Arroyo Sequit Fish Passage Projects 2011-2017

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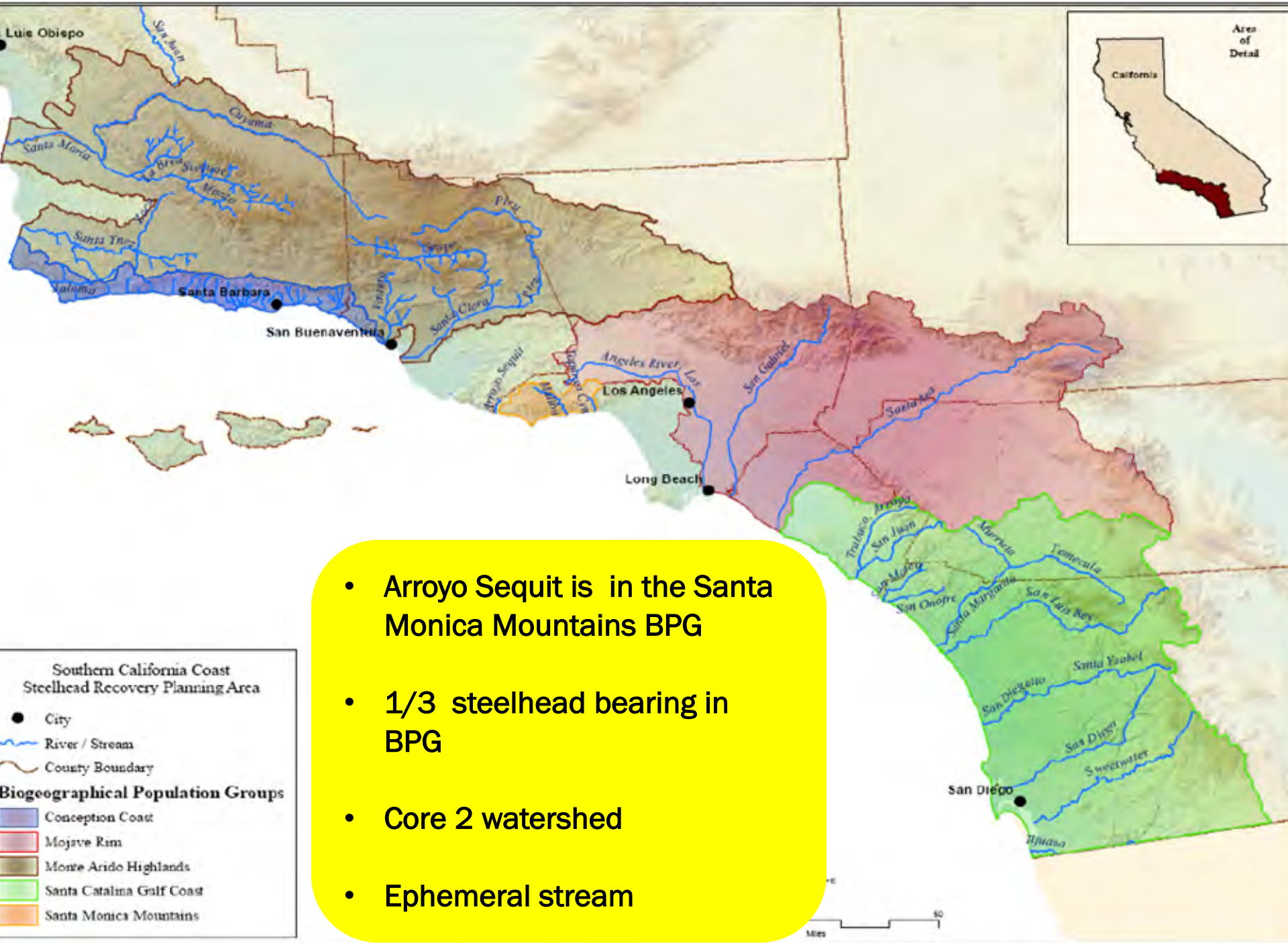
NOAA

bay restoration commission
STEWARDS OF SANTA MONICA BAY

American Rivers
Thriving By Nature

NOAA/CCC Veterans Corps Fishery Program



- Arroyo Sequit is in the Santa Monica Mountains BPG
- 1/3 steelhead bearing in BPG
- Core 2 watershed
- Ephemeral stream

PHYSICAL CHARACTERISTICS						LAND USE			
WATERSHEDS (west to east)	Area (acres)[1]	Area (sq. miles)[1]	Stream Length[2] (miles)	Ave. Ann. Rainfall[3] (inches)	Total Human Population[4]	Public Ownership*	Urban Area[5]	Agriculture/ Barren[5]	Open Space[5]
Big Sycamore Canyon Creek	13,649	21	32	17.9	27	76%	< 1%	< 1%	99%
Arroyo Sequit	7,572	12	17	17.9	370	43%	3%	1%	96%
Malibu Creek	70,726	110	161	18.0	74,585	32%	23%	2%	75%
Las Flores Canyon Creek	2,908	5	6	18.5	1,144	5%	15%	< 1%	85%
Topanga Canyon Creek	12,616	20	30	17.9	5,561	72%	15%	< 1%	85%
TOTAL or AVERAGE	**107,471**	**168**	**246**	**18.0**	**81,687**	---	**18%**	**1%**	**81%**

