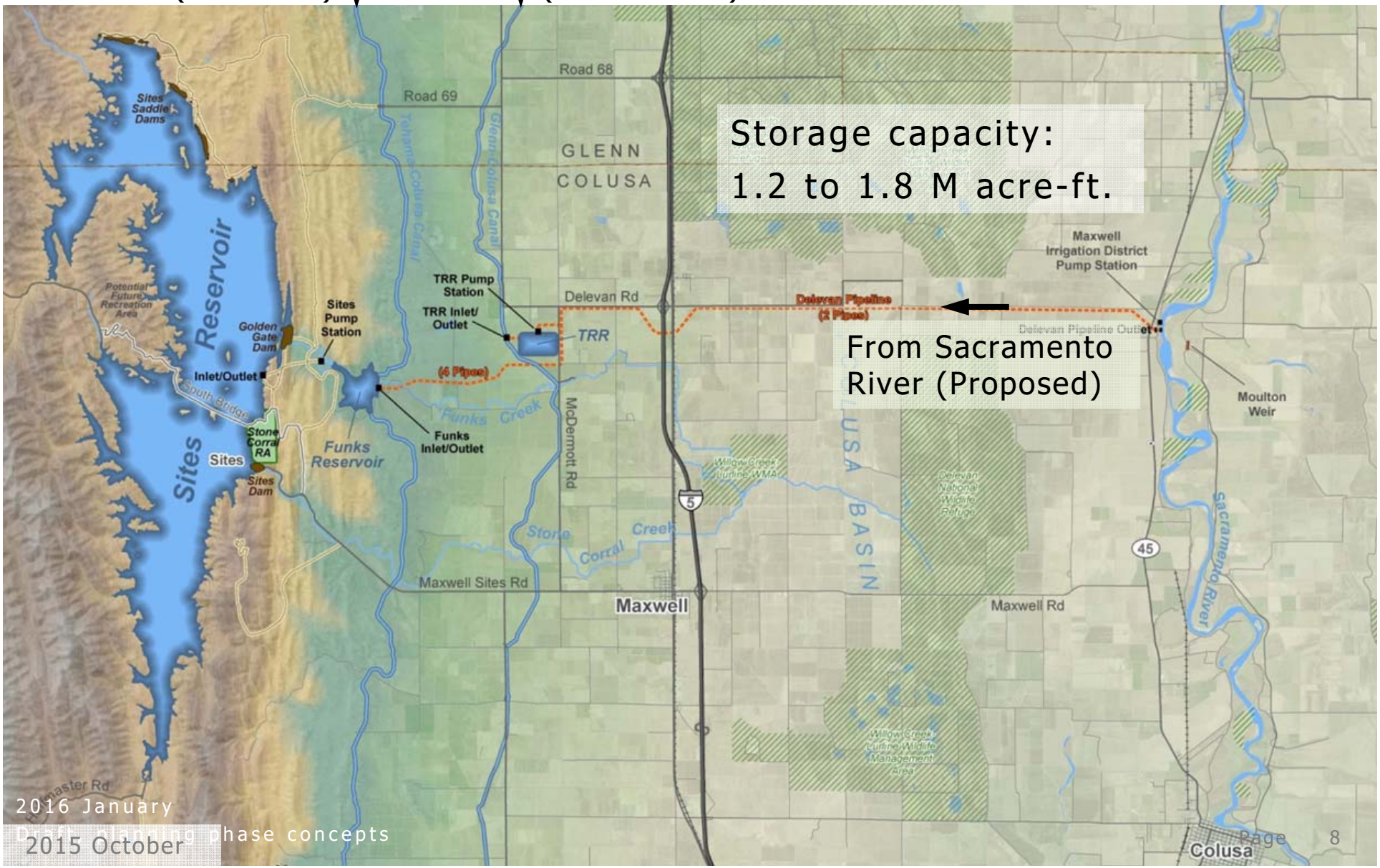
~ 75 miles northwest from downtown Sacramento

Project Location:



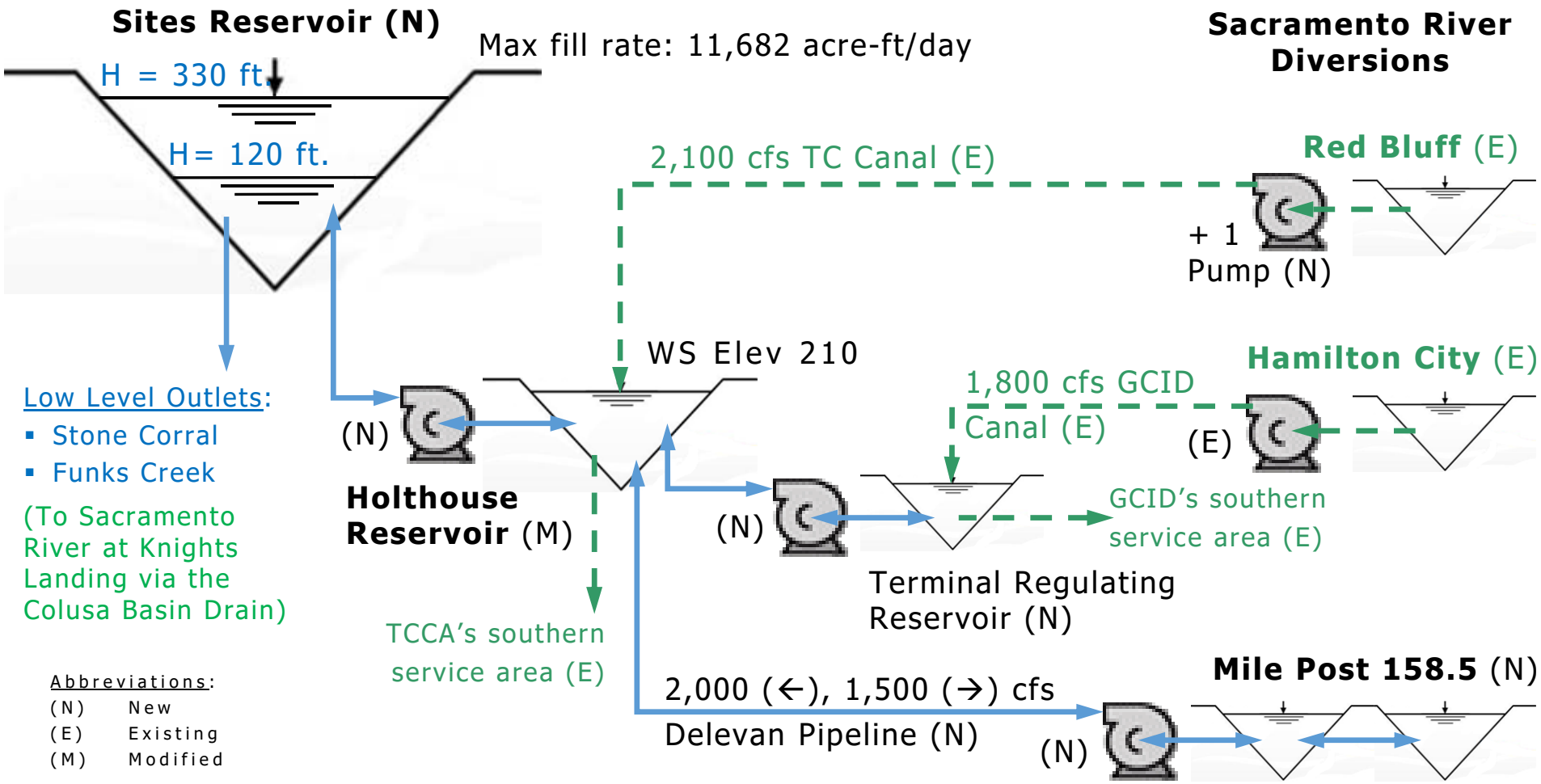
~ 75 miles northwest from downtown Sacramento

Facilities:



2016 January
Draft planning phase concepts
2015 October

Schematic:



Plant Mode	Pumping Mode					Generation Mode		
Plant Name	TC Canal	GCID Canal	TRR	Sac River	Sites	Sites	TRR	Sac River
Planned Capacity, MW	6	3.39	19.68	65.65	181.35	123	9.8	10.8
Planned Capacity, cfs	2250	3000	1890	2000	5900	5100	1500	1500

Source: DWR Report (2013 Dec), Appendix H: Power Planning Study, Figure H.4-2. NODOS Project, Schematic of Conveyance and Storage Interconnection

Dry Year Operations:

Average using prior drought periods (28-34, 76-77, 87-92):

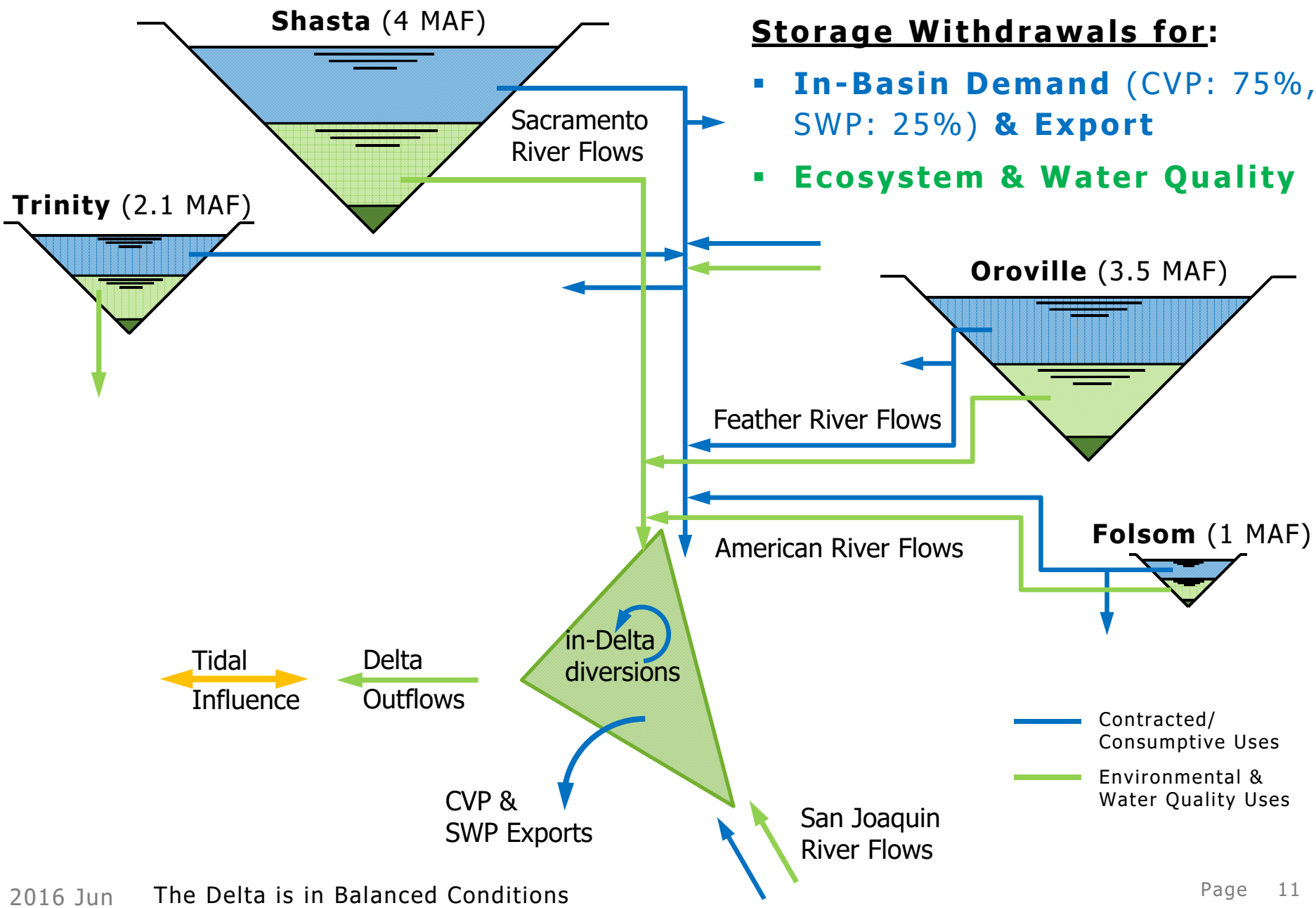
Reservoir	Storage (acre-ft.)		Percent increase	Ecosystem Benefits
Shasta	240,000		12.1	***Prop 1 Eligible*** *(cold-water pool & Delta Water quality)*
Oroville	105,000		7.1	
Folsom	37,000		9.6	
Trinity	79,000		8.5	***Non-Prop 1*** *(possible Federal)*
Sites	660,000	(*)		***Prop 1 Eligible*** *(flows & habitat)*
Total	**1,121,000**		**23.4**	

