TETRA TECH

Interjurisdictional Project Success Stories

Difficulties and Lessons Learned

Chesapeake Bay Program Trading and Offsets Workgroup Call

March 21, 2018

Objective

- Examine examples of real-world projects to learn about
  - Potential pitfalls and difficulties in working across jurisdictional lines to implement solutions to environmental issues
  - Factors that played into success
- Criteria
  - Any media (water, air, etc.,)
  - Multi- and/or Cross-jurisdictional stakeholders
  - Mature enough to have some implementation success
- Examples
  - Penobscot River Restoration, Maine
  - Los Angeles TMDL Enhanced Management Plan Implementation
- Background, issues, problem resolutions, questions

Penobscot River Restoration

Aerial photo by J.Royte/TNC/Lighthawk

Penobscot River Restoration - Synopsis

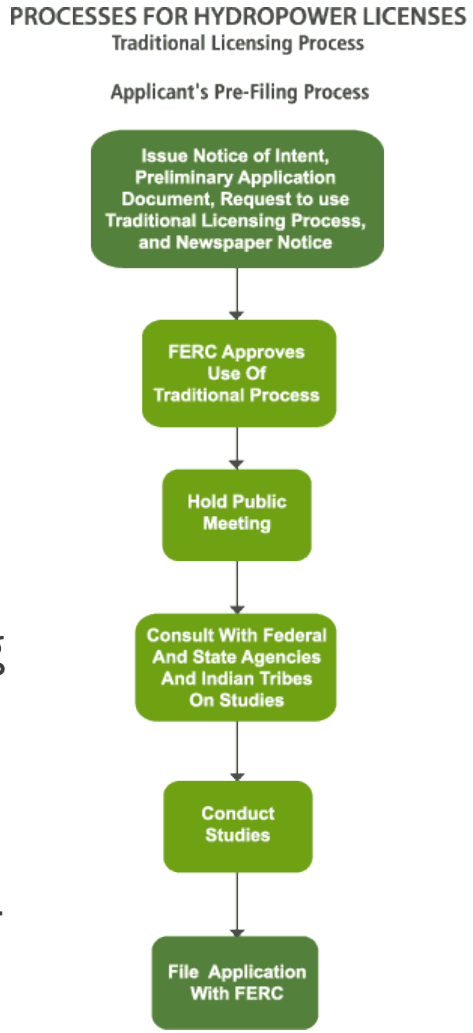
- A multi-stakeholder coalition worked to restore 11 species of sea-run fish to the Penobscot River, while maintaining energy production.
- At 2016 completion, two dams were purchased and removed, a fish passage was built around one and fish passage enhancements at four additional dams.

Penobscot River

- Drains 8750 square mile watershed, empties into Penobscot Bay near the town of Bucksport.
- Penobscot Indians first known inhabitants
- Historic migratory fish runs
  - Atlantic salmon, shad, alewives
- Habitat altered by logging, industrialization, waste discharges and dams
  - 1834 – Veazy Dam built
  - severe decline of the migratory runs

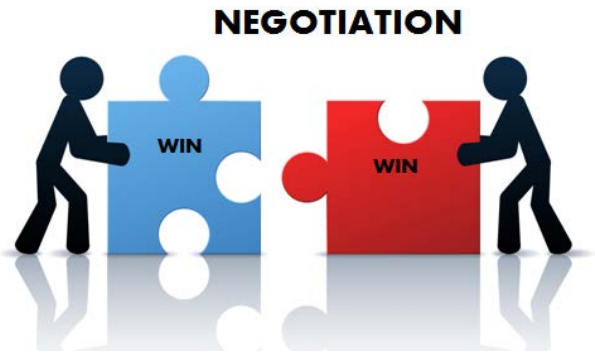
Catalyst for Restoration - Relicensing

- 1999 PPL purchased all the dams on the Penobscot
- Regulated by FERC, several were under relicensing negotiations
- FERC required to comply with NEPA and the CWA
- Licensing process allows for consolidating multiple licensing proceedings – Rare but used for Penobscot
- During settlement discussions, PPL was willing to include other dams not under review.



How the Project came to be

- In 1999 PPL approached stakeholders to consider relicensing options related to its dams
- Penobscot Indian Tribe and stakeholders agreed to withhold opposition to continued dam operations at several sites
- PPL agreed to sell two dams (ultimately they were removed), decommission a third, and implement upgrades to fish passage capacity at four others
- 2004 – Signed agreement between the Trust and PPL
- 2016 – Project Completed



- Penobscot River Restoration Trust
- Penobscot Indian Nation
- PPL Corporation
- USDOI Bureau of Fish
- USDOI Wildlife Service
- Bureau of Indian Affairs
- Maine Department of Inland Fisheries and Wildlife
- National Park Service
- Black Bear LLC
- Maine Department of Marine Resources
- Maine State Planning Office
- National Oceanic and Atmospheric Administration

Penobscot River Restoration Trust

- Non-profit created and charged with implementing key aspects of plan
  - Raise money
  - Purchased 3 dams in 2010 for $24 million
  - Steward the restoration projects

PENOBSCOT RIVER RESTORATION TRUST

American Rivers
Rivers Connect Us

Penobscot Nation

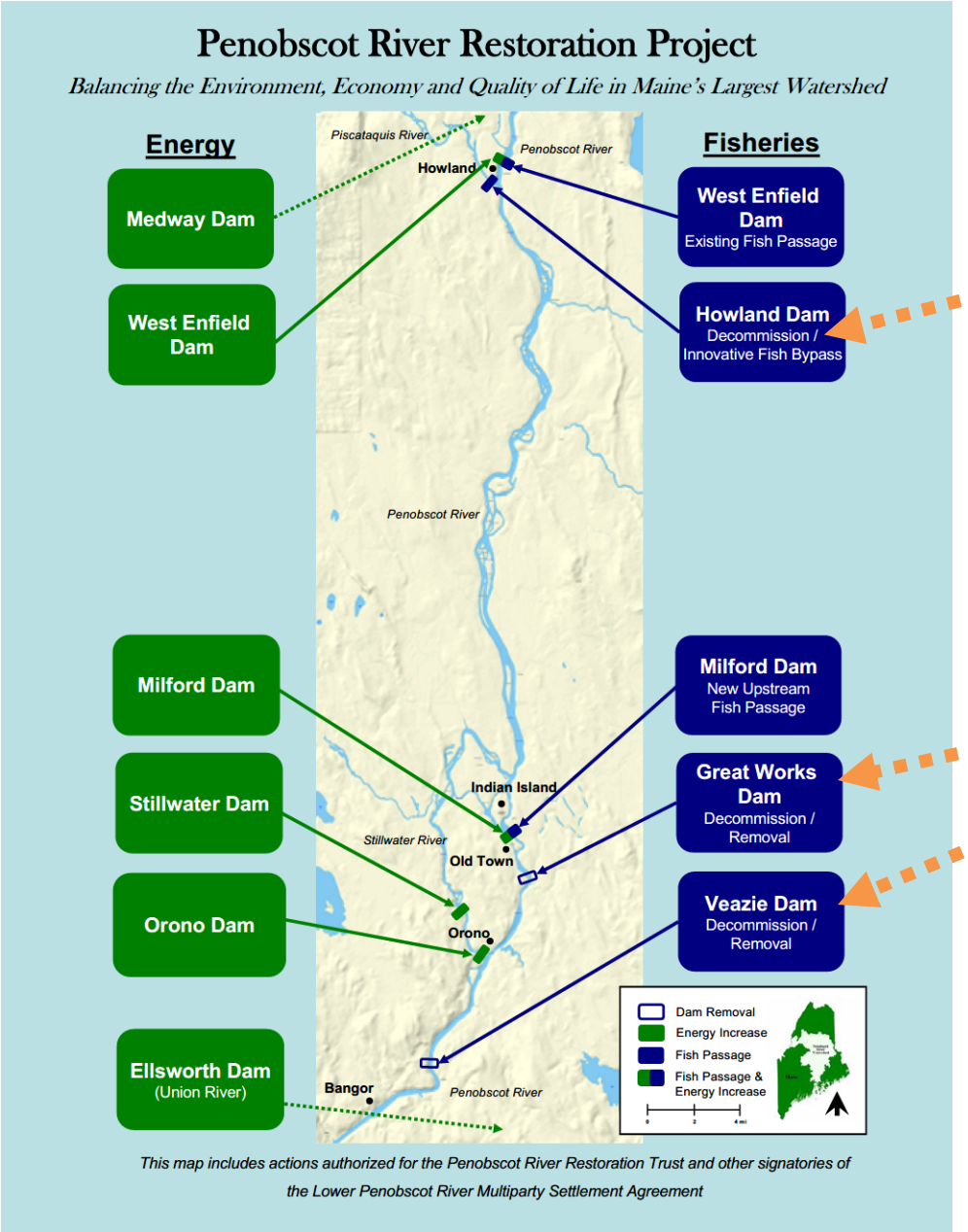
Maine Audubon

Natural Resources Council of Maine

The Nature Conservancy
Protecting nature. Preserving life.™

asf
Wild Salmon. Wild Rivers.