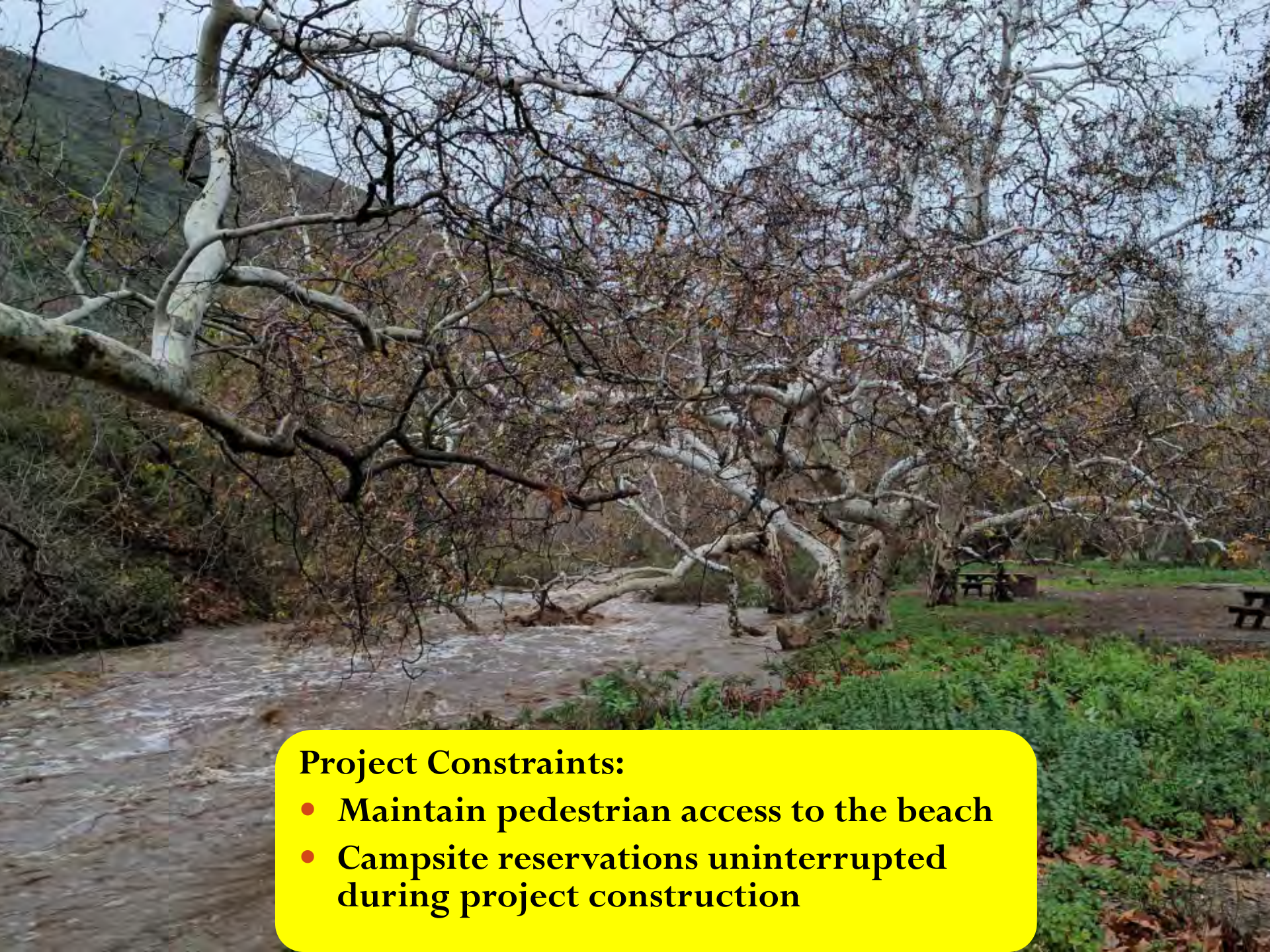
- 1 million visitors annually visit Leo Carrillo
- 5 million neighbors – LA and Ventura Counties

Project Goals

Remove 3 Barriers: 1 check-dam and 2 Arizona-crossings to open 4.5 miles of habitat to southern steelhead

Project Constraints:

- **Maintain pedestrian access to the beach**
- **Campsite reservations uninterrupted during project construction**



Project Constraints:

- **Maintain pedestrian access to the beach**
- **Campsite reservations uninterrupted during project construction**

2011 Obama Executive Order Fast Tracks Permitting

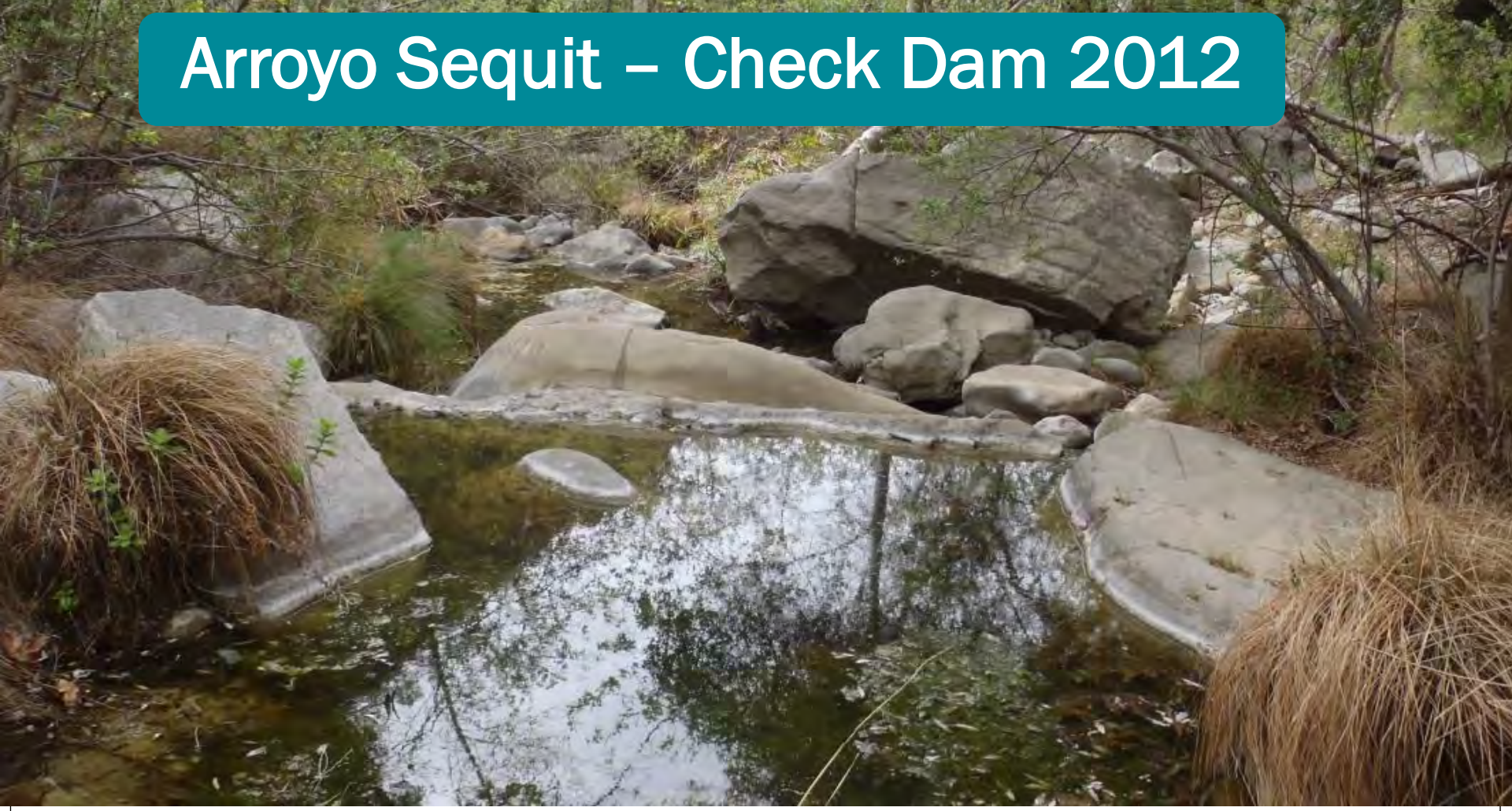
- 1/14 projects in the nation to be fast-tracked for federal permitting
- Administration's efforts to improve the efficiency of federal reviews needed to help job-creating infrastructure projects move as quickly as possible from the drawing board to completion.
- NOAA and USACE expedited construction permits by up to one year, with the goal of beginning construction as early as 2012

