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

Technical Working Group Meeting #4
November 18, 2025

Mountains Recreation & Conservation Authority

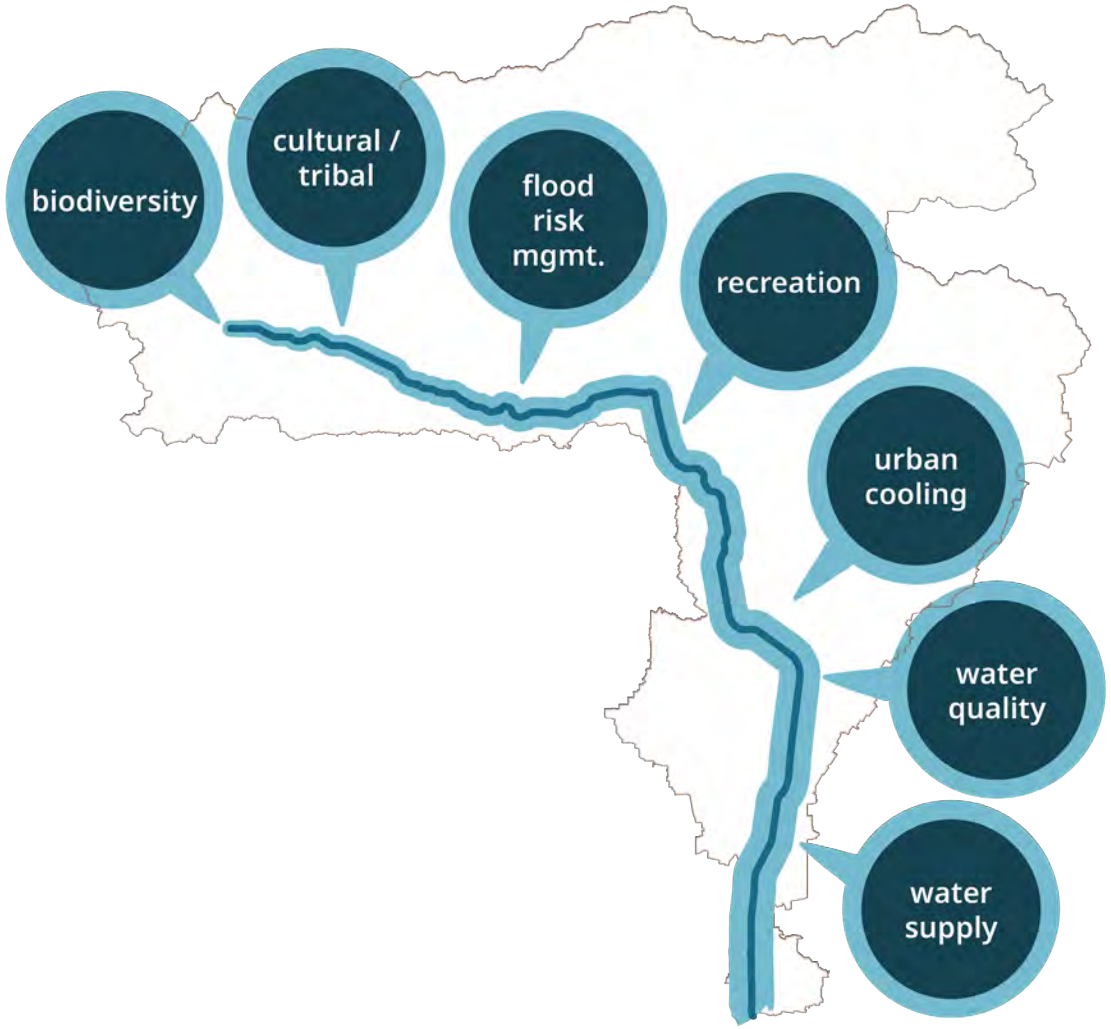
Stillwater Sciences

McMillen

TWG#4 AGENDA

1	**Introduction**
2	**Flow Assessment Scenarios**
3	**Flow Assessment Initial Results**
4	**Looking Ahead**

CEFF Overview



CEFF Outcome

Flow recommendations that are aligned with management goals

THE LA RIVER CALIFORNIA ENVIRONMENTAL FLOWS FRAMEWORK (CEFF)

A vision for coexistence

Previous plans, published documents, and procedures for the LA River

LA RIVER CEFF SECTION A

The LA River watershed as a natural system

LA RIVER CEFF SECTION B

Flow needs for biodiversity and recreation management goals

LA RIVER CEFF SECTION C

Stakeholder-driven, comprehensive environmental flow recommendations

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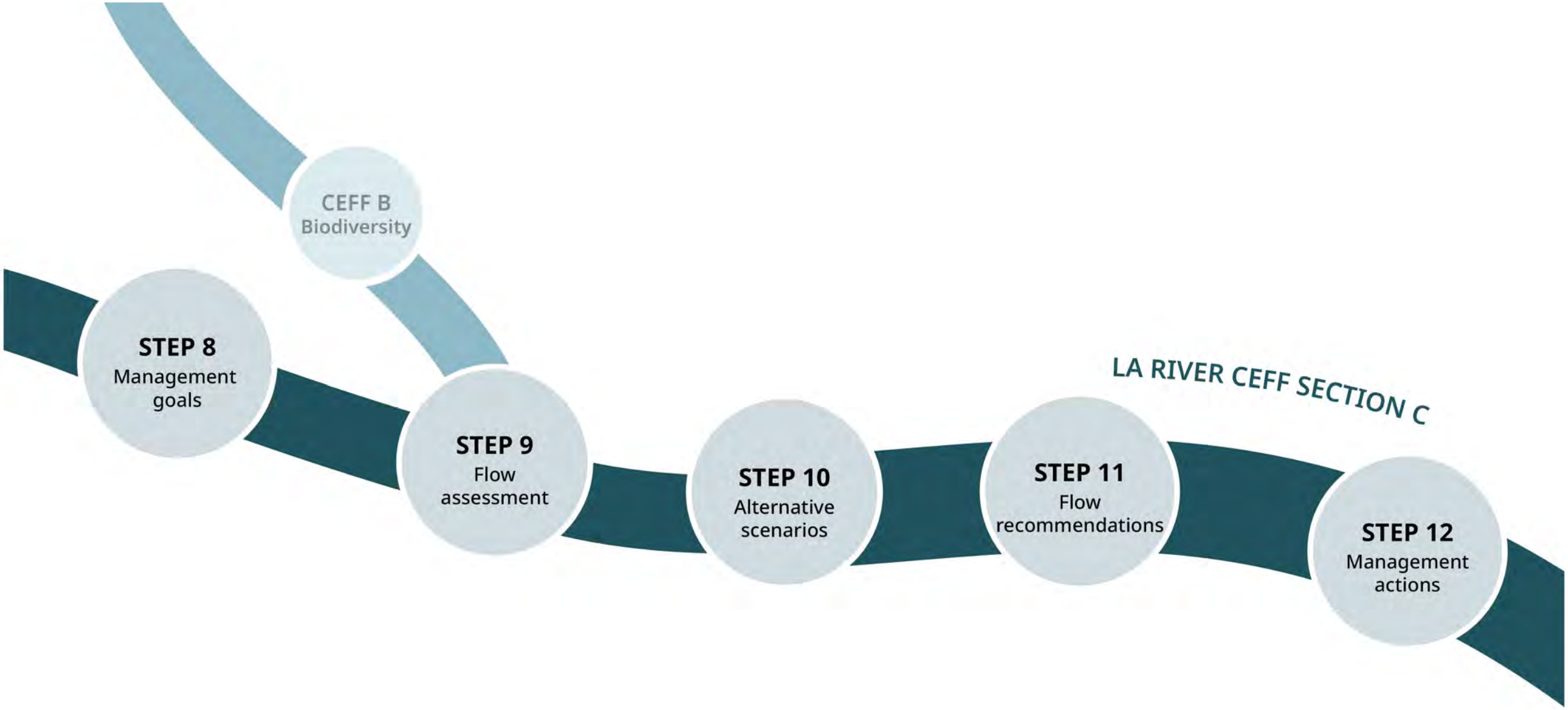
LA River CEFF Section C Progress



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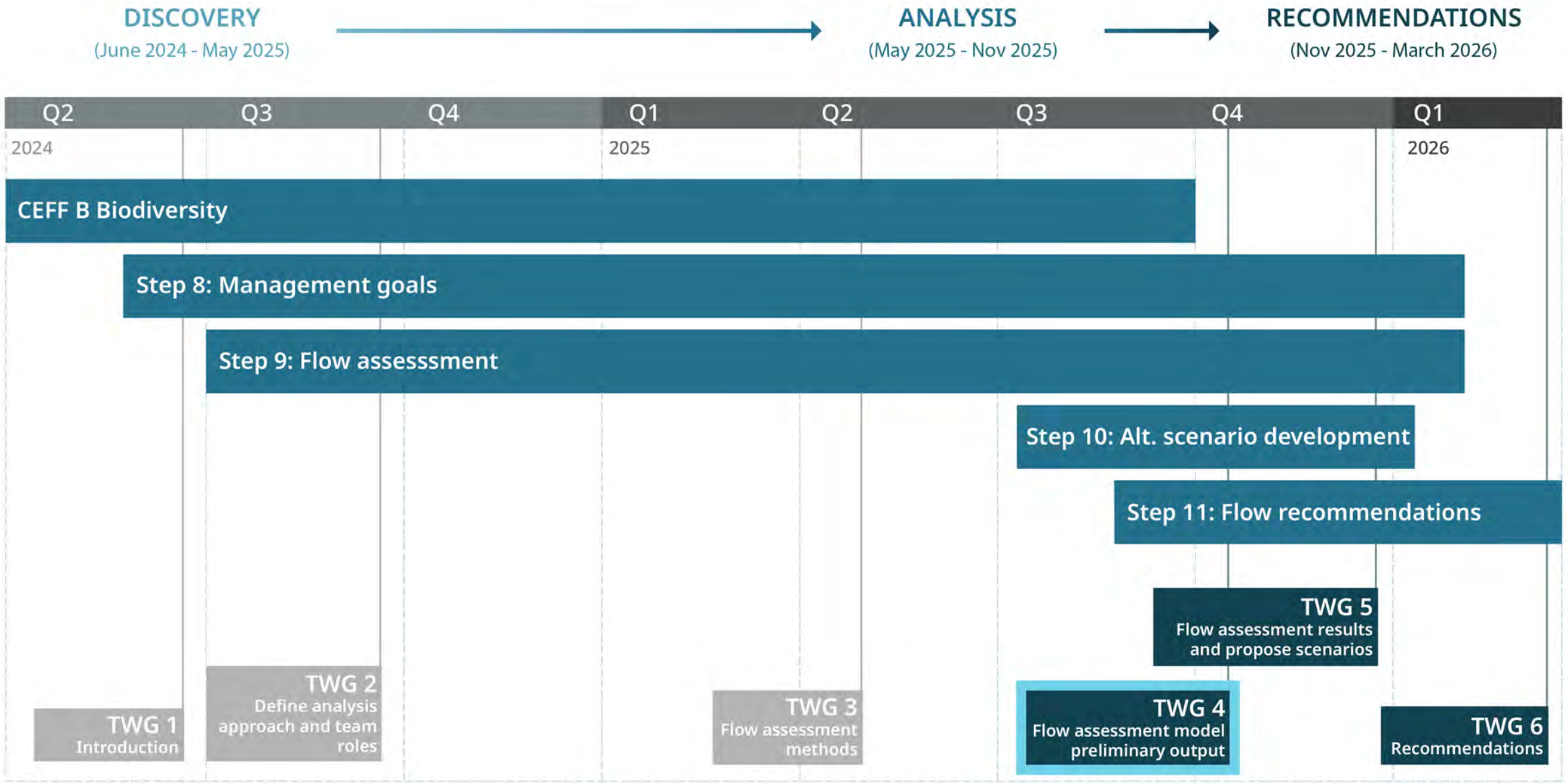
LA River CEFF Project Schedule



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TWG#4 Purpose

LA River CEFF Project – TWG #4 Purpose

Define initial three scenarios:

1) **Existing** conditions
2) **“Low” Implementation** of current designs/plans for the river
3) **“High” Implementation** of current designs/plans for the river

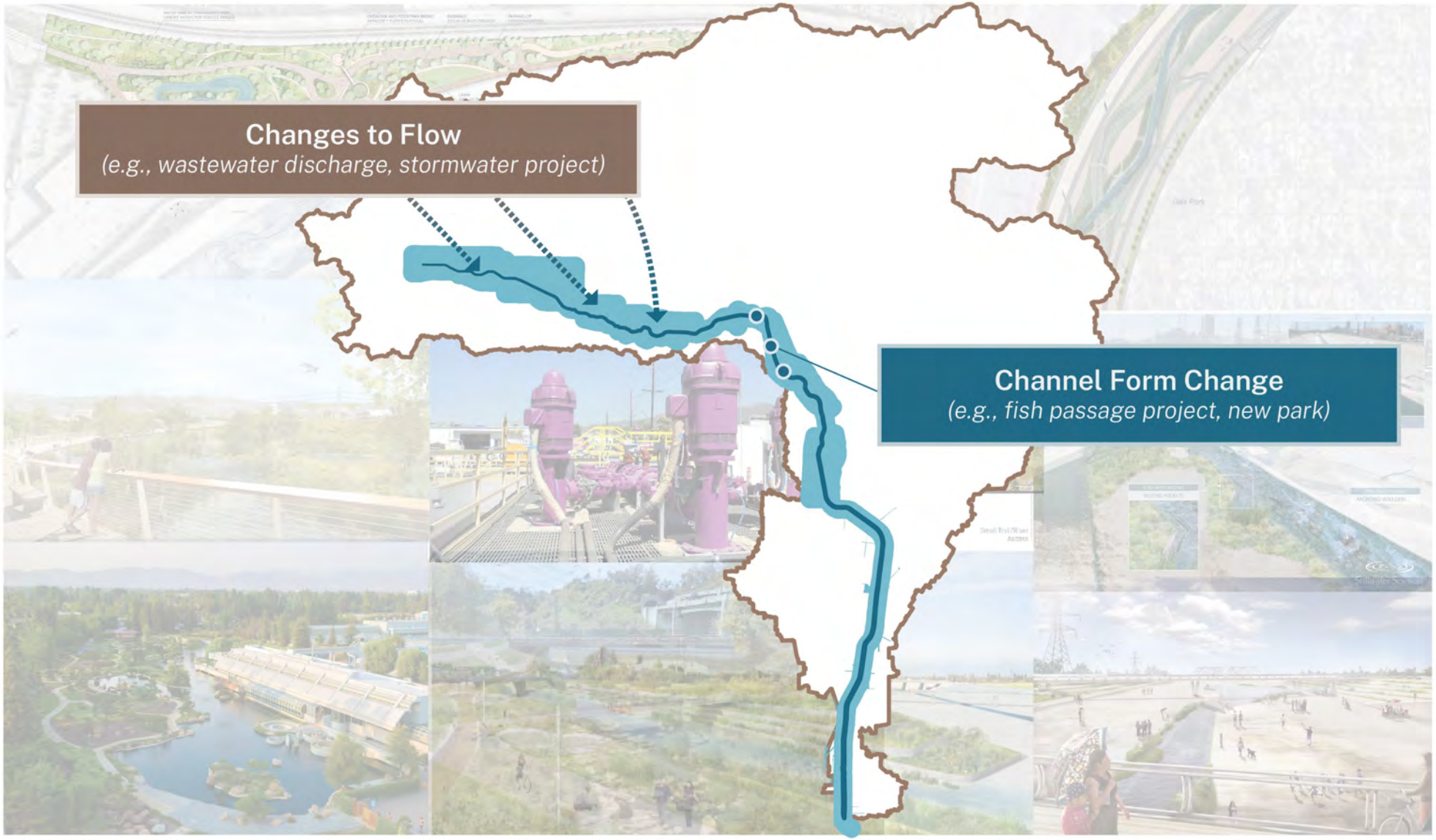
Share initial flow assessment results for two performance measures within the demonstration reach.

Prepare TWG to propose alternative scenarios during TWG#5.

Flow Assessment Scenarios

Photo credit: Stillwater Sciences

Flow Assessment: River-wide Scenarios for Changes to Flow and Channel Form



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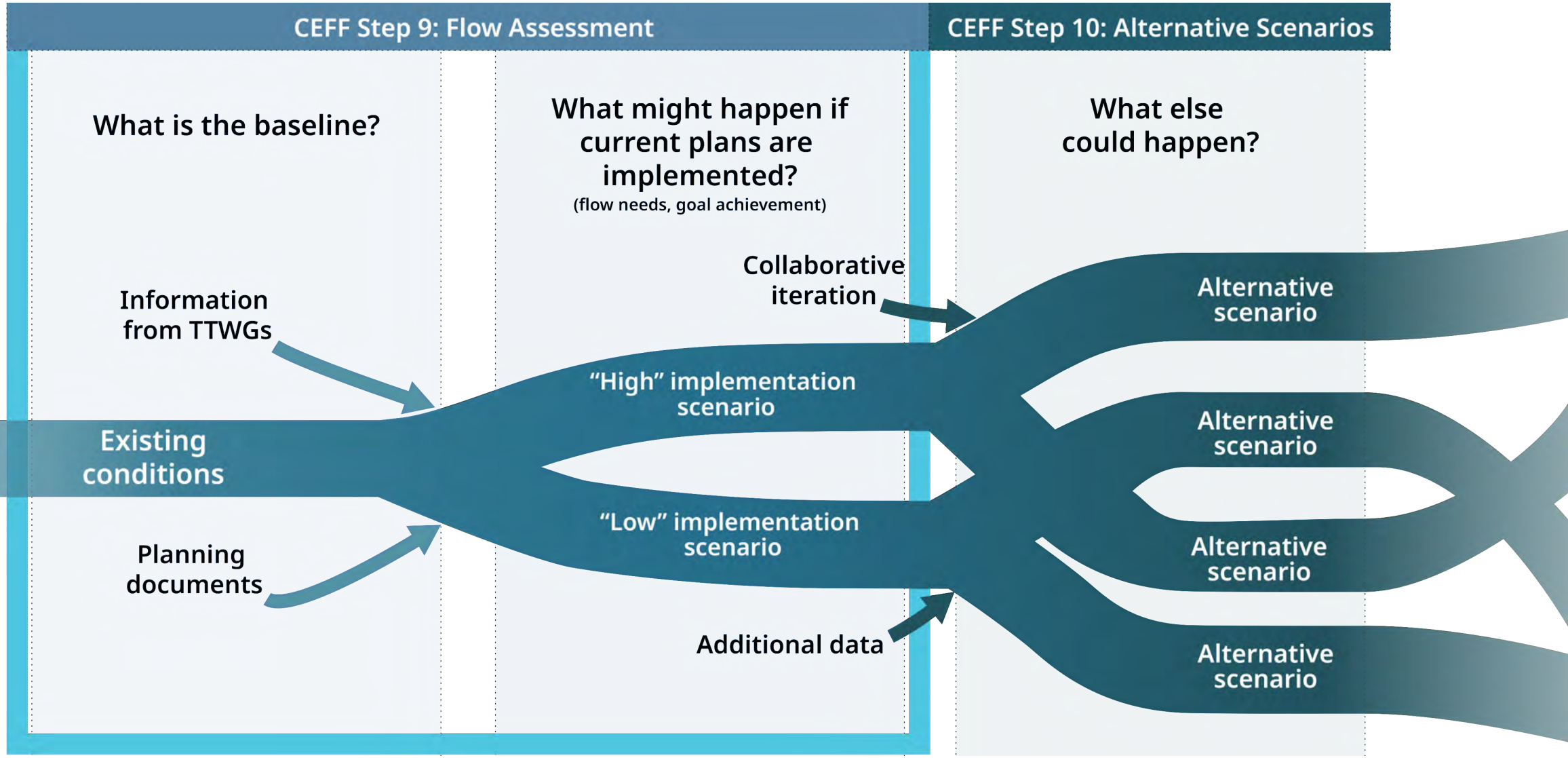
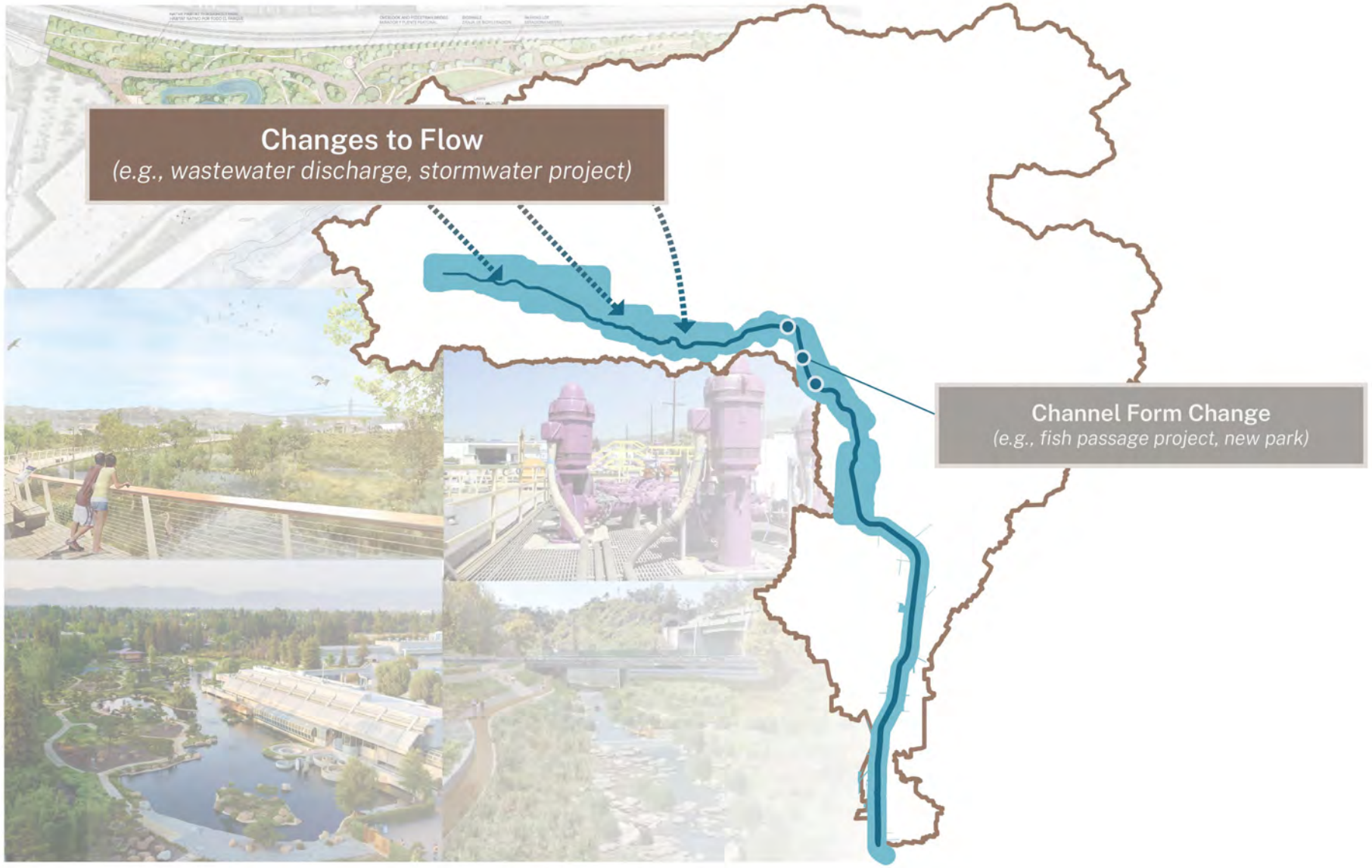
Flow Assessment: Scenarios Approach



