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Proposed Change to the Preferred Project Alternative (PPA) For the Bay-Delta Conservation Plan (BDCP) Conveyance Facility

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Summary: The California Natural Resources Agency conducted a public meeting on June 20, 2012, at which a new PPA for the BDCP conveyance facility was described.

The previous PPA would convey a maximum flow of 15,000 cubic feet per second (cfs) of water from five screened diversions in the Sacramento River through a pair of large diameter, pressurized tunnels to the State Water Project and Central Valley Project pumping stations in the South Delta near Tracy.

The new PPA would convey a maximum flow of 9,000 cubic feet per second (cfs) of water from three screened diversions in the Sacramento River through a pair of large diameter, gravity-flow tunnels to the pumping stations. The new PPA would also employ a "decision tree" approach to assessing the effectiveness of habitat restoration efforts and new flow criteria on restoring fish species, and would use the results to determine the actual operation of the conveyance system.

Background

In late 2011 and early 2012, the BDCP electronically posted draft environmental documents containing a suite of alternative projects and invited comments from federal and state regulatory agencies and the public. As originally proposed, the PPA was Alternative 1A, a 15,000 cfs dual conveyance tunnel facility with five 3,000-cfs intake structures on the Sacramento River between Hood and Courtland in the north Delta. Alternative 1A included a forebay near Courtland, an intermediate pump station, and twin 35-mile long, 33-foot diameter pressurized tunnels to the Clifton Court forebay in the south Delta. The PPA assumed a delivery of an annual average of 5.9 million acre feet (maf).

At a public meeting on June 20, 2012 the California Natural Resources Agency identified a new PPA and presented the key elements of the project. The new PPA includes three 3,000-cfs intakes on the east bank of the Sacramento River between Hood and Courtland, a forebay between Hood and Courtland, and twin 35-mile long gravity-flow tunnels to the Clifton Court forebay. The tunnel diameters are thought to be approximately 33 feet (though they may be slightly larger depending on the engineering requirements for gravity flow). Since the new PPA will operate by gravity flow and does not include an intermediate pump station, it would save money in the project construction and operation, and would have reduced electrical power needs and

emissions. The new PPA assumes a delivery of an annual average of 5.3 maf. It also will include three different operational scenarios, which have not yet been finalized. The effects of new conveyance PPA on the fish species are expected to be lower, but have not yet been fully analyzed.

The new preferred project includes an accelerated habitat restoration program, developing 30,000 acres of new aquatic habitat in the next 15 years, during construction of the conveyance facilities. BDCP is also reviewing changes in flows designed to help fish, and the criteria for water operations to be included in permit applications needed to satisfy the requirements of the federal Endangered Species Act and California's Natural Community Conservation Planning Act.

A major proposed change from the original PPA is use of a "decision tree approach" in implementing the overall Plan during the 15 years the conveyance facilities are being constructed. Specific information on the decision tree approach is not yet available, but it appears to be a tool that will enable BDCP to test hypotheses regarding the effectiveness of habitat restoration and flows on fish recovery. The decision tree approach was described as an open, collaborative, community science process, which retains the authority of regulatory agencies to determine permittable operations after the facility is in operation.

Contact

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Delta Stewardship Council

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BDCP Public Meeting

June 20, 2012

California Natural Resources Agency

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Welcome

- Introductions
- Meeting Purpose

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BDCP Planning Update

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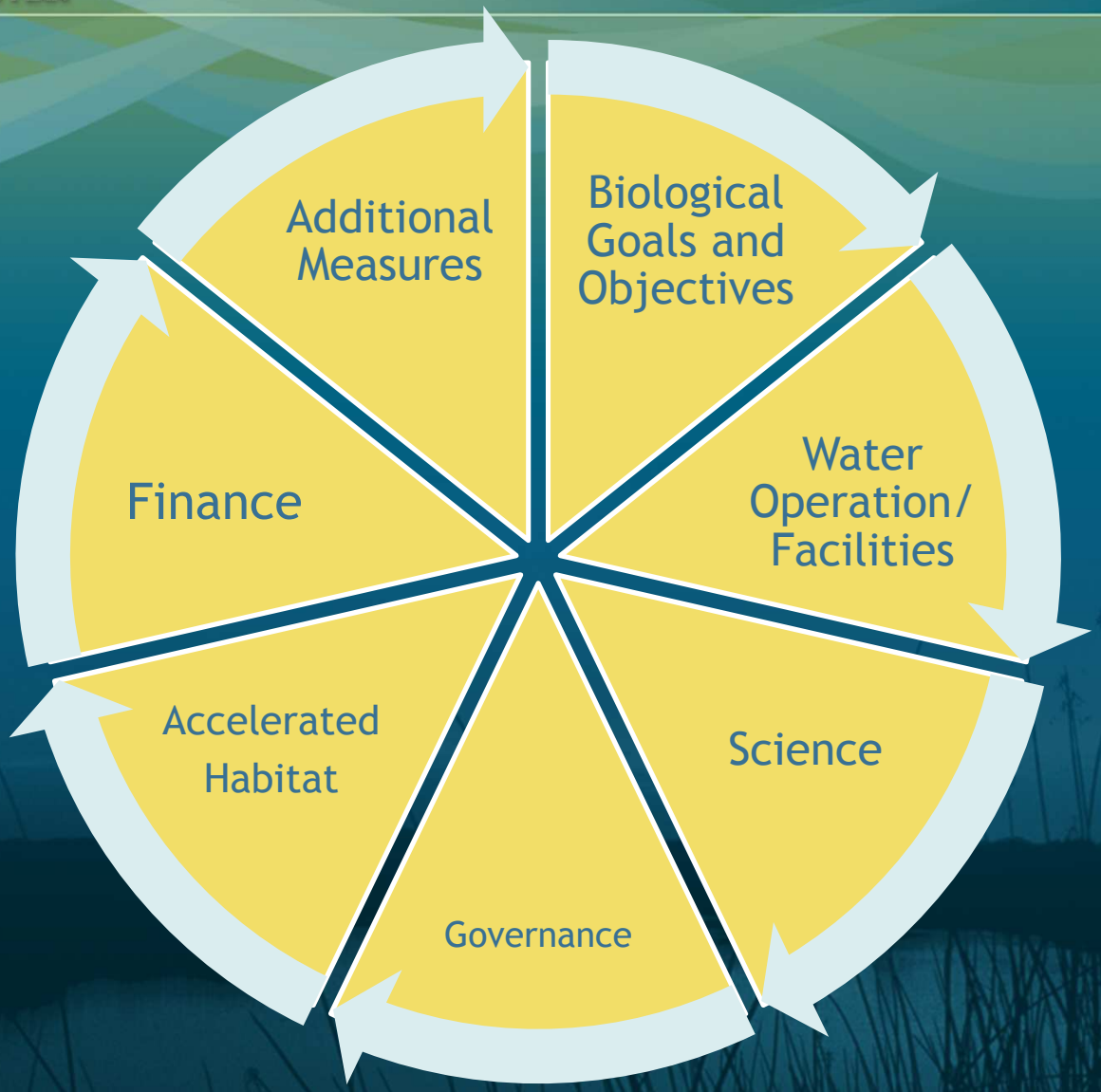
Key Elements of Proposed Project



Co-Equal Goals

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Work in Progress

Response to Comments on Effects Analysis

- Incorporate Independent Science Review
- Ongoing Discussions with Fish Agencies to Address Red-Flag Issues

Water Operations

- Operating criteria of new facilities included in permit application
- Must meet regulatory requirements of ESA/NCCPA

Decision Tree Approach

- First 15 years of plan, prior to facility operation
- Test ***scientific hypothesis*** about effectiveness of flows and habitat restoration on recovering species
- Guided by ***biological goals and objectives*** for fish species
- Supported by ***open, collaborative, community science*** process
- Regulatory agencies retain authority to determine permitable operations once facility is operable

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Habitat Restoration

Accelerated habitat restoration in the Delta.

- **30,000 acres** of aquatic habitat in next 15 years

Additional habitat restoration components:

Considering a total of 113,000 acres of habitat restoration.	Up to 65,000 acres of freshwater and brackish habitat	20 linear miles of channel margin habitat
Enhanced floodplain in the Yolo Bypass-temporary inundation	10,000 acres of seasonally inundated floodplains	5,000 acres of riparian forest and scrub

Changes in flows designed to help fish

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Financing

- **Conveyance facilities:** "User Pays" Principle
- **Habitat restoration:** Financing by the state and federal governments over a period of 40 years
  - Existing water bond contains $1.5 billion

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Additional Measures

- **Delta County benefits** (e.g. in-lieu taxes, habitat maintenance guarantees, and agricultural mitigation)
- **Future funding** for water storage, water conservation, wastewater recycling, and integration of CVP and SWP. Additional environmental benefits.
- **Permits** from the fish agencies, Corps of Engineers, and State Water Resources Control Board.