Construction begins 2014 –
Delays due to Coastal Zone Development Permit

Overview of Barriers Removed

2017 – 1st Time Estuary Connected to Ocean Since 2011

Arroyo Sequit – Check Dam 2012



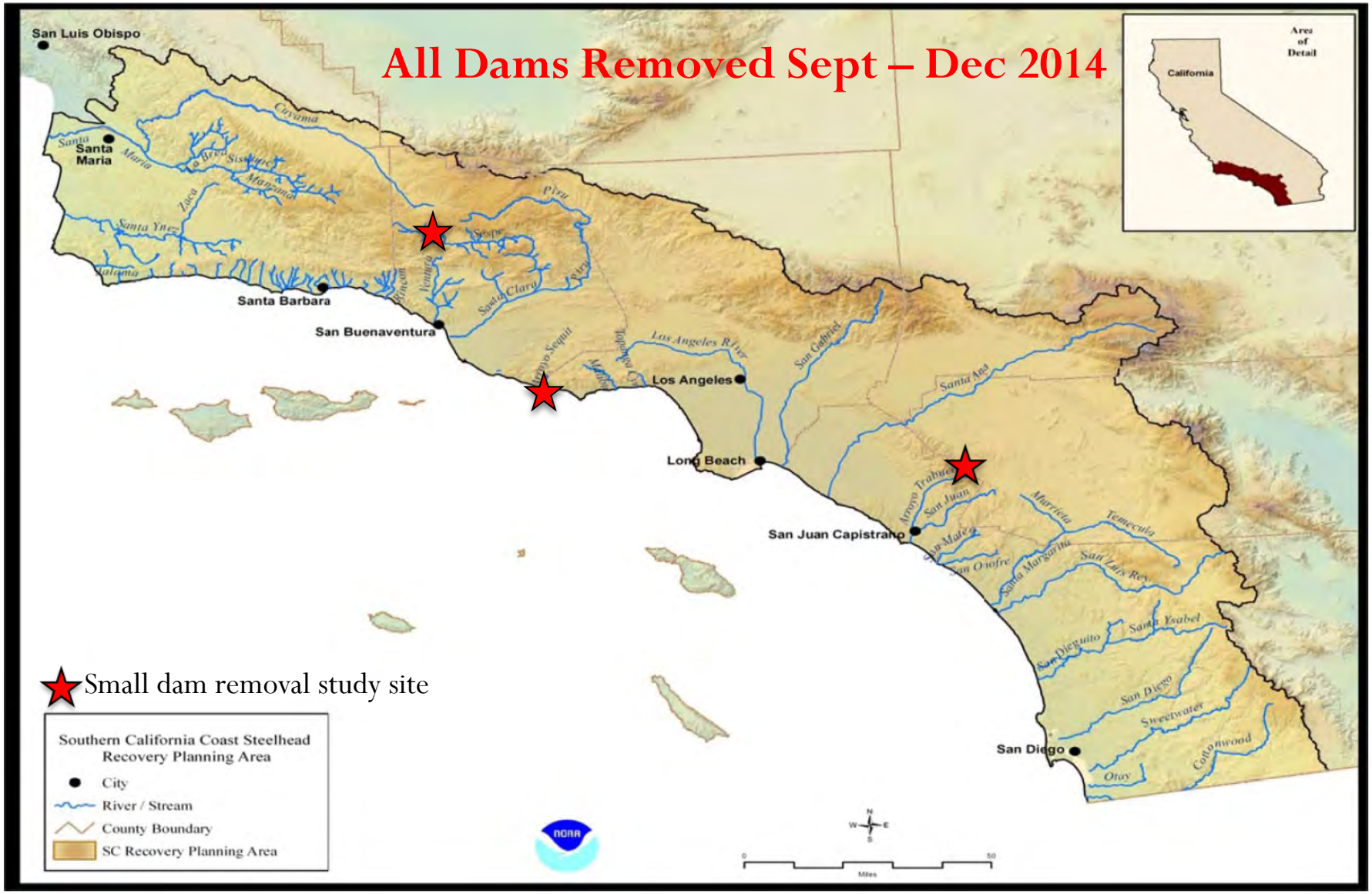
- Built in 1920s for irrigation - Concrete, railroad ties, pipe
- 40’ long x 5’ tall x 4’ wide
- Impounded ~ 185 cubic yards sediment (unknown quality)
- All dam material debris carried out 1000 feet by hand


~40,000 pounds (20 tons) concrete and debris were removed by hand in 11 days


2015


2017

Small Dam Removal Case Studies



Low Cost Small Dam Removal Using Restoration Center's Programmatic Biological Opinion

- Limit of 900 cubic yards impounded sediment
- NMFS concerned about:

  1)The loss of pool habitat

  2) the mobilization of fines and cause fowling of downstream spawning habitat at base flows