Management Actions: Assessing Changes to Flow



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LA River CEFF Section C – Scenarios for Potential Changes to FLOW

Existing Conditions

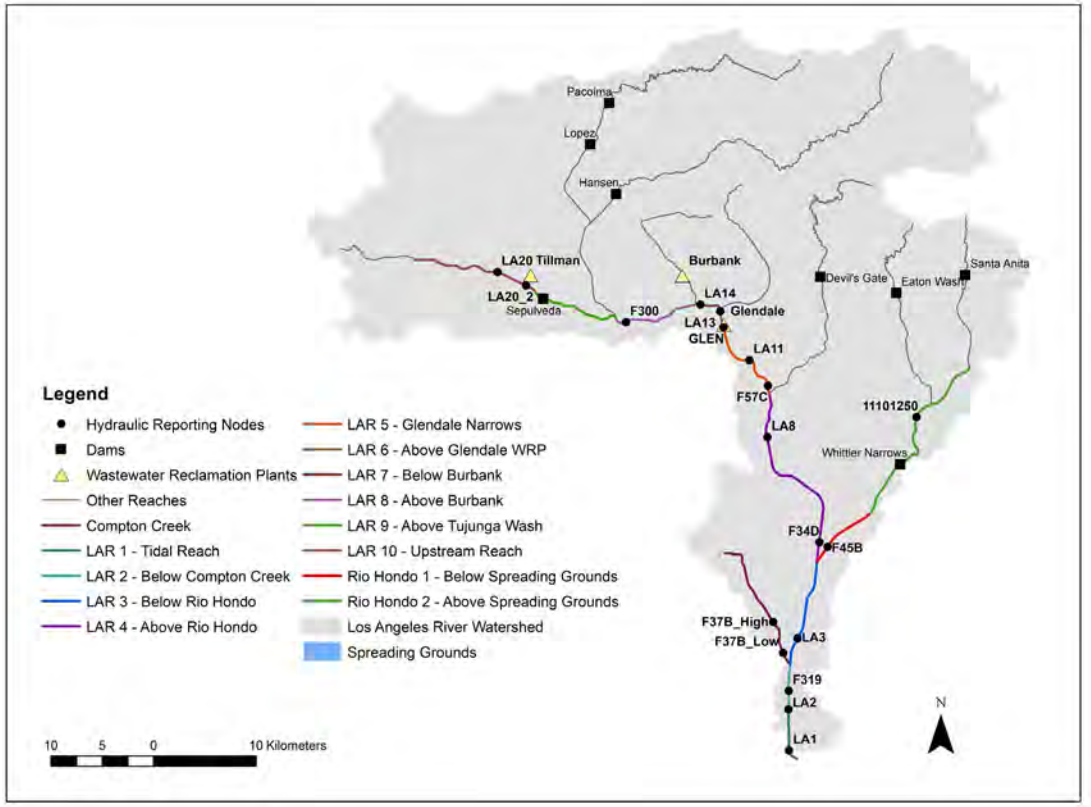
- Historical 2011 – 2017 flows

"Low" Implementation

- DCT – 4 MGD reduction
- BUR – 1211 petition reductions
- LAG – 1211 petition reductions
- MS4 stormwater and dry-weather full buildout
- Evaporation/evapotranspiration *("Low" channel form change)**
- Groundwater exchange *("Low" channel form change)**

"High" Implementation

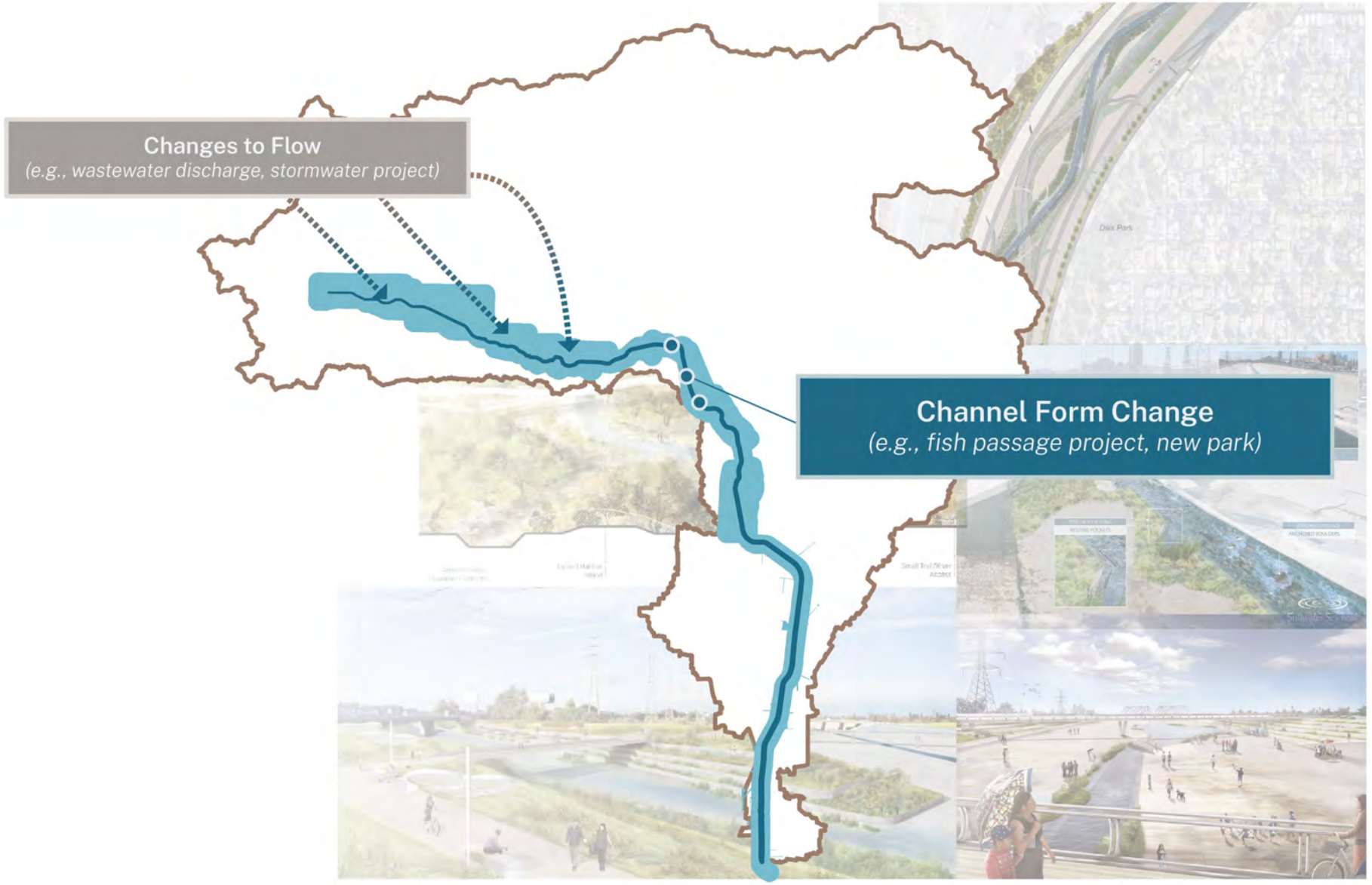
- DCT – 4 MGD reduction
- BUR – **actual** reductions
- LAG – 1211 petition reductions
- MS4 stormwater and dry-weather full buildout
- Evaporation/evapotranspiration *("High" channel form change)**
- Groundwater exchange based on *("High" channel form change)**



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.

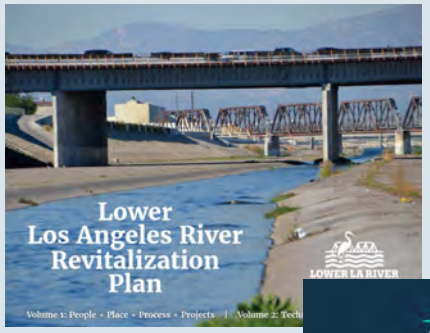
* LA River SWMM hydrology model update in progress.

Management Actions: Assessing Changes to Channel Form



Channel Form Change Methods Overview

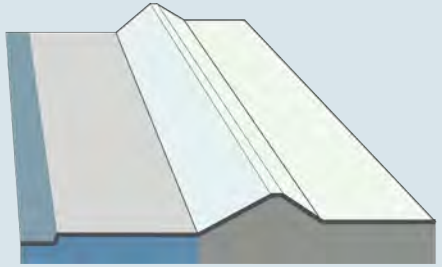
Source plans
What is planned?



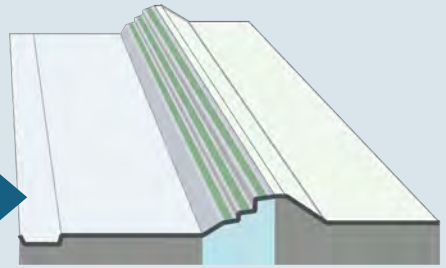
LA RIVER MASTER PLAN

Other
Known plans/designs from misc. sources

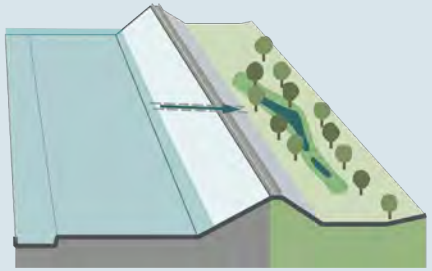
Inventory
What projects do the plans contain?
How to translate form change?



Channel bed
Concrete



Channel walls
Terraced



Overbank
Off-channel wetland

Aspect, Capacity, DACs, Groundwater, etc.

Overlays

Initial river-wide Scenarios
How will planned projects be built out?

Existing conditions

Scenario: Low implementation

Scenario: High implementation

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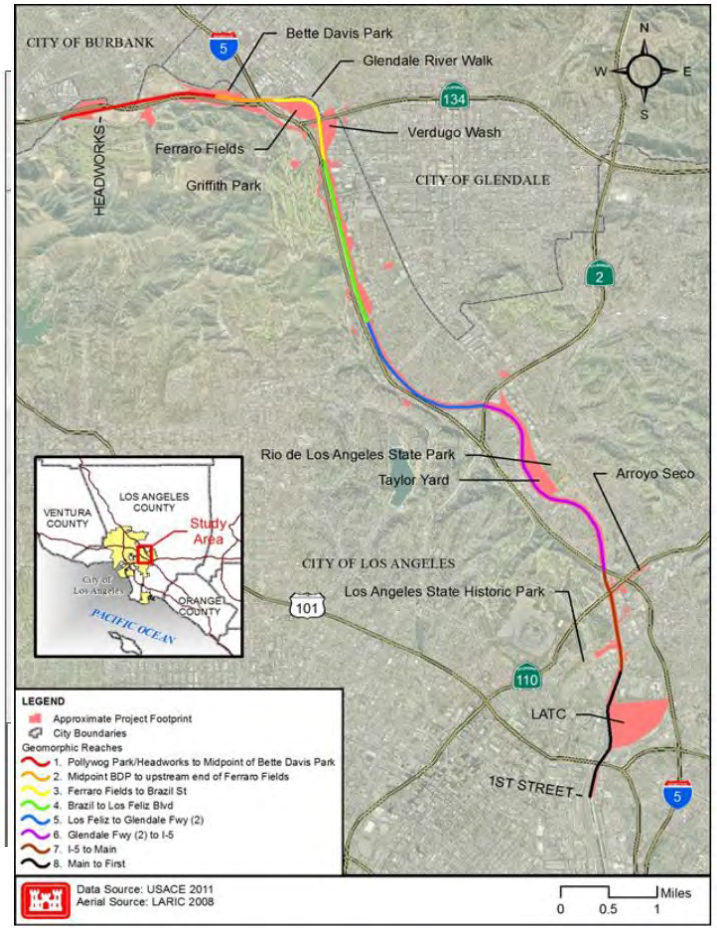
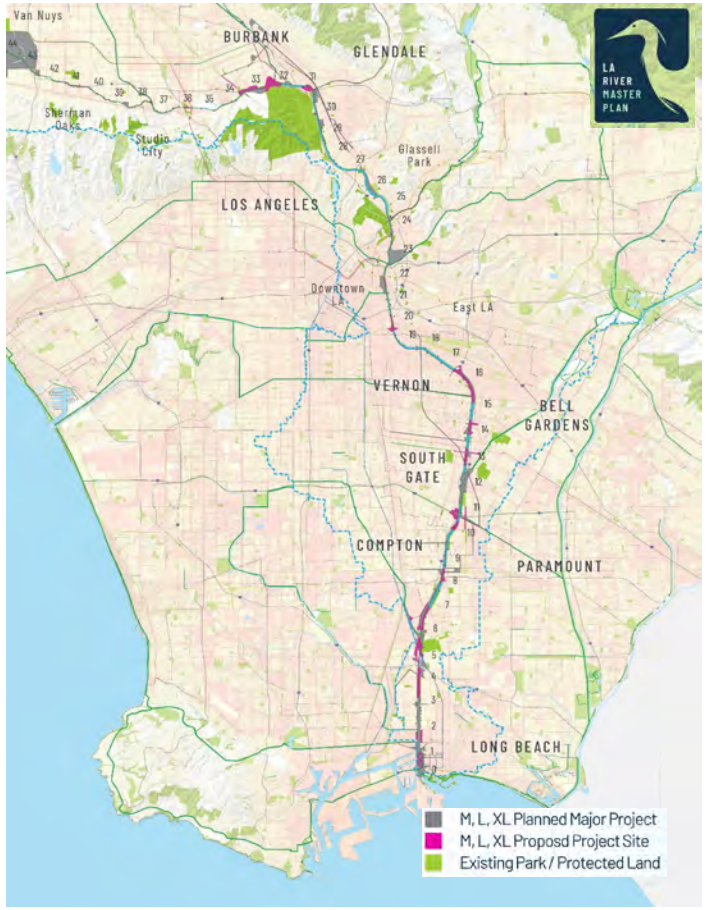
LA River CEFF Section C – Scenarios for Potential Changes to CHANNEL FORM

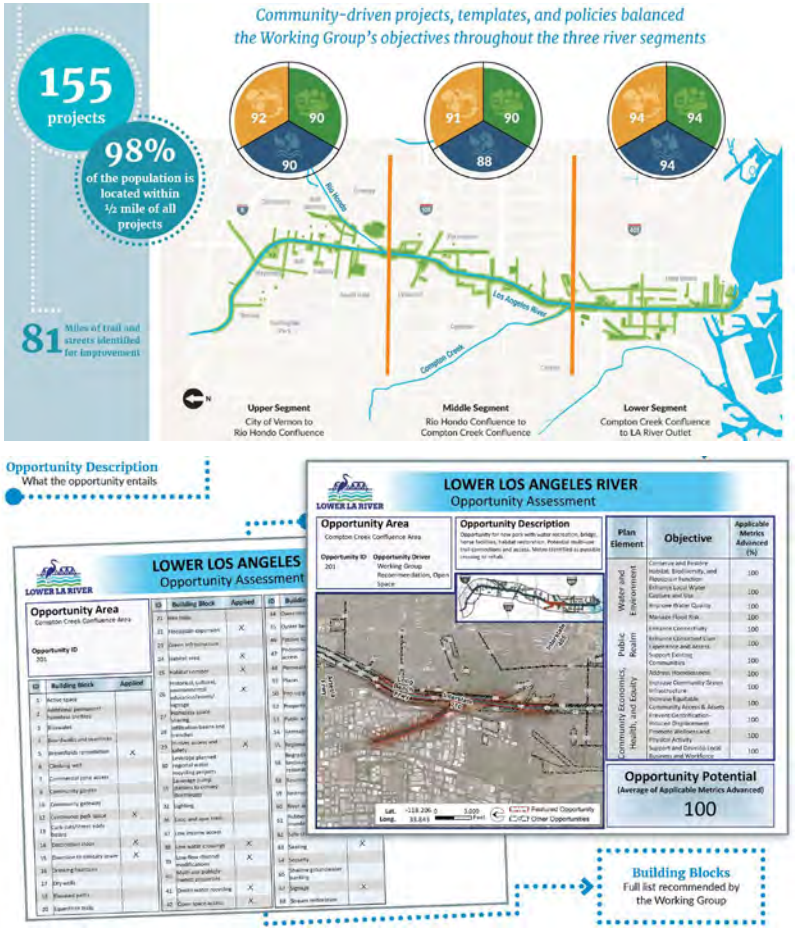
Los Angeles River Ecosystem Restoration Study (ARBOR)



Los Angeles River Master Plan (LARMP)



Lower Los Angeles River Revitalization Plan (LLARRP)



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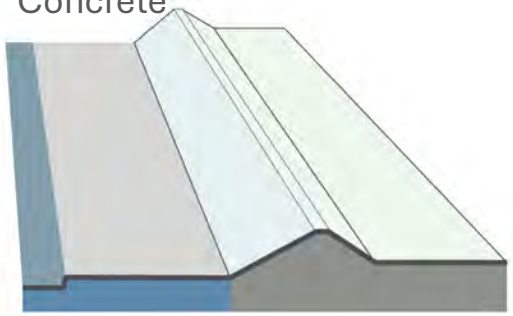
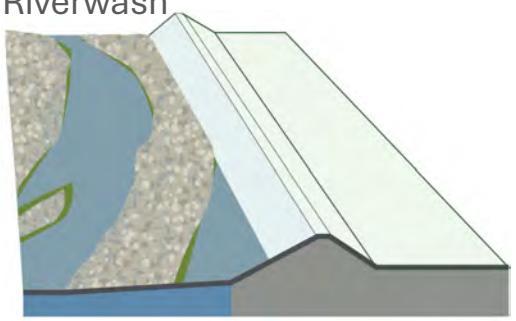
Channel and Channel Wall Zones and Typologies (additional typologies are not shown)

CHANNEL BED (13 typologies)

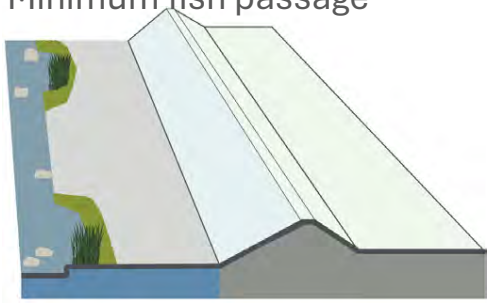
Concrete



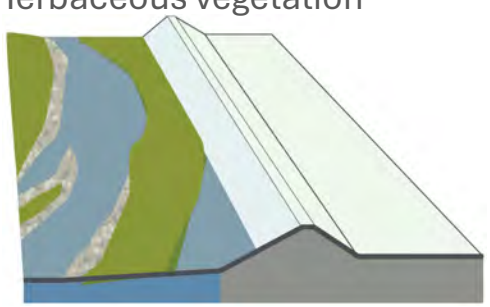
Riverwash



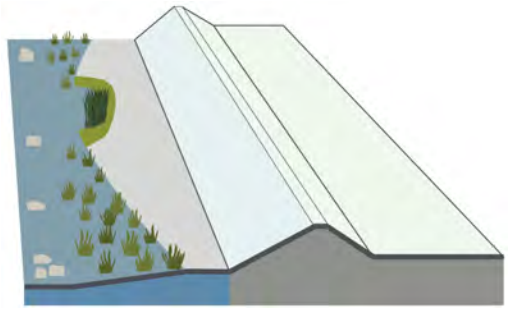
Minimum fish passage



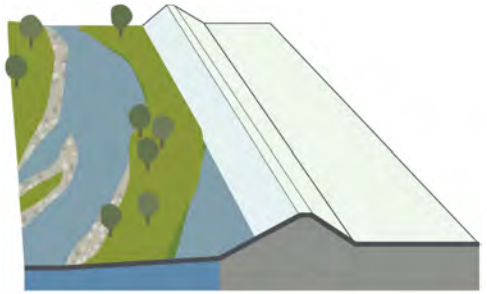
Herbaceous vegetation



60’ fish passage meanders

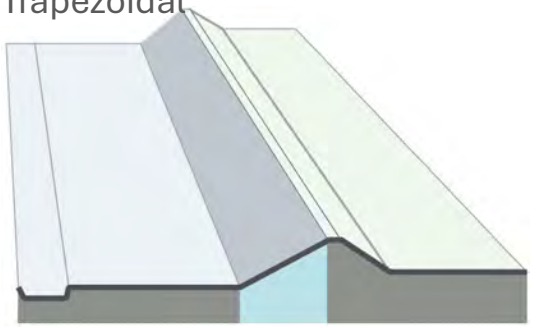


Mixed managed vegetation

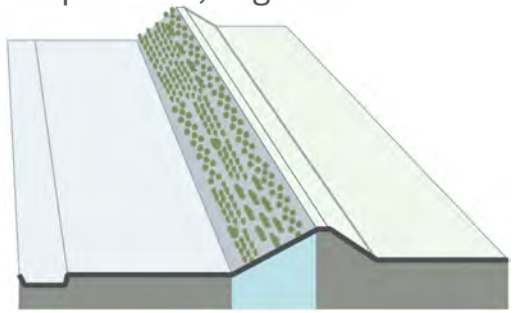


CHANNEL WALLS (10 typologies)