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Proposed Conveyance Facilities

Dale Hoffman-Floerke, DWR

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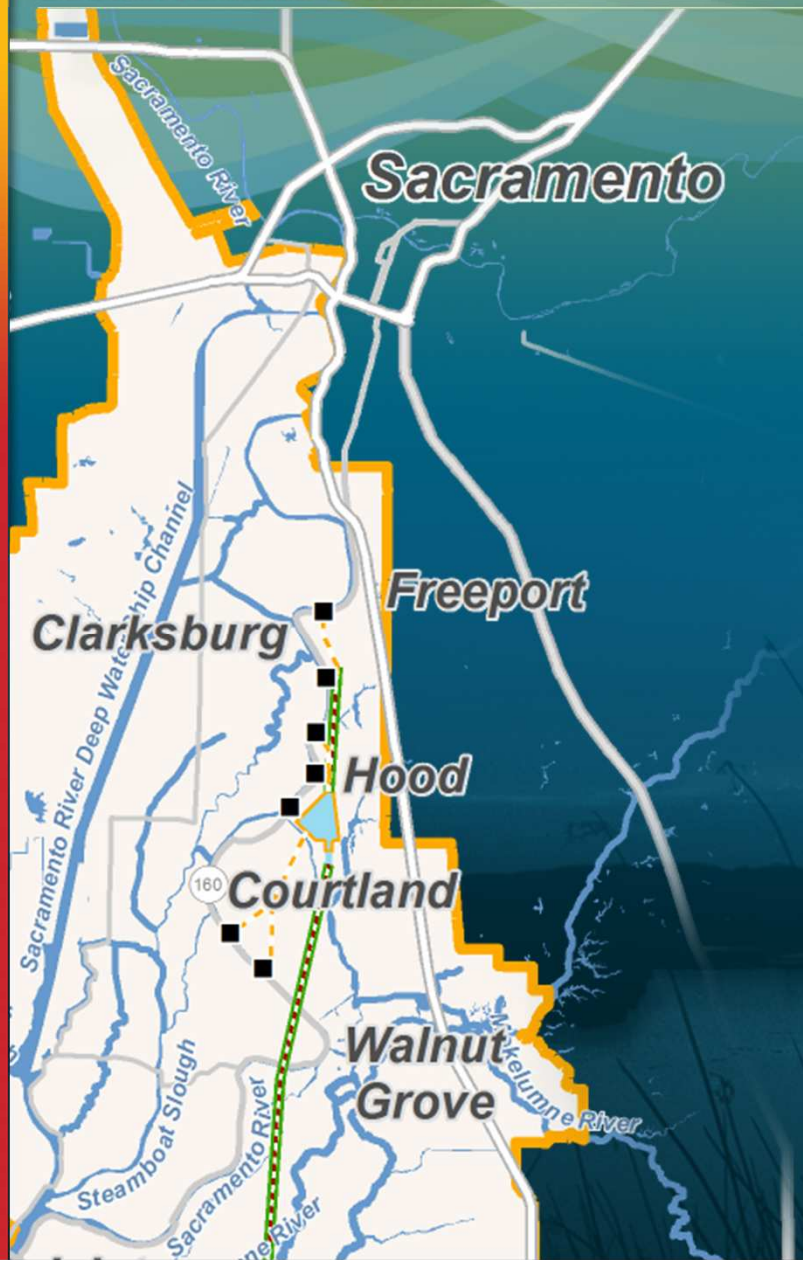
Intake Facilities



- Three intakes with a cumulative maximum capacity of 9000 cubic feet per second
- Built on the Sacramento River in the North Delta
- Reducing number of intakes greatly reduces impacts of construction and operation on Sacramento County.

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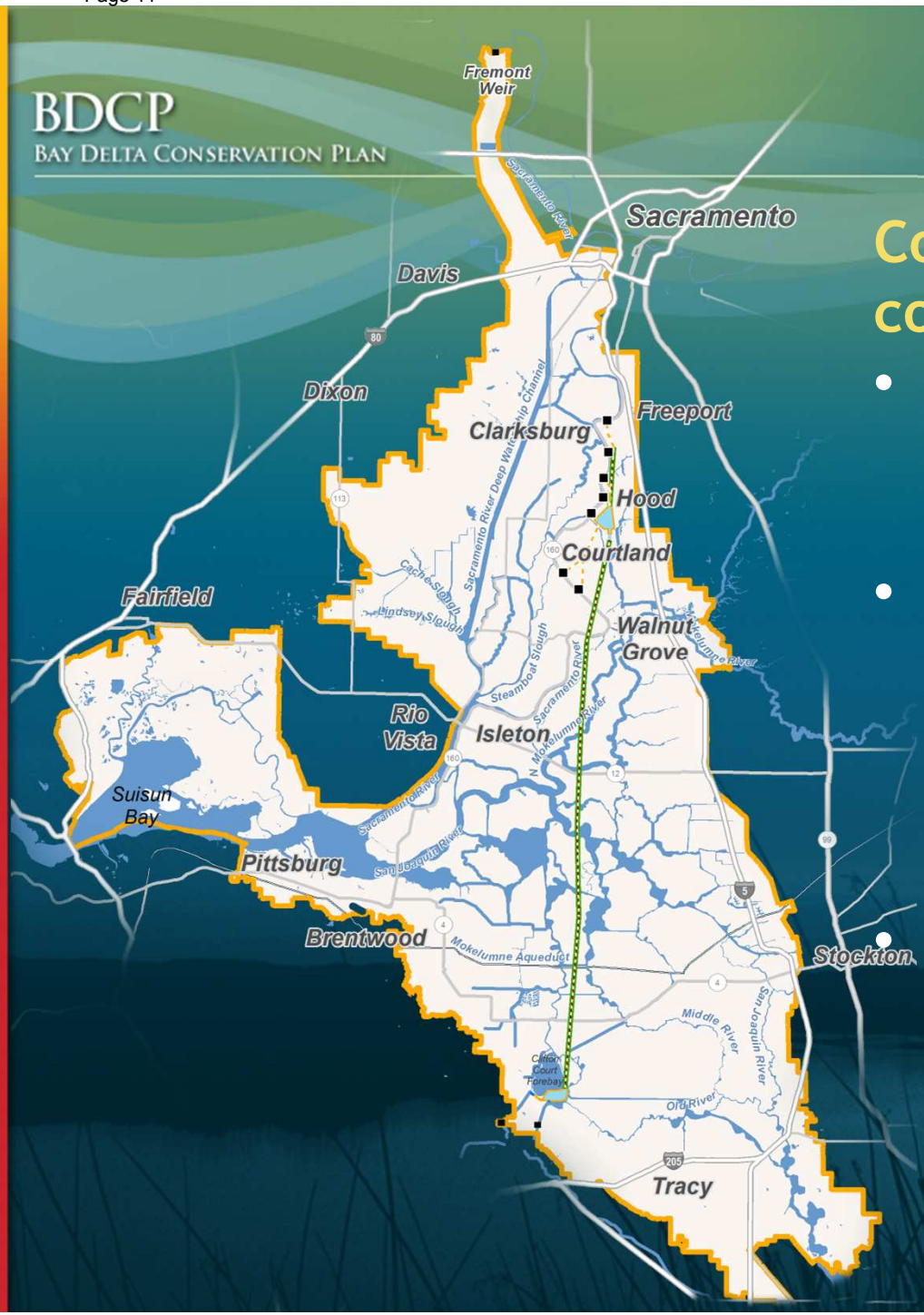
Conveyance



Conveyance facility would consist of:

- Forebay for temporary storage of the water diverted from intakes
- Two side-by-side underground tunnels which would transmit the water 35 miles to the federal and state pumps near Tracy.
- Sized to accommodate gravity flow

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Timeline

2012	July: Governor and Secretary release key elements of a proposed project, subject to further analysis Fall: Release Public Draft EIR/EIS and Public Draft BDCP
2013	- Habitat implementation begins - Delta Stewardship Council determination of compliance with 2009 Delta legislation - Submit application for change in place of diversion to State Water Resources Control Board. - Begin formal permitting process
2014	- State Water Resources Control Board holds hearings. - Continue environmental surveys in support of permits
2015/2016	- Continue environmental surveys - Continue engineering designs necessary for permits
2017	- Permit applications complete and permits issued

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Benefit Analysis of BDCP Project Alternatives