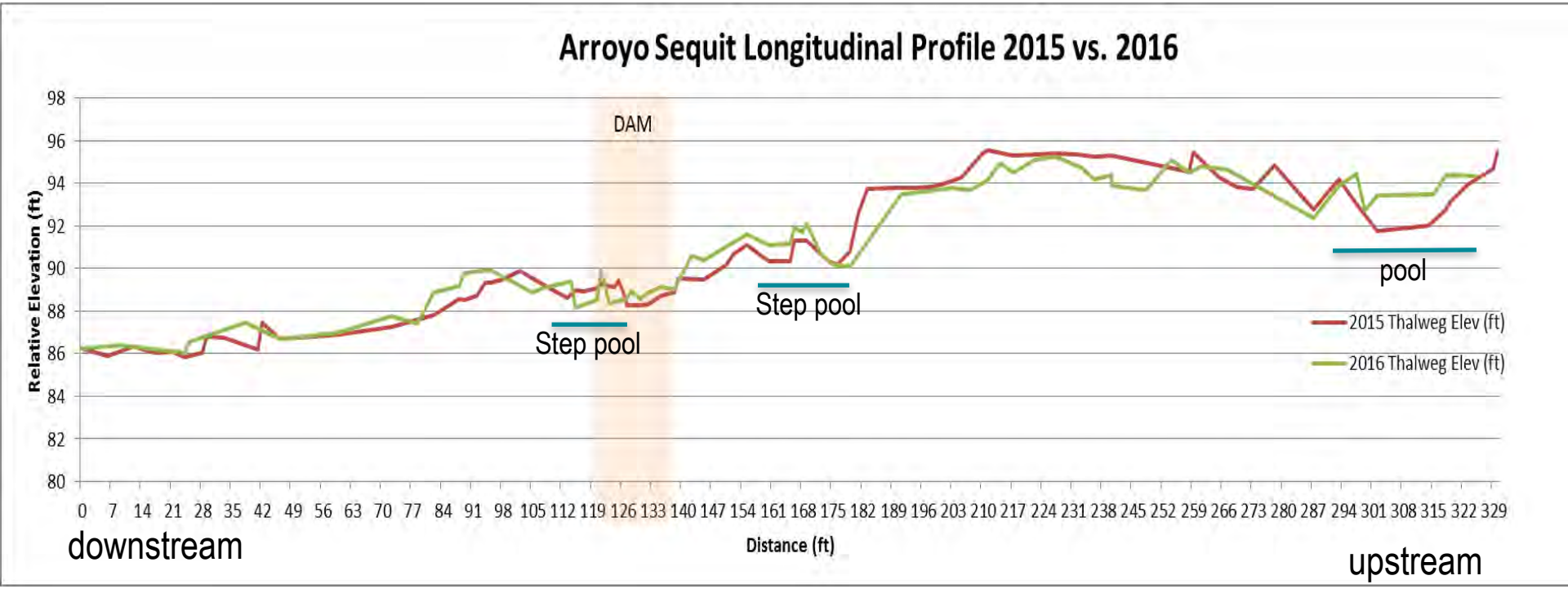
How does sediment released by small dam removal influence streambed morphology and habitat quality under extended drought conditions in S. CA?

Low Cost Small Dam Removal Monitoring

NOAA/CCC Veterans Corps Fishery Program

Harrelson et al. 1997

Long Profile for Arroyo Sequit- Post Dam removal (2015) and under extended drought (2016)



