The California Environmental Flows Framework (CEFF) for the Los Angeles River

Technical Working Group Meeting #3
April 10, 2025

Mountains Recreation & Conservation Authority

Stillwater Sciences

McMillen

TWG Meeting #3 Agenda

Part I: Introduction

Welcome

LA River CEFF Process and Schedule

Questions

Part II: Project Progress

TTWG Progress and Achievements

Flow Assessment

Questions

Part III: Breakout Groups

Lunch

Part IV: Looking Ahead

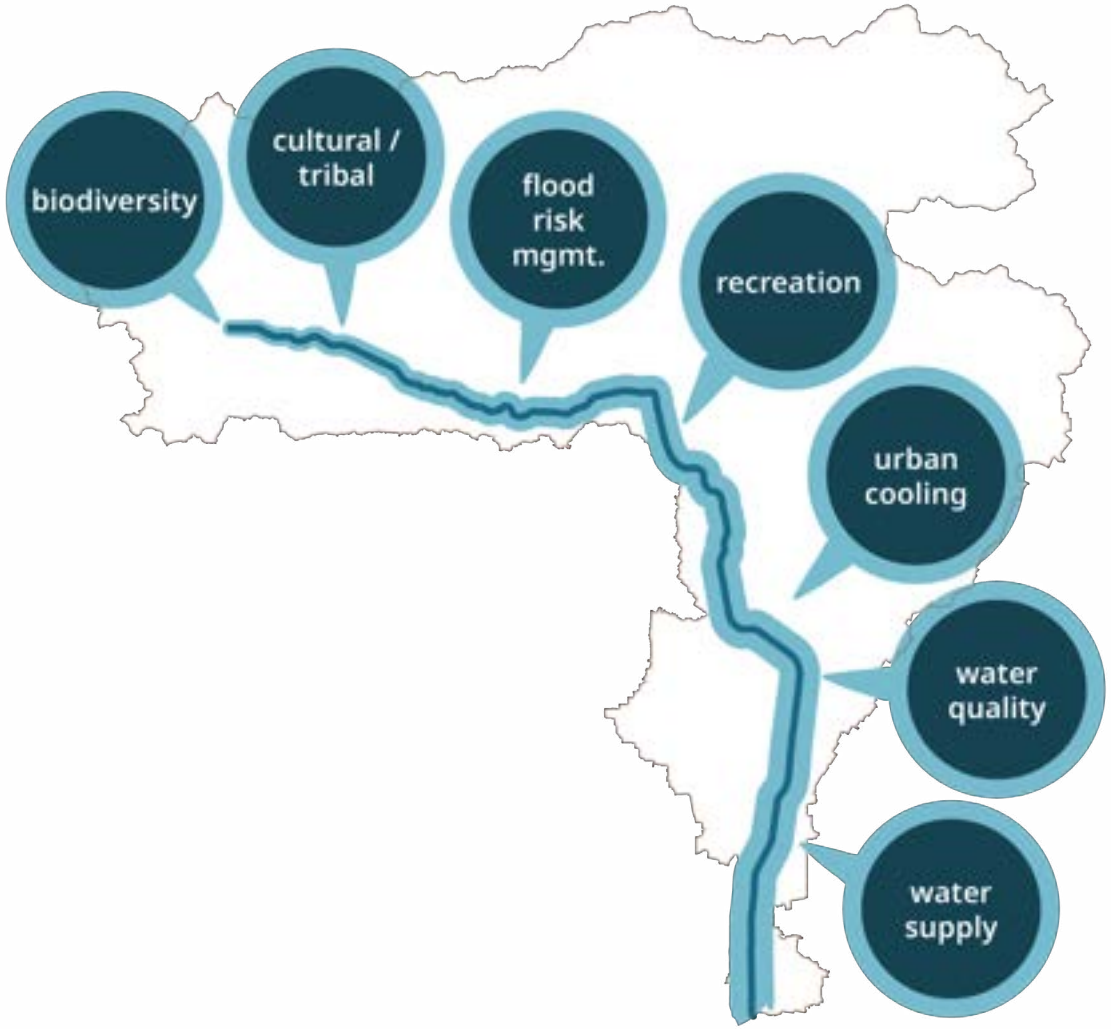
Structured Decision-Making Process

Next Steps

Group Discussion

Closing

CEFF Overview



CEFF Outcome

Flow recommendations that are aligned with management goals

Los Angeles Fires and Recovery

Mountains Recreation & Conservation Authority

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THE LA RIVER CALIFORNIA ENVIRONMENTAL FLOWS FRAMEWORK (CEFF)

A vision for coexistence

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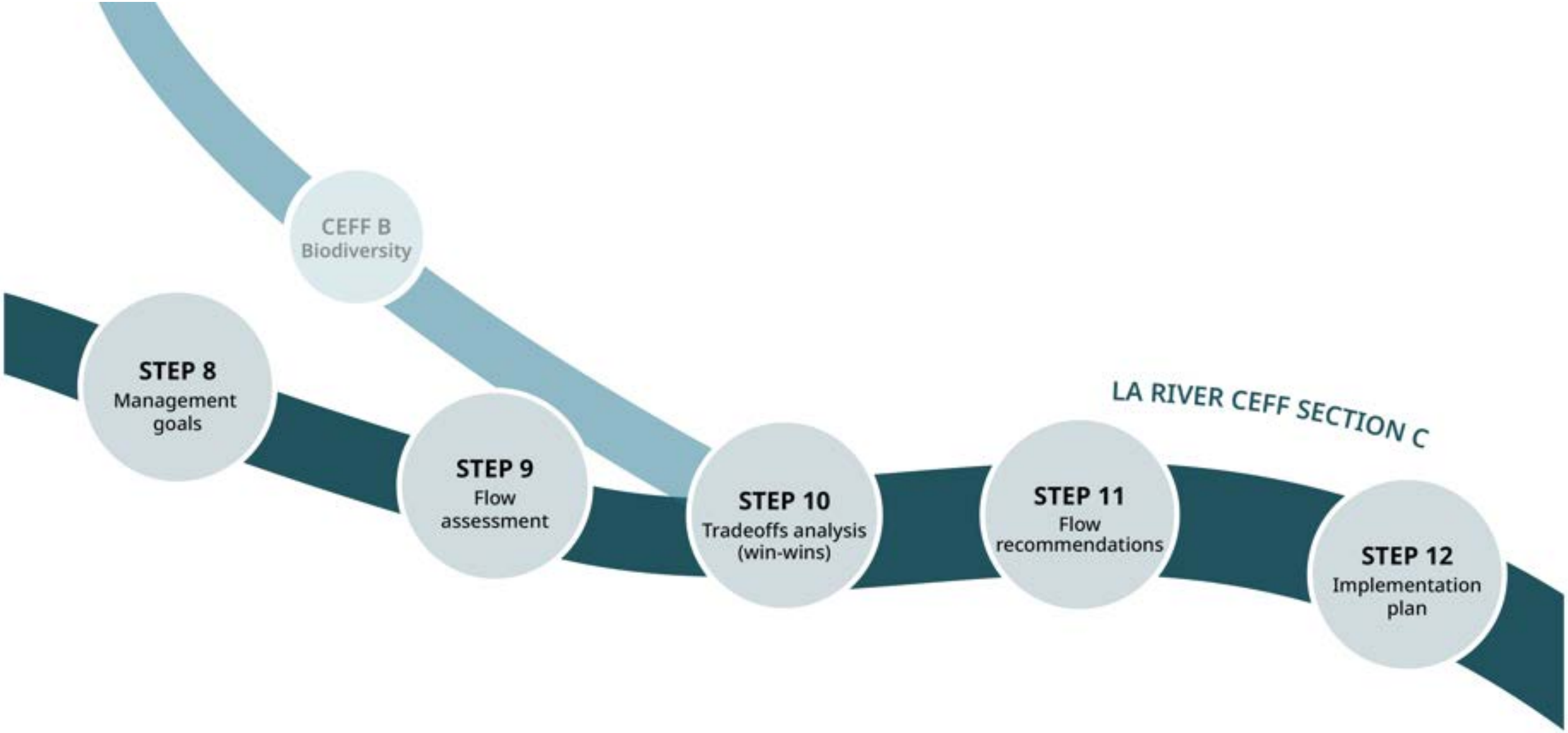
LA River CEFF Process: We are HERE



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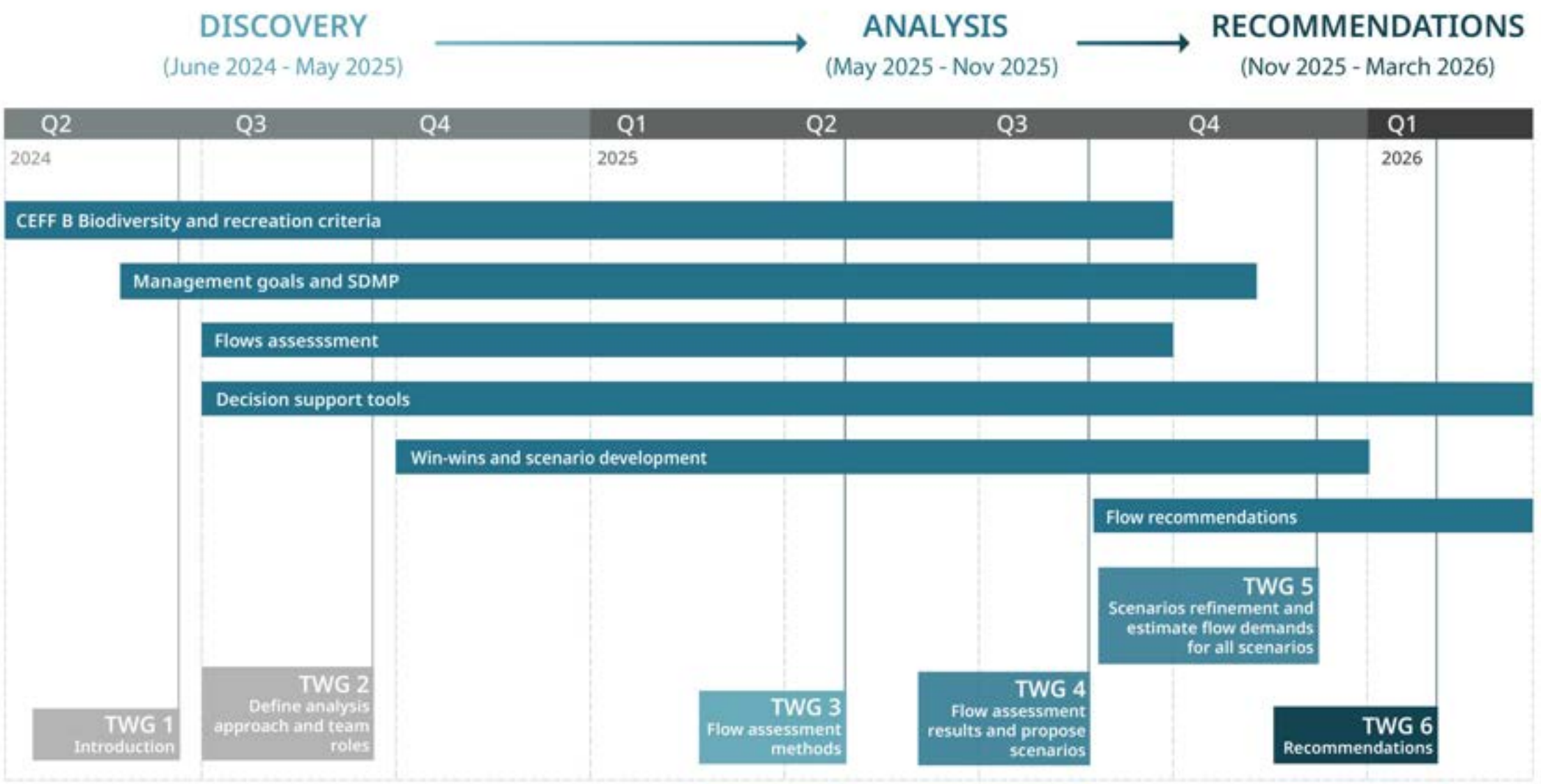
CEFF Project Schedule



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Questions

Photo credit: Nurit Katz

TTWG Progress and Achievements

Photo credit: Nurit Katz

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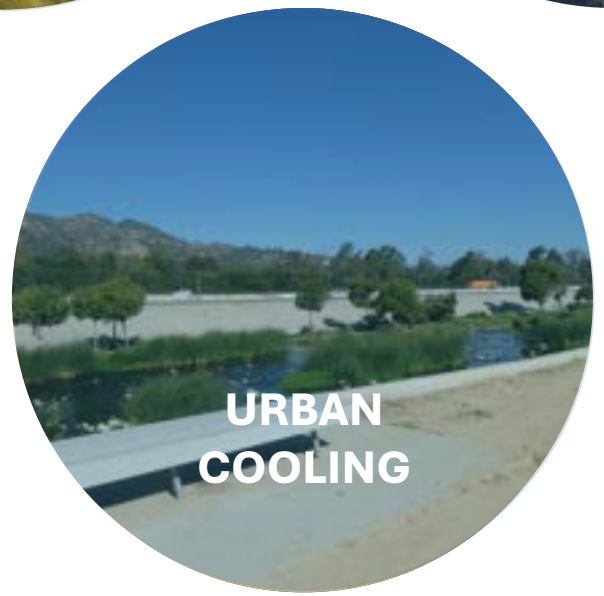
Seven Major Management Themes of the LA River



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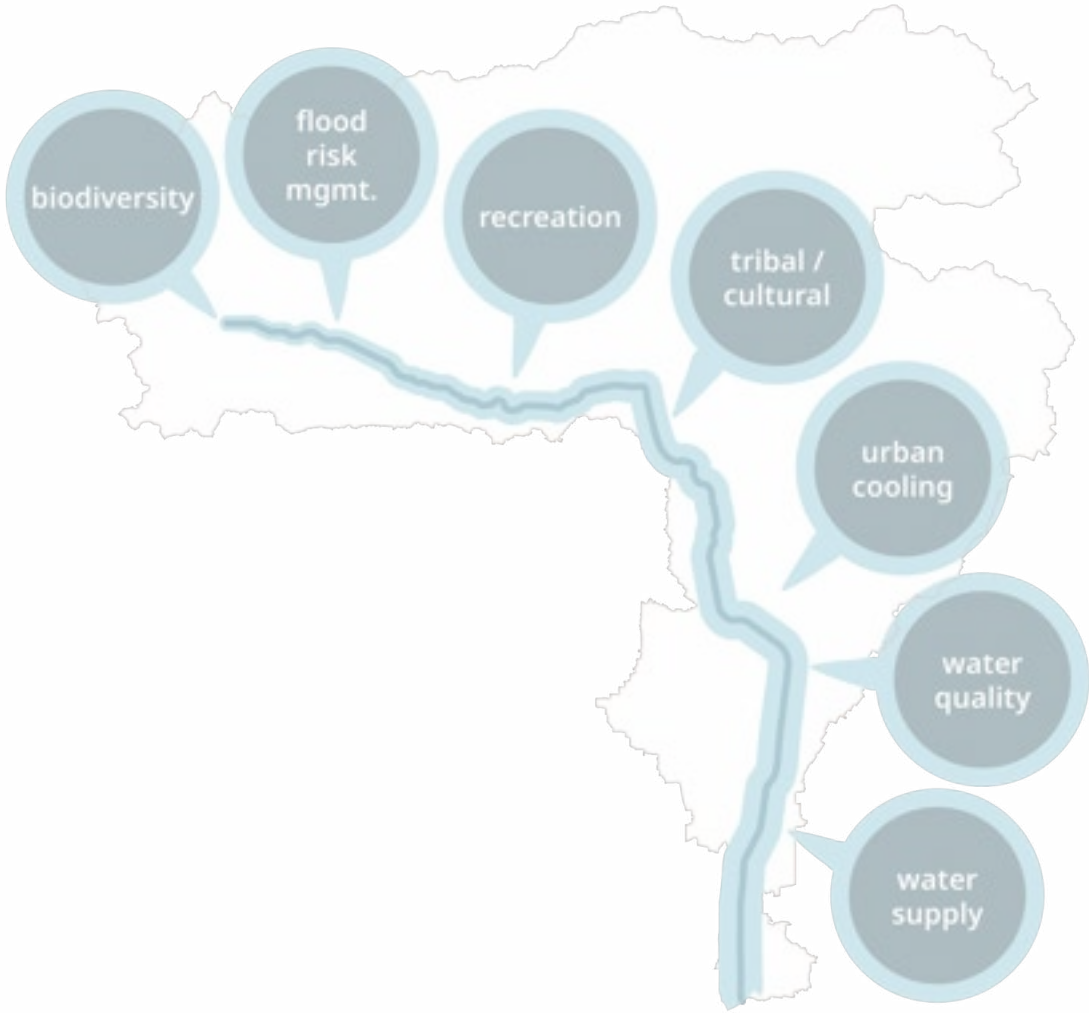
Thematic Technical Working Groups (TTWGs) Progress

TTWGs organized to collect information on **priorities and goals** to assess in the LA River CEFF analysis.

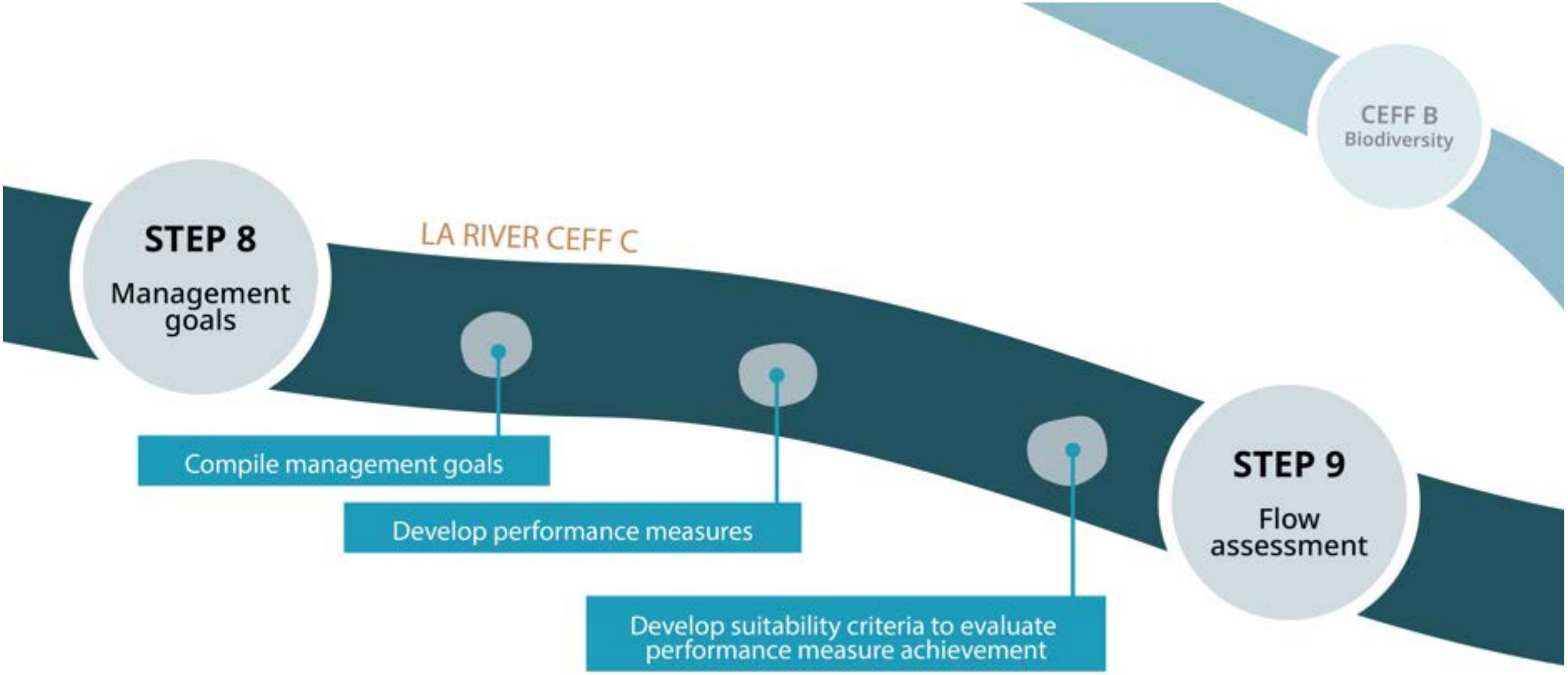
TTWGs have typically had:

- 6 to 7 group meetings
- multiple topic-focused smaller meetings

Each TTWG had similar methods for compiling information, but each TTWG adapted to theme needs.



LA RIVER CEFF PROCESS – Discovering Watershed Needs



TTWG Progress Overview

Term	Definition
Goal	What do **planning documents** (or theme experts in TTWG meetings) aim to achieve in the watershed?
Performance measure for goal	1. What do goals need to achieve? 2. When do they need to achieve it? 3. Where do they need to achieve it?
Parameters linking flow and performance measure	What physical, water quality, biological, or social parameters: 1. influence performance measure achievement? 2. are influenced by flow in the river?
Suitability criteria for performance measures	What values do the parameters need to be to achieve performance measures that are influenced by flow in the river?

TTWG Progress Example

Term	Recreation TTWG			
Goal	Conserve and enhance water non-contact (REC-2) recreation within and along the LA River.			
Performance measure for goal	Kayaking is possible 100 percent of the time during May through September (as quantified by number of days per month) in the LA River LOIs 0, 1.85, 24.02, 30.31 and 37.51.			
Parameters linking flow and performance measure	Water depth, water velocity, wetted channel width, unwetted channel width, water quality objectives (multiple), riparian vegetation density, ecosystem diversity, species diversity, time of day, and more			
Suitability criteria for performance measures	**Parameter**	**Suitability Criteria**	**Suitability Index**	**Source**
	Water depth	≤ 0.4 ft	0	Mosley 1983; USEPA 2010
		0.5 ft	0.5	USEPA 2010
		0.7 ft	0.8	Mosley 1983
		0.9 ft	0.9	USEPA 2010; SCCWRP 2021
		≥1.5 ft	1	Mosley 1983; USEPA 2010; SCCWRP 2021

Biodiversity TTWG Progress

Photo credit: Grove Pashley and LA River Kayak Safari

Identified **35 biodiversity goals** to assess.

Goals often overlap, with different biodiversity priorities:

Connectivity	Habitat Preservation	Species Biodiversity
Riparian Floodplain Ecosystem functions	Riparian Freshwater marsh Vernal pool	Individual species Habitat types Ecosystem functions

Identified **43 biodiversity performance measures**: *(ongoing)*

- Many performance measures since the Biodiversity TTWG members want to assess a range of biodiversity elements and priorities.
- Some focused on "ecosystem function"
- Mostly species-specific

Actively developing suitability criteria for performance measures in small groups *(ongoing)*

Biodiversity TTWG Progress

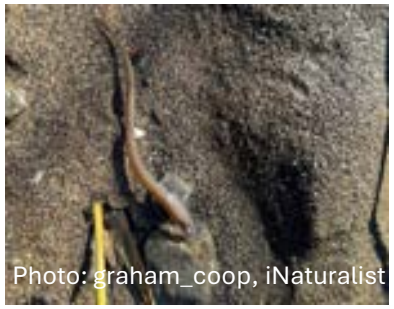
Biodiversity performance measures are being developed for each species that was specifically mentioned in LA River biodiversity goals:

Steelhead
11 performance measures

SW pond turtle
7 performance measures

Least Bell's vireo
8 performance measures

Santa Ana sucker
5 performance measures



Pacific lamprey
3 performance measures

However, LA River flow influences biodiversity in more ways than represented by just these species.

Biodiversity TTWG and Stillwater developed method to select **focal species** that best characterize influence of flow:

- Built on past aquatic-dependent focal species selection methods
- Designed to characterize range of species supported by flows
- Considered 6 taxonomic groups, 5 to 9 species per group

LA River CEFF Focal Species

INVERTEBRATES

Western tiger swallowtail
James M. Maley, iNaturalist

Common green darner
Jesse Rorabaugh, iNaturalist

California floater
Ken-ichi Ueda, iNaturalist

REPTILES

FISH

Southern California Steelhead
NOAA Fisheries

Santa Ana sucker
Manna Warburton

Arroyo chub
Zack Abbey, iNaturalist

BIRDS

AMPHIBIANS

Baja California tree frog
Diego Blanco, iNaturalist

Arroyo toad
Tom Mills, iNaturalist

MAMMALS

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LA River CEFF Focal Species

INVERTEBRATES | **REPTILES** | FISH | **BIRDS** | AMPHIBIANS | **MAMMALS**

Southwestern pond turtle
Nurit Katz

Least Bell's vireo
trevor1, iNaturalist

Belted kingfisher
Pat Farris, iNaturalist

Black-necked stilt
Daniel S. Katz, iNaturalist

Osprey
Grove Pashley, LA River Kayak Safari

Mountain lion
Cougar Conservancy, iNaturalist

Bobcat
nmoorhatch, iNaturalist

Yuma myotis
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Water Quality TTWG Progress

Goals

108 water quality management goals

Umbrella Goal

BASIN PLAN: *[WQ-5] Designate beneficial uses,* ***establish water quality objectives*** *to protect those uses, and* ***identify (and implement) programs of implementation to meet objectives.***

Performance Measures

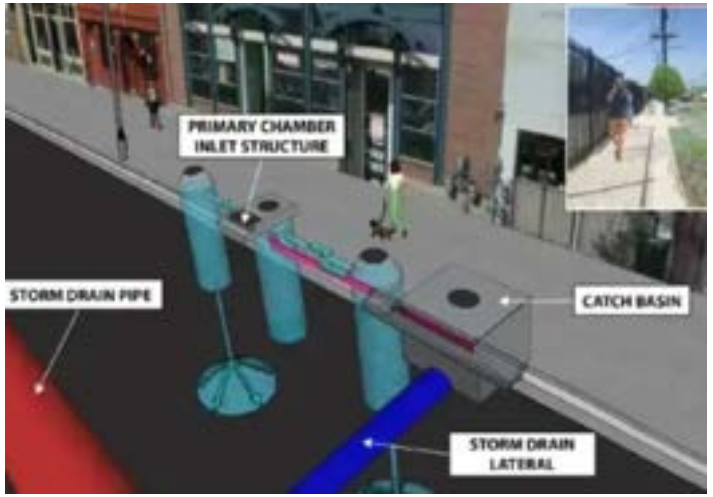
MS4 NPDES effluent limits and receiving water limitations

Wastewater NPDES effluent limits (focus on water temperature)

Management Actions

Programs or projects addressing effluent limits
e.g., Enhanced Watershed Management Plans
Safe Clean Water Program
Bowtie Parcel Project
more

Water Quality TTWG Progress



Source: LA Stormwater Partners
https://www.lastormh2o.org/

Management Actions inventoried to document potential pathways to achieving effluent limits by addressing:

- Wet weather flows
- Dry weather flows
- Temperature management strategies at Water Reclamation Plants
- Non-stormwater discharges
- In stream, flow-dependent strategies *(Temperature and bacteria)*

Management actions have different levels of completion

- Implemented
- Designed
- Planned
- Conceptual

Planned or conceptual management actions are adjustable watershed "levers" that provide opportunities to "tune" watershed to better achieve goals.

Flood Risk Management (FRM) TTWG Progress

Flood Risk Management TTWG compiled and reviewed **71 goals.**

FRM has many goals because flood risk comes up in many local, regional, state, and federal plans.

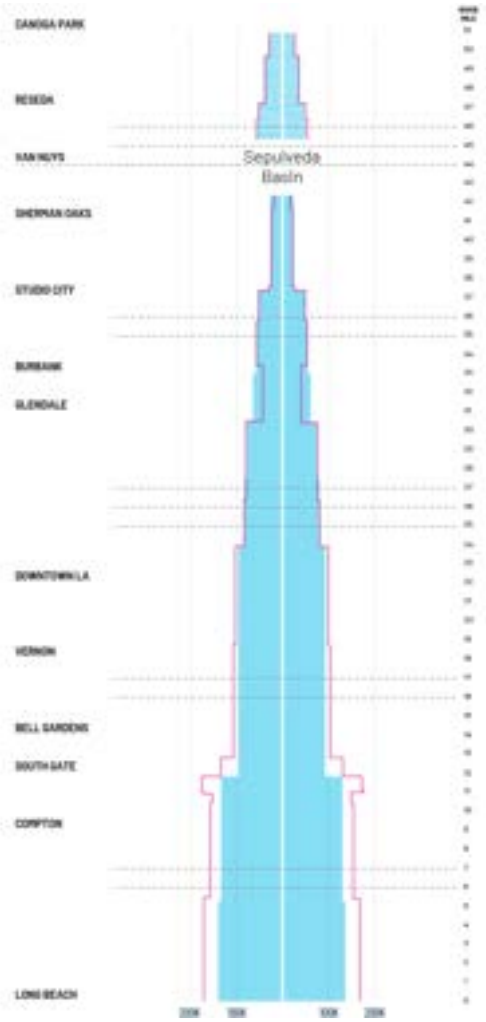
Seven draft performance measures developed to characterize FRM goals in LA River CEFF analysis.

Performance measures primarily focused on accommodating range of flow events.

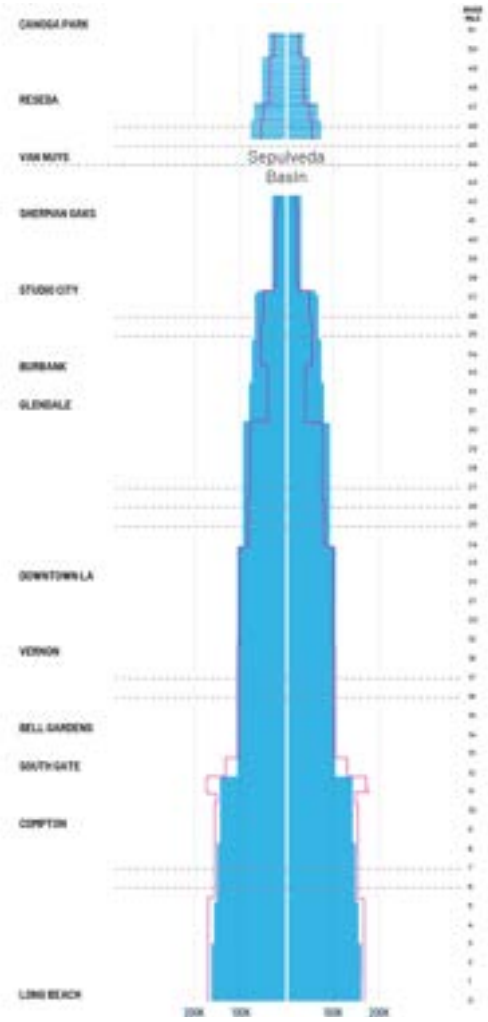
Suitability criteria for FRM center around maintaining water depth below the required freeboard in river for different flood events.

Flood Risk Management (FRM) TTWG Progress

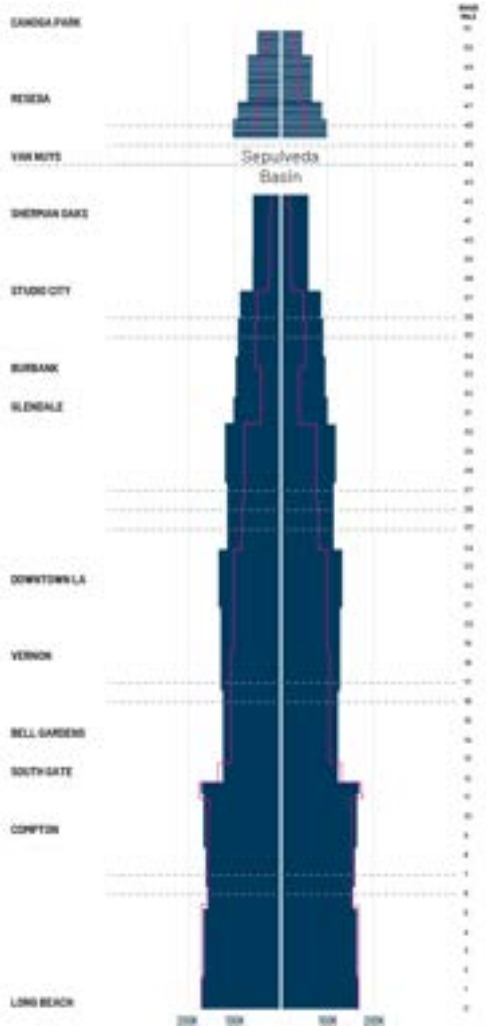
2% annual chance flood event



1% annual chance flood event



0.2% annual chance flood event



Design Discharge/Capacity

Source: LA County LA River Masterplan (2022)

Flood risk under different range of flow events has been quantified along river.

Management actions to accommodate range of flow events primarily focus on:

- Changing magnitude of flow
- Changing timing of flow
- Changing channel capacity

Tribal / Cultural TTWG Progress

LA River CEFF presents a unique opportunity to listen to tribal leaders and to ensure flow recommendations for the LA River include tribal priorities.

California Water Boards developing tribal beneficial uses:

- Tribal Tradition and Culture (CUL)
- Tribal Subsistence Fishing (T-SUB)
- Subsistence Fishing (SUB)

Los Angeles Regional Water Board adopted tribal beneficial uses into Region's Basin Plan in 2022/2023.

Photo credit: LA River Arts

Tribal / Cultural TTWG Progress

Sa-angna Village of Guashna in Ballona Wetlands painted by Mary Leighton Thomson (1923 – 2004) https://westwoodgreenway.org/tongva/

Tribal Tradition and Culture (CUL):

"Uses of water that support the cultural, spiritual, ceremonial, or traditional rights or lifeways[2] of California Native American Tribes, including, but not limited to: navigation, ceremonies, or fishing, gathering, or consumption of natural aquatic resources, including fish, shellfish, vegetation, and materials."

[2] *Any customs, practices or art of a California Native American Tribe*

The LA River CEFF aims to have tribal/cultural goals for each use of water listed in CUL beneficial use definition:

- Navigation
- Ceremonies
- Fishing
- Gathering
- Consumption of natural aquatic resources

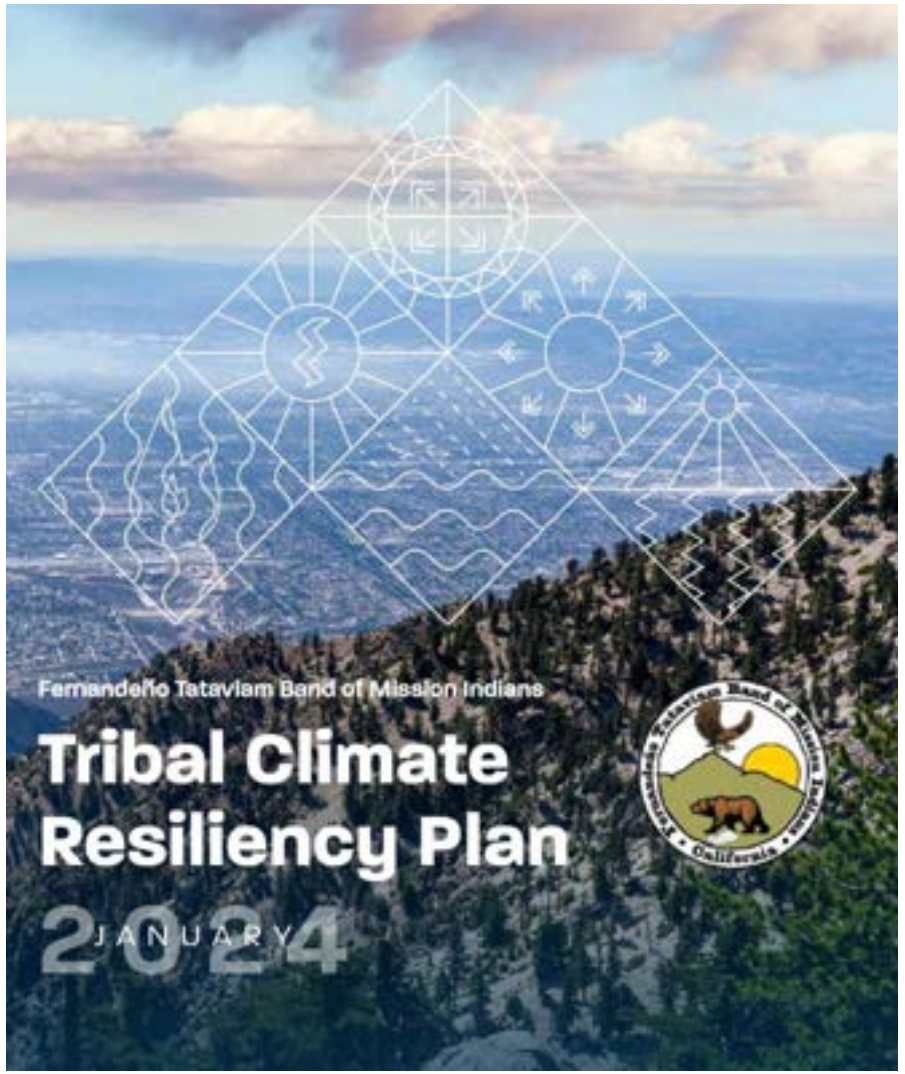
Tribal / Cultural TTWG Progress

Available plans and documents reviewed for tribal / cultural goals potentially supported by LA River flow.

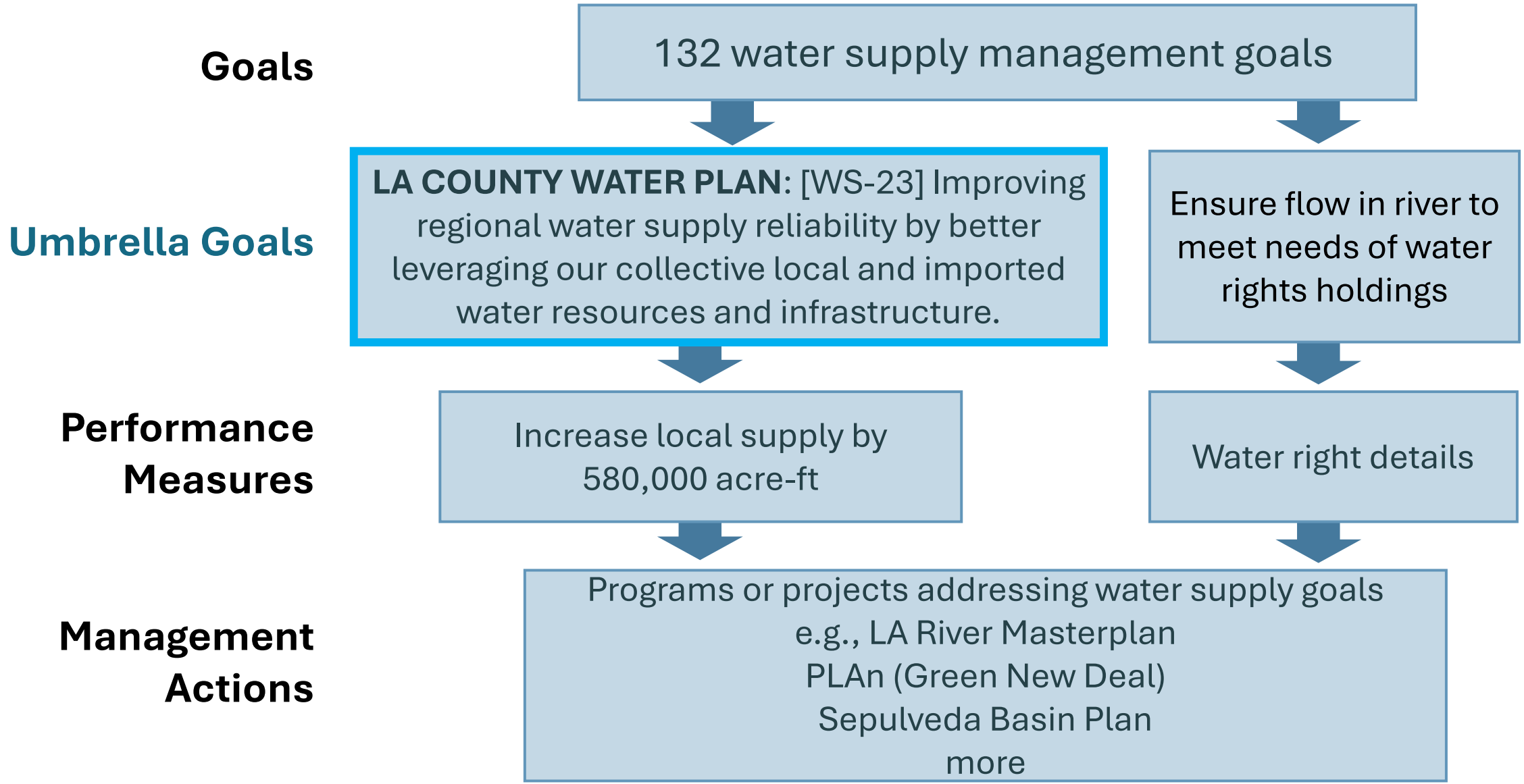
Tribal / cultural goals likely link to other theme goals:

- Fishing, gathering, and consumption of natural aquatic resources link to biodiversity.
- Navigation and fishing link to recreation.

The Tribal / Cultural TTWG has initiated coordination with regional tribal representatives to better understand LA River tribal / cultural goals and how to best incorporate into the LA River CEFF.



Water Supply TTWG Progress



Water Supply TTWG Progress

Inventoried **26 management actions** that improve water supply and potentially alter LA River flows.

Minimum discharge limits from Water Reclamation Plants
(Incorporates recycled water and water use efficiency)

Centralized spreading grounds *(7 basins)*

Diversions from waterways

Decentralized stormwater infiltration/diversion
(links to Water Quality TTWG)

Source: LAC DPW

Source: LA SAN

Management action inventory helps determine:

- Magnitude of planned LA River flow changes
- Extent management actions are complete/designed
- Extent management actions are flexible "levers" that can be utilized to better achieve goals.

Discussed more in upcoming flow assessment section.

Urban Cooling TTWG Progress

Identified **24 goals** to assess in the LA River CEFF analysis.

Developed **12 performance measures**:

- Decrease temperature in channel
- Improve function as thermal refuge for surrounding neighborhoods
- Reducing the regional urban heat island effect

Developing suitability criteria for performance measures:

- Canopy cover: Maximum best
- Percent vegetated: Maximum best
- Topographic shade: Maximum best
- Wetted channel width: Variable curve

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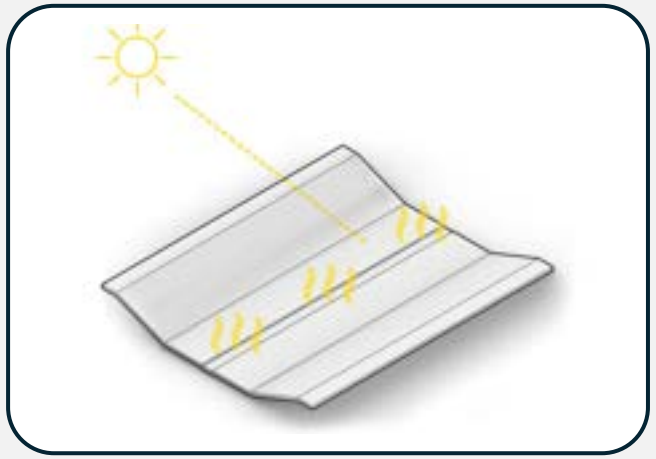
Urban Cooling TTWG Progress

Management action inventoried for urban cooling:

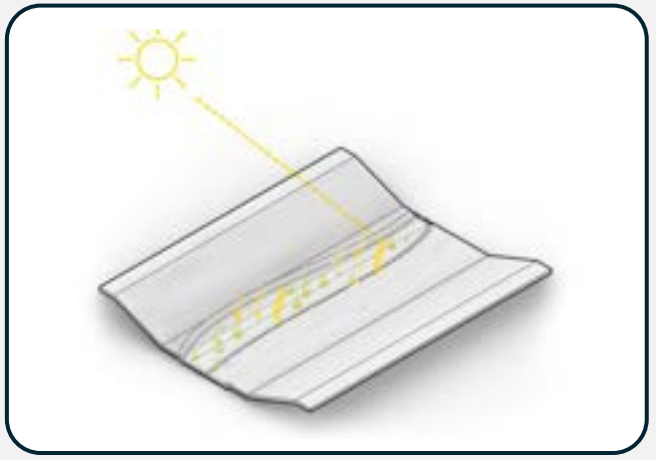
- Increase shade within and adjacent to the channel
- Increase surface water-subsurface exchange
- Reduce water temperature of LA River inflows
- Increase local cooling benefits from evaporation

MINIMUM SHADE



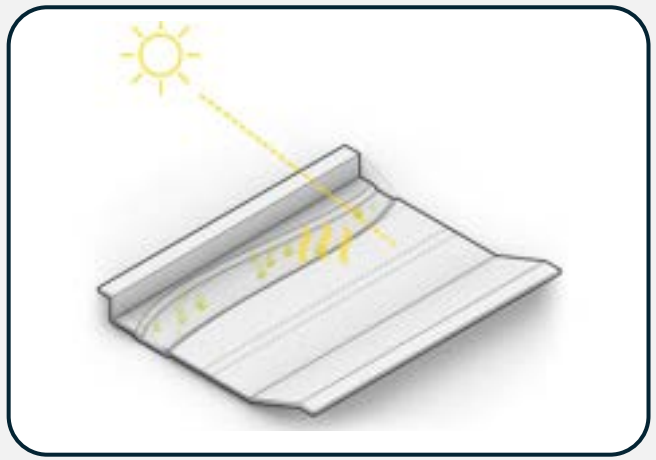
Low flow channel in the center

MORE SHADE



Low flow channel toward wall, some vegetation added

MOST SHADE



Vertical wall, low flow channel toward wall, lots of vegetation added

Source: Downtown LA River Fish Passage Project concrete channel re-design concepts

Recreation TTWG Progress

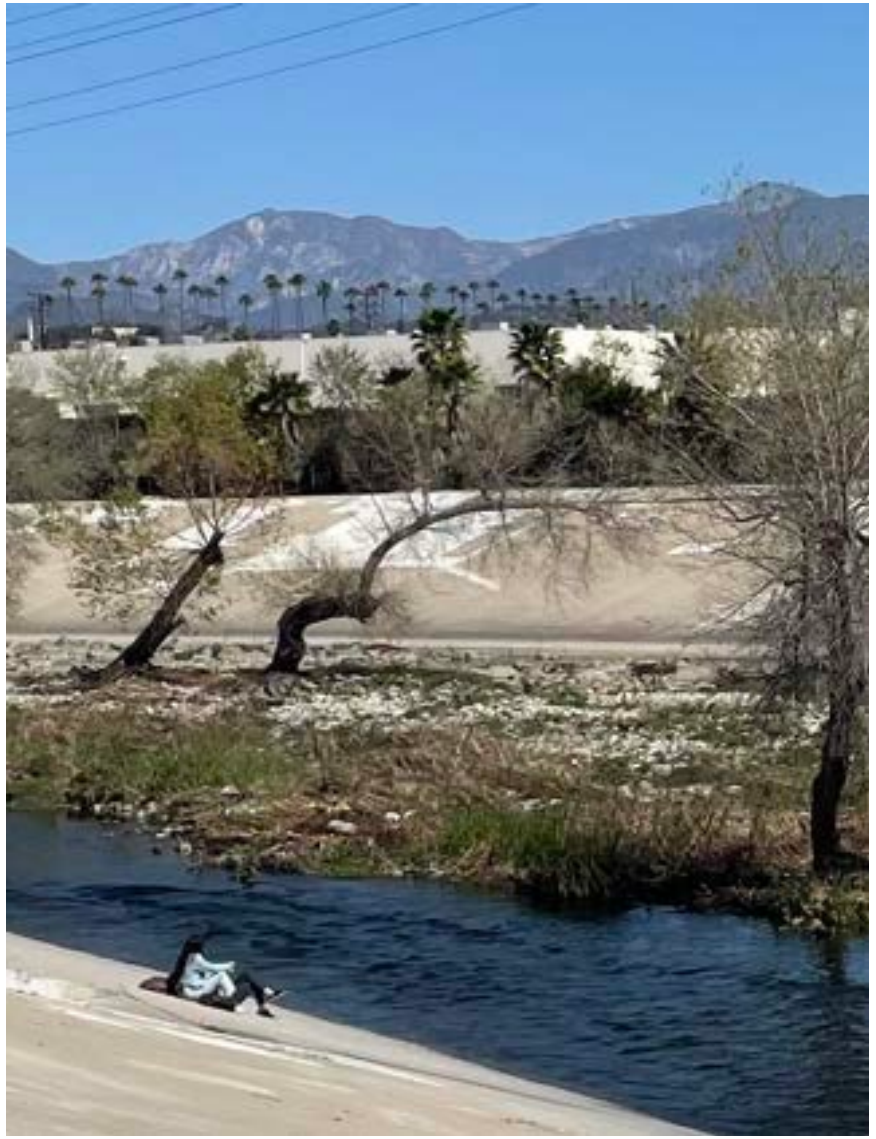
Identified **24 recreation goals** to assess in the LA River CEFF analysis.

Developed **24 recreation performance measures,** with most relating to more than one goal.

Recreation performance measures focused on assessing influence of flow on:

- Potential for specific recreational activities
- Where and when recreation is available
- Quality of recreational conditions

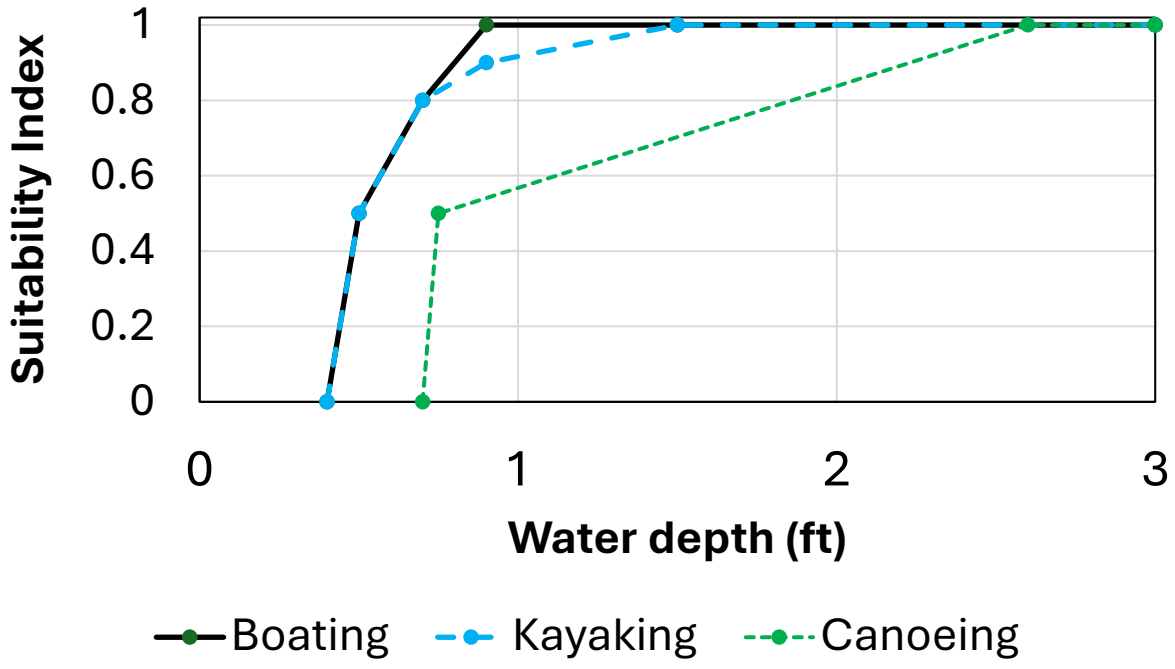
Actively developing suitability criteria for performance measures in small groups. *(ongoing)*

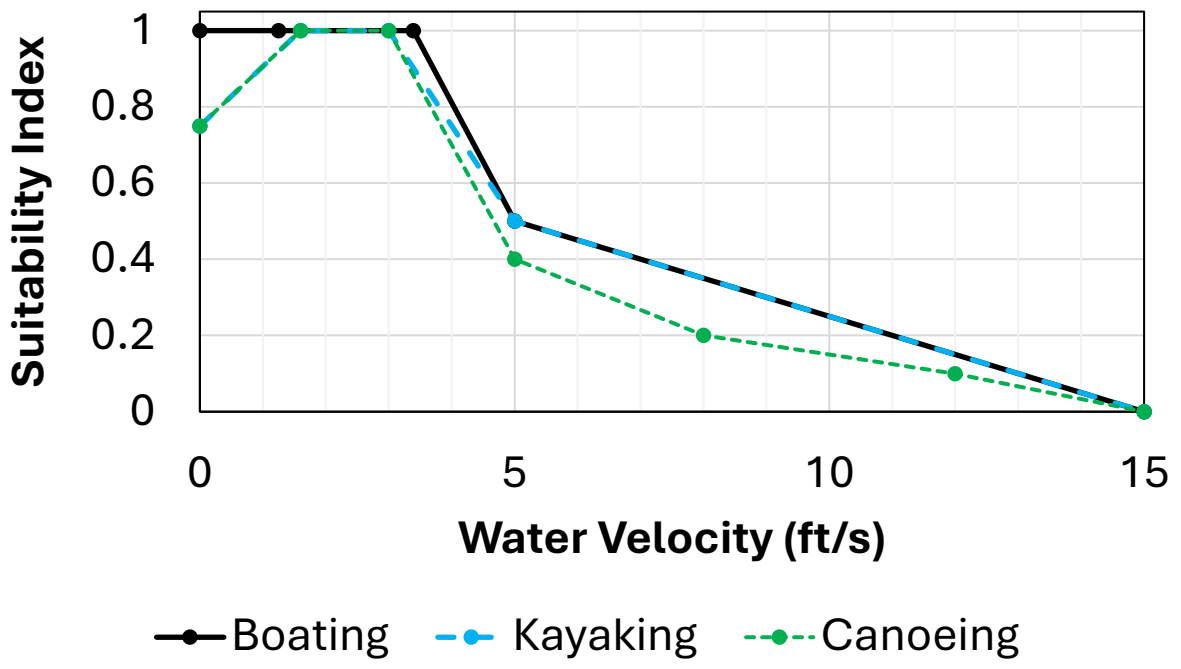


Recreation TTWG Progress

Suitability criteria highlight similarities and differences in what recreational uses need.

Suitability criteria can be combined with available data, hydrology model results, and hydraulic model results to estimate frequency flows are suitable for recreational uses.





Theme Linkages and Integration

Compilation of goals along with development of performance measures and suitability criteria enable LA River CEFF analysis to identify linkages between themes and goals.

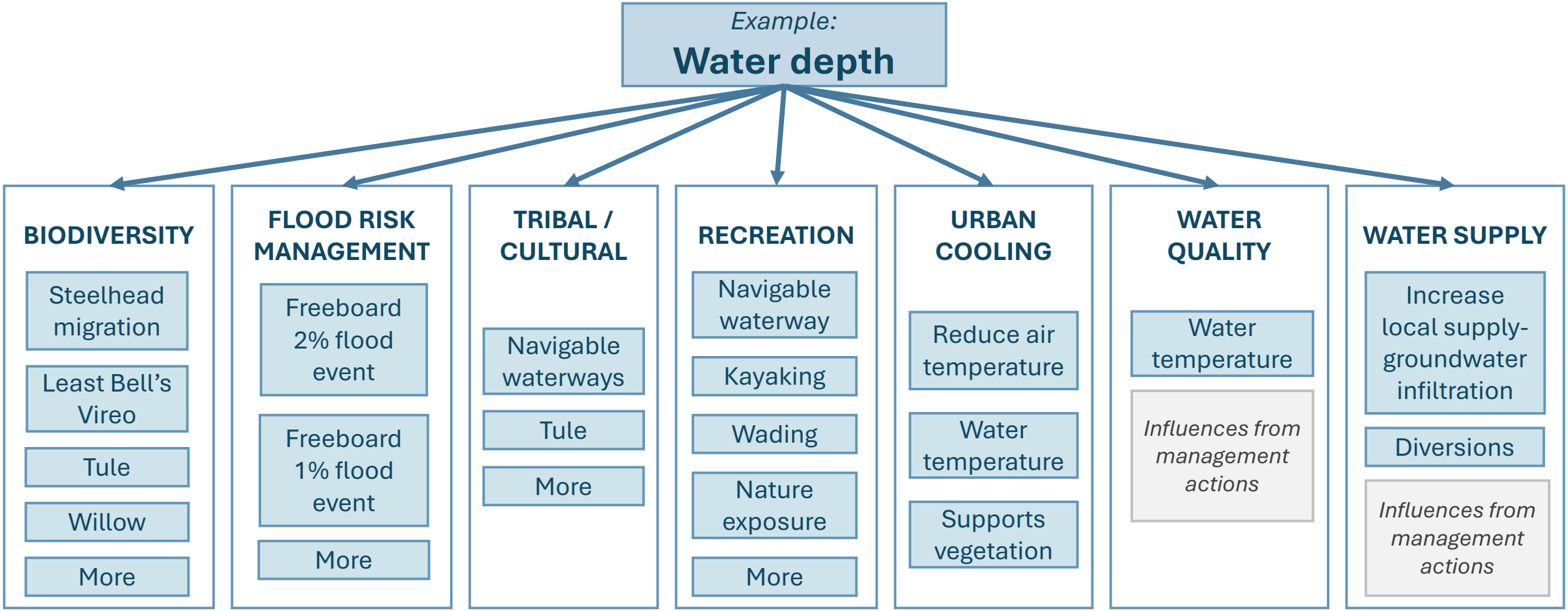
Performance measures highlight when and where certain conditions are needed to meet goals:

- Steelhead migration - Oct/Dec to May/June
- Kayaking/canoeing - May to Sept *(daylight)*
- Urban cooling - April to Oct *(variable)*

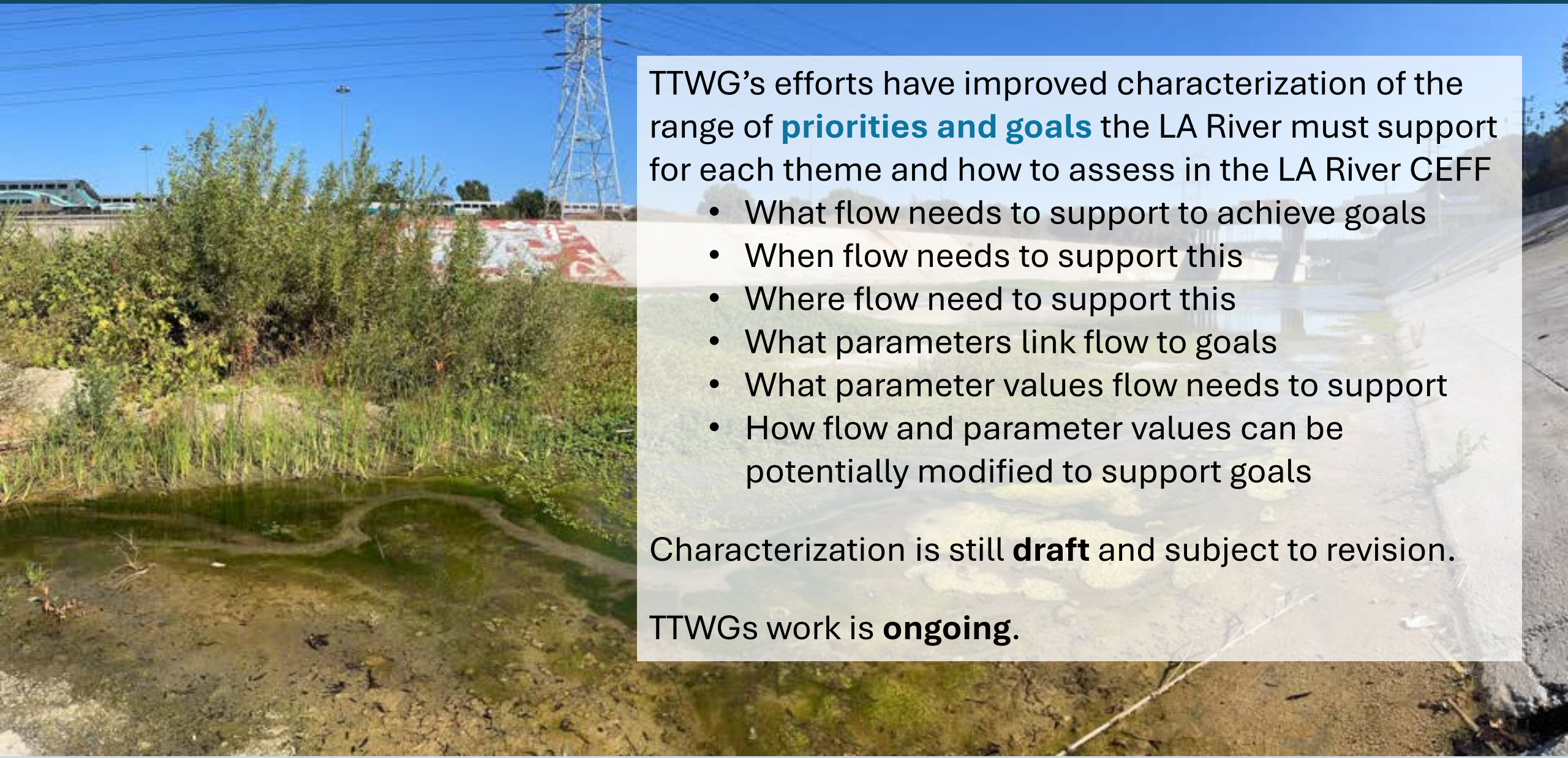
Suitability criteria identify potential commonalities and tensions between themes.

Theme Linkages and Integration

Water depth in the LA River is **linked to** many performance measures and suitability criteria and is **influenced by** multiple management actions:



TTWG Progress Overview



TTWG's efforts have improved characterization of the range of **priorities and goals** the LA River must support for each theme and how to assess in the LA River CEFF

- What flow needs to support to achieve goals
- When flow needs to support this
- Where flow need to support this
- What parameters link flow to goals
- What parameter values flow needs to support
- How flow and parameter values can be potentially modified to support goals

Characterization is still **draft** and subject to revision.

TTWGs work is **ongoing**.

Questions

Photo credit: Ian Shive

Flow Assessment

Photo credit: Stillwater Sciences

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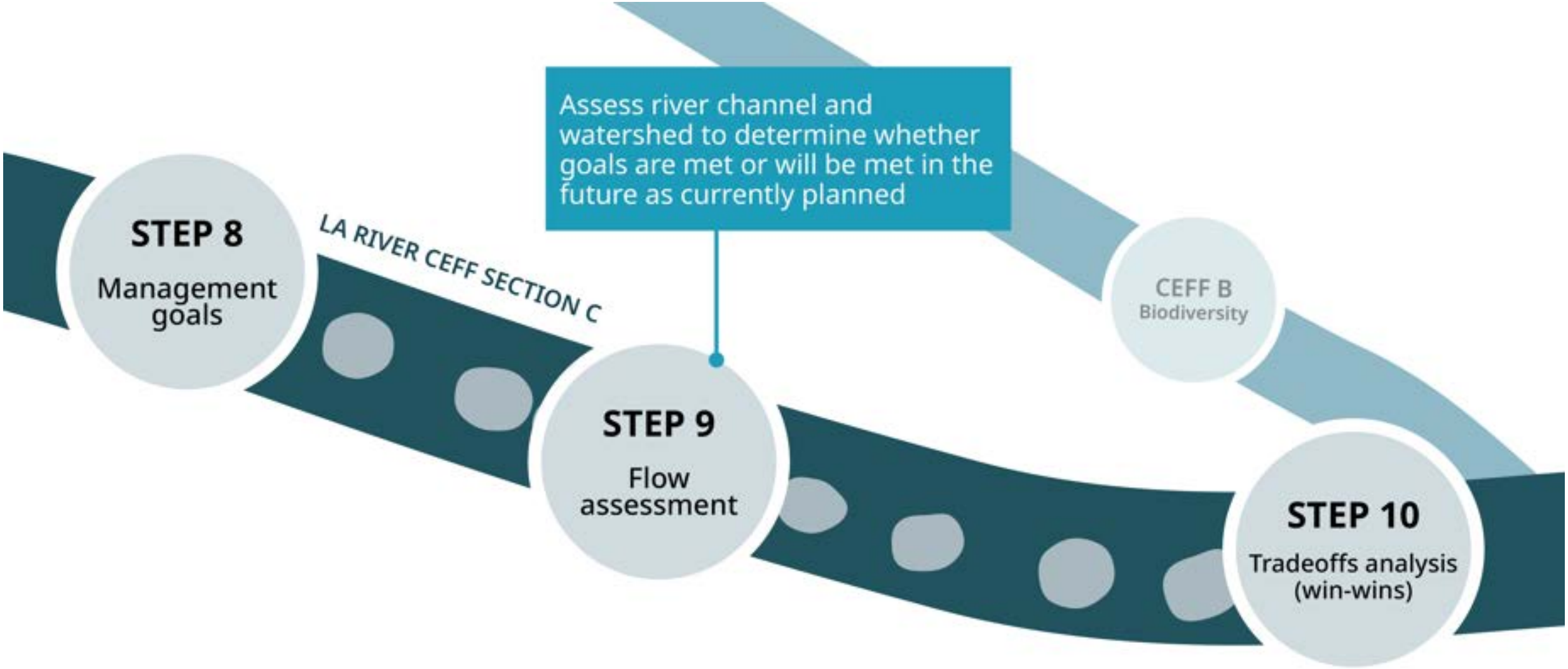
LA RIVER CEFF PROCESS – Understanding Watershed Conditions



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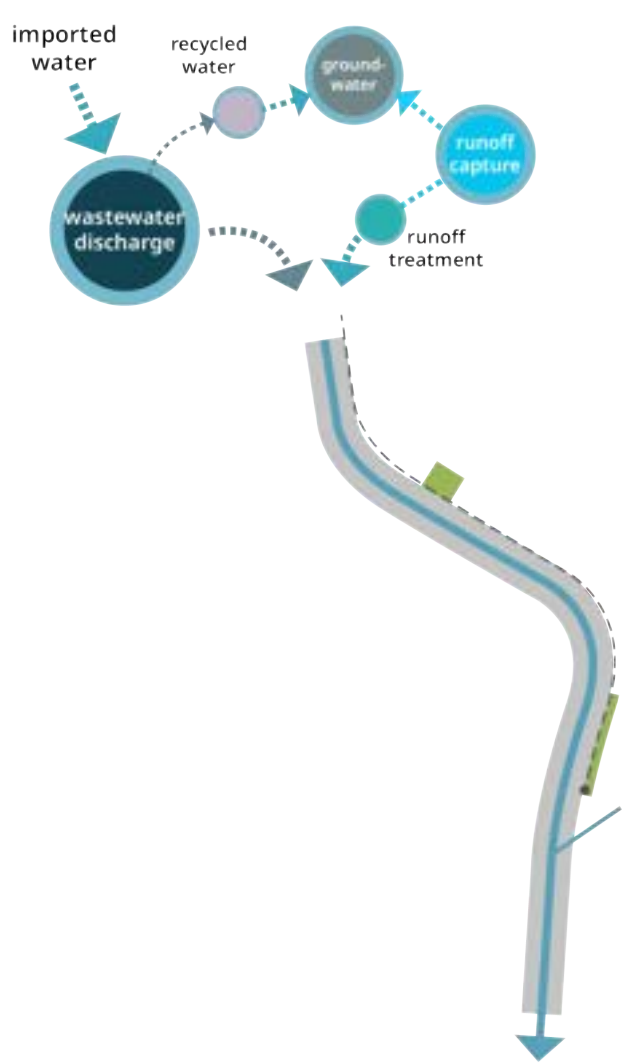
Flow Assessment Methods Overview (Part 1)

Type 2 Flow Nexus
Changes flow in the channel

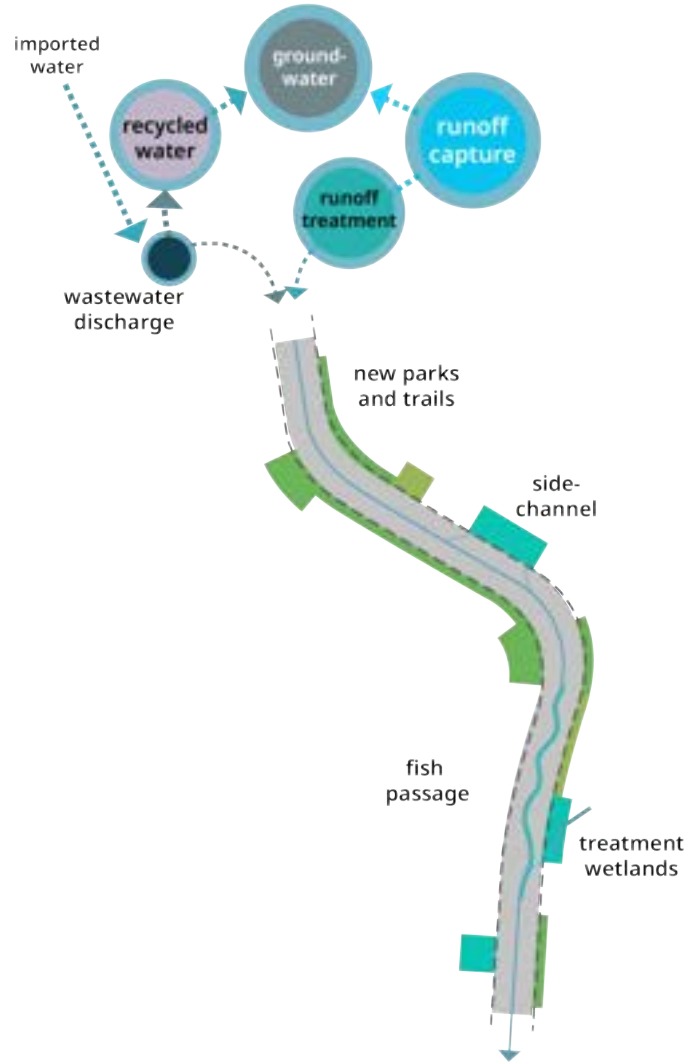
Type 1 Flow Nexus
Changes conditions within and adjacent to the channel

OUTPUT
Hydrology & hydraulic conditions

Existing Conditions



Potential Future Conditions



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Refresher: Functional Flow Metrics

Functional flows are the five seasonal flows that support ecology and biodiversity along a river.

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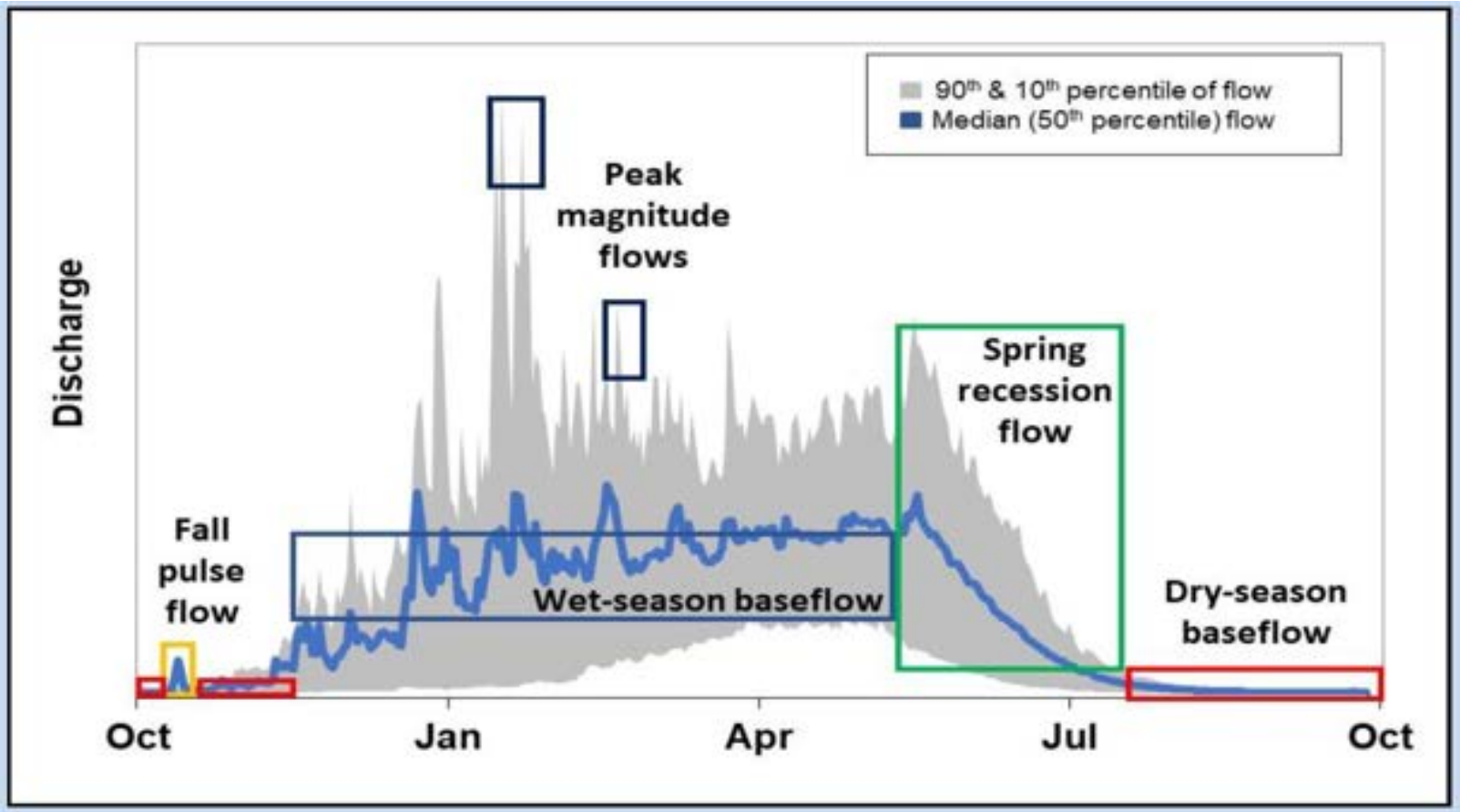
Refresher: Functional Flow Metrics – Reading a Hydrograph



Source: CEFF Technical Report, Figure 1.3 (California Environmental Flows Working Group 2021)

Source: LA River CEFF Section A, Figure 3-1 (Stillwater Sciences 2023)

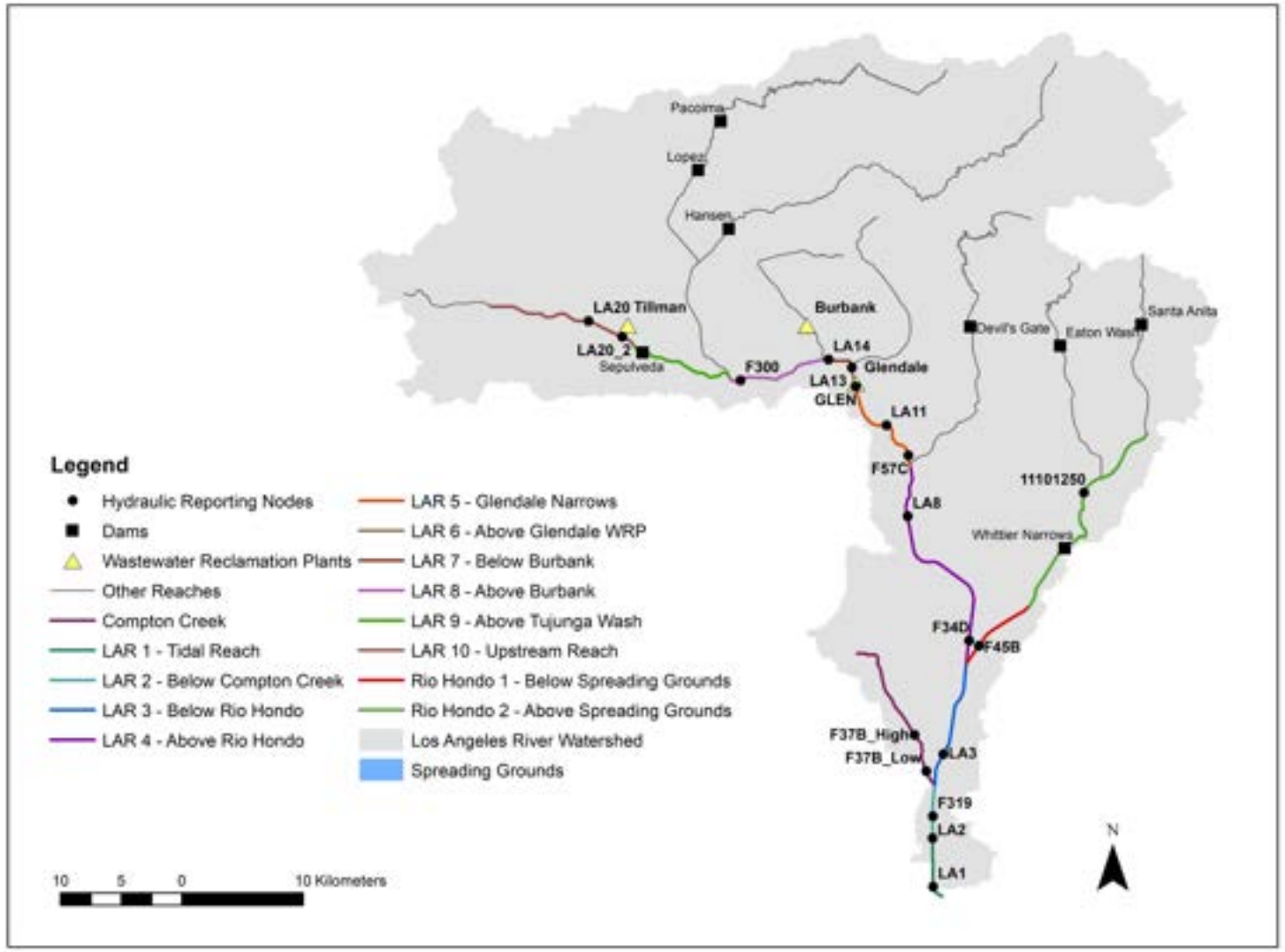
LA River Models: Analysis at flexible time scale

Available Models

- LA River Storm Water Management Model (SWMM)
- LA River HEC-RAS model

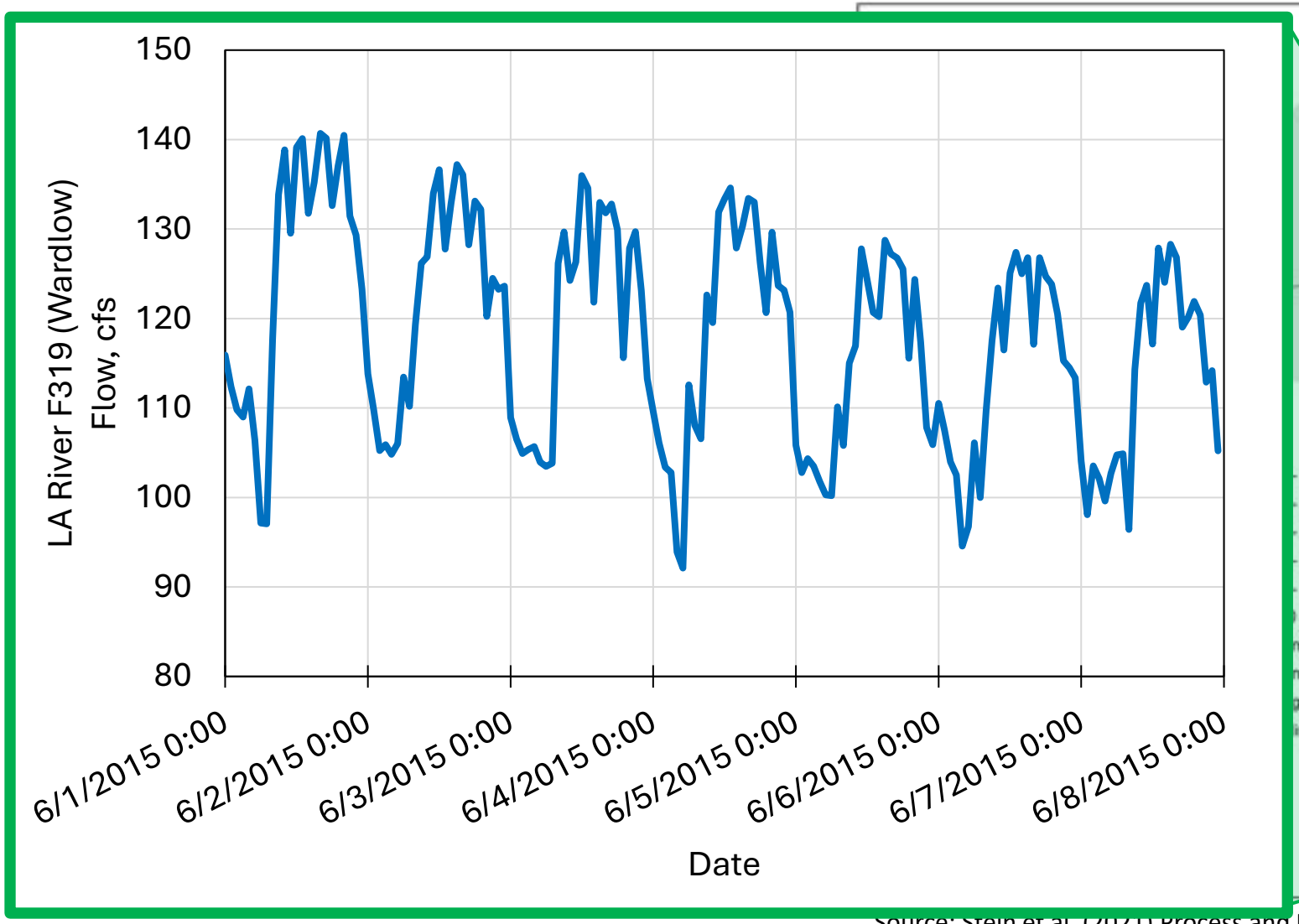
Anticipated Models

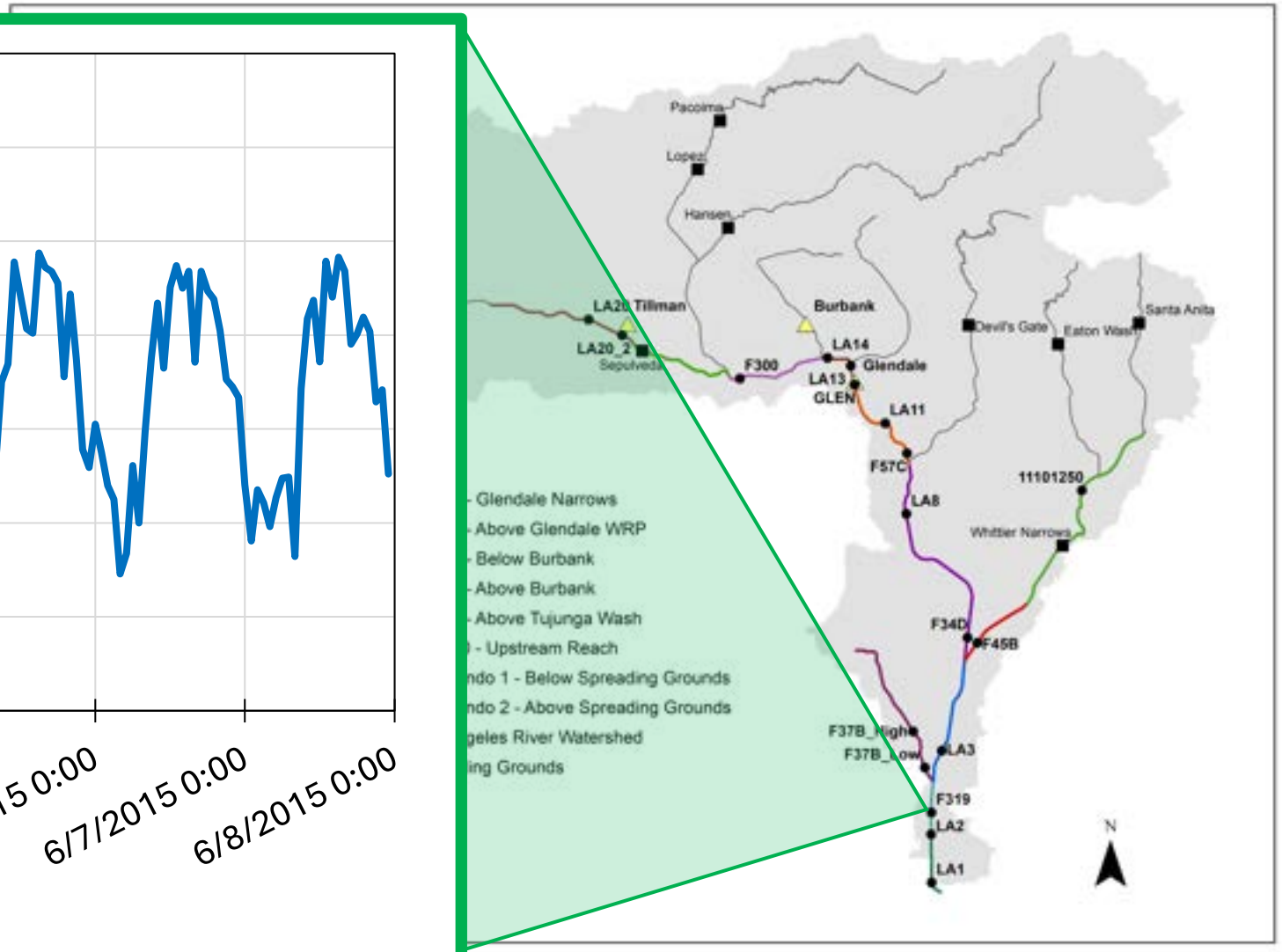
- LA River water temperature model



Source: Stein et al. (2021) Process and Decision Support Tools for Evaluating Flow Management Targets to Support Aquatic Life and Recreational Beneficial Uses of the Los Angeles River.

LA River Models: Analysis at flexible time scale





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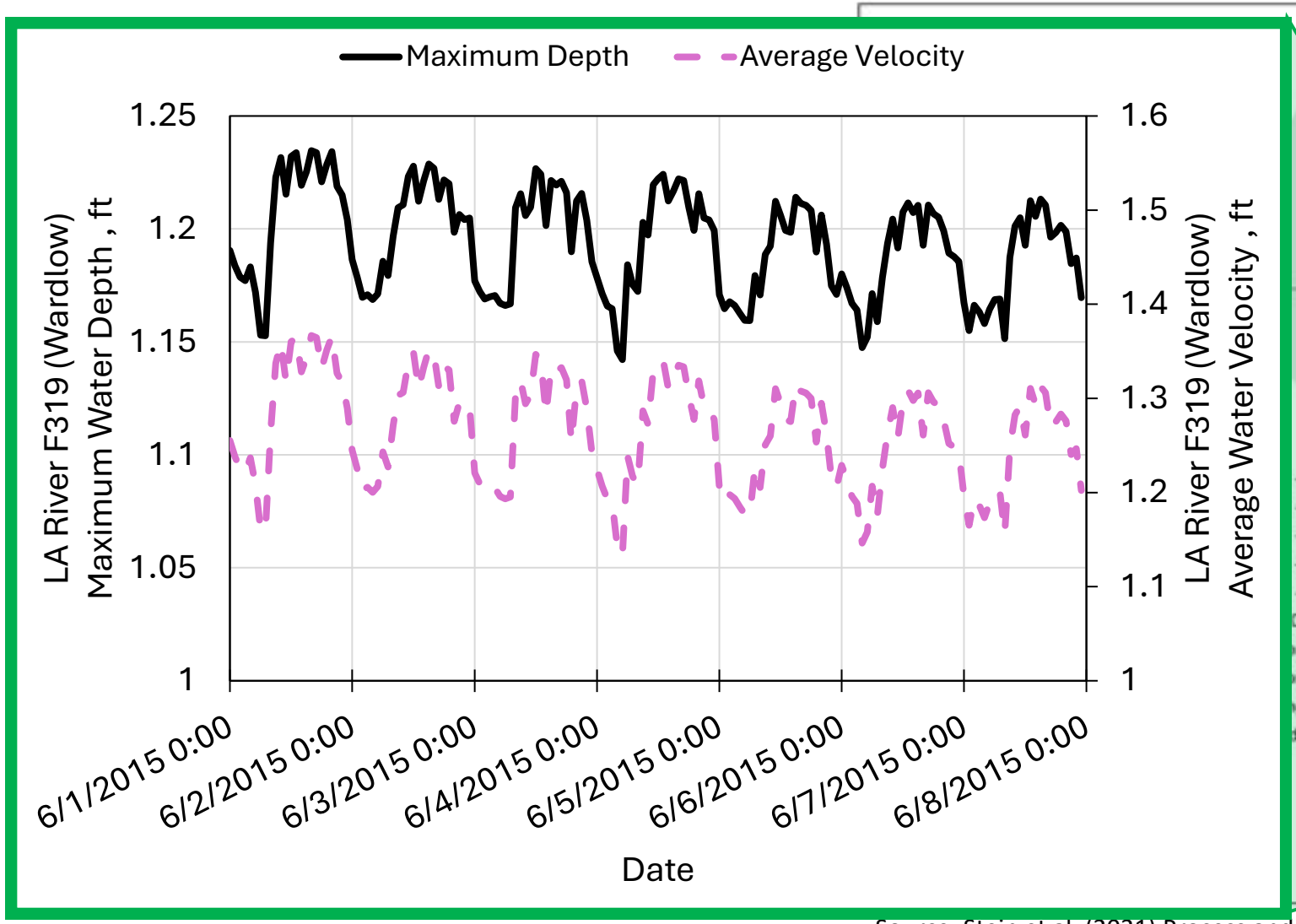
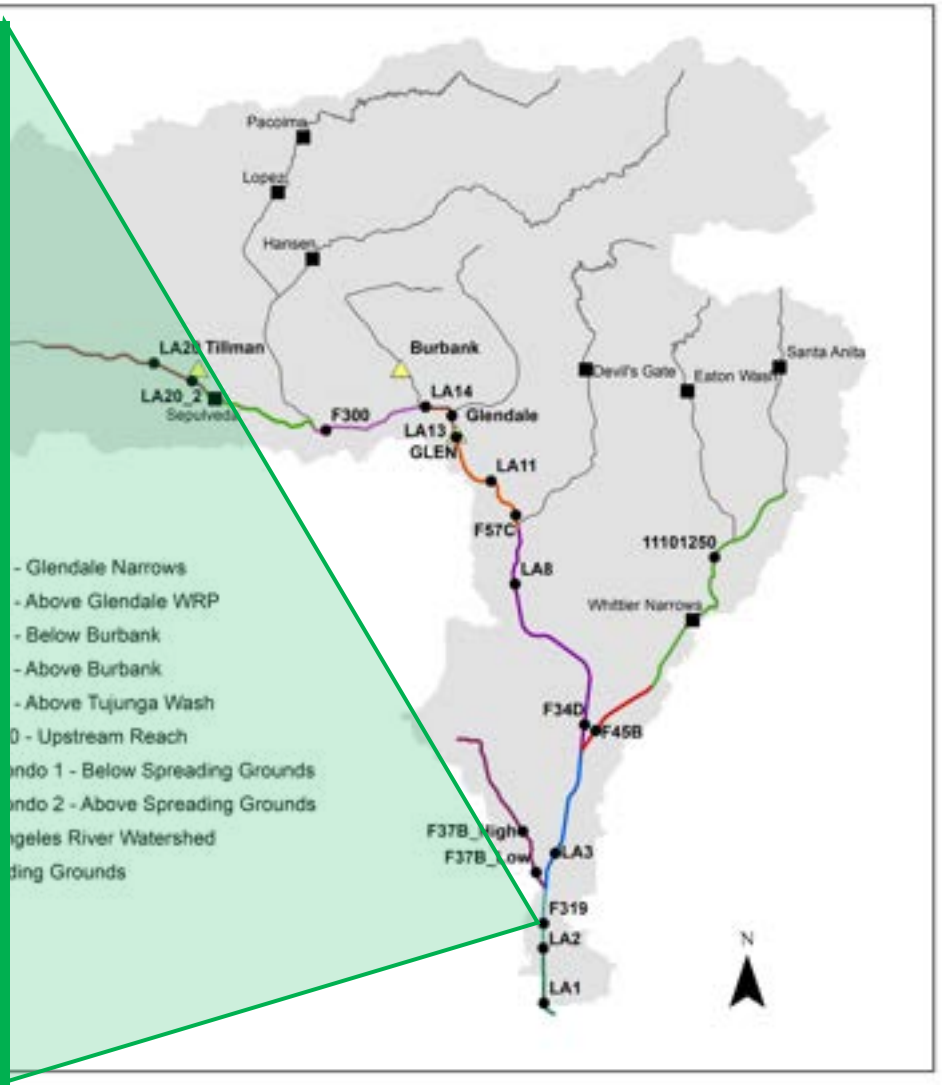
LA River Models: Analysis at flexible time scale





Source: Stein et al. (2021) Process and Decision Support Tools for Evaluating Flow Management Targets to Support Aquatic Life and Recreational Beneficial Uses of the Los Angeles River.

Flow Assessment Workflow

LA River Environmental Flows Project (2021)

LA River California Environmental Flows Framework Flow Assessment

Flow Assessment Workflow

LA River Environmental Flows Project (2021)

Existing channel form → LA River models + Sensitivity curves for: 5 focal species 2 recreation activities → Flow range supporting focal species in existing channel + % flow reduction scenarios → Whether existing channel supports the 5 focal species and 2 recreational activities

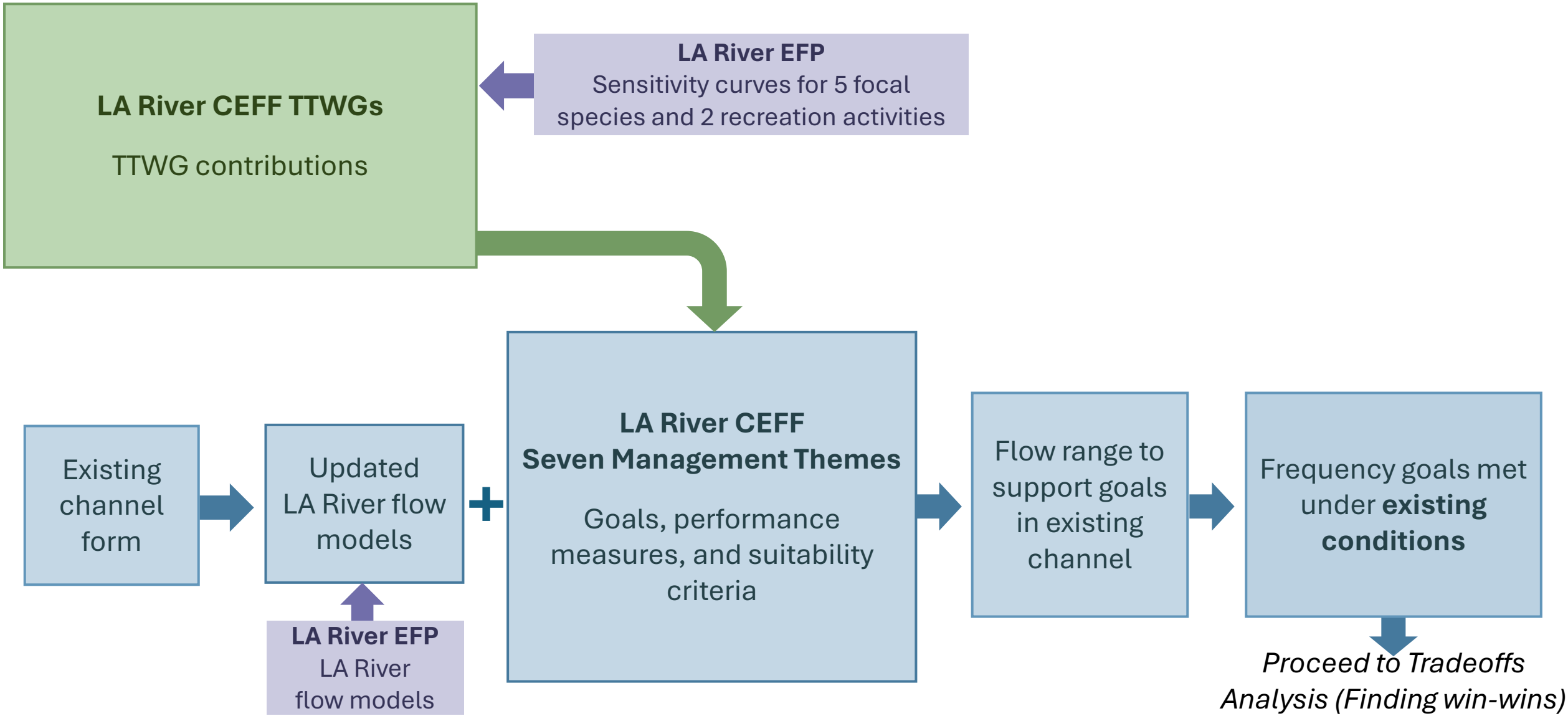
LA River California Environmental Flows Framework

Flow Assessment

Existing Conditions Assessment

Potential Future Conditions Assessment

Flow Assessment Workflow: Existing Conditions



Los Angeles River Major Projects Underway

1. River Origin Park
2. **County Headwaters Project ●**
3. City Headwaters Bike Path
4. Canoga Park River Park
5. **City West Valley Bike Path ●**
6. Southern Aliso Green Network
7. **TPL Aliso Creek Confluence Park /Reseda River Loop**
8. **MRCA Caballero Creek Confluence Park**
9. **LACC/MRCA Boating Program ●**
10. **City Sepulveda Basin Masterplan**
11. **County North Valleyheart Greenway**
12. **MRCA LA River Zev Yaroslavsky Greenway ●**
13. **SLAROS LA River Natural Park**
14. Hazeltine River Edge Park
15. Hazeltine Avenue
16. Harvard Westlake River Park
17. Tujunga Wash Path
18. Tujunga Wash Confluence Park
19. **Sennett Creek**
20. **City of LA/USACE Headworks**
21. Burbank Western Green Network
22. **Burbank Bob Hope Park ●**
23. Glendale Riverwalk Non-Motorized Bridge
24. **Glendale Narrows Riverwalk ●**
25. Verdugo Wash Path
26. River Glen Wetlands (ARBOR)
27. River Glen Wetlands (ULART)
28. Griffith Park Side Channel (ARBOR)
29. San Fernando Path
30. **Central Service Yard ●**
31. Atwater Village East Bank Riverway
32. **City N. Atwater Park & RRC N. Atwater Bridge ●**
33. San Fernando Railroad Path
34. **City Sunnynook Park ●**
35. **MRCA Lewis MacAdams Riverfront Park ●**
36. **G1 Bowtie**
37. **G2 Park/Paseo del Rio**
38. **CA State Parks Rio de LA State Park ●**
39. **Taylor Yard Non-Motorized Bridge ●**
40. **HUD NELA Riverfront Collaborative ●**
41. LACC River HEART
42. **City Elysian Valley Bike Path ●**
43. Dorris Place Sanitation Yard
44. TIGER River Bikeway Network
45. **Arroyo Seco Confluence**
46. MRCA Confluence Park
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48. County Arroyo Seco Greenway
49. **RRC Lincoln Heights Jail**
50. **CA State Parks LA State Historic Park ●**
51. **Bending the River Back into the City**
52. **Ed P. Reyes Riverway ●**
53. **City Albion Dairy Park ●**
54. Main Street Terrace
55. **City Los Angeles River Fish Passage & Habitat Structures**
56. FoLAR Piggyback Yard Collaborative
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59. Upper Segment Multiuse Easement & Atlantic Blvd Area
60. Active Transportation Rail to River Corridor: Randolph Street
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67. West Santa Ana Branch Bikeway
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74. **County Dominguez Gap Wetlands ●**
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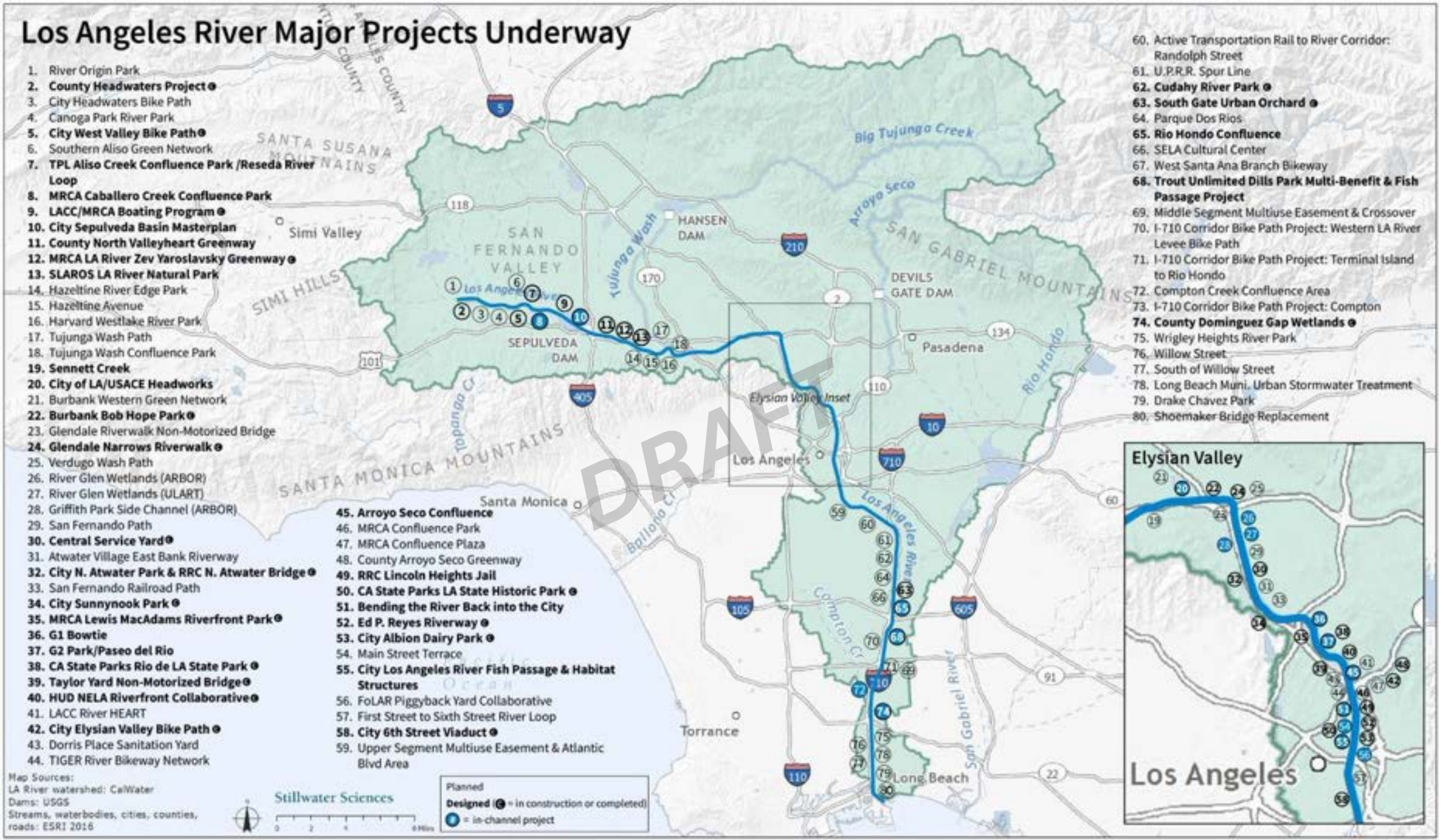
76. Willow Street
77. South of Willow Street
78. Long Beach Muni. Urban Stormwater Treatment
79. Drake Chavez Park
80. Shoemaker Bridge Replacement



Map Sources:
LA River watershed: CalWater
Dams: USGS
Streams, waterbodies, cities, counties, roads: ESRI 2016

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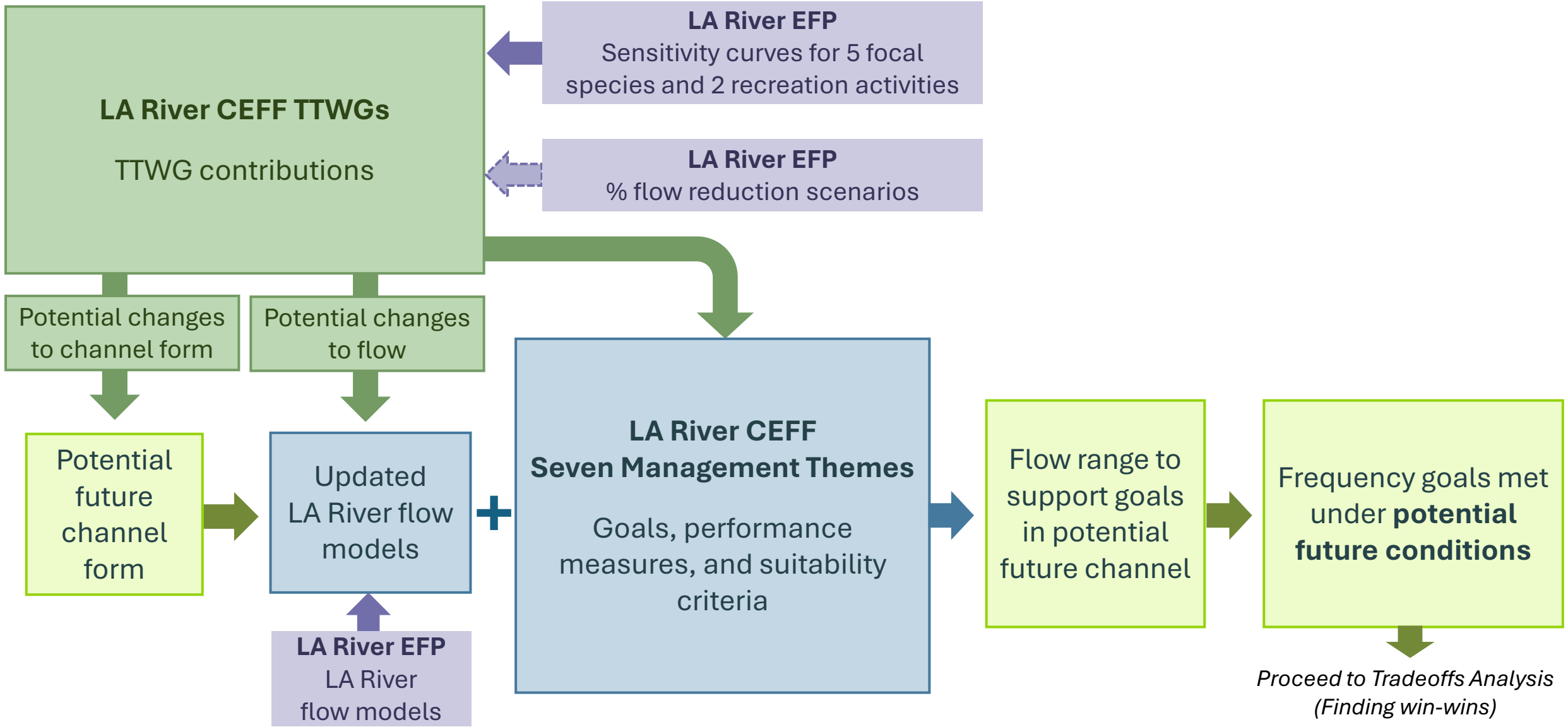
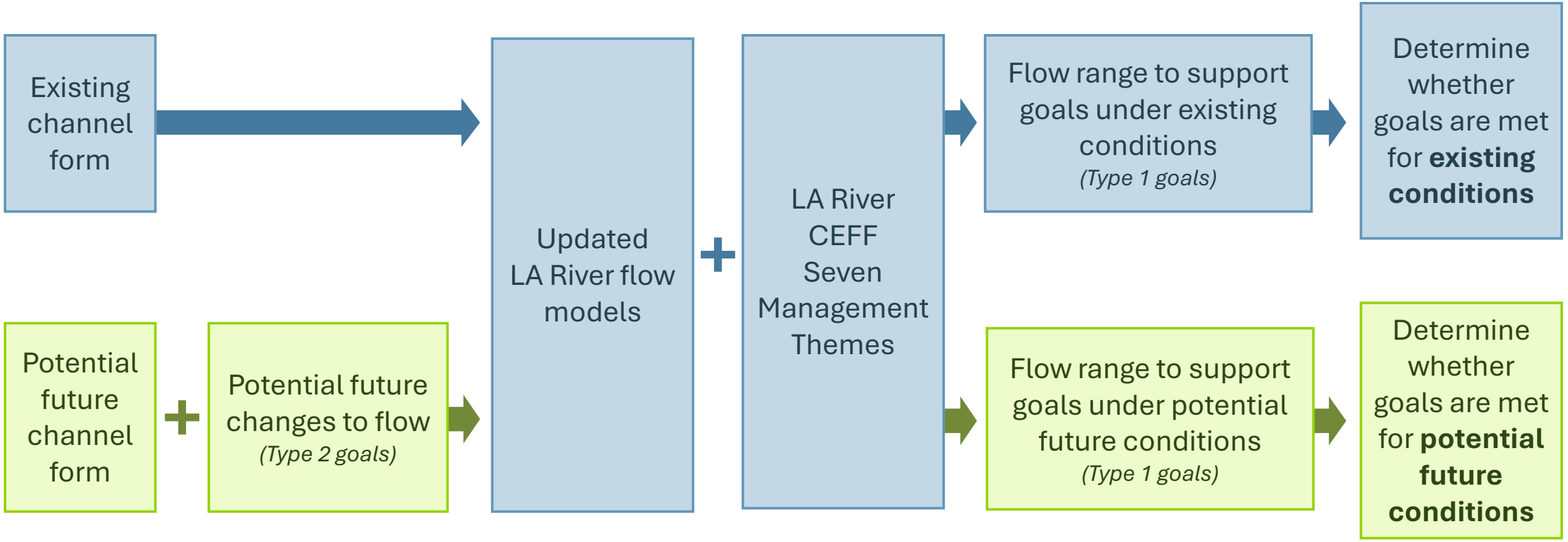
Planned
Designed (● = in construction or completed)
(● = in-channel project

Flow Assessment Workflow: Potential Future Conditions



Flow Assessment Workflow Summary



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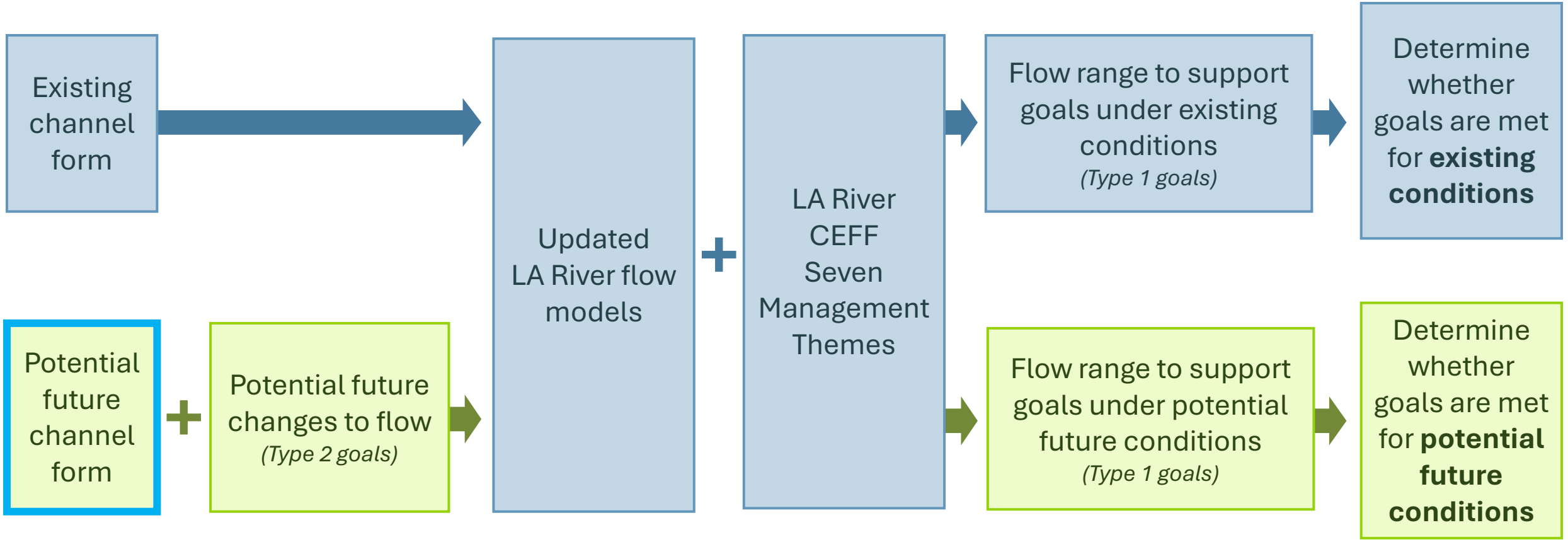

Study questions

How could the channel form change in the future?

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Los Angeles River Major Projects Underway (202x)

1. River Origin Park
2. **County Headwaters Project** ●
3. City Headwaters Bike Path
4. Canoga Park River Park
5. **City West Valley Bike Path** ●
6. Southern Aliso Green Network
7. **TPL Aliso Creek Confluence Park /Reseda River Loop**
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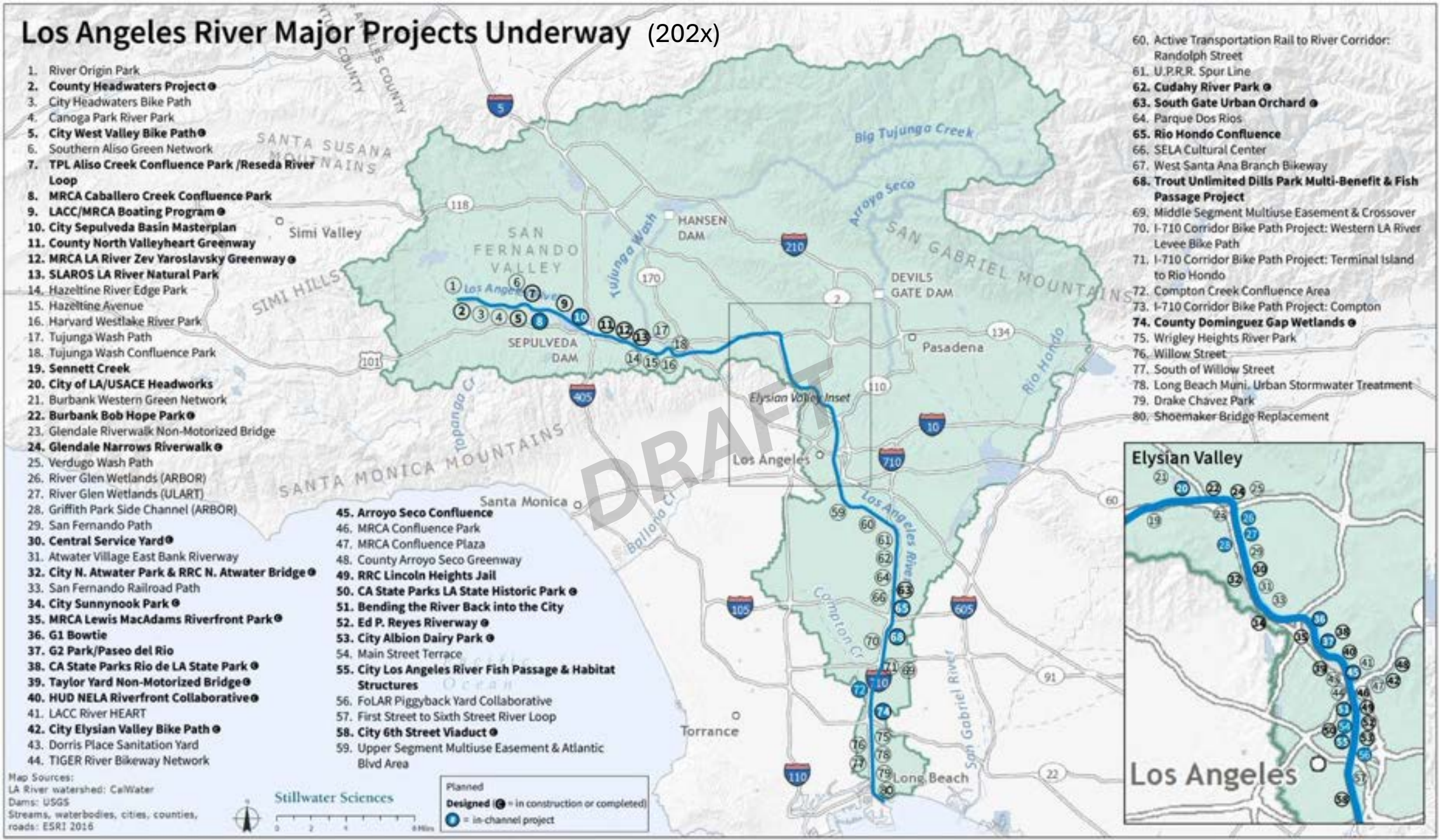

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Stillwater Sciences

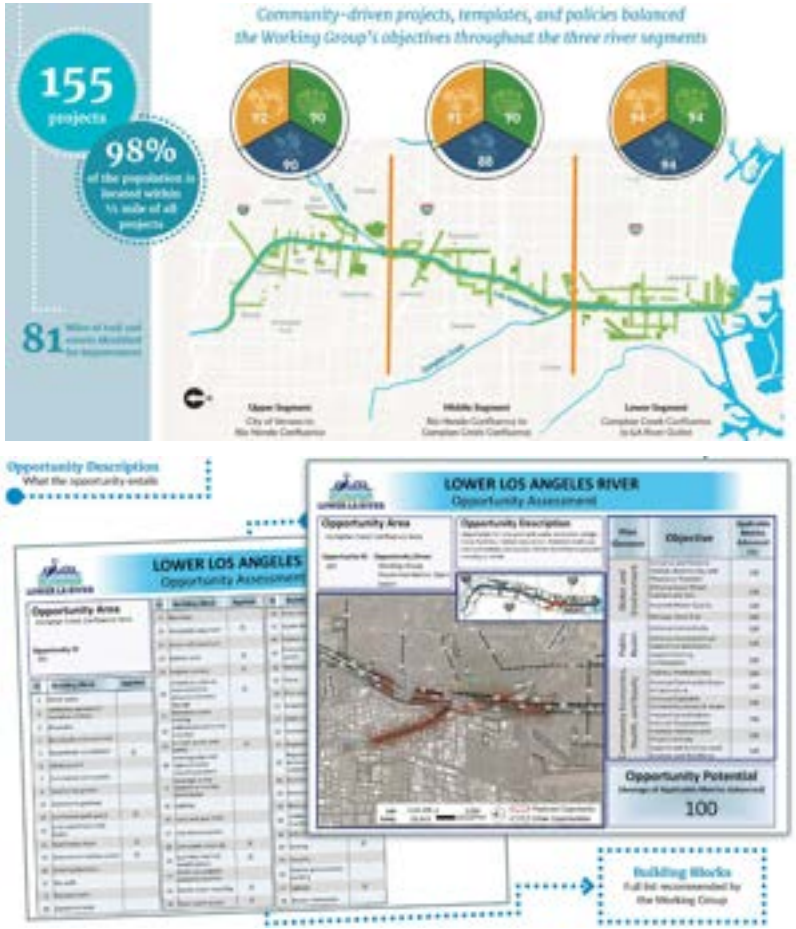
Planned
Designed (● = in construction or completed)
(● = in-channel project

Potential Future Projects Inventory (Type 1 - Channel Form Change/River Projects)

Los Angeles River Ecosystem Restoration Study (ARBOR)

Los Angeles River Masterplan (LARMP)

Lower Los Angeles River Revitalization Plan (LLARRP)



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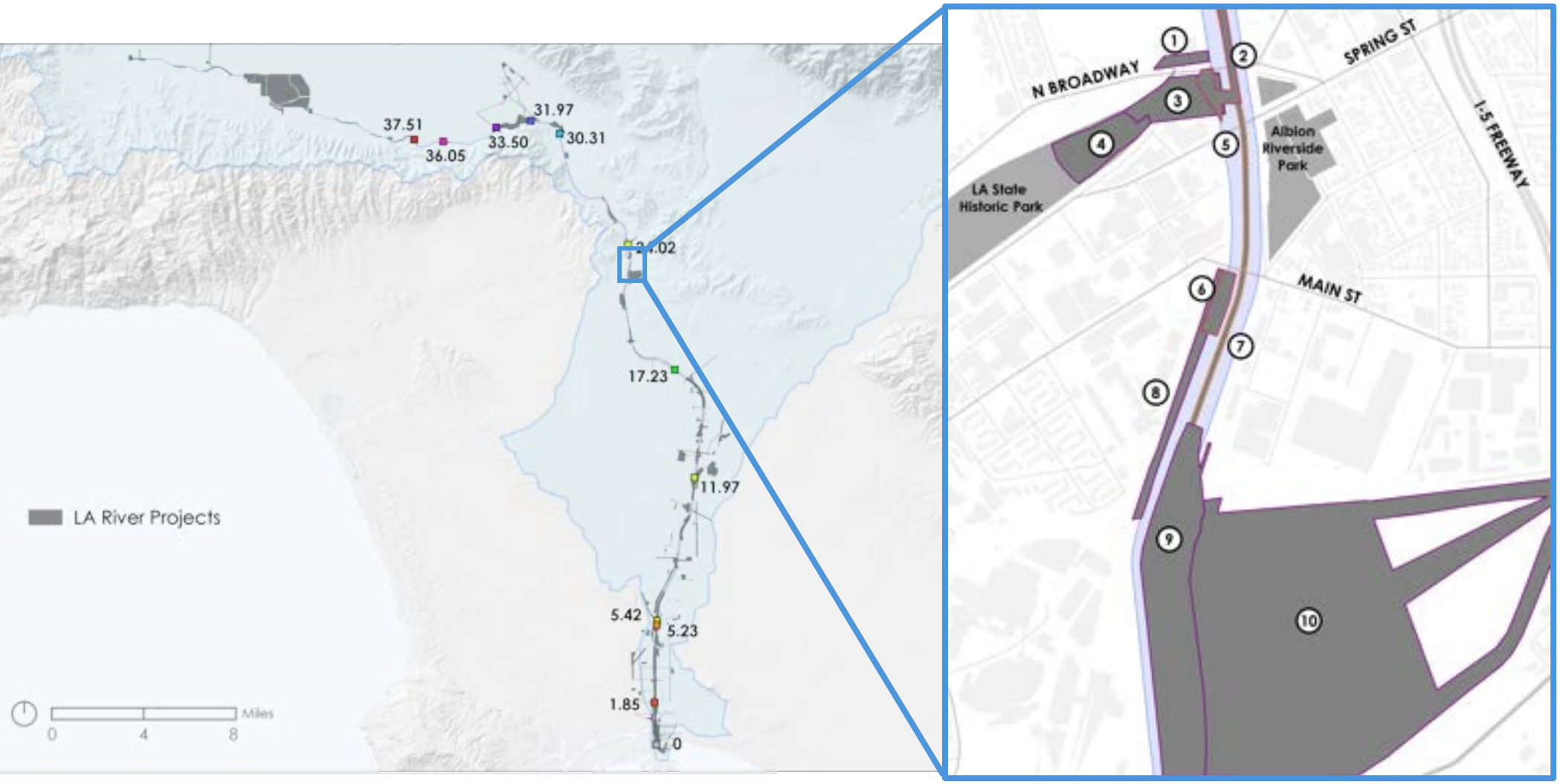
River Projects Inventory Map (2025)



1. ARBOR natural stream confluence
2. Bend the River Back into the City
3. ARBOR riparian planting
4. ARBOR freshwater marsh
5. DTLA Fish Passage & Habitat Structures
6. Main St Terrace
7. Reach 8A Fish Passage
8. ARBOR terraced floodplain expansion
9. Piggyback Yard – floodplain expansion
10. Piggyback Yard – concrete removal

ARBOR
Other
LARMP

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Potential Future Conditions: Designed vs. Planned Projects

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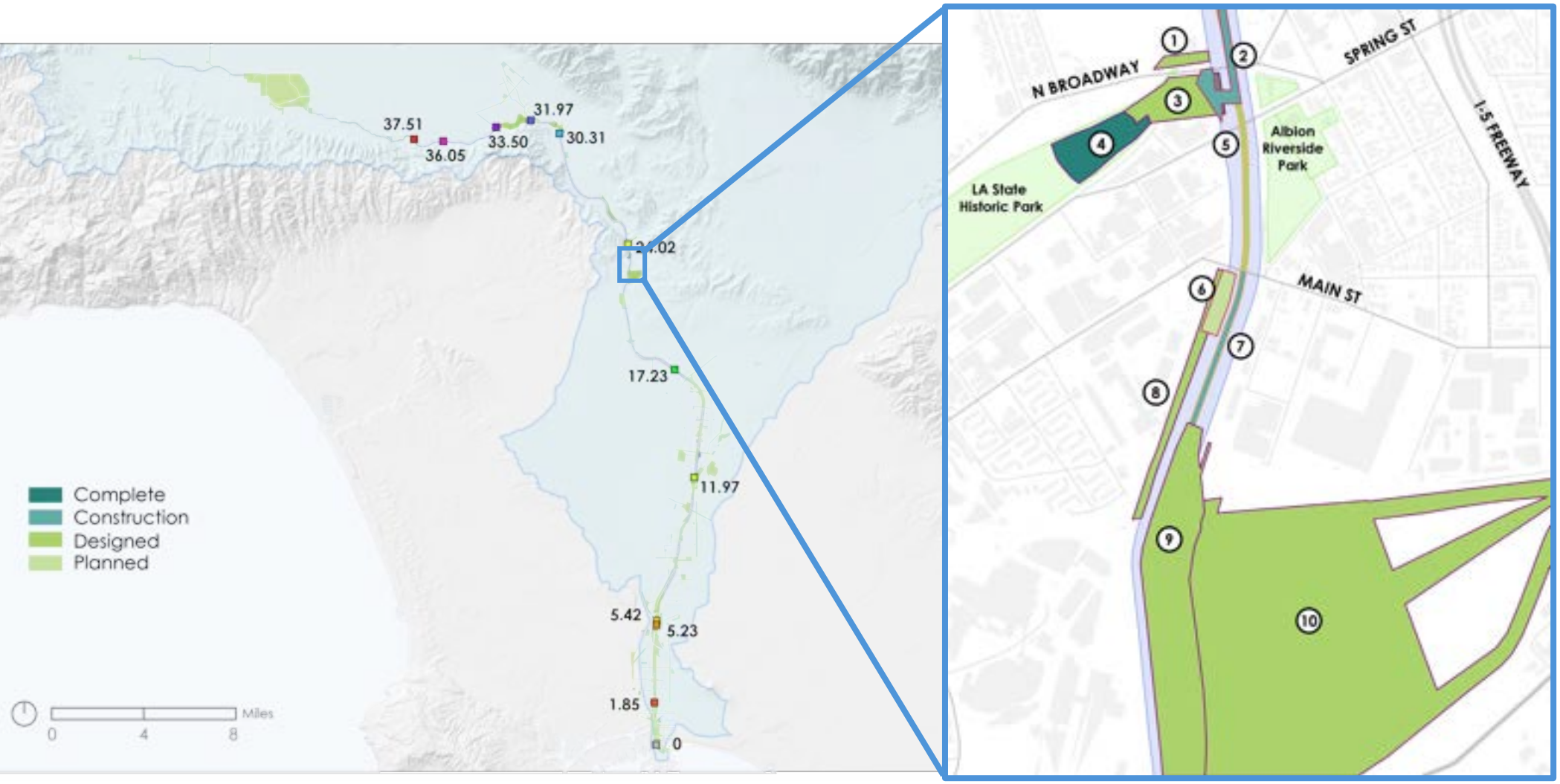
Potential Future Conditions: Designed vs. Planned Projects

- Designed Project
  - At least 30% (schematic design) in the design process
  - Used to assess near-term flow needs/implications
  - **Assumed to be reasonably foreseeable**

- Planned Project
  - Less than 30% design
  - Contained in stakeholder-driven plan
  - **Assumed to reflect long-term implementation of goals if current efforts proceed as planned**

River Projects Inventory Map (2025)



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ARBOR
Other
LARMP

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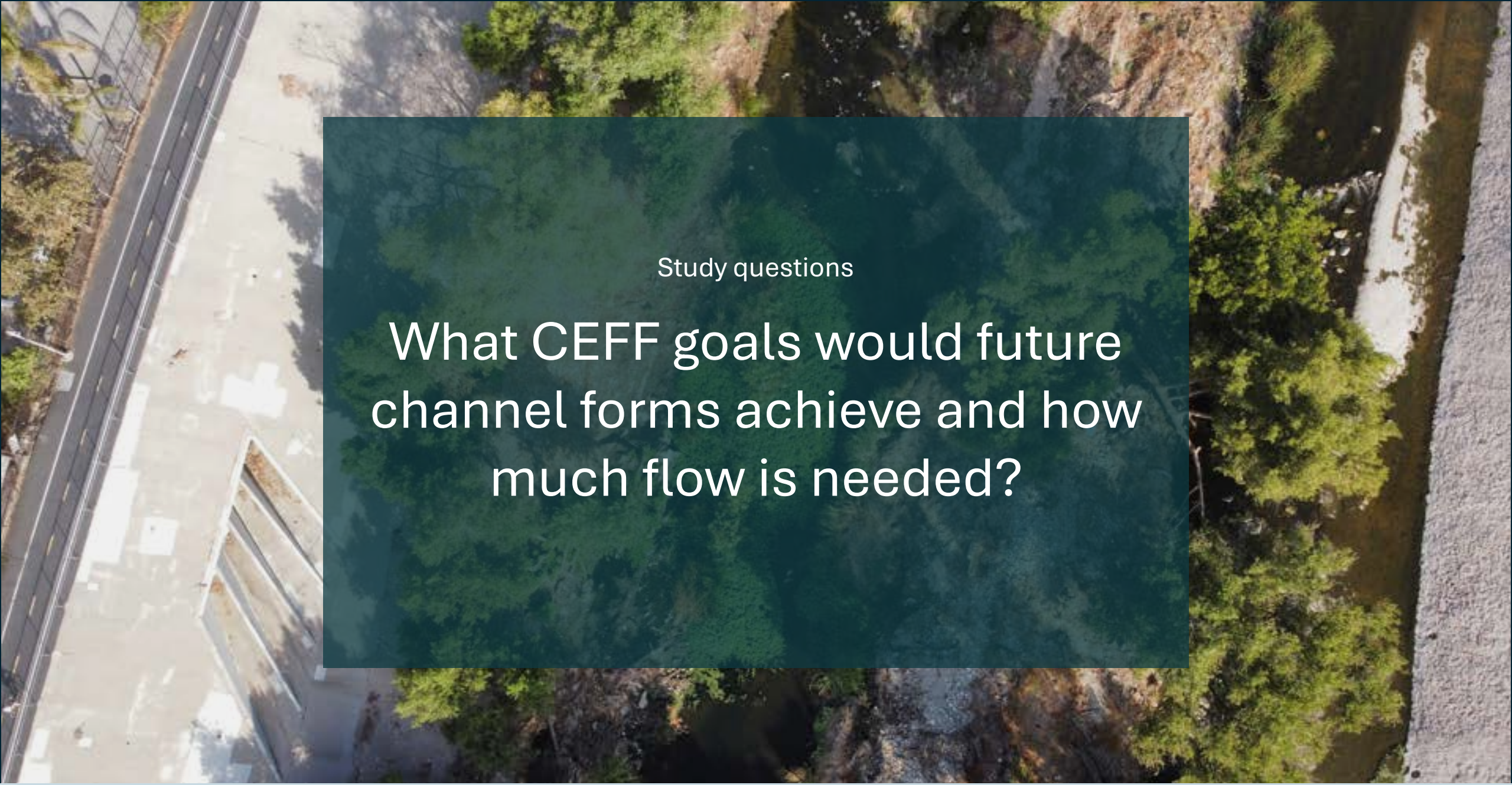

Study questions

What CEFF goals would future channel forms achieve and how much flow is needed?

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Designed Projects: Channel Form Change Assumptions - Taylor Yard Alternative Designs

Paseo Del Rio / Treatment Wetland Early Activation Projects

Island Scenario: Integrated Feasibility Report

ARBOR Alternative 20

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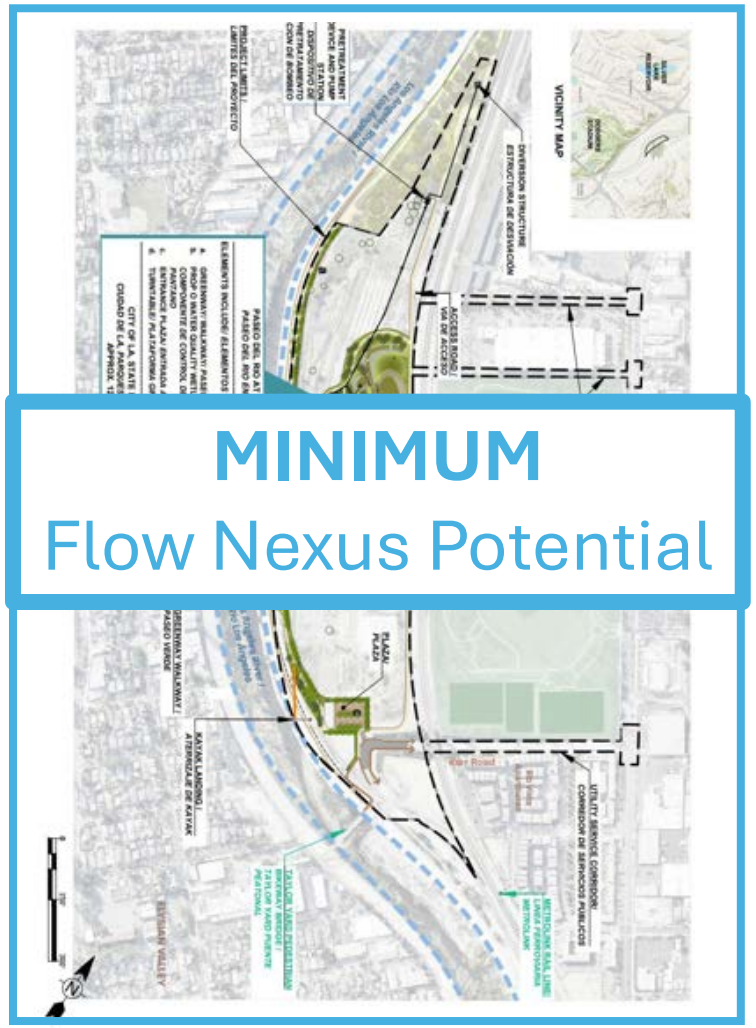
Designed Projects: Channel Form Change Assumptions - Taylor Yard Alternative Designs

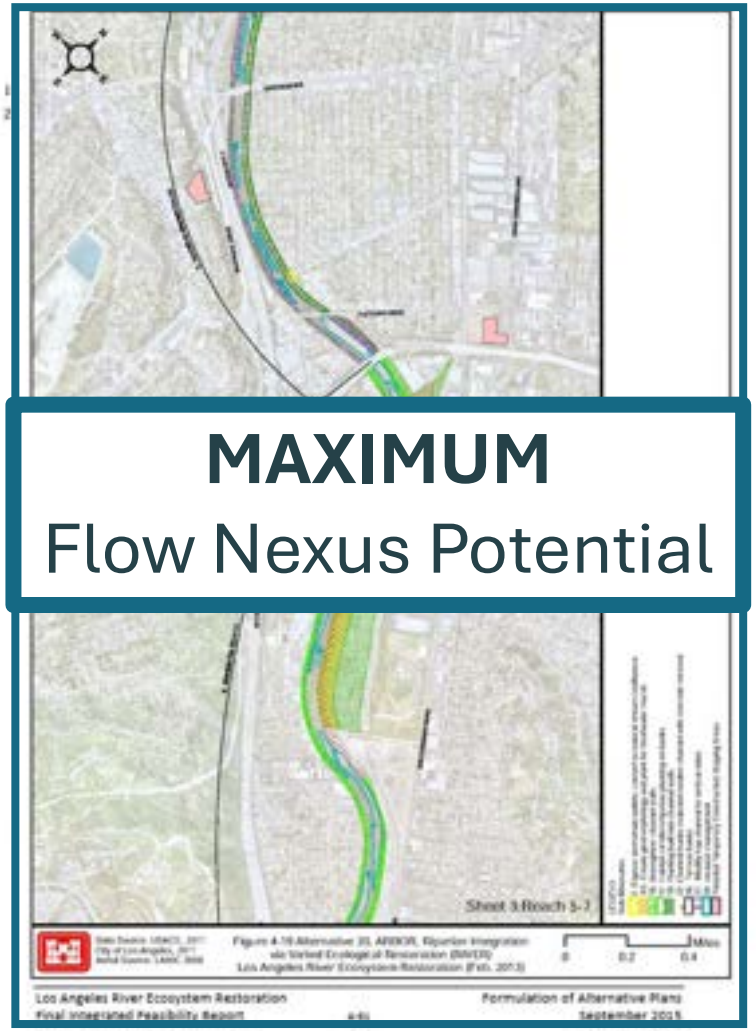
Paseo Del Rio / Treatment Wetland Early Activation Projects



MINIMUM
Flow Nexus Potential

Island Scenario: Integrated Feasibility Report

ARBOR Alternative 20



MAXIMUM
Flow Nexus Potential

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Planned Projects: Lower Los Angeles River Masterplan Opportunity Area 117

LOWER LA RIVER

LOWER LOS ANGELES RIVER
Opportunity Assessment

Opportunity Area
Rosecrans Ave - North of Rosecrans between the 710 and the river

Opportunity ID 117

Opportunity Driver LLAR-Site-Specific Opportunities

Opportunity Description
Consider using railroad to create a loop at Garfield Ave; upgrade multi-use trail to have both dirt and concrete; upgrade crossing for all users.

Plan Element	Objective	Applicable Metrics Advanced (%)
Water and Environment	Conserve, Enhance, and Restore Habitat, Biodiversity, and Floodplain Functions	100
	Enhance Local Water Capture and Use	100
	Improve Environmental Quality	100
	Manage Flood Risk	100
Public Realm	Enhance Connectivity	33
	Improve User Experience and Equitable Access	80
	Enhance and Create Diverse, Vibrant Public Spaces	60
Community Economics, Health, and Equity	Address Homelessness	100
	Increase Community Green Infrastructure	0
	Increase Equitable Community Access to Multi-use Trails, Assets	0
	Prevent Local Gentrification-Induced Displacement	0
	Promote Wellness and Physical Activity	0
	Support and Develop Local Business and Workforce	100

Opportunity Potential
(Average of Applicable Metrics Advanced)

86

LOWER LA RIVER

LOWER LOS ANGELES RIVER
Opportunity Assessment

Opportunity Area
Rosecrans Ave - North of Rosecrans between the 710 and the river

Opportunity ID 117

ID	Building Block	Applied
1	Active space	
2	Additional permanent homeless shelters	
3	Bioswales	X
4	Boardwalks and overlooks	
5	Brownfields remediation	
6	Climbing wall	
7	Commercial zone access	
9	Community garden	
10	Community gateway	
12	Continuous park space	
13	Curb cuts/street eddy basins	
14	Destination stops	
15	Diversion to sanitary sewer	
16	Drinking fountains	
17	Dry wells	
18	Elevated paths	
20	Equestrian trails	

ID	Building Block	Applied
21	Bike hubs	X
22	Floodplain expansion	X
23	Green infrastructure	X
24	Habitat area	X
25	Habitat corridor	X
26	Historical, cultural, environmental education/assets/ signage	X
27	Homeless space sharing	
28	Infiltration basins and trenches	X
29	In-river access and safety	
30	Leverage planned regional water recycling projects	
31	Leverage pump stations to convey stormwater	
32	Lighting	X
36	Loop and spur trails	X
37	Low income access	
38	Low water crossings	
39	Low flow channel modifications	
40	Multi use publicly owned properties	
41	Onsite water recycling	
42	Open space access	

ID	Building Block	Applied
44	Overcrossing	
45	Oyster bed restoration	
46	Passive space	X
47	Pedestrian and cyclist access	
48	Permeable paving	
49	Plazas	
50	Pop up parks	
52	Property acquisition	
53	Public art and murals	
54	Recreation center	
55	Regional gateway	
56	Regrading for landscape topography restoration	X
58	Residential zone access	
59	Restrooms	
60	River amphitheater	
61	Rubber dams and inundation areas	
62	Safe crossings	
63	Seating	X
64	Security	X
65	Shallow groundwater banking	X
67	Signage	
68	Stream restoration	X

ID	Building Block	Applied
69	Sub-regional water recycling facility	
70	Traffic calming	
71	Trailheads and staging areas	
72	Transit oriented development	
73	Tunnels	
74	Undercrossing	
75	Water capture and onsite storage	X
76	Water recreation	
78	Shade (veg or structural)	X

Source: Lower LA River Revitalization Plan (2015)

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Channel Form Change Typologies

Designed project: Taylor Yard

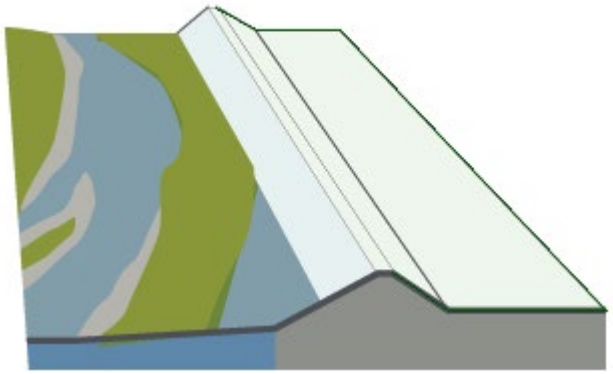
Paseo Del Rio / Treatment Wetland Early Activation Projects

Island Scenario: Integrated Feasibility Report

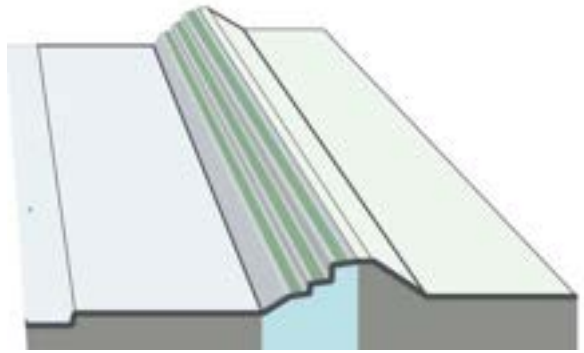
ARBOR Alternative 20

A common language: LA River CEFF Channel Form Change Typologies

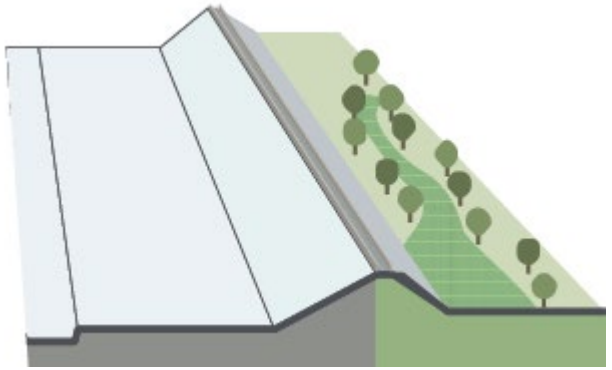
CHANNEL BED: VEGETATED



CHANNEL WALLS: TERRACES



OVERBANK: WETLANDS



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River-wide channel form scenarios: CHANNEL BED CHANGE TYPOLOGIES (CONCEPTUAL)

Existing Condition

Designed & In-Construction Projects

(Reasonably Foreseeable Maximum)

Planned Condition

(Long-term Minimum)

Planned Condition

(Long-term Maximum)

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Assumed flow suitability: Biodiversity PM 1 Adult Steelhead Migration (CONCEPTUAL)

Existing Condition

Designed & In-Construction Projects

(Reasonably Foreseeable Maximum)

Planned Condition

(Long-term Minimum)

Planned Condition

(Long-term Maximum)

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Flow Assessment: Potential Future River Projects Flow Needs & Influences

CEFF Flow Assessment Model

LA River SWMM

LA River HEC-RAS

PLANNED CONDITIONS

LOI 24.02

Confluence with Arroyo Seco to near upstream extent of Glendale Narrows soft-bottom reach
Length: 6.29 miles

N

NOT TO SCALE

Type of flow relationship	Channel drainage infrastructure	Project status
Into river	Gravity main (x43) Storm drain network	Conceptual
Out of river	Lateral line (x29) Storm drain network	Planned
Both or exchange	Open channel (x2) Storm drain network	Designed
	Underdrains (x4) Subdrain system	In construction
		Completed

Associated LA River plan	
ARBOR	LA River Ecosystem Restoration Study (2016, 2022)
LARMP	LA River Master Plan (2022)
LARRMP	LA River Revitalization Master Plan (2008)
LLARRMP	Lower LA River Revitalization Master Plan (2017)
ULART	Upper LA River and Tributaries Revitalization Plan (2020)

*Relative magnitude of influence of individual flow components on the overall flow and individual functional flow are *not finalized* and populated with only test information.

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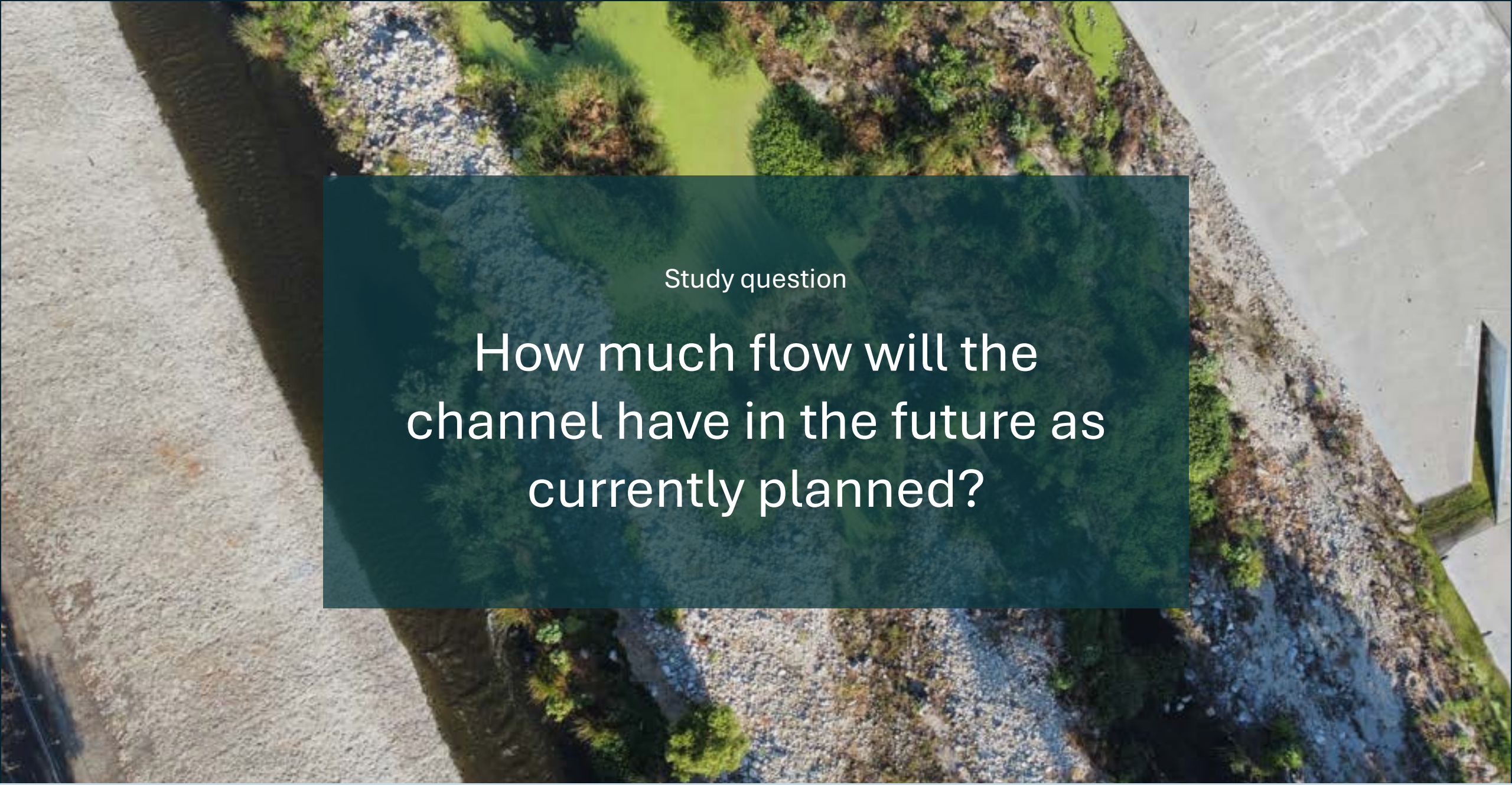

Study question

How much flow will the channel have in the future as currently planned?

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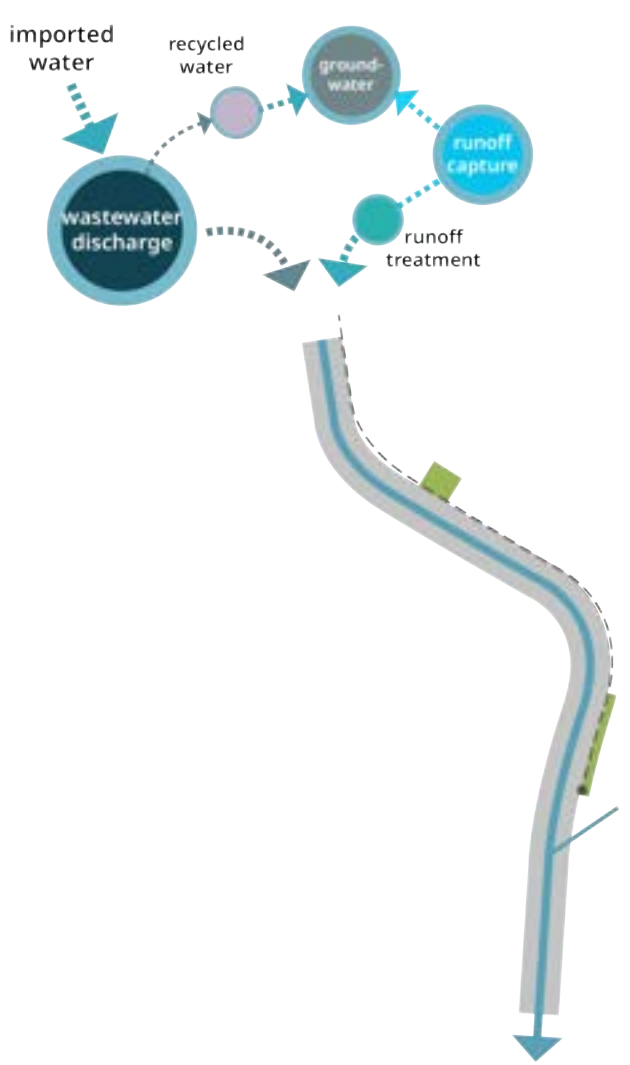
Flow Assessment Methods Overview

Type 2 Flow Nexus
Changes flow entering the channel

Type 1 Flow Nexus
Requires flow in the channel

OUTPUT
Hydrograph & hydraulic conditions

Existing Conditions



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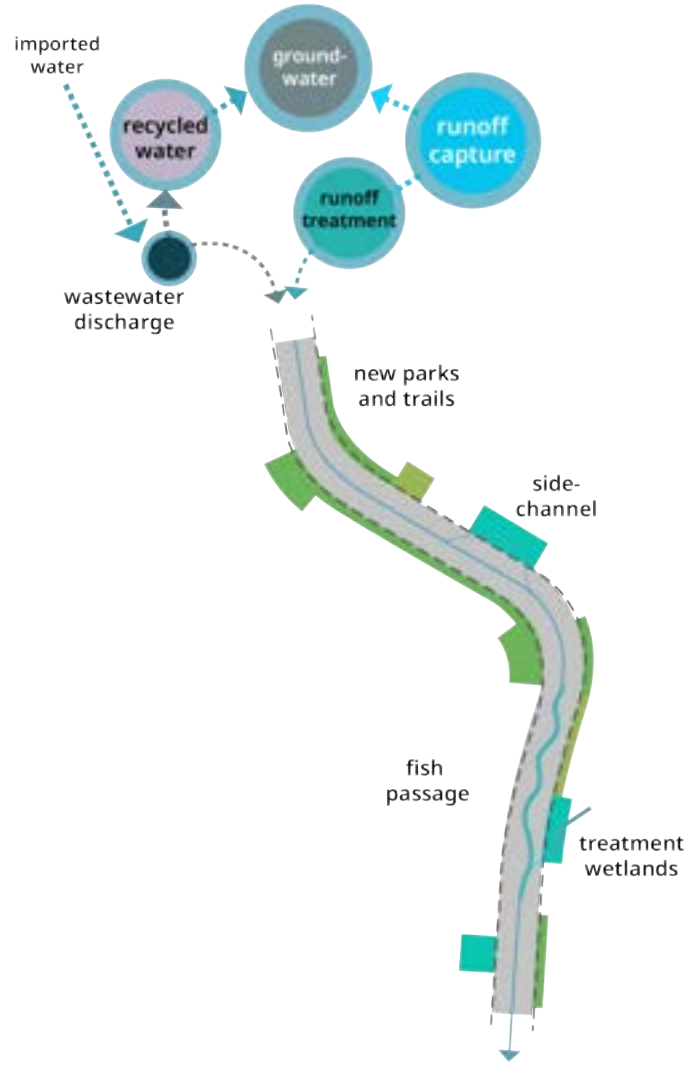

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Type 2 Flow Assessment: Watershed Management Actions

Theme: Water Quality

EXAMPLE GOAL: Designate beneficial uses, establish water quality objectives to protect those uses, and identify programs of implementation to meet objectives *(LARWQCB – Basin Plan)*

EXAMPLE PERFORMANCE MEASURE: [WQ-1] NPDES compliance with water quality-based effluent limitations (WQBELs)* **consistent with TMDL waste load allocations (WLA)s.*

EXAMPLE MANAGEMENT ACTIONS
Capture **4,847 acre-ft of wet weather flow** (90th percentile event) across the **Upper LA River Watershed** by 2037
For the **Upper LA River Watershed**, **reduce bacterial load** from priority and outlier (defined in LRS) outfalls **during dry weather by diverting dry weather flows to sanitary sewer** through LRS process.
Eliminate 100% of **Non-Stormwater Discharges** (about 219 acre-ft/year) in the Upper L.A. River catchment.
Reduce **DC Tillman WRP** discharges during high temperature events. (cfs unknown)
Etc… Currently have 13 management actions, some of which apply to numerous projects

Type 2 Flow Assessment: Watershed Management Actions

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Type 2 Flow Assessment: Watershed Management Actions

Example Management Action: WQ-1

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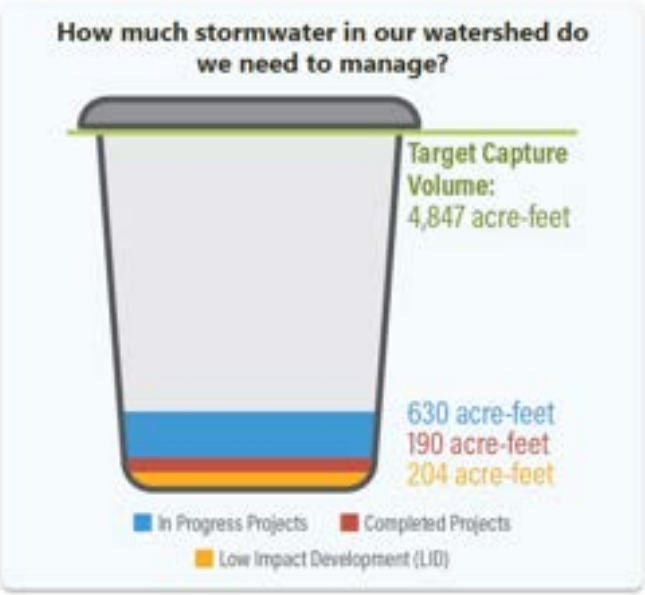
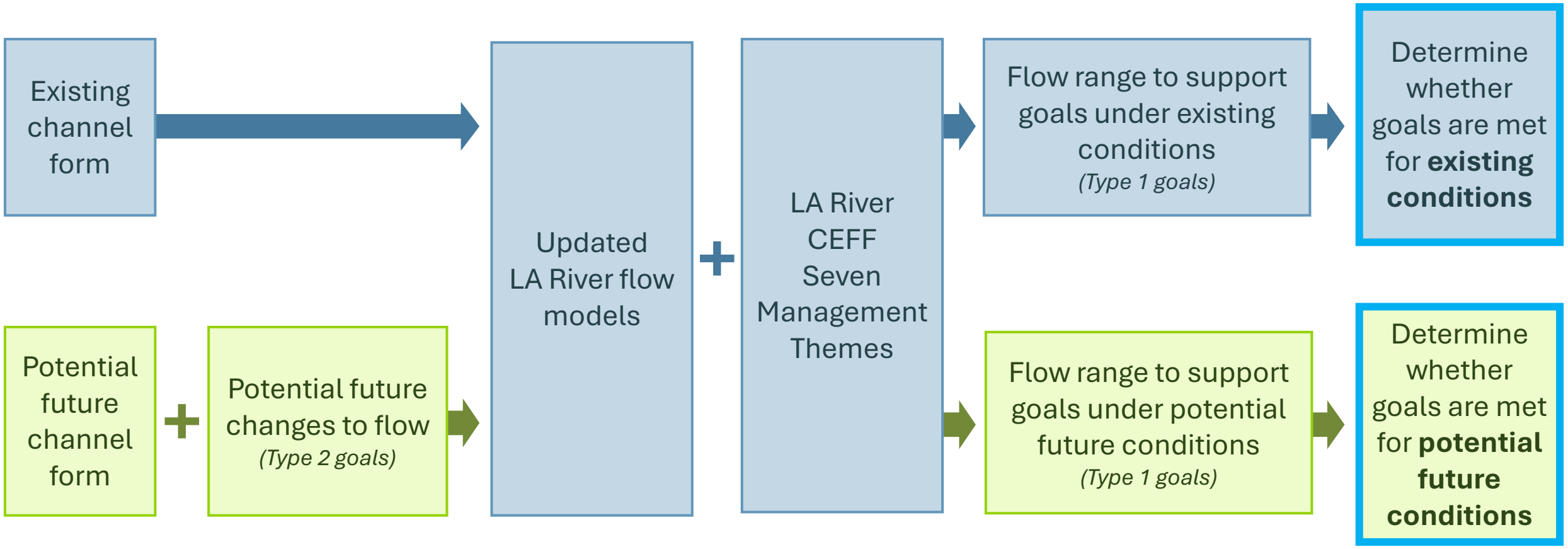


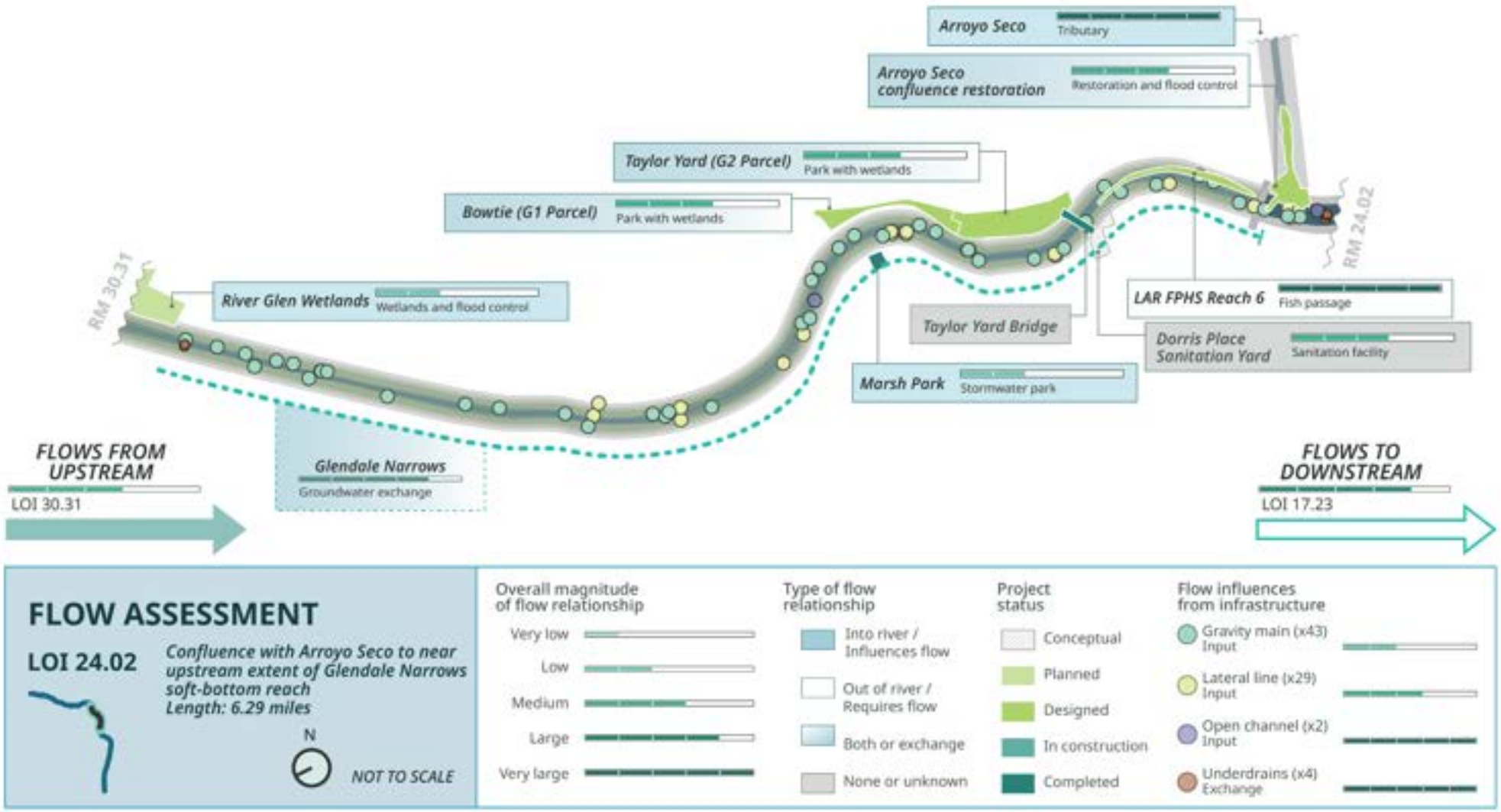
% Complete	% Designed	% Planned	% Concept
4%	14%	82%	0%

Influence on LA River flow **already realized**	Influence on LA River flow that **can be estimated**	Influence on LA River flow is **adjustable** based on differing design approaches/alternatives.

Flow Assessment Workflow Summary



Flow Assessment: Water Balance Model Framework



LA River SWMM

LA River HEC-RAS

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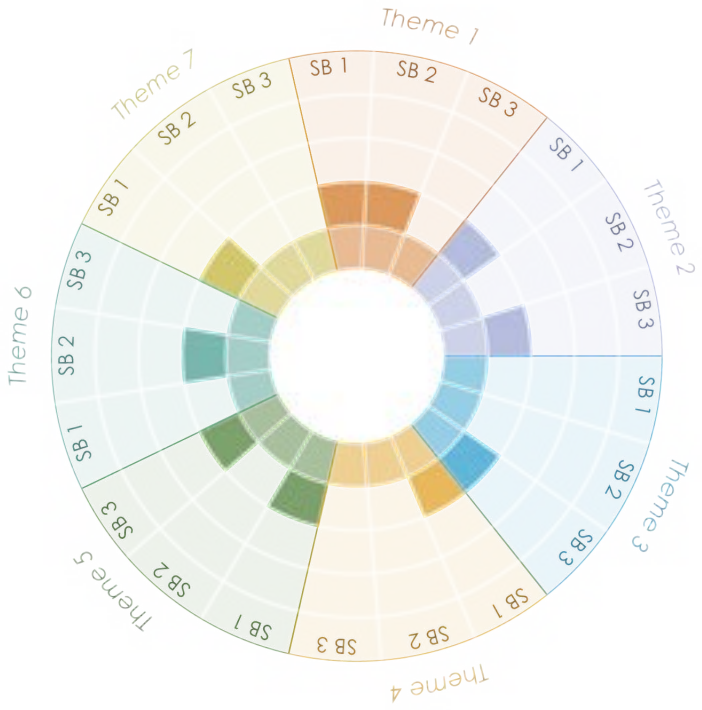
Flow Assessment Results (CONCEPTUAL)

Existing Condition Goal Achievement



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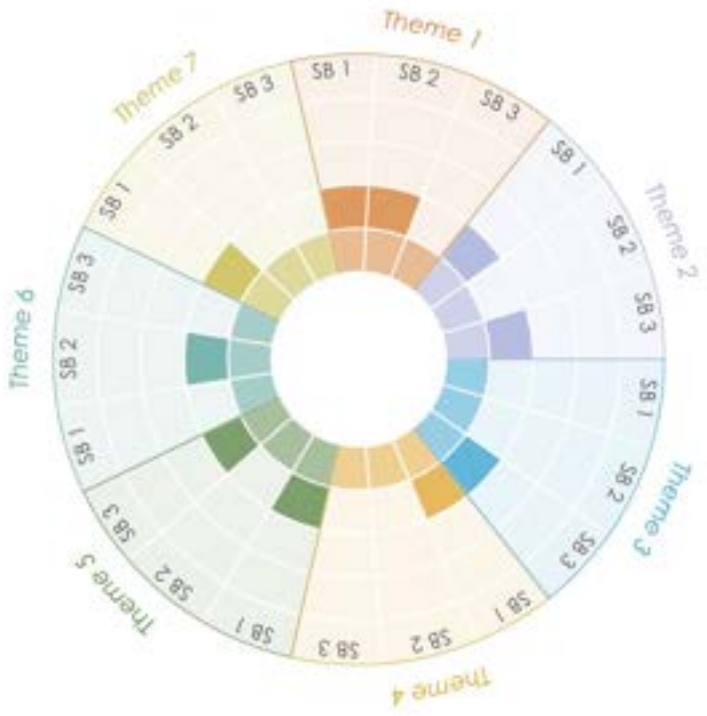
Flow Assessment Results (CONCEPTUAL)

Existing Condition Goal Achievement



Potential Future Goal Achievement
(designed + planned)

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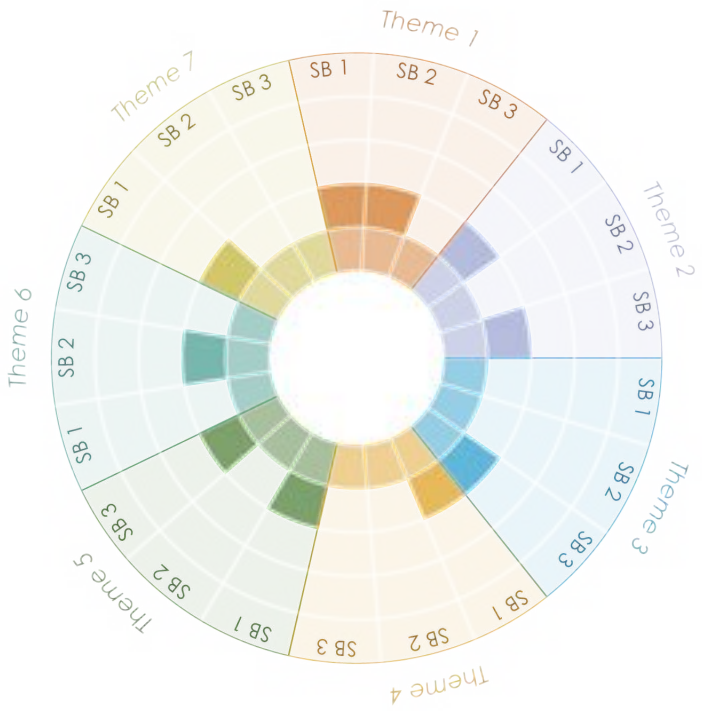
Flow Assessment Results (CONCEPTUAL)

Existing Condition Goal Achievement



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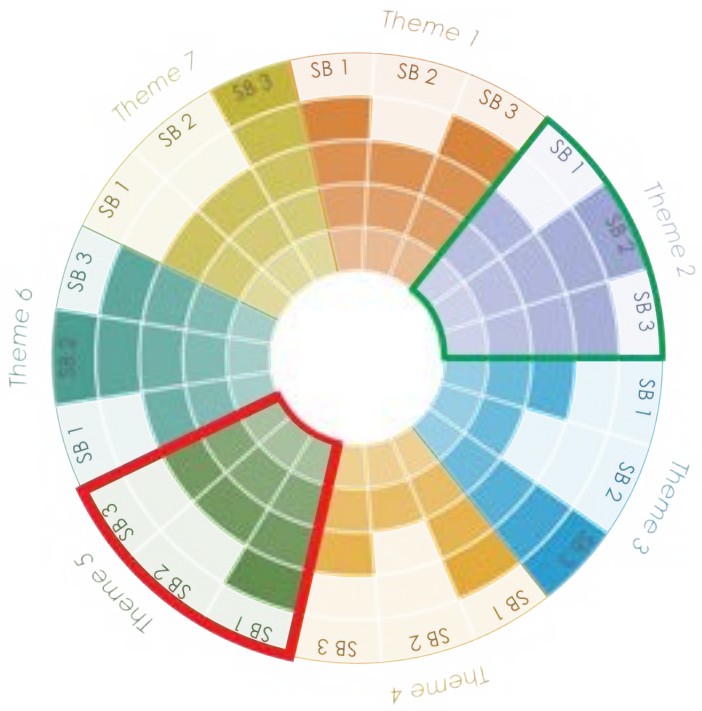
(designed + planned)



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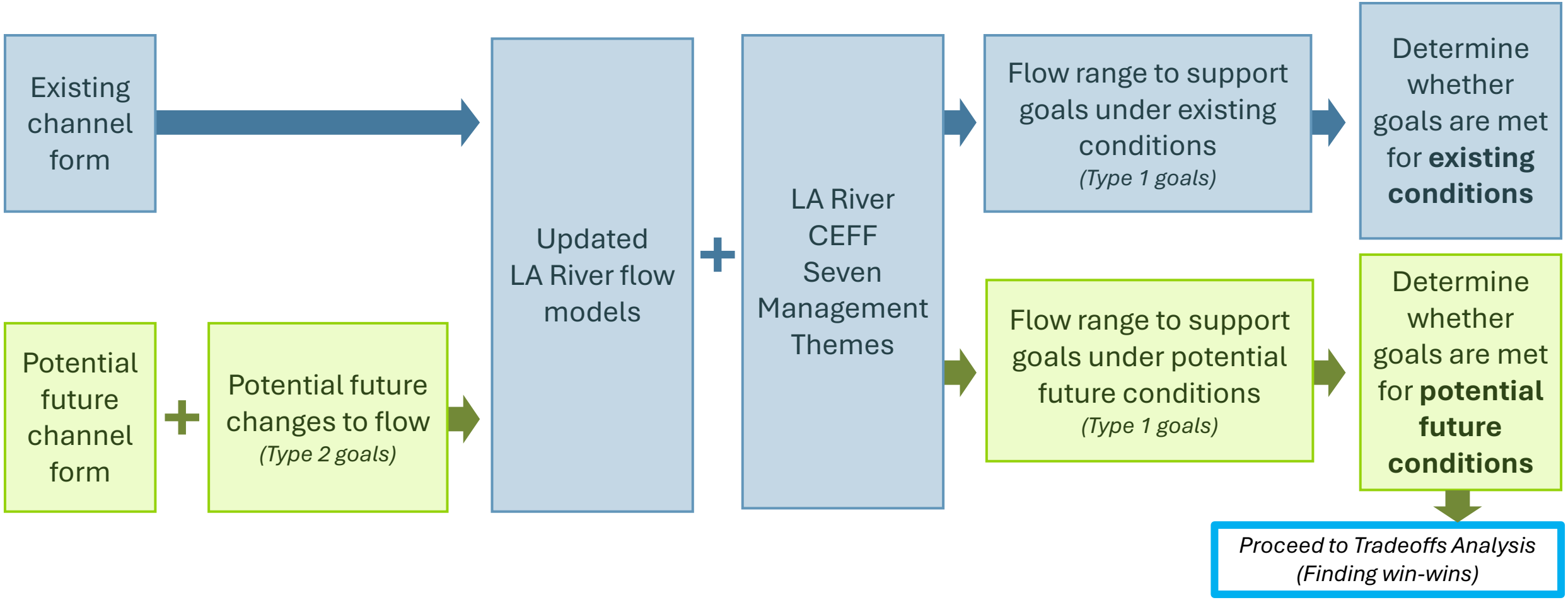
Flow Assessment Workflow Summary

LA River California Environmental Flows Framework Flow Assessment



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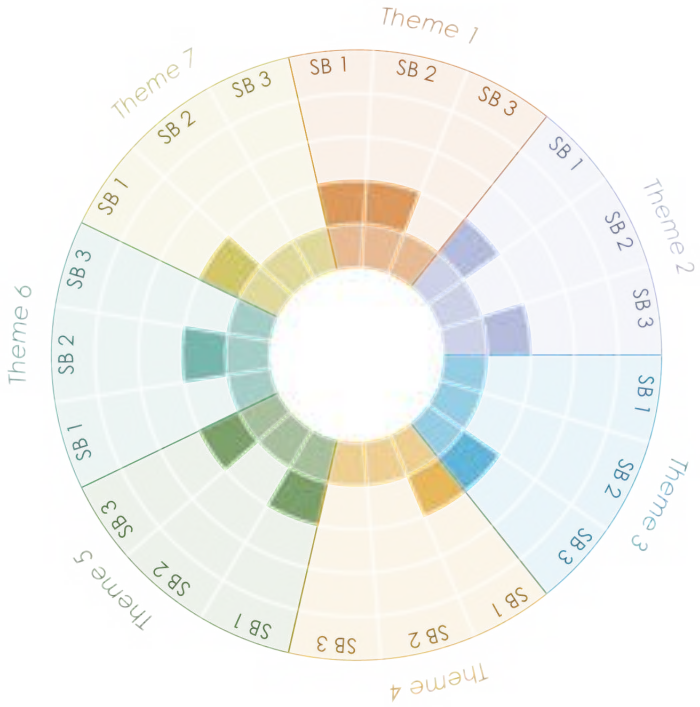
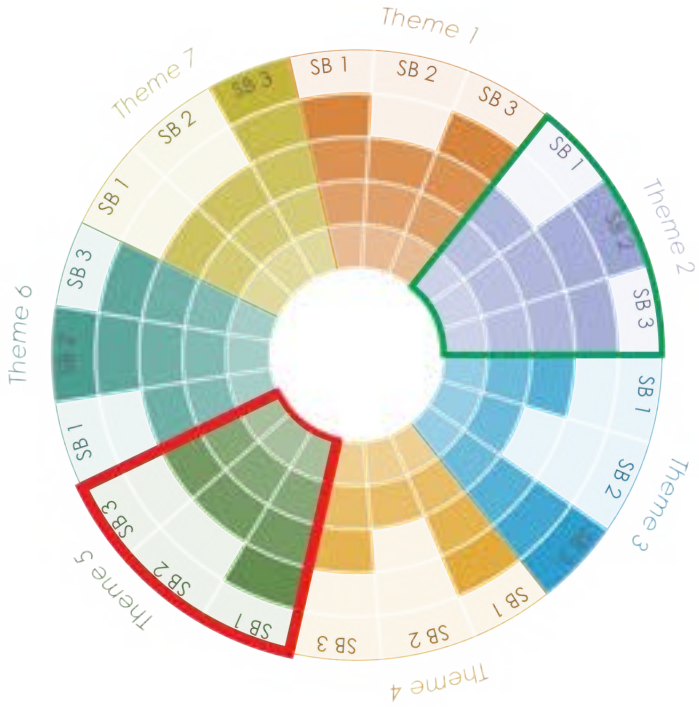
LOOK AHEAD: Applying Flow Assessment Results (CEFF Step 10)

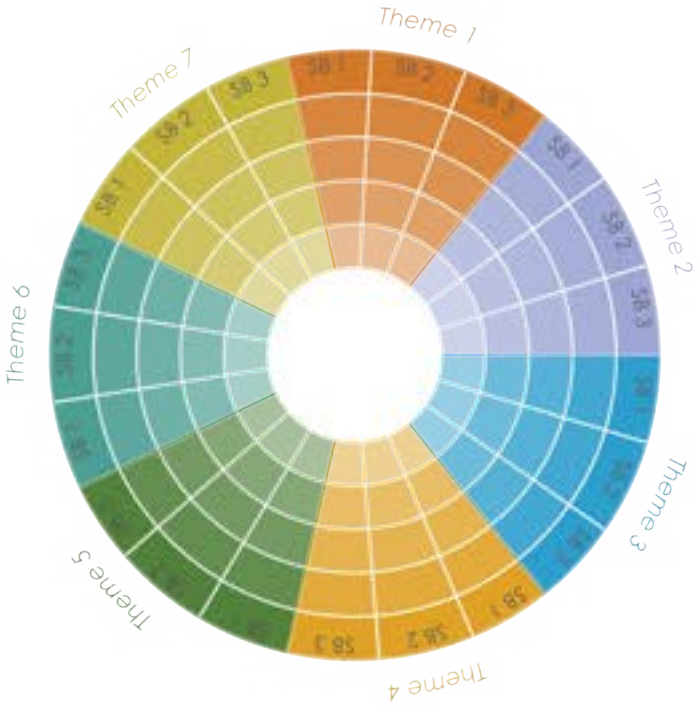
Existing Condition Goal Achievement



Potential Future Goal Achievement
(designed + planned)



Alt. Scenario *(Step 10)*
(full achievement of CEFF goals)



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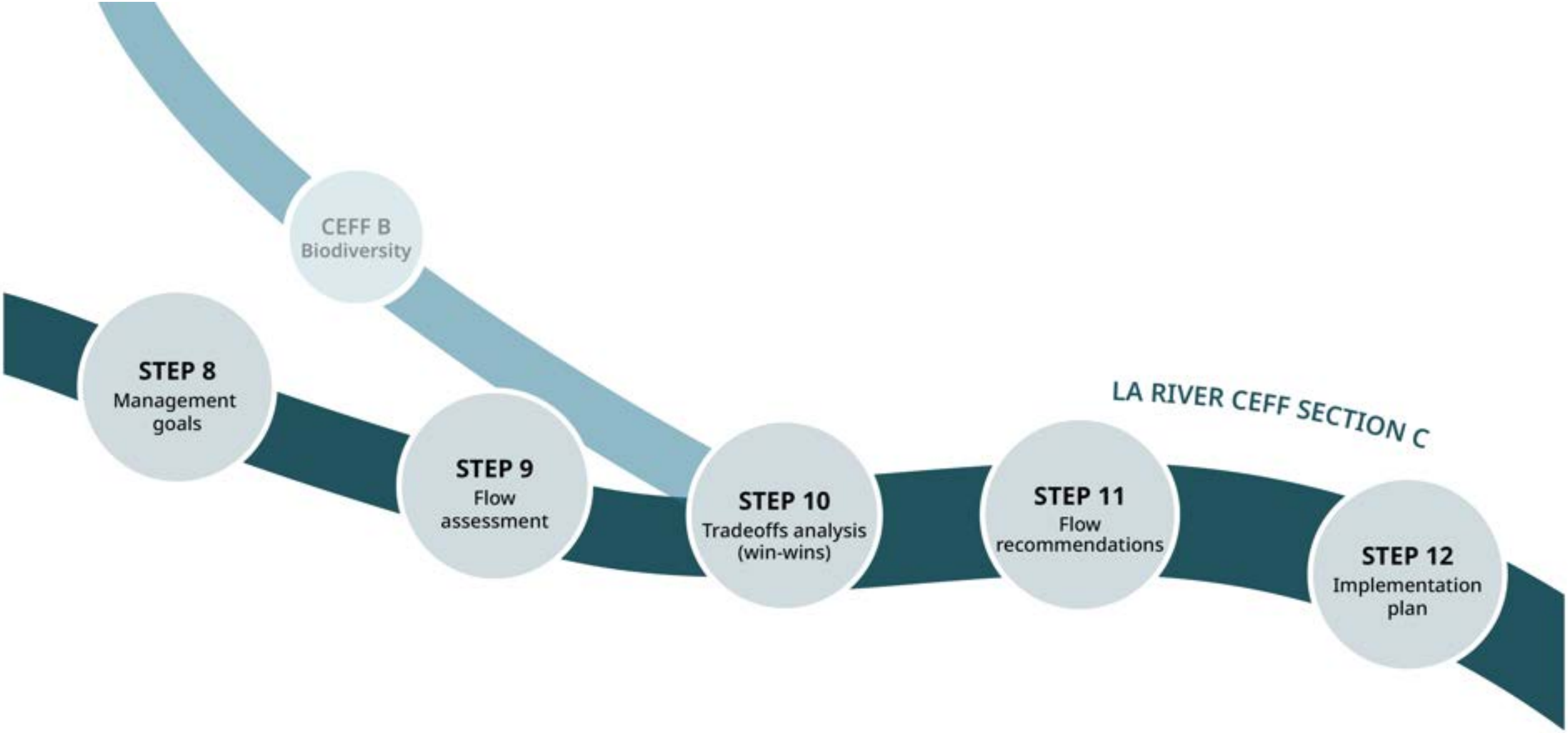
Questions

Photo credit: Ian Shive

LA River CEFF Process: We are HERE



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Breakout questions

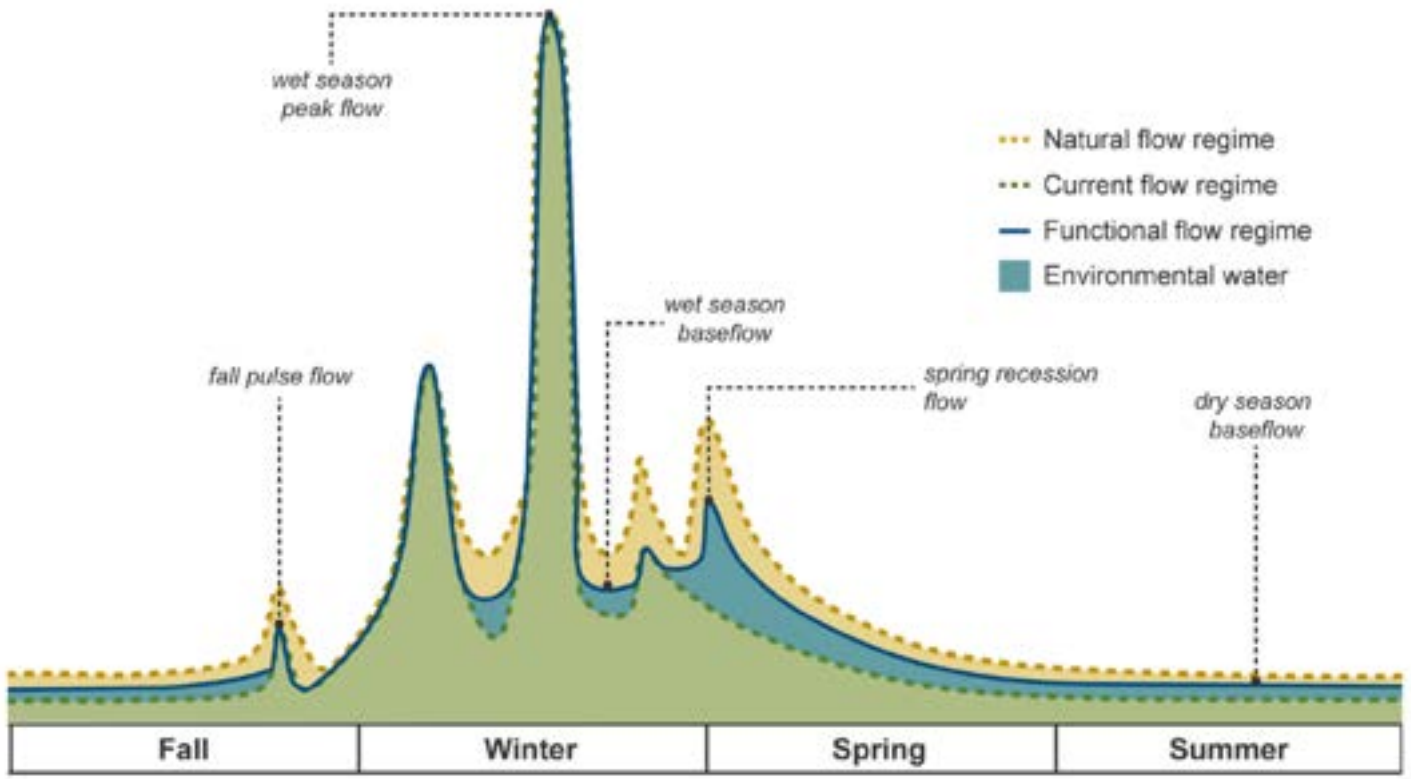
Discuss how the LA River CEFF products could be useful to your organization.

Can you envision other useful end products from the CEFF process?

Recommended hydrograph per functional flow in the LA River

- Flow magnitude
- Timing
- Duration
- Range of variation between wet, moderate, and dry water years

Guide future design to ensure modifications to channel can accommodate potential range of future flows.



Source: Stein et al. (2022) Allocations and environmental flows. https://doi.org/10.2166/9781789062786

Recommended management actions and projects to support goals

- Potential **operational changes to address near-term flow reductions** from designed projects
- Potential **near-term channel form design changes to achieve goals** and balance flow needs
- **Changes to long-term plans** for themes to achieve win-wins

Implementation Plan Recommendations

- Structured decision-making **tools and suitability criteria to guide design of future projects**
- Adaptable framework to **track and manage goal achievement**
- **Phasing of projects** to align timing of flow changes with channel form changes
- **Implementation plan and "observance" of CEFF recommendations**

Breakout questions

Discuss how the LA River CEFF products could be useful to your organization.

Can you envision other useful end products from the CEFF process?

Lunch

Photo credit: NPS / Jeff Sikich

CEFF Structured Decision Making Process

Photo credit: Hannah Michael Flynn / Stillwater Sciences

What is the decision support tool, and who is it for?

- Provides a roadmap and communicates key information about the project process, assumptions, analysis methods, results, and recommendations with the TWG, Stakeholders, and broader project team, focusing on:
  - Sharing key information needed for decision making
  - Graphic and visual communication, spatial data
  - Gathering feedback and refining CEFF modeling *(e.g., building river-wide scenarios or altering river project or watershed design project parameters)*

How will it work?

DRAFT Decision Support Tool Framework

CEFF Progress Tracking Dashboard
Audience: TTWGs, CEFF team

Module 1: Goals and Management Actions

Audience: TWG, Stakeholders

Module 2: Flow Assessment

Audience: TTWGs, CEFF team

Module 3: Performance Results

Audience: TWG, Stakeholders

Final Product
LA River CEFF Flow and Management Recommendations

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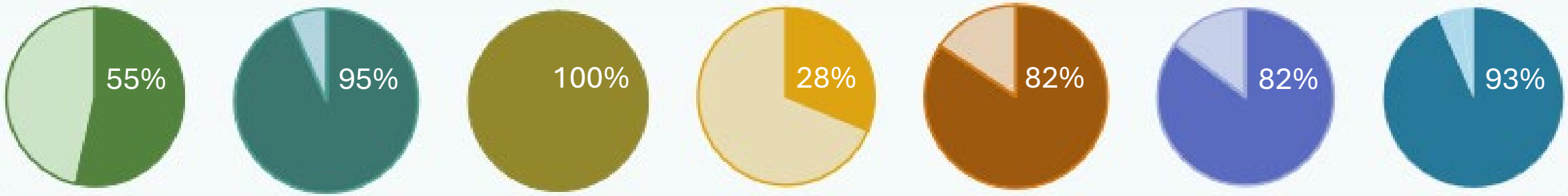
Final Product
LA River CEFF Flow and Management Recommendations

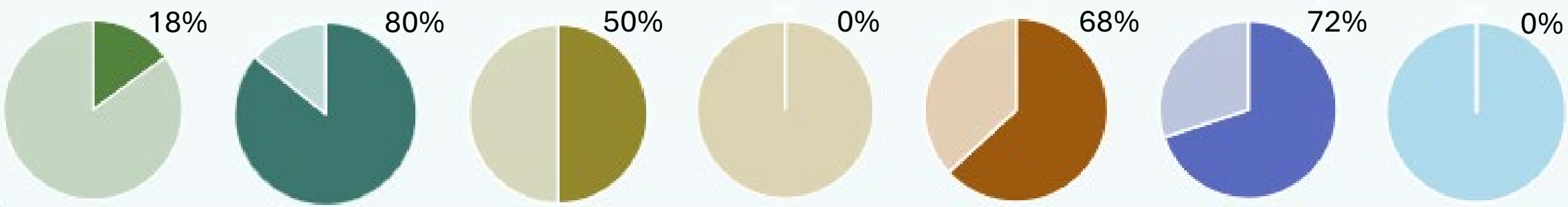
TTWG Progress Dashboard

BIODIVERSITY | FLOOD RISK MANAGEMENT | RECREATION | TRIBAL / CULTURAL | URBAN COOLING | WATER QUALITY | WATER SUPPLY

*Percent of **management goals** with draft performance measures*



*Percent of **draft performance measures** ready to advance in LA River CEFF analysis*



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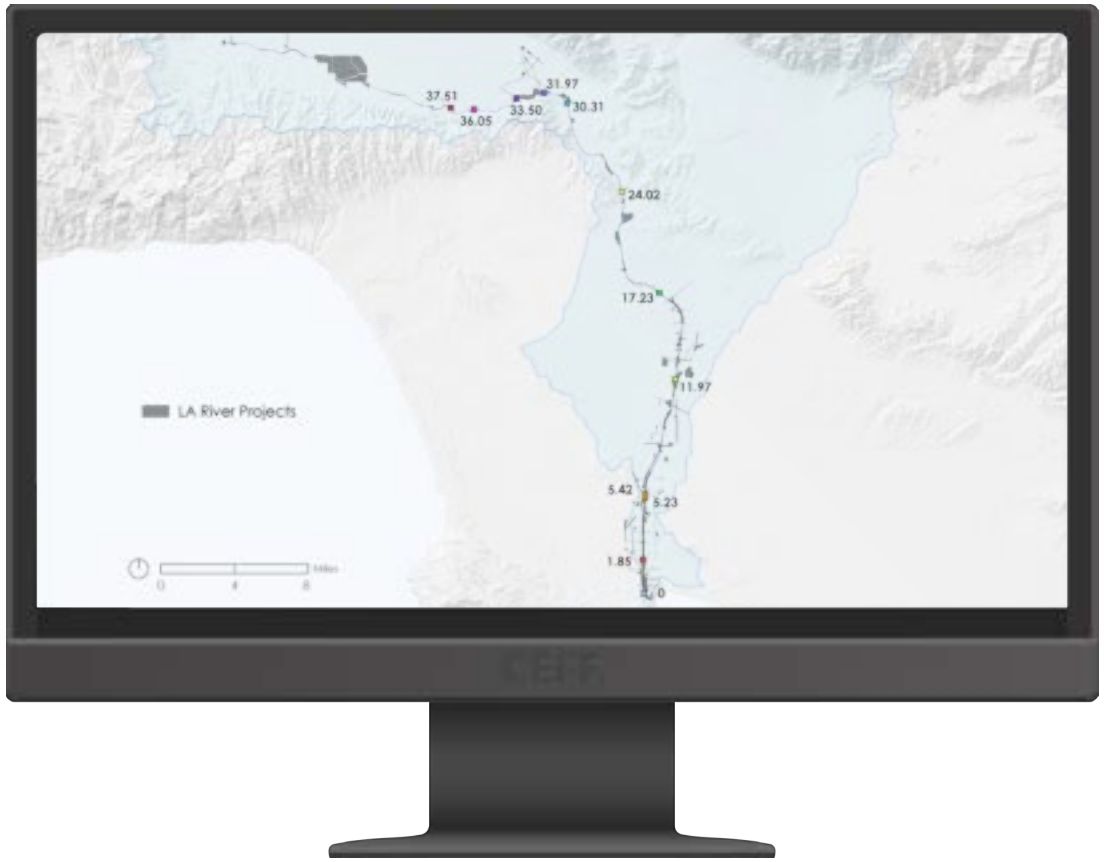
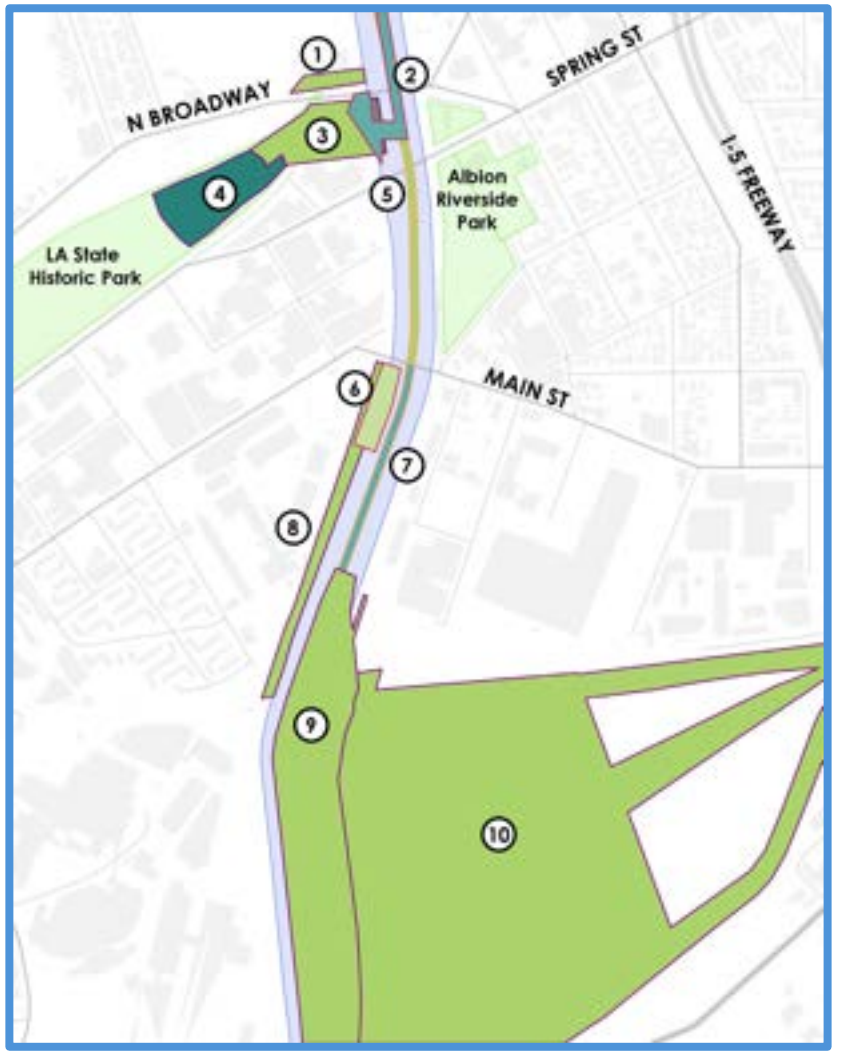
Final Product
LA River CEFF Flow and Management Recommendations

DRAFT GIS Online Map Interface Mock Up





1. ARBOR natural stream confluence
2. Bend the River Back into the City
3. ARBOR riparian planting
4. ARBOR freshwater marsh
5. DTLA Fish Passage & Habitat Structures
6. Main St Terrace
7. Reach 8A Fish Passage
8. ARBOR terraced floodplain expansion
9. Piggyback Yard – floodplain expansion
10. Piggyback Yard – concrete removal

ARBOR Other

LARMP

DRAFT Decision Support Tool Framework

CEFF Progress Tracking Dashboard
Audience: TTWGs, CEFF team

Module 1: Goals and Management Actions

Audience: TWG, Stakeholders

Module 2: Flow Assessment

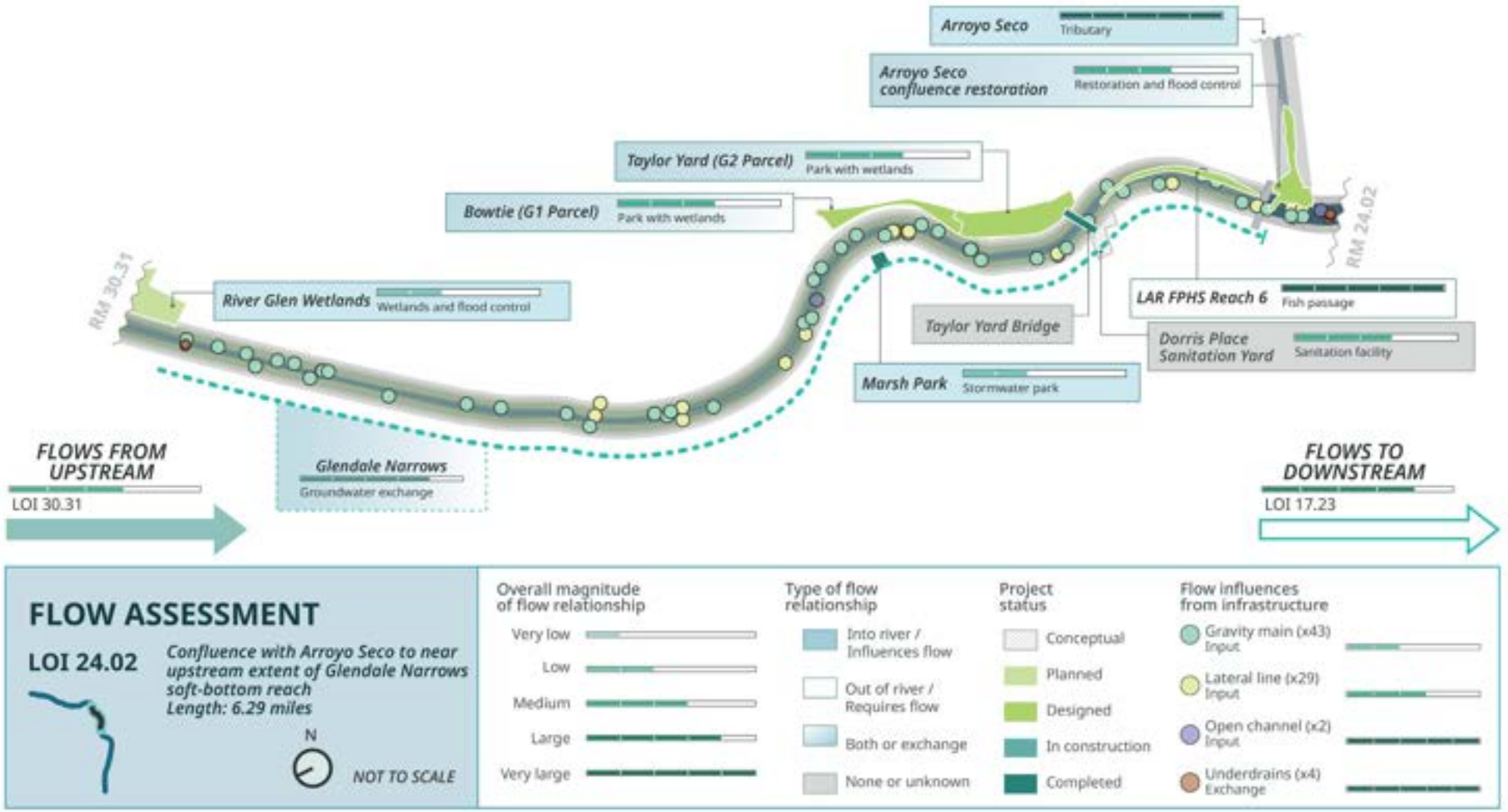
Audience: TTWGs, CEFF team

Module 3: Performance Results

Audience: TWG, Stakeholders

Final Product
LA River CEFF Flow and Management Recommendations

Flow assessment reach example



*Relative magnitude of influence of individual flow components on the overall flow and individual functional flow are *not finalized* and populated with only test information.

DRAFT Decision Support Tool Framework

CEFF Progress Tracking Dashboard
Audience: TTWGs, CEFF team

OPTIMIZING MANAGEMENT ACTIONS

Module 1: Goals and Management Actions

Audience: TWG, Stakeholders

Module 2: Flow Assessment

Audience: TTWGs, CEFF team

Module 3: Performance Results

Audience: TWG, Stakeholders

Final Product
LA River CEFF Flow and Management Recommendations

DRAFT Performance Results Interface Mock Up

LA RIVER CEFF

Rbdm`qhn Bnl o`qhrnmSnnk

Scenario 1: 00 Existing conditions

Scenario 2: Select...

- 1A Min planned
- 1B Max planned
- 2A Max fish passage
- 2B Phased fish passage

Location: LOI 17.29

Compare scenarios...

Combine scenarios...

*Relative magnitude of influence of individual flow components on the overall flow and individual functional flow are *not finalized* and populated with only test information.

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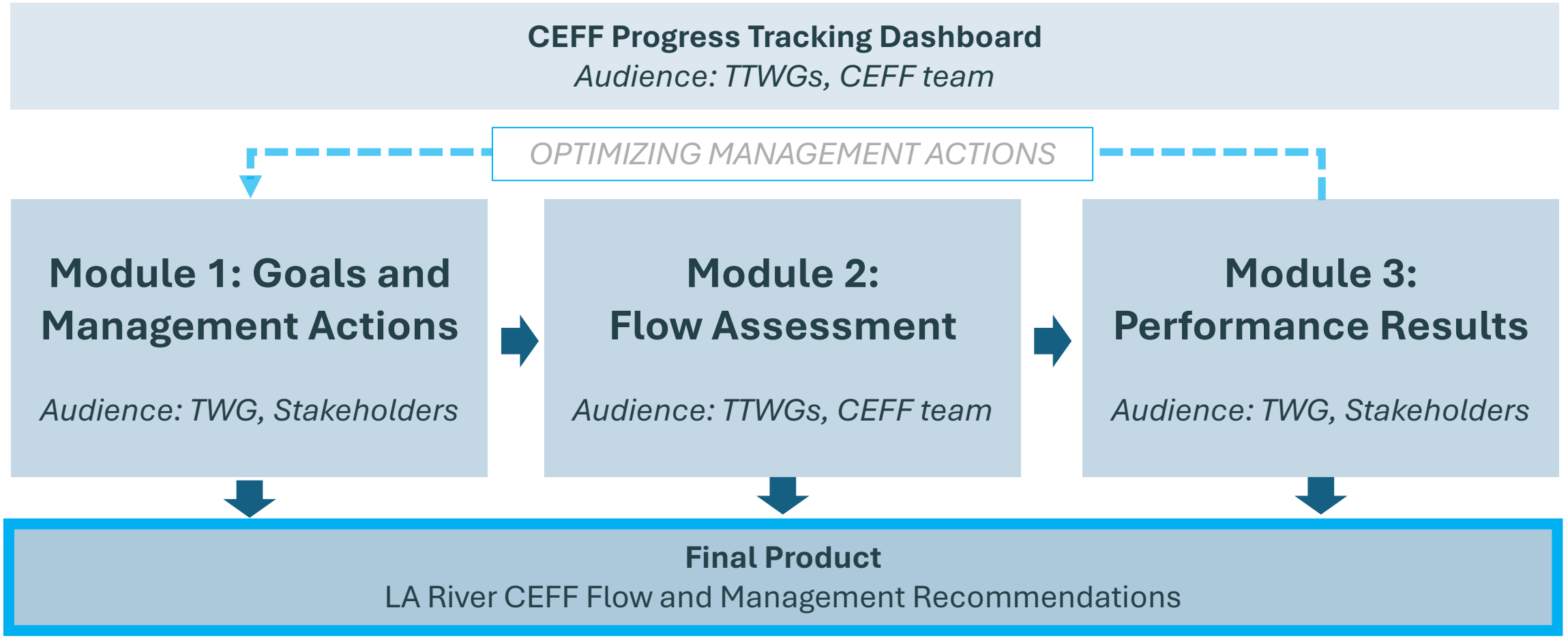
DRAFT Decision Support Tool Framework



Questions

Photo credit: Ian Shive

Next Steps

“River Access for All”, Los Angeles, CA

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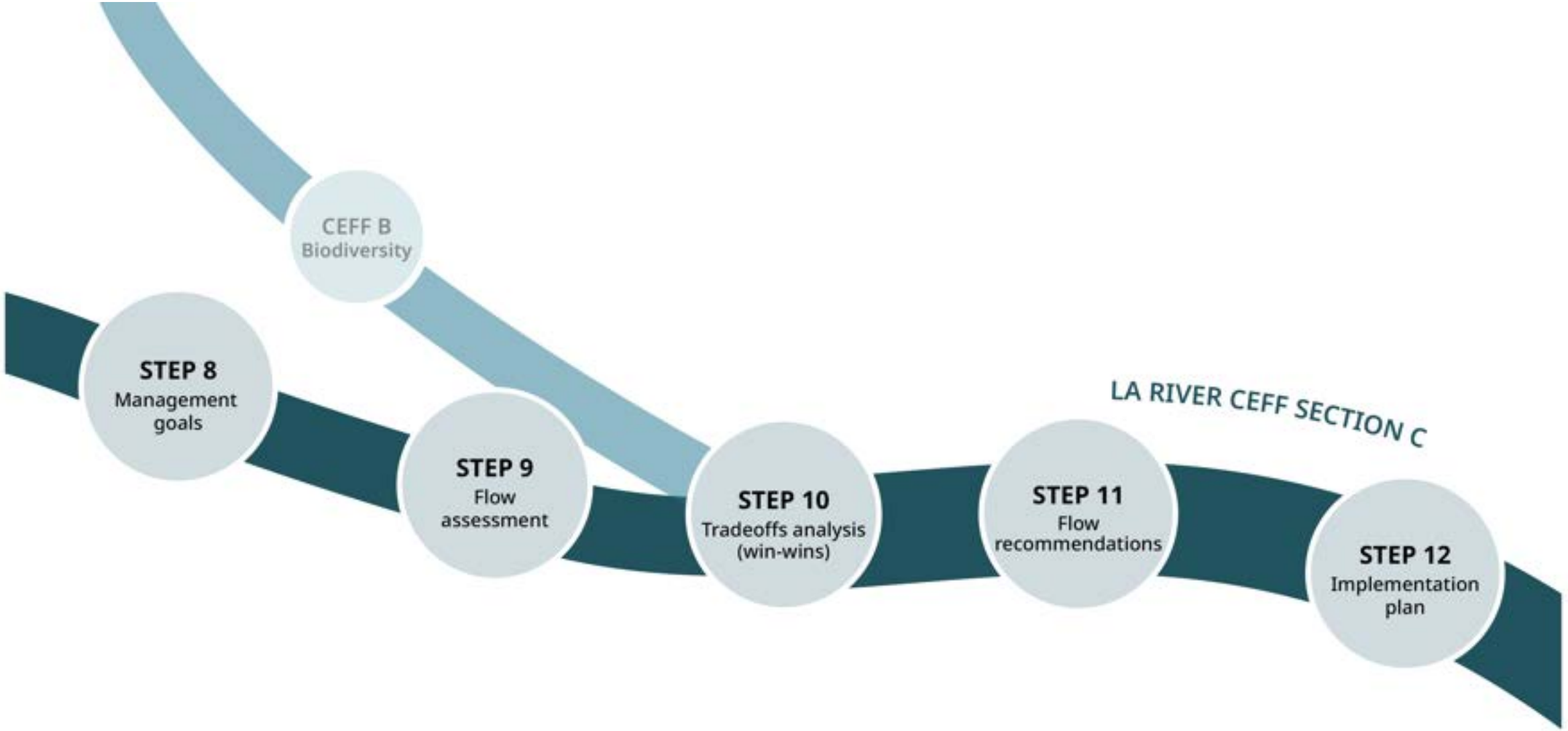
Next Steps – TWG#4



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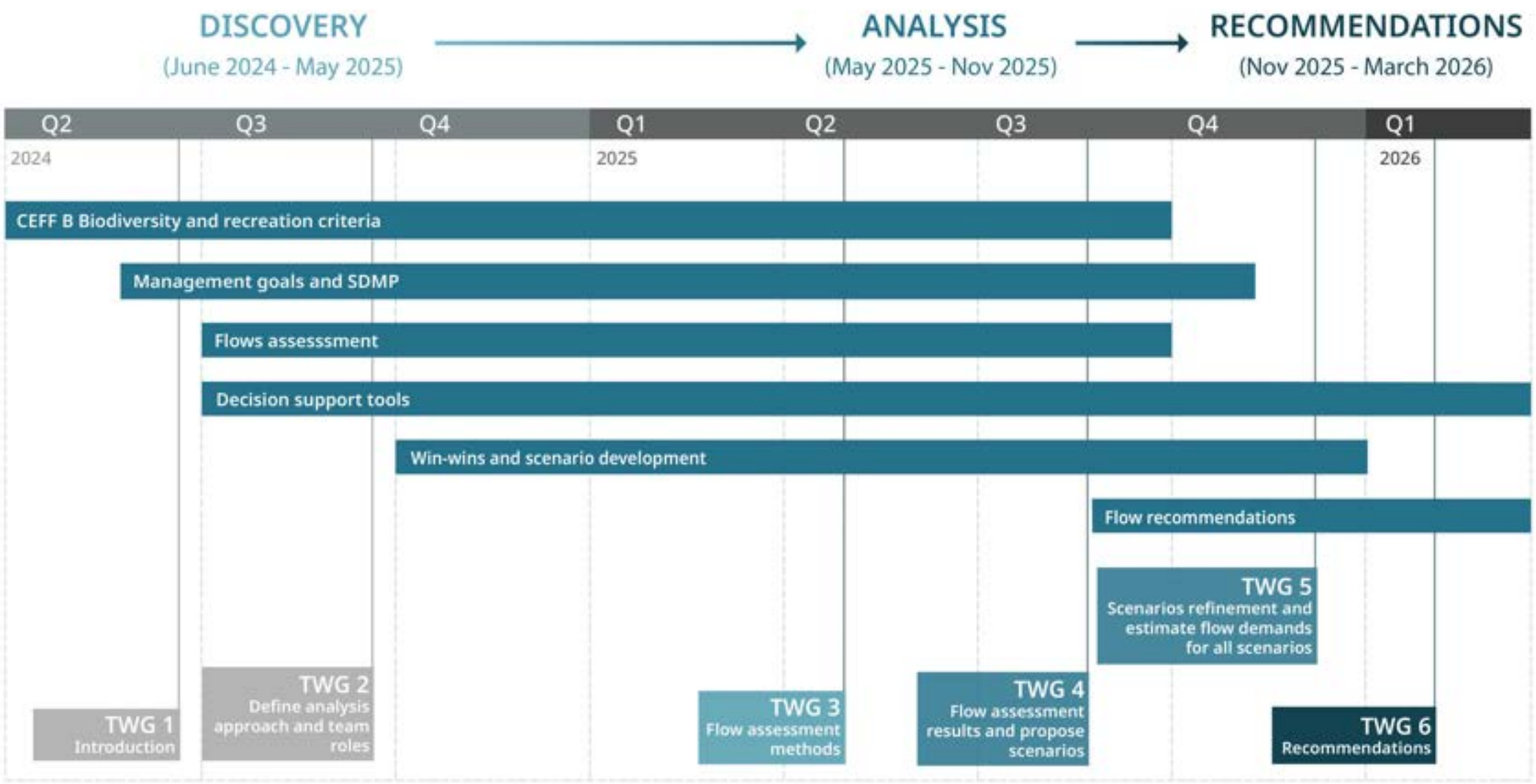
CEFF PROJECT SCHEDULE



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DISCUSSION QUESTIONS

Discussion question

Which elements of LA River CEFF would you like to understand better?

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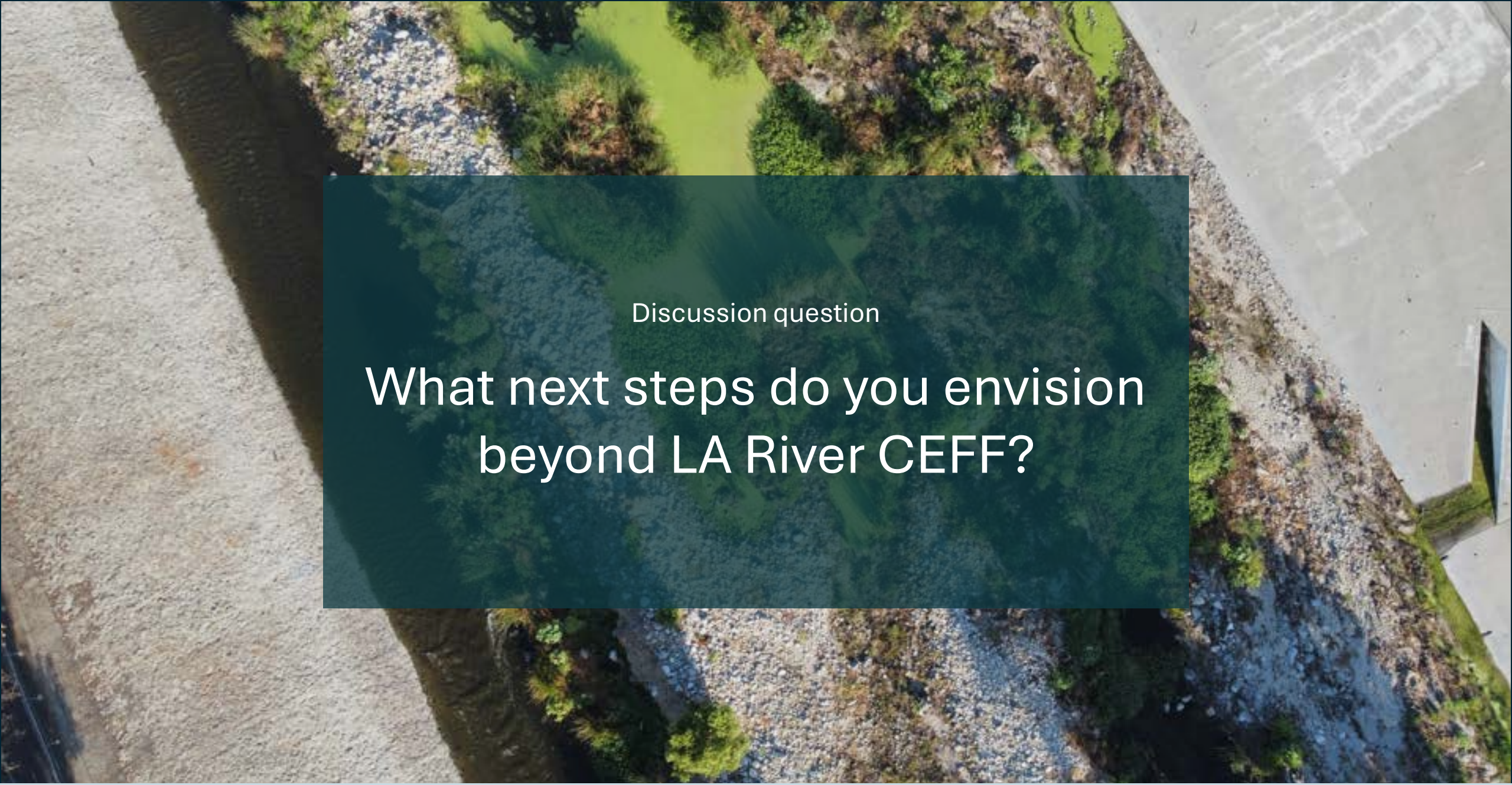
Discussion question

What challenges do you anticipate in the CEFF process?



Discussion question

What next steps do you envision beyond LA River CEFF?

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LA River CEFF

LA River from Fletcher Street Bridge, Los Angeles, CA