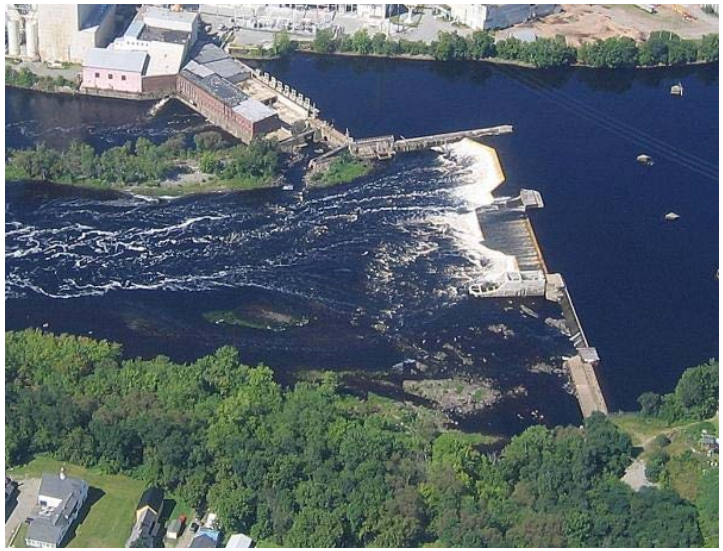
Trout Unlimited

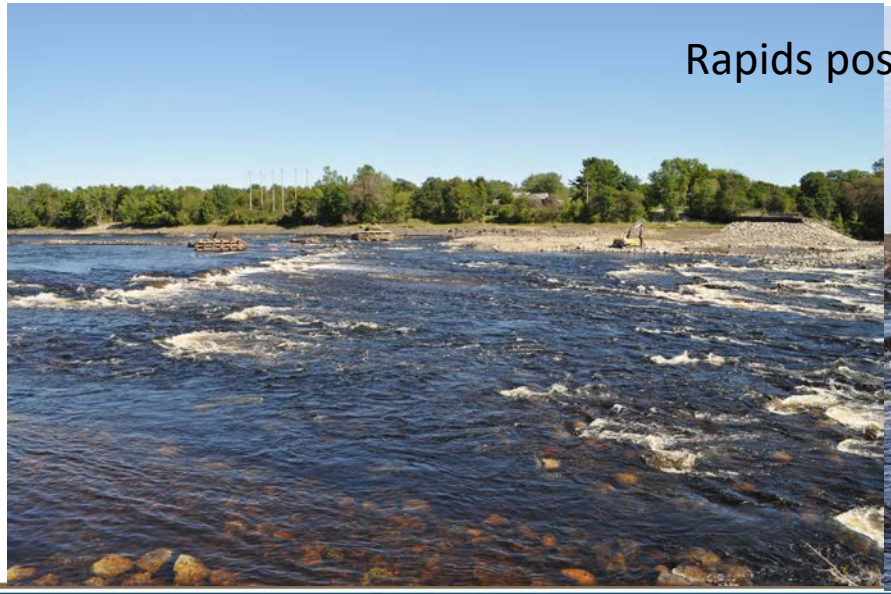


Decommissioned
Natural passage (2016)

Removed
2012
2013

Great Works Dam Removal

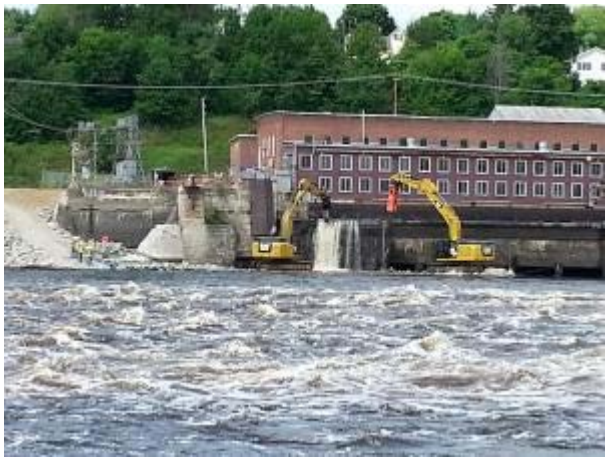




Rapids post removal

All Photos this page: penobscotriver.org

Veazie Dam Removal

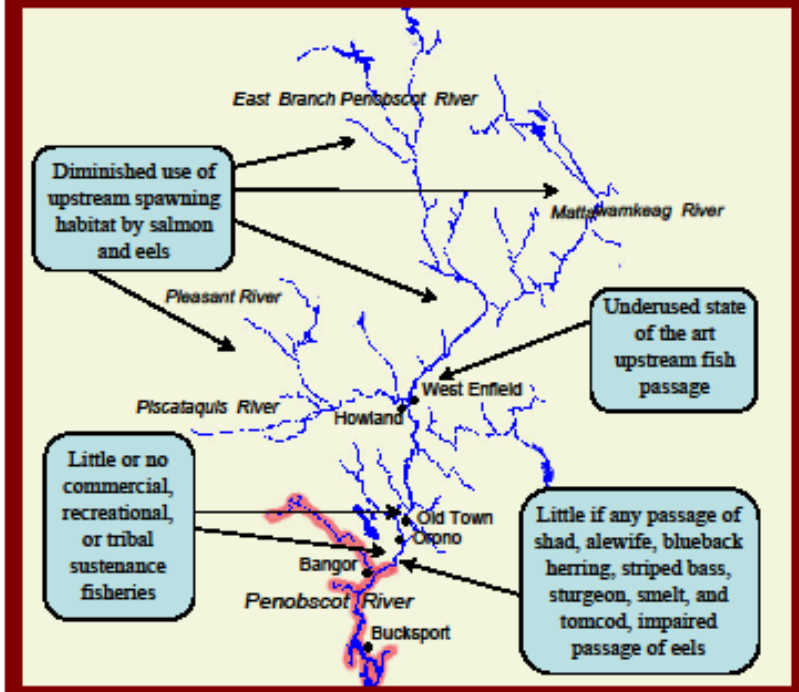


All Photos this page: penobscotriver.org

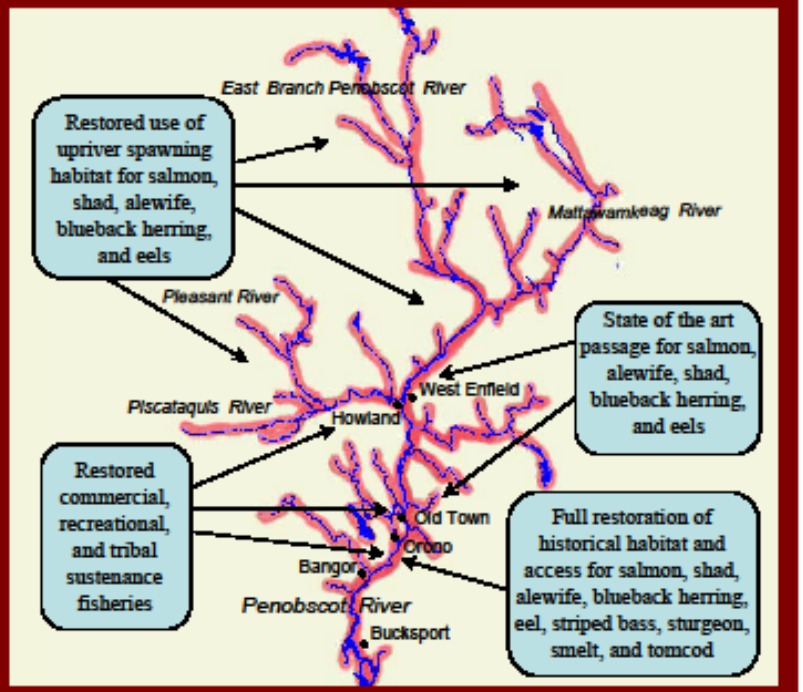
Howland Bypass

Penobscot River Restoration Project

Before and After Habitat Access



Existing Access for Sea-Run Fish



Significantly Improved Access for Sea-Run Fish to Nearly 1,000 Miles

From penobscotriver.org

Results

- **Prior to restoration**
- Salmon - endangered
  - from 100,000 fish to less than 2,000
- American shad – nearly gone
- Shortnose sturgeon – endangered
- Alewife – species of concern
- Blueback herring – species of concern
- Fisheries an economic disaster

- **After**
- No decrease in power generation
- In Aug. 2016 in opened stretches of the river, Maine Dept. of Marine Resources recorded
  - 7,846 shad
  - 287 mature Atlantic salmon
  - 1.26 million river herring
  - 1,149 striped bass
  - 3,833 sea lamprey

Results – Additional Benefits

- Tribal cultural traditions reinforced and renewed
- Improved water quality
- New opportunities for tourism, business and communities
- Improvements to coastal ecosystem and fisheries
- Resolve longstanding disputes and avoid future uncertainties over the regulation of the river.
- Energy production—net increase in amount produced

Difficulties and Lessons

- Complex relicensing and regulatory process
- Multitude of stakeholders
- Funding requirements – over $60 million ultimately was raised to implement the restoration project from public and private sources
- Future management of multiple dams in single basin
  - https://lawreview.law.ucdavis.edu/issues/48/3/Articles/48-3_Owen-Apse.pdf
  - Using Penobscot River restoration project as an example, article analyzes how trading systems might facilitate better reconciliation of the positive benefits and negative impacts of dams.

Factors for Success

- Recent similar efforts for Edwards Dam on Kennebec River and Elwha and Glines Canyon Dams on west coast
- Potential for significant recovery of fisheries with restoration of access to the river
- Unique dam ownership situation
  - One owner of multiple dams, allowed for holistic viewpoint
  - Participants decided to concurrently evaluate all of PPL's dams in the lower Penobscot basin.
  - Opportunity to ID cost-effective ways to rehabilitate fisheries while retaining much of its hydropower
- Partners open to creative solution and acknowledging the benefit of tremendous ecological restoration benefits in exchange for enhanced power production elsewhere
- **http://www.penobscotriver.org/**

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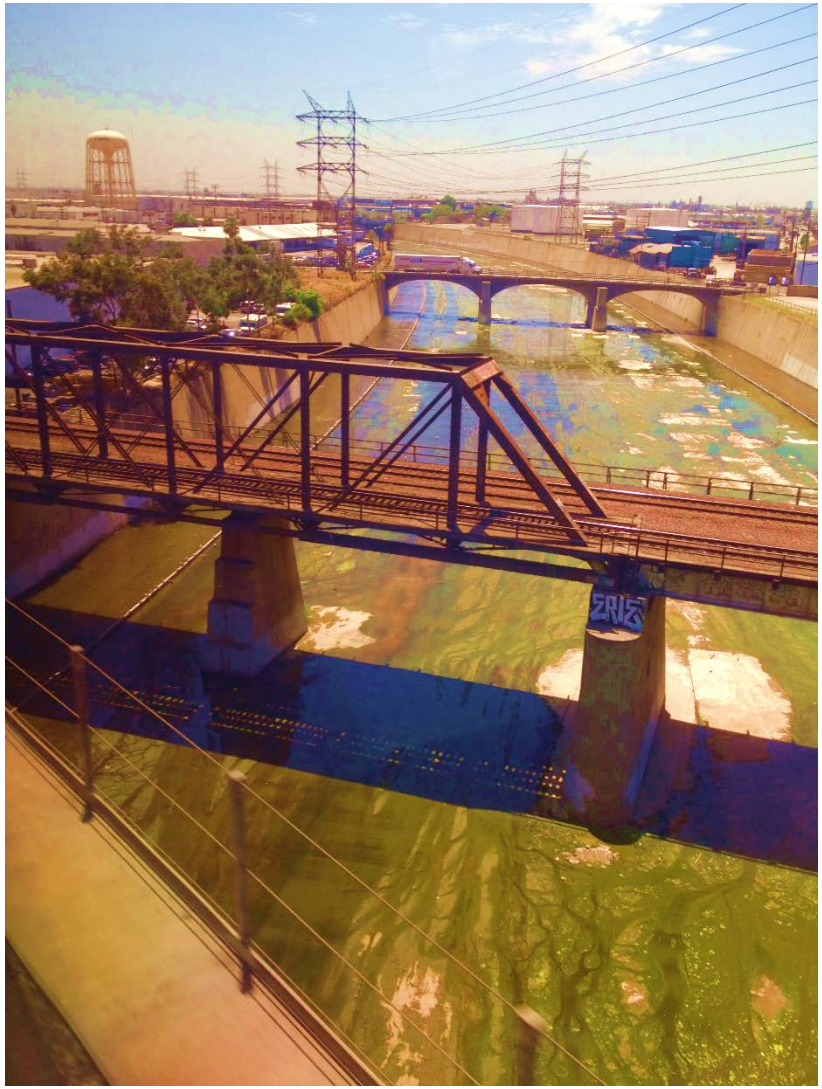
Los Angeles TMDL Implementation