Perennial Pool June 2016


Perennial Pool 3-27-17

Pebble Counts: Arroyo Sequit Upstream of Dam at Pool 2015 vs 2016

2mm

	<	> or =	Total
Reference	21	102	123
Study	10	98	108
Total	31	200	231

Reference <	Study <	Average <	Average >=
17.1%	9.3%	13.4%	86.6%

p-value	0.0612

4 mm

	<	> or =	Total
Reference	5	53	58
Study	14	36	50
Total	19	89	108

Reference <	Study <	Average <	Average >=
8.6%	28.0%	17.6%	82.4%

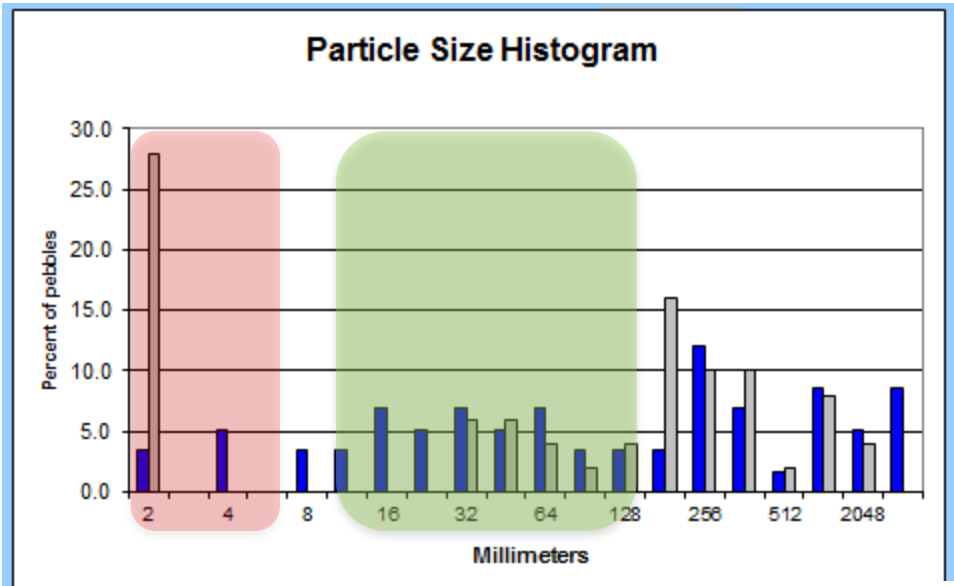
p-value	0.0086

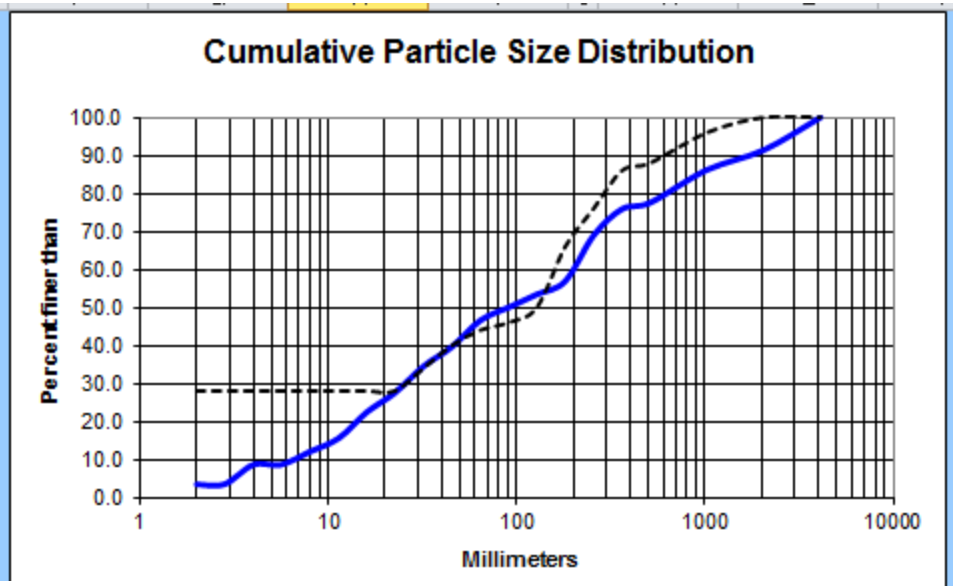
8 mm

	<	> or =	Total
Reference	7	51	58
Study	14	36	50
Total	21	87	108

Reference <	Study <	Average <	Average >=
12.1%	28.0%	19.4%	80.6%

p-value	0.0327





= 2015 post dam removal

= 2016 extended drought

NOAA FISHERIES

Neg. Effects size - Bjorn & Reiser 1991

Preferred redd size -NMFS 2012

Pebble Counts: Arroyo Sequit Upstream of Dam 2015 vs 2016

2mm

	<	> or =	Total
Reference	21	102	123
Study	10	98	108
Total	31	200	231

Reference <	Study <	Average <	Average >=
17.1%	9.3%	13.4%	86.6%

p-value	0.0612

4 mm

	<	> or =	Total
Reference	31	74	105
Study	25	71	96
Total	56	145	201

Reference <	Study <	Average <	Average >=
29.5%	26.0%	27.9%	72.1%

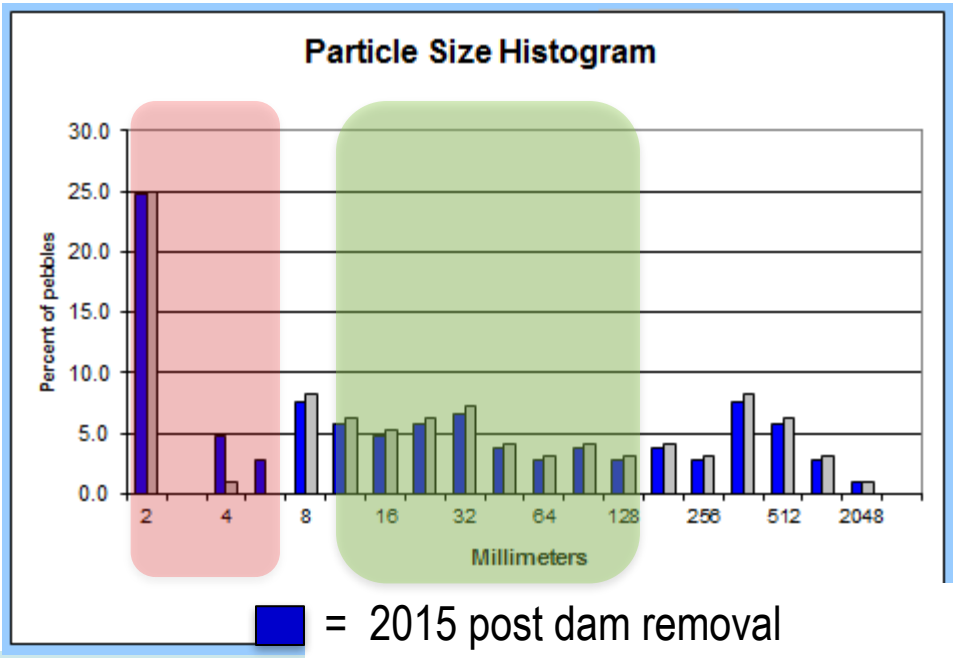
p-value	0.3473

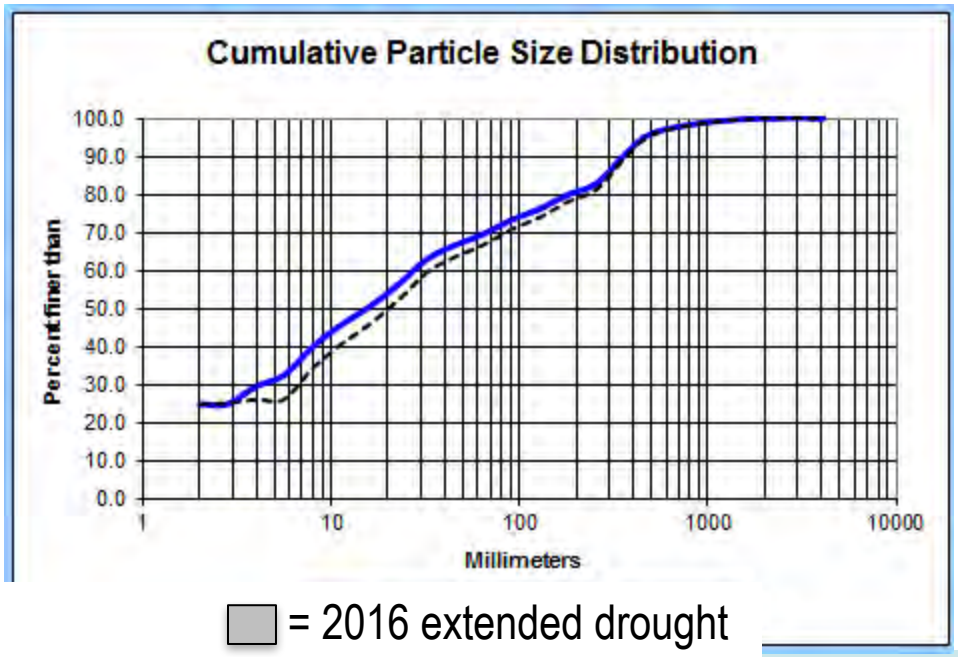
8 mm

	<	> or =	Total
Reference	42	63	105
Study	33	63	96
Total	75	126	201

Reference <	Study <	Average <	Average >=
40.0%	34.4%	37.3%	62.7%

p-value	0.2490





= 2015 post dam removal

= 2016 extended drought

NOAA FISHERIES **Neg. Effects size - Bjorn & Reiser 1991** **Preferred redd size -NMFS 2012**

