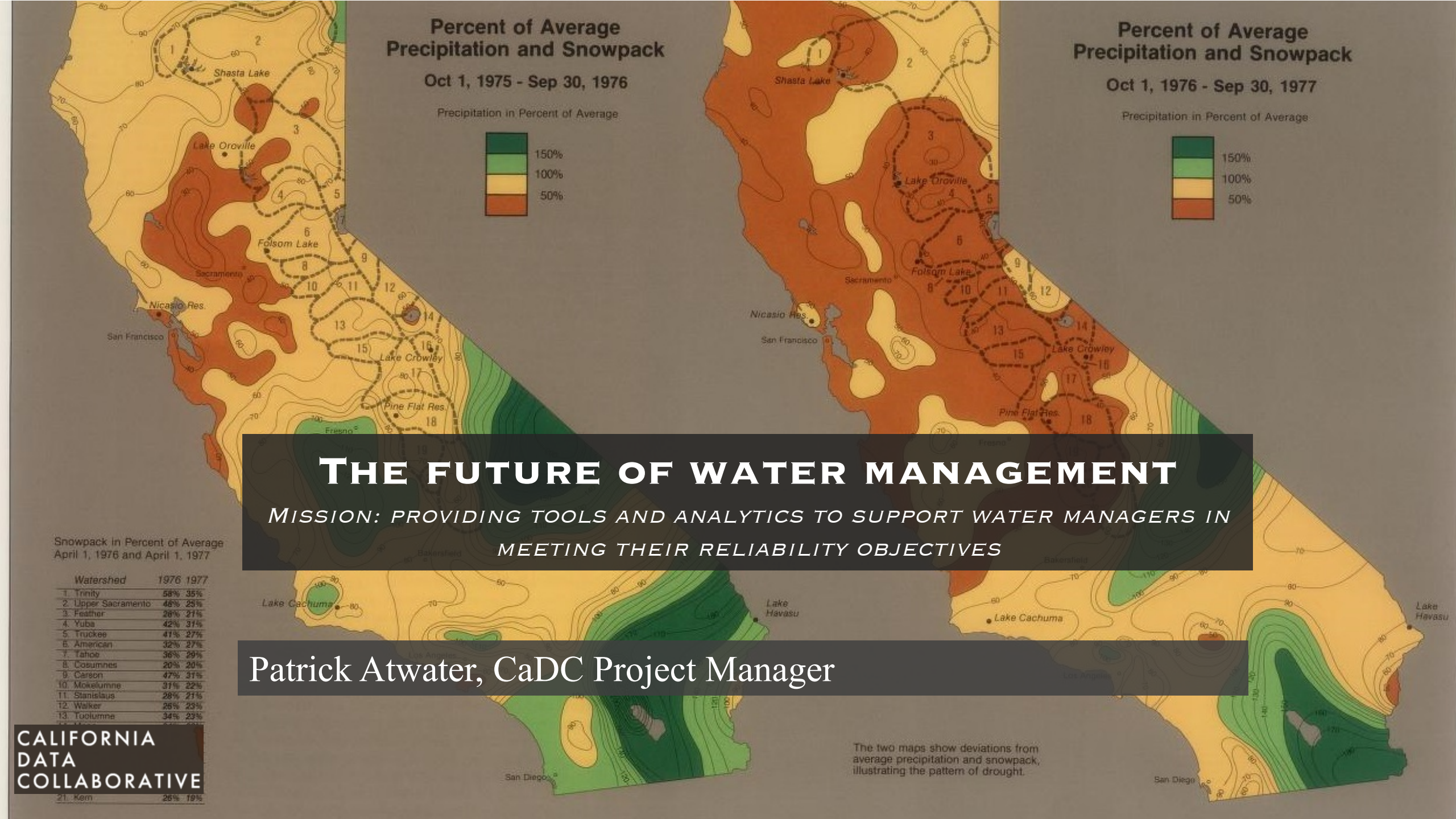


The future of water management

Mission: providing tools and analytics to support water managers in meeting their reliability objectives

