Application of the California Environmental Flows Framework (CEFF) to the Los Angeles River

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August 13, 2024

Mountains Recreation & Conservation Authority

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Los Angeles River Background

Los Angeles River at Glendale/Hyperion Bridge, circa 1937

Source: https://tessa.lapl.org/cdm/singleitem/collection/photos/id/83078/rec/401

Los Angeles River near Ninth Street looking north, circa 1938

Source: https://tessa2.lapl.org/digital/collection/photos/id/83078

Source: Los Angeles River Master Plan

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Los Angeles River Background

Los Angeles River, Glendale Narrows facing south from Taylor Yard Bridge (August 2023)

Los Angeles River, Glendale Narrows facing south from Taylor Yard Bridge (January 2023)

Source: Los Angeles River Master Plan

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Los Angeles River Background

Los Angeles River, Glendale Narrows

Los Angeles River, south of Downtown

The Los Angeles River is ***the*** major ecological, recreational, and flood-conveyance waterway in the Los Angeles River watershed.

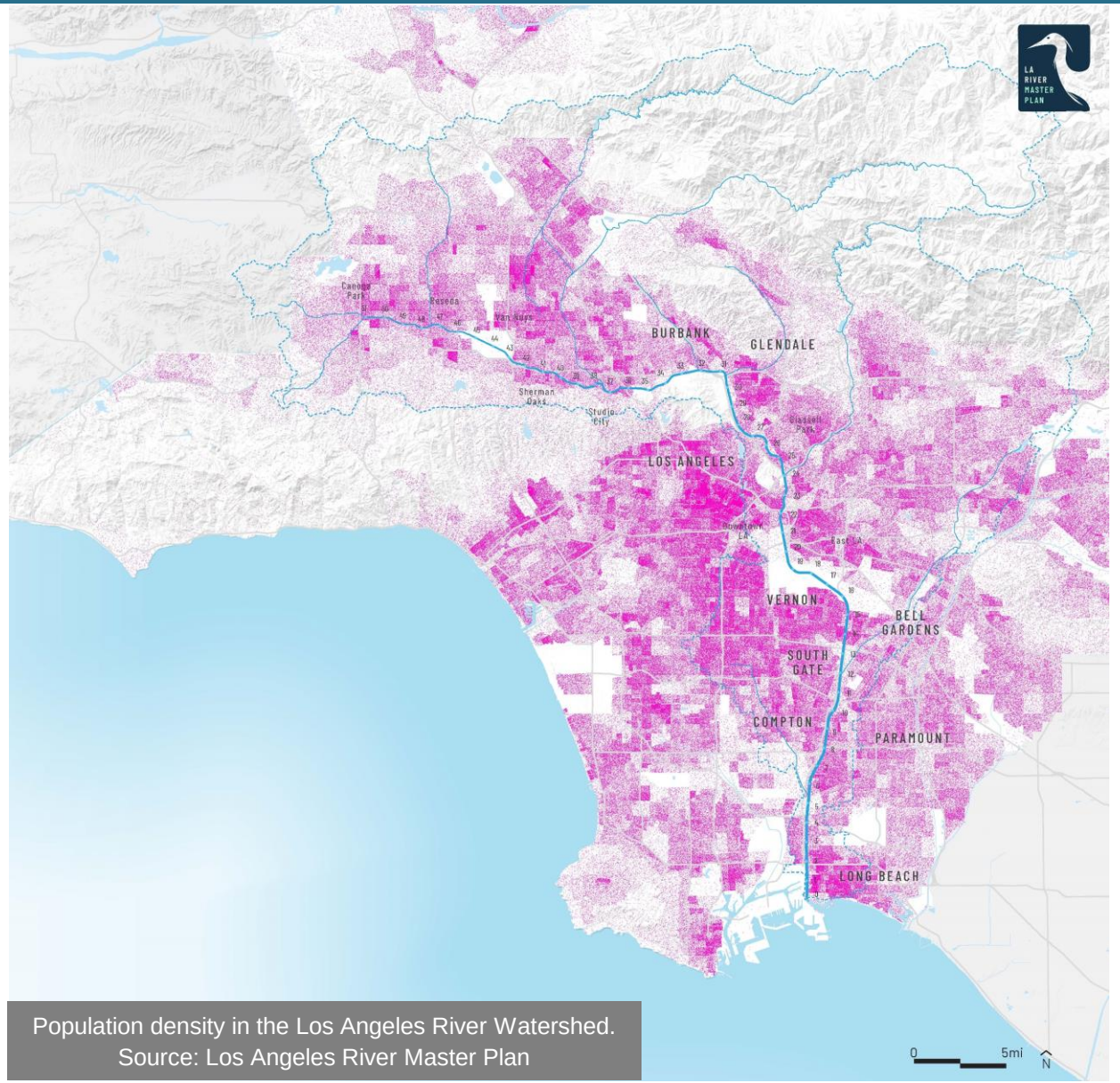
Los Angeles River Background

The Los Angeles River is many things to many people.

Nearly 1 million people live within 1 mile of the river.

More than a third of all Californians live within a 1-hour drive of the Los Angeles River.

Many management goals exist for a river that serves such a large community.



Population density in the Los Angeles River Watershed.
Source: Los Angeles River Master Plan

The Seven Los Angeles River Management Goals “Themes”

Los Angeles River California Environmental Flows Framework (LAR CEFF)

How did we get here?

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LAR CEFF: How did we get here?

- Multiple actions are ongoing or planned that will likely alter flows, ecology, and beneficial uses along the LA River.
- LA River Environmental Flow Project developed initial toolkit to evaluate link between flow and ***some*** of the LA River ecology and beneficial uses.
- ***LA River Environmental Flow Project had limited scope and did not make flow recommendations that address all LA River management goals.***
- An approach was needed to more holistically evaluate link between flow and LA River management goals.

Los Angeles River California Environmental Flows Framework (LAR CEFF)

How did we get here?

Why was CEFF selected?

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LAR CEFF: Why was CEFF selected?

CEFF was funded by the State Water Board.

CEFF is being put forth as the tool for determining flow recommendations in California.

In some projects, state agencies are strongly recommending or requiring CEFF analysis as part of their decision-making process.

CEFF is able to build on previous work by LA River Environmental Flows Project

State Water Board has stated they would use the information developed in the CEFF process in future decisions.

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Los Angeles River California Environmental Flows Framework (LAR CEFF)

How did we get here?

Why was CEFF selected?

What CEFF work has been completed or is in-process for Sections A and B?

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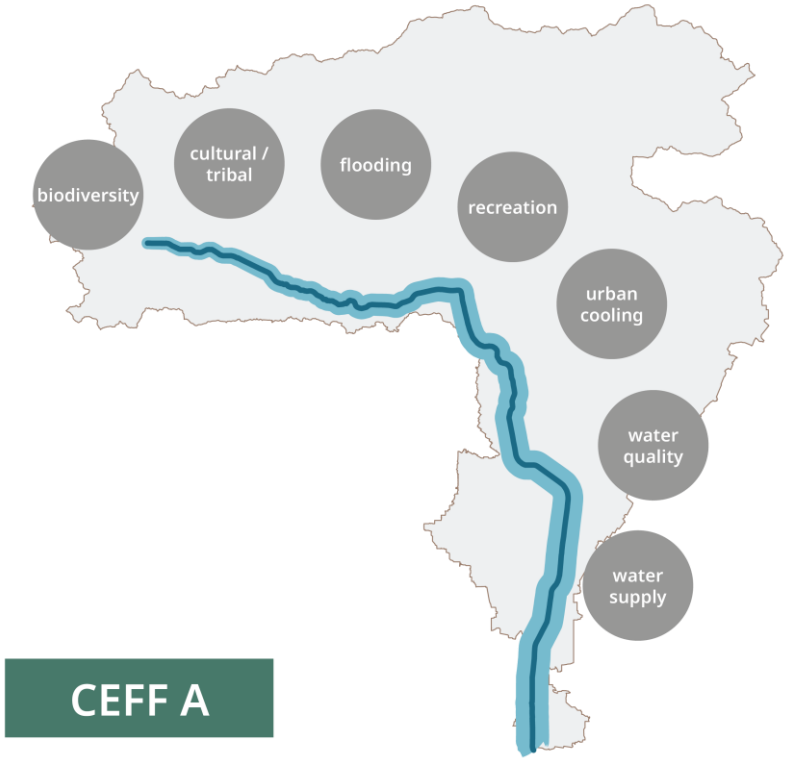
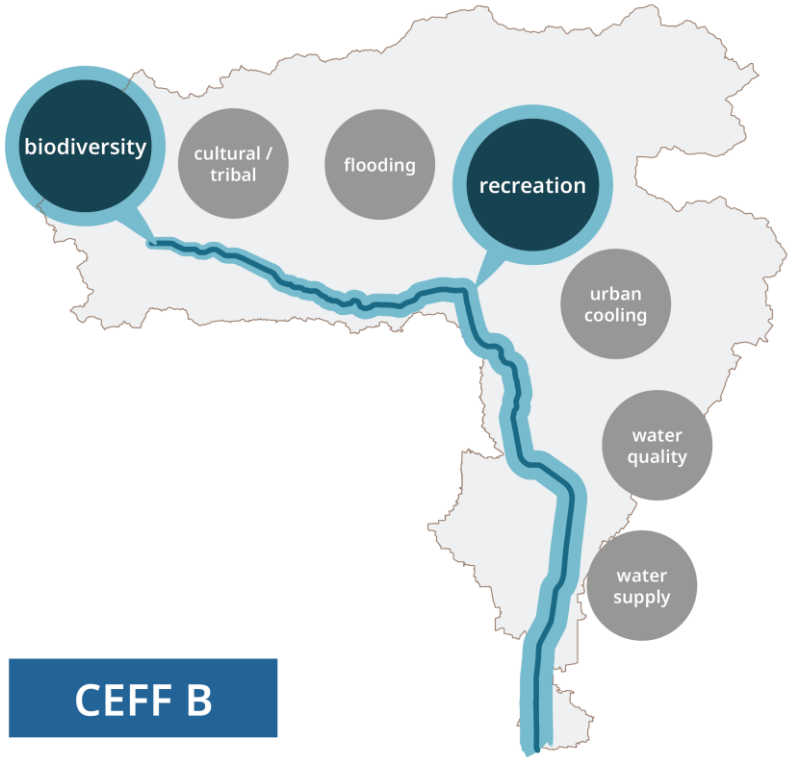
CEFF Process Overview for the Los Angeles River



CEFF A

Understanding the system's **biodiversity goals and natural baseline.**



CEFF B

Understanding flow needs for **biodiversity and recreation** goals in the river.

CEFF C

Developing flow recommendations that best **align with the many goals** across the watershed.

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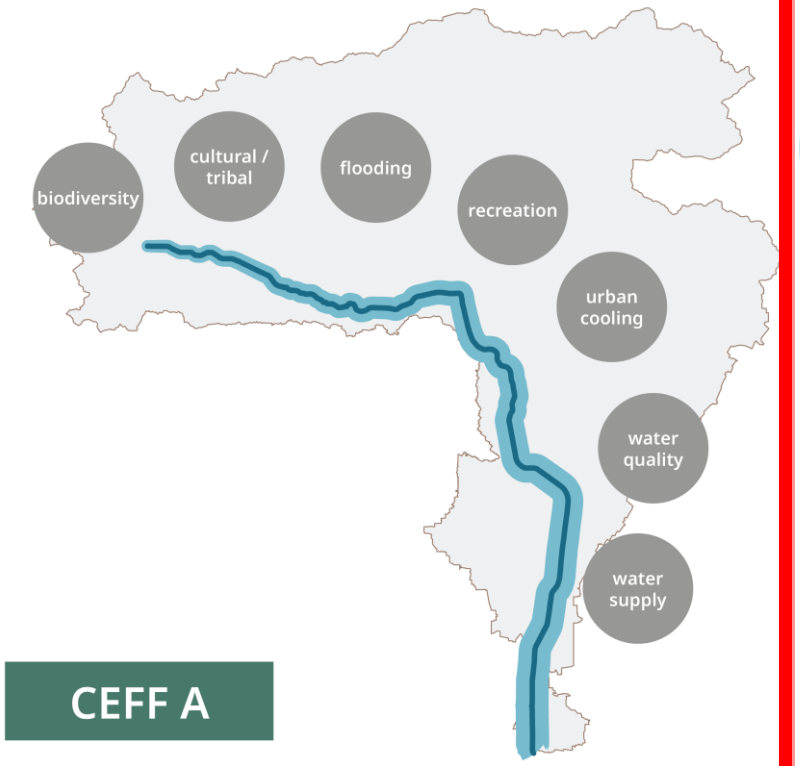
CEFF Process Overview for the Los Angeles River



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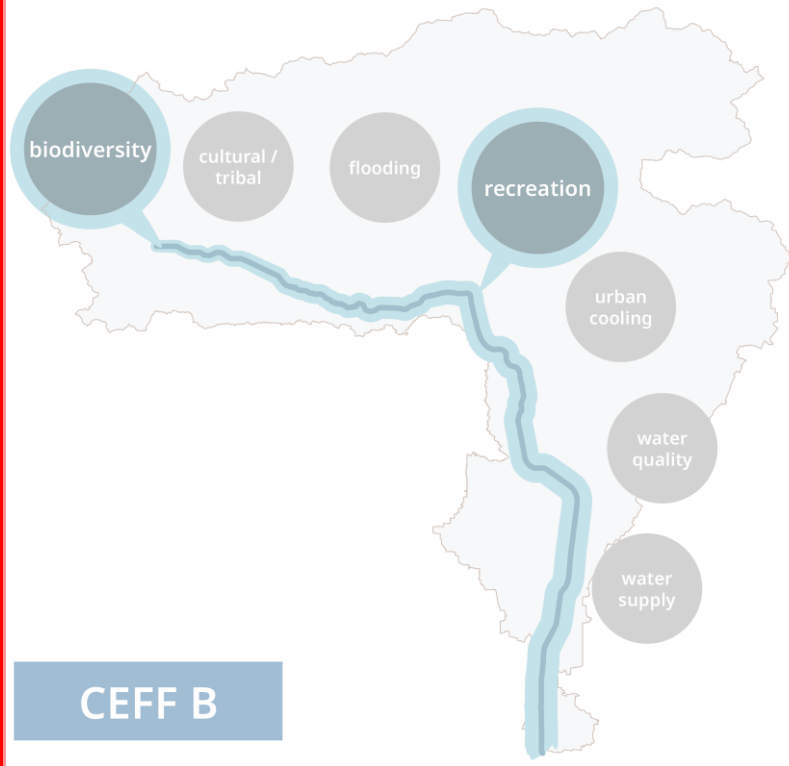

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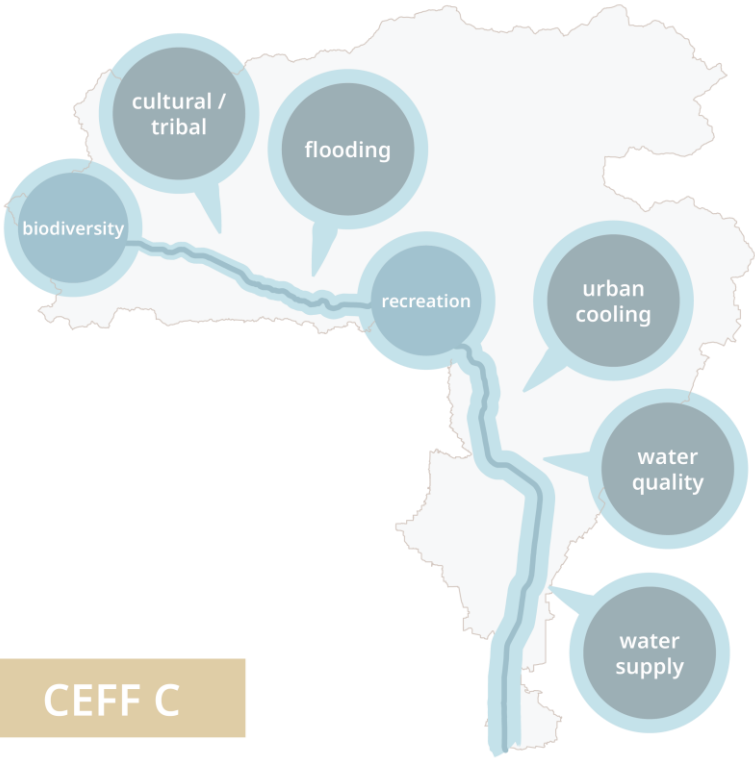

CEFF C

Developing flow recommendations that best **align with the many goals** across the watershed.

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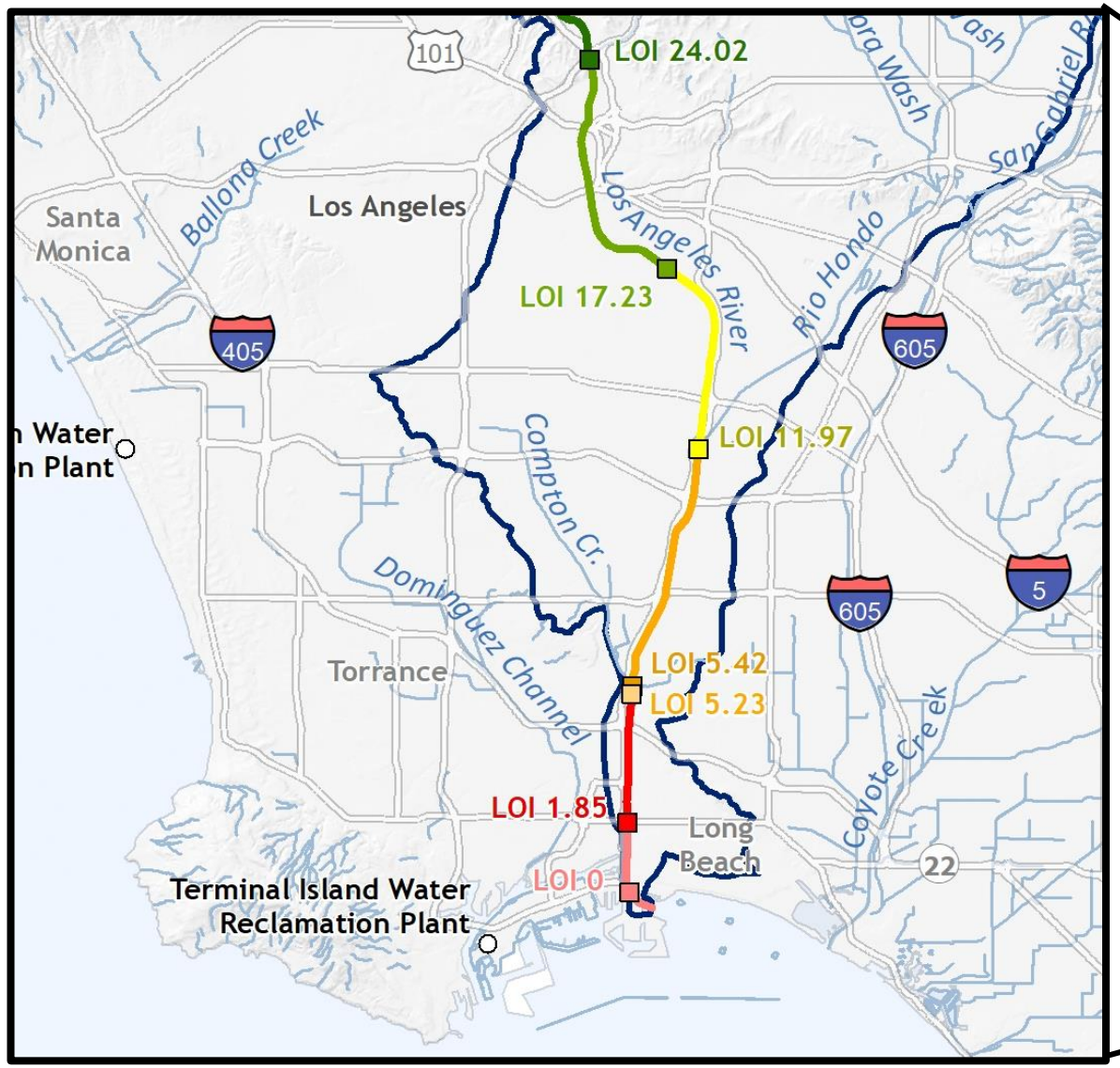
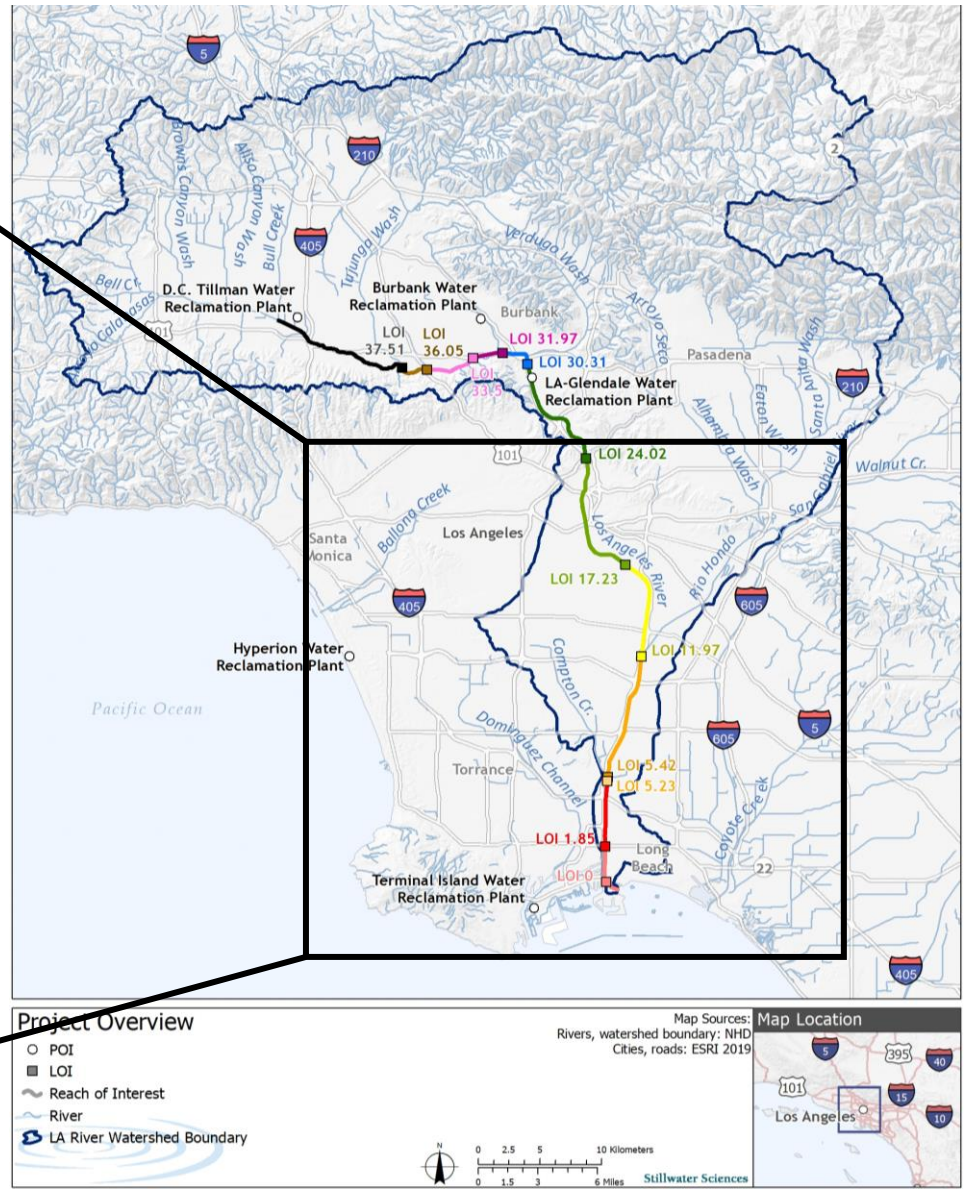
Where will we analyze flows along the LA River?





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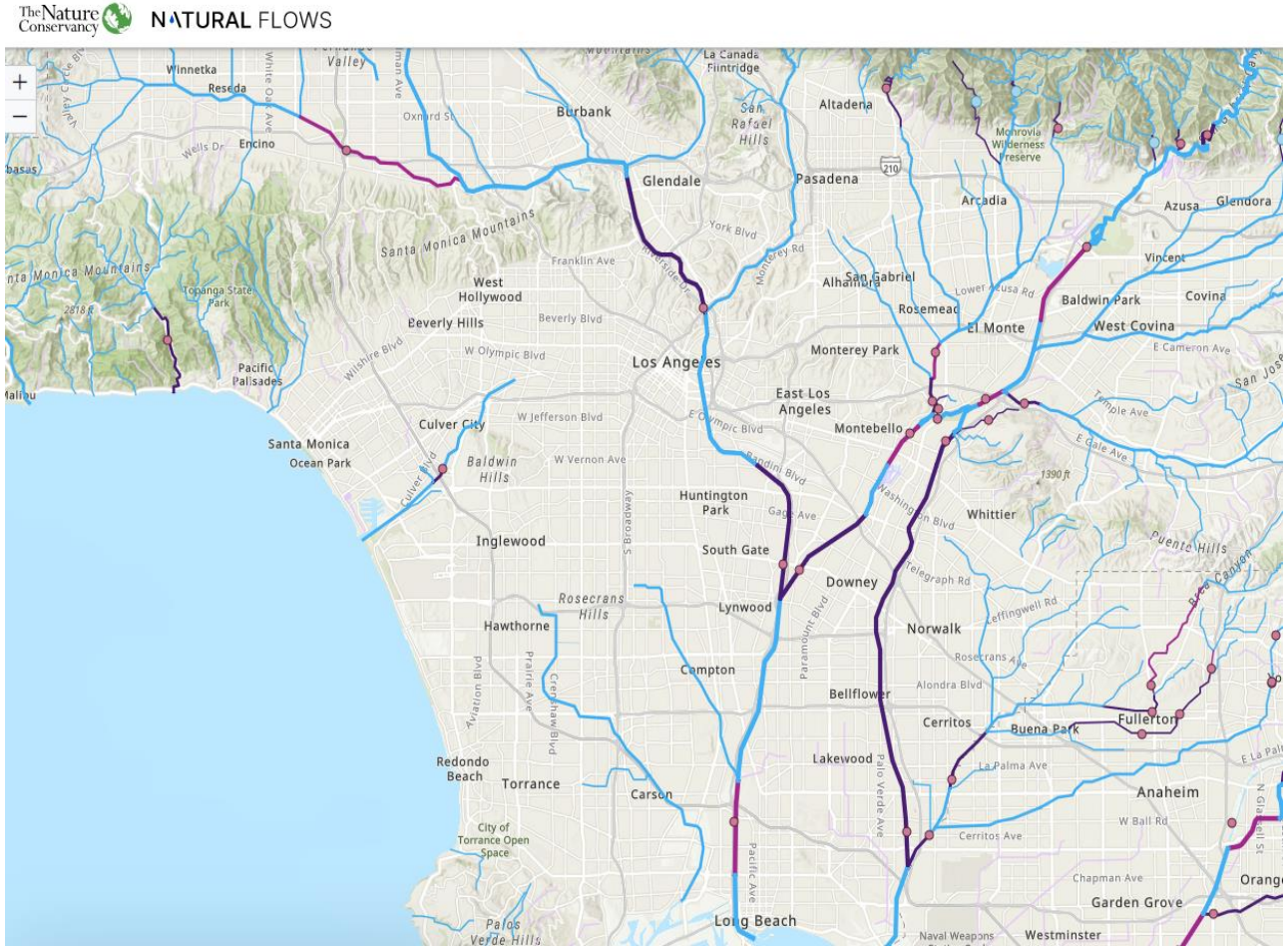
What are the LA River Biodiversity Management Goals?

Biodiversity Management Goal	Planning Document Source
Support healthy, connected ecosystems	LA River Masterplan (2022)
Conserve, enhance and restore habitat, biodiversity, and floodplain functions	Lower LA River Revitalization Masterplan (2018)
Restore Valley Foothill riparian strand and freshwater marsh habitat	LA River Ecosystem Restoration Project IFR (2015)
Increase habitat connectivity	
Restore a functional riparian ecosystem	LA River Revitalization Masterplan (2007)
Southern California steelhead recovery (viable)	NMFS Southern California Steelhead Recovery Plan (2012)
Southern California steelhead recovery (fishery)	
Santa Ana sucker recovery	USFWS Recovery Plan for the Santa Ana Sucker (2017)
Reclassification of the least Bell's vireo to threatened and, ultimately, delisting through recovery[1]	USFWS Draft Recovery Plan for the Least Bell's Vireo (1998)[1]

[1] Biodiversity management goal added after LAR CEFF Technical Working Group 1 on June 11, 2024, based on feedback from USFWS. It was not included in the LAR CEFF Section A report issued in July 2023.

What are “natural” flows in the LA River?



Source: https://rivers.codefornature.org

Natural flows are estimated from the California Natural Flow Database (CNFD), as required by CEFF.

CNFD “natural” flows are less accurate when significant surface water-groundwater interactions occur.

Historical data (1890s) suggests CNFD “natural” flows likely underpredict true natural flows in portions of LA River.

Could natural flows support biodiversity goals?

CEFF Section A findings for the LA River (Stillwater Sciences, July 2023):

- Channel modifications have significantly altered relationships between flow, water depth, water velocity, and shear.
- Natural flows no longer able to support ecological functions needed to achieve biodiversity goals.
- CEFF Section B analysis is needed to determine flows that will now support biodiversity goals.

LA River near Riverfront Park, Maywood, CA

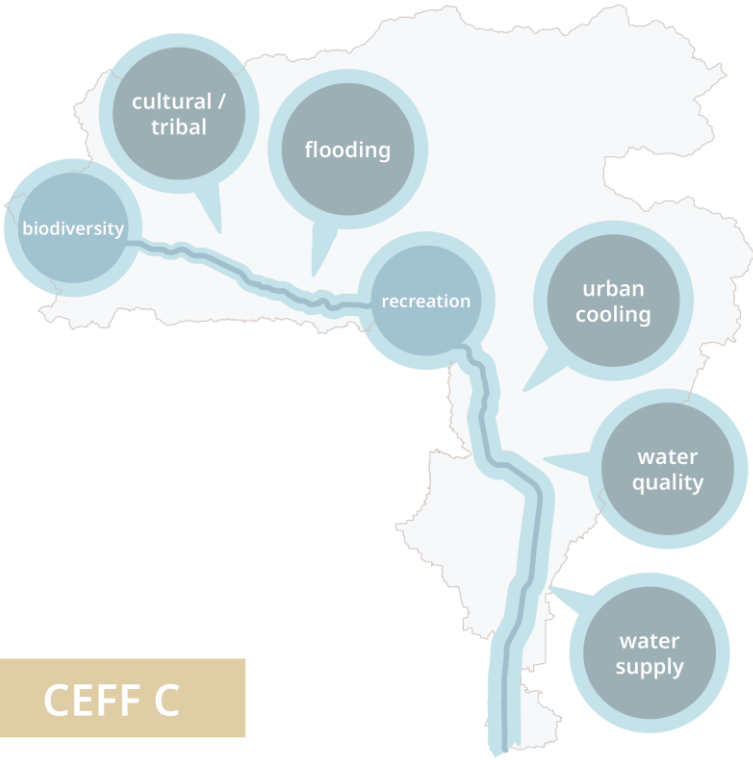
CEFF Process Overview for the Los Angeles River

CEFF A

Understanding the system's **biodiversity goals and natural baseline.**

CEFF B

Understanding flow needs for **biodiversity and recreation** goals in the river.



CEFF C

Developing flow recommendations that best **align with the many goals** across the watershed.

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How do you determine flow needs for goals?

BIODIVERSITY MANAGEMENT GOAL GROUP 1

Support healthy, connected ecosystems

Conserve, enhance, and restore habitat biodiversity, and floodplain functions

Increase habitat connectivity

ESSENTIAL ELEMENTS

CONCEPTUAL MODELS

ESSENTIAL ELEMENTS	CONCEPTUAL MODELS
Riparian Habitat for Recruitment and Establishment of Seedlings and Saplings (< 3 year)	Riparian Habitat (< 3 years)
Riparian Habitat for Continued Establishment and Growth of Vegetation (> 3 year)	Riparian Habitat (> 3 years)
Migratory Songbirds	Focal songbird species
Steelhead Migration	Steelhead migration
Santa Ana Sucker	Santa Ana sucker

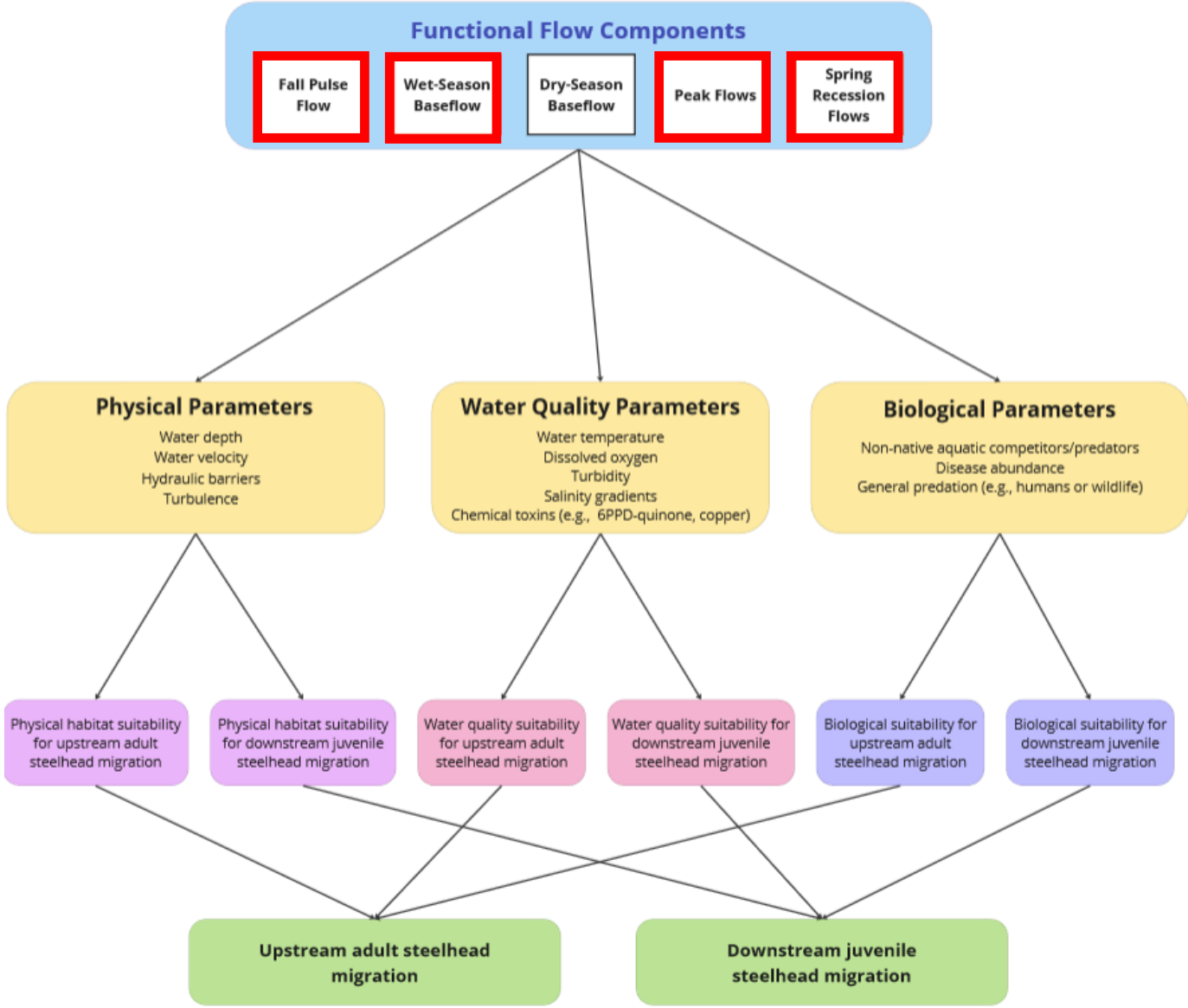
(and more)

Conceptual Model Example: Steelhead Migration

The LA River CEFF took expansive approach for conceptual models.

Identify all potentially important parameters linking flow and goal outcomes.

Parameters that are considered when determining flow criteria will be identified in next steps.



CEFF Section B: What flow criteria are needed to support the goals?

The range of a parameter necessary to support a goal outcome ("suitability criteria") are compiled from literature.

The LA River CEFF utilizes LA River Environmental Flows Project focal species flow-ecology relationships when possible.

Uncertainties and data gaps for parameters are documented, highlighting what may need revisited in the future.

Available models of the LA River will be used to determine the functional flow criteria to support biodiversity and recreation goal outcomes.

Parameter	Units	Adult Steelhead Upstream Migration Suitability Criteria	Source
Physical			
Thalweg Water Depth	ft	> 0.7	Thompson 1972; Bell 1991; SWRCB 2007; CDFW 2013; SWRCB 2014; Holmes et al. 2016
Average Water Depth	ft	> 1	CDFW (Love and Bates 2009) pg. XII-54; NMFS (2023)
Cross-sectional Average Water Velocity	ft/s	60 ft length: ≤ 6.0 ft/s	CDFW (Love and Bates 2009) pg. XII-53, CDFW (Taylor and Love 2004) pg. IX-A-8; NMFS (2023) Section 5.10.3.1
		60 to 100 ft length: ≤ 5.0 ft/s	
		100 to 200 ft length: ≤ 4.0 ft/s	
		200 to 300 ft length: ≤ 3.0 ft/s	
		> 300 ft length: ≤ 2.0 ft/s	
Maximum Water Velocity	ft/s	8	Thompson 1972; Bell 1991; Bjornn and Reiser 1991
Hydraulic barriers	ft	< 1	NMFS (2023) Section 5.10.3.3; CDFW (Love and Bates 2009) pg. XII-53; CDFW (Taylor and Love 2004) pg. IX-A-8
Turbulence (Energy Dissipation Factor[EDF])	ft-lb/s/ft^3	< 7	CDFW (Love and Bates 2009) pg. XII-74
Water Quality			
Water Temperature	^{o}F	65	Bratovich et al. (2012), McCullough et al. (2001), EPA (2003), Keefer et al. 2009; NMFS (2000, 2001), Richter and Kolmes (2005), SWRCB (2003), USBR (1997, 2003), and USFWS (1995)
Dissolved oxygen	mg/L	> 7 (instantaneous)	Bjornn and Reiser 1991; Carter 2005
Minimum dissolved oxygen for migration	mg/L	> 4.5 (instantaneous)	Bjornn and Reiser 1991
...	...	...	...

Los Angeles River California Environmental Flows Framework (LAR CEFF)

How did we get here?

Why was CEFF selected?

What CEFF work has been completed or is in-process for Sections A and B?

Where are we going in CEFF Section C?

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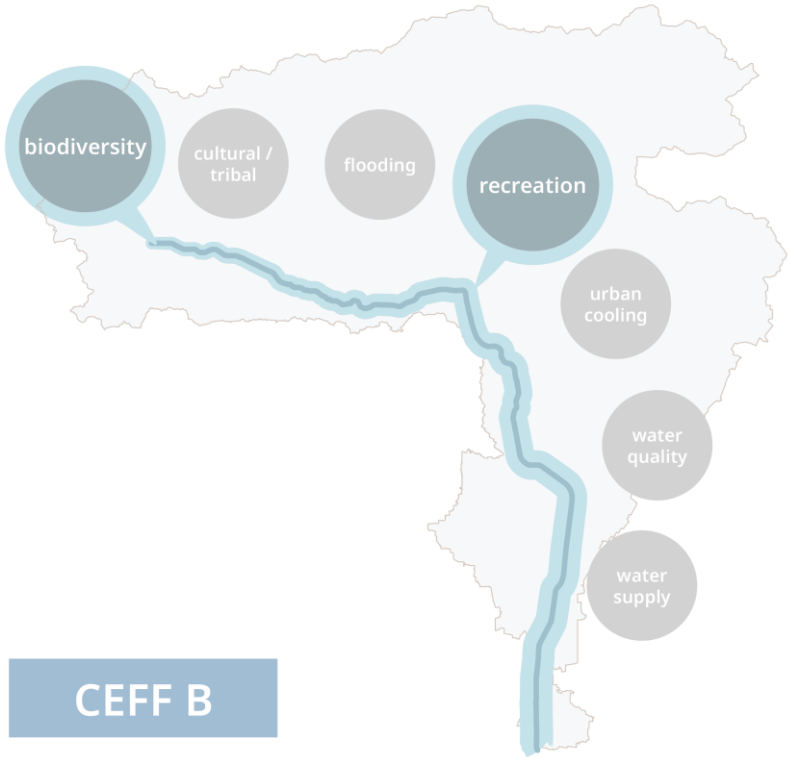
CEFF Section C: Overview for the Los Angeles River

CEFF A

Understanding the system's **biodiversity goals and natural baseline.**



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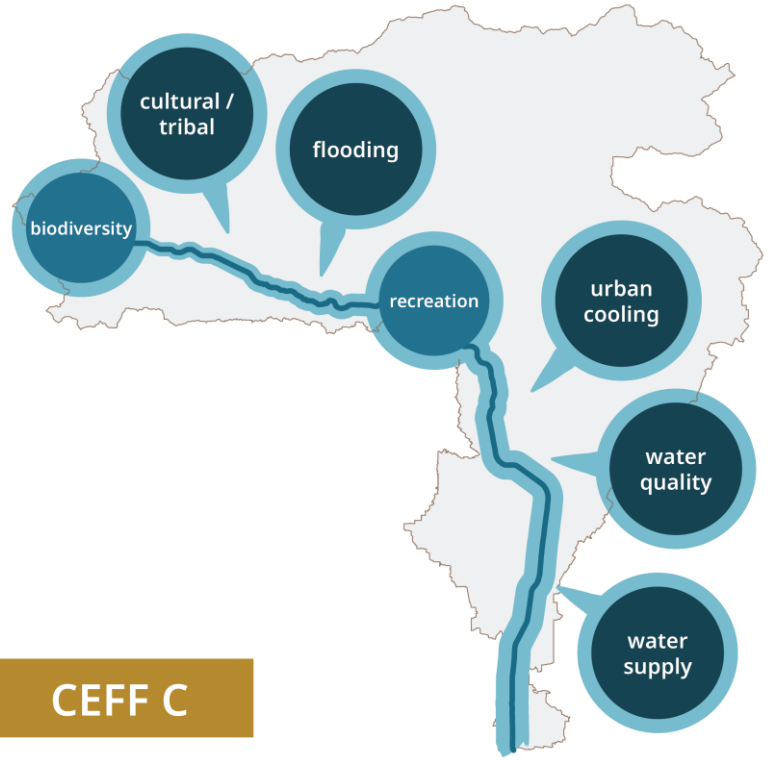

CEFF C

Developing flow recommendations that best **align with the many goals** across the watershed.

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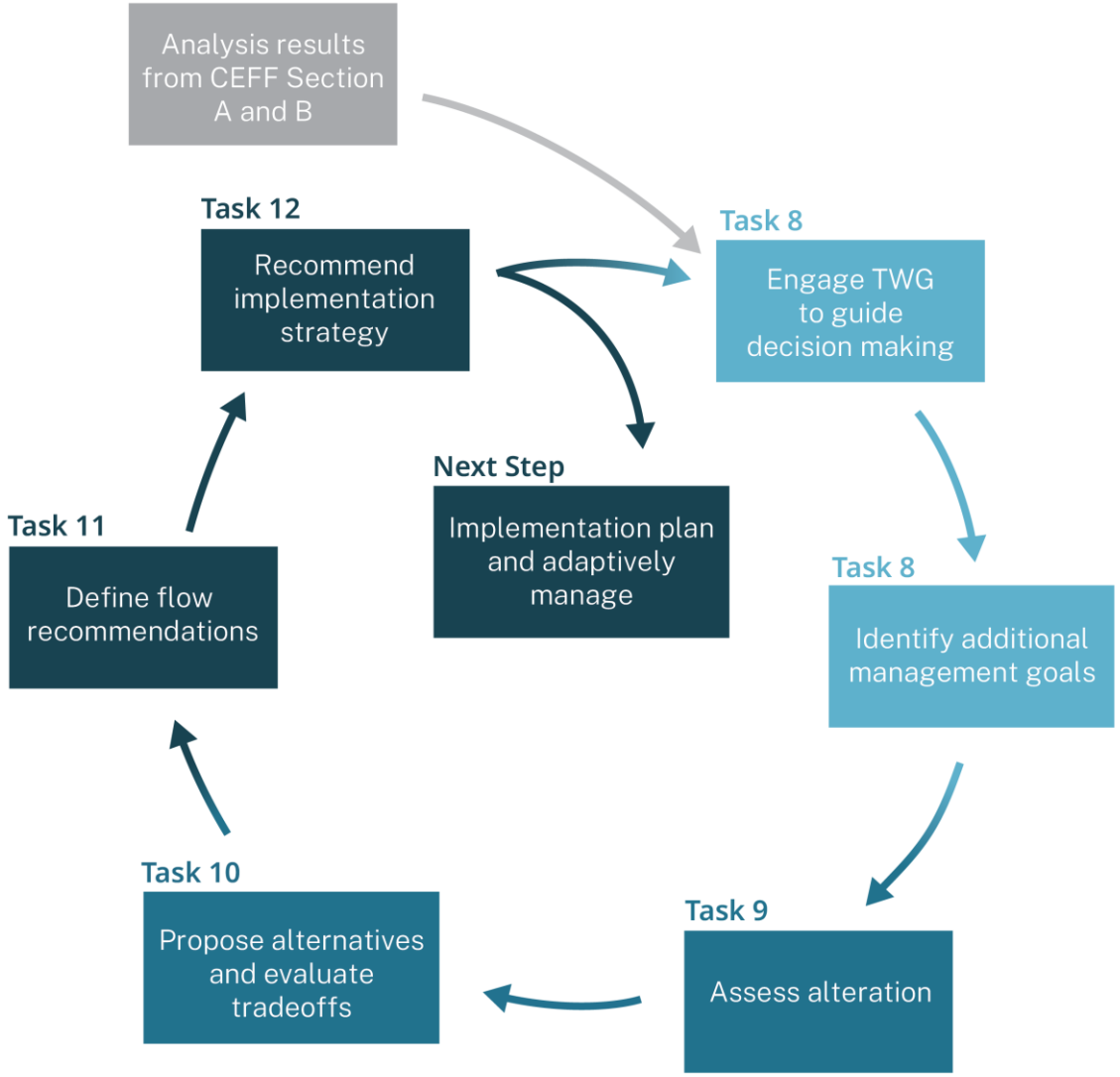
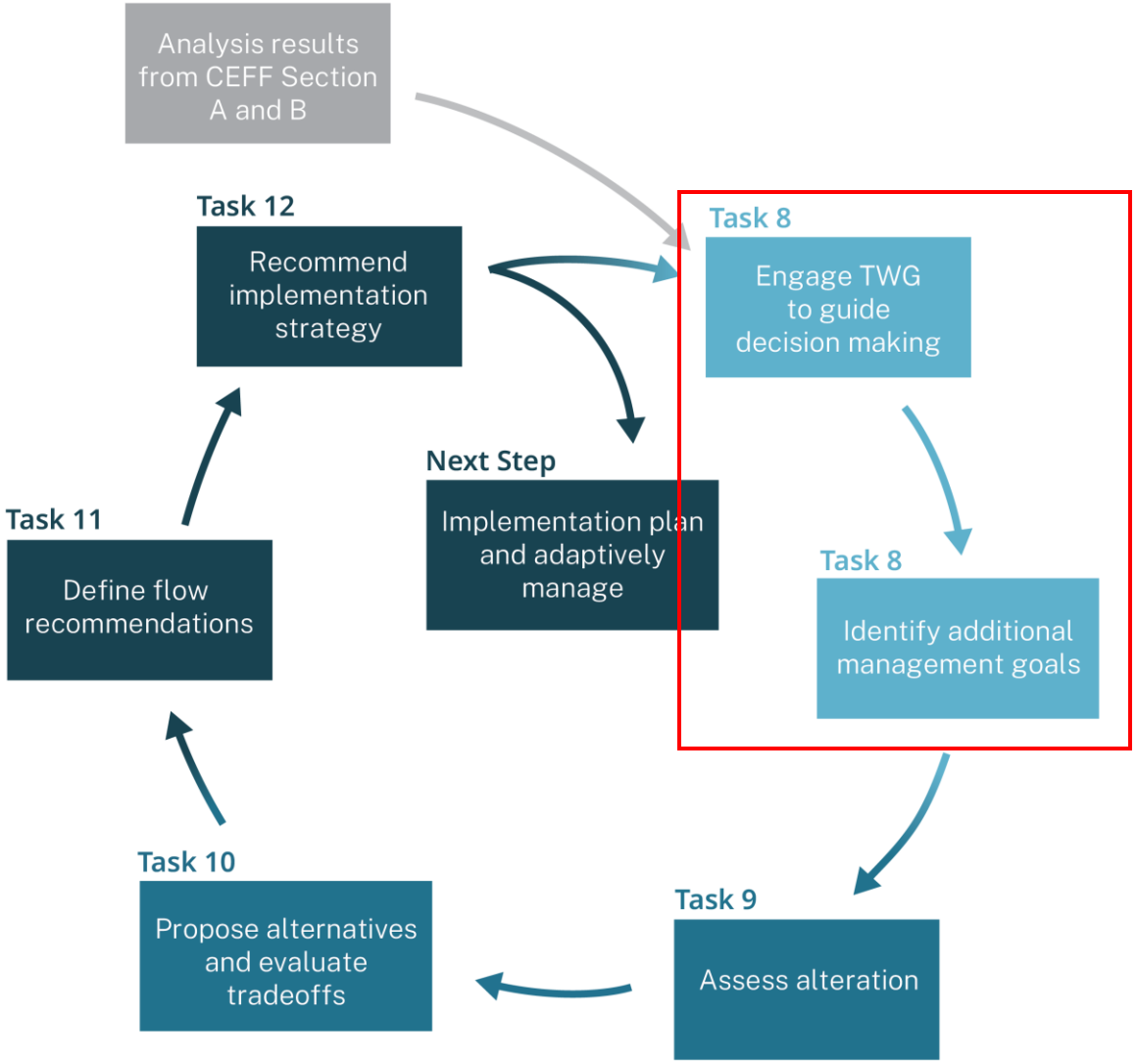
CEFF Section C: Overview for the Los Angeles River

- **Task 8:** Working Group / Structured Decision-Making Process
- **Task 9:** Assess Flow Alteration
- **Task 10:** Alternative Management Scenarios
- **Task 11:** Flow Recommendations
- **Task 12:** Proposed Implementation Plan Outline



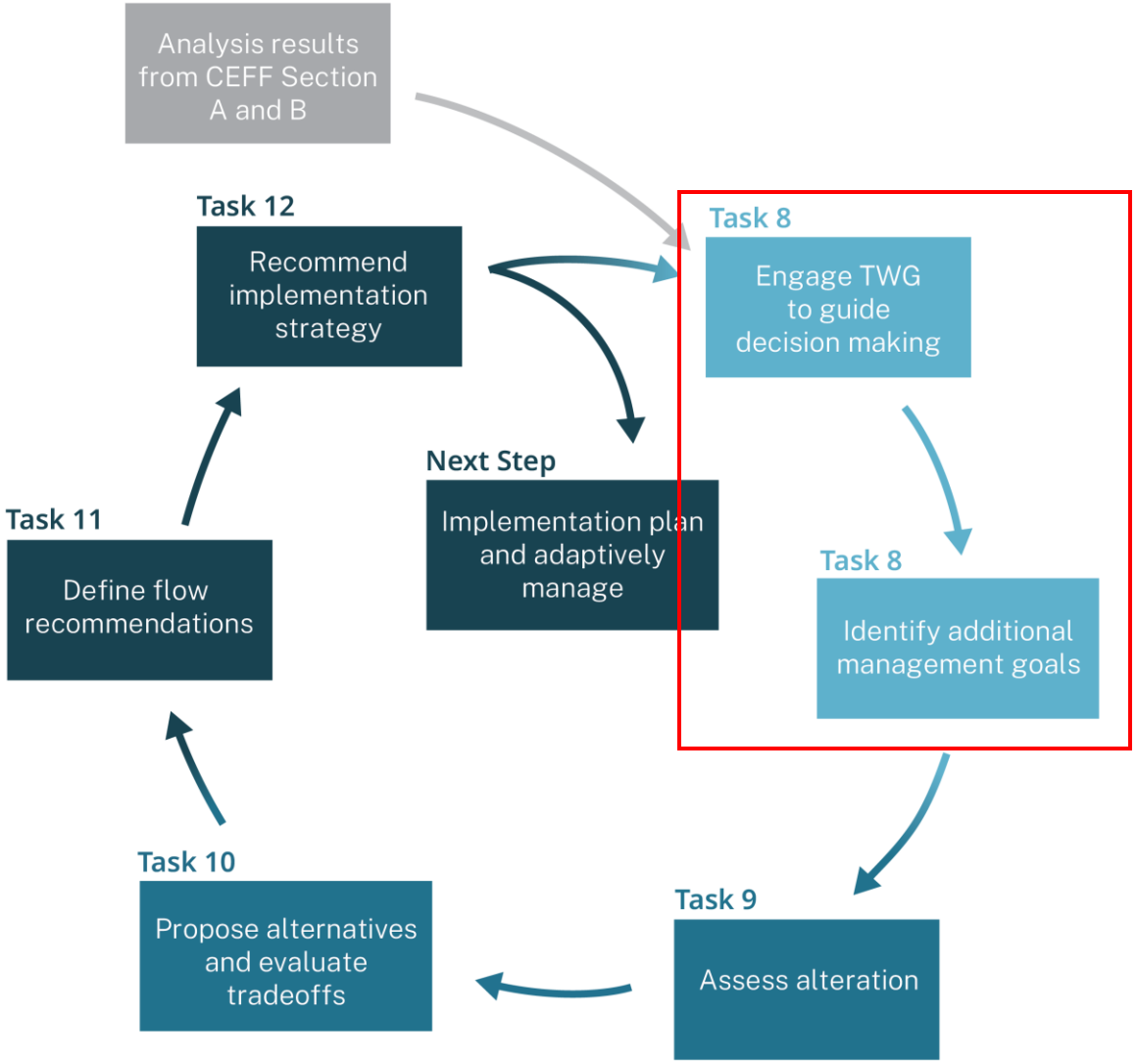
Task 8: Working Group / Structured Decision-Making Process *(ongoing)*

- Expand engagement with stakeholders by convening the LA River CEFF technical working group (TWG).
- Determine structured decision-making process through the TWG.
- Determine functional flow criteria for management goals in collaboration with the TWG.



Task 8: Working Group / Structured Decision-Making Process *(ongoing)*

- LAR CEFF TWG 1 occurred on June 11, 2024
- LA River stakeholders including City of LA, LA County, City of Glendale, environmental non-profits, regulatory agencies, tribal representatives, and academics with multiple representatives for each theme introduced to LAR CEFF process, structured decision-making process, and initial list of LA River management goals for all themes.
- LAR CEFF TWG 1 focused on creating a collaborative space to brainstorm, ask questions, and refine CEFF Section C analysis to address the needs of LA River stakeholders.
- Multiple action items developed from TWG feedback.



CEFF Section C: Task 8 - Structured Decision-Making Process (SDMP)

Collaborate with TWG to determine the structure decision-making process (SDMP) *(ongoing):*

- Review strengths and weaknesses of SDMPs
- Identify key decision points when SDMP will be needed
- Identify SDMP to use in LA River CEFF
- Adapt SDMP for LA River CEFF needs

Keys to success

- Trust the process as an opportunity
- Find “win-wins” and “low hanging fruit”
- Build understanding and collaboration across disciplines

GENERAL CEFF SECTION C PROCESS OVERVIEW

CEFF Section C: Task 8 – Management Goal Flow Criteria Development

Collaborate with TWG to develop for each theme *(ongoing)*:

- Finalized management goal list
- Management goal groupings
- Goal outcomes for management goals
- Conceptual model(s) for each goal outcome
- Suitability criteria and unknowns for parameters identified in conceptual models
- Data/models available to evaluate linkage between parameters and functional flows

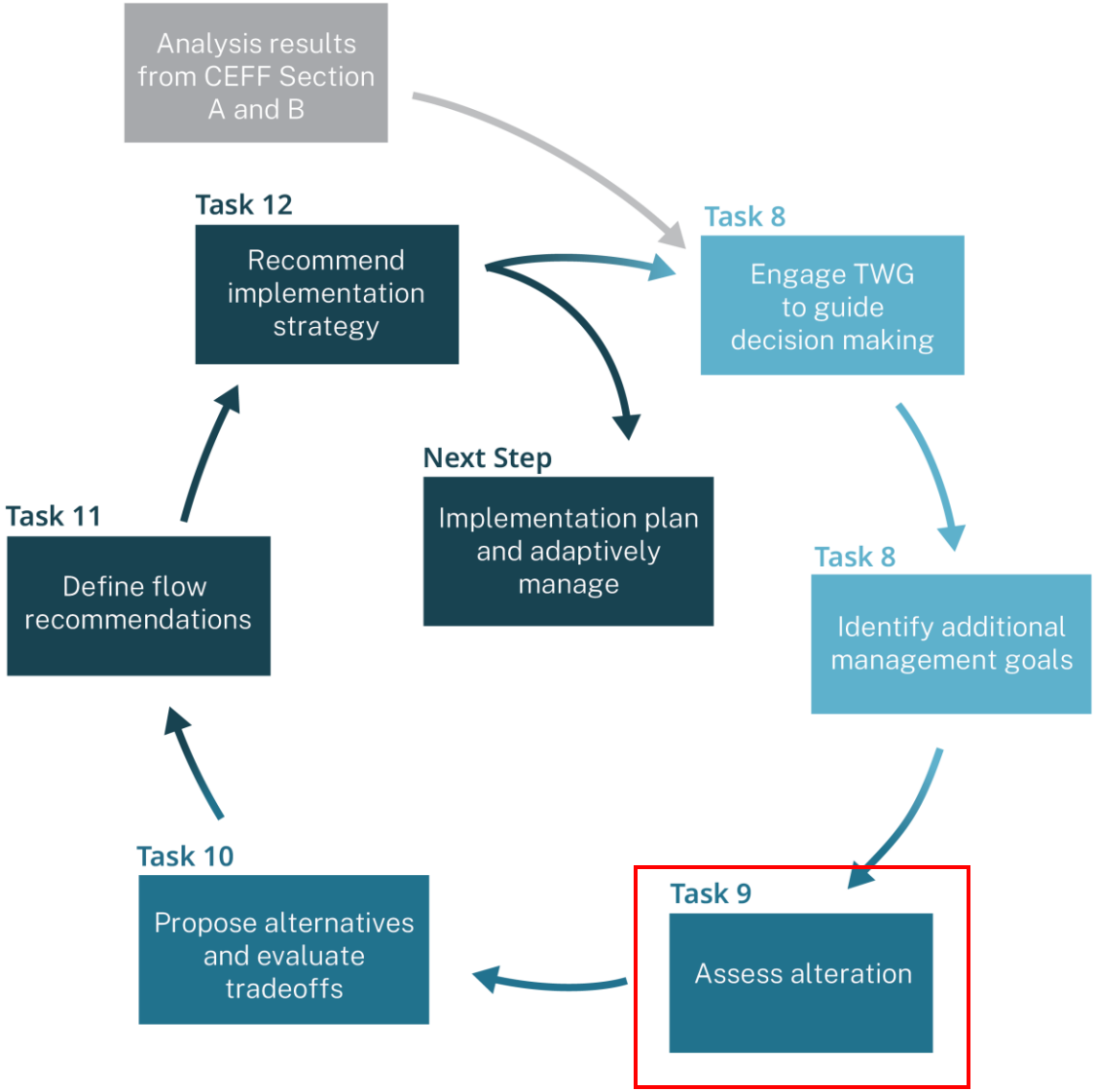
Once above is completed, flow criteria will be determined using best available data/models.

Uncertainties will exist, but CEFF process allows refinement if additional information becomes available.

GENERAL CEFF SECTION C PROCESS OVERVIEW

Task 9: Assess Flow Alteration

- Existing and planned flow inventory to understand flow inputs, outputs, and storage per LOI along river.
- Establish an existing and planned flow baseline for LAR CEFF Section C analysis
- Evaluation of goals achievement
  - Existing flow baseline
  - Planned flow baseline



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
47. MRCA Confluence Plaza
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
57. First Street to Sixth Street River Loop
58. **City 6th Street Viaduct**
59. Upper Segment Multiuse Easement & Atlantic Blvd Area
60. Active Transportation Rail to River Corridor: Randolph Street
61. U.P.R.R. Spur Line
62. **Cudahy River Park**
63. **South Gate Urban Orchard**
64. Parque Dos Rios
65. **Rio Hondo Confluence**
66. SELA Cultural Center
67. West Santa Ana Branch Bikeway
68. **Trout Unlimited Dills Park Multi-Benefit & Fish Passage Project**
69. Middle Segment Multiuse Easement & Crossover
70. I-710 Corridor Bike Path Project: Western LA River Levee Bike Path
71. I-710 Corridor Bike Path Project: Terminal Island to Rio Hondo
72. Compton Creek Confluence Area
73. I-710 Corridor Bike Path Project: Compton
74. **County Dominguez Gap Wetlands**
75. Wrigley Heights River Park
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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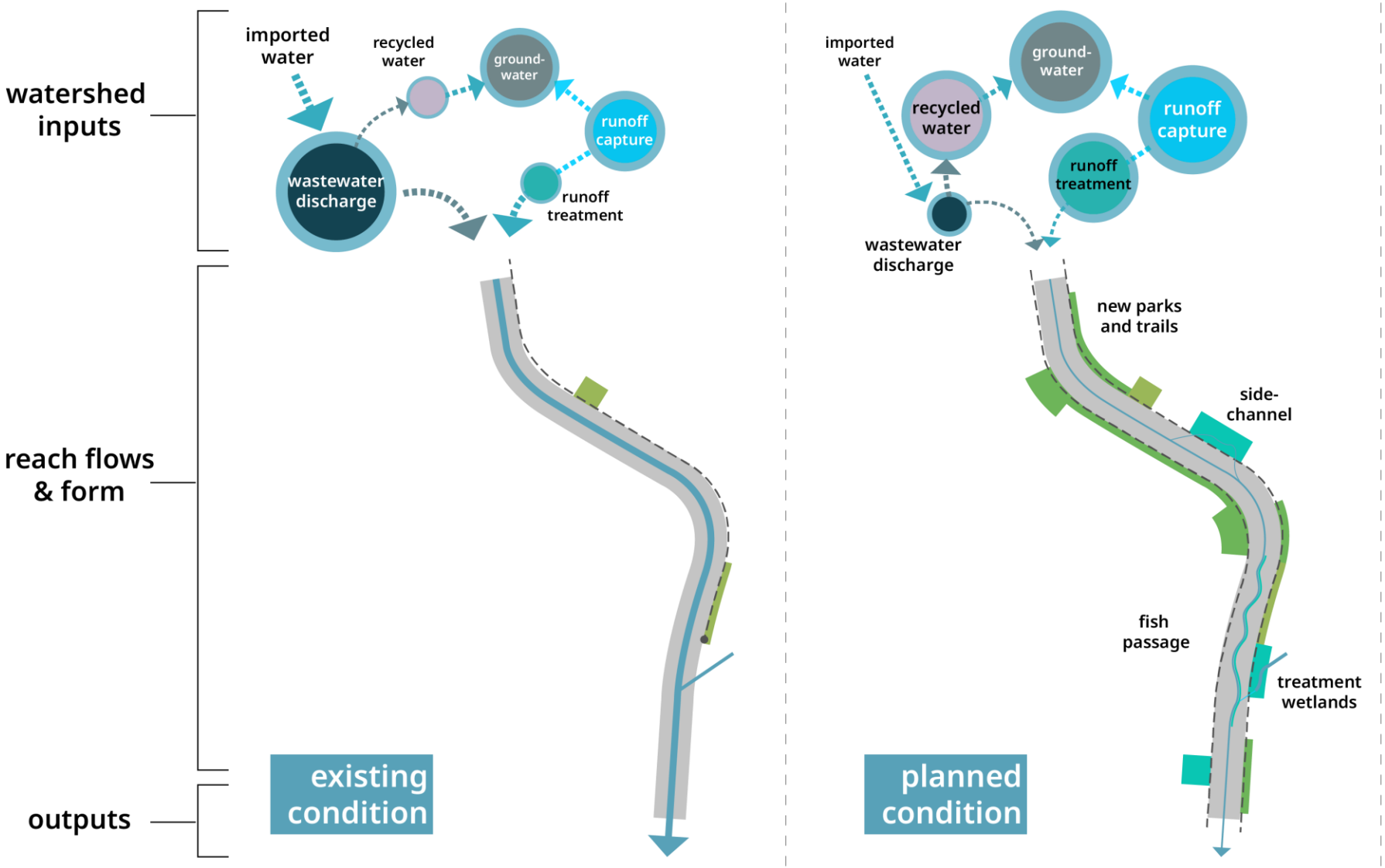
0 2 4 8 Miles

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

CEFF Section C: Task 9 - Assess Flow Alteration



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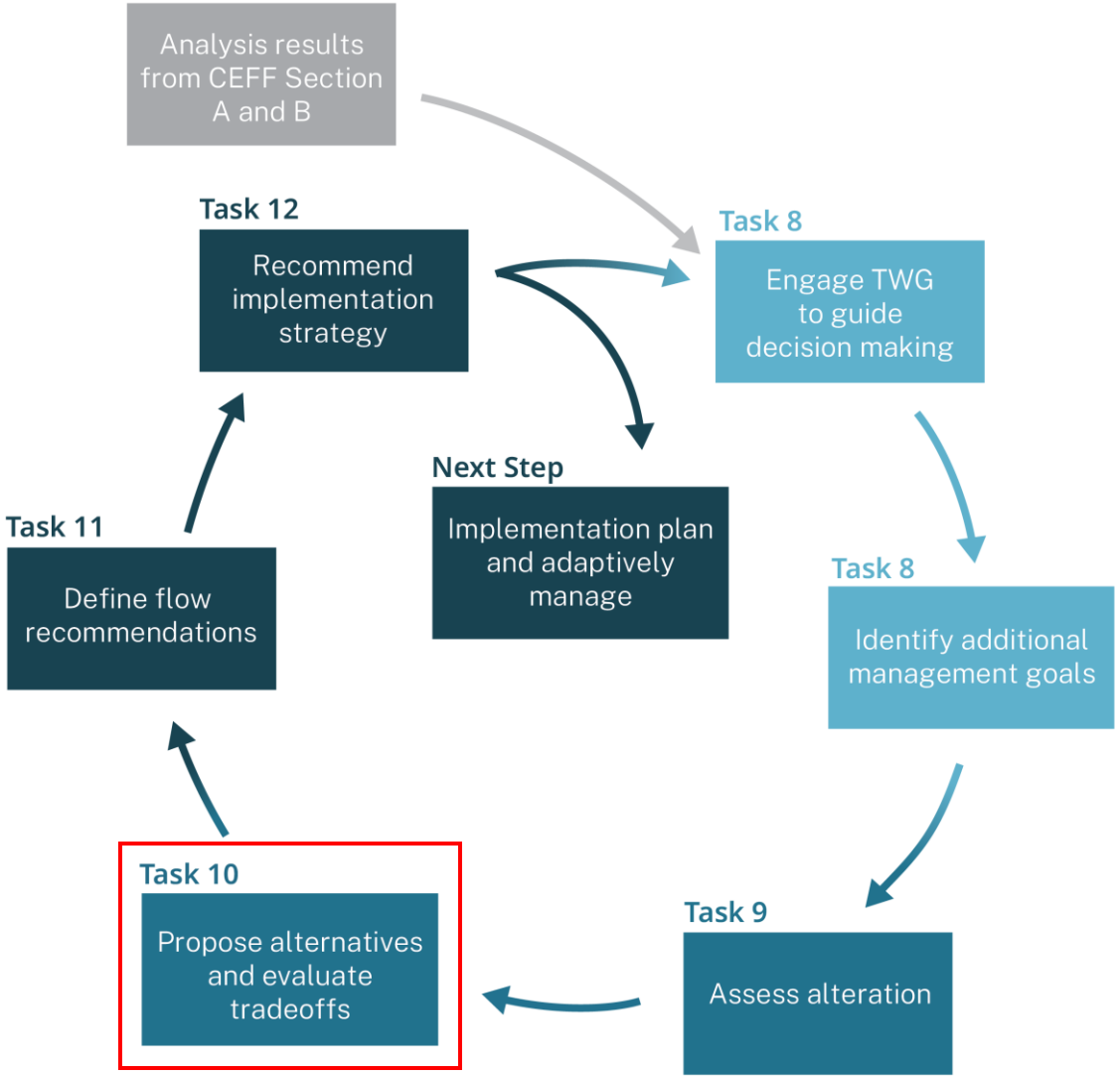
Task 10: Alternative Management Scenarios (Developed Through TWG)

- Alternative scenarios to achieve goals
- Tradeoffs analysis to address challenges, optimization
- Consensus building and preferred flow scenario selection



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CEFF Section C Process: Tasks 11 & 12

Task 11: Flow Recommendations

Task 12: Recommended Implementation Plan Outline

Potential recommendations format

Recommended flow in terms of the five functional flow metrics

Recommended channel design measures to achieve biodiversity and recreation goals at recommended flow

Recommended watershed flow inputs design measures to achieve recommended flow

Outline of recommended implementation plan

Questions?