Enhanced Watershed Management Programs

Regional Drivers

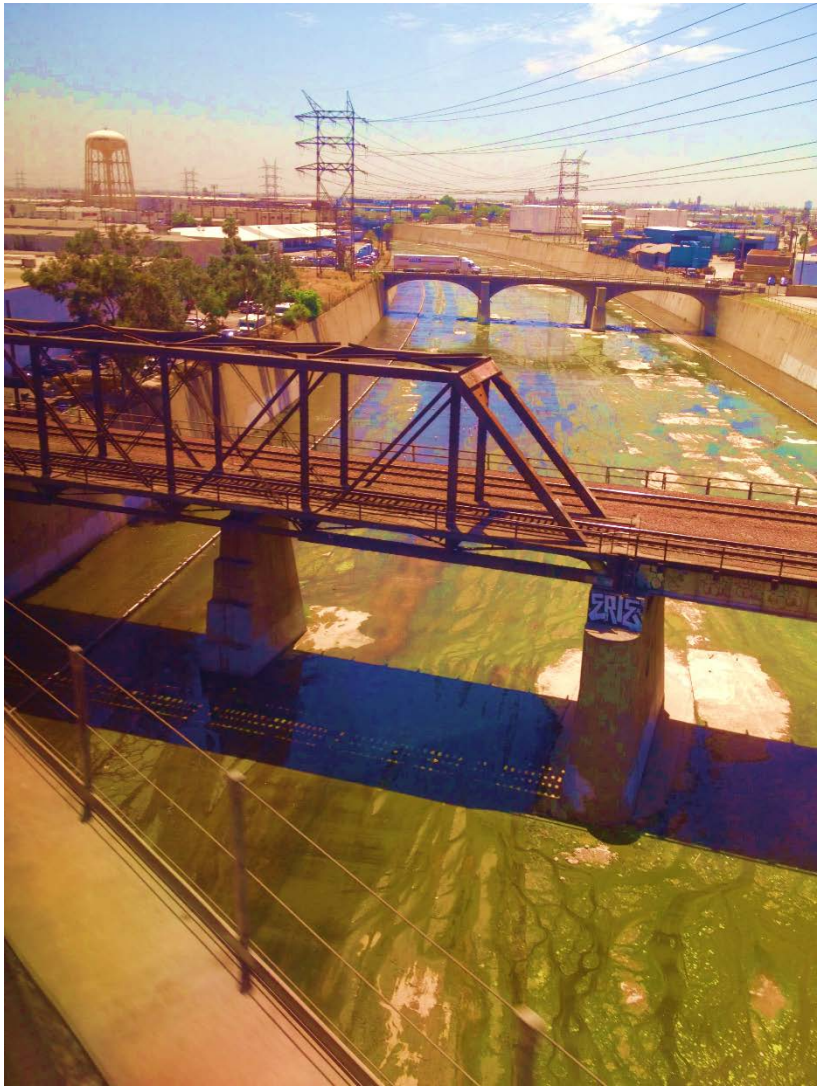
- Water Quality Impairments



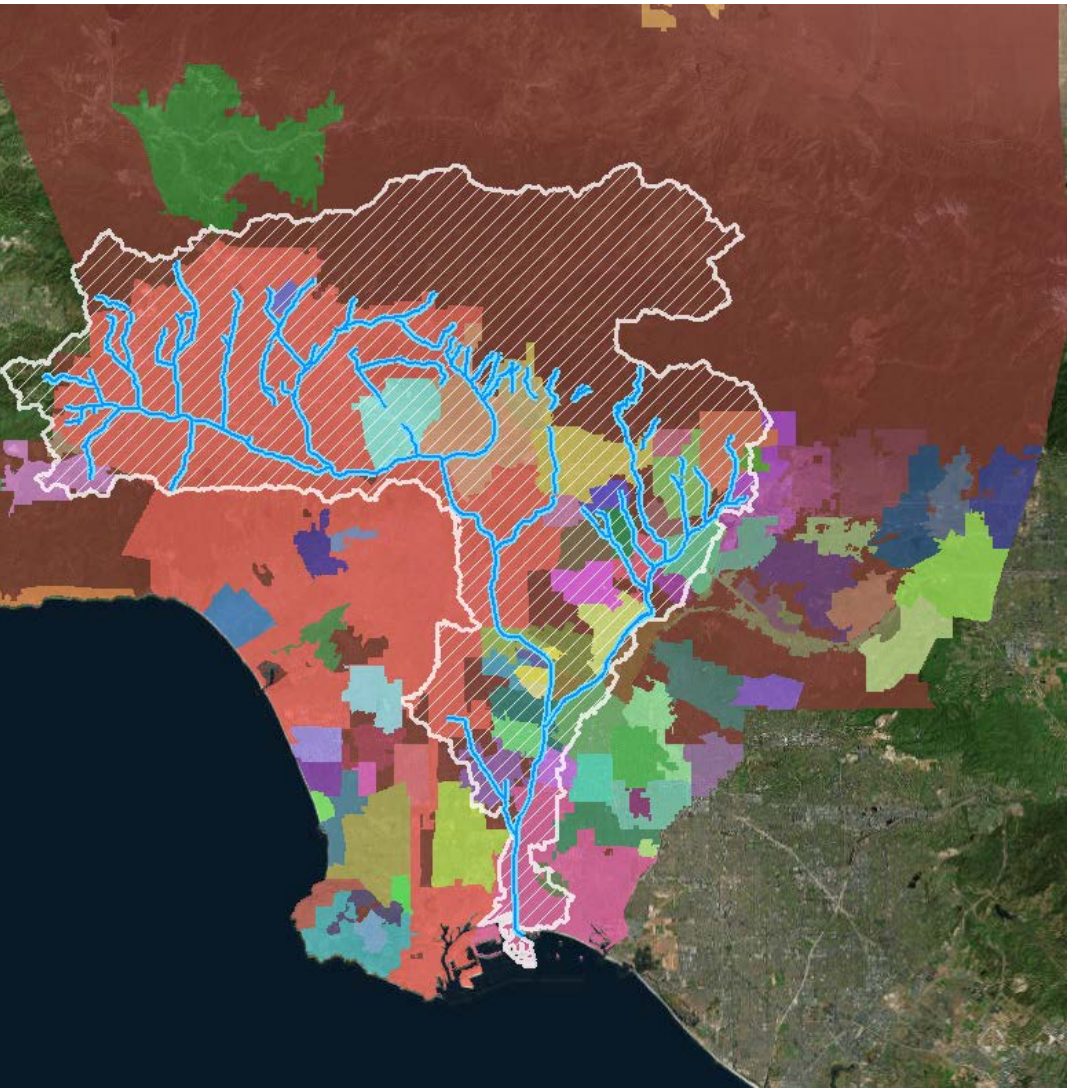
By the Numbers

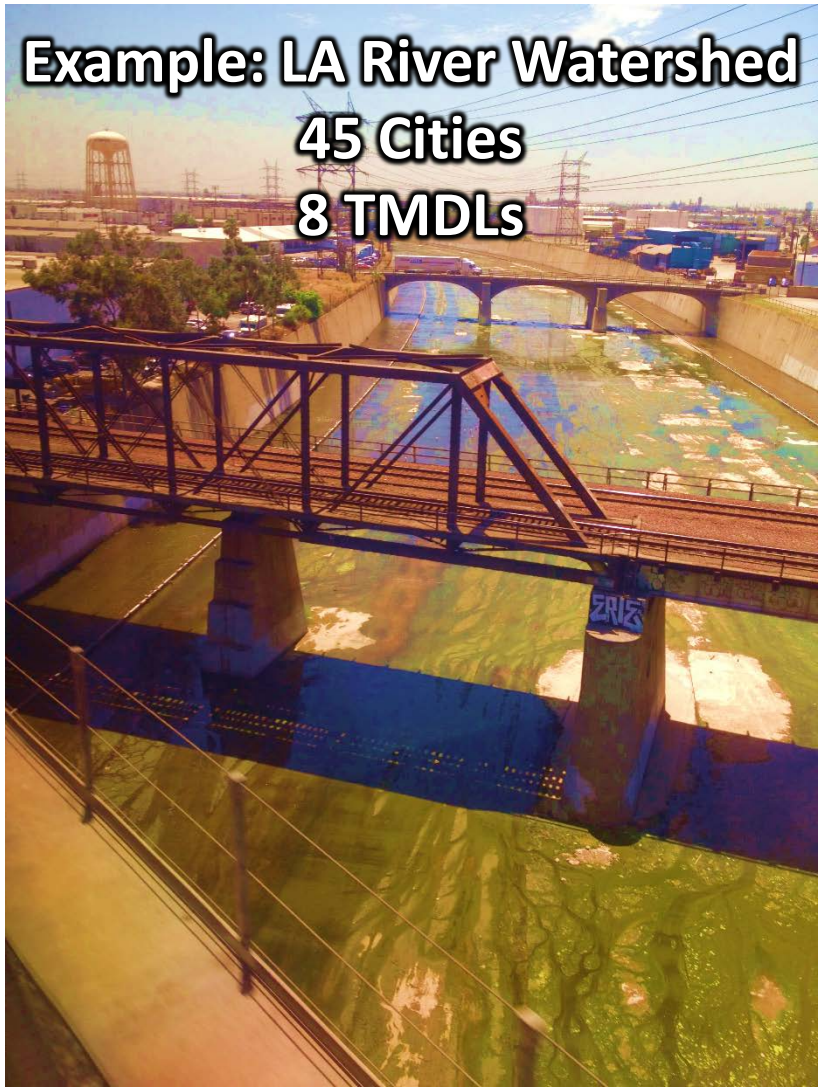
- Water Quality Impairments
  - 1,379 303(d)-listed impairments*
  - 75 TMDLs*
  - 88 cities, LA County, and LA County Flood Control District
  - 500 miles of open channel
  - 2,800 miles of underground storm drain
  - 120,000+ catch basins
  - 2.1M+ parcels