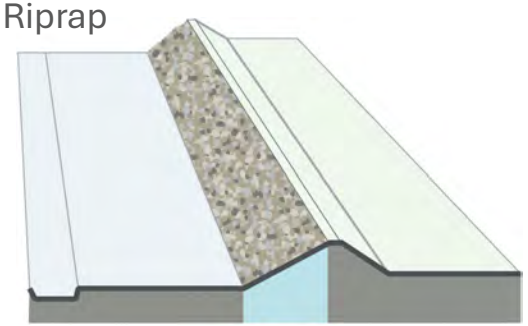
Trapezoidal



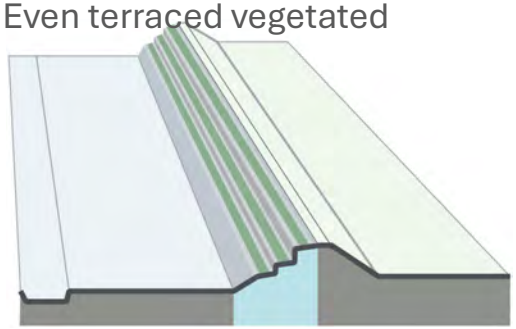
Trapezoidal, vegetated



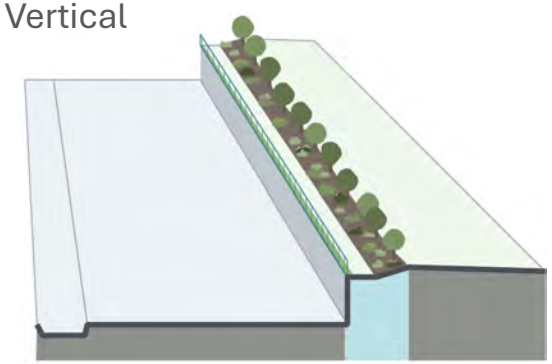
Riprap



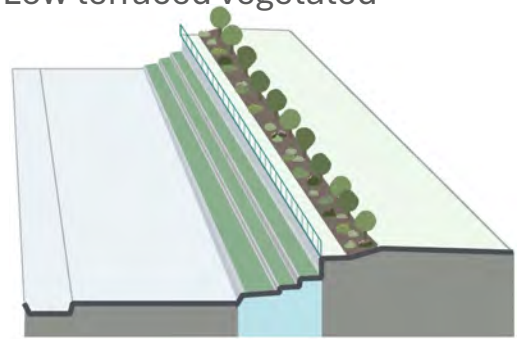
Even terraced vegetated



Vertical



Low terraced vegetated



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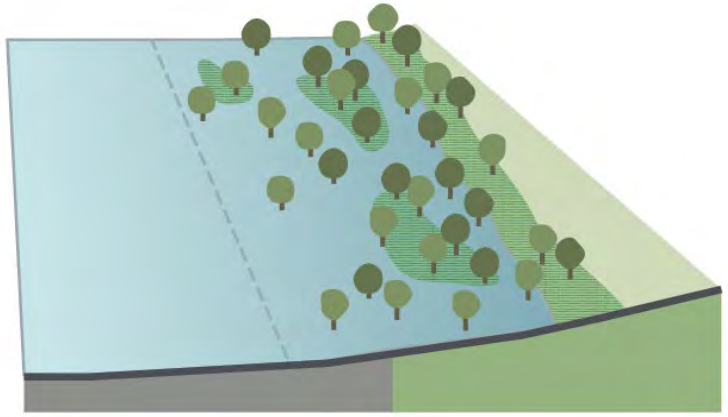
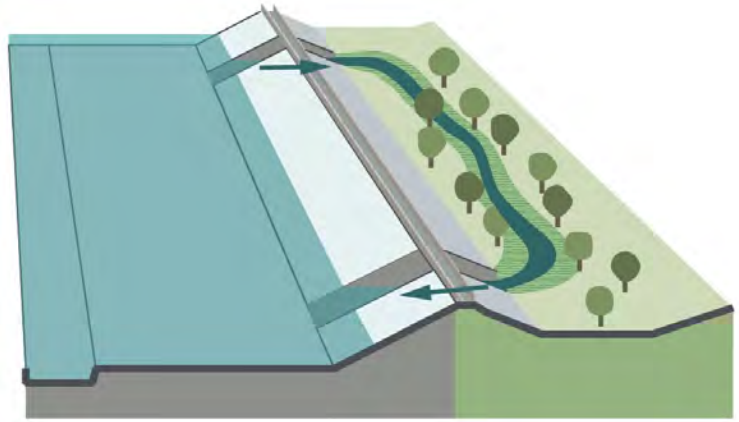
Overbank Zone Typologies (additional typologies not shown)

OVERBANK (12 Typologies)

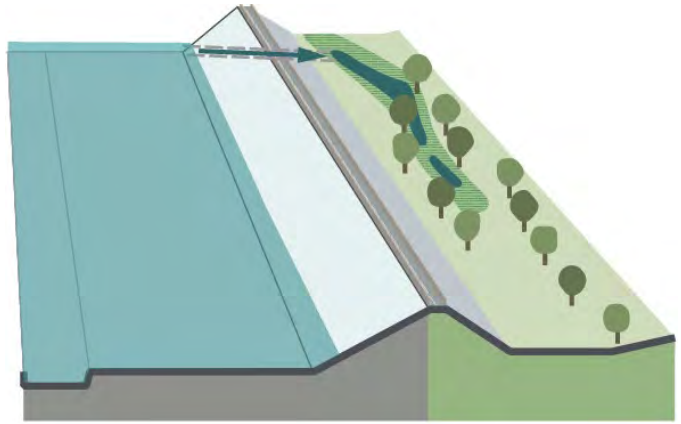
Floodplain Expansion, Natural



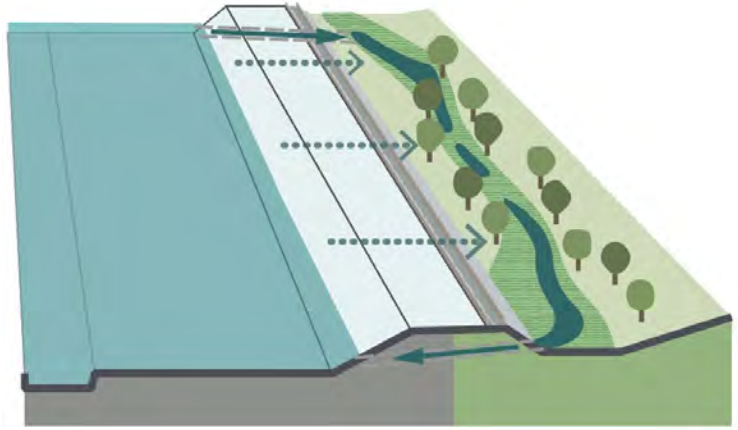
Floodplain Expansion with Side Channel



Off-channel Wetland with Flow Diversion



Off-channel Wetland with Side Channel and Flood Basin



Additional Overbank Typologies

- Floodplain expansion with tributary
- Off-channel wetland
- Off-channel wetland with tributary
- Upland natural
- Park
- Park with flood basin
- Developed
- Degraded (existing condition only)

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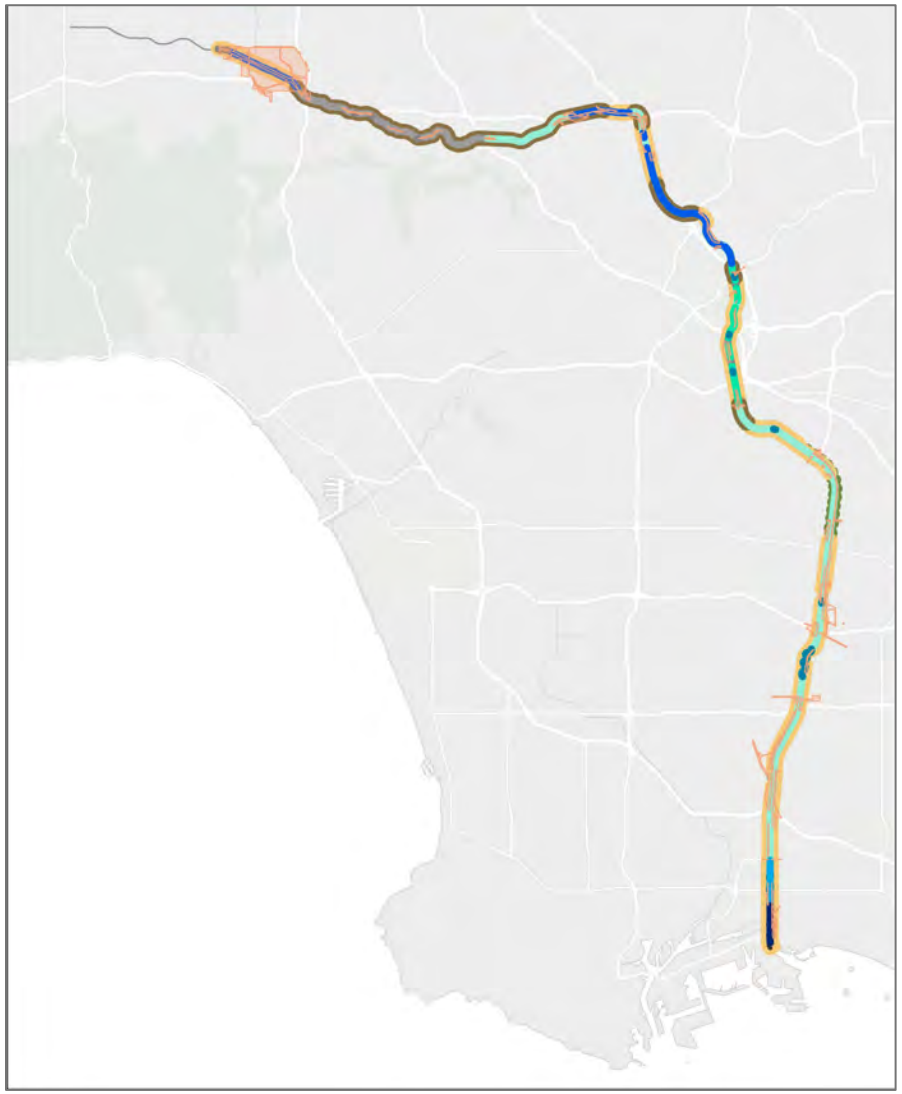
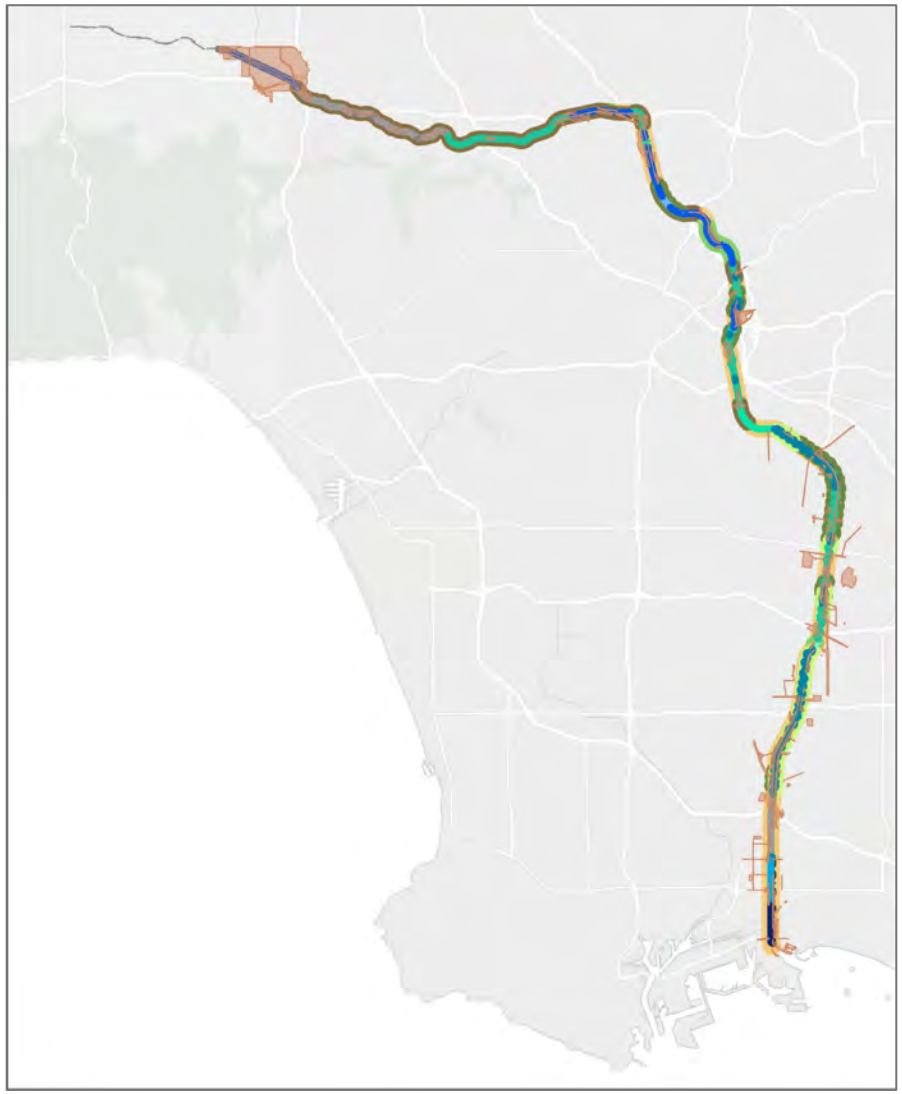
Full River Channel Form Change Scenarios Summary

Scenario 1: "Low" Implementation



Scenario 2: "High" Implementation



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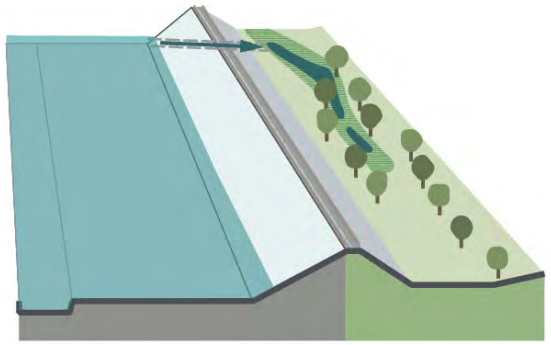
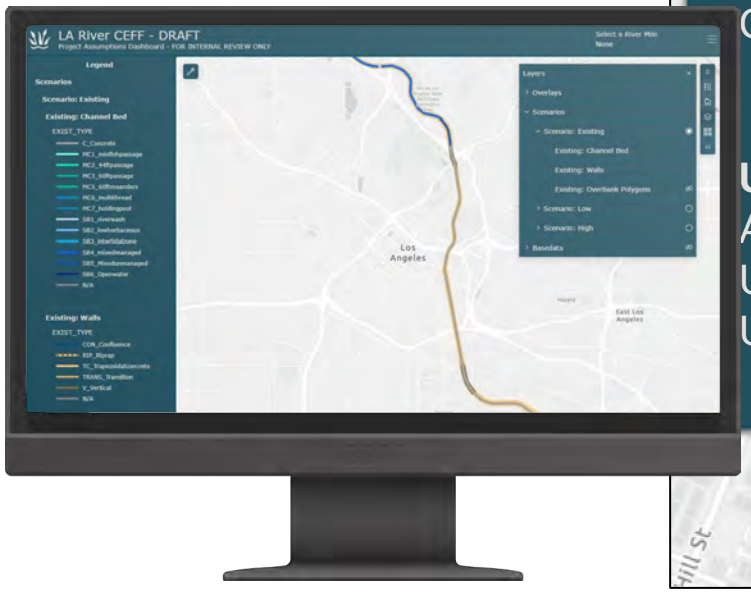
ArcGIS Online Scenarios Database



Majority overbank typology:
Off Channel Wetland with
Flow Diversion

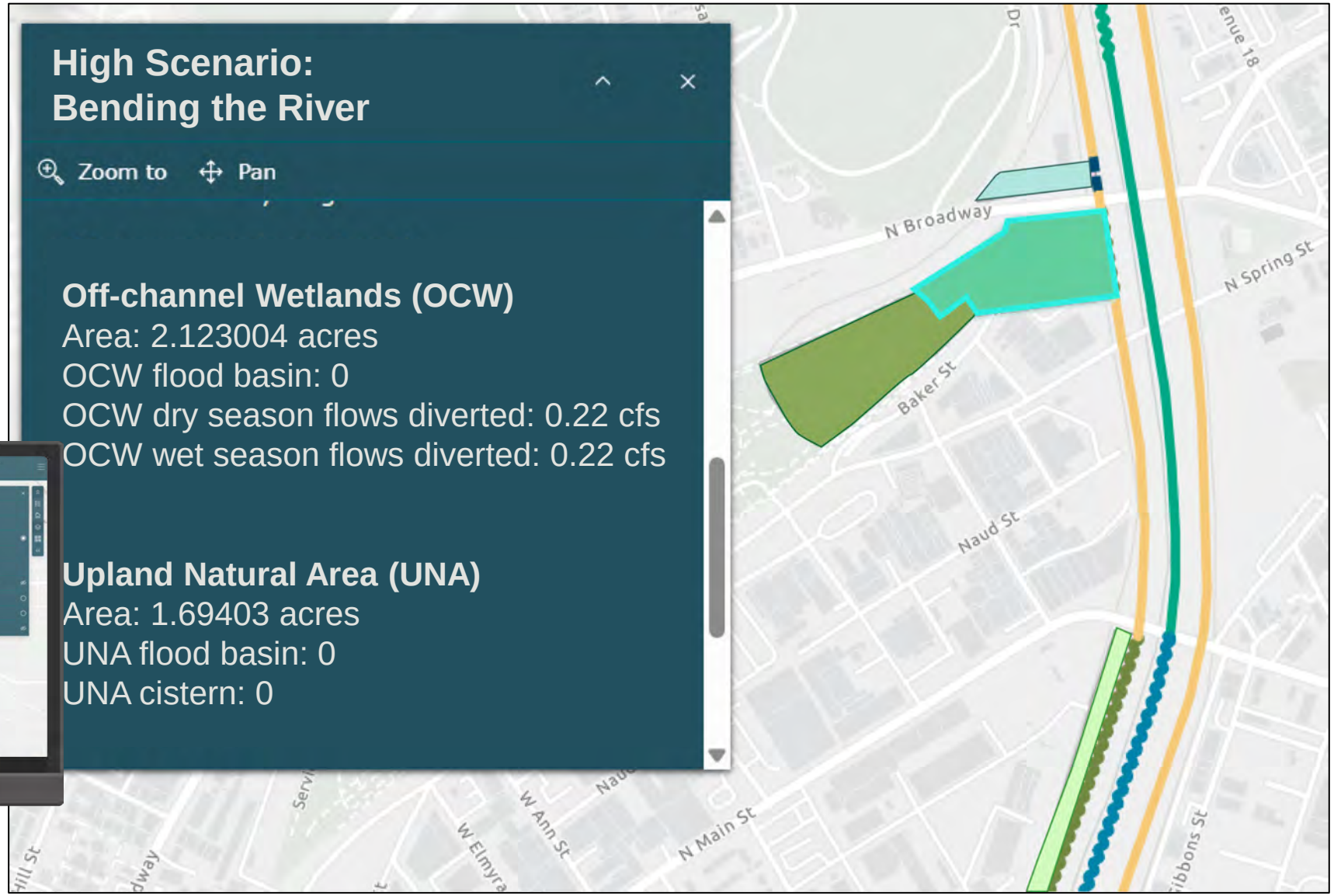


High Scenario: Bending the River

Zoom to Pan

Off-channel Wetlands (OCW)
Area: 2.123004 acres
OCW flood basin: 0
OCW dry season flows diverted: 0.22 cfs
OCW wet season flows diverted: 0.22 cfs

Upland Natural Area (UNA)
Area: 1.69403 acres
UNA flood basin: 0
UNA cistern: 0



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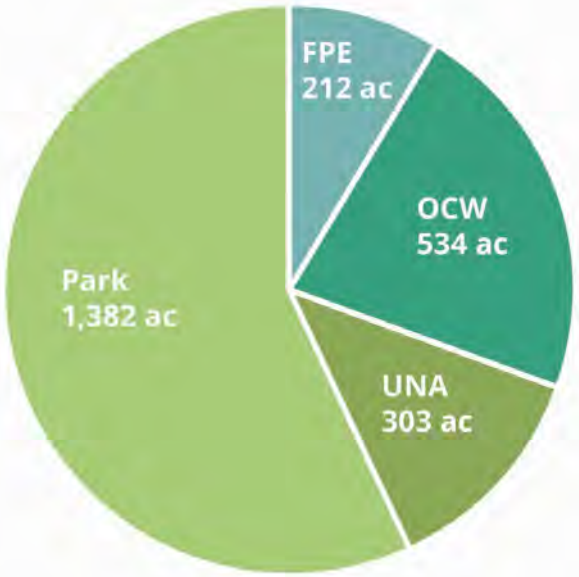
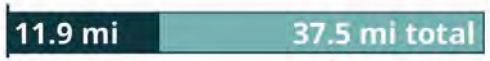
Full River Scenarios Summary – Potential Changes to Channel Form

Low Scenario

*Total Additional Acres: 2,431**



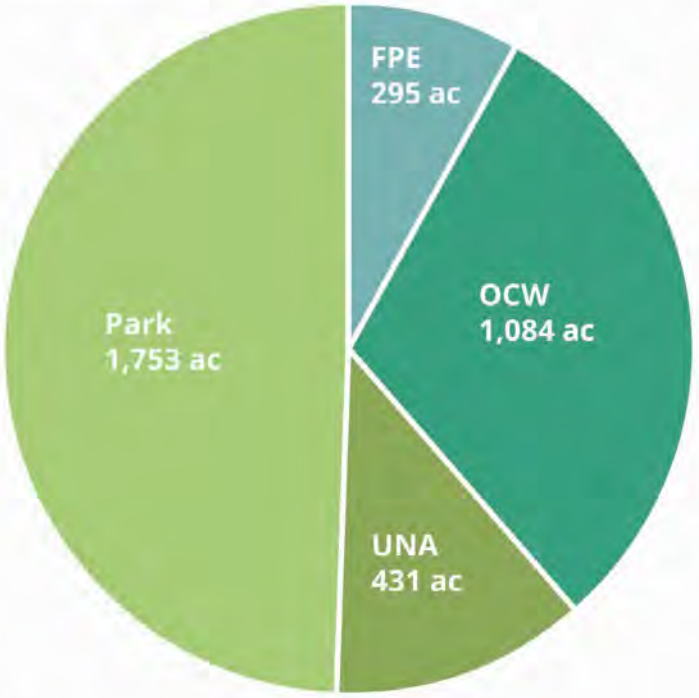


Soft Bottom Main Stem *(existing)*

Fish Passage *(ocean to Tujunga Wash confl.)*

High Scenario

*Total Additional Acres: 3,564**



Soft Bottom Main Stem *(existing + piggyback yd.)*

Fish Passage *(ocean to Tujunga Wash confl.)*

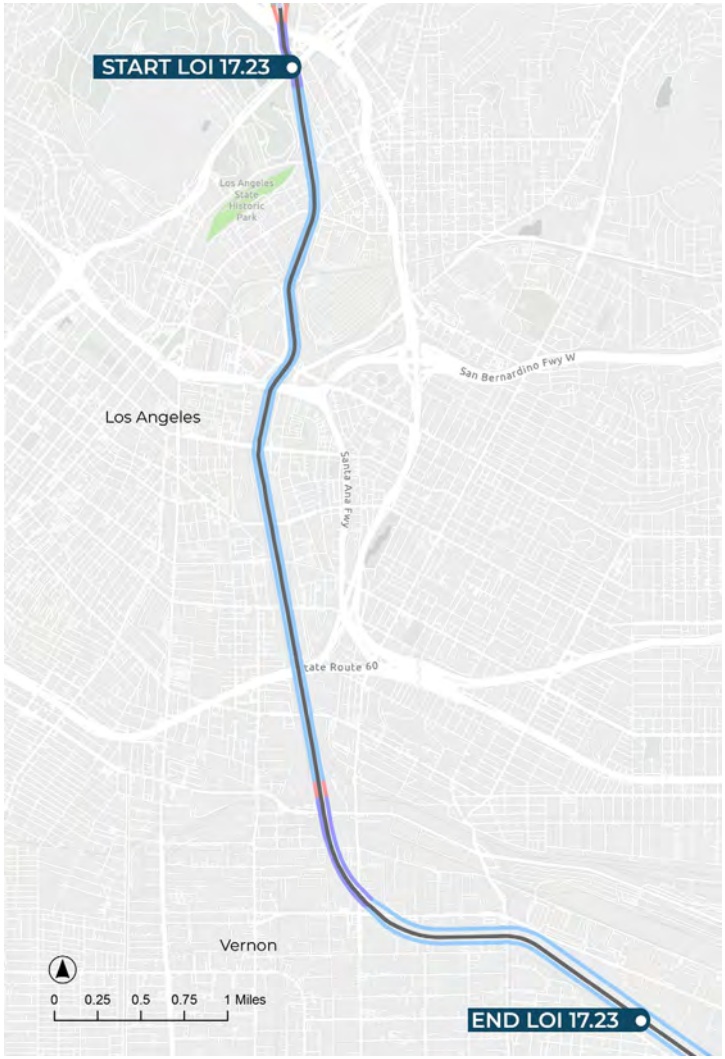
Legend

- Park (new)
- Upland Natural Area (UNA)
- Off-Channel Wetlands (OCW)
- Floodplain Expansion (FPE)

*Compared to existing condition

LA River CEFF Section C – Potential Changes to Channel Form LIO 17.23

Existing conditions scenario



"Low" Implementation scenario

"High" Implementation scenario

*LEGEND FORTHCOMING - Overbank polygons contain multiple typologies. Symbol color indicates predominant typology.