Patrick Atwater, CaDC Project Manager

CALIFORNIA DATA COLLABORATIVE

The California Data Collaborative

Water managers working together to pioneer new data infrastructure

Current members

moulton niguel water district

El Toro Water District

Western Municipal Water District

City of Sacramento Department of Utilities

The Metropolitan Water District of Southern California

EBMUD

Monte Vista Water District

Las Virgenes Municipal Water District

Irvine Ranch Water District

emwd Eastern Municipal Water District

Inland Empire Utilities Agency, A Municipal Water District

Santa Margarita Water District

Prospective members

City of Newport Beach California

City of Santa Rosa California

Pasadena

The City of San Diego

Partnerships

UC Davis Center for Water-Energy Efficiency

DataKind

enigma

Microsoft

Netflix

OmniEarth

seed

UCLA

ACWA

Claremont Graduate University

SCWC

California Institute of Technology

UC Riverside

CUWCC California Urban Water Conservation Council

UCI WEX Center

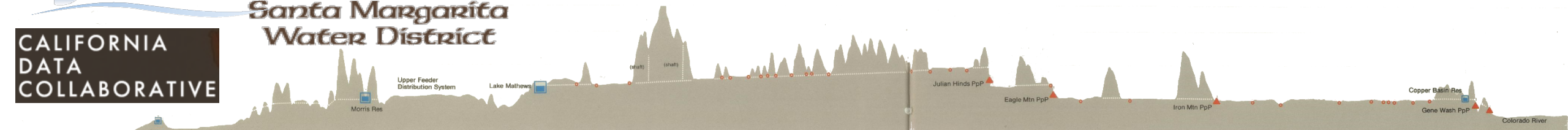
UC Davis University of California

U.S. Department of the Interior Bureau of Reclamation

Rose Institute of State and Local Government, Claremont McKenna College

Stanford Business

CALIFORNIA DATA COLLABORATIVE



FY 2016-17 Objectives

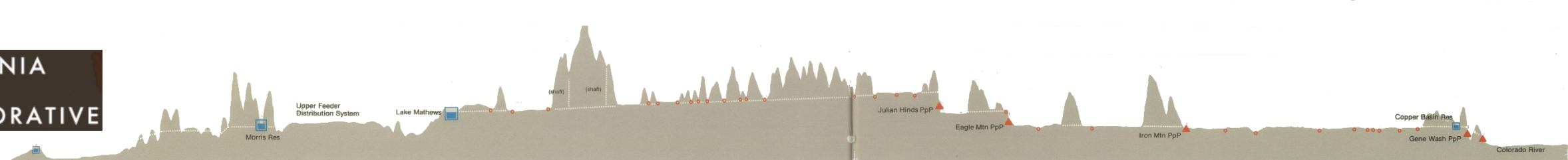
Top CaDC priorities

1. Deploy CaDC efficiency explorer tool (funded by RLF).

2. Complete study of turf removal program effectiveness

3. Operationalize CaDC rate comparison tool

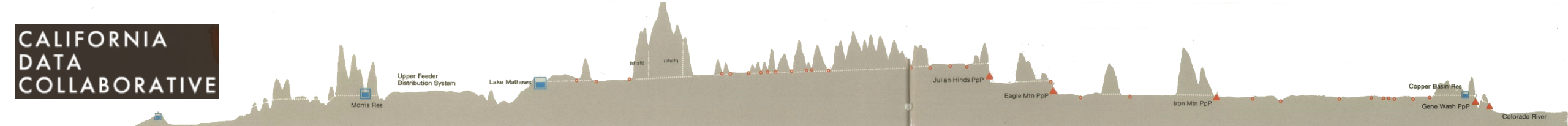
CALIFORNIA DATA COLLABORATIVE



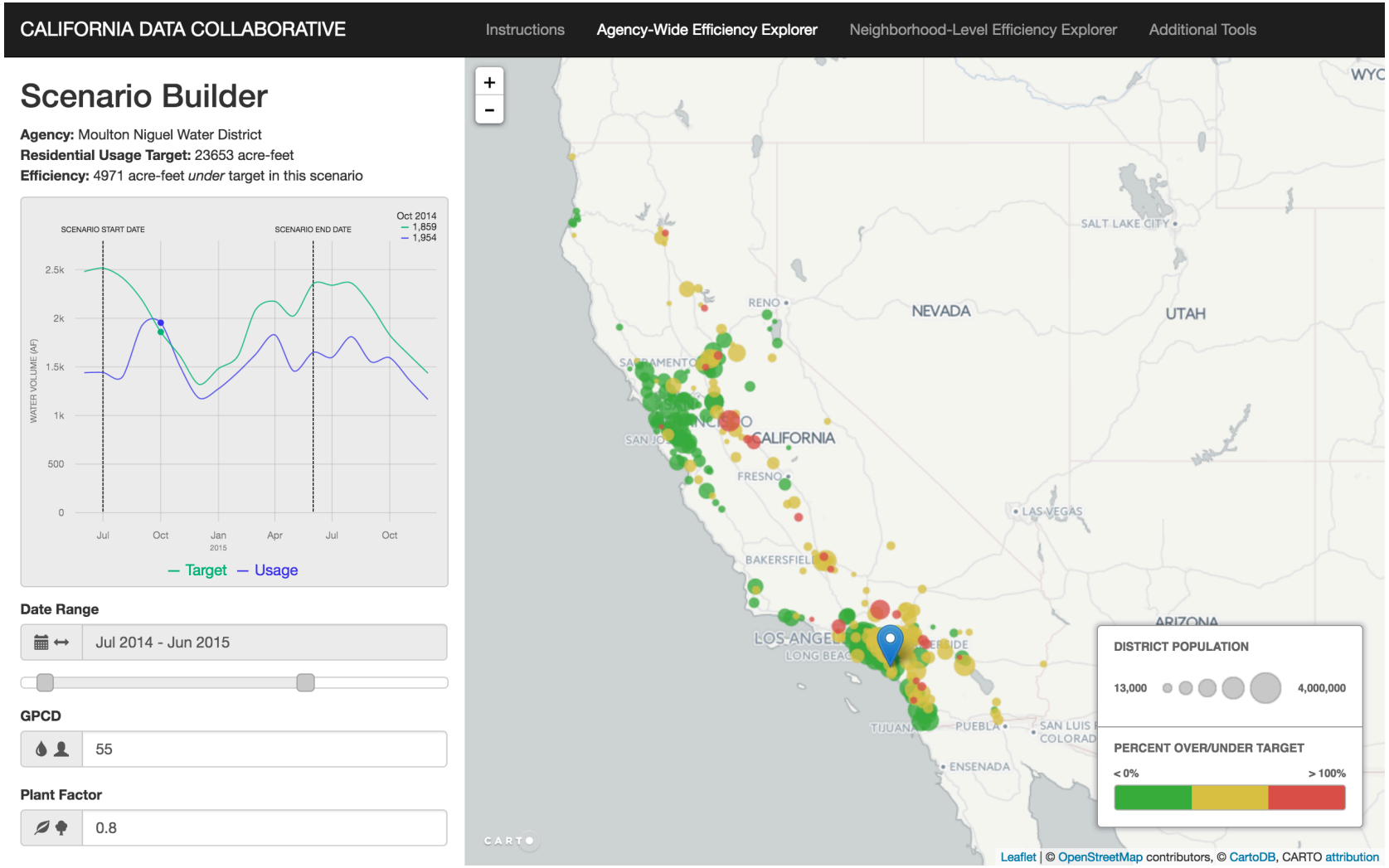
Resources Legacy Fund Grant Overview

- Goal is to help agencies understand new efficiency targets
- December 2016 through February 2017
- Working collaboratively with the state on parallel landscape area development
- Independent panel of academic experts, CaDC local utility partners and state staff to review
- Will be incorporated into CaDC efficiency explorer and rate comparison tools