Presented by:
David Sunding

June 20, 2012

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International Trade Product Liability Regulatory Finance and Accounting Risk Management Securities Tax Utility Regulatory Policy and Ratemaking Valuation
Electric Power Financial Institutions Natural Gas Petroleum Pharmaceuticals, Medical Devices, and Biotechnology Telecommunications and Media Transportation

Purpose of Study

- Assess whether the benefits of BDCP are sufficient to justify the costs to the agencies receiving project water supplies
  - Not a statewide benefit-cost analysis
  - Costs of BDCP are described in Chapter 8 that is available to the public
- Assess whether the public good benefits of Delta restoration are sufficient to justify public expenditures on habitat

Outline

- Proposed Projects
- Urban Water Supplies
- Agricultural Water Supplies
- Water Quality Impacts
- Reduction in Seismic Risk
- Regulatory Certainty
- Recreation and Public Good Benefits
- Conclusions

Proposed Projects

Alternatives

Characteristics of Alternatives

	Alt 1A	Alt 4
Alignment/ Conveyance	Tunnel / Dual	Tunnel / Dual
Diversion Capacity (cfs)	15,000	9,000
Intakes	1, 2, 3, 4, 5; alts 1, 2, 3, 4, 5	1, 2, 3; alts 1, 2, 3
Operations	BDCP Steering Committee	Scenario 6 / Fall X2
Mean Exports (maf)	5.9	5.3

Urban Water Supplies

Analysis Background

We evaluate losses at the individual agency level

- 26 MWD member agencies
- 9 other agencies receiving SWP supplies

Analysis relies on a unique data set containing historical demands and other characteristics for 119 California urban water retailers

Data used to measure the value of avoiding future shortages

Components of Economic Welfare Calculations

1) **Forecasted supply and demand**

2) **Shortage level**

3) **Price elasticity of demand**

4) **Retail rate structure**

5) **Marginal cost of service**

Water Supplies

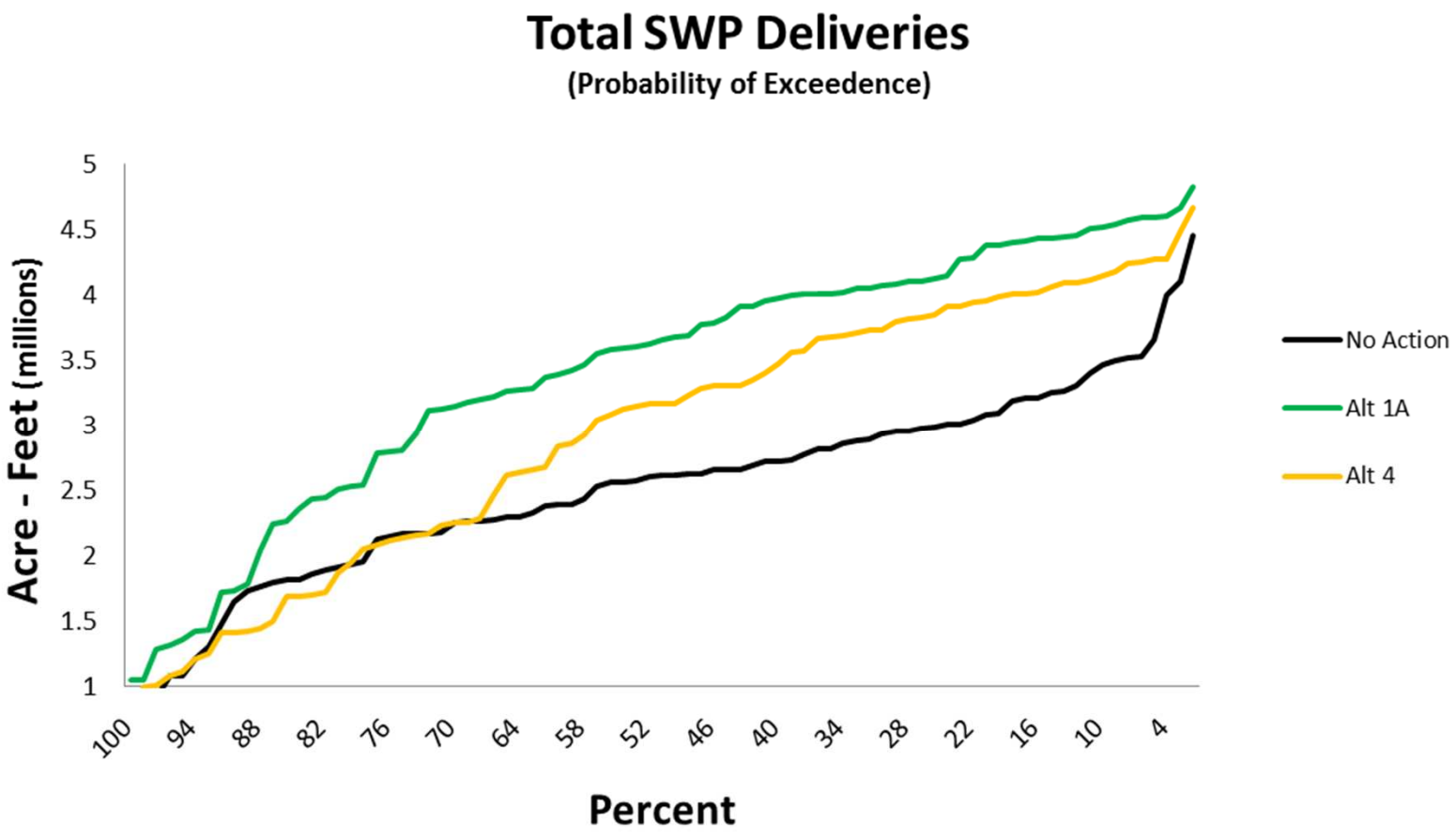
Local Supplies

- Groundwater
- Local surface water
- Recycled water
- Desalination

Imported Supplies

- Colorado River Supplies
  - 1.2 million AF per year
- State Water Project
  - Table A: scheduled ~2.5 million AF per year
  - Article 21: unscheduled water
- LA Aqueduct

State Water Project Supplies



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Forecasting Demand (2012–2050)