*Los Angeles Region, includes Ventura County



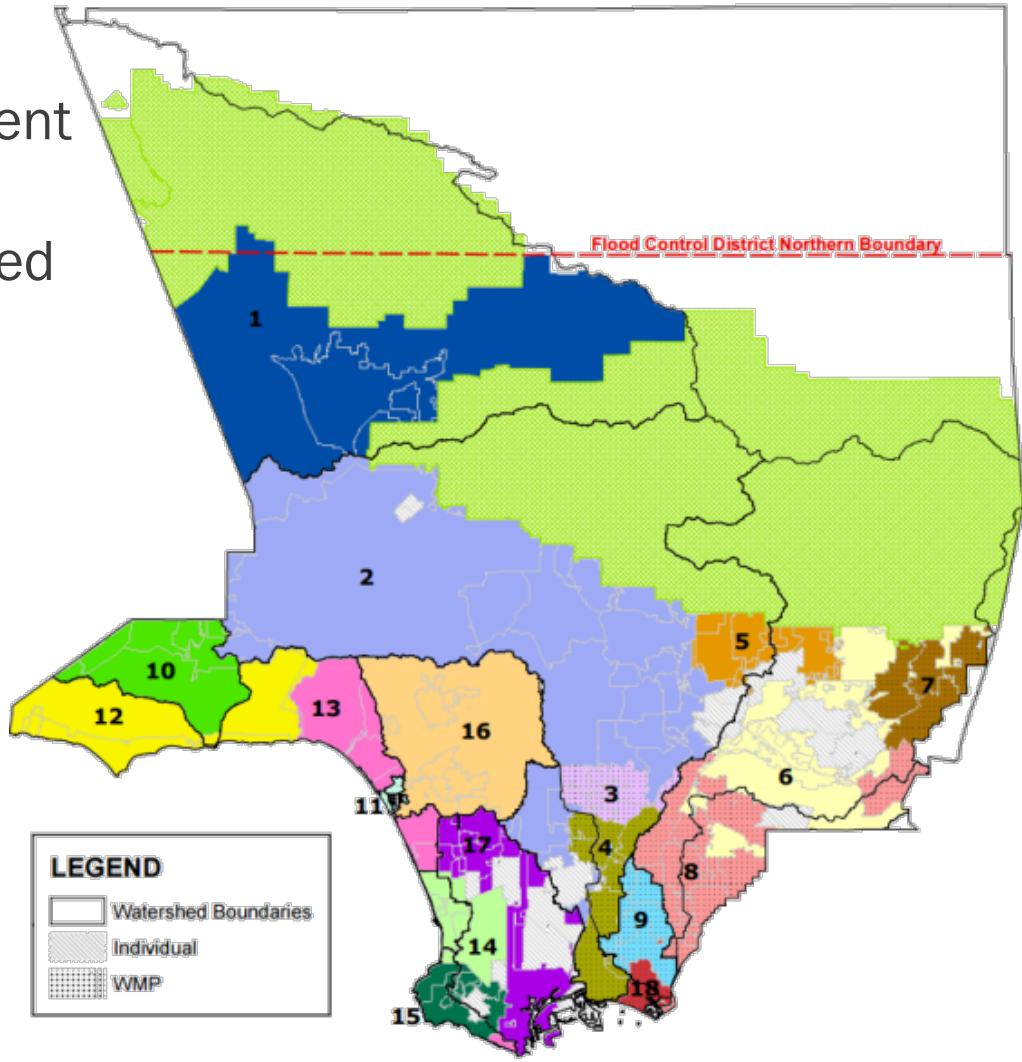
By the Numbers





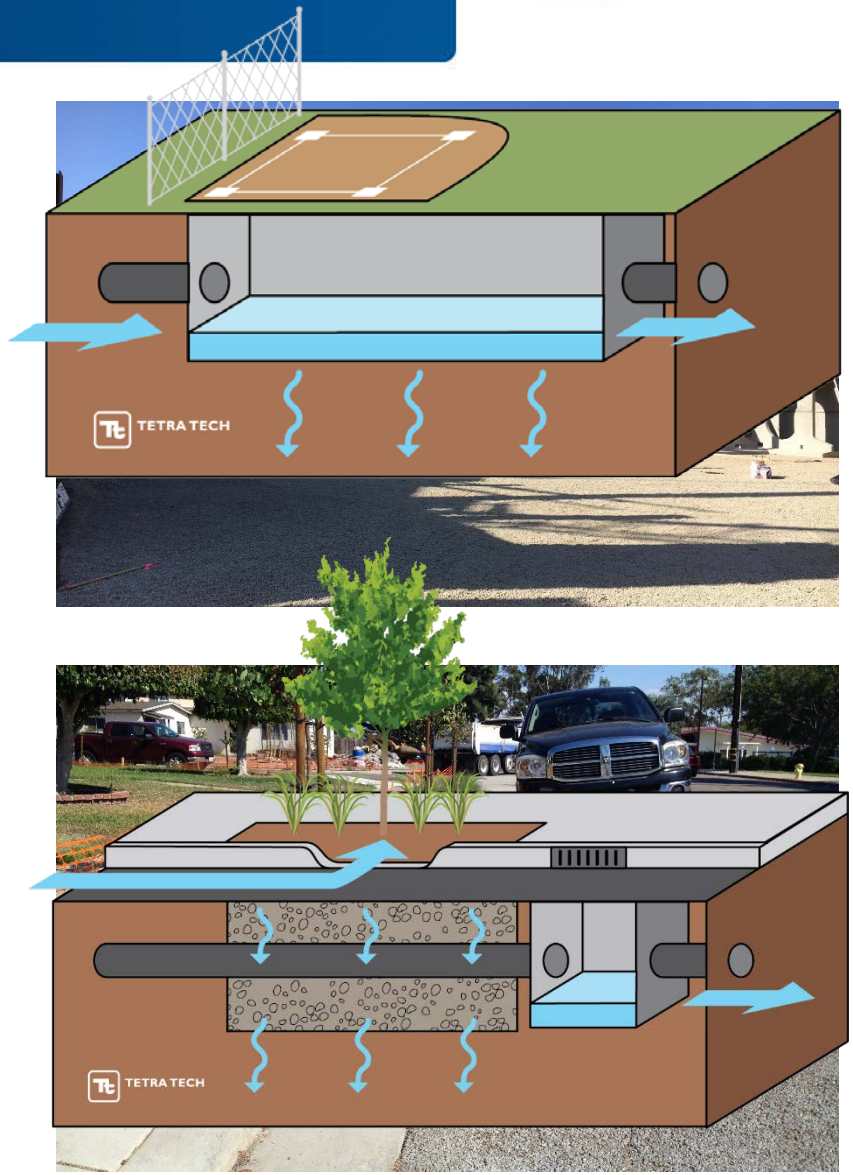
Regulatory Response

- MS4 Permit allowed development of Watershed Management Programs (WMPs) and Enhanced Watershed Management Programs (EWMPs)
- WMPs/EWMPs are voluntary interjurisdictional programs to improve water quality
- EWMPs focus on **collaborative**, multi-benefit projects (in exchange for time)



The Challenge

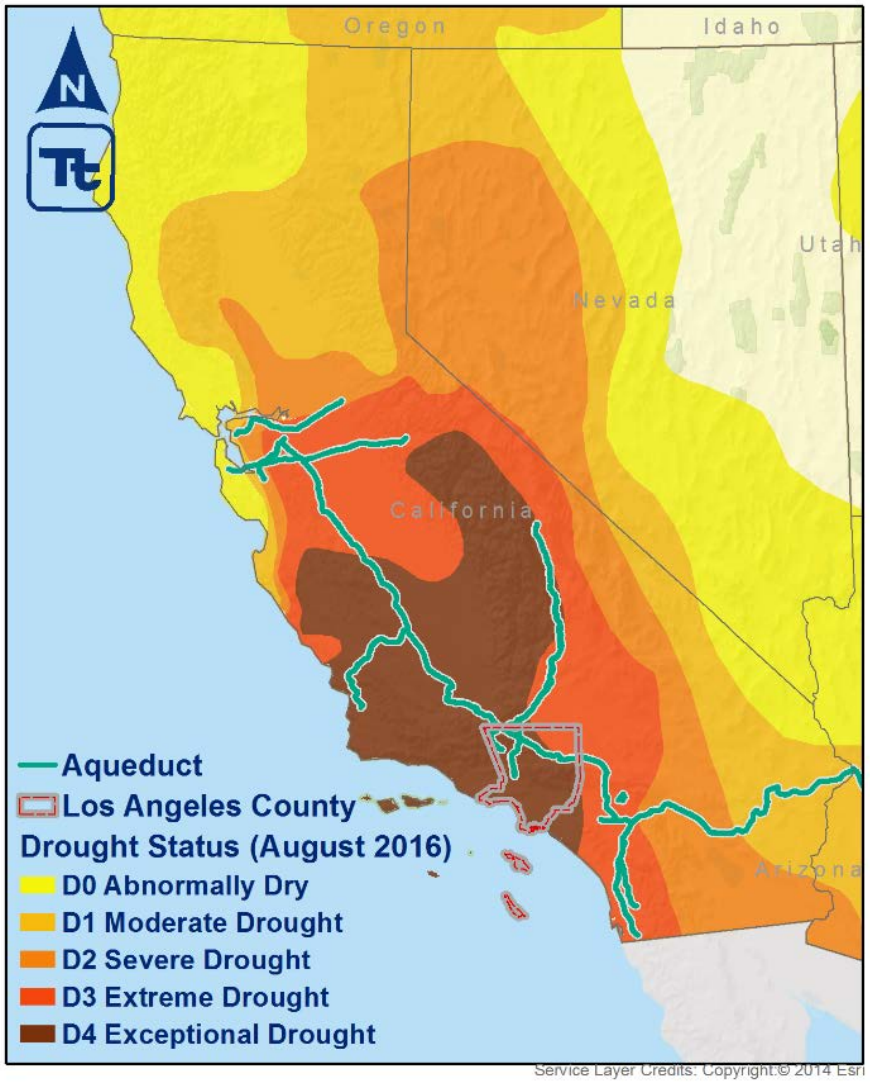
- EWMPs prescribed over **$20 billion** of green stormwater infrastructure **retrofits** (16,000+ ac-ft of BMPs)
- Operating in built out environment with limited, expensive real estate
- Current plans default to land acquisition for 80% of the solution