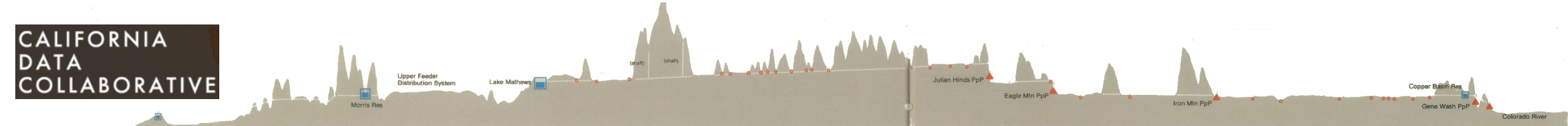
CALIFORNIA DATA COLLABORATIVE



Informing statewide policy

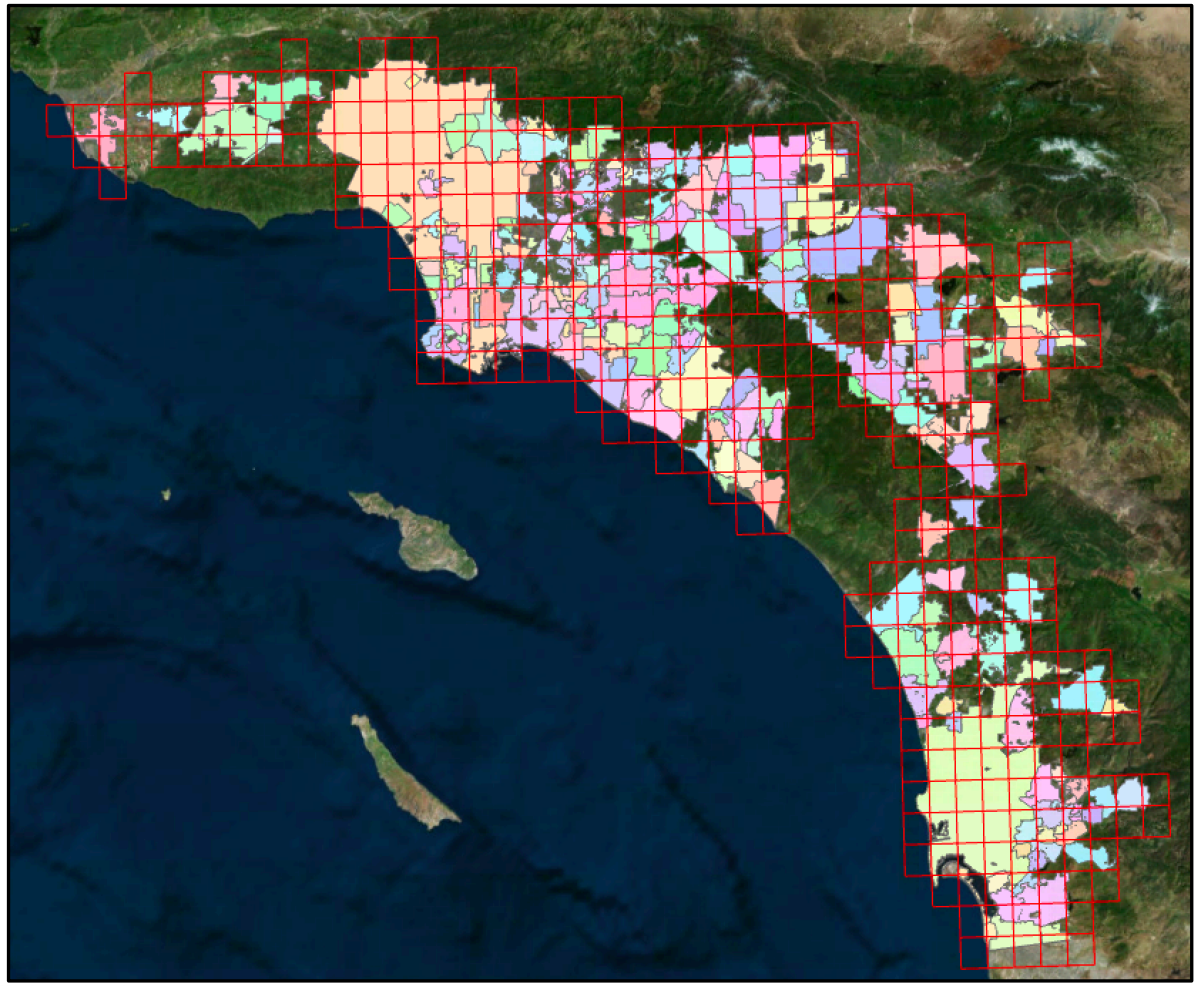


CALIFORNIA DATA COLLABORATIVE



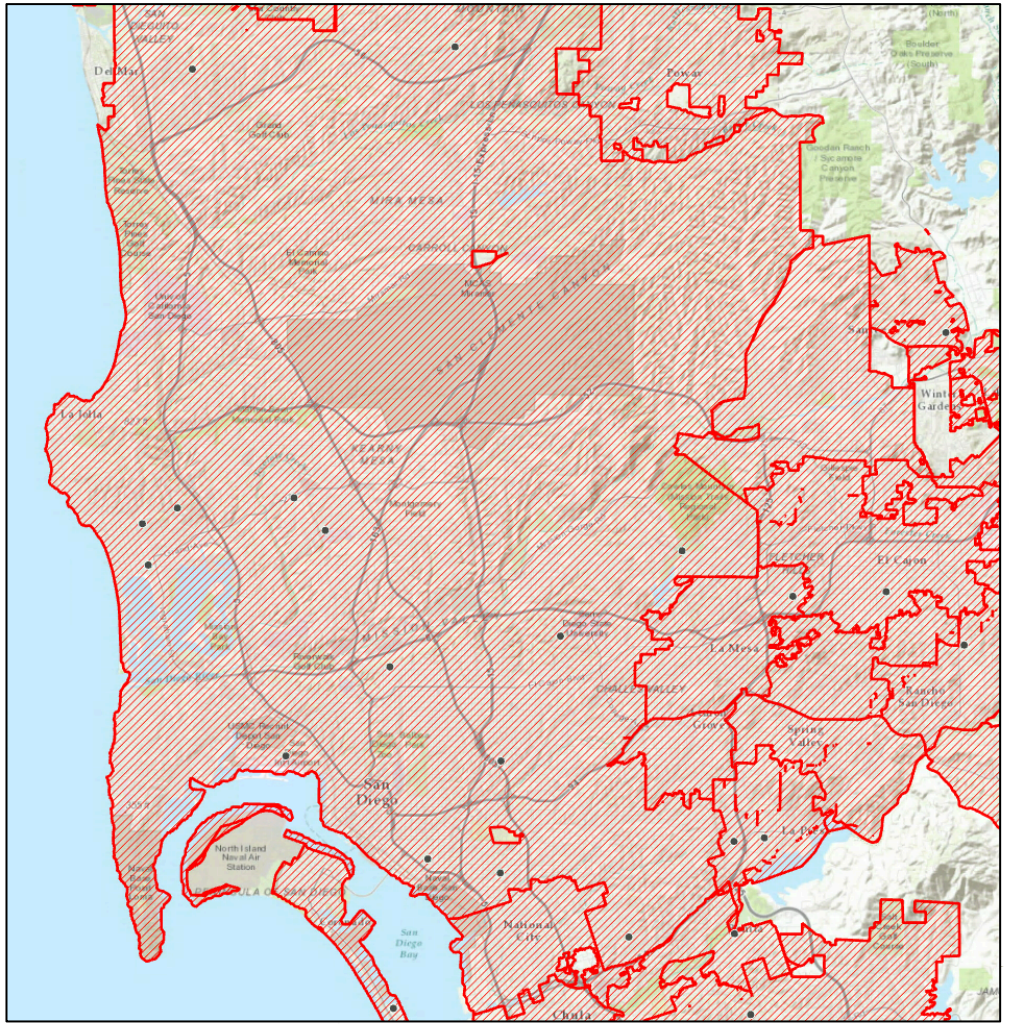
Builds on remote sensing work for Metropolitan