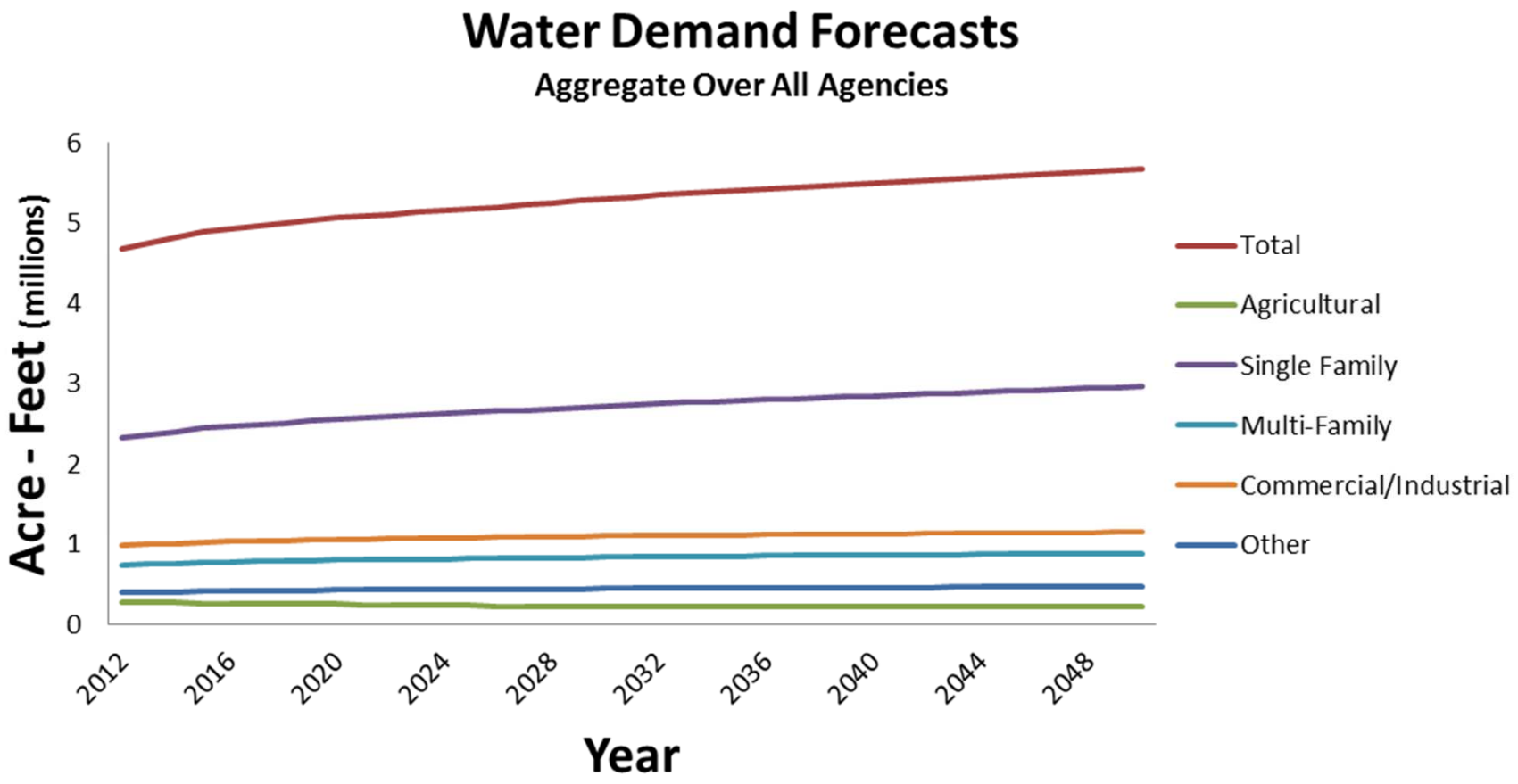
Northern California and Central Coast

- Provided by the agencies

Southern California

- Use MWD - MAIN model that relies on
  - Projected retail water rates
  - SCAG and SANDAG demographic projections
    - Population
    - Household size
    - Employment
    - Income
  - Conservation projections

Demand Forecasts



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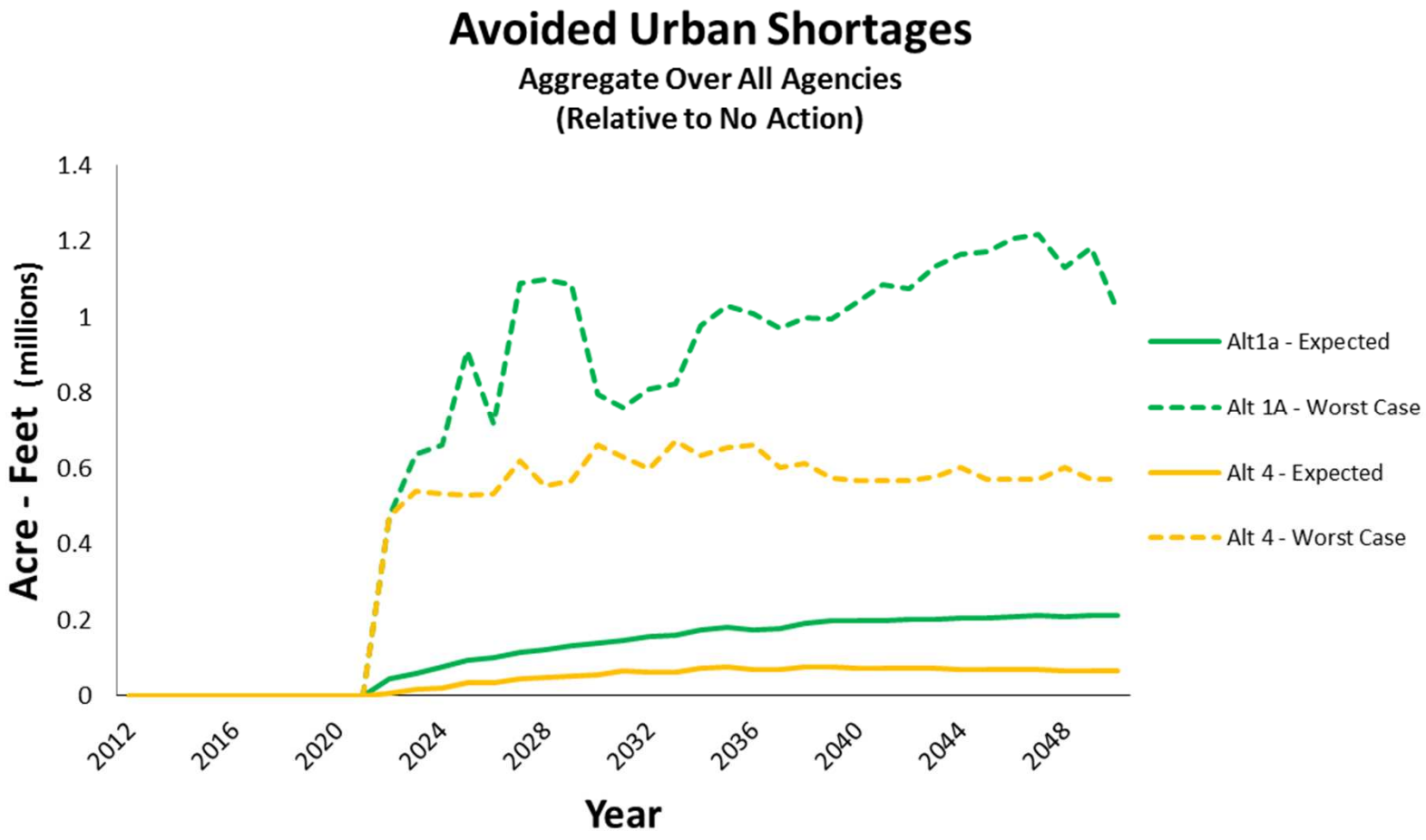
Forecasting Shortages (2012–2050)

Rotating Monte-Carlo Simulation

- Uses 83 year historical hydrologic record (1922 – 2004)
- Rotates through 83 trials of the hydrologic pattern given the forecasted demand and water supplies
- Captures the uncertainty of extreme weather patterns
- Accounts for on-going storage fluctuations given previous year levels

Forecasted Shortages (Relative to No Action)



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Model Framework

Mediate shortage primarily through the single family residential sector

- Easier to cut back for residential than commercial/industrial
- Fewer impacts to jobs and economic activity

Curtail least valuable water first

- Outdoor irrigation, filling swimming pools, washing cars

Existing water rates structures and demand elasticities affect the value placed on avoiding shortage

Price Elasticity of Demand

Data Collection:

- Track 119 retailers in California from 1994 – 2010
- Over 1,200 price – consumption observation points

Variables considered in econometric model

- Consumption
- Rate
- Lot size
- Income
- Household size
- Weather (temperature, precipitation)

Estimating Welfare Gains From Reduced Water Shortage

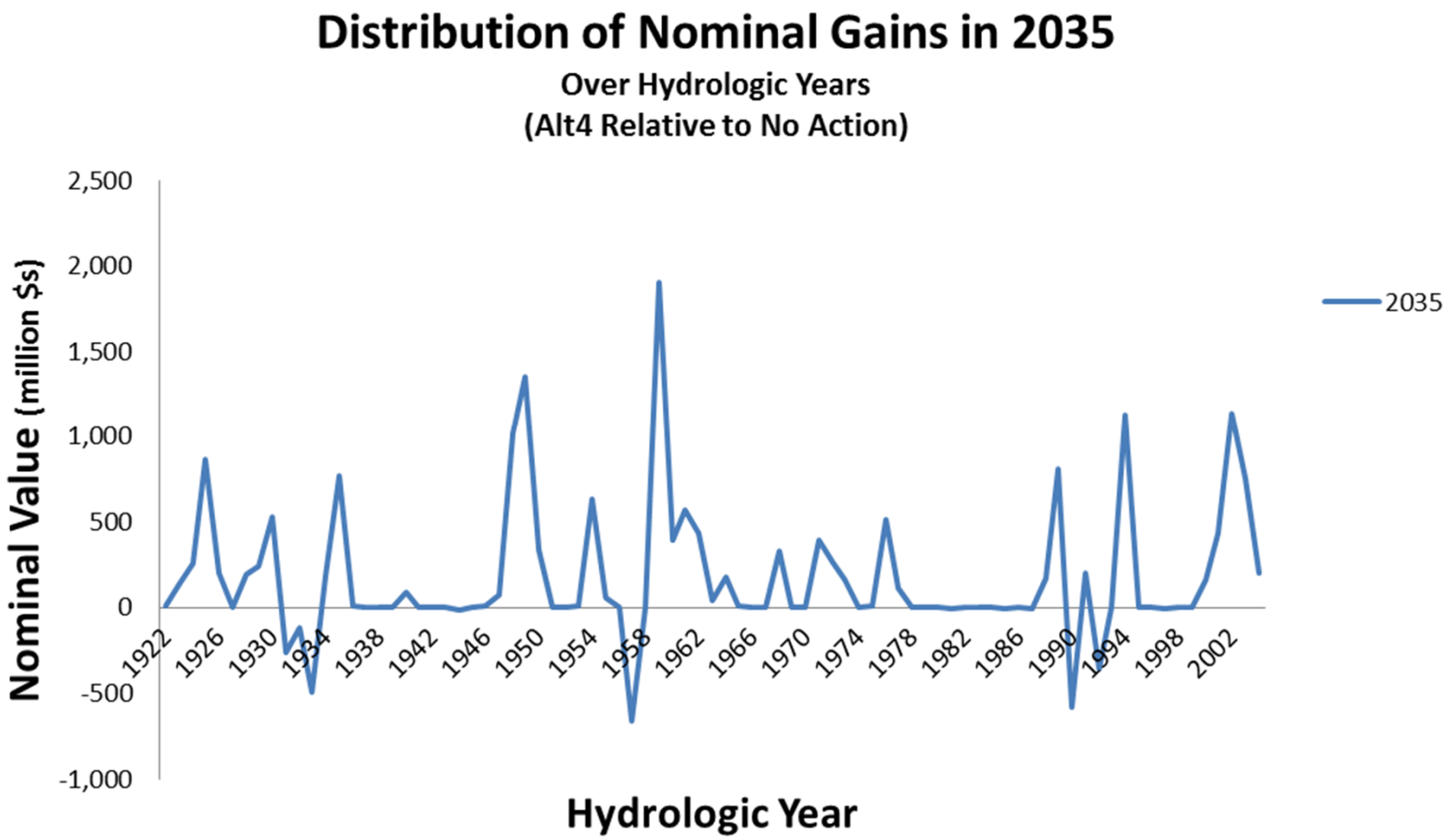
Losses for 2012 – 2050 are calculated for