The Challenge

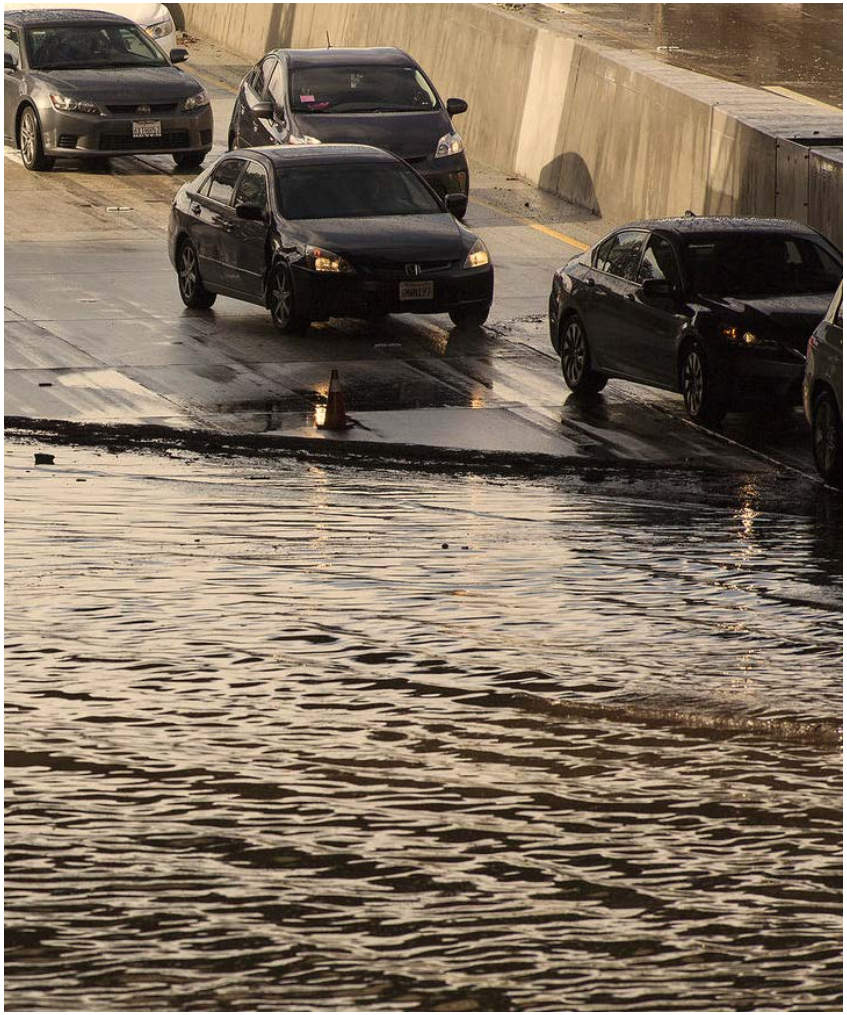
Other Regional Drivers for Collaboration

- Water Quality Impairments
- Prolonged Droughts



Other Regional Drivers for Collaboration

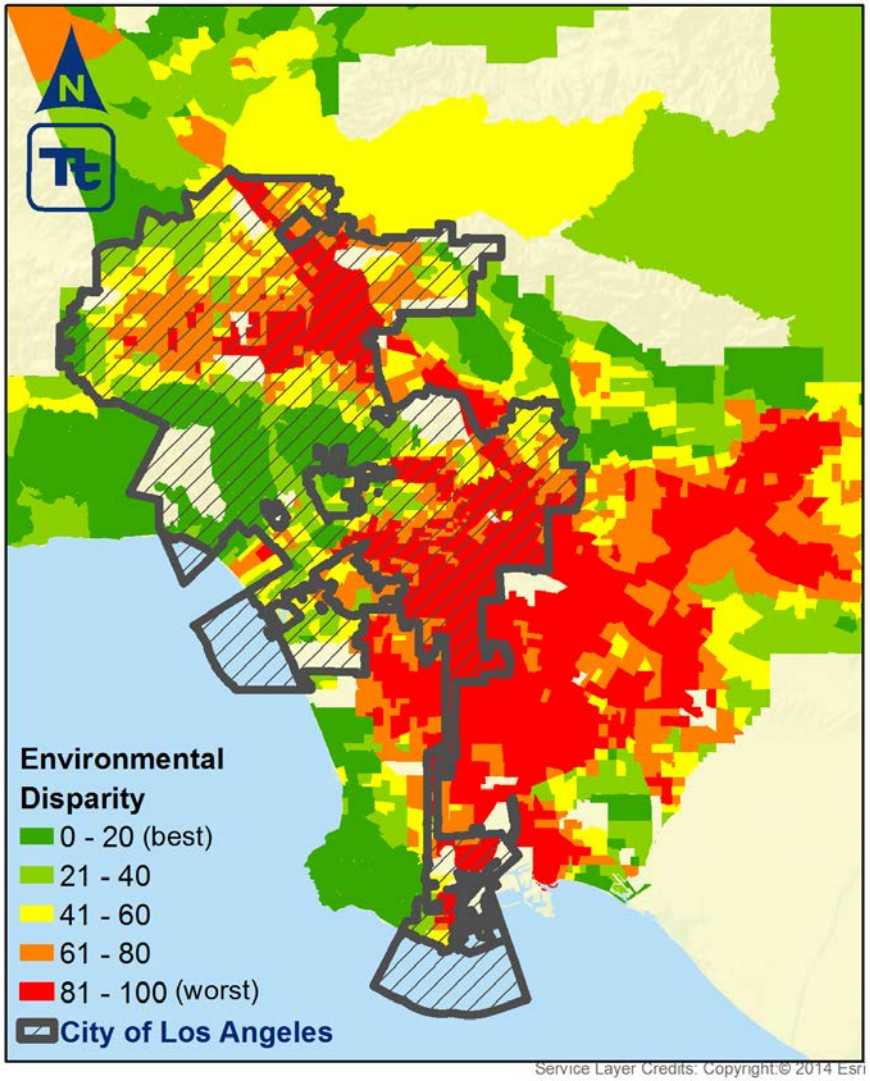
- Water Quality Impairments
- Prolonged Droughts
- More Frequent Flooding



Brian van der Brug / Los Angeles Times

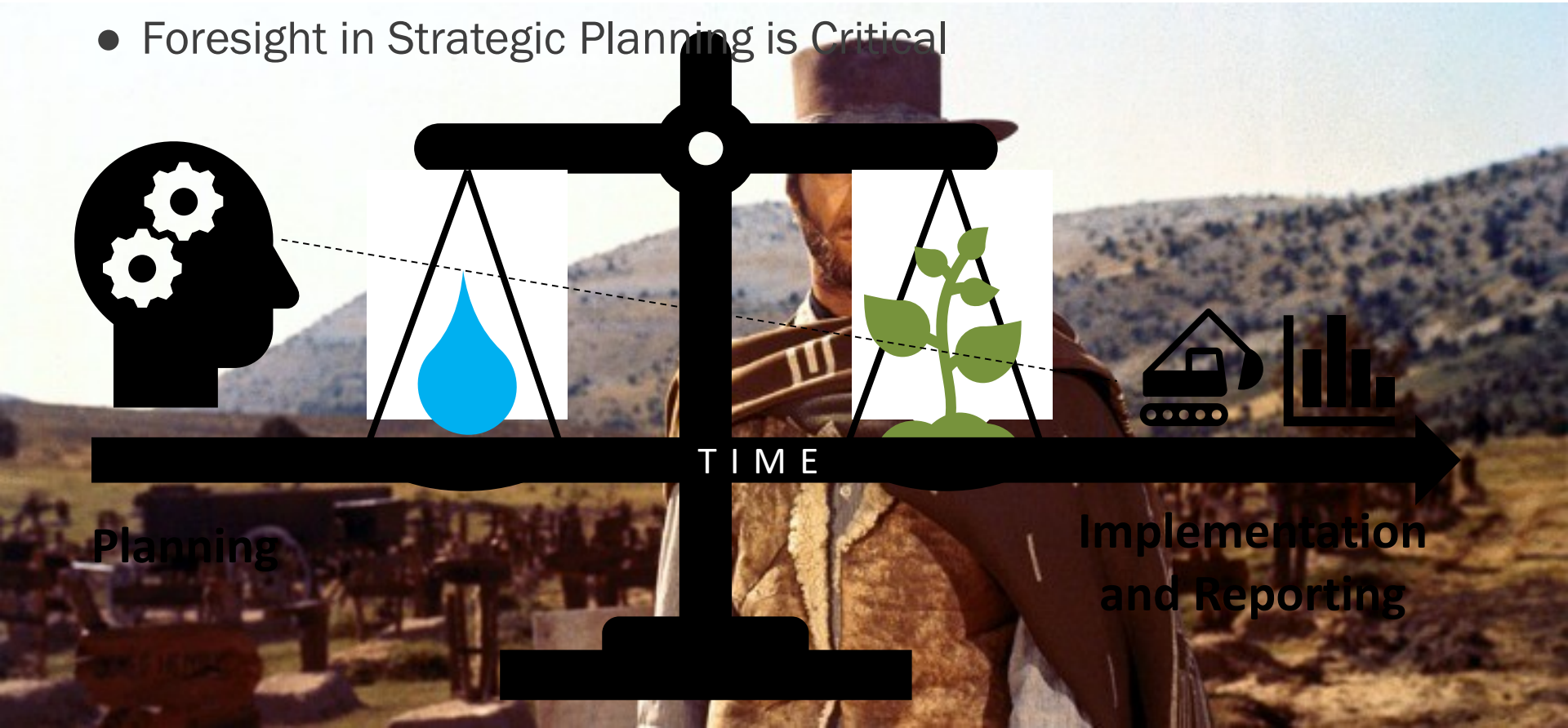
Other Regional Drivers for Collaboration

- Water Quality Impairments
- Prolonged Droughts
- More Frequent Flooding
- Environmental Justice
- Affordable Housing
- Climate Resiliency
- Aging Infrastructure



Lessons Learned and Challenges

- LA County is the Wild West of Water Quality Trading
- All Water is Not Created Equally
- But Co-Benefits Might be Valued Equally
- Foresight in Strategic Planning is Critical