While meeting the existing water quality and flow obligations of the CVP & SWP

(*) This water is independent of CVP & SWP water contracts

Source: DWR, 2015 FAQ

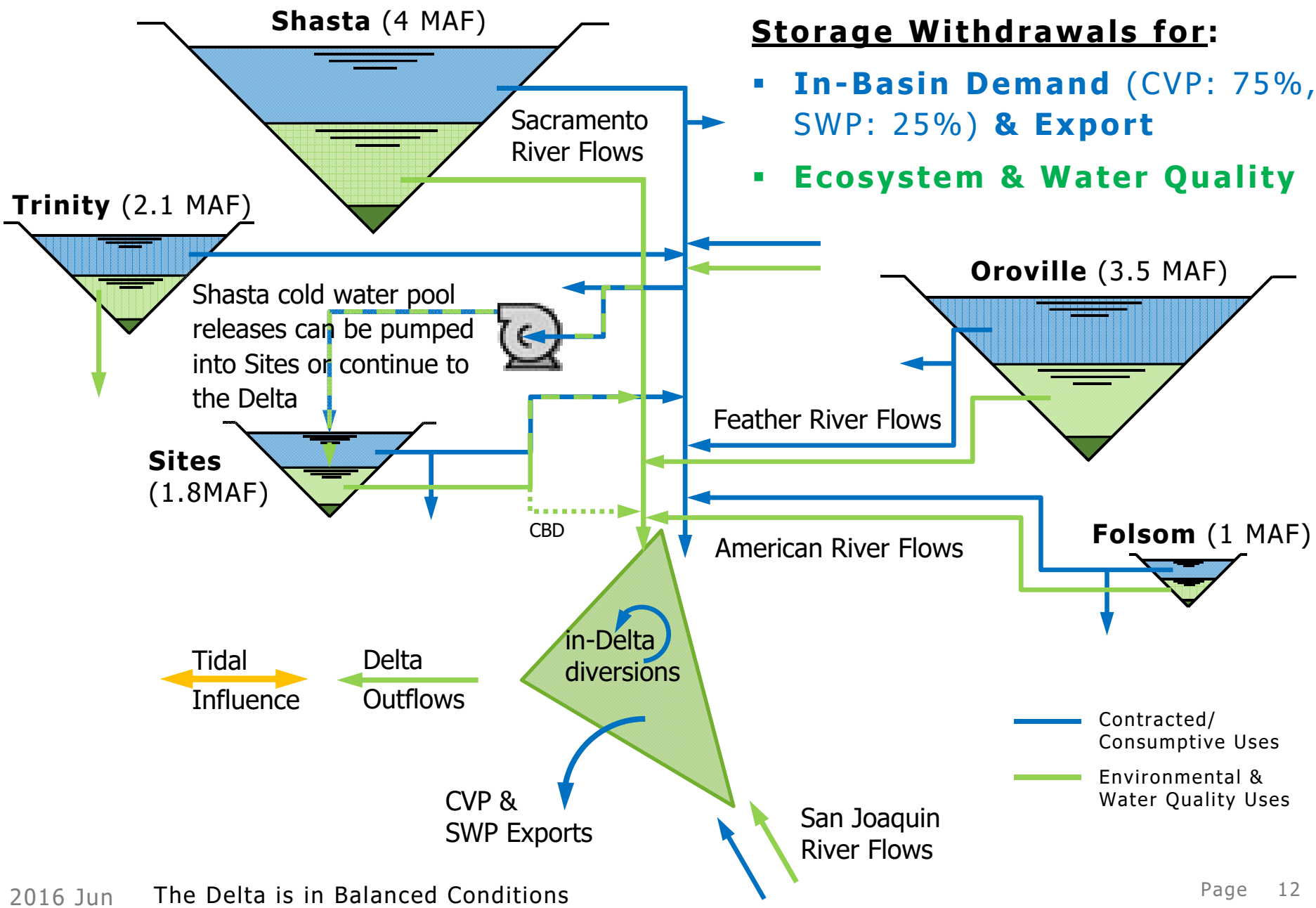
Sac. V. Water System Schematic (Today)



Storage Withdrawals for:

- **In-Basin Demand** (CVP: 75%, SWP: 25%) **& Export**
- **Ecosystem & Water Quality**

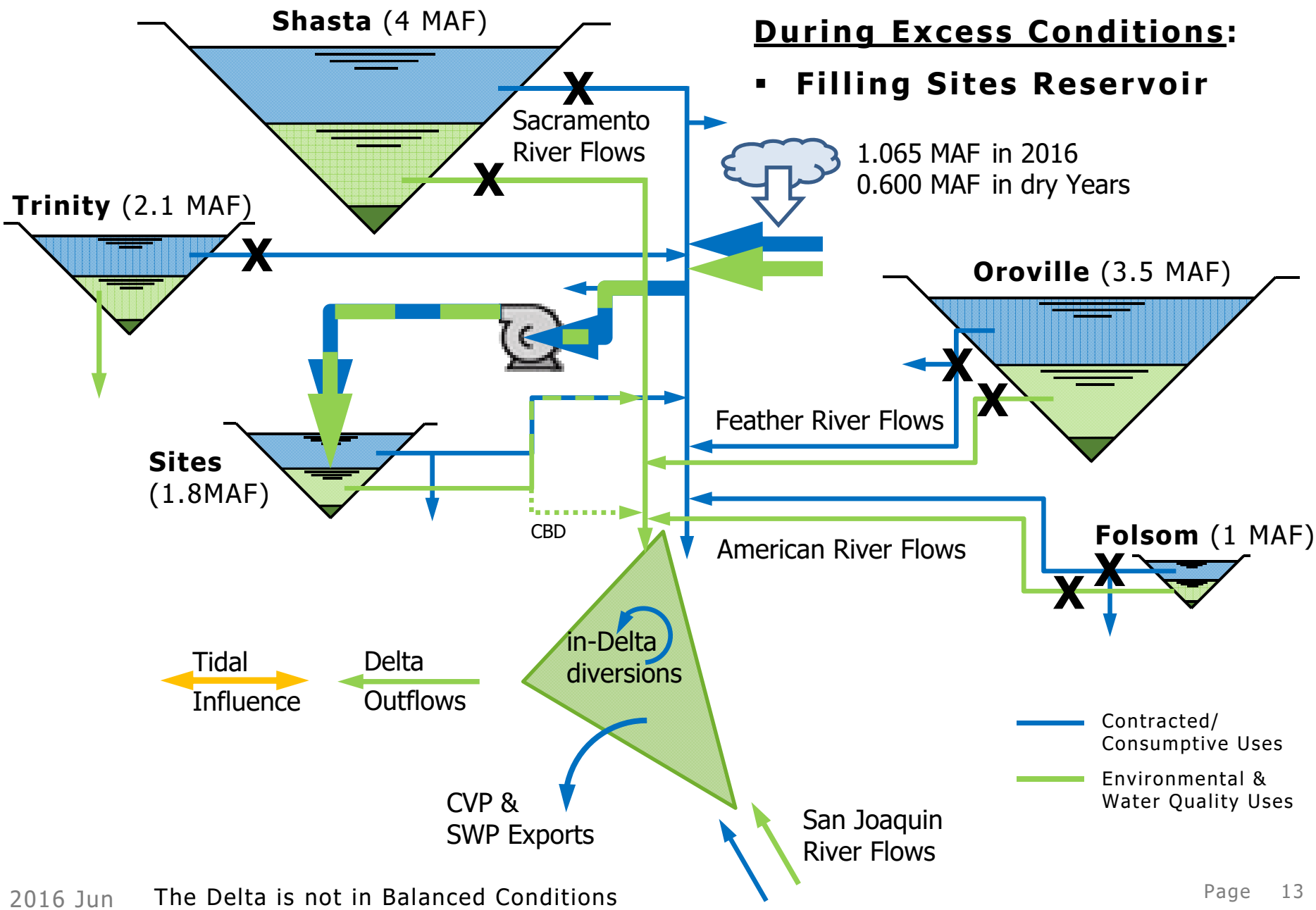
Sac. V. Water System Schematic (Proposed)



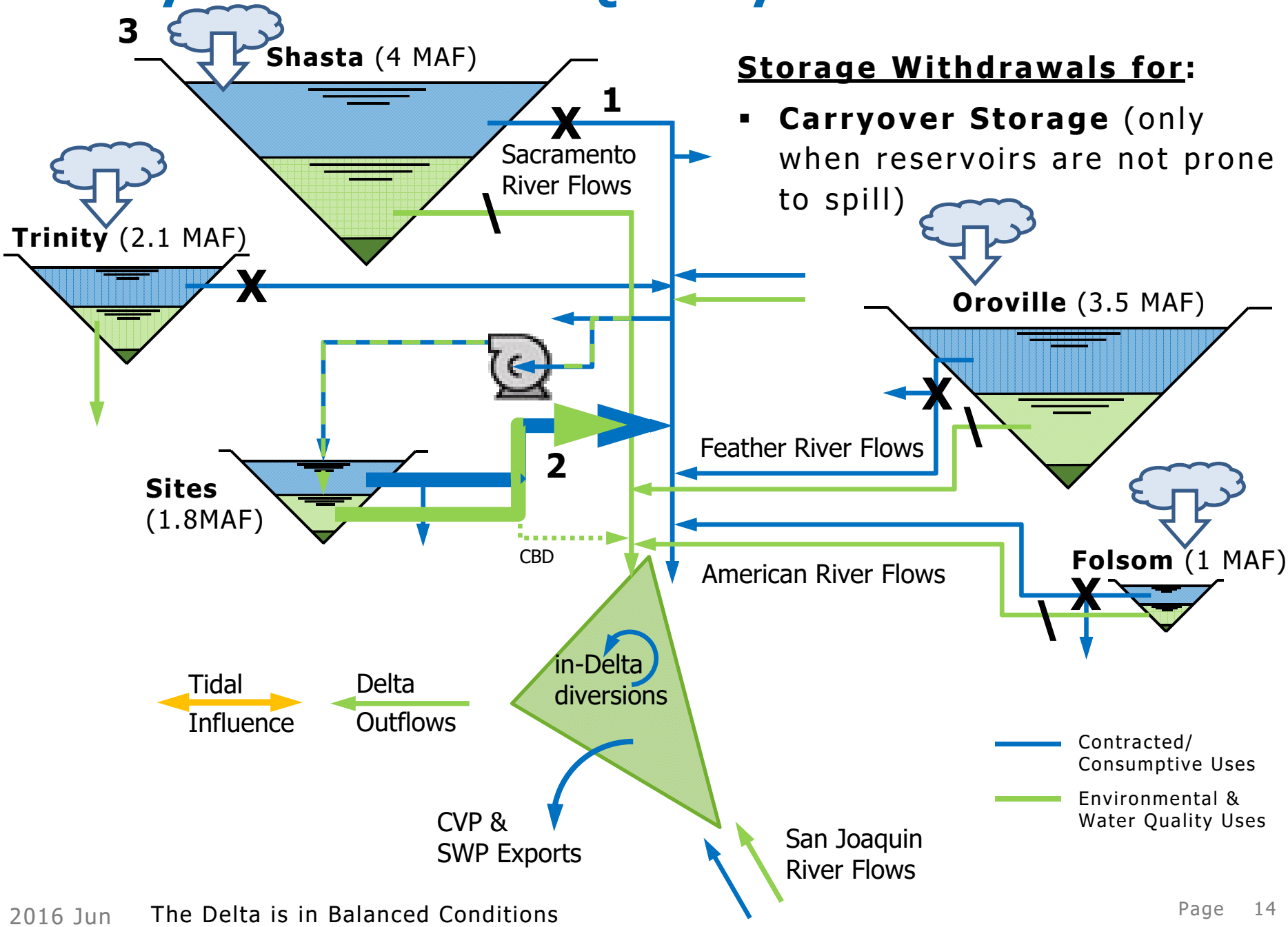
Storage Withdrawals for:

- **In-Basin Demand** (CVP: 75%, SWP: 25%) **& Export**
- **Ecosystem & Water Quality**

Ecosystem & Water Quality Benefit Creation:



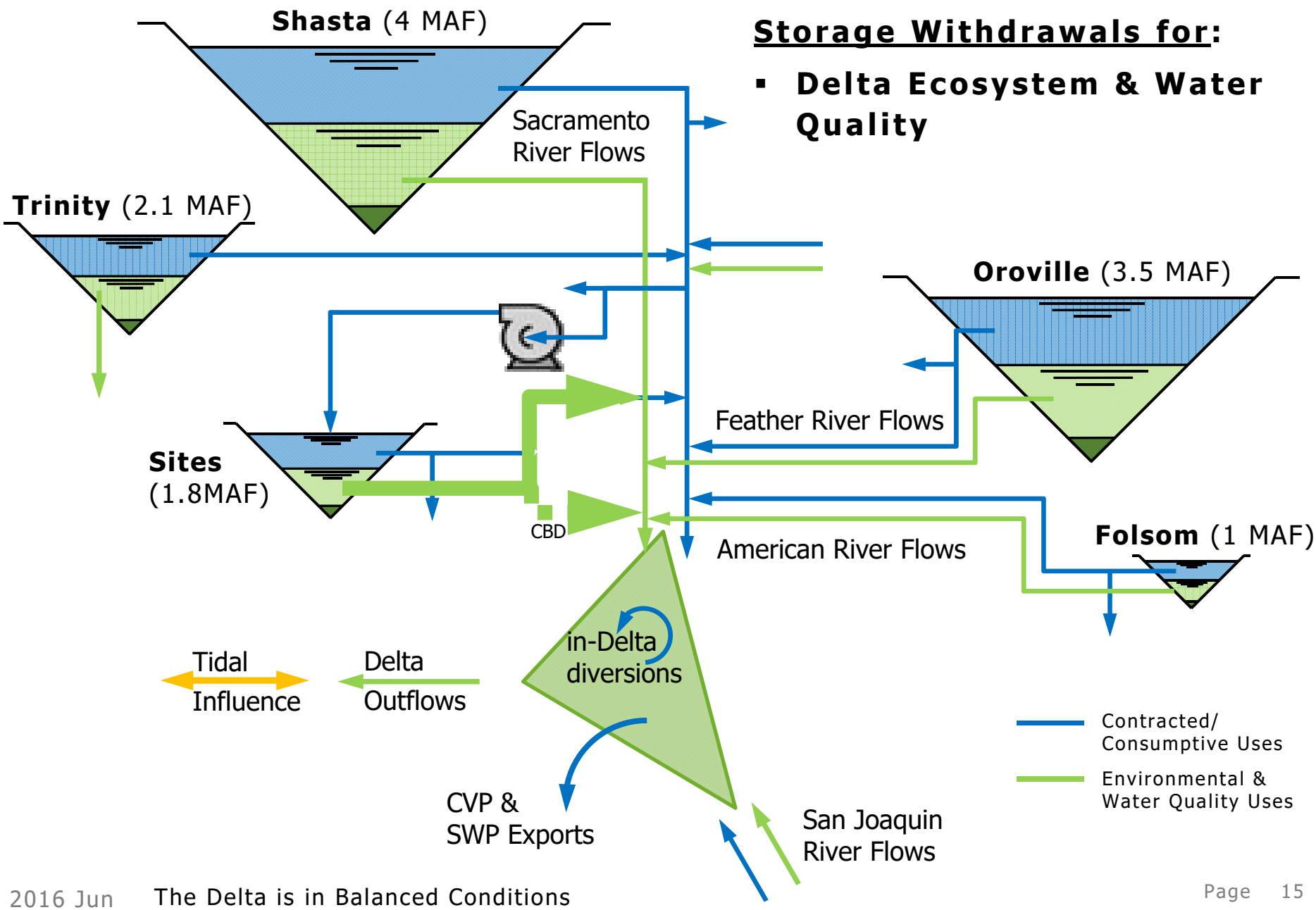
Ecosystem & Water Quality Benefit Creation:



Storage Withdrawals for:

- **Carryover Storage** (only when reservoirs are not prone to spill)

Ecosystem & Water Quality Benefit Creation:

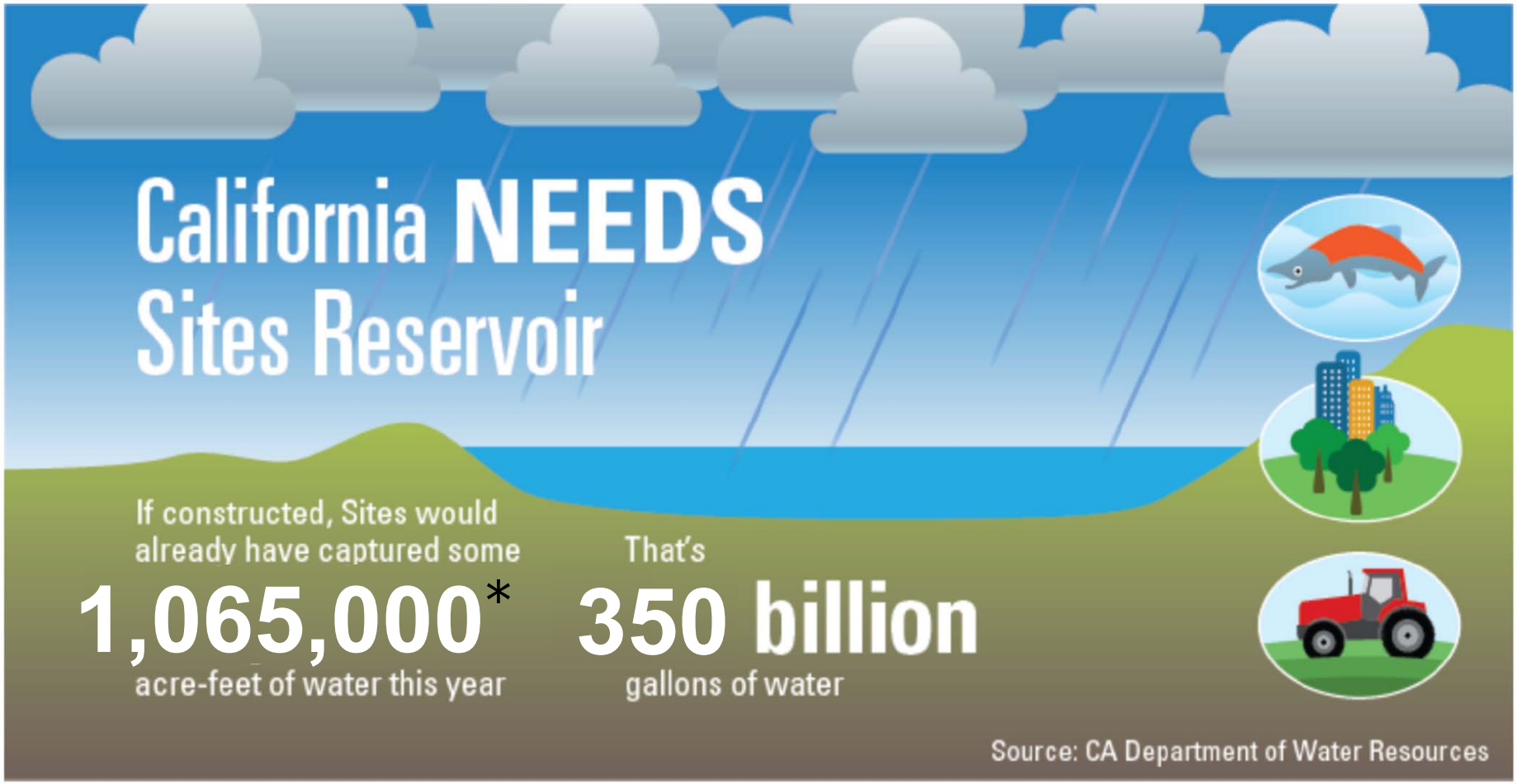


Storage Withdrawals for:

- **Delta Ecosystem & Water Quality**

Why Sites?

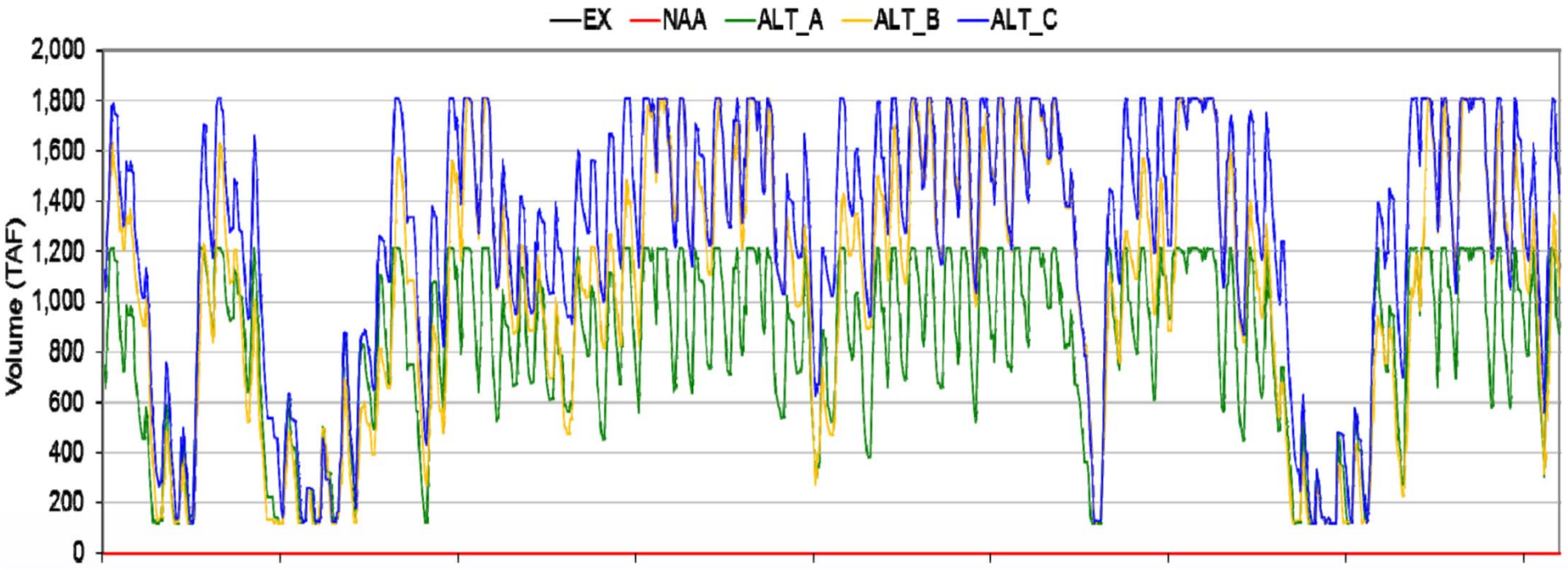
If Sites operated in 2016



* Through May 1

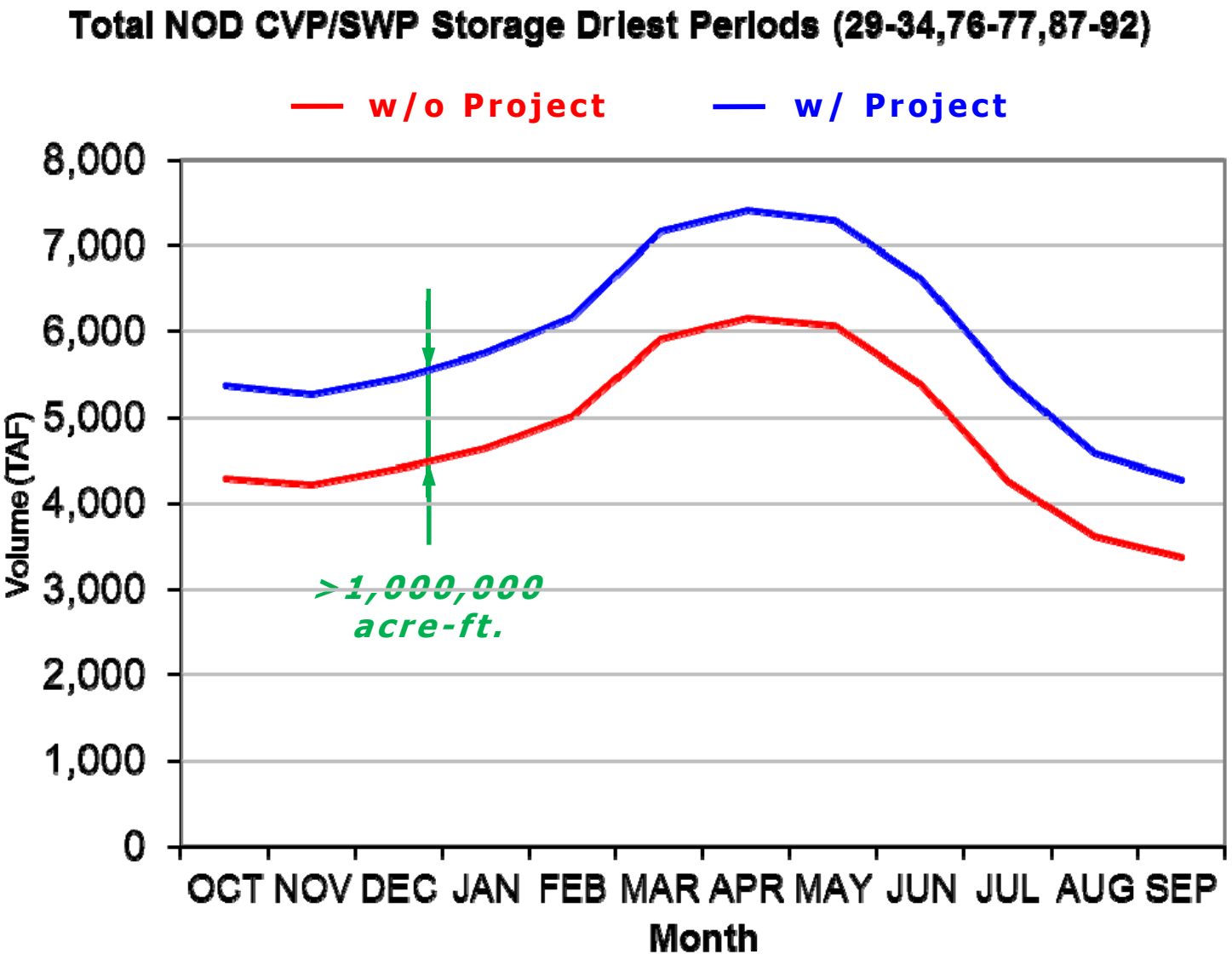
Refill Frequency:

On Average, every 3 to 5 years



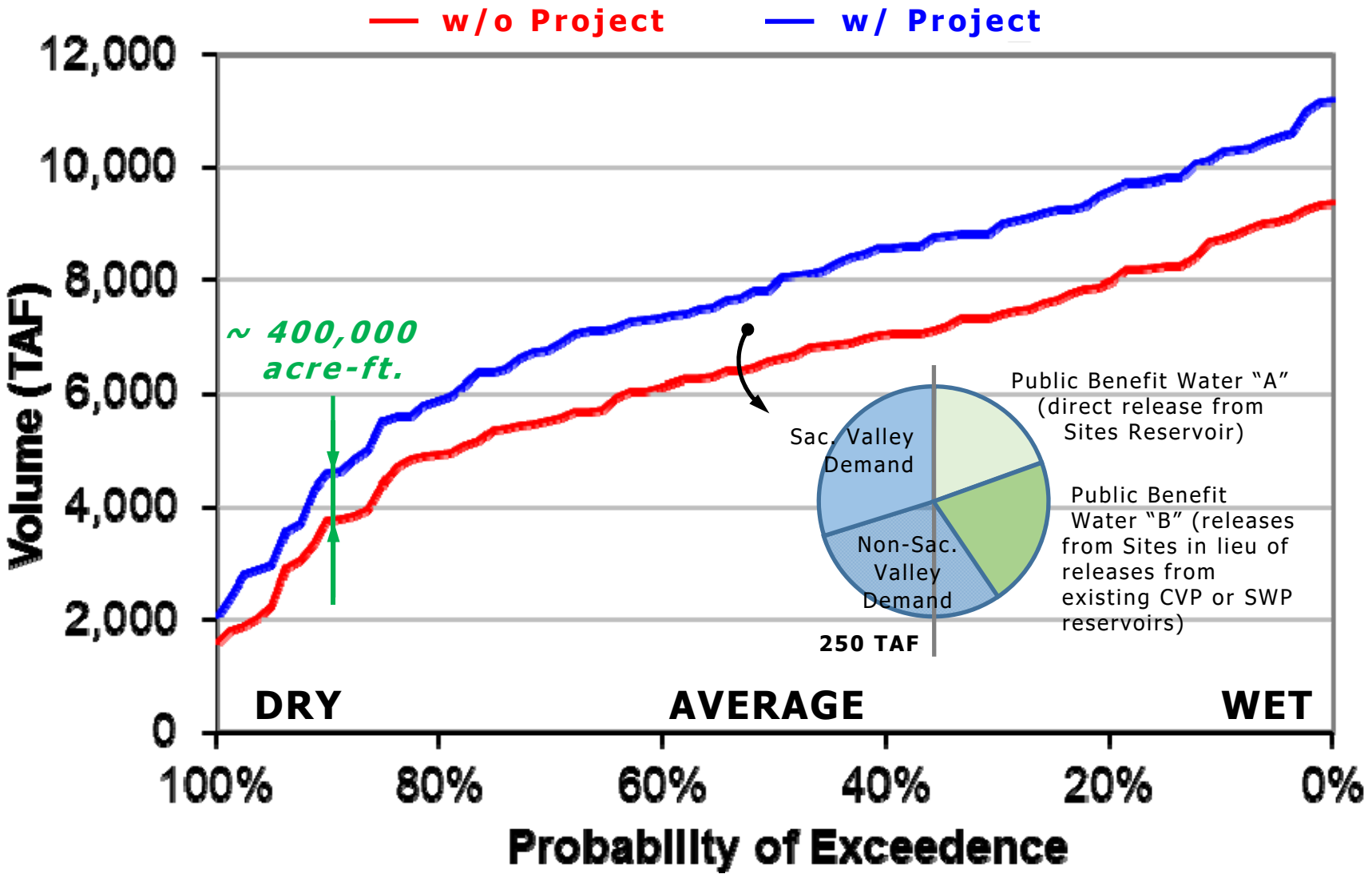
Simulated hydrologic sequence (1921 - 2002) with water demand in year 2030

Monthly Storage (Shasta, Oroville & Sites)

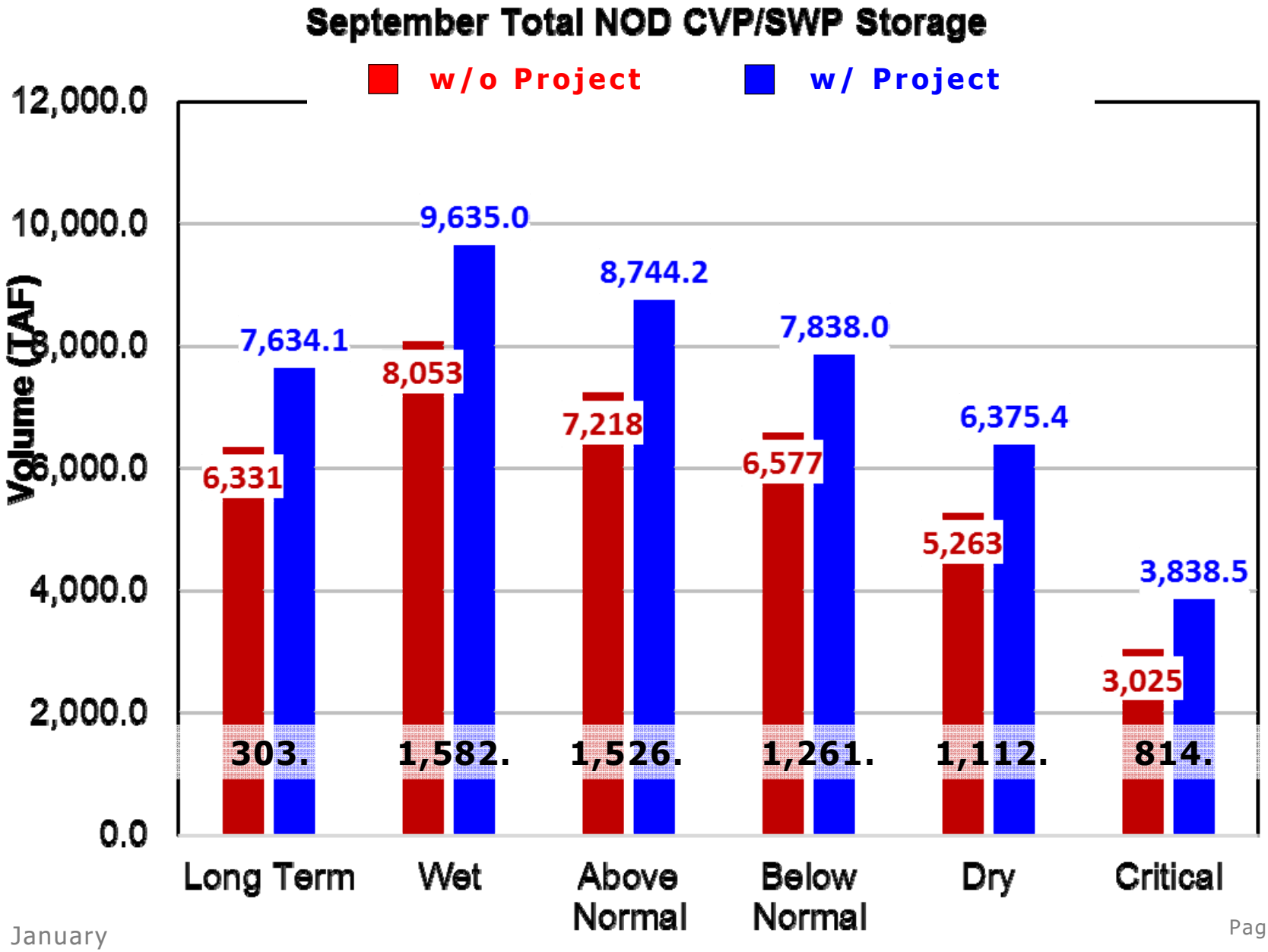


Status:	Conceptual	Version:	B
Purpose:	Prepare by Sites to facilitate communications	Date:	2016 April 27
Caveat 1	Working Draft, Subject to change	Ref/File #:	P31. 12.235
Caveat 2		Page:	18 of