- Each of the 35 agencies in the model
- 83 unique hydrologic trajectories
- 3 scenarios: No Action (baseline) and 2 alternative projects

Losses are aggregated across all agencies and discounted back to present value at a 3% discount rate

The difference in losses under No Action scenario and each alternative scenario is considered to be the welfare loss

Example: Value of Avoided 2035 Shortages Across the Hydrologic Record



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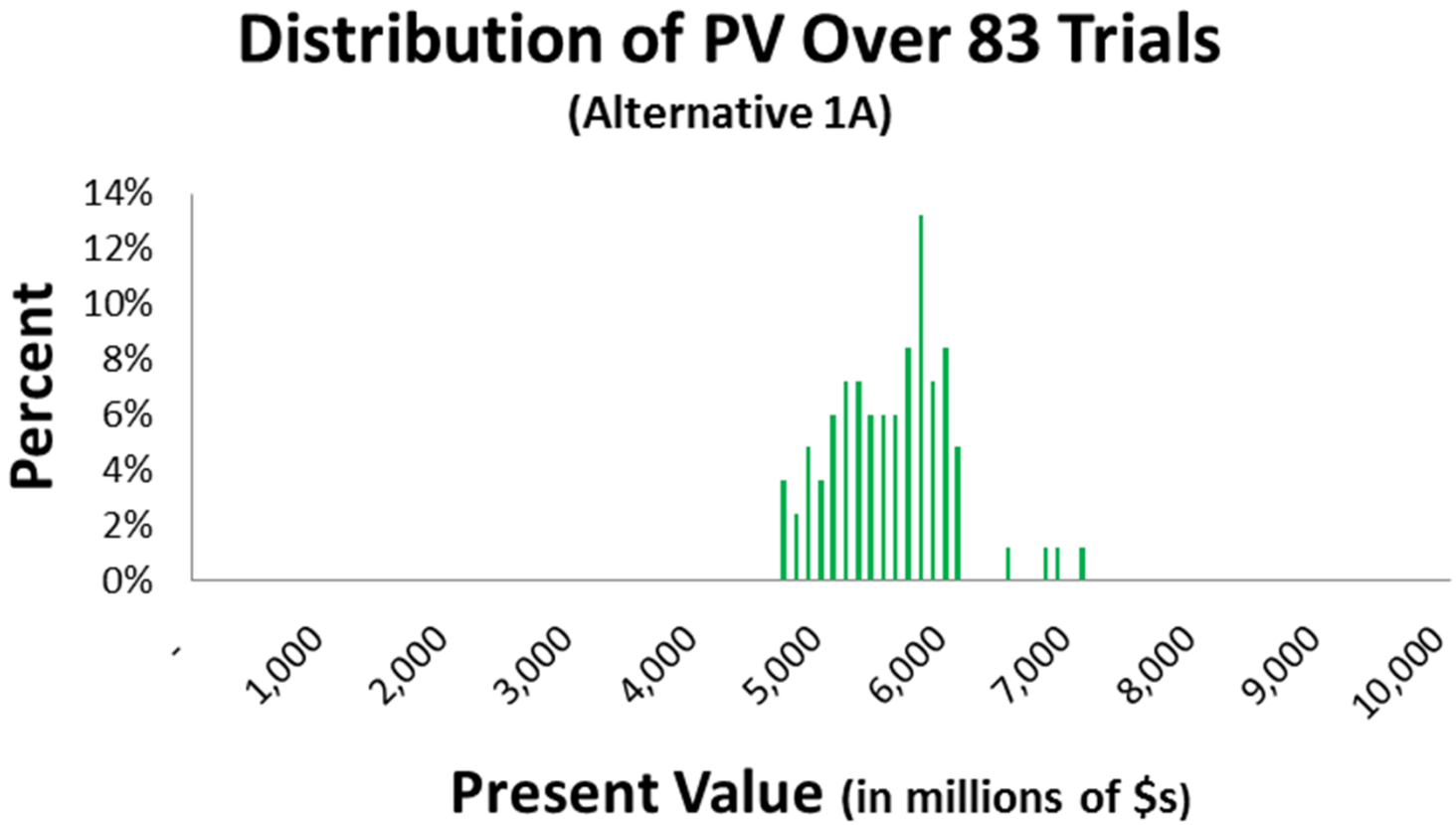
Distribution of the Present Value of Urban Water Supply Benefits for Alternative 1A



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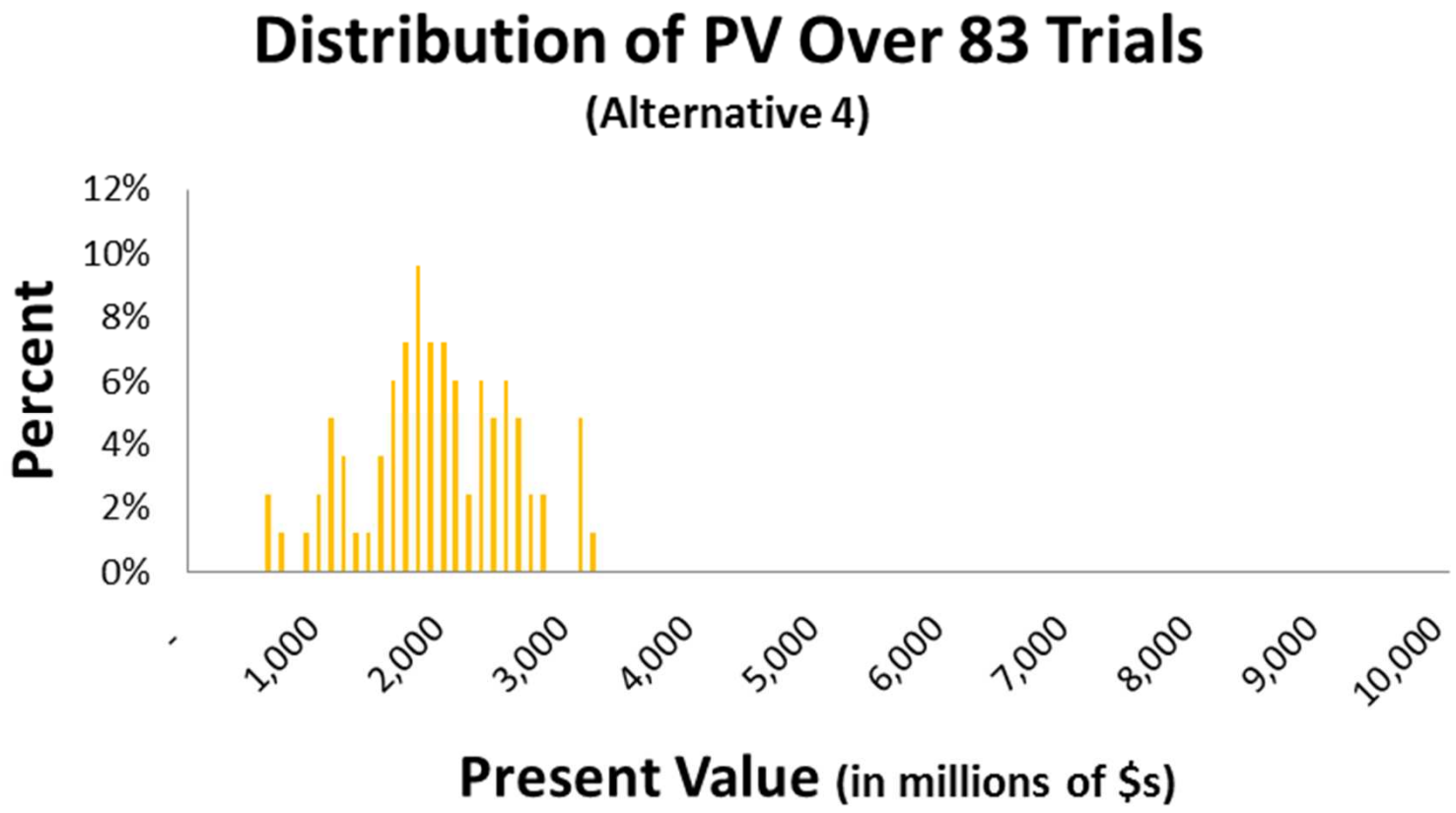
Distribution of the Present Value of Urban Water Supply Benefits for Alternative 4