Case Study:
Carriage Crest Park Stormwater Capture Project

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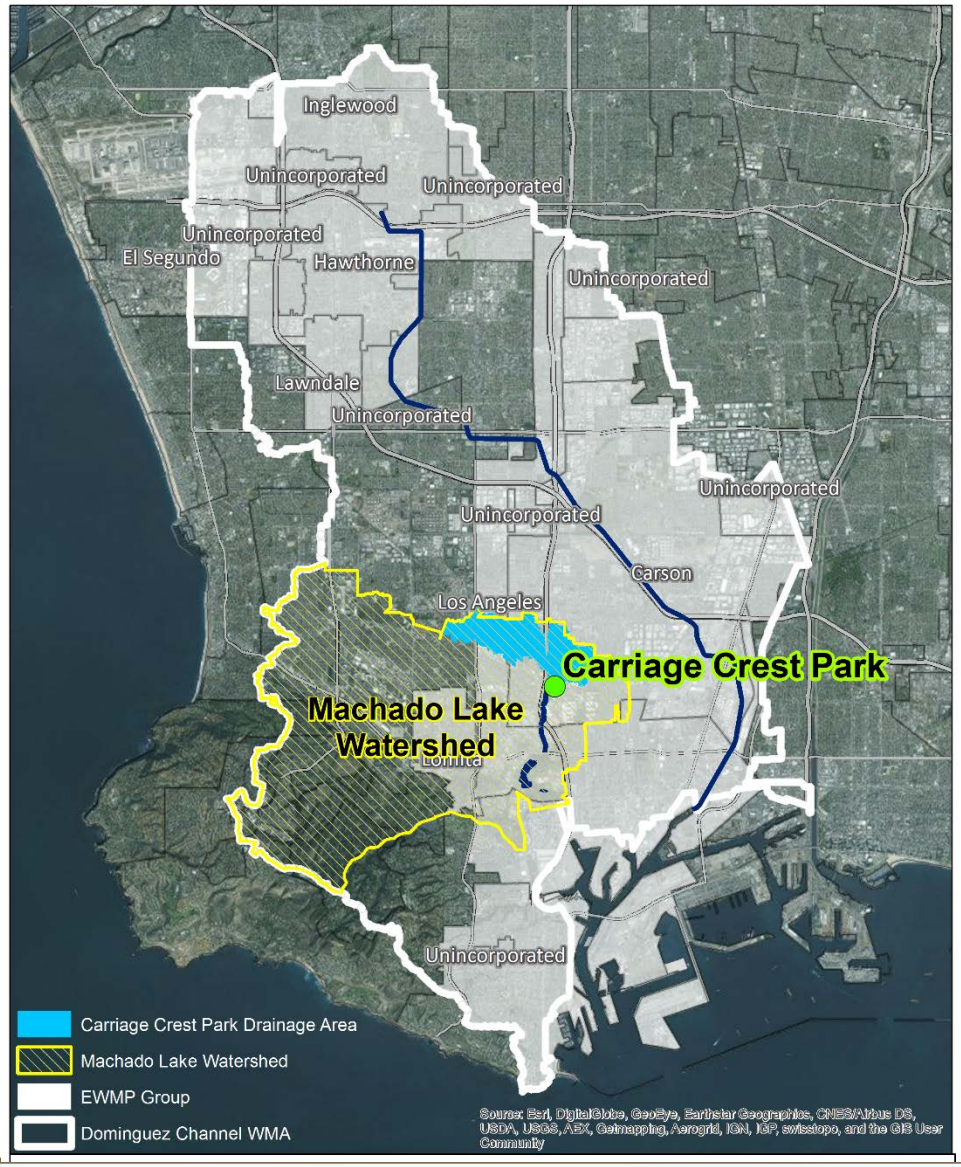
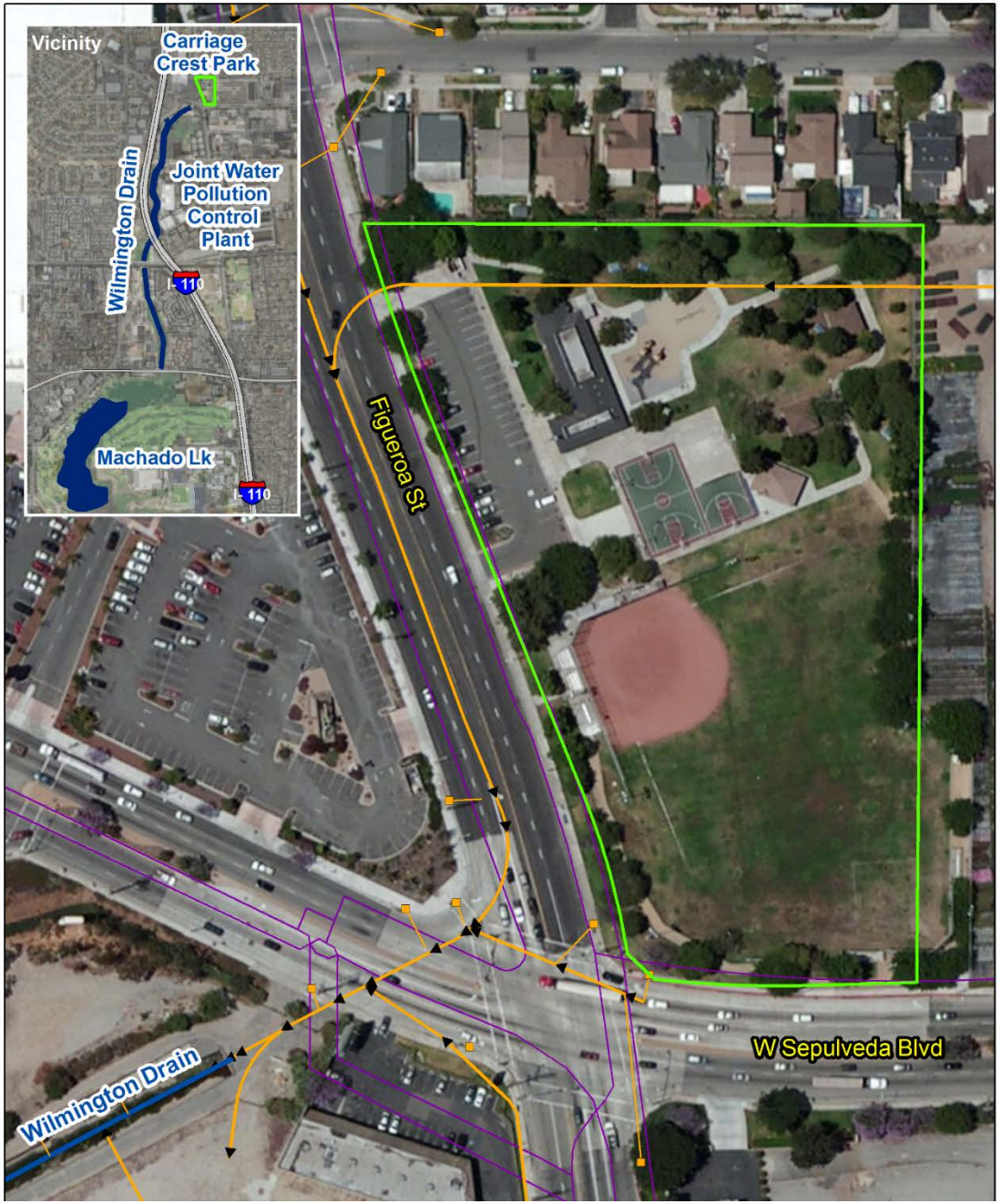
- **Dominguez Channel EWMP** includes 8 Watershed Management Group members, 3 major receiving waters
- **23 square-mile drainage area** to Machado Lake (8% of which drains to Carriage Crest drains)
- Regional project at Carriage Crest Park will reduce **bacteria**, **nutrients**, and other pollutants discharged to Machado Lake



Site Location and Context

- “Last line of defense” before Wilmington Drain
- Located adjacent to Joint Water Pollution Control Plant
- Infiltration is infeasible



Site Location and Context

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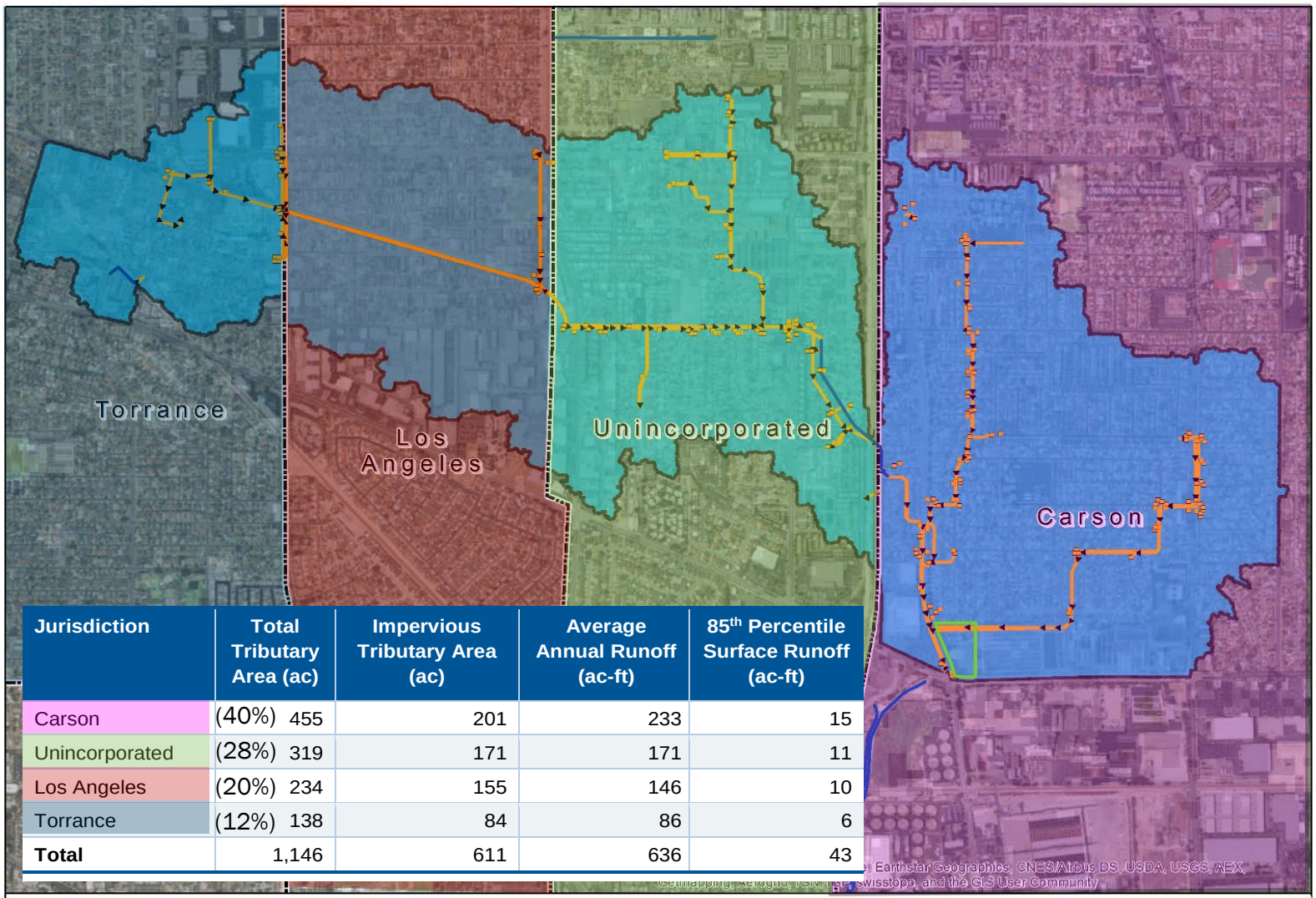
SCALE: 1" = 100'