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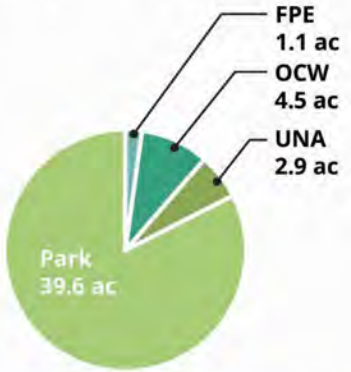
Low and High Summary Recap of Channel Form Change LIO 17.23

Reach 17.23 Changes to Acreage

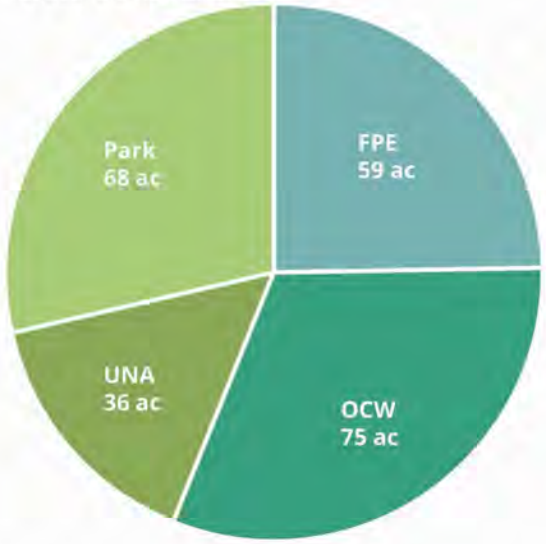
Low Scenario

*Total Additional Acres: 48**



High Scenario

*Total Additional Acres: 238**



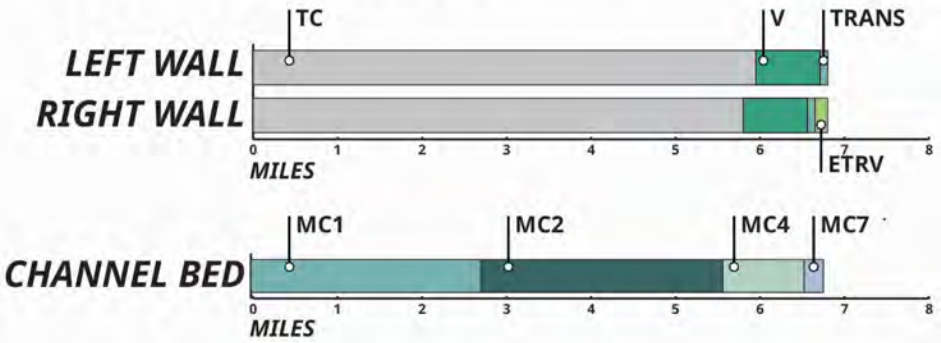
Legend

- Park (new)
- Upland Natural Area (UNA)
- Off-Channel Wetlands (OCW)
- Floodplain Expansion (FPE)

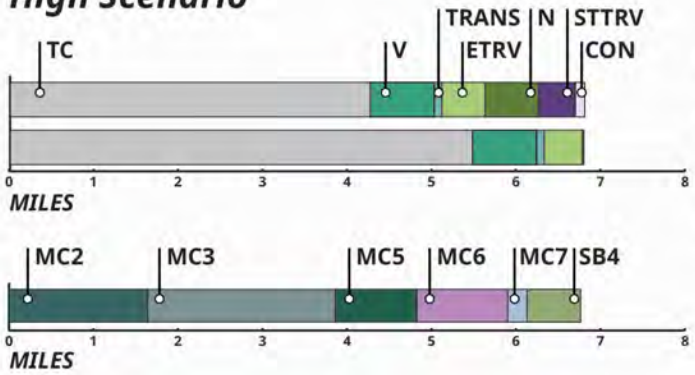
*Compared to existing condition

Reach 17.23 Channel Wall & Bed Typology

Low Scenario



High Scenario



Channel Walls

- **TC:** Trapezoidal Concrete
- **V:** Vertical
- **TRANS:** Transitional
- **ETRV:** Even Terraced Vegetated
- **N:** Natural (moved)
- **STTRV:** Single-top Terraced Vegetated
- **CON:** Confluence

Channel Beds

- **MC1:** Mini Fish Passage
- **MC2:** 44 ft. Passage
- **MC3:** 60 ft. Passage
- **MC4:** 44 ft. Meanders
- **MC5:** 60 ft. Meanders
- **MC6:** Multithread
- **MC7:** Holding Pool
- **SB4:** Mixed Managed

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Questions

Flow Assessment Initial Results

Photo credit: Stillwater Sciences

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LA River CEFF Section C –Performance Results Overview

Performance measure results are presented for a demonstration reach of the LA River.

Introduce the reach and how it varies under:

- **Existing** conditions
- **“Low”** Implementation
- **“High”** Implementation

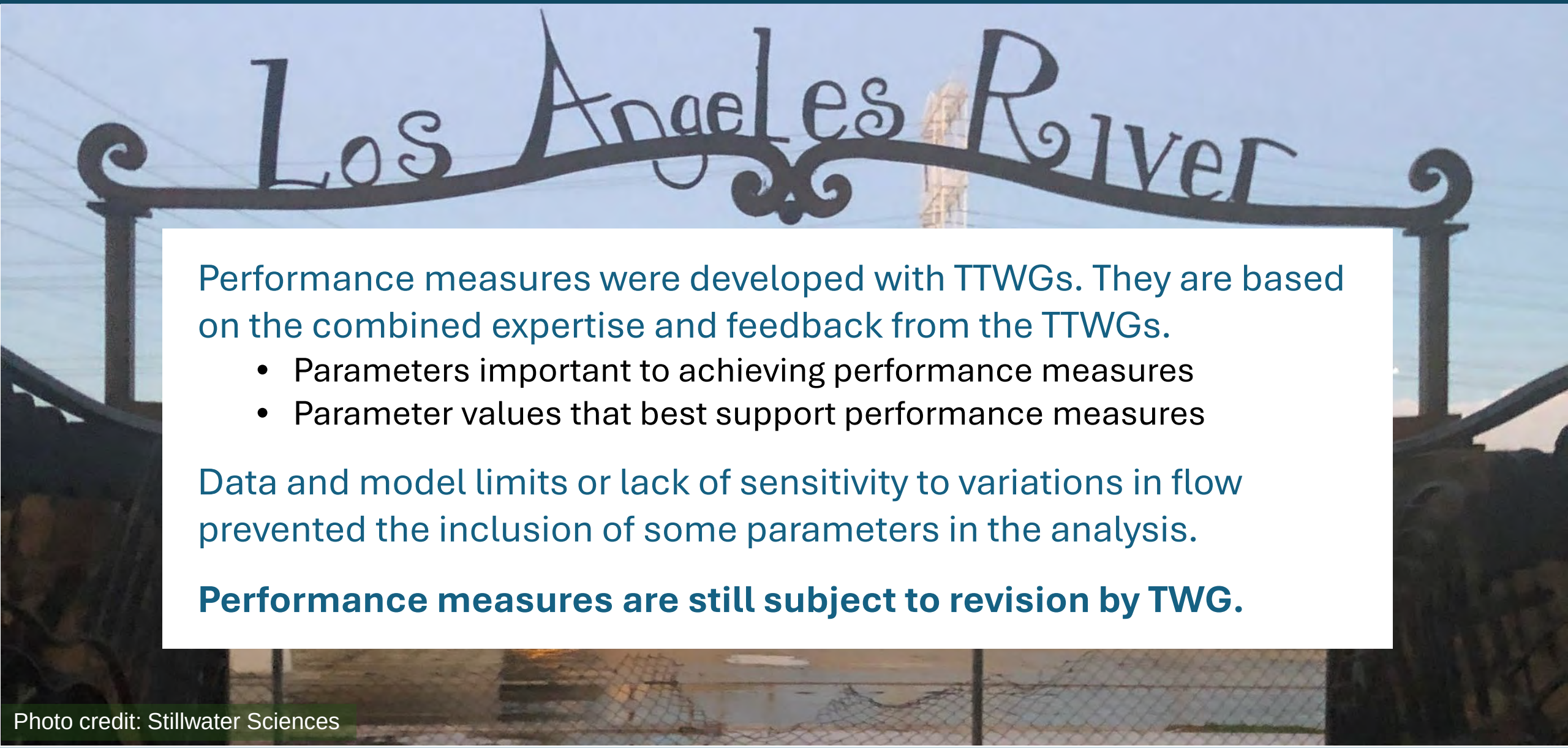
Detail results for two performance measures:

- Adult steelhead passage (BD-PM-1)
- Kayaking (RE-PM-2)

Highlight how performance measure results inform development of alternative scenarios.

Photo credit: Stillwater Sciences

LA River CEFF Section C – Performance Results Disclaimer



Performance measures were developed with TTWGs. They are based on the combined expertise and feedback from the TTWGs.

- Parameters important to achieving performance measures
- Parameter values that best support performance measures

Data and model limits or lack of sensitivity to variations in flow prevented the inclusion of some parameters in the analysis.

Performance measures are still subject to revision by TWG.

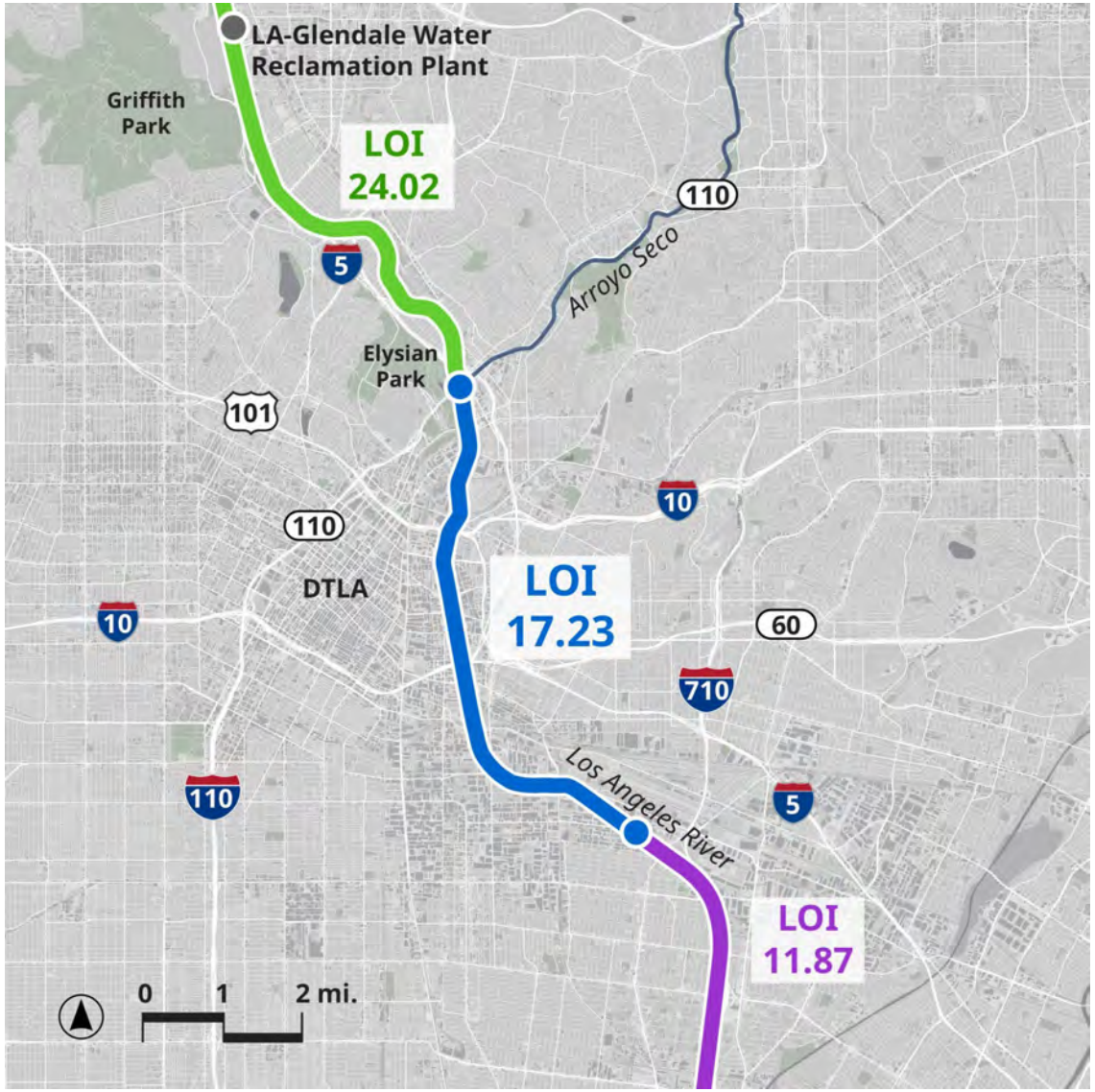
Photo credit: Stillwater Sciences

LA River CEFF Section C – LOI 17.23

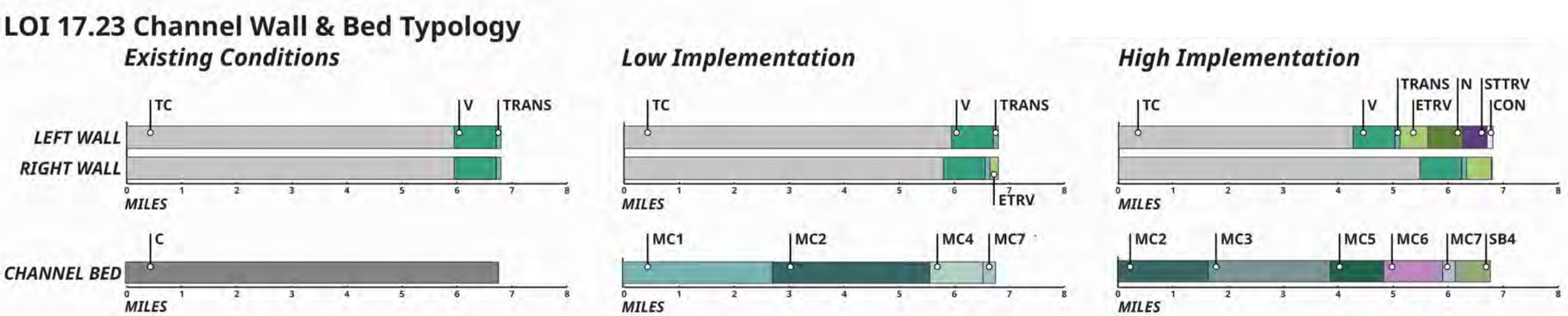
LA River CEFF analysis subdivided the mainstem LA River into 12 reaches (locations of interest or LOIs).

LOI 17.23 was selected as the demonstration reach for performance assessment tool results because:

- Influence of multiple channel form changes can be assessed
- Influence of multiple flow changes can be assessed



LA River CEFF Section C – Channel Form Variations in LOI 17.23



Channel walls **slightly changed** between existing and low implementation.

Channel walls **more substantially changed** between existing and high implementation.

Channel bed **substantially** changed under low and high implementation.

Channel Walls

TC: Trapezoidal Concrete
V: Vertical
TRANS: Transitional
ETRV: Even Terraced Vegetated
N: Natural (moved)
STTRV: Single-top Terraced Vegetated
CON: Confluence

Channel Beds

C: Concrete
MC1: Mini Fish Passage
MC2: 44 ft. Passage
MC3: 60 ft. Passage
MC4: 44 ft. Meanders
MC5: 60 ft. Meanders
MC6: Multithread
MC7: Holding Pool
SB4: Mixed Managed

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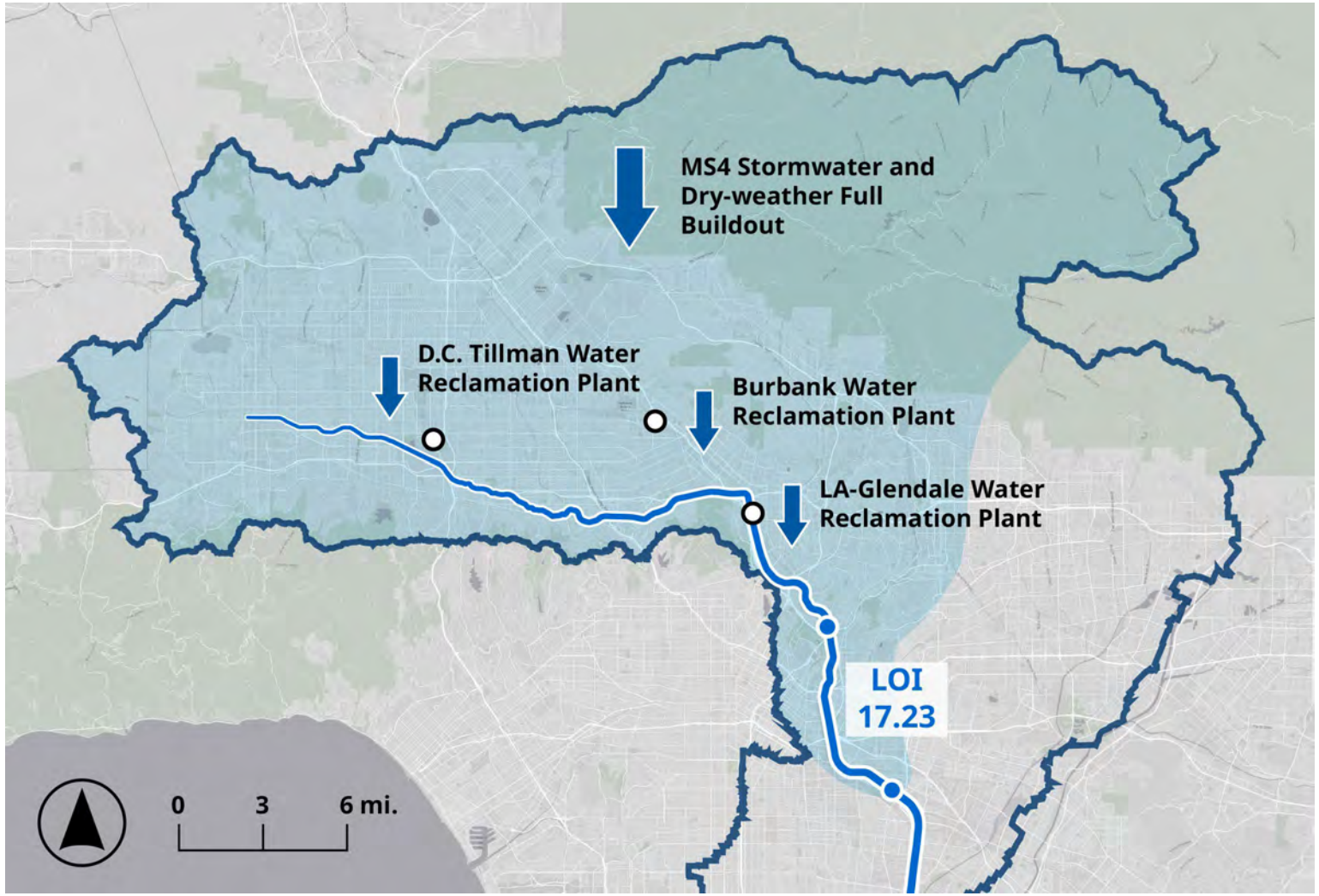
LA River CEFF Section C –Flow Variations in LOI 17.23

Flow entering LOI 17.23 has been reduced under “Low” and “High” Implementation.

Flow reductions at all three water reclamation plants (WRPs)

Flow reductions from MS4 stormwater and dry-weather full buildout.



LA River CEFF Section C – Water Supply and Water Quality Performance Measures

Water Supply and Water Quality TTWGs each had two performance measures.

Water Supply TTWG	• Increase Local Water Supply (WS-PM-1) • Sufficient Flow for Lauren Bon Water Right (WS-PM-2)
Water Quality TTWG	• Stormflow and Dry-weather MS4 Compliance (WQ-PM-1) • Discharge water temperature limits (WQ-PM-2)

LA River CEFF Section C – Water Supply and Water Quality Performance Measures

Water Supply and Water Quality performance measures WS-PM-1 and WQ-PM-1 are supported to the extent discussed by their TTWGS under "Low" and "High" Implementation scenarios by **changes to flow** implemented in those scenarios.

"Low" Implementation Changes to Flow

• D.C. Tillman WRP	4 MGD reduction
• Burbank WRP	1211 petition reductions
• LA-Glendale WRP	1211 petition reductions
• MS4 stormwater and dry-weather full buildout	Variable reductions across watershed

"High" Implementation Changes to Flow

• D.C. Tillman WRP	4 MGD reduction
• Burbank WRP	Actual reductions
• LA-Glendale WRP	1211 petition reductions
• MS4 stormwater and dry-weather full buildout	Variable reductions across watershed

LA River CEFF Section C – Water Supply and Water Quality Performance Measures

Water Supply and Water Quality performance measures WS-PM-1 and WQ-PM-1 are supported to the extent discussed by their TTWGS under Low and High Implementation scenarios by **changes to flow implemented in those scenarios**.

"Low" Implementation

WS-PM-1 is achieved because all requested WRP flow reductions implemented.
WQ-PM-1 is achieved because all required MS4 flow modifications are implemented.

"High" Implementation

WS-PM-1 is achieved because all requested WRP flow reductions implemented.
WQ-PM-1 is achieved because all required MS4 flow modifications are implemented.

LA River CEFF Section C – Water Supply and Water Quality Performance Measures

Water Supply and Water Quality performance measures WS-PM-1 and WQ-PM-1 are supported to the extent discussed by their TTWGS under Low and High Implementation scenarios by **changes to flow implemented in those scenarios**.

Low and High Implementation are just two **initial** scenarios based on available planning documents and TTWG expert input.

LA River CEFF alternatives can develop scenarios that explore other combinations of WRP flow reductions or MS4 flow modifications.

LA River CEFF Section C – Water Supply and Water Quality Performance Measures

The **Water Supply** performance measure associated with sufficient flow for Lauren Bon water right (**WS-PM-2**) will be included in future LA River CEFF analysis results.

The **Water Quality** performance measure associated with discharge water temperature limits (**WQ-PM-2**) **not assessed at this time** by LA River CEFF analysis.

- LA River Water Temperature Study is analyzing the relationship between water reclamation plant (WRP) flows and water temperature in LA River
- LA River Water Temperature Study is still in progress, so results cannot be incorporated into LA River CEFF yet.