- Analysis of USDA (NAIP) imagery for longitudinal analysis of landscape trends in MWD service area
- Analysis of 2016 NAIP for estimating parcel-level landcover

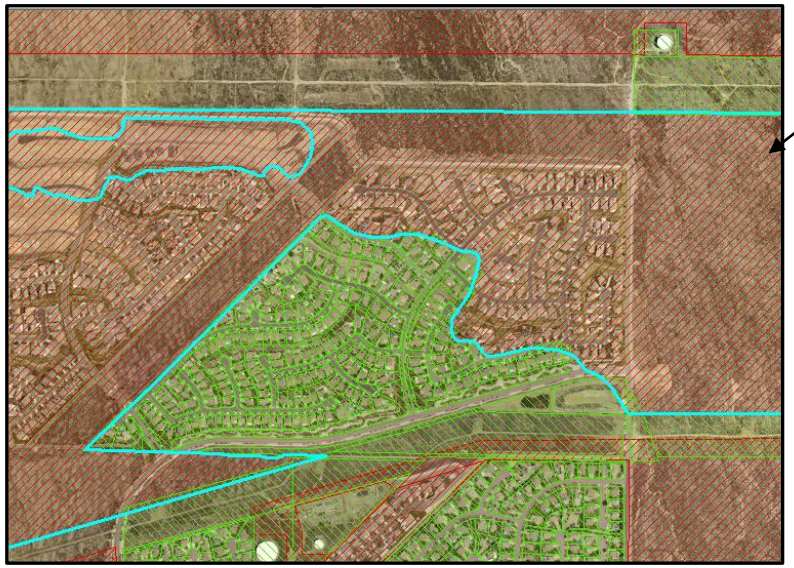


Accuracy assessment

- 300 points, manually checked by trained Research Assistant
- Overall Accuracy 88%