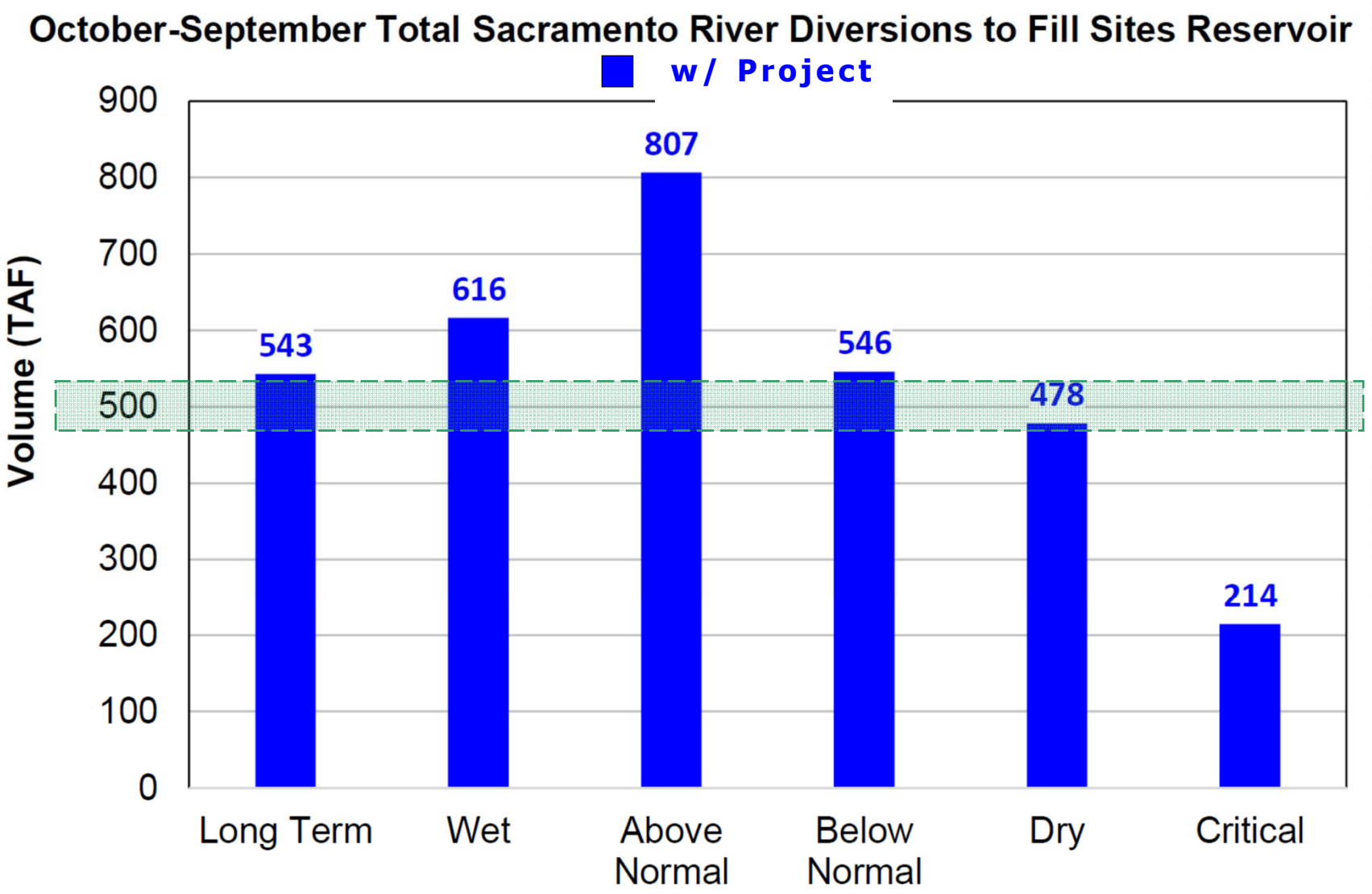
September Storage (Shasta, Oroville & Sites)



Annualized Storage: (Shasta, Oroville & Sites)



Annualized Storage (By Water Year Type)



Proposition 1, Chapter 8:

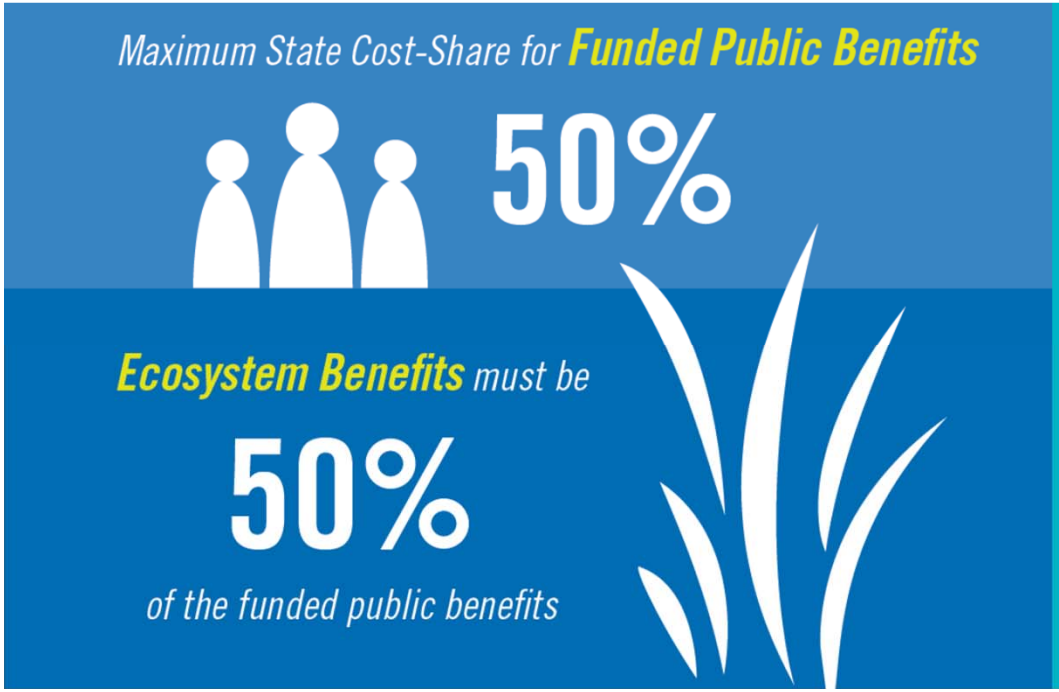
$ 2.7 Bn is available

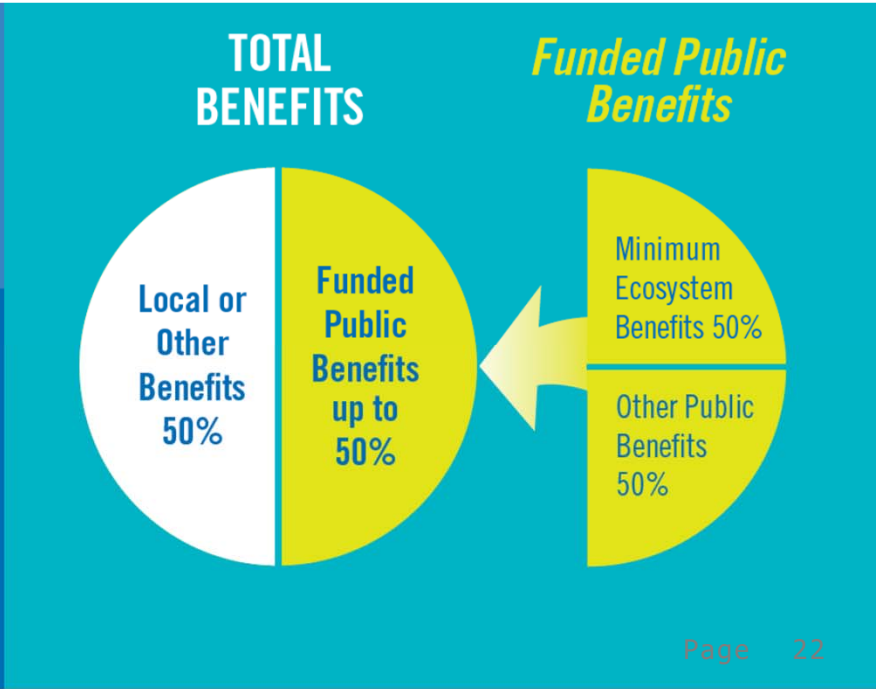
Eligible Projects

- ❑ CALFED & Groundwater Storage
- ❑ Conjunctive Use and Reservoir Reoperation
- ❑ Local and Regional Surface Storage

Eligible Public Benefits

- ❑ Ecosystem Improvement
- ❑ Water Quality Improvement
- ❑ Emergency Response
- ❑ Flood Control
- ❑ Recreation





Proposition 1, Chapter 8:

Key Performance Measures:

- "Priority will be given to projects that *leverage* private, federal, or local *funding to produce the greatest public benefit*. § 79707 (chapter 4)

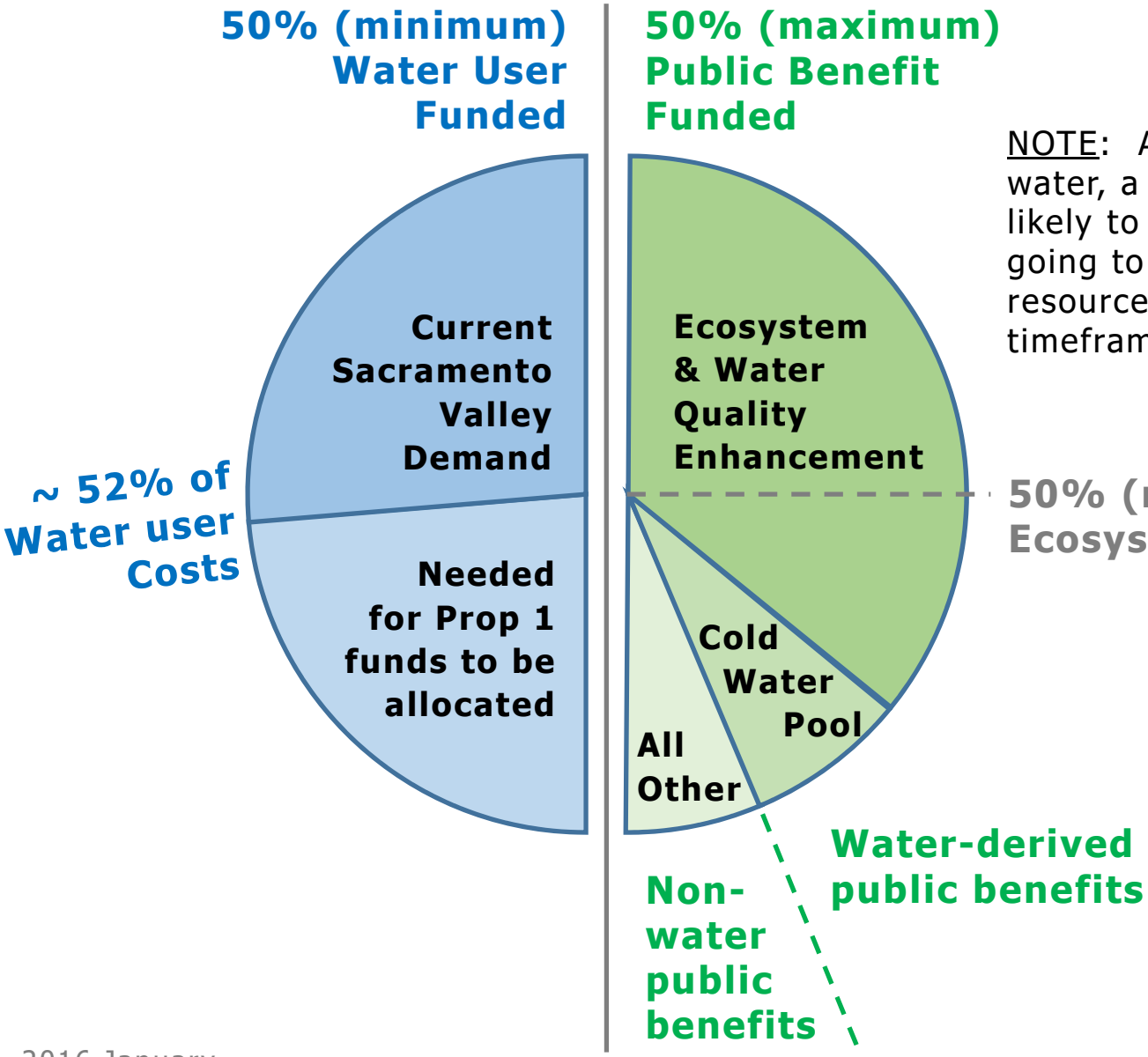
- Funds provided for "public benefits associated with water storage projects that *improve the operation of the state water system*, are *cost effective*, and provide a *net improvement in ecosystem and water quality conditions*." § 79750(b)