Pebble Counts: Arroyo Sequit Downstream of Dam
2015 vs 2016

2mm

	<	> or =	Total
Reference	25	80	105
Study	10	41	51
Total	35	121	156

Reference <	Study <	Average <	Average >=
23.8%	19.6%	22.4%	77.6%

p-value	0.3499

4 mm

	<	> or =	Total
Reference	27	78	105
Study	10	41	51
Total	37	119	156

Reference <	Study <	Average <	Average >=
25.7%	19.6%	23.7%	76.3%

p-value	0.2609

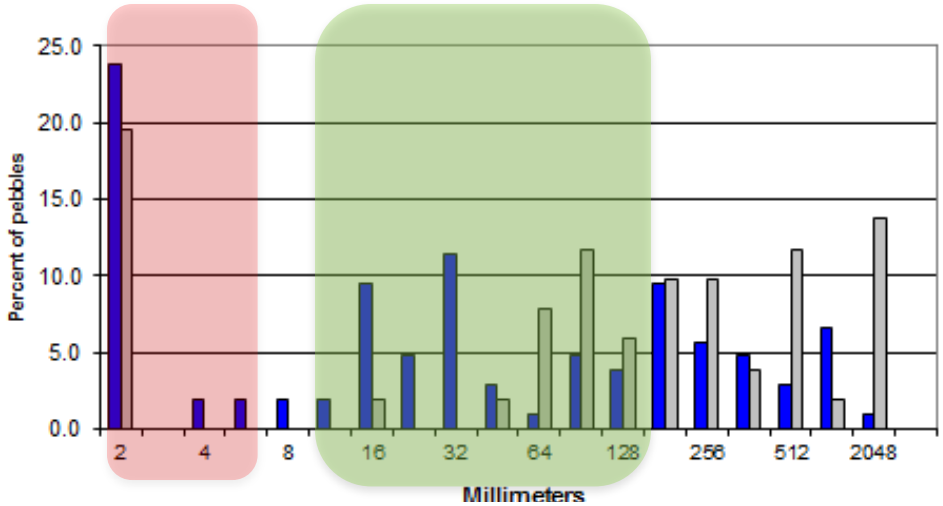
8 mm

	<	> or =	Total
Reference	31	74	105
Study	10	41	51
Total	41	115	156

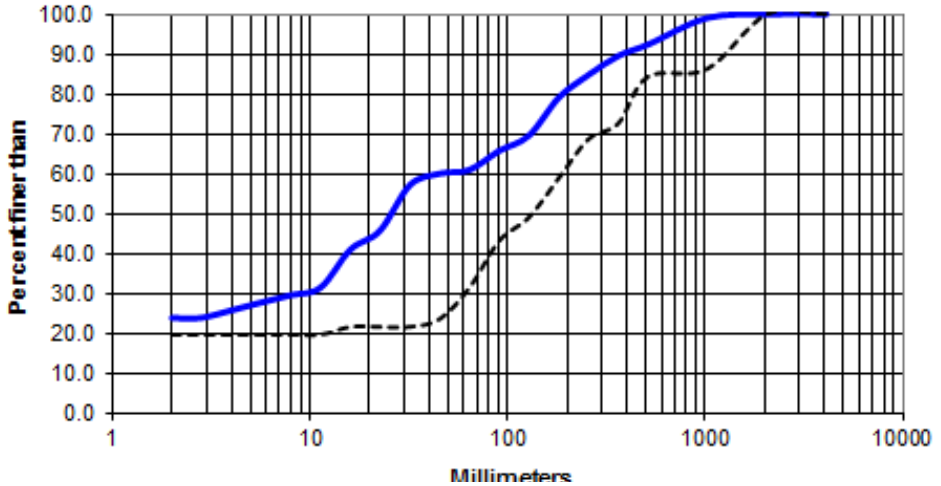
Reference <	Study <	Average <	Average >=
29.5%	19.6%	26.3%	73.7%

p-value	0.1301

Particle Size Histogram



Cumulative Particle Size Distribution



= 2015 post dam removal

= 2016 extended drought

NOAA FISHERIES Neg. Effects size - Bjorn & Reiser 1991 Preferred redd size -NMFS 2012

Pebble Counts: Arroyo Sequit Downstream Cross section 2015 vs 2016

2mm

	<	> or =	Total
Reference	21	102	123
Study	10	98	108
Total	31	200	231

Reference <	Study <	Average <	Average >=
17.1%	9.3%	13.4%	86.6%

p-value	0.0612

4 mm

	<	> or =	Total
Reference	27	78	105
Study	37	71	108
Total	64	149	213

Reference <	Study <	Average <	Average >=
25.7%	34.3%	30.0%	70.0%

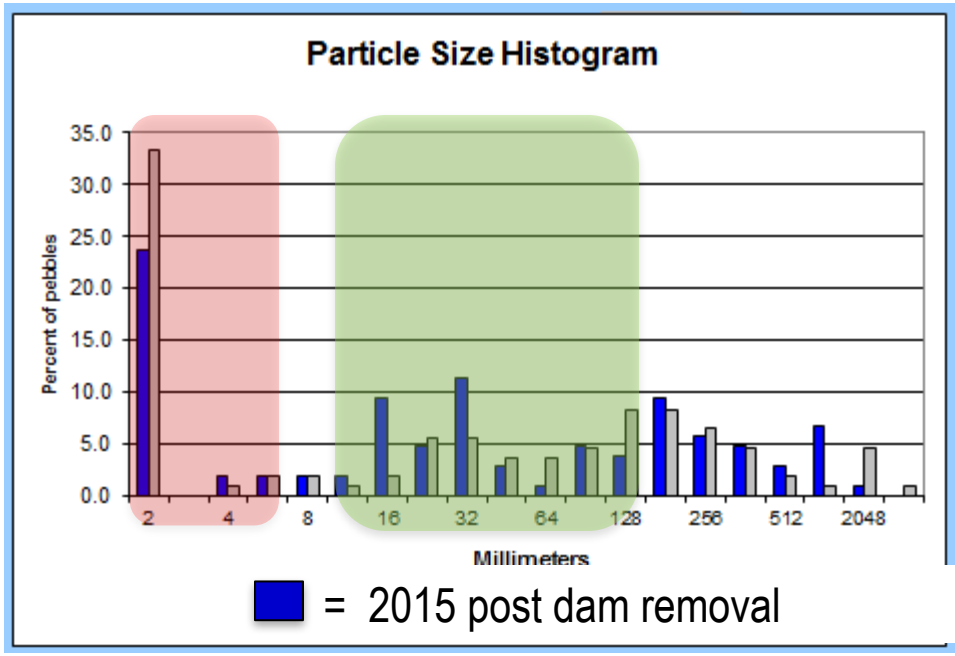
p-value	0.1130

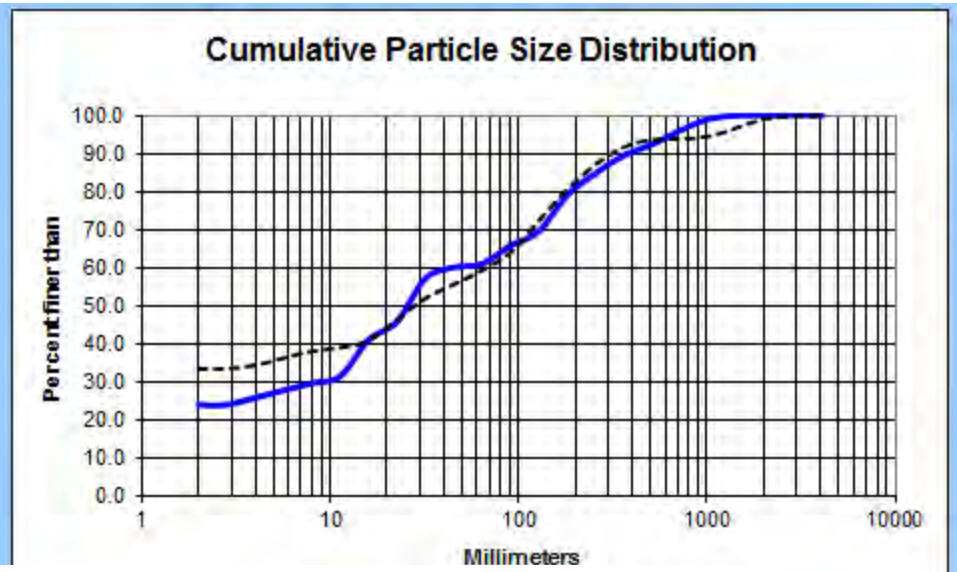
8 mm

	<	> or =	Total
Reference	31	74	105
Study	41	67	108
Total	72	141	213

Reference <	Study <	Average <	Average >=
29.5%	38.0%	33.8%	66.2%

p-value	0.1237





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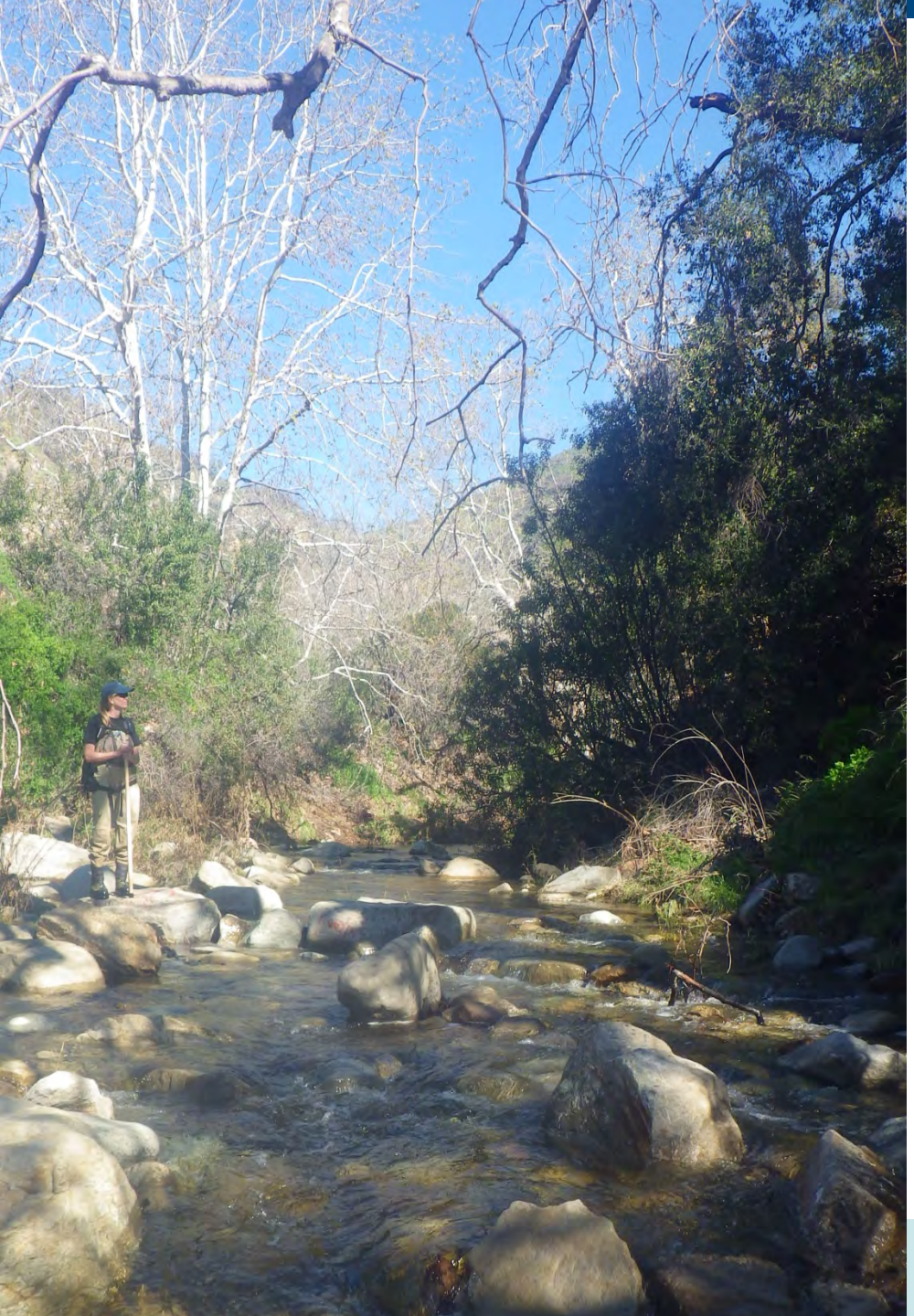
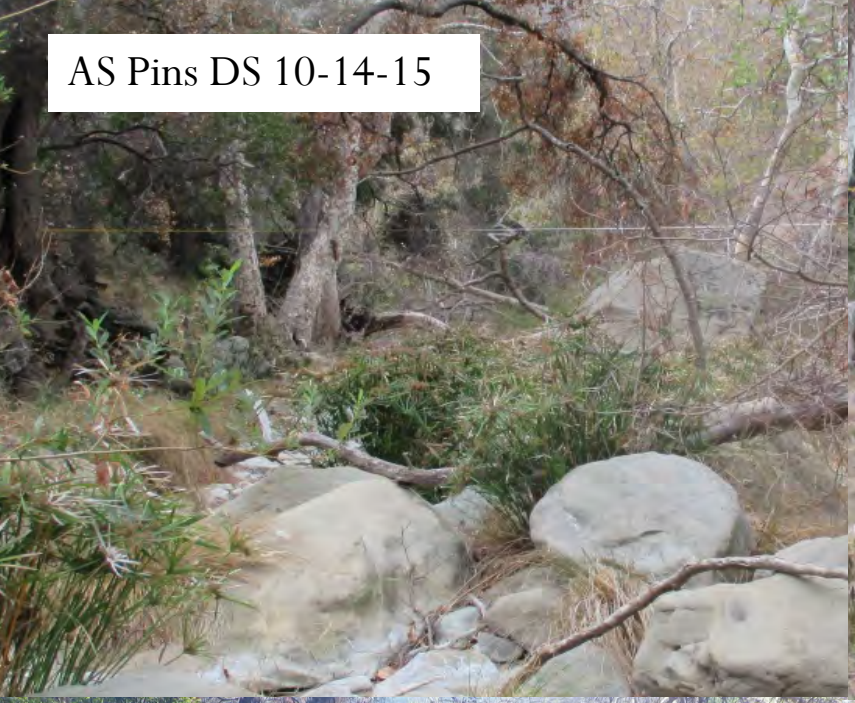
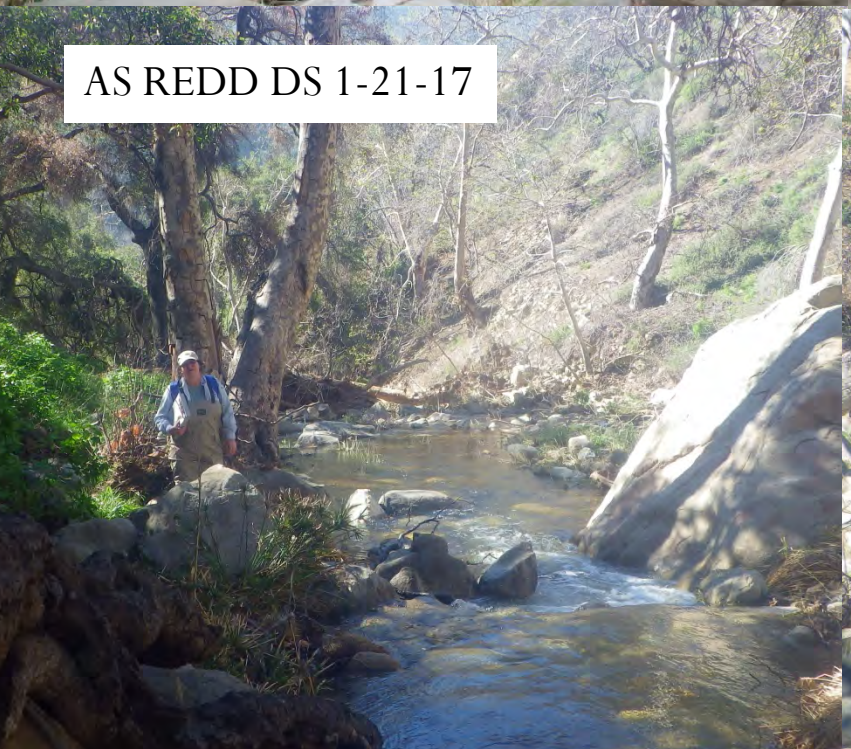


Dam Insights

- Using the RC's Programmatic Opinion can facilitate low cost dam removal – especially with funding programs like Prop 1
- Data requirements can be done using low tech – CCC, Vet Corps
- Inputs from upstream inputs may be larger than impounded sediment
- No loss of pools resulted
- Southern CA is FLASHY – even under extended droughts
- Sites are more exciting with WATER


AS Pins DS 10-14-15


AS Pins US 10-14-15


AS REDD DS 1-21-17


AS REDD DS 1-21-17


2015


2017

Upper Crossing to Group Campsite


Completed
December
2015

Lower Crossing to State Parks Equipment Yard

Lower Crossing Construction Sept. 2015

Dewatering Issues Construction Aug. 2016


Completed
December
2016

First Estuary Reconnection Since 2011


Pool with Steelhead 1/21/17


Pool with Steelhead 3/27/17

Arroyo Sequit Lessons Learned

- Permit process is never a sure thing- even with a presidential executive order
- Year to year progress keeps the community, funders, and regulators engaged and motivated
- Small dam sediment less than other system inputs
- Sediment moves through this system regularly resulting in fluctuating habitat quality
- When your bio window is up at least get the barrier out
- Dewatering even dry streams is tough
- Regular outreach is needed in high use areas