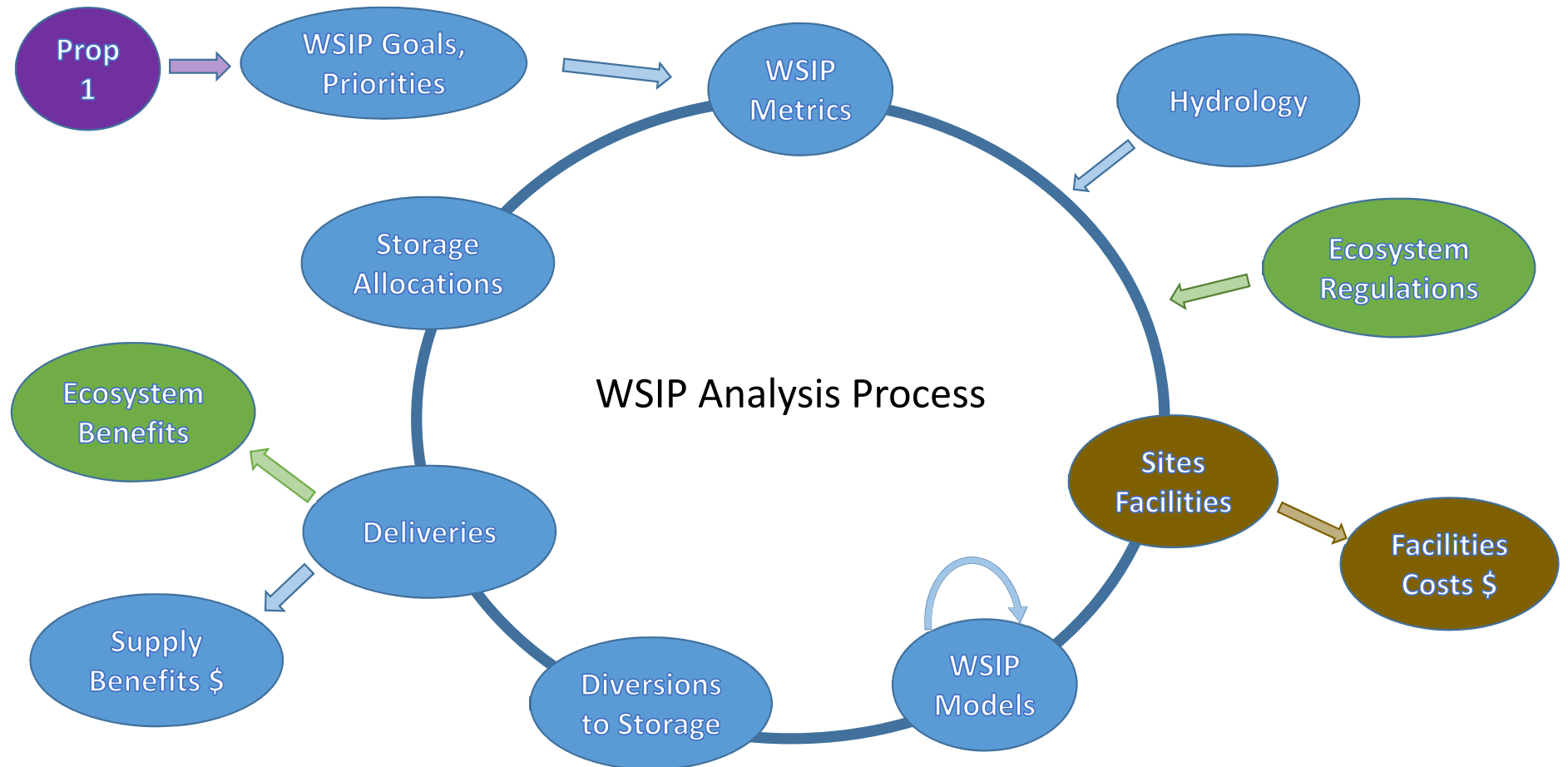


Water Storage Investment Program – Application Summary

General Process



WSIP Goals and Priorities

❑ **Project Eligibility**

- Measurable improvements in the Delta ecosystem or tributaries
- “Advances the long-term objectives of restoring ecological health and improving water management for beneficial uses of the Delta”