- Projects selected "through a competitive public process [ranked by] the [magnitude of the] *expected return for public investment*." § 79759(c)

- The project provides "*measureable improvement* to the *Delta ecosystem or* to *tributaries* to the Delta" § 79752

- The project "will advance the long-term objectives of *restoring ecological health and improving water management for beneficial uses of the Delta*" § 79755(a)(5)(B)

Cost Allocation:

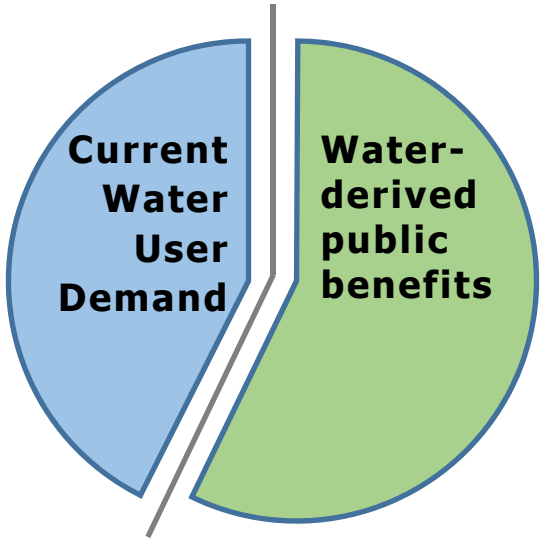


NOTE: Assuming cost follows the water, a yield-based allocation is not likely to result in 50% of the yield going to water users and 50% to resource agencies on an annual timeframe.

Yield-Based Allocation:

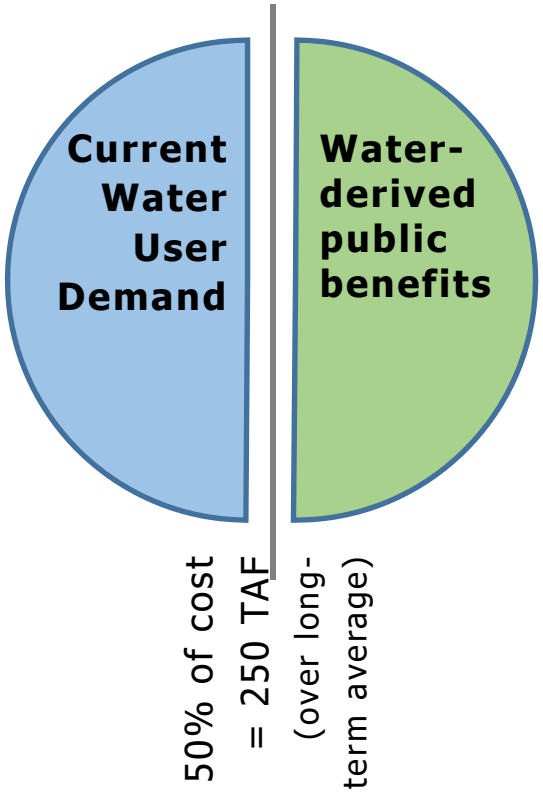
Scenario 2

(contract price of public benefit water reflects its avoided-cost, which is < water user's repayment cost)



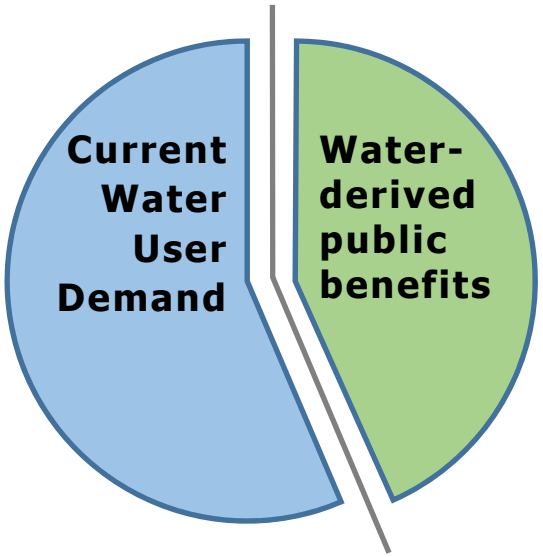
Base Scenario 1

(Cost & Yield Correlation = 1)



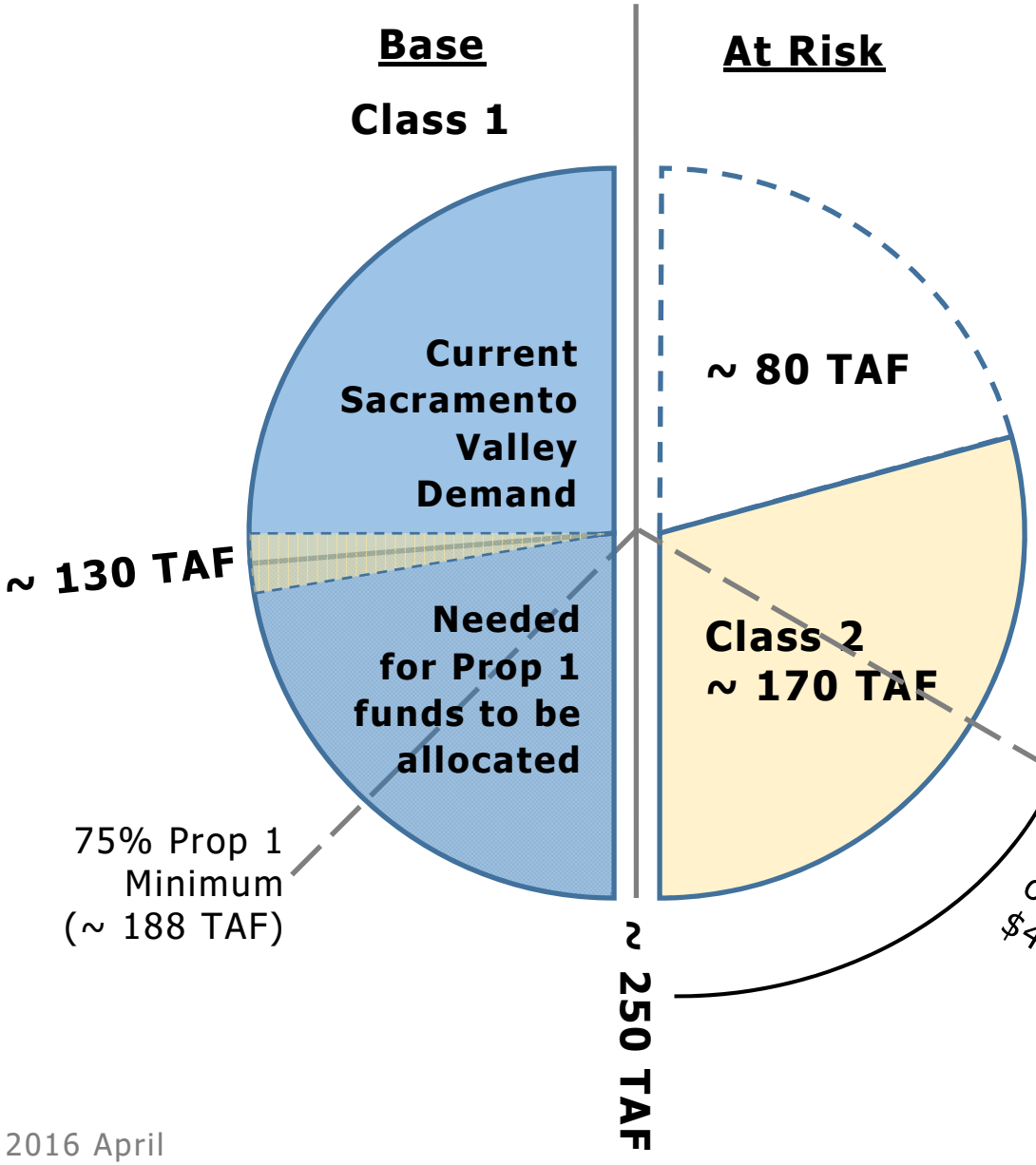
Scenario 3

(contract price of public benefit water is value-based and reflects a value > water users repayment cost)



NOTE: Analysis assume 50% Prop 1, Chapter 8 funds are requested

Yield-Based Allocation:



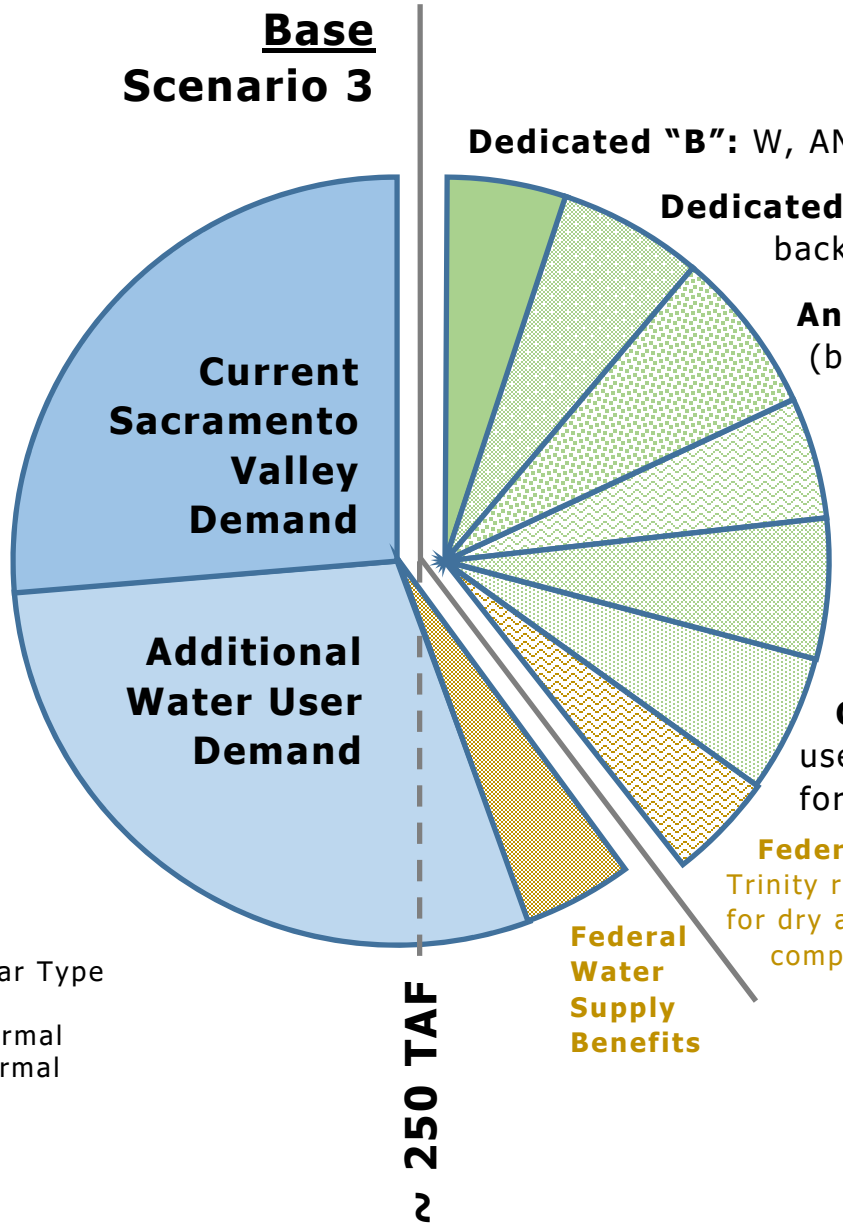
Water Criteria

Class 1: Assumes 50% yield is needed to provide 50% public-funded costs.