TETRA TECH
www.tetratech.com
3475 E. Foothill Blvd.
Pasadena, CA 91107
Phone: (626) 351-4664 Fax: (626) 351-5291

CITY OF CARSON
CARRAIGE CREST PARK
STORMWATER CAPTURE PROJECT
EXISTING UTILITIES

Project No.: 135-01297-16021
Date: 12/9/2016
Designed By: JLF
Supplemental
EH-1

Benefits Spanning Jurisdictional Boundaries



Jurisdiction	Total Tributary Area (ac)	Impervious Tributary Area (ac)	Average Annual Runoff (ac-ft)	85th Percentile Surface Runoff (ac-ft)
Carson	(40%) 455	201	233	15
Unincorporated	(28%) 319	171	171	11
Los Angeles	(20%) 234	155	146	10
Torrance	(12%) 138	84	86	6
Total	1,146	611	636	43

Project Funding and Coordination

- **City of Carson** entered into a Cooperative Implementation Agreement with Caltrans for $13 Million
- **Caltrans** Cooperative Implementation Credits: $88k/compliance unit (i.e., per acre of ROW)
- **Sanitation Districts** of LA County offered implementation services under SB 485
- **County of LA** "buying into" project

Project Summary

Carson Water Capture Project at Carriage Crest Park	
Drainage Area	1,146 acres
Contributing Drainage Area	Carson, Unincorporated LA County, City of LA, and Torrance
Water Quality BMP Volume	12.5 AF
Annual Volume Capture	481 AFY (average) 685 AFY (wet year)
BMP Opportunity Area (max)	4.8 acres
Storm Drain Diversion Rate	45 cfs
Sanitary Sewer Discharge Rate, Dry and Wet Weather (max)	34 cfs

Design Components

Storm Drain Diversion System

Pre-Treatment

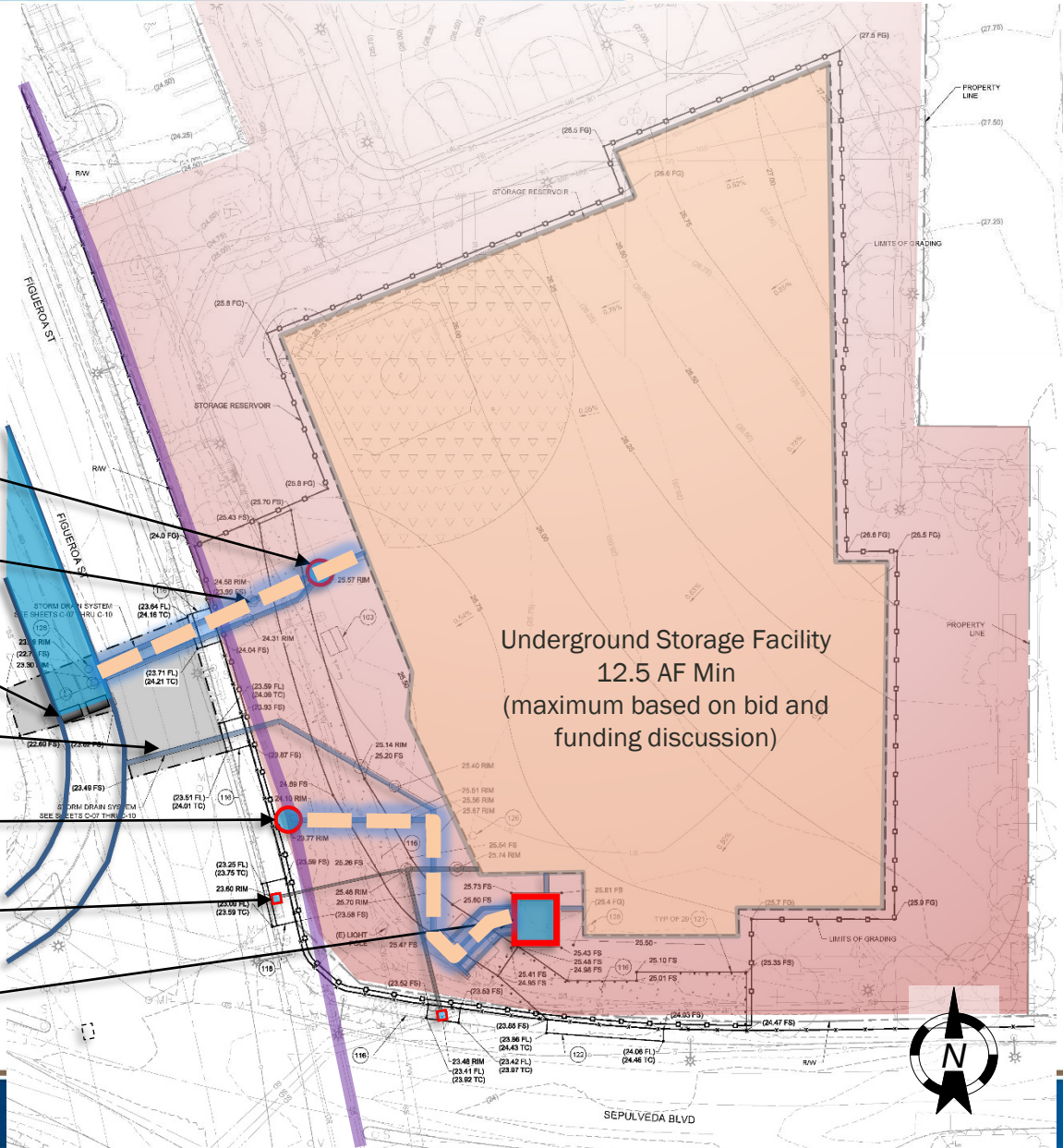
Storm Drain Conveyance Pipeline

Storage Facility

Sanitary Sewer Pump Station

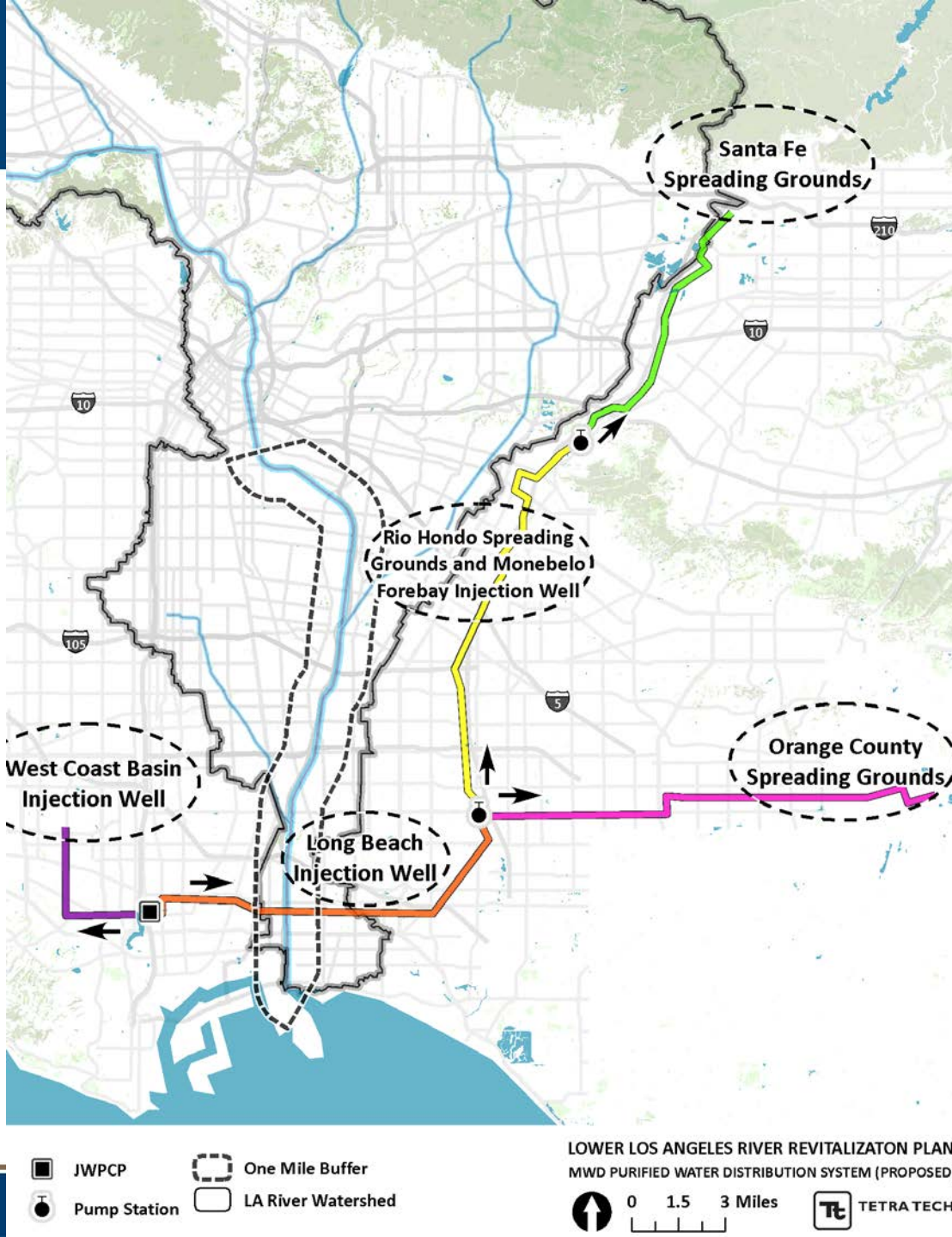
Design Operation

- Pre-Treatment Unit
- Conveyance Pipeline
- Diversion System
- Discharge to Storm Drain
- Discharge to Sewer
- U/S Catch Basin
- Pump Station Discharge