❑ **Resiliency**

- Flexibility and integration into the State water system
- Response to sources of uncertainty (Climate change, future water management actions, & drought performance)

❑ **Implementation Risk**

- Technical & Financial feasibility
- Economic feasibility
- Environmental feasibility & permit acquisition schedule

❑ **Public Benefit Ratio**

$$\text{Return on Public Investment} = \frac{\text{Monetized Public Benefits}}{\text{Funding Request}}$$

❑ **Relative Environmental Values**

- Ecosystem (CA DFW): 303 questions
- Water Quality (SWRCB) 129 questions

WSIP Scoring Metrics

• Project Eligibility	Pass/Fail
• Implementation Risk	15
• Resiliency	25
• Relative Environmental Values	27
• Public Benefit Ratio	33

Priorities and Metrics

- Ecosystem
 - Flow and Water Quality
 - Physical Processes and Habitat
- Water Quality
- Flood Risk Reduction
- Recreation
- Emergency Response

- Water Supply
- Hydropower

Ecosystem Priorities – Flow and Water Quality

- **Coldwater to increase the survival of salmonid eggs and fry**
- **Flows to improve in-river rearing and downstream migration of juvenile salmonids**
- **Maintain flows and ramping rates to avoid stranding and dewatering redds**
- **Improve ecosystem water quality**
- **Provide flows that increase dissolved oxygen and lower water temperatures**
- Increase attraction flows during upstream migration
- Increase Delta outflow to provide low salinity habitat
- Maintain or restore groundwater and surface water interconnection

Ecosystem Priorities – Physical Processes and Habitat

- Enhance flow regimes or groundwater conditions to improve riparian and floodplain habitats
- Enhance the frequency, magnitude, and duration of floodplain inundation
- Enhance the temporal and spatial distribution and diversity of habitats
- Enhance access to fish spawning, rearing, and holding habitat by eliminating barriers to migration
- Remediate unscreened or poorly screened diversions to reduce entrainment of fish.
- **Provide water to enhance seasonal wetlands, permanent wetlands, and riparian habitat on State and Federal wildlife refuges and on other public and private lands**
- Develop and implement invasive species management plans to enhance habitat and increase the survival of native species
- **Enhance habitat for native species that have commercial, recreational, scientific, or educational uses**

Sites Applications - WSIP Public Benefits

Public Benefit Category	Sites Project Approach
Ecosystem	Primary focus – coldwater pool, releases to aid migration, Yolo Bypass , refuges
Flood	Monetized
Recreation	Monetized
Water Quality	Described, but not monetized
Emergency	Described, but not monetized

Sites Applications - Ecosystem Benefit Details

- Coldwater Pool (Temperature/salmon) – Shasta
- Augmented Release (Flow/salmon) – from Shasta for juveniles and redds
- Coldwater Pool (Temperature/salmon) – Oroville
- Coldwater Pool (Temperature/salmon) – Folsom
- Food Web Improvement (smelt) – Yolo Bypass
- Refuge Water Supply – waterfowl, anadromous fish, other wildlife