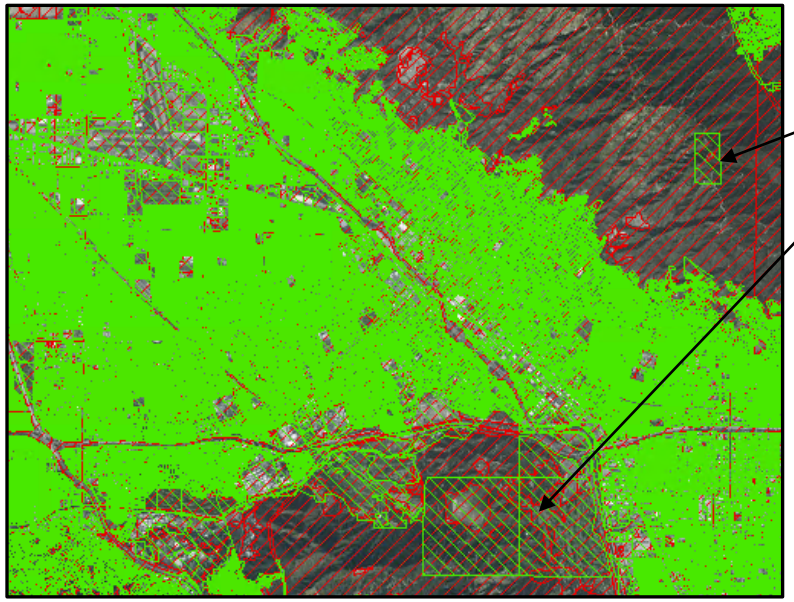


Next Steps



- Manmade Growth
  - Construction of new Housing Developments
- Ancillary Data
  - Natural Areas Analyzed
- Retailer Boundaries
- Parcel Database

Next Steps



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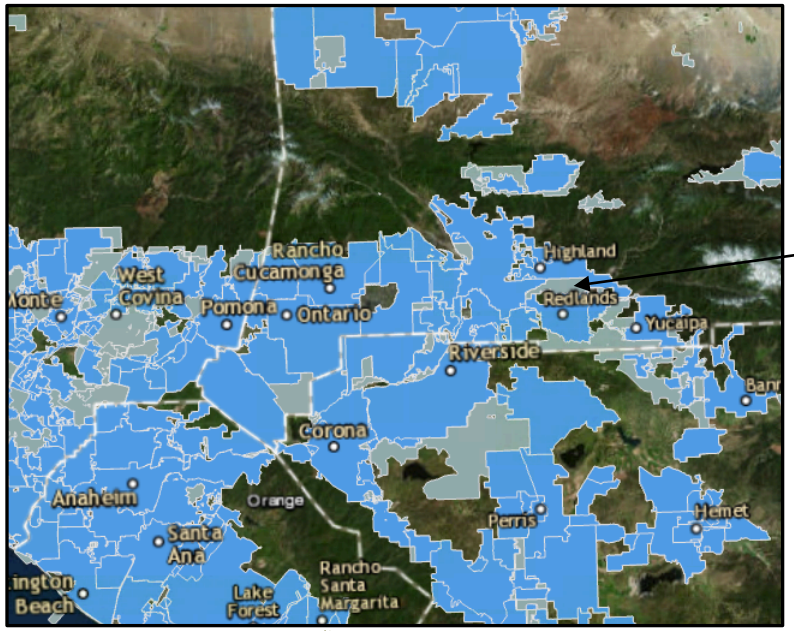

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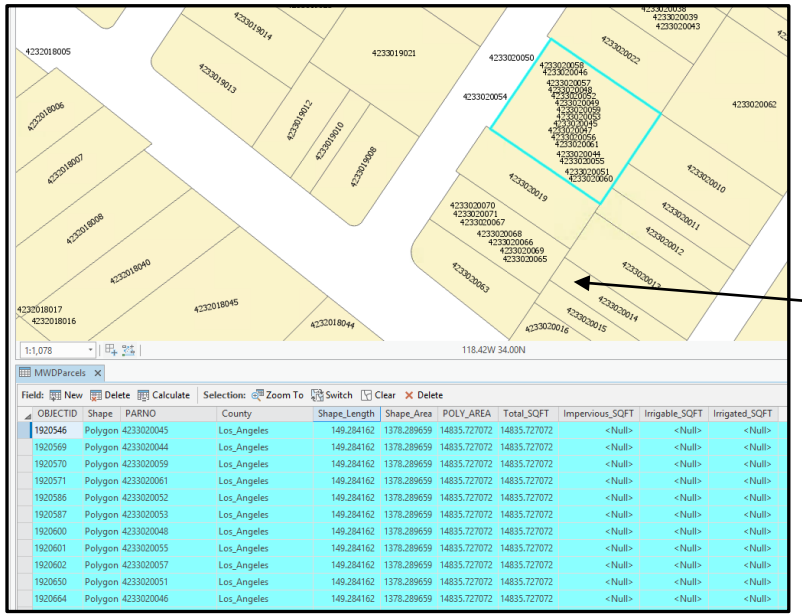

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  - Construction of new Housing Developments
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- Retailer Boundaries
- Parcel Database

Way forward

- Landscape data now exists for:
  - Policy Analysis
  - Trend Analysis
  - Use in Residential Efficiency Standards

- Large-scale analysis dependent on ancillary data standardization

Multiple benefits: benchmarking the historic investment in turf rebates

Peer effect of turf rebate participants influencing their neighbors to convert without a rebate will be key in evaluating cost effectiveness