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Value of Project Water Supplies to Urban Agencies

Present Value (in millions)

	Alt 1A	Alt 4
Lowest PV	$4,647	$532
Highest PV	$7,068	$3,167
Expected PV	**$5,517**	**$1,898**

Agricultural Water Supplies

CVP and SWP Agricultural Water Supply Benefits

Benefits are estimated using the Statewide Agricultural Production (SWAP) model

- Simulates the profit-maximizing decisions of agricultural producers given inputs:
  - Availability and cost of water
  - Land
  - Labor
  - Other
- Accounts for SWP & CVP water, other local supplies, and groundwater

Urban + Agricultural Water Supply Benefits

Present Value (in millions)

Benefit Category	**Alt 1A**	**Alt 4**
Urban Water Supply	$5,517	$1,898
Agricultural Water Supply	$2,363	$1,138
Total Expected PV Benefits	**$7,880**	**$3,036**
Mean Exports (maf)	**5.9**	**5.3**

Water Quality Impacts

Water Quality Impacts

Two models used to estimate salinity - related benefits

- Lower Colorado River Basin Water Quality Model
- South Bay Water Quality Model

Main variables

- Total dissolved solids (TDS) concentration
- Costs to users
- Demographic characteristics

Evaluates reduced salinity impacts on

- Useful life of appliances
- Specific crop yields
- Cost to industrial and commercial customers
- Amount of irrigation water needed

Value of Water Quality Impacts

Present Value (in millions)

	Alt 1A	Alt 4
Total Water Quality Benefits	$1,586	$1,802

Reduction in Seismic Risk

Estimating Seismic Risk to Urban Agencies

Framework

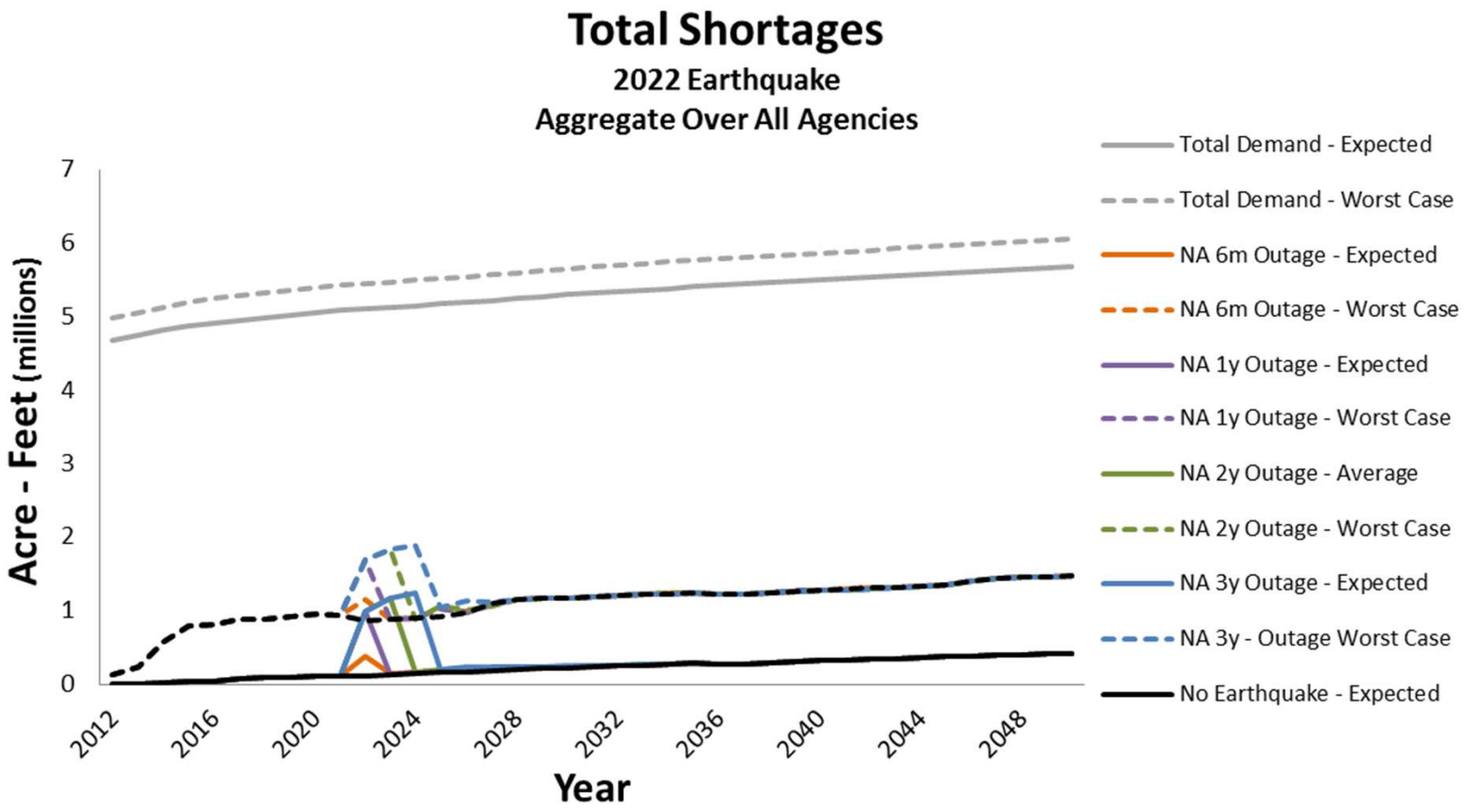
1) **Assume year of earthquake**
   - Example: Year 2022
2) **Evaluate shortages at four levels of outage**
   - 6 months, 1 year, 2 year, 3 year
3) **Calculate PV loss under 83 hydrologic trials**
   - Similar to urban supply benefit calculations