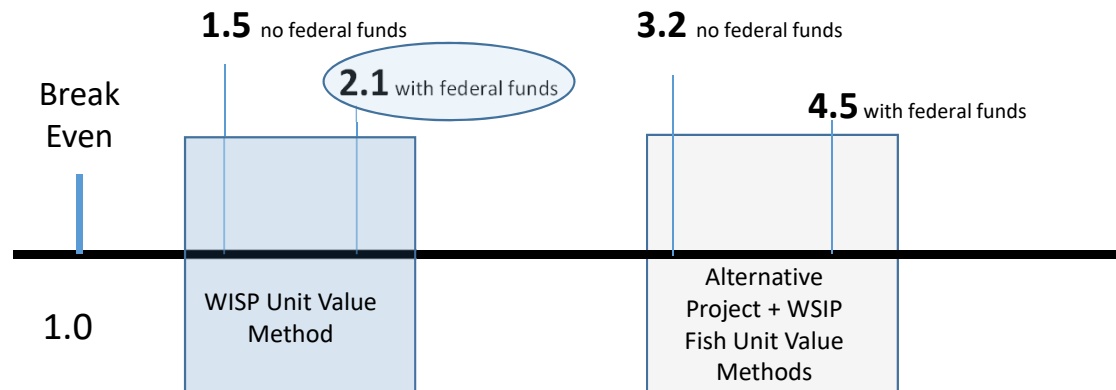
Economics Summary

WSIP Models (Economics)

Category	Primary Method	Alternate Method	Alternate Method
Ecosystem Improvement – Anadromous Fish	Alternative Cost	WSIP Unit Water Values	WSIP Unit Fish Values
Ecosystem Improvement – Incremental Level 4 Refuge Water	WSIP Unit Water Values	Alternative Cost	
Ecosystem Improvement – Oroville Coldwater	WSIP Unit Water Values	Alternative Cost	
Ecosystem Improvement – Yolo Bypass	WSIP Unit Water Values	Alternative Cost	
Recreation	Facilities Assessment and Unit Day Values	WSIP Recreational Visitation Model	
Flood Control	Avoided Cost Savings	HEC-FDA	
Water Supply – M&I, Agricultural, and Recaptured	CWEST Modeling (M&I and Recaptured); WSIP Unit Water Values (Agricultural)	WSIP Unit Water Values (M&I and recaptured);	SWAP (Agricultural)
Hydropower	PARO/PLEXOS Modeling	—	

WSIP Models (Economics)

Range of Public Benefit Ratio Results



Sites Facilities Cost

Category	WSIP Public Benefits			Non-Prop 1. Eligible Benefits		Total
	Ecosystem Improvement	Recreation	Flood Control	Water Supply	Hydropower (System)	
Total Project Costs (Billions)						\$209.1
Total Allocated Costs (Separable Plus Allocated Joint Costs)	\$88.5	\$5.4	\$3.9	\$92.9	\$18.5	\$209.1
Percent Total Cost Allocation	42.3%	2.6%	1.8%	44.4%	8.8%	100%
Allocated OM&R Annual Costs						
Total Allocated OM&R Cost	\$12.0	\$0.9	\$0.5	\$12.6	\$0.5	\$26.6
Percent OM&R Cost Allocation	45.3%	3.3%	2.0%	47.5%	2.0%	100%
Allocated Capital Costs (Annualized)						
Total Allocated Annual Capital Cost	\$76.5	\$4.5	\$3.3	\$80.2	\$17.9	\$182.5
Percent Capital Cost Allocation	41.9%	2.5%	1.8%	44.0%	9.8%	100%
Allocated Construction Costs (Annualized)						
Total Allocated Construction Cost	\$70.1	\$4.2	\$3.1	\$73.6	\$16.5	\$167.4
Percent Construction Cost Allocation	41.9%	2.5%	1.82%	44.0%	9.8%	100%
Allocated IDC Costs (Annualized)						
Allocated IDC	\$180	\$11	\$8	\$189	\$42	\$429
Construction Cost	\$1,989	\$118.1	\$86.6	\$2,087	\$467	\$4,747