Class 2: Assumes less yield is needed to obtain 50% public funds or Water Commission decision to fund less than 50% (e.g. only fund $1.5 Bn of project's costs)

80 TAF: Difference between the 1.8 MAF and 1.2 MAF reservoir. Serves as a contingency should the Project downsize to the smaller reservoir or a decision to advance the project with delayed (or absent) public funding.

Yield-Based Allocation: (Hypothetical)



Dedicated "B": W, AN, & BN WYT

Dedicated "A": all WYT, including back-to-back dry or critical WYT (highest value water)

Annual "A": W, AN, & BN WYT (based on carryover & hydrology)

Annual "B": Generate revenue for other ecosystem benefits (e.g. habitat) *after providing a public benefit* (e.g. water quality)

Annual "C": To cover public benefit share of annual O&M costs *after providing a public benefit* (e.g. cold water pool)

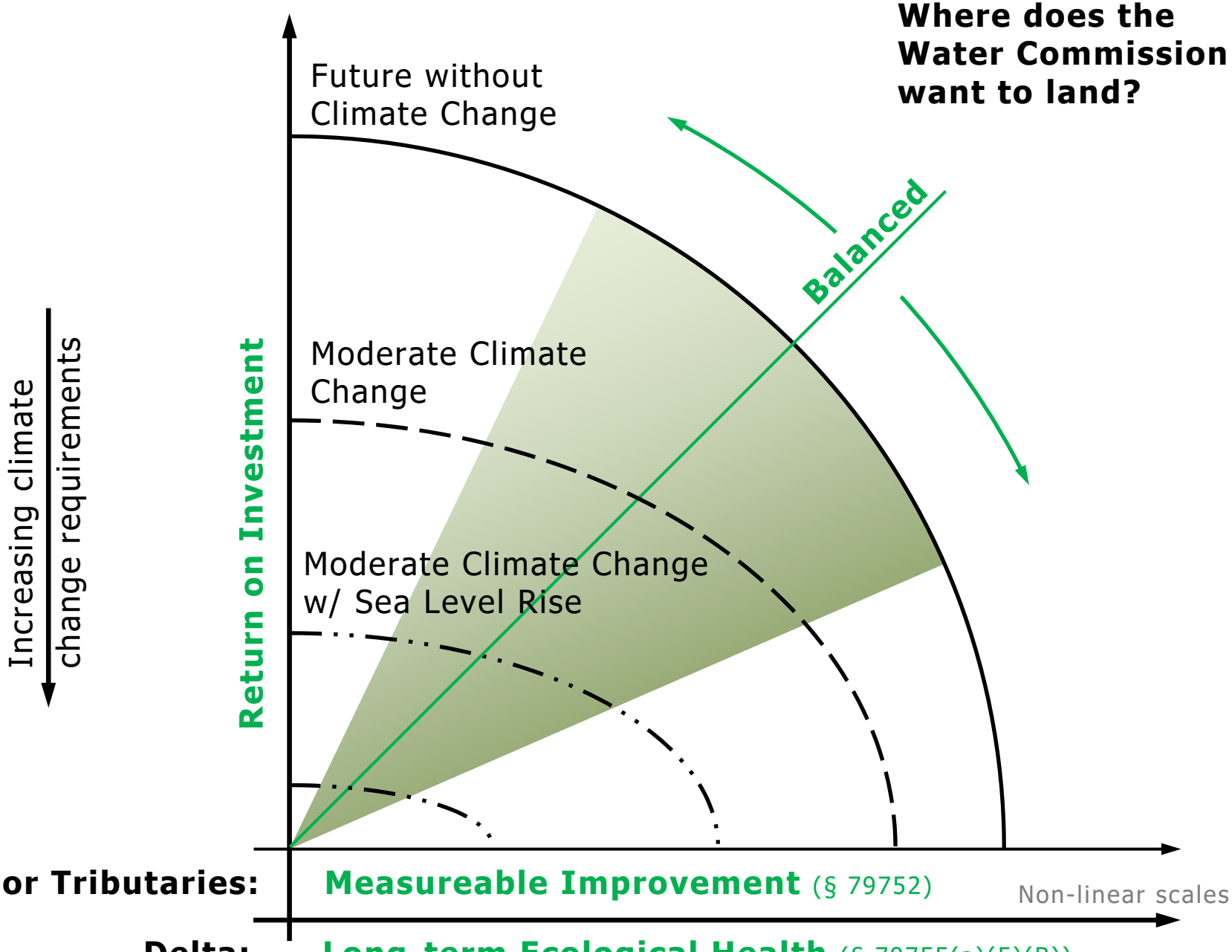
Carryover "A" & "B": Available for multiple uses, including the creation of a 'pool' available for infrequent emergency response

Federal Benefit which are non-Prop 1 eligible (e.g. Trinity river, refuge supplies, additional cold water pool for dry and critical years until Shasta enlargement is completed)

WYT	Water Year Type
W	Wet
AN	Above Normal
BN	Below Normal
D	Dry
C	Critical

Estimated Public Benefits:

Selection Criteria:

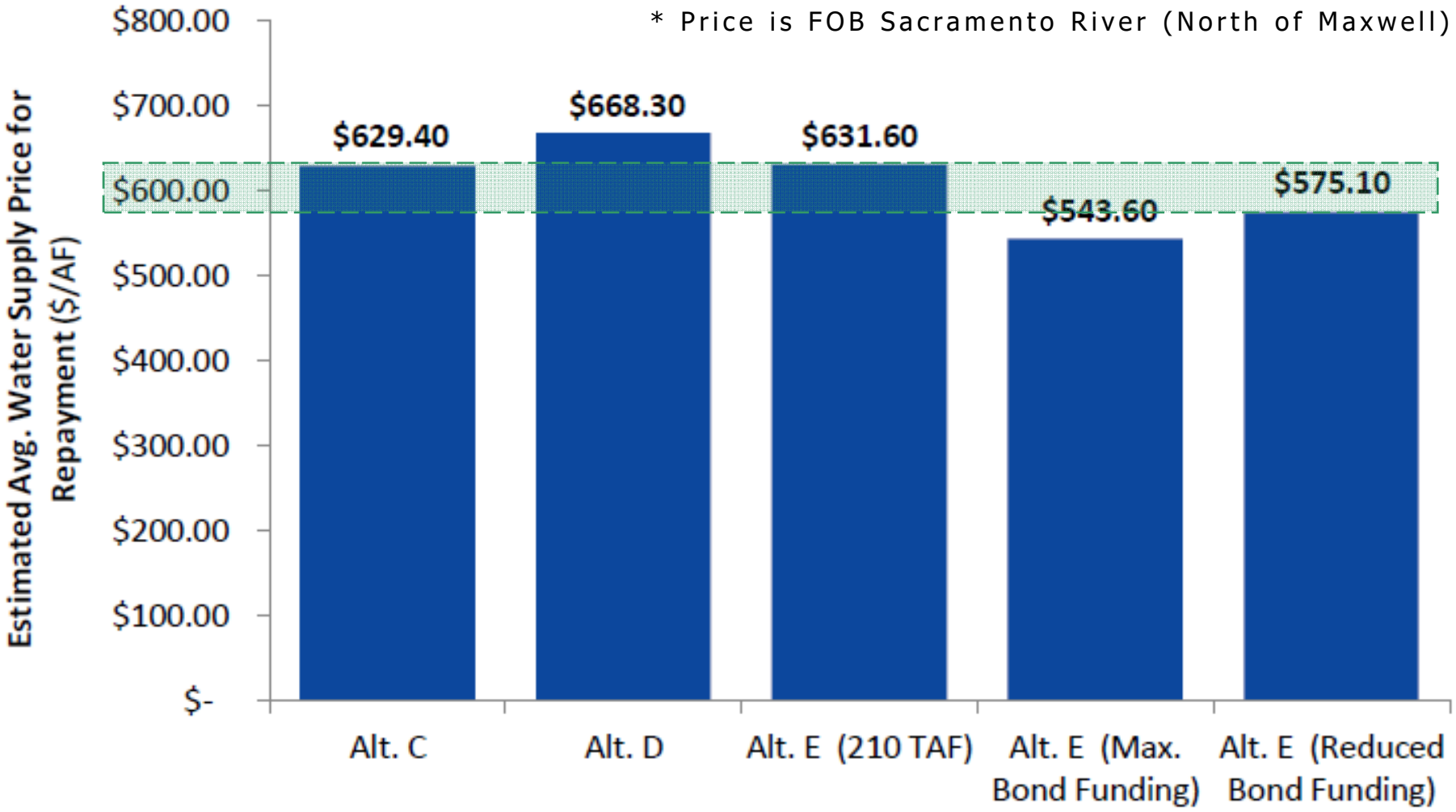


Range of Project Development Costs

Reservoirs and Dams:	$1. B - $1.7 B
Pumping and Generating Plants:	$1. B - $1.5 B
Pipelines:	$1. B - $1.2 B
Total:	$3. B - $4.4 B

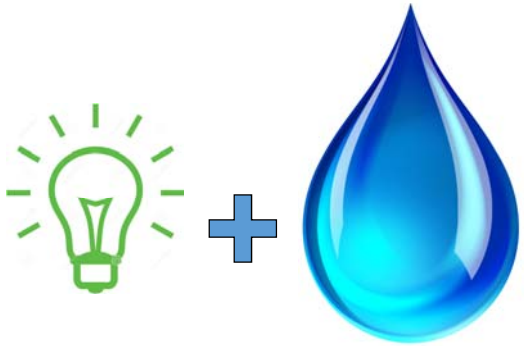
- Escalated to 2015 dollars
- w/o finance cost
- Includes contingency

Costs/acre-ft: (with financing)



NOTE: RIFIA could reduce finance costs over $100/acre-ft. (requires congressional approval)

Repayment: (with Federal Participation)



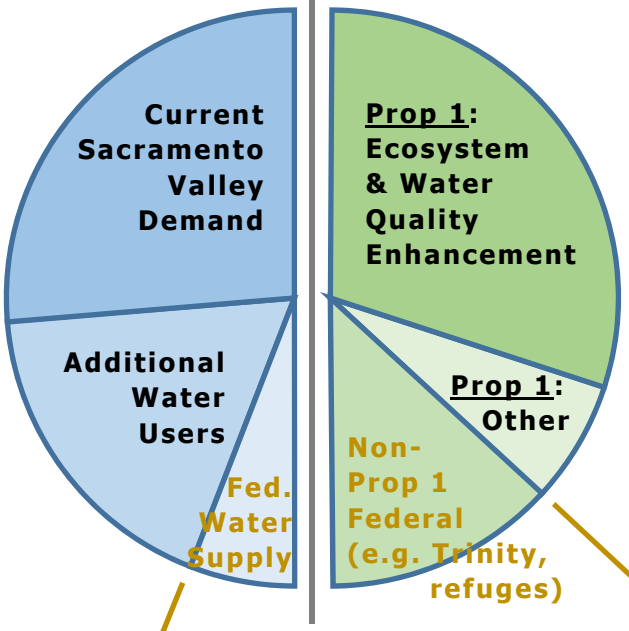
Pumped-storage ($/kWh generated)

Water ($/acre-ft. of water)

Storage

50% (minimum) Water User Funded

50% (maximum) Public Benefit Funded

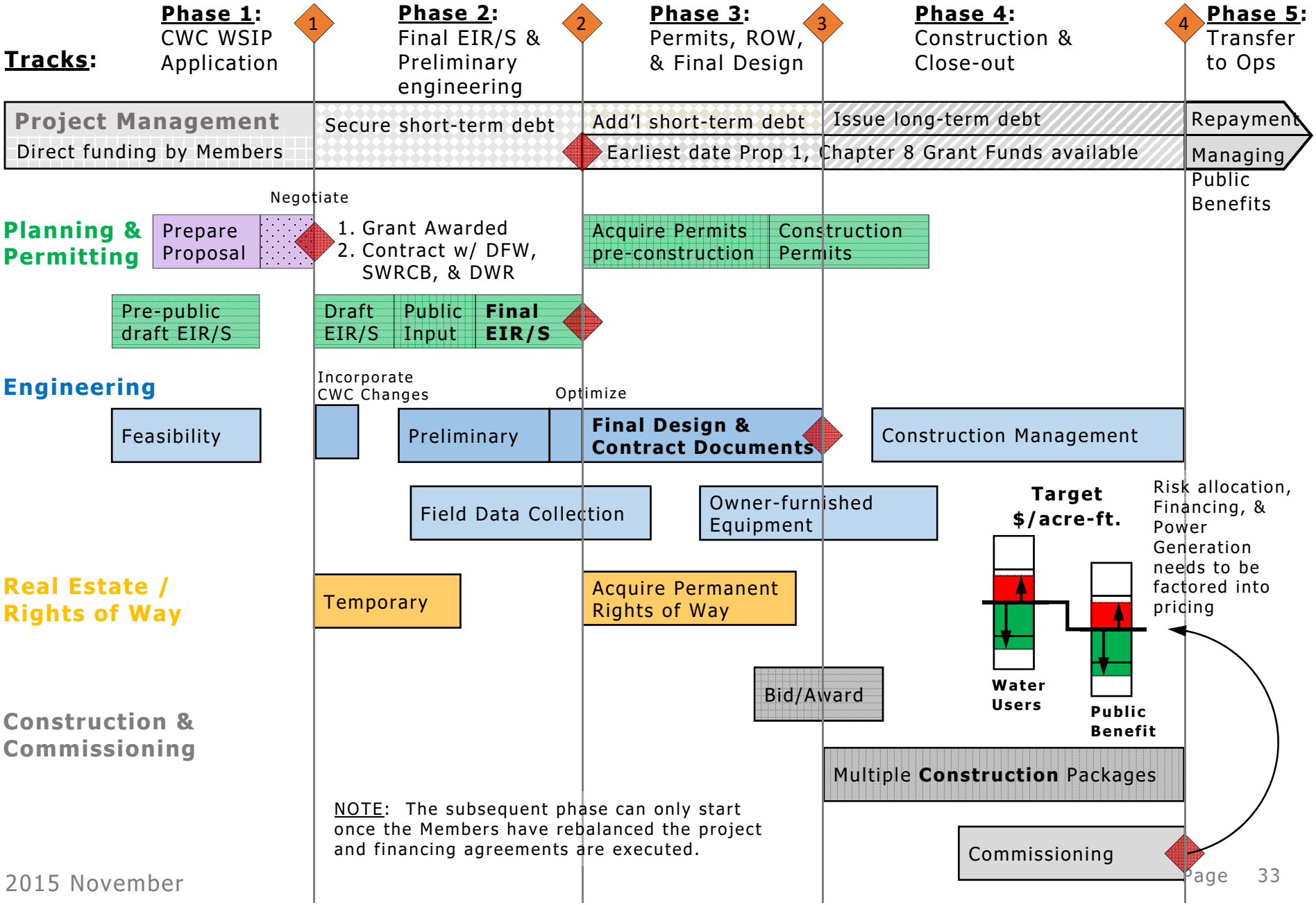


PROP 1
GOVERNOR EDMUND G. BROWN, JR.
WATER BOND 2014
RELIABILITY | RESTORATION | RESILIENCE

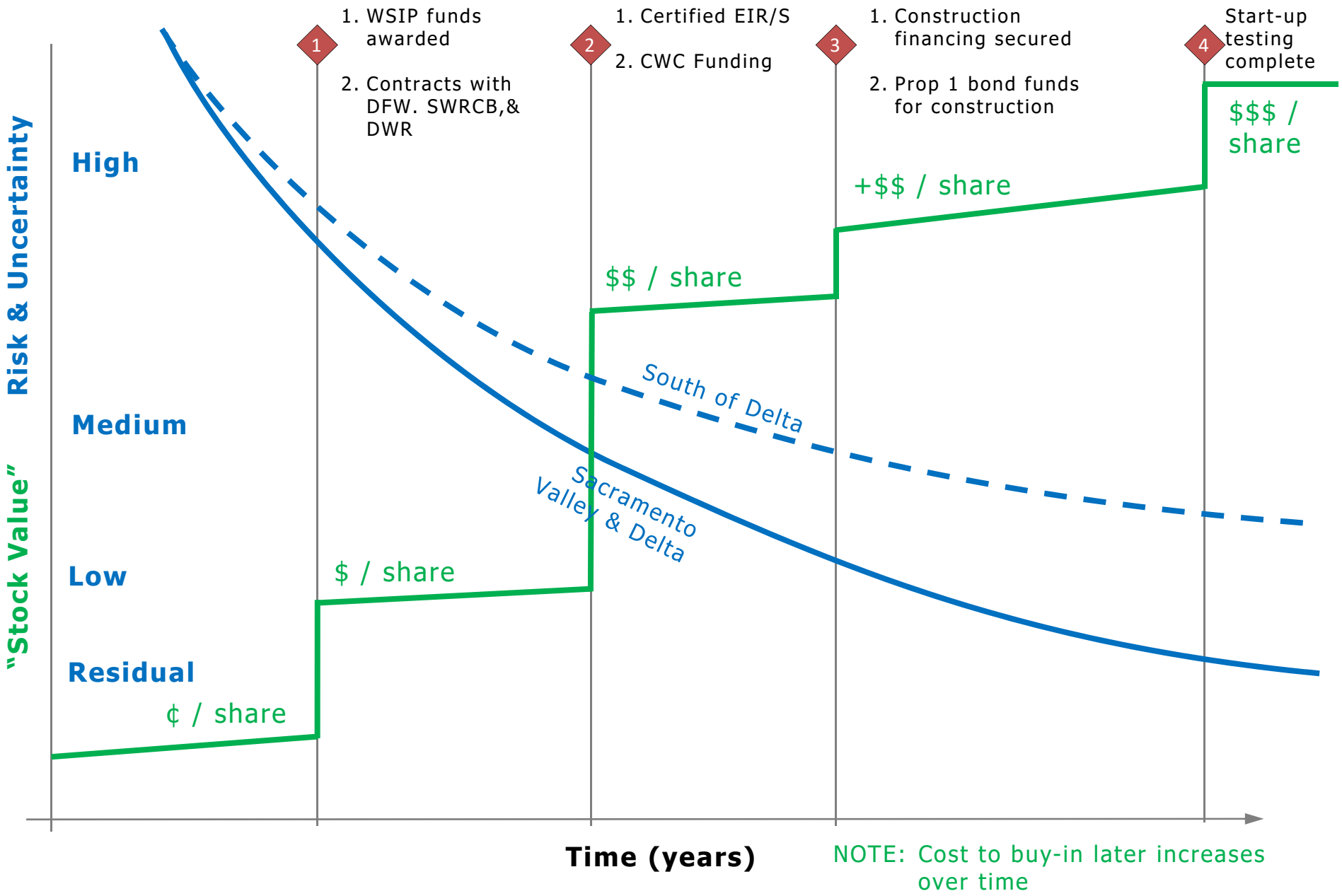
State Taxpayers
(General Obligation Bonds)

Interior &/or Reclamation
(Method is dependent upon congressionally authorized role & appropriations. Could include pumped-storage)

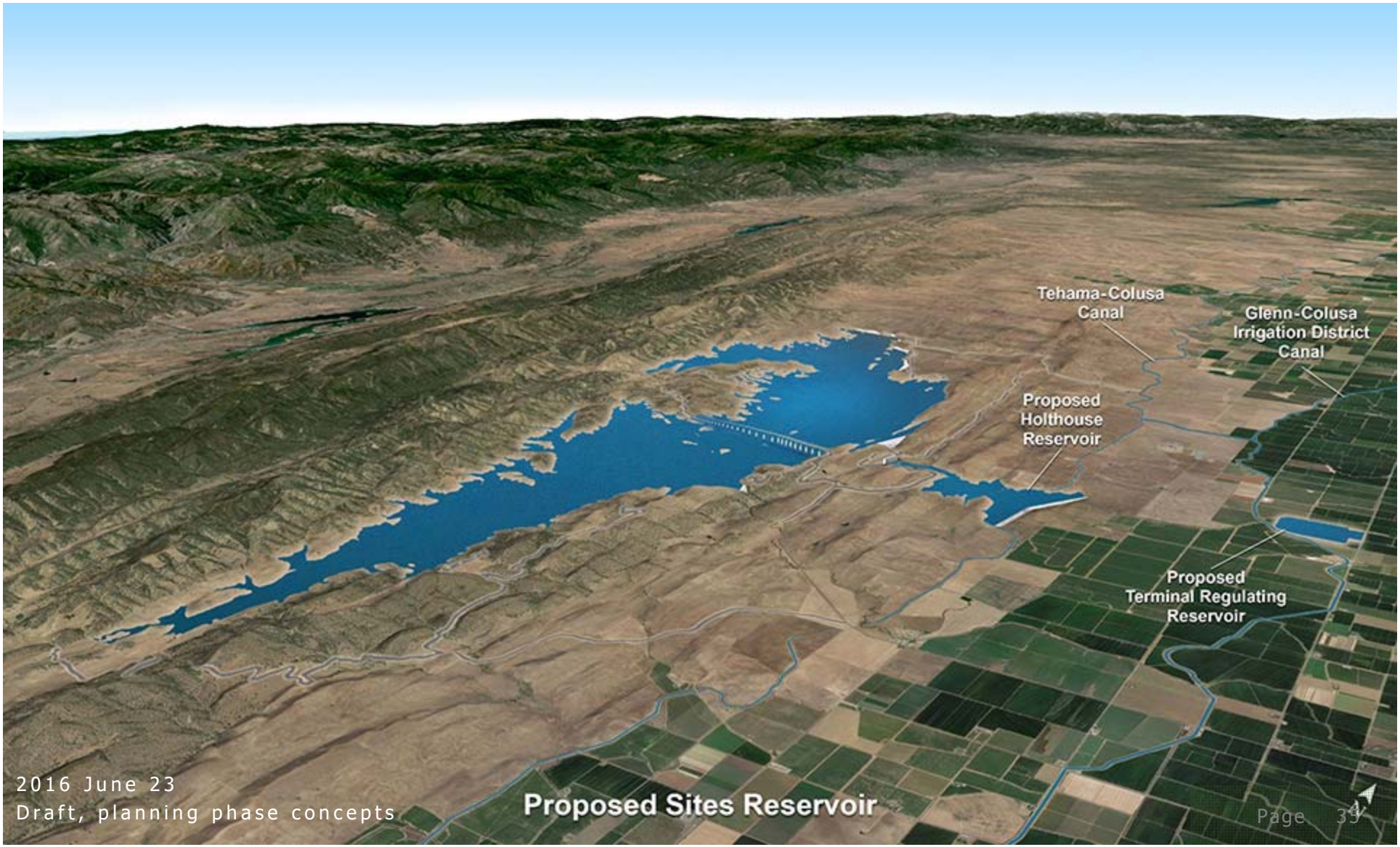
Phase Schedule:



Project's Risk & Uncertainty vs. Value:



Discussion


Tehama-Colusa Canal
Glenn-Colusa Irrigation District Canal
Proposed Holthouse Reservoir
Proposed Terminal Regulating Reservoir
Proposed Sites Reservoir