	Peer Effect	0%	100%	200%	300%	400%	500%	600%	700%
Lifespan	10	$ 3,200	$ 1,600	$ 1,067	$ 800	$ 640	$ 533	$ 457	$ 400
	20	$ 1,877	$ 938	$ 626	$ 469	$ 375	$ 313	$ 268	$ 235
	30	$ 1,422	$ 711	$ 474	$ 356	$ 284	$ 237	$ 203	$ 178
	40	$ 1,187	$ 594	$ 396	$ 297	$ 237	$ 198	$ 170	$ 148
	50	$ 1,042	$ 521	$ 347	$ 261	$ 208	$ 174	$ 149	$ 130
	60	$ 943	$ 471	$ 314	$ 236	$ 189	$ 157	$ 135	$ 118
	70	$ 869	$ 435	$ 290	$ 217	$ 174	$ 145	$ 124	$ 109

*Uses conservative 5% hyperbolic discounting to value future water saved

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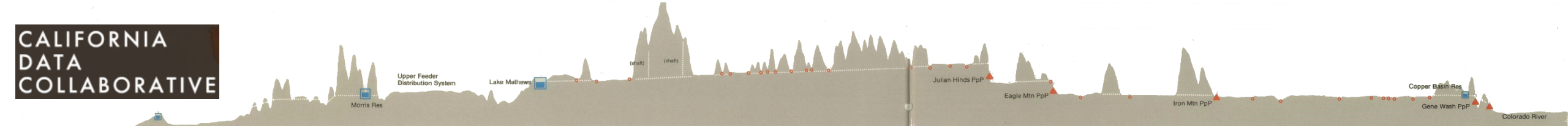

Multiple benefits: integrates into CaDC's open source rate comparison tool

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Rate Comparison | Scenario Planning

RESIDENTIAL_SINGLE | RESIDENTIAL_MULTI | IRRIGATION | COMMERCIAL | INSTITUTIONAL | INDUSTRIAL | OTHER

Rate Type
Flat | Tiered | Budget

Display
Revenue | Usage

Time Range
2012-01 — 2016-10
2012-01 2012-12 2013-11 2014-11 2015-10 2016-10

Service Charge: (depends on...) meter_size

Values	Charges ($)
5/8"	11.39
3/4"	11.39
1"	11.39
1 1/2"	37.98
2"	60.77
3"	132.94
4"	227.88
6"	475.14
8"	683.65
10"	1101.82
2 1/2"	0
	0

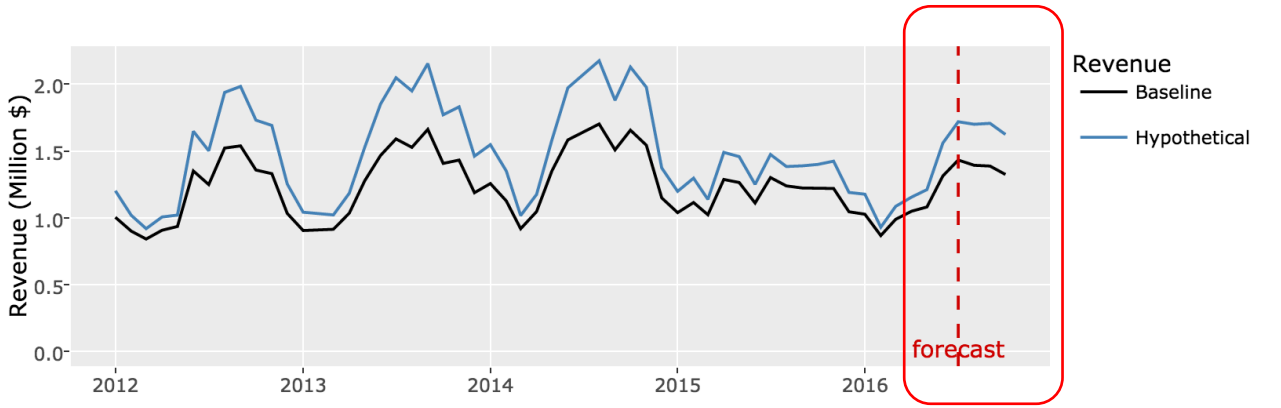
GPCD: 60

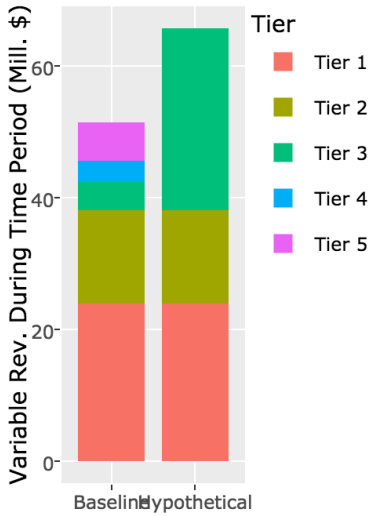
Landscape Factor:

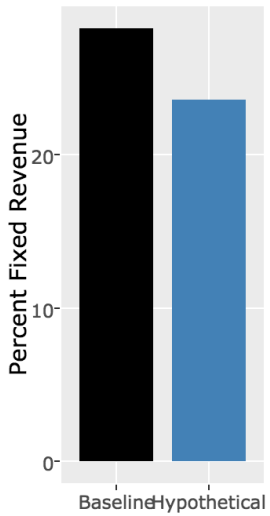
Service charge can vary by flexible inputs

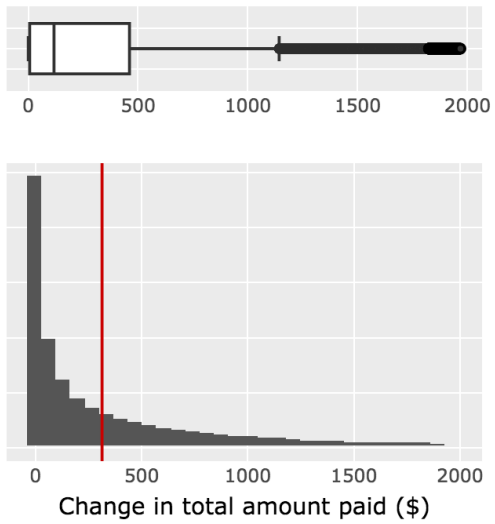
Rate Code
R1 | R1C | WO1

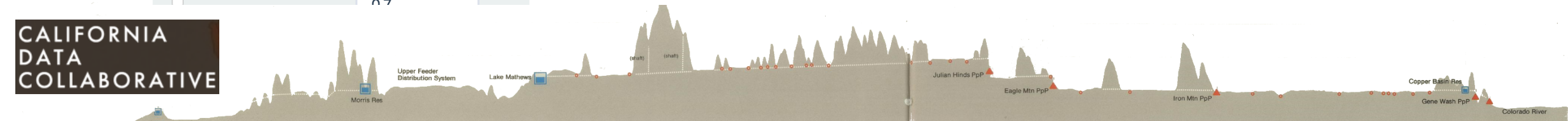
Forecast











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Multiple benefits: Civic Spark Survey

Lunday residence, Temecula CA. Inland Empire Landscape Contest Winner 2016

- Determine what motivates Californians to remove their lawns.
- Establish what resources are most useful for residents in adopting outdoor water efficient practices.
- Optimize water-agency conversion programs.

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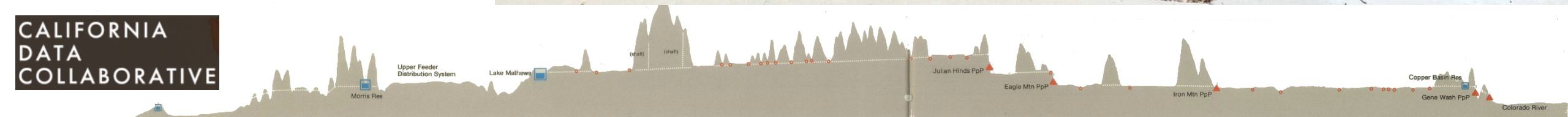


An integrated water data platform to ensure water reliability!

Jan 16

Jan 17

Launch

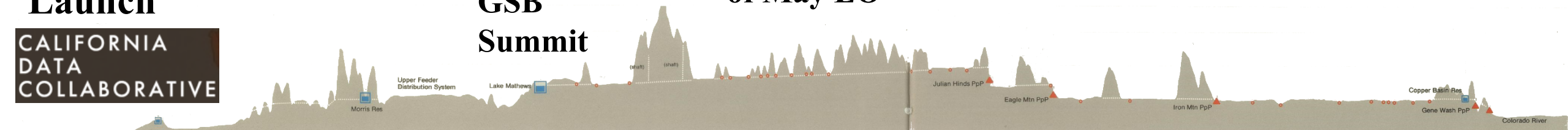
Stanford GSB Summit

Pragmatic, phased implementation of May EO

Integrated suite of analytics supporting <u>any</u> of CA's water managers

Trusted data platform integrating <u>the entire</u> lifecycle of CA water use data and beyond

CALIFORNIA DATA COLLABORATIVE



"The people of California have not lost their pioneering spirit or their capacity to meet life's challenges."

– Jerry Brown

Contact:
Patrick@argolabs.org