Sites Cost Assignment

Purpose/Action	Total		Total Cost (Capital and OM&R) - Present Value					
			Federal Non-Reimbursable		WSIP		Authority	
	Percent	Cost (\$M)	Percent	Cost (\$M)	Percent	Cost (\$M)	Percent	Cost (\$M)
Cost Assignment: WSIP (w/ IDC Savings), Federal Funding (w/ IDC Savings)								
WSIP Public Benefits	47%	\$2,773	28%	\$766	60%	\$1,662	12%	\$345
Ecosystem Improvement	42%	\$2,510	29%	\$725	59%	\$1,480	12%	\$305
Anadromous Fish	52%	\$1,294	38%	\$488	49%	\$630	14%	\$86
Level 4 Refuge	21%	\$534	44%	\$238	49%	\$260	7%	\$36
Oroville Coldwater Pool	19%	\$470	0%	\$0	86%	\$406	14%	\$55
Yolo Bypass	8%	\$212	0%	\$0	86%	\$183	14%	\$25
Recreation	3%	\$153	0%	\$0	84%	\$129	16%	\$25
Flood Control	2%	\$109	38%	\$41	49%	\$53	14%	\$15
Non-Prop.1 Eligible Benefits	53%	\$3,158	0%	\$0	0%	\$0	100%	\$3,158
Water Supply	44%	\$2,634	0%	\$0	0%	\$0	100%	\$2,634
M&I Water Supply	65%	\$1,714	0%	\$0	0%	\$0	100%	\$1,714
Ag Water Supply	29%	\$754	0%	\$0	0%	\$0	100%	\$754
Recaptured Water Supply	6%	\$167	0%	\$0	0%	\$0	100%	\$167
Hydropower (System)	9%	\$524	0%	\$0	0%	\$0	100%	\$524
Total	100%	\$5,931	13%	\$766	28%	\$1,662	59%	\$3,503

Operations Summary

Water Supply Benefits

Summary of Sites Project Operations (WSIP)				Water Supply Benefits		
		Period	Average Annual Diversion to Sites Reservoir (TAF)	Average Annual Deliveries to Sacramento Valley Participants (TAF)	Average Annual Deliveries to South of Delta Project Participants (TAF)	Total Average Annual Deliveries to Water Supply Participants (TAF)
DWR Delivery Capability Report 2015	Current Conditions With Project	Long-Term	514	79	120	200
		Drier 50%	409	123	196	319
		Dry	429	135	306	441
WSIP	WSIP 2030 With Project	Long-Term	552	110	134	244
		Drier 50%	480	144	215	359
		Dry	535	157	269	426
	WSIP 2070 With Project	Long-Term	588	137	148	285
		Drier 50%	483	151	236	387
		Dry	539	161	326	488