Measure range of impacts based on variation in these three factors

Companion agricultural analysis is in progress

Total Urban Shortages

Comparison Across All Outage Levels



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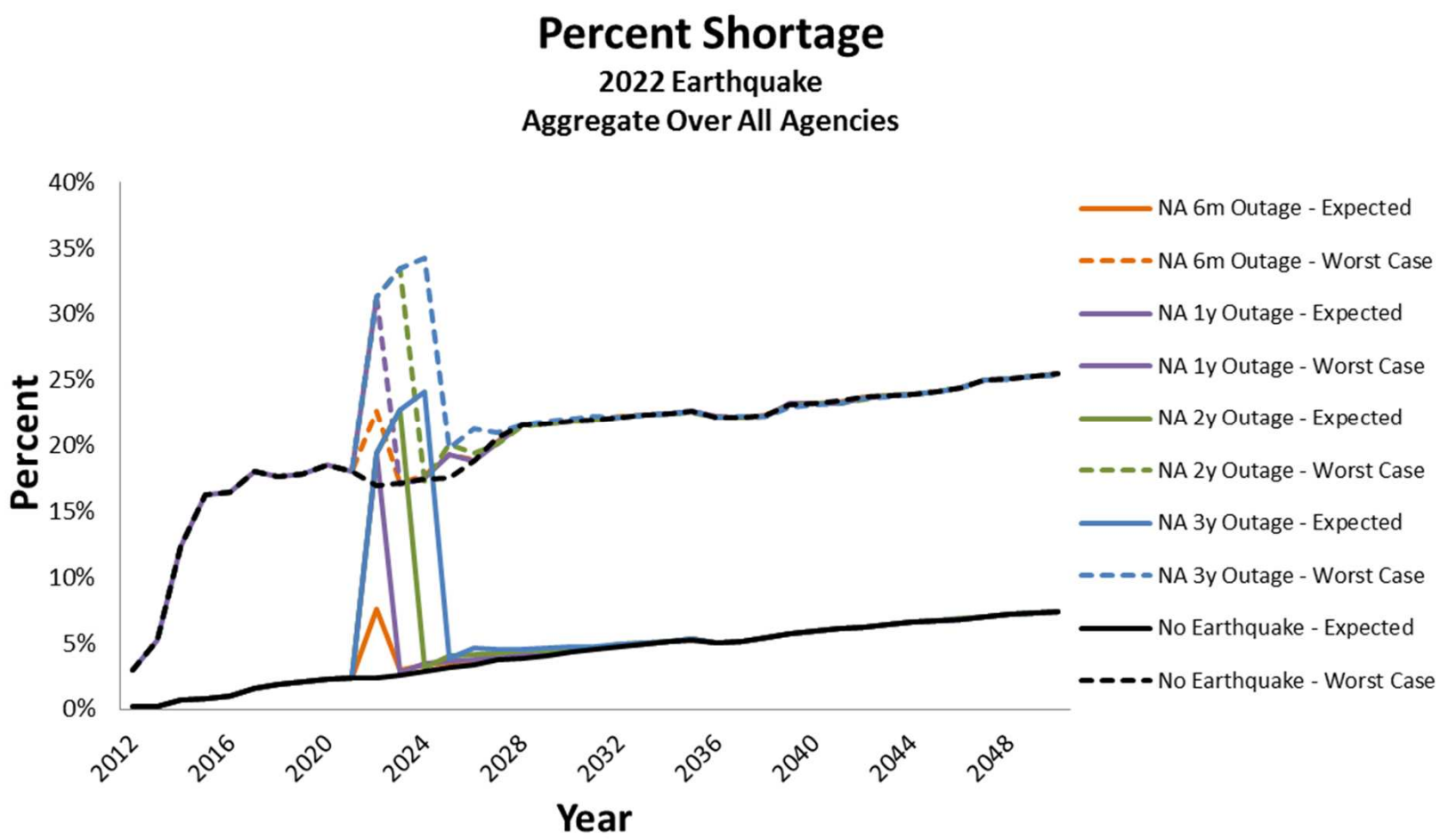
Percent Shortage

Comparison Across All Outage Levels



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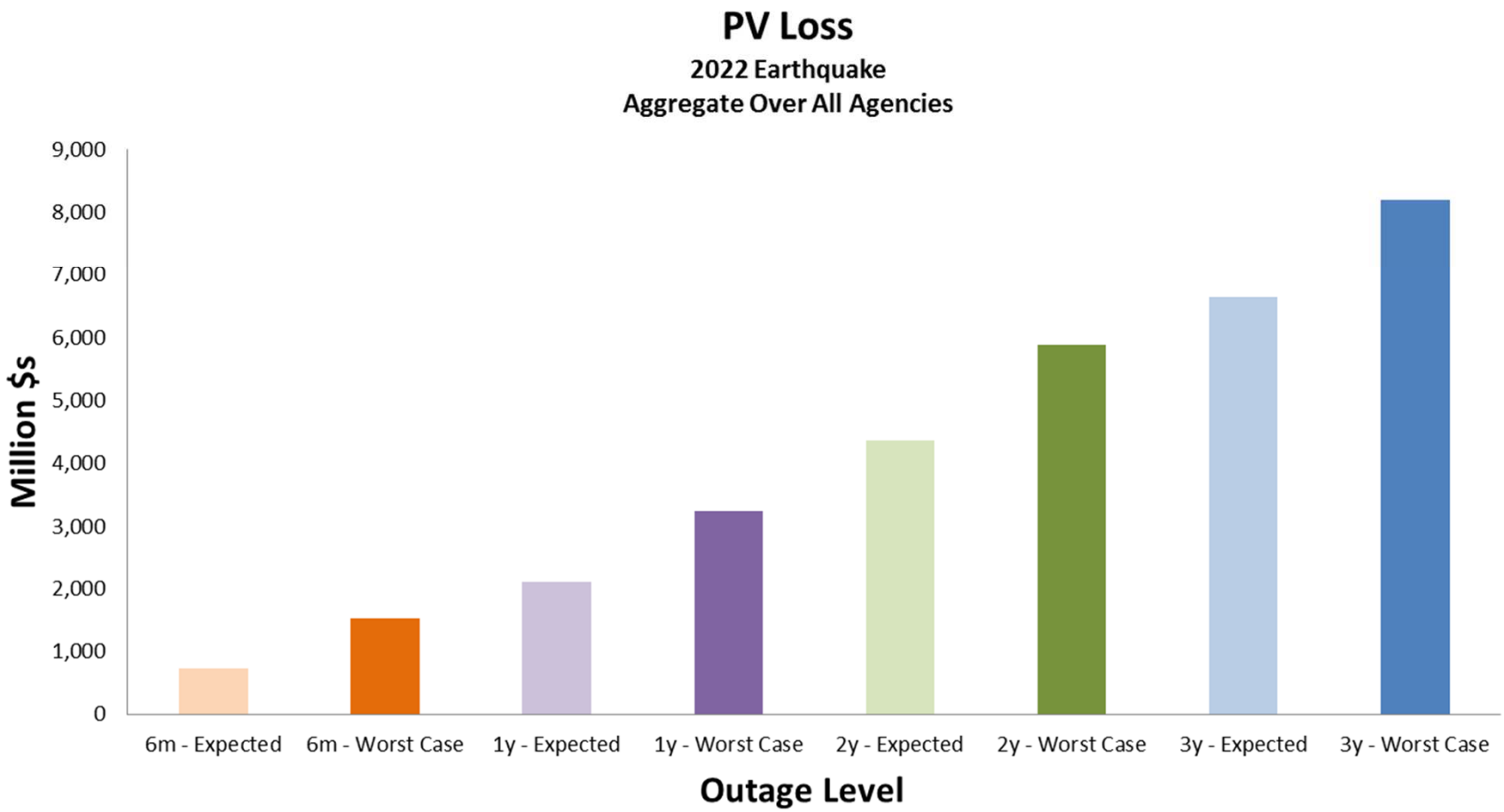
Present Value of Seismic Risk

Present Value (in millions)

Outage	6m	1y	2y	3y
Expected	$722	$2,093	$4,367	$6,643
Worst Case	$1,517	$3,245	$5,892	$8,190

Total PV Loss

Comparison Across All Outage Levels



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Regulatory Certainty

Regulatory Certainty

Section 10 of ESA permits a potential take of a species for holders of an Incidental Take Permit (ITP)