Integrated Watershed Management

- Sanitation Districts and Metropolitan Water District plan to construct advanced water treatment facility
- Plan to eventually generate 150 MGD to supply regional spreading grounds, injection wells



Project Status: Currently Out for Bids

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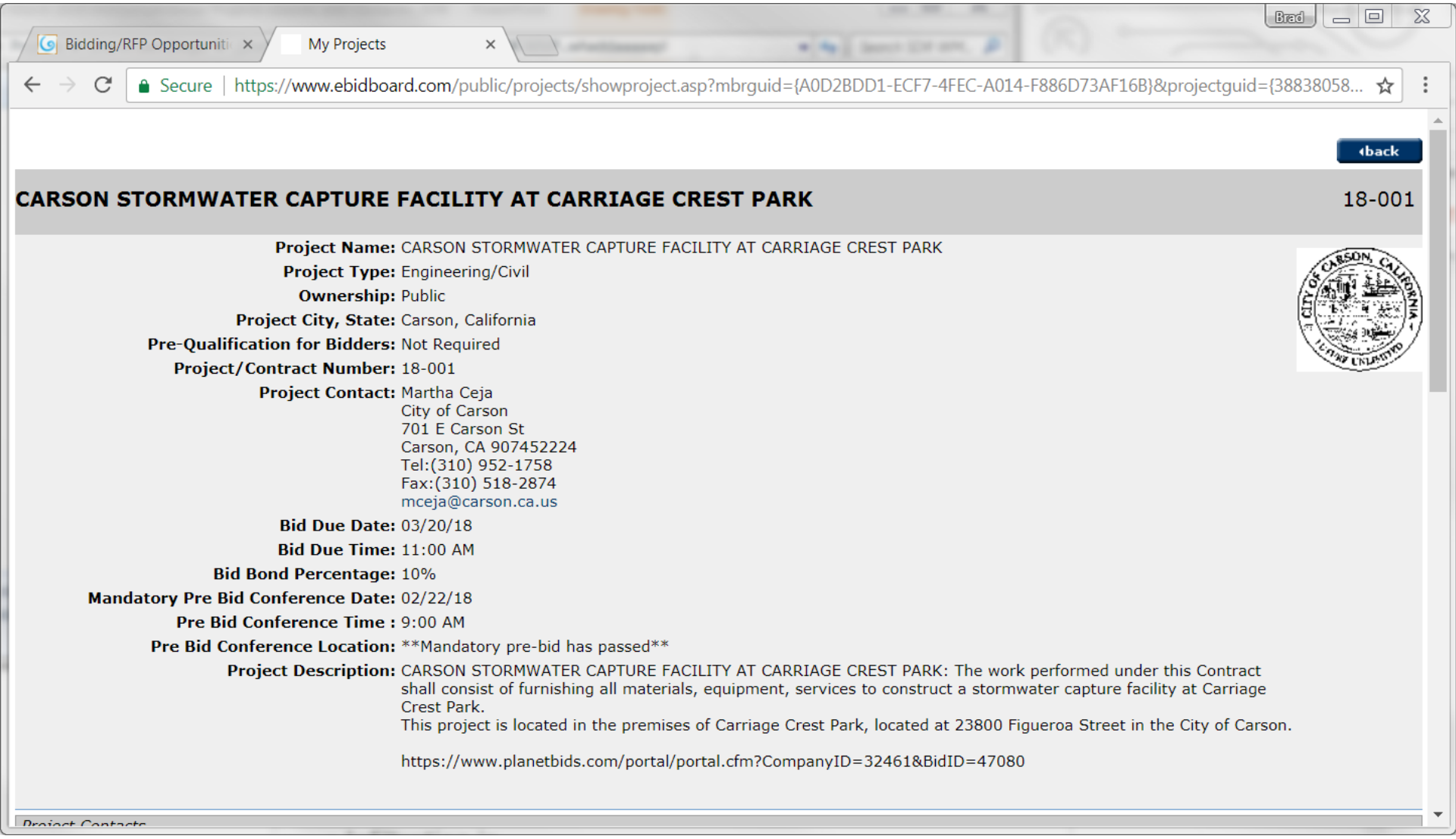

Interjurisdictional Co-Funding of O&M

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O&M Component	Average Year	Wet Year
Active Control	$58,000	$58,000
Channel Diversion and Pretreatment	$27,000	$27,000
Pump Station	$38,000	$38,000
Storage	$16,000	$16,000
Sampling	$31,000	$31,000
Treatment Surcharge	$158,000	$215,000
Total Estimated Annual O&M to Fully Manage 26.5 Acre-Feet Equiv. Design Storm Volume	**$328,000**	**$385,000**

Carson	**(58% of runoff volume)**	**$189,000**	**$222,000**
Unincorporated	**(42% of runoff volume)**	**$139,000**	**$163,000**

Co-funding is Negotiated, but Who is "Getting Credit" and How?

- EWMP focuses on managing bacteria as "limiting pollutant"
- EWMP uses subwatershed-scale runoff volume as a proxy for bacteria
- MS4 Permit alternative compliance pathway: 85th %-ile storm retention

Contributior
All Jurisdic

ac-ft

Carsc
Unincorp

Carsc

Table 5.2: Dominguez Channel Watershed – Summary of volume managed and BMP capacity by jurisdiction for final compliance

COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)				
Jurisdiction	**24-hour Volume Managed (acre-ft)**	**LID/Redevelopment**	**Green Streets**	**Regional BMPs (identified)**	**Additional BMPs (TBD)**	**Total BMP Capacity (acre-ft)**
Carson	231.7	24.9	59.5	17.7	100.3	**202.6**
El Segundo	63.6	1.4	2.0	44.9	3.3	**51.5**
Hawthorne	151.6	12.5	35.3	50.1	23.7	**121.6**
Inglewood	96.5	4.1	44.1	5.2	20.4	**73.8**
Lawndale	42.2	3.5	0.0	34.8	0.0	**38.3**
Lomita	38.2	1.3	0.0	49.0	3.8	**54.1**
Los Angeles	433.1	50.7	96.0	57.8	165.6	**370.2**
Uninc. LA County	212.4	18.4	57.2	72.9	51.6	**200.1**
Total	**1,284.30**	**116.8**	**294.2**	**332.4**	**368.9**	**1,112.3**

Co-funding is Negotiated, but Who is "Getting Credit" and How?

- Required special permission to use design storm volume to demonstrate compliance
- Now misalignment between plan and implementation
- Carson is managing runoff from 3 other jurisdictions, but "credit" is only being granted to those who pay
- Volume metrics are simple… but…
  - Eliminates some efficiencies of regional projects
  - All water is not created equal
  - e.g. using pollutant load as a metric, Carriage Crest Park may demonstrate compliance for tributary portions of all 4 jurisdictions

Water Boards

Los Angeles Regional Water Quality Control Board

April 7, 2017

Ms. Kristen Ruffell
County Sanitation Districts of Los Angeles County
1955 Workman Mill Road
Whittier, CA 90607

COMPLIANCE CLARIFICATION FOR CARSON STORMWATER AND RUNOFF CAPTURE PROJECT AT CARRIAGE CREST PARK PURSUANT TO THE LOS ANGELES COUNTY MUNICIPAL SEPARATE STORM SEWER SYSTEM PERMIT (ORDER NO. R4-2012-0175 AS AMENDED, NPDES NO. CAS004001)

Dear Ms. Ruffell:

The Los Angeles Regional Water Quality Control Board (Regional Water Board) is in receipt of your letter dated March 13, 2017. As stated in the letter, per Part VI.E.2.e.i.(4) of the Los Angeles County Municipal Separate Storm Sewer System (LA County MS4) Permit:

> i. A Permittee shall be deemed in compliance with an applicable final water quality-based effluent limitation and final receiving water limitation for the pollutant(s) associated with a specific TMDL if any of the following is demonstrated: …
>
> (4) In drainage areas where Permittees are implementing an EWMP, (i) all non-storm water and (ii) all storm water runoff up to and including the volume equivalent to the 85th percentile, 24-hour event is retained for the drainage area tributary to the applicable receiving water, and the Permittee is implementing all requirements of the EWMP, including, but not limited to, Parts VI.C.7 and VI.C.8 of this Order. This provision (4) shall not apply to final trash WQBELs."
>
> (p. 145)

For the Carriage Crest Park project, this means the City of Carson will be deemed in compliance per Part VI.E.2.e.i.(4) for its 455-acre portion of the project's tributary drainage area assuming that, when constructed, it captures and retains all non-stormwater and all stormwater runoff up to and including the volume equivalent to the 85th percentile, 24-hour event. To be deemed in compliance per Part VI.E.2.e.i.(4), the City of Carson must also implement all other requirements of the Enhanced Watershed Management Program, including, but not limited to, those requirements related to Parts VI.C.7 and VI.C.8 of the LA County MS4 Permit. Parts VI.C.7 and VI.C.8 ensure that Permittees verify through appropriate monitoring that final WQBELs and other TMDL-specific limitations are achieved through stormwater retention and implementation of all other requirements of the EWMP and that Permittees adapt their EWMP, as necessary. The same would hold true for the County in regards to its 319-acre portion of the project's tributary drainage area if it is similarly addressed by the Carriage Crest Park project.

IRMA MUÑOZ, CHAIR | SAMUEL UNGER, EXECUTIVE OFFICER

320 West 4th St., Suite 200, Los Angeles, CA 90013 | www.waterboards.ca.gov/losangeles

RECYCLED PAPER

[1] Health and Safety Code § 4730.68 (2015).

The Takeaways from Carriage Crest Park

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- Cross-jurisdictional collaboration leveraged funding/assets to develop an efficient project
- Strategic compliance planning is important
- In Wild West, credit is assessed on a case-by-case basis through adaptive management
  - Permit interpretation breeds competition and collaboration between jurisdictions
  - Defining targets/credit at watershed-scale based on long-term water quality is most meaningful, measurable, achievable
- Continuous monitoring and control can streamline crediting and boost performance

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Thank You for Your Time

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