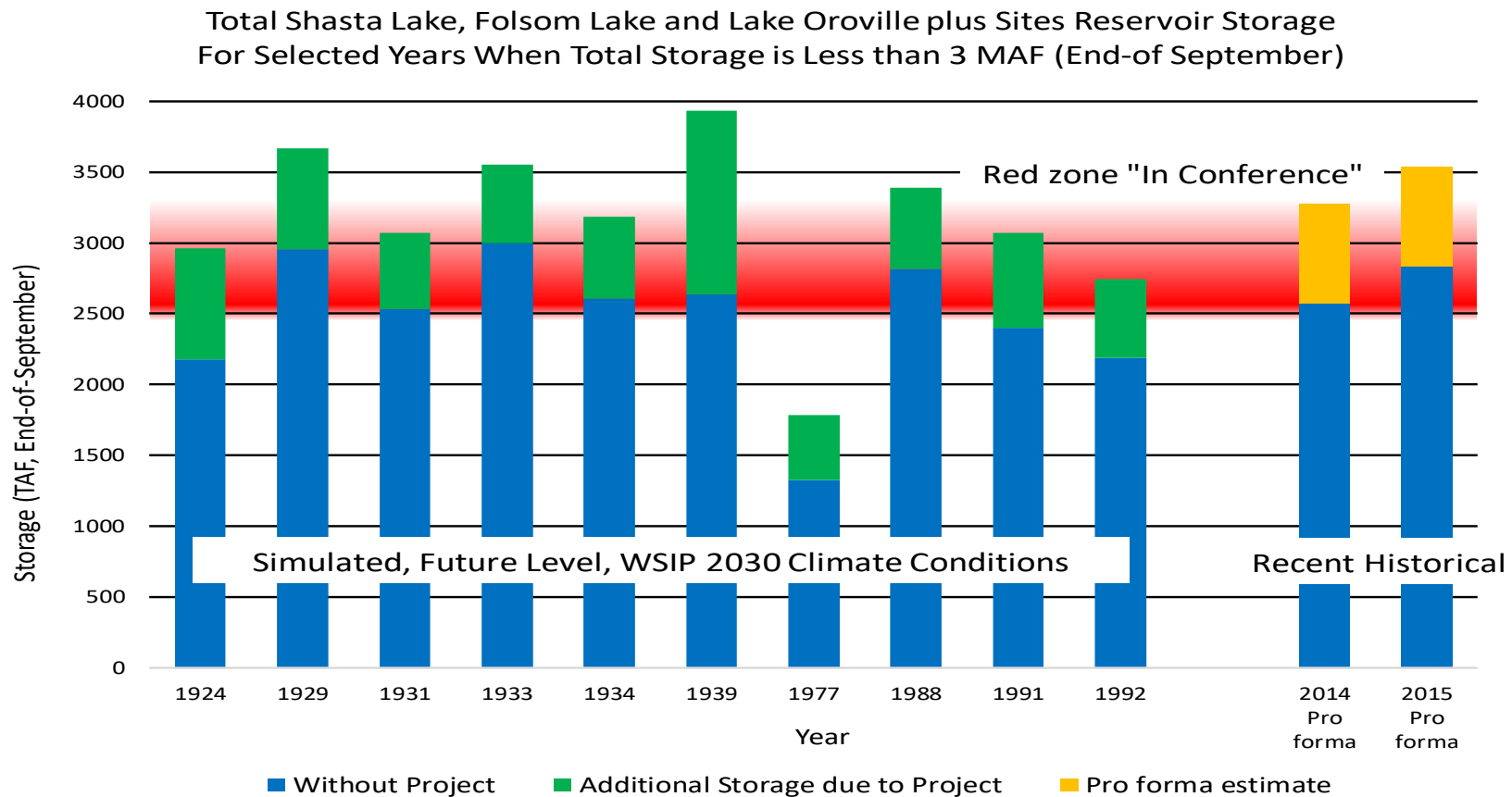
Public Benefits

Summary of Sites Project Operations (WSIP)				Public Benefits			
		Period	Average Annual Diversion to Sites Reservoir (TAF)	Average Annual Water Deliveries to EEA Storage (Shasta, Oroville, Folsom) (TAF)	Average Annual Deliveries to Yolo Bypass Flow (TAF)	Average Annual Deliveries to Refuges (TAF)	Total Average Annual Deliveries to Environment (TAF)
DWR 2015	Current Conditions With Project	Long-Term	514	131	41	37	208
		Drier 50%	409	202	34	23	258
		Dry	429	207	33	22	262
WSIP	WSIP 2030 With Project	Long-Term	552	124	39	35	197
		Drier 50%	480	194	29	22	245
		Dry	535	181	33	21	235
	WSIP 2070 With Project	Long-Term	588	125	39	31	194
		Drier 50%	483	187	29	17	233
		Dry	539	159	33	16	208

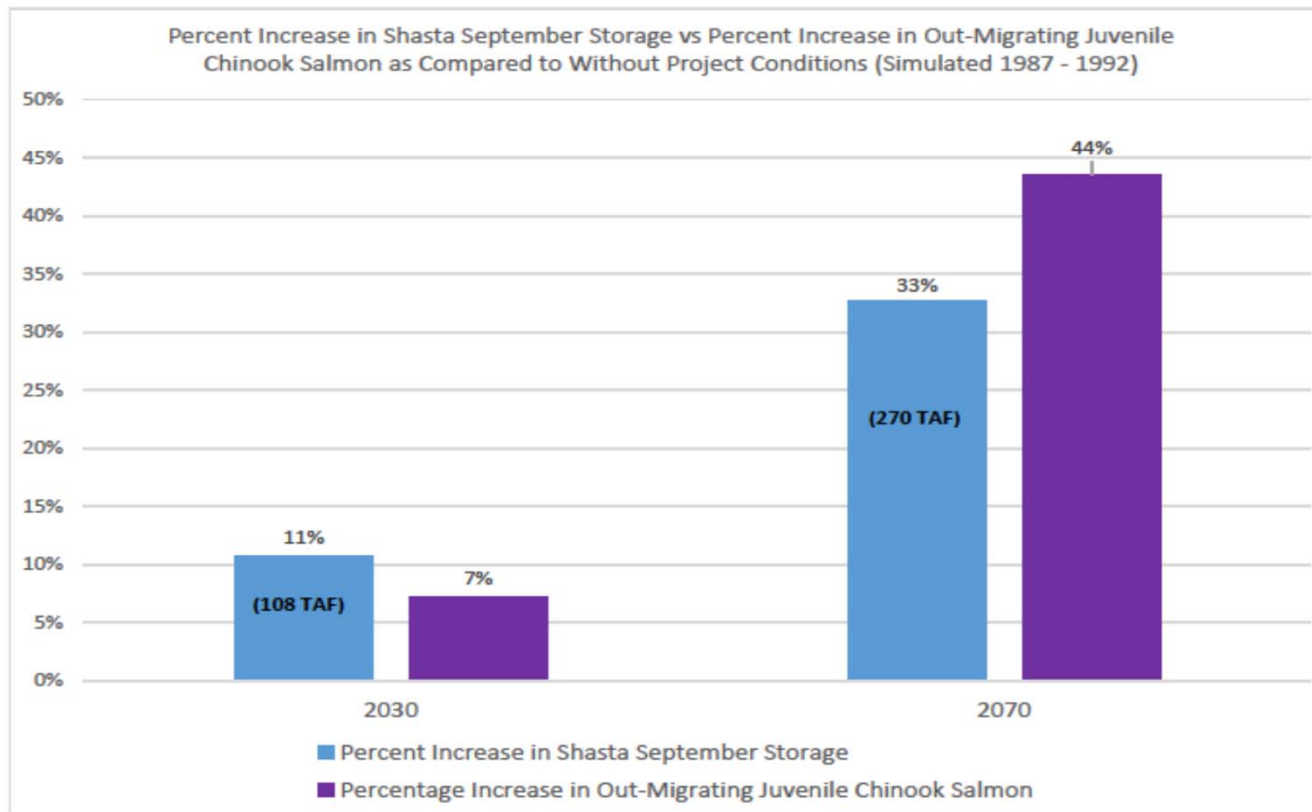
Other Project Benefit Metrics

Summary of Sites Project Operations (WSIP)		Other Metrics			
		Period	Average Annual EEA Recapture (TAF)	September Storage (Shasta, Oroville, Folsom) (TAF)	Average Annual Sacramento River Flow for Fall Flow Stability (TAF)
DWR Delivery Capability Report 2015	Current Conditions With Project	Long-Term	14	237	79
		Drier 50%	13	321	71
		Dry	17	283	80
WSIP	WSIP 2030 With Project	Long-Term	19	161	50
		Drier 50%	8	182	45
		Dry	6	145	119
	WSIP 2070 With Project	Long-Term	11	174	22
		Drier 50%	9	182	31
		Dry	12	87	39

Drought Year Water Storage Benefits



Shasta Storage and Fisheries Benefits



*Values presented in TAF represent increases in Shasta September Storage as Compared to Without Project Conditions