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) Overview

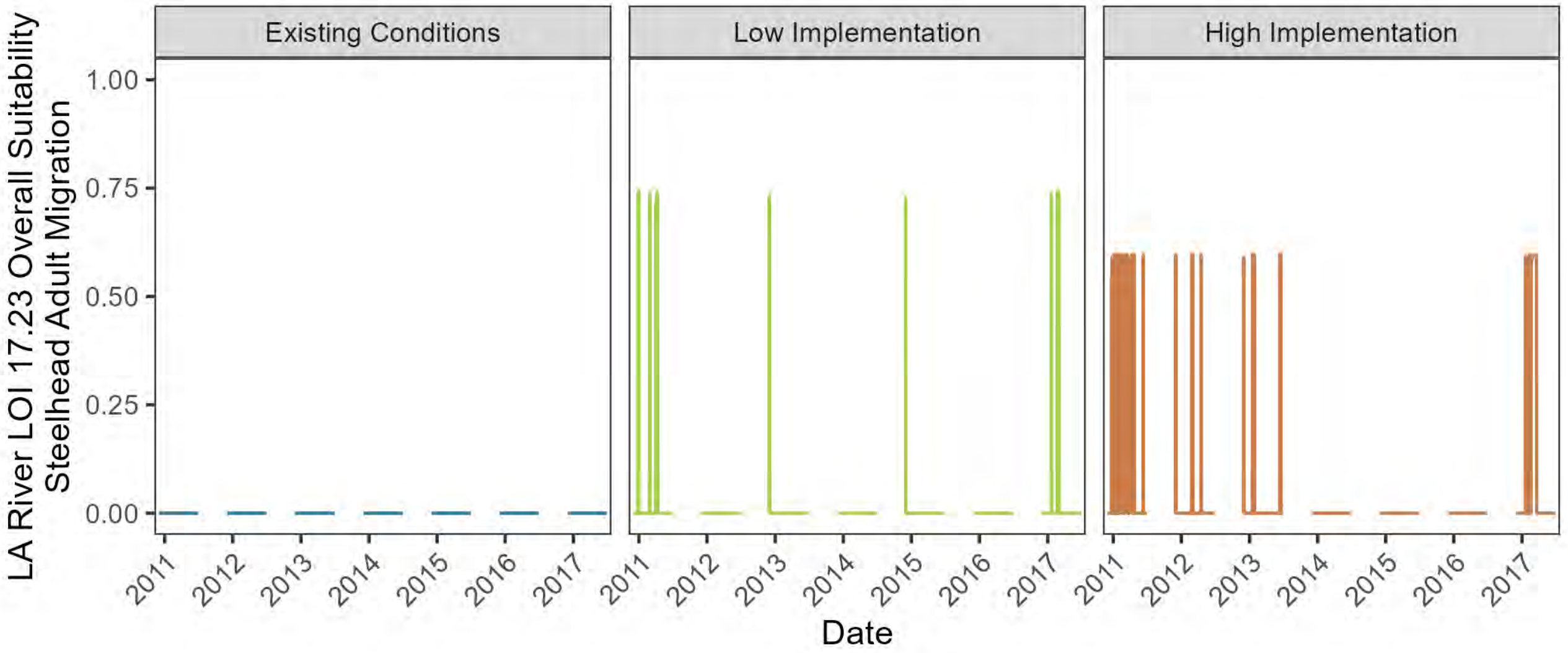
Biodiversity TTWG

- Adult steelhead migration is supported from Dec 1 to Jun 30, when LA River flow ≤ Oct 1 – Jun 30 1% flow exceedance. (BD-PM-1)

Biodiversity TTWG Recommended Parameters Evaluated	Biodiversity TTWG Recommended Parameters **Not** Evaluated
• Water depth • Water velocity • Turbulence • Potential riparian cover	• Hydraulic barriers • Water temperature

Hydraulic barriers and water temperature were not evaluated at this time due to data and model limitations.

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



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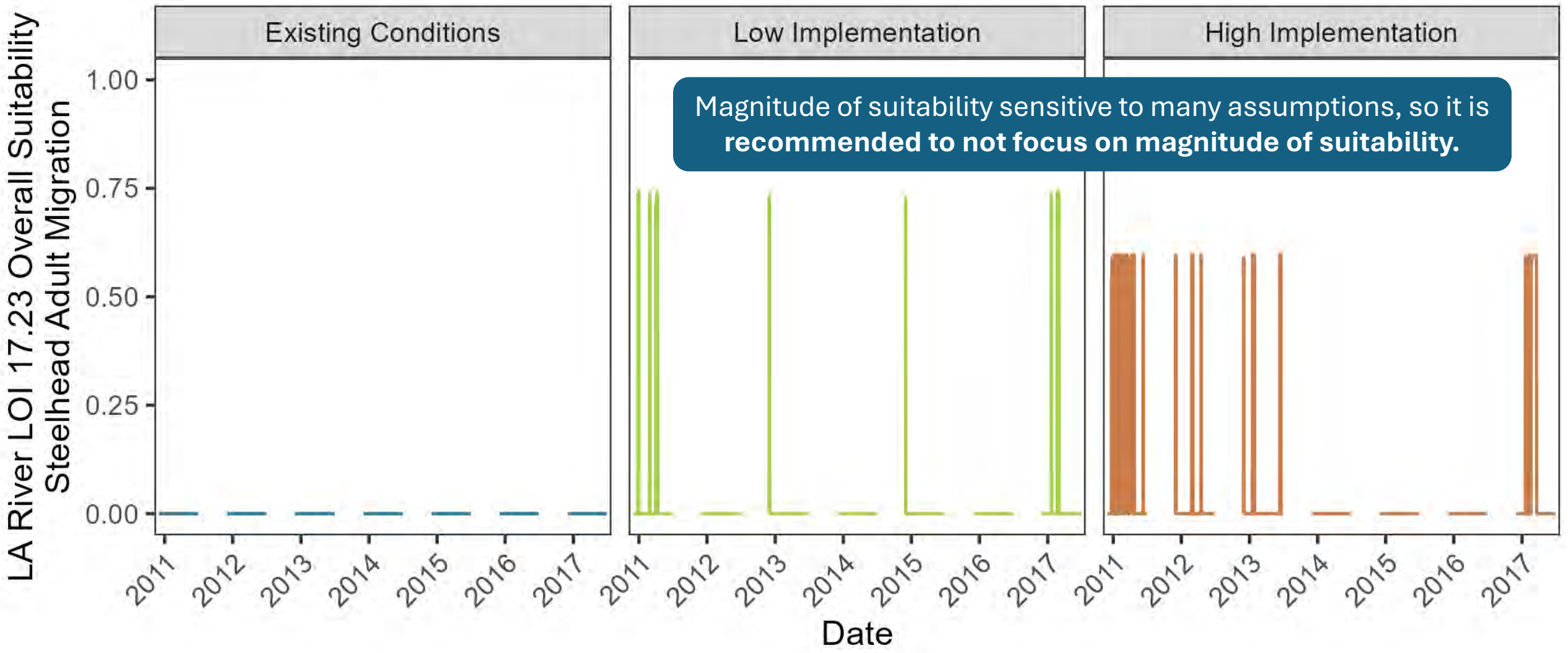
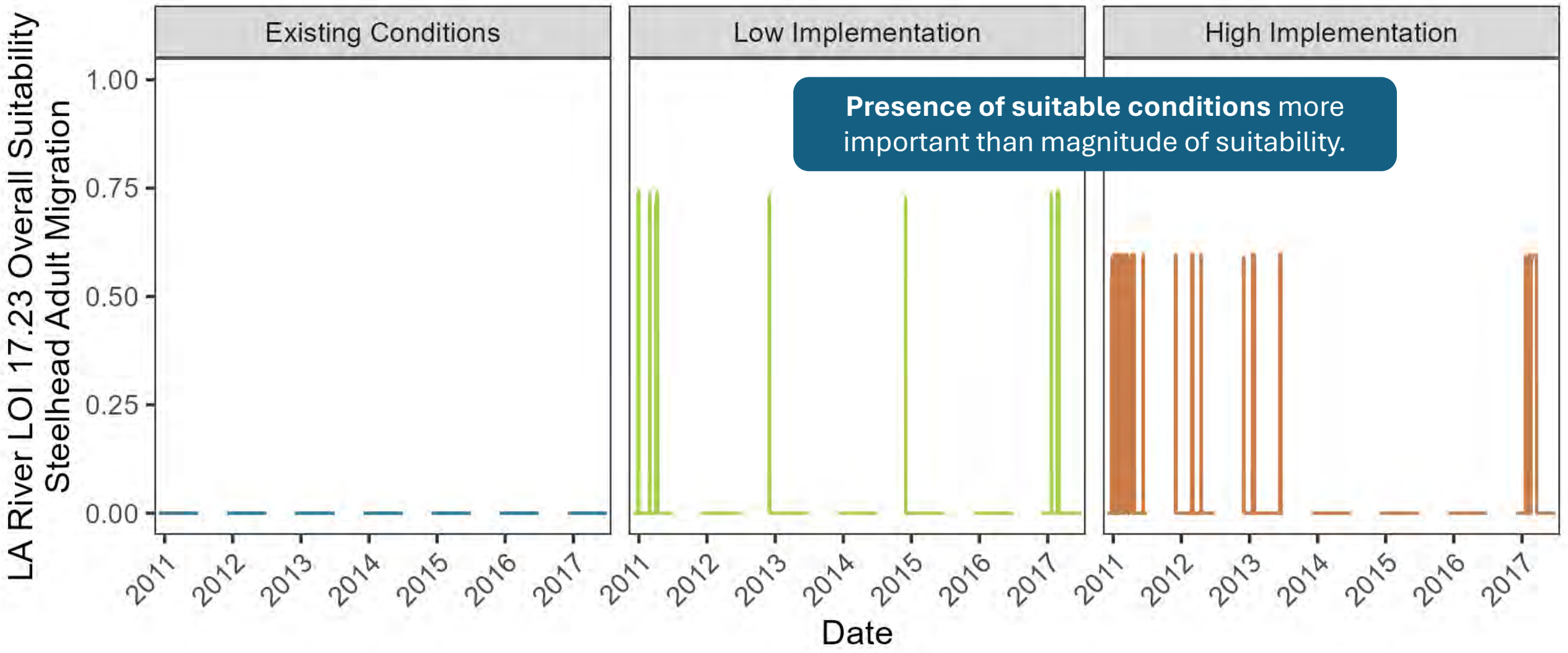
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



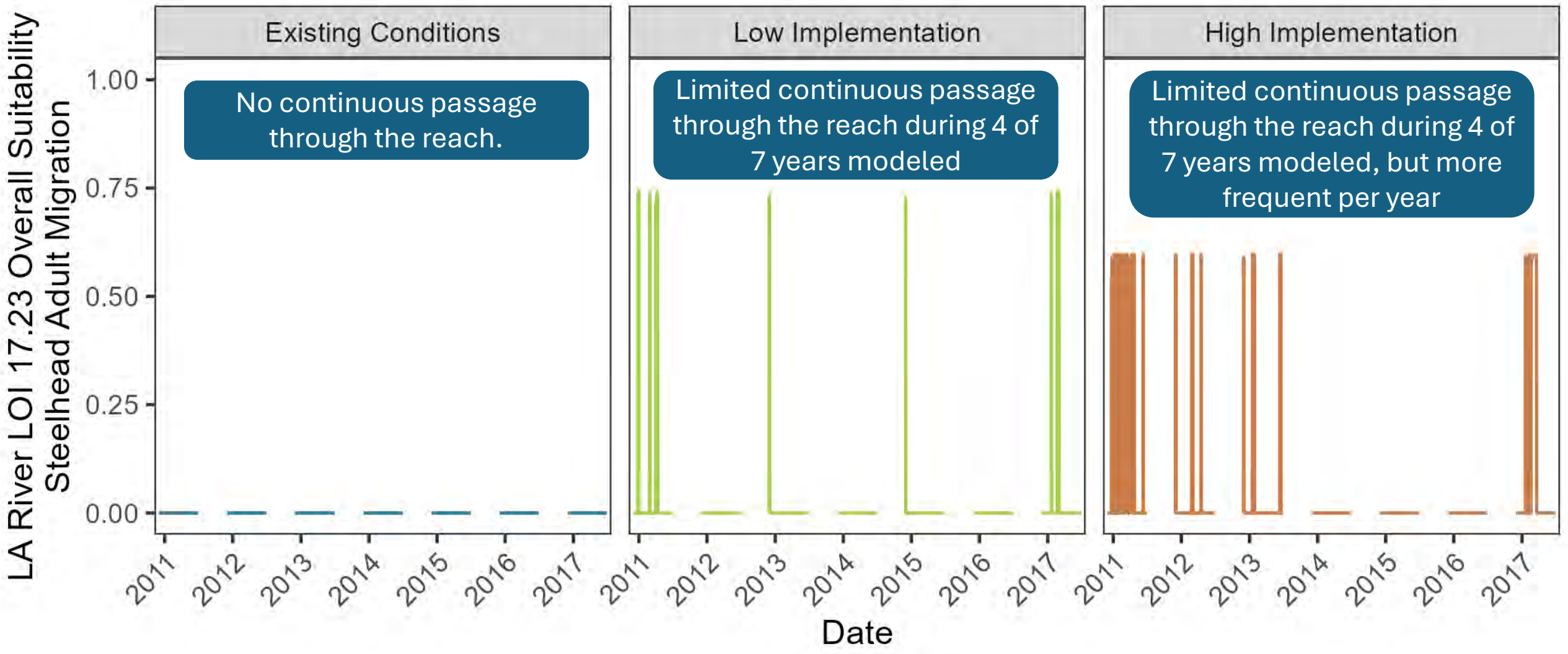
Magnitude of suitability sensitive to many assumptions, so it is **recommended to not focus on magnitude of suitability.**

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

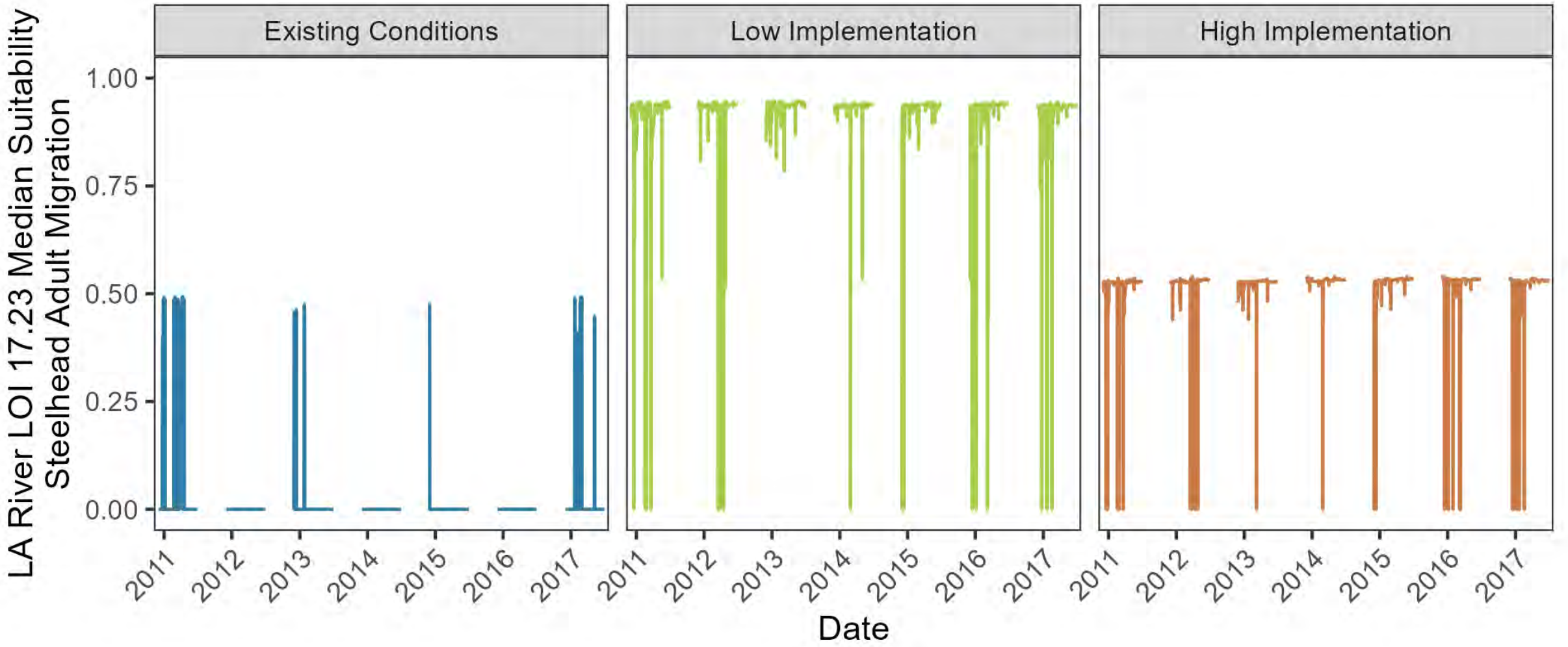


Presence of suitable conditions more important than magnitude of suitability.

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



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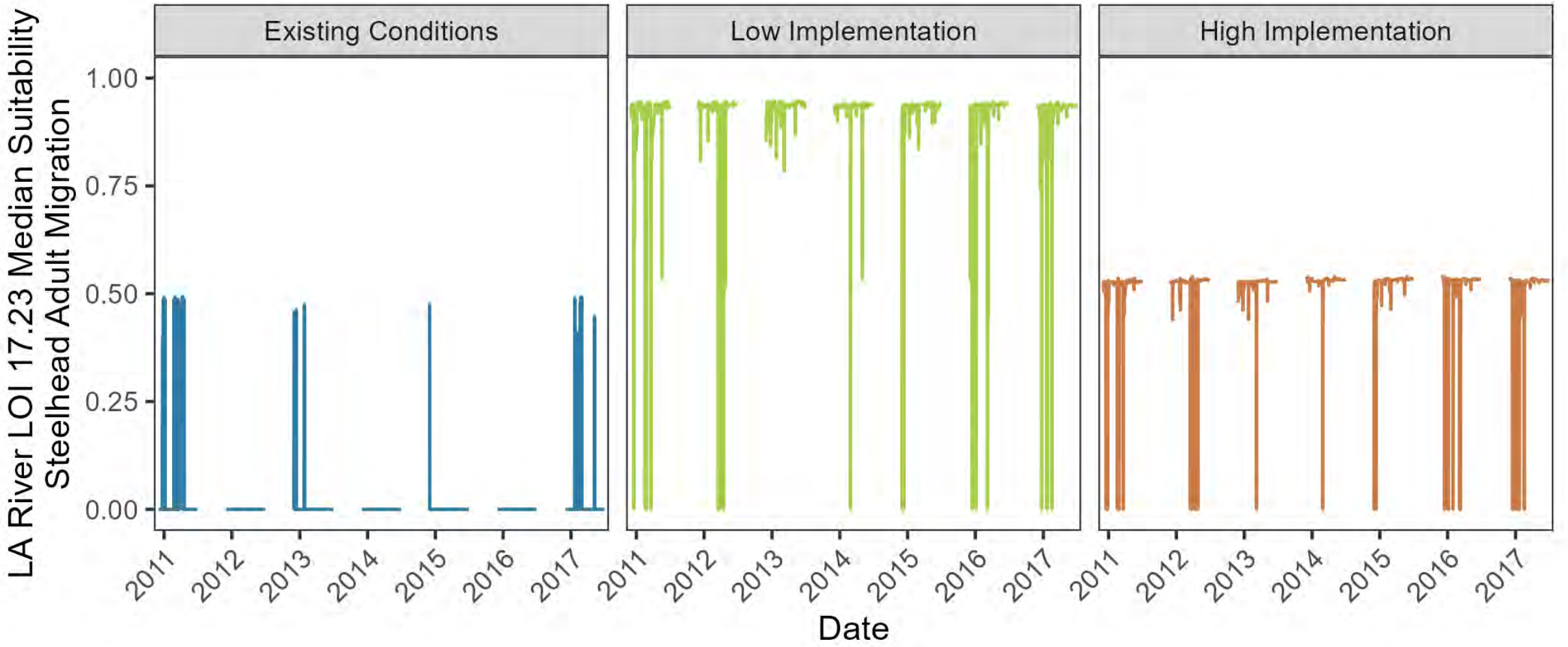
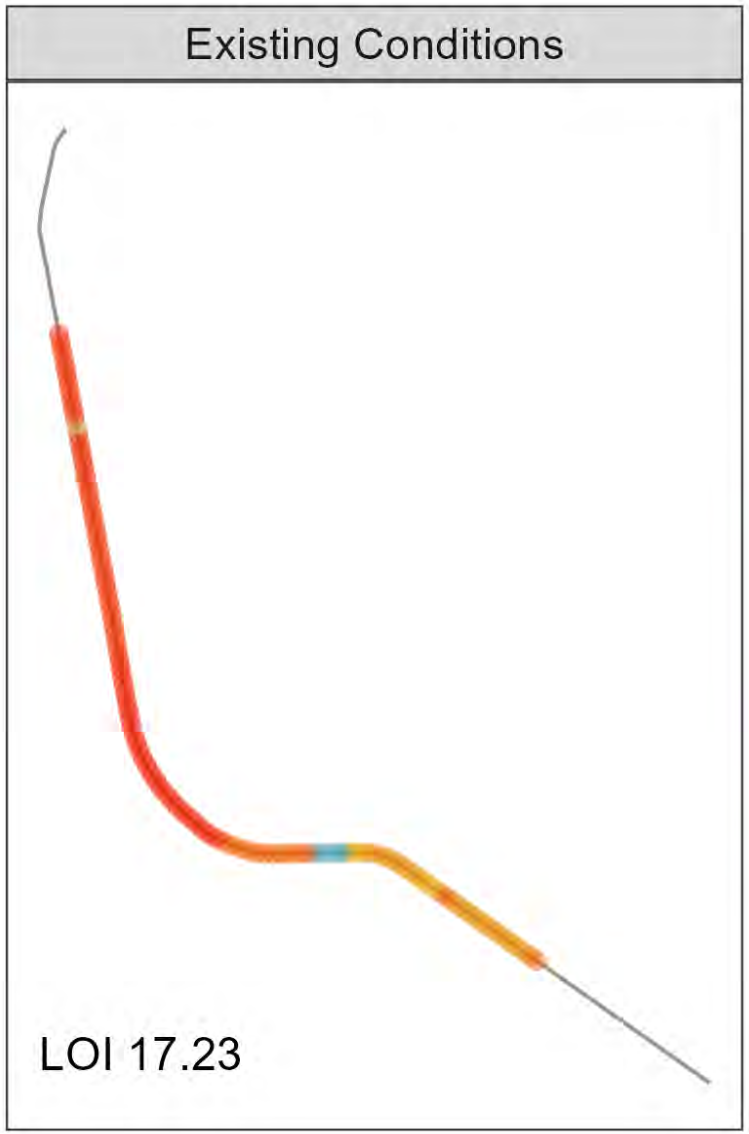
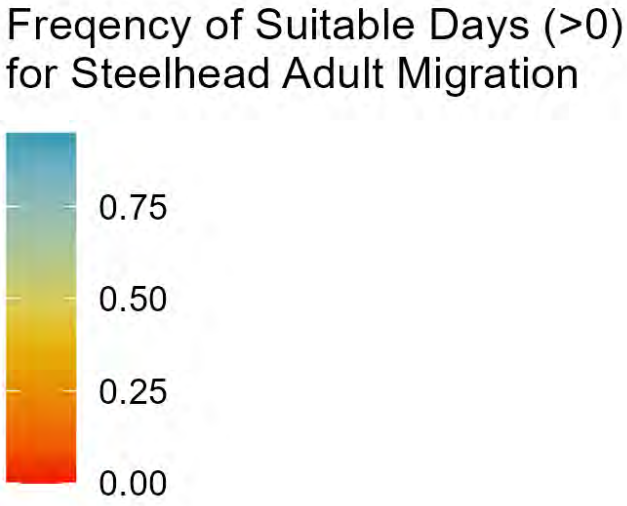
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



Median suitability indicates most of channel is passable during migration time period, but there is one or more sections of reach that are limiting passage.