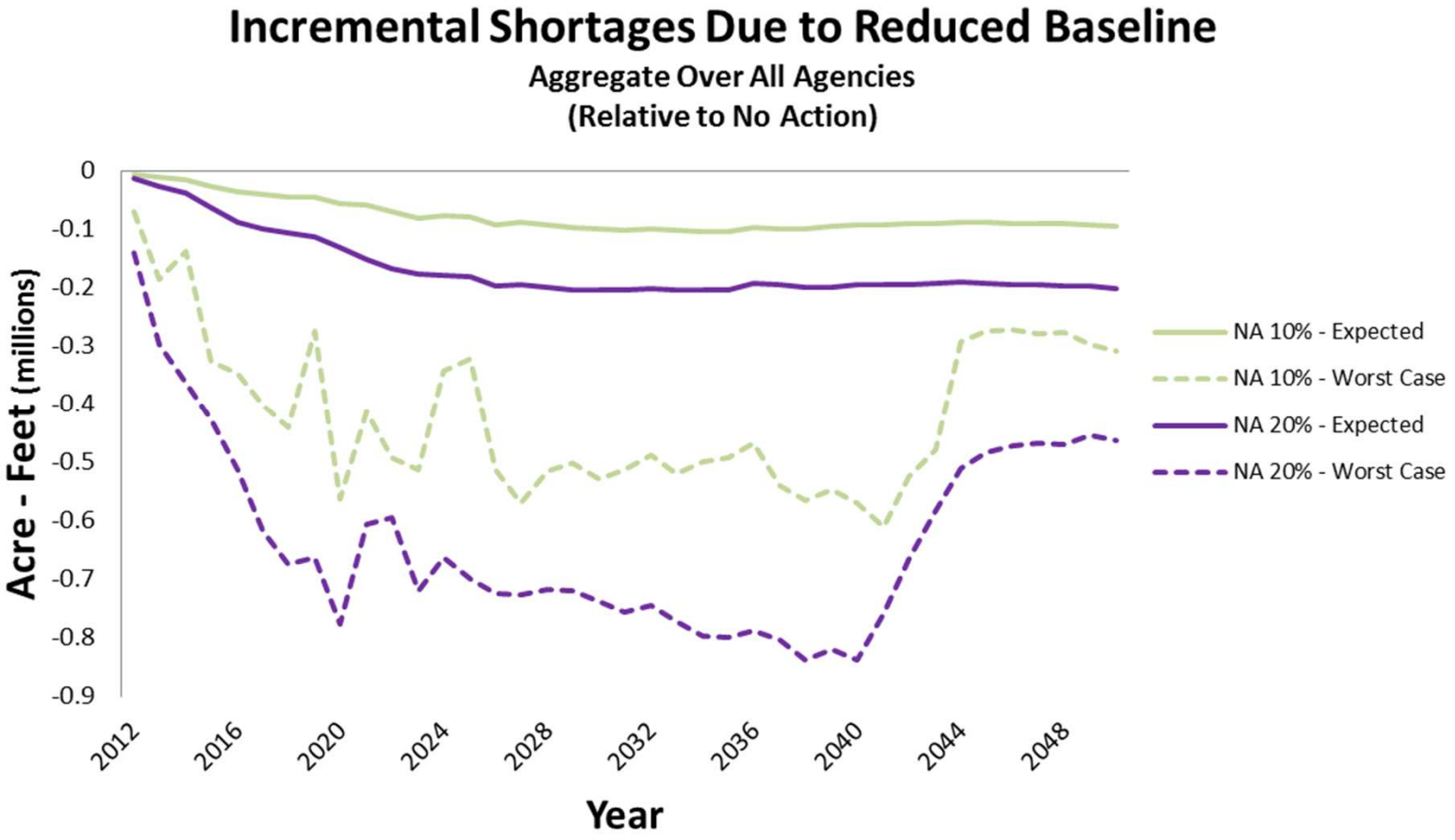
"*if such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity*"

An ITP is issued in return for the implementation of a Habitat Conservation Plan (HCP)

The "No Surprises" policy assures ITP holders of some regulatory certainty

- Protects against any unforeseen land use restrictions or financial compensation requirements

Incremental Shortages from Reducing No Action Water Supplies to Urban Agencies



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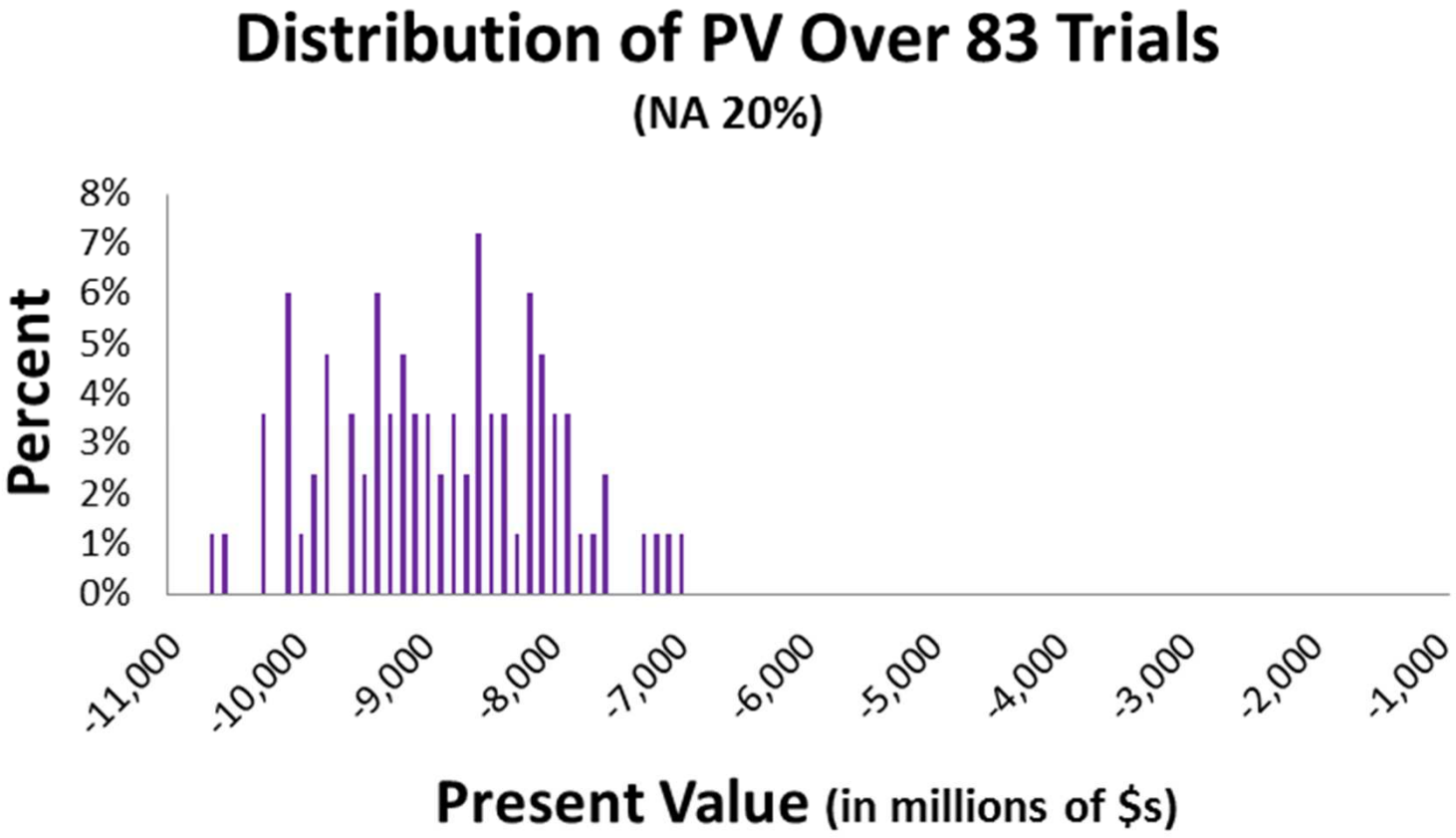
Distribution of the PV Loss from Reducing NA Urban Water Supplies by 20 Percent



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PV Loss from a 20 Percent Reduction in NA Water Supplies

Present Value (in millions)	
	20% Reduction
Urban	($8,943)
Agricultural	($2,700)
Total	**($11,643)**

Recreation and Public Good Benefit

Recreation and Public Good Benefits

Implementation of HCP will

- Restore ~72,809 acres
- Create 7 Recreational Opportunity Areas (ROAs)
- Improve ecological environment
- Improve wildlife habitat in the Southern Delta

22 Conservation Measures

- 8 land acquisition/restoration measures
- 14 administrative/management tasks

Quantifying Recreation and Public Good Benefits

Recreational Use Value

- Benefits gained from increased recreational opportunities
- Quantified as aggregation of
  - cost of travel
  - depreciation of sports equipment
  - opportunity cost of time

Non-Use Value

- Monetary value of environmental improvement
- Quantified with combination of:
  - Contingent Valuation Method (CVM)
  - Land purchase data

Value of Habitat Restoration

Present Value (in millions)

Source of Value	Method	Low Scenario		High Scenario	
		Weights	Estimate	Weights	Estimate
Recreation Use	Travel Cost	100%	**$721**	100%	**$2,163**
Non-Use	Land Purchases	67%	**$1,155**	33%	**$2,157**
	CVM*	33%	**$34,543**	67%	**$78,798**
	Blended:		**$12,284**		**$53,251**
All:			**$13,005**		**$55,414**

*Note: * CVM subtracts the recreational use value to arrive at the non-use value*

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Conclusions

Benefits Not Included and Ongoing Work

- Only quantified benefits to 2050
  - Ignores water supply and water quality benefits beyond that date
  - Ignores benefits of mitigating effects of sea level rise
- Increased operational flexibility
- Increased transfer potential
- Ongoing work:
  - Seismic risk reduction for agricultural water supplies
  - Several important urban districts
  - More refined analysis of regulatory certainty

Lessons

- Analysis demonstrates that the benefits of BDCP exceed the costs borne by the agencies funding the isolated conveyance facility
- The public good benefits of habitat restoration in the Delta exceed the costs to be borne by the State and Federal governments
- Analysis focused on the direct benefits of BDCP to those paying the costs
  - Appropriate given financing decisions to be made
  - There are also significant indirect benefits in both the agricultural and urban sectors of the economy resulting from more reliable project water supplies

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Meeting Close

- Review of significant discussion items
- Action Items for further consideration
- Next Meeting
  - TBD