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

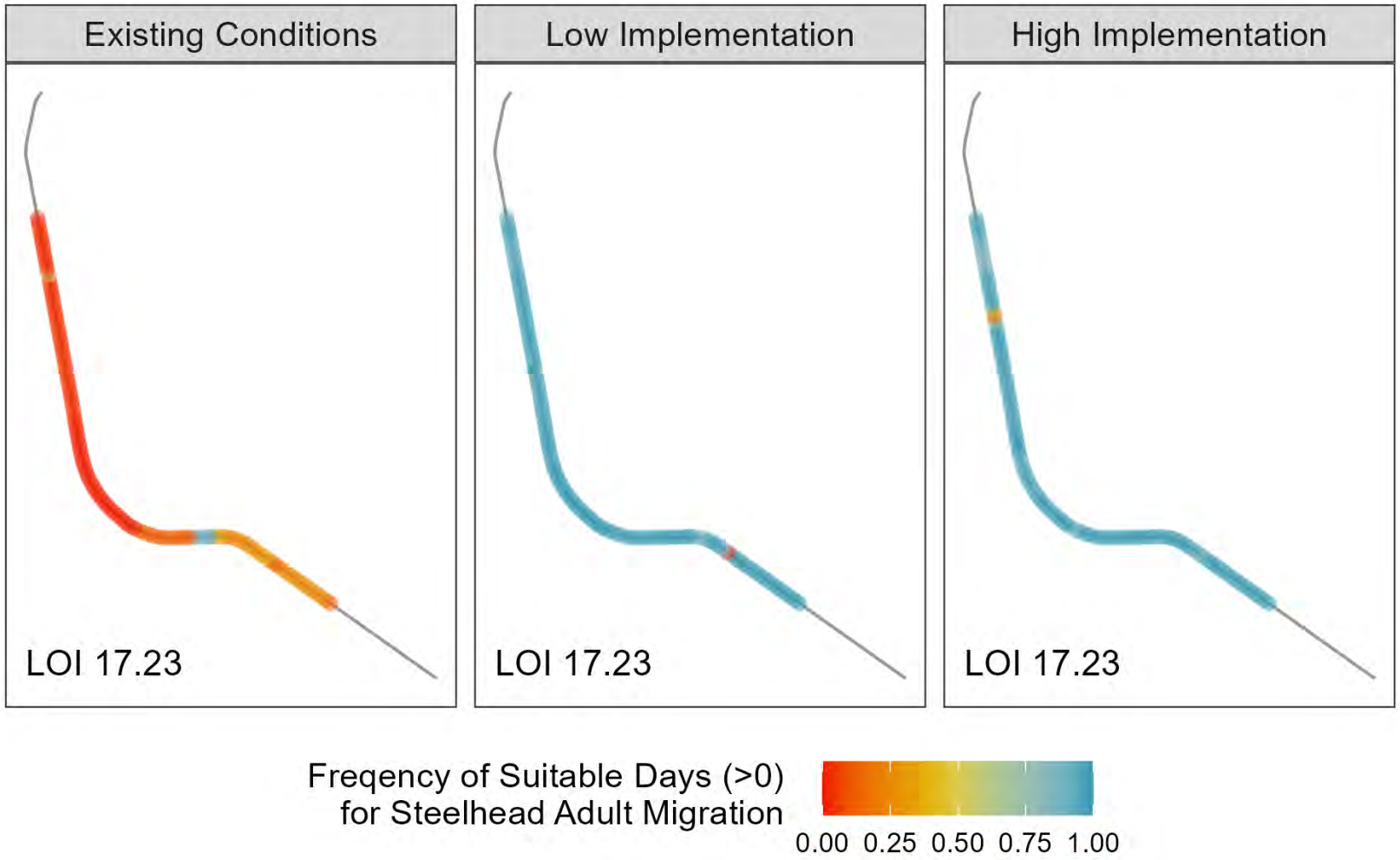




Frequency of suitable days for steelhead adult migration during their migration period is assessed for each 200 ft segment.

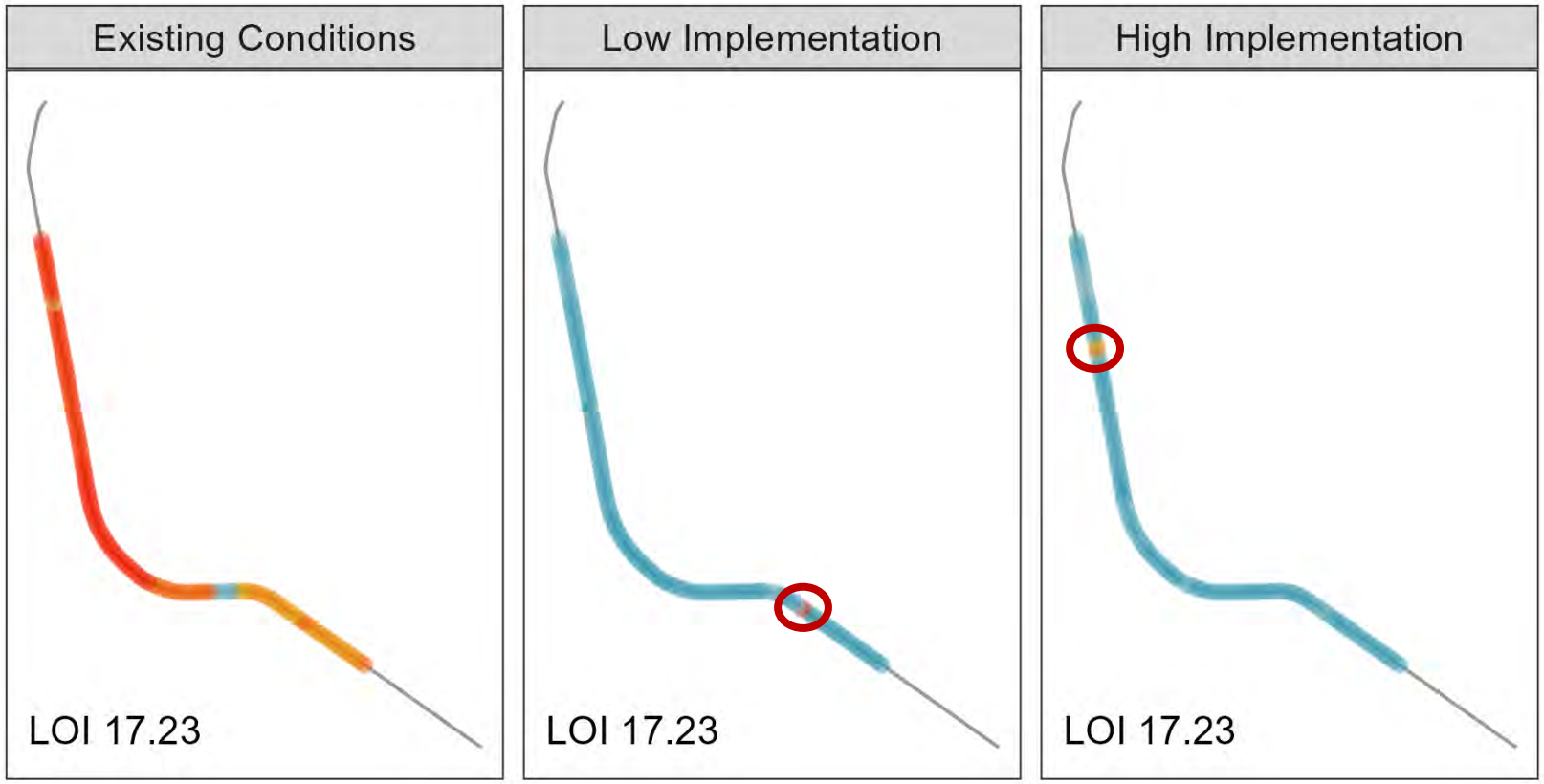
Most 200 ft segments in LOI 17.23 were found to have a **relatively low frequency** of suitable days during the steelhead migration period between WY 2011 – 2017 under existing conditions.

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



Frequency of suitable days during steelhead migration period between WY 2011 – 2017 **improves substantially** under "Low" and "High" Implementation.

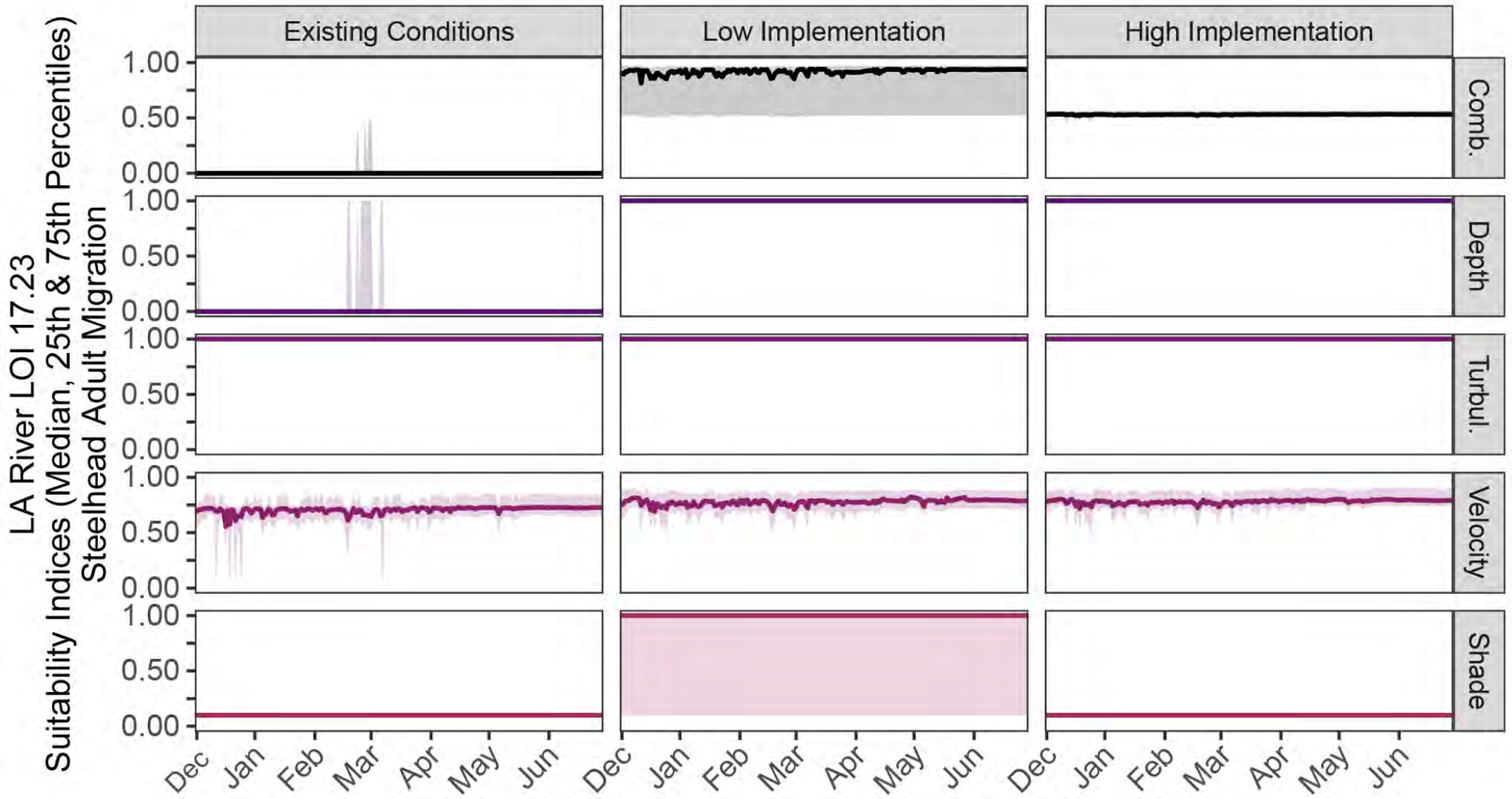
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



Both scenarios still have some limiting segments.

Model results indicate where to focus attention during alternative development to improve frequency passage conditions are met.

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



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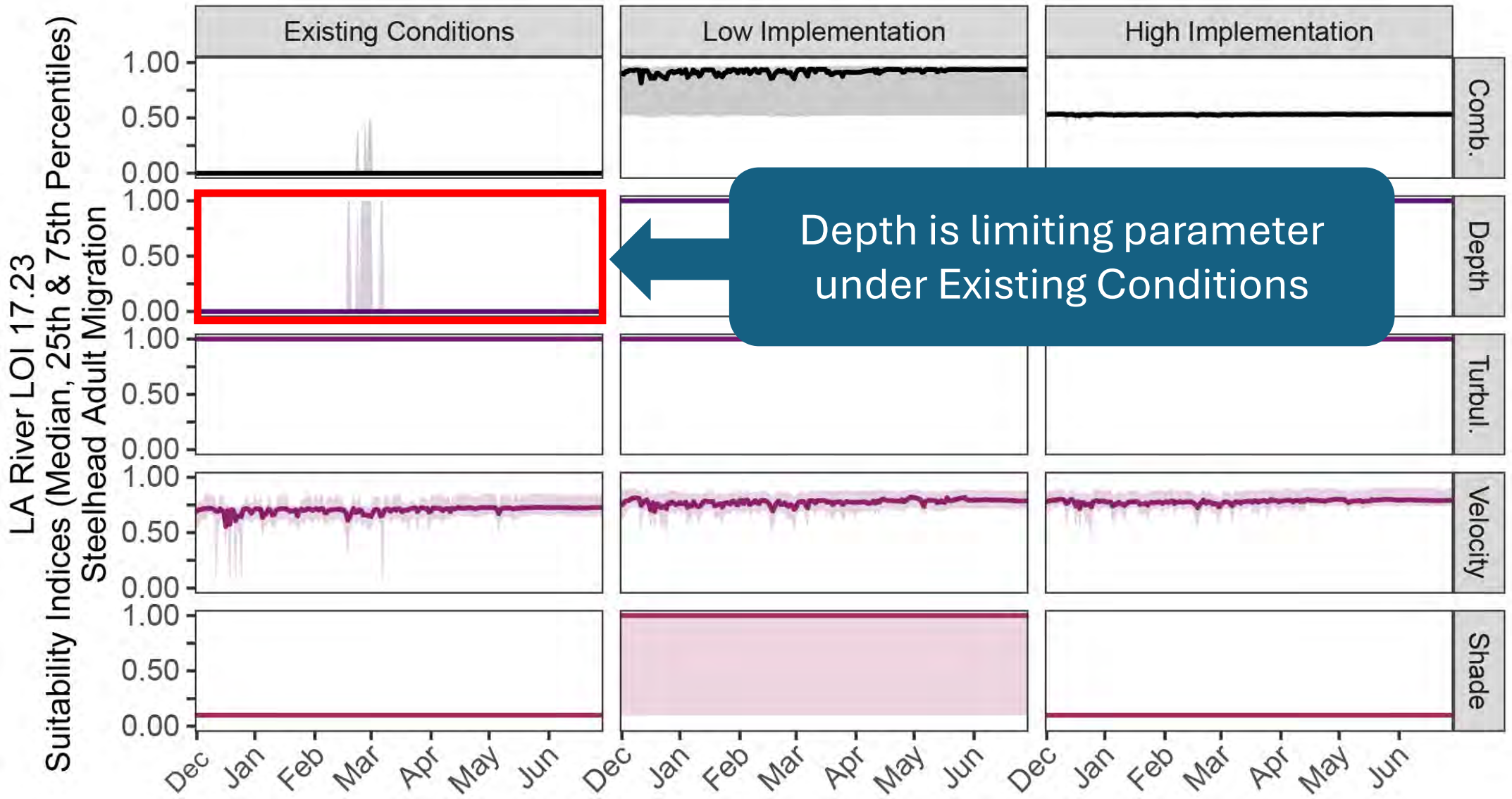
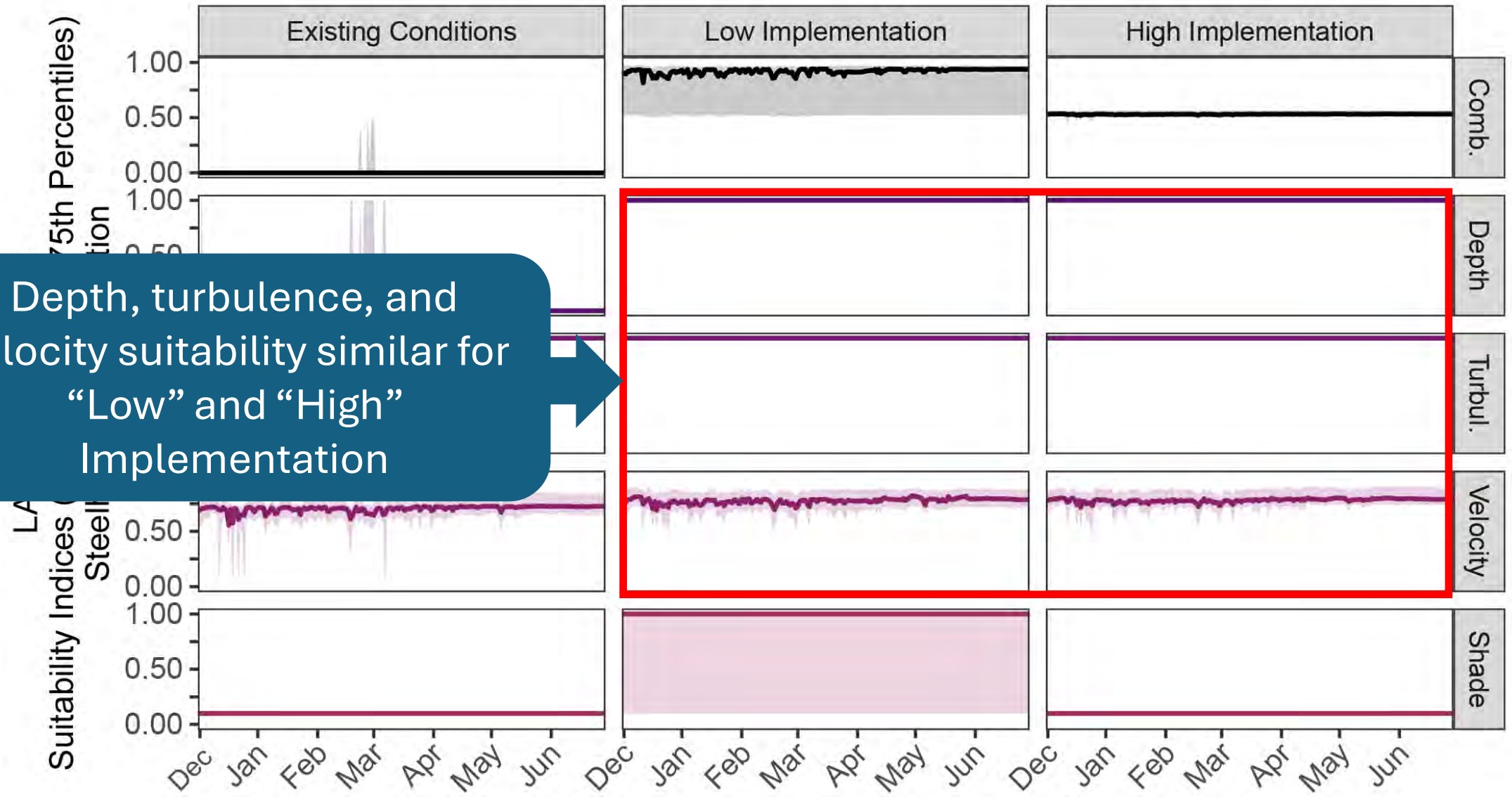
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

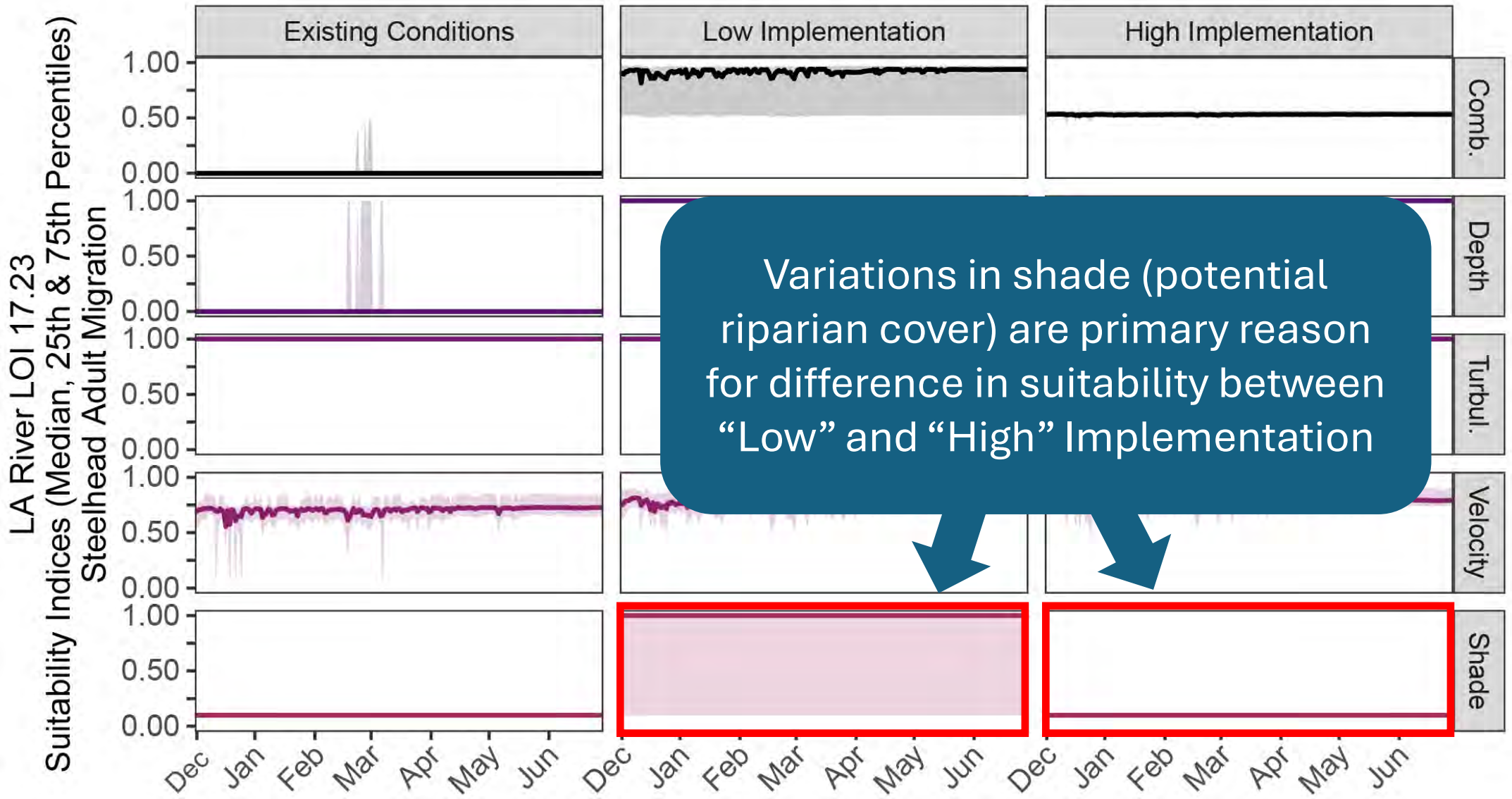


LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

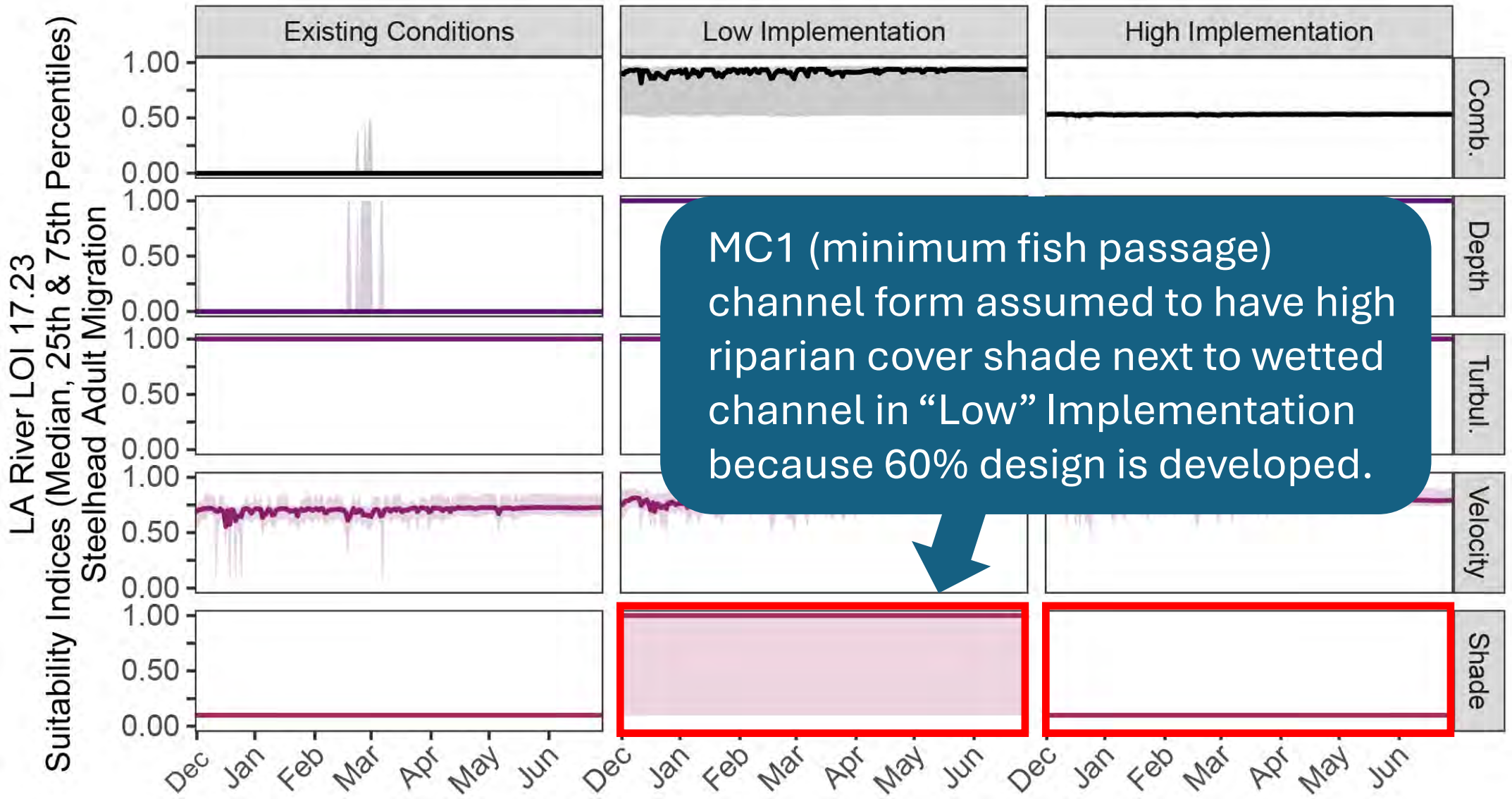


Depth, turbulence, and velocity suitability similar for "Low" and "High" Implementation

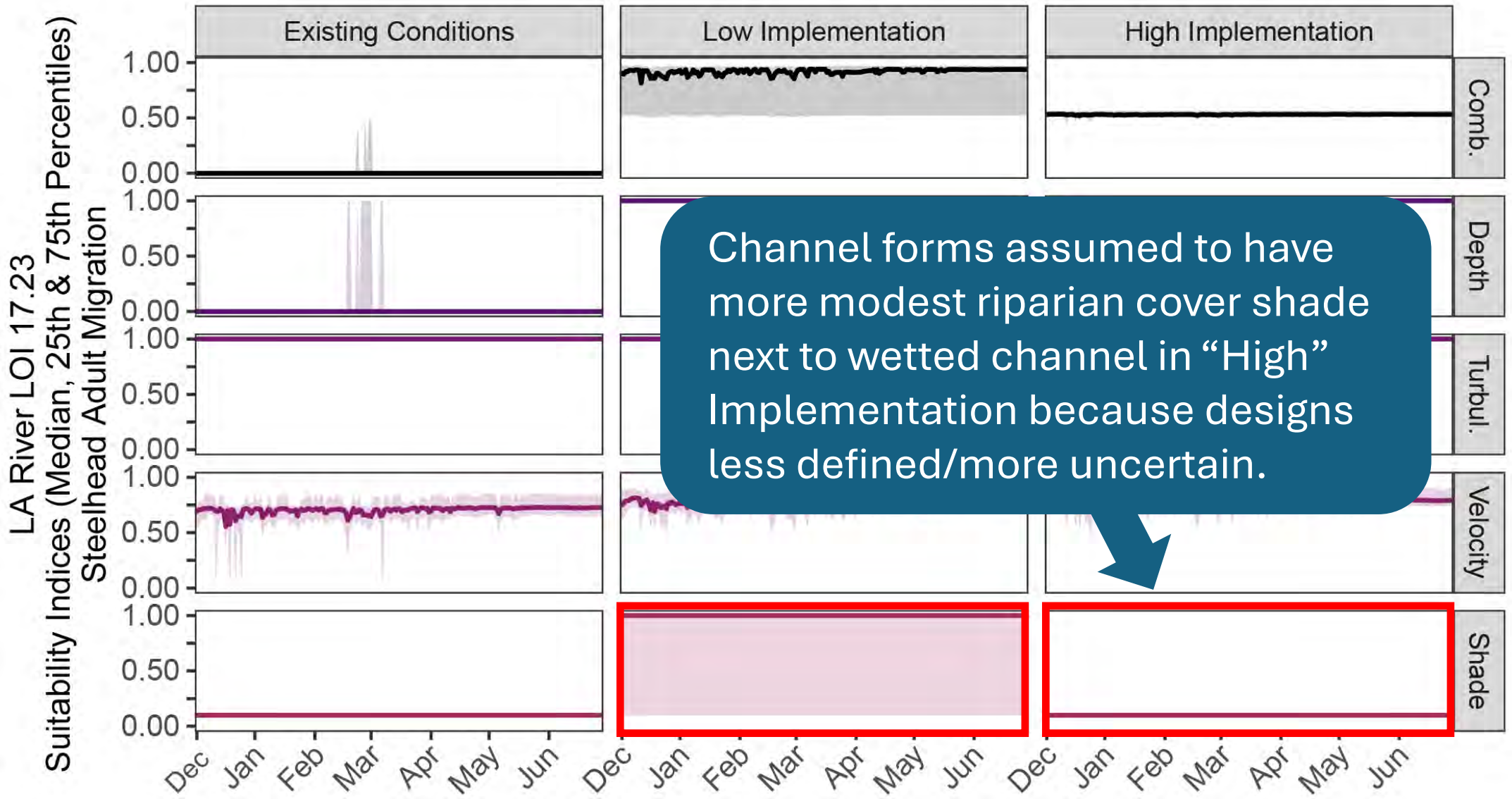
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

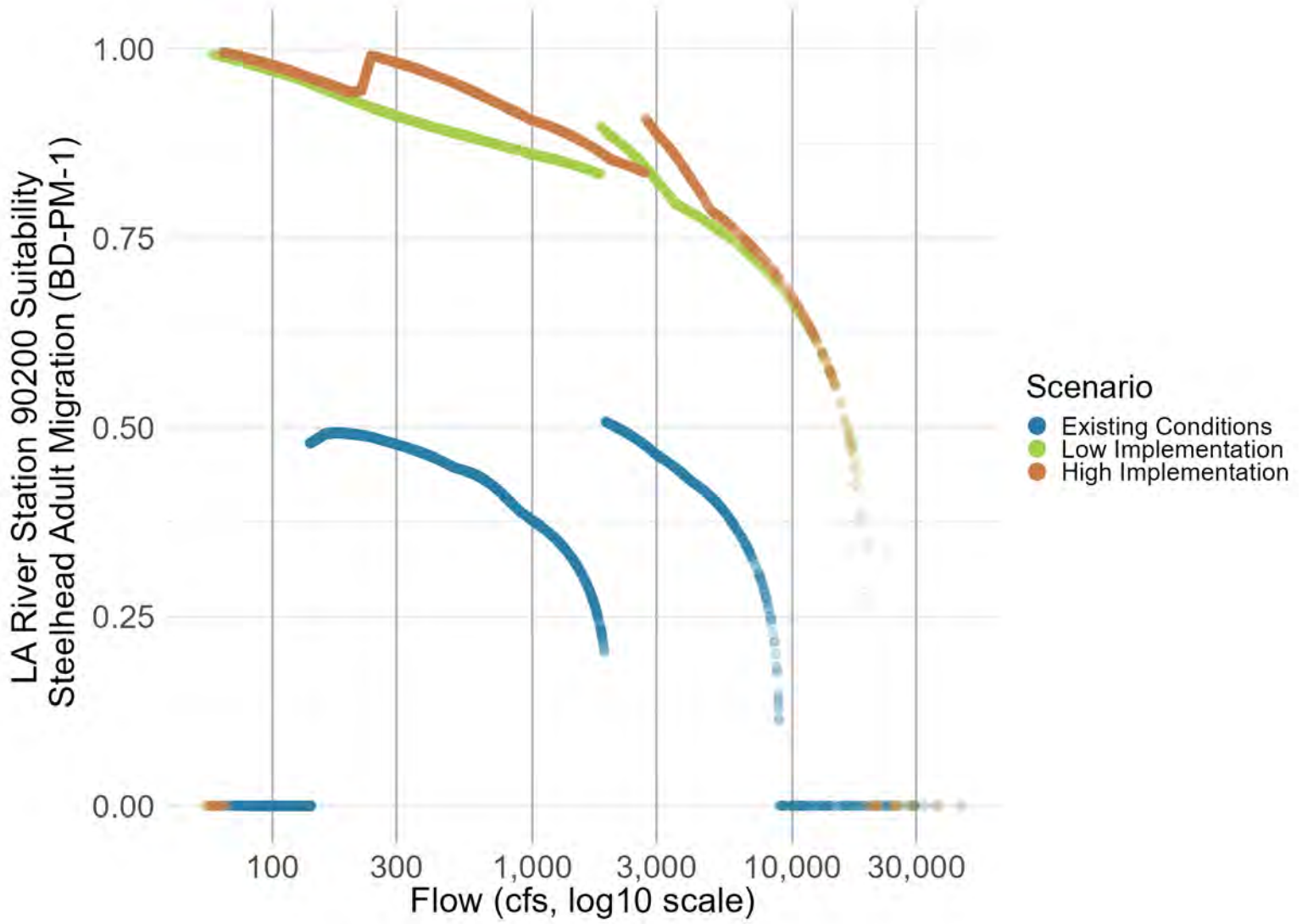


LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

Comparison of flow and overall suitability at a 200 ft segment shows flow range that supports suitable conditions for that 200 ft segment.



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

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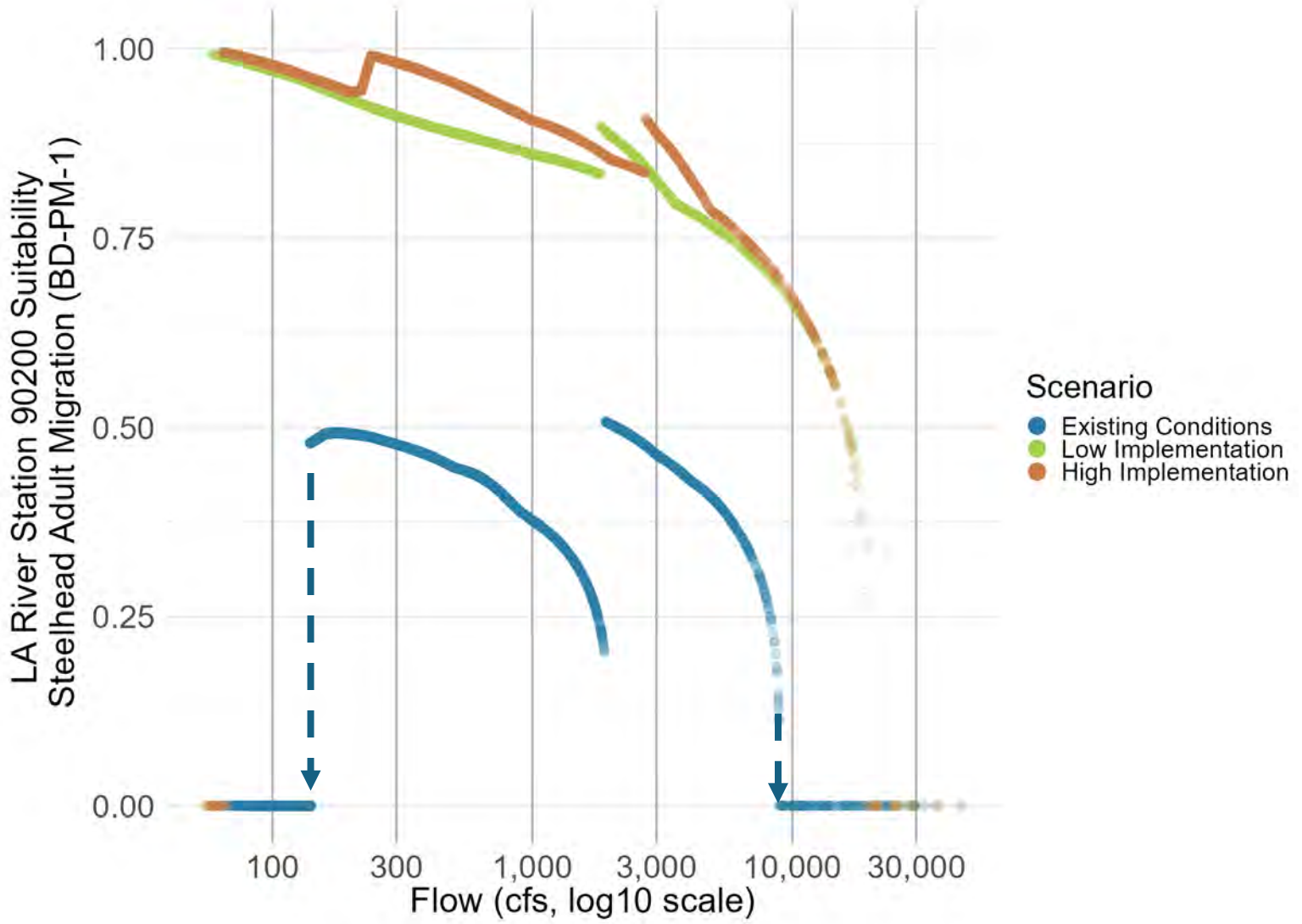

LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

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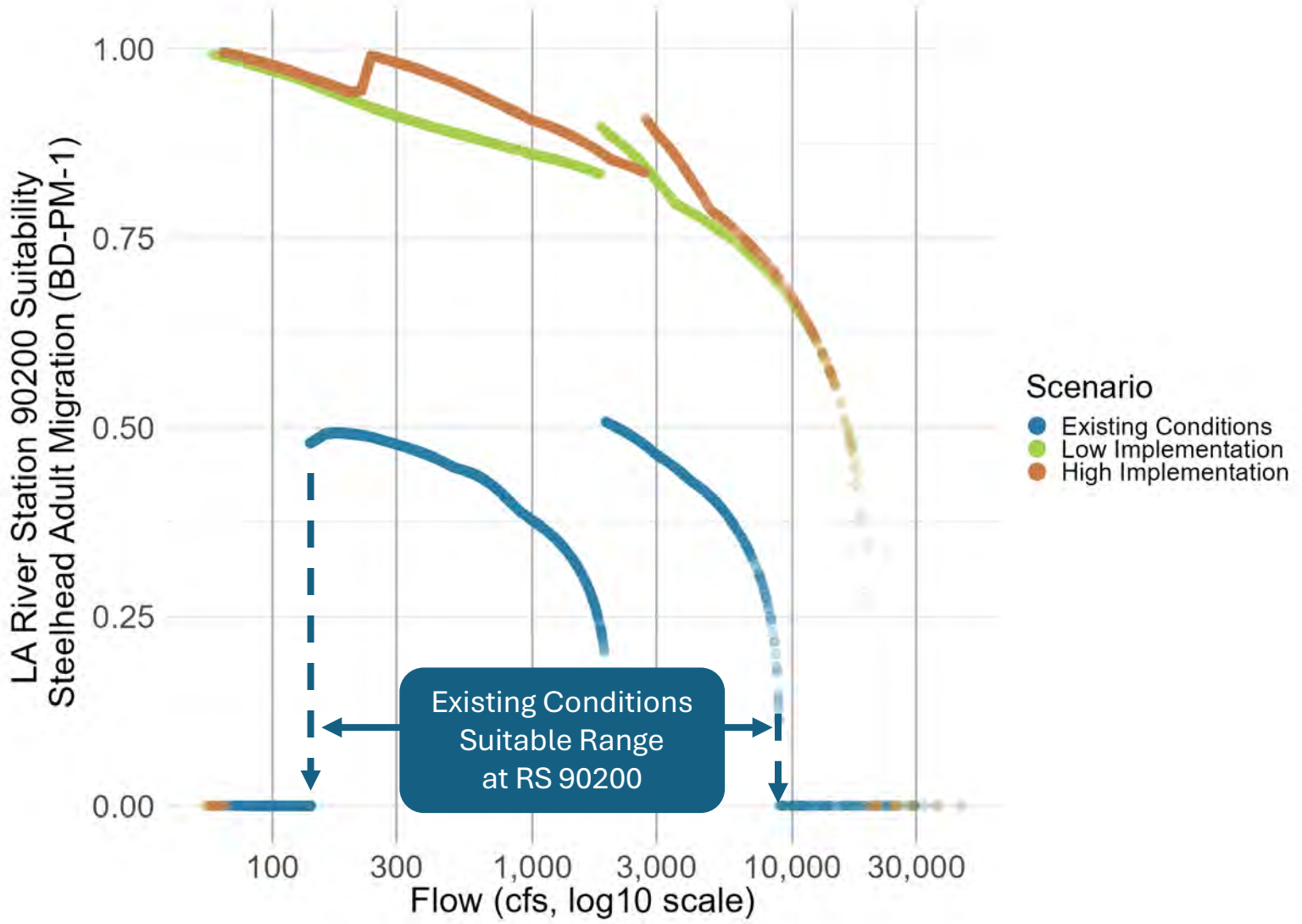
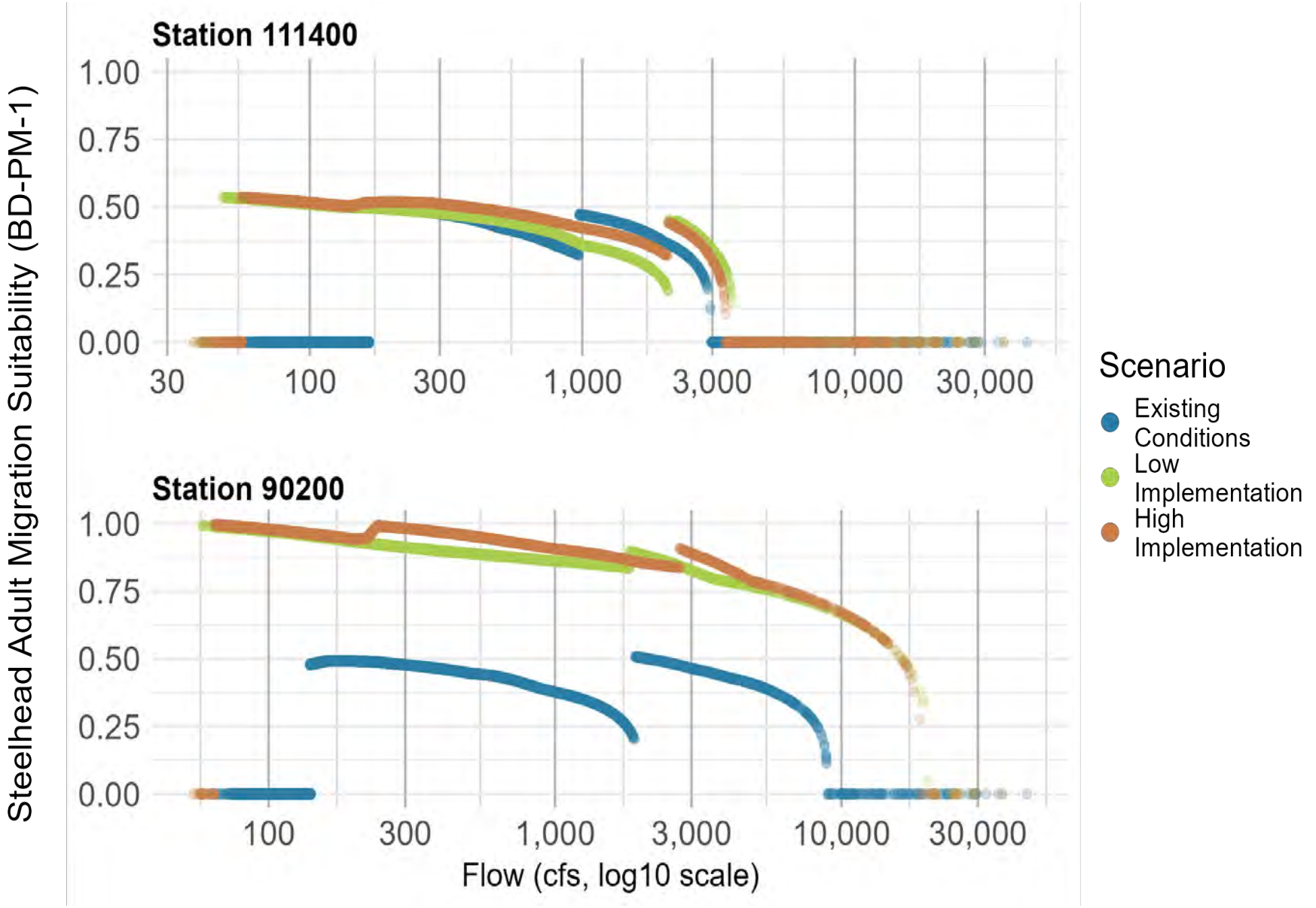


LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

Flow range that supports suitable conditions is identified for the each of the 200 ft segments in LOI 17.23 for each scenario.



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

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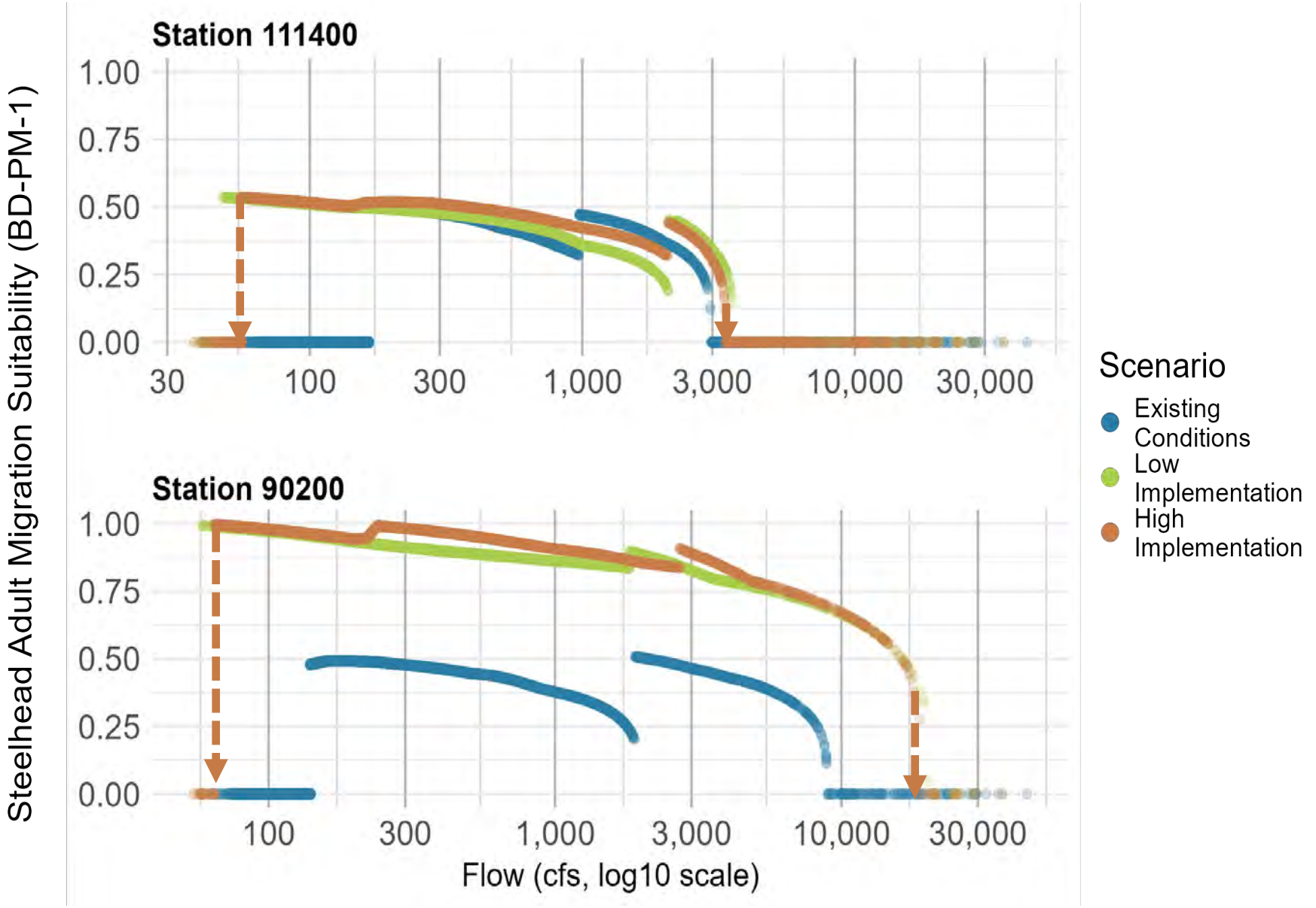
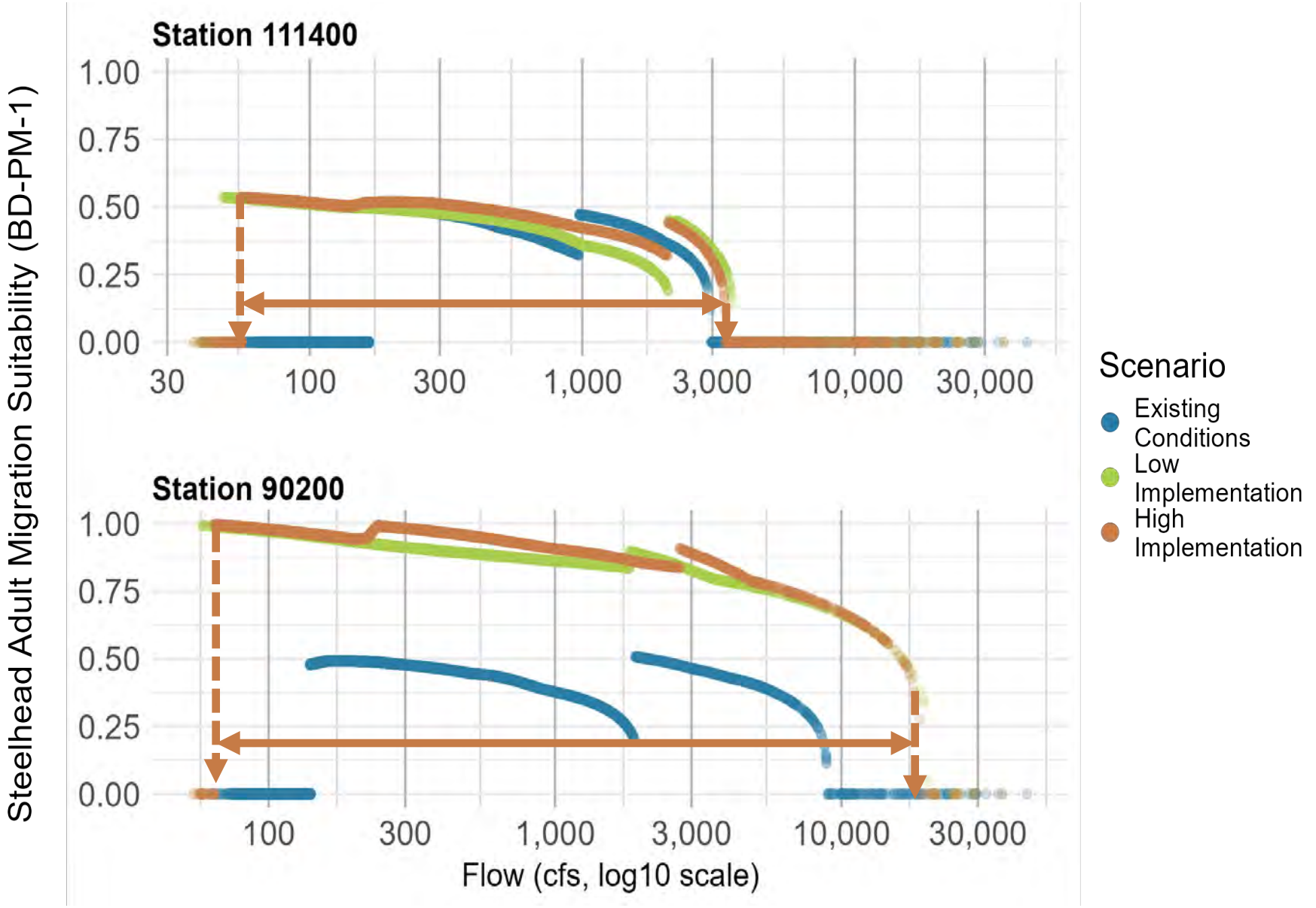


LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

Flow range that supports suitable conditions is identified for the each of the 200 ft segments in LOI 17.23 for each scenario.



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

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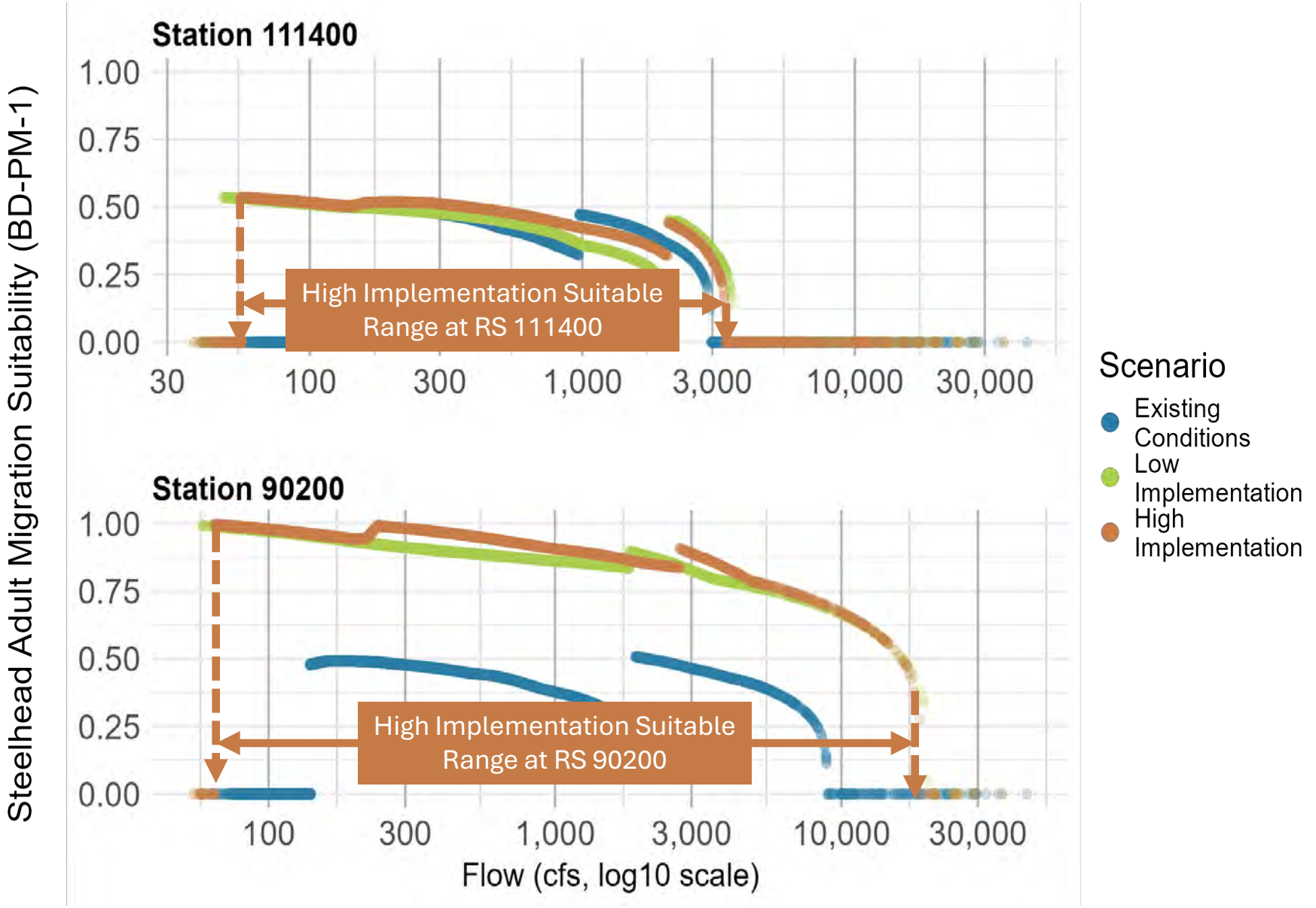
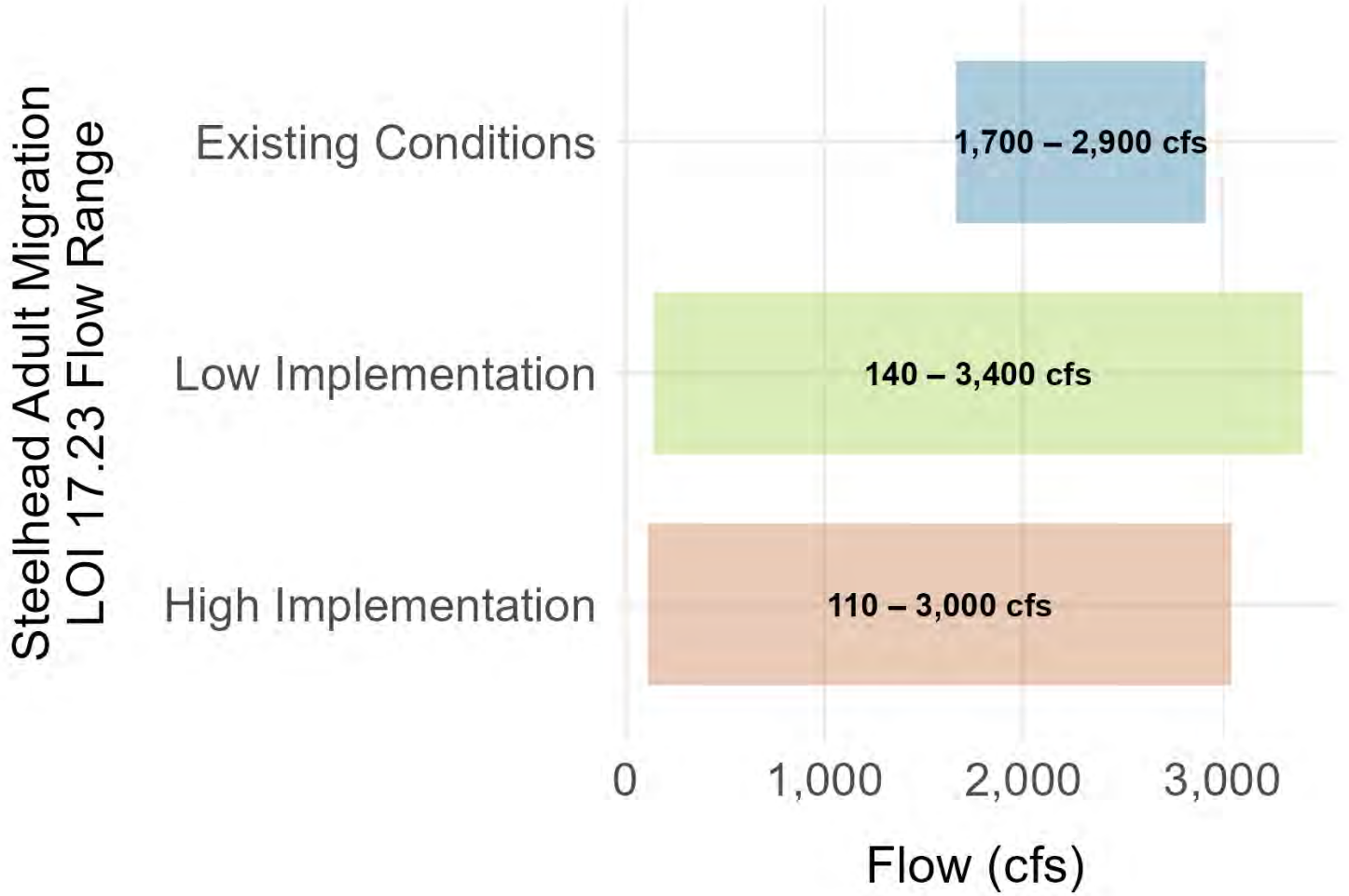


LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

Flow range that supports suitable conditions for a performance measure is calculated for entire reach.

The low flow is the **lowest flow** that meets suitable conditions in **all 200 ft segments**

The high flow the **highest flow** that meets suitable conditions in **all 200 ft segments**



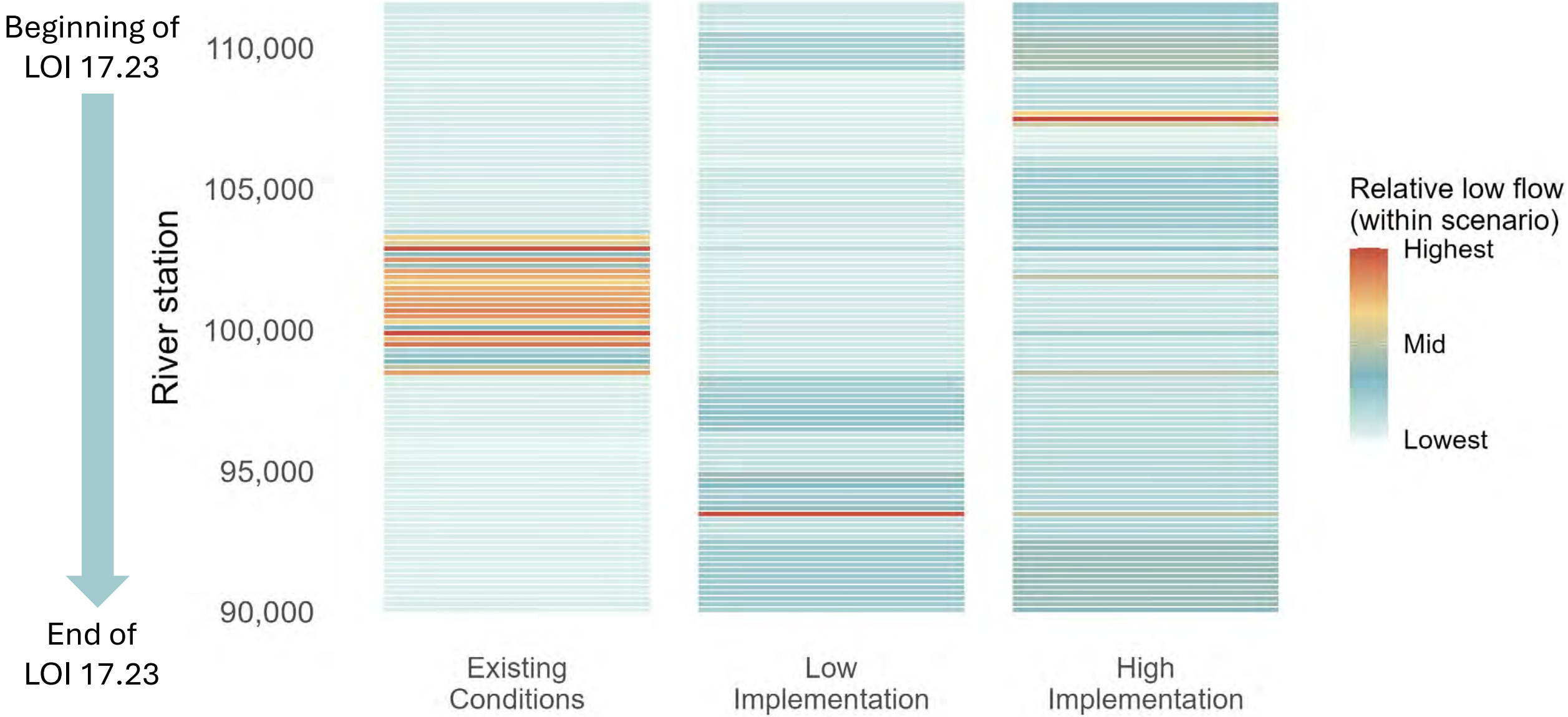
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

Flow range results can be used as a diagnostic tool to identify where channel form change may be needed.

- How many 200 ft segments need modified to get suitable conditions at lower flows?
- Alternatives could implement channel form changes to get suitable conditions at lower flow.

Photo credit: Stillwater Sciences

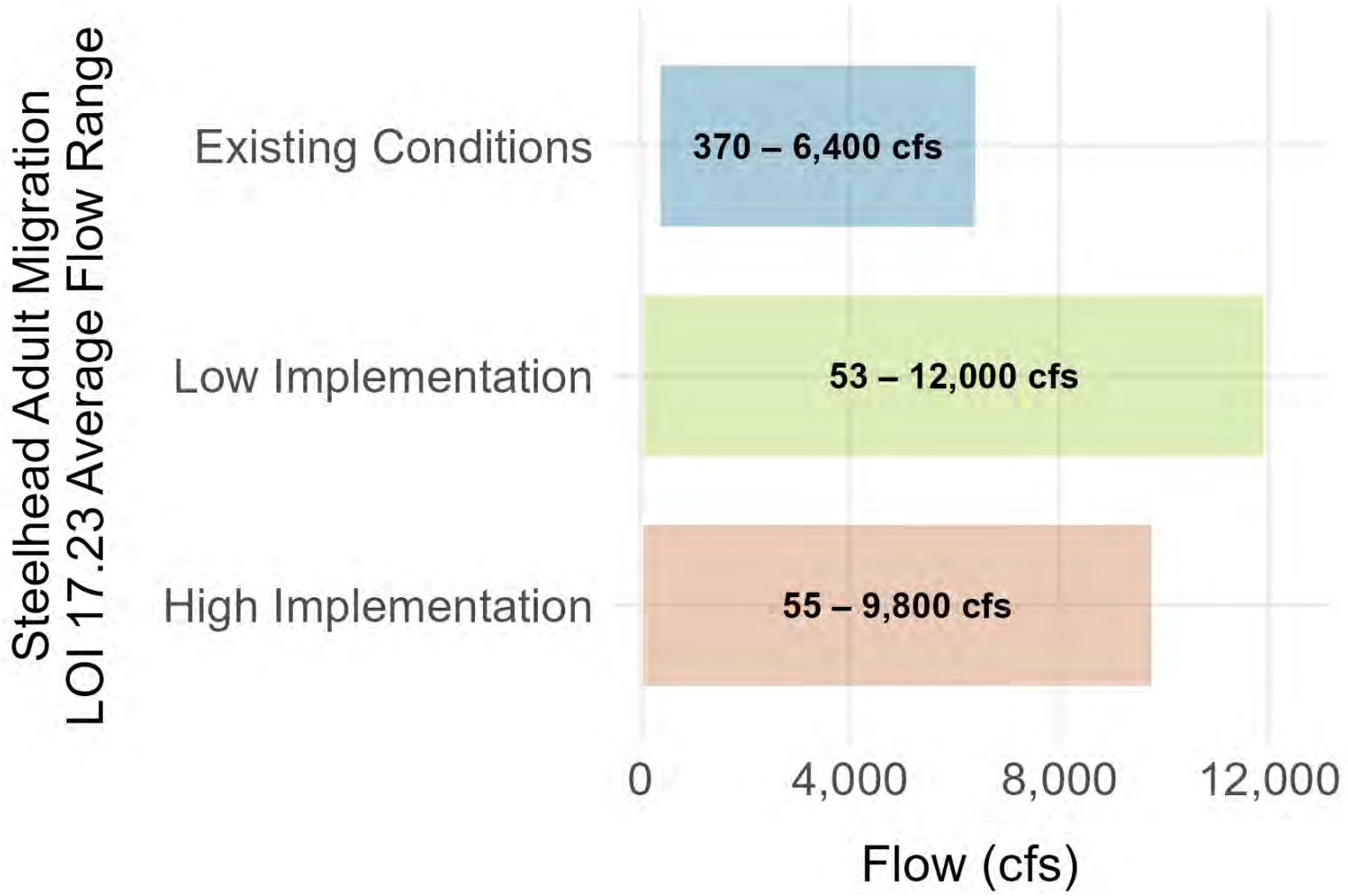
LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results



LA River CEFF Section C – Steelhead Adult Migration (BD-PM-1) LOI 17.23 Results

Locations needing higher flow under low and high implementation could likely be designed to provide passage at lower flows.

Average flow range better characterizes trends through reach and what flows would likely support performance measures under designed conditions.



LA River CEFF Section C – Kayaking (RE-PM-2) Overview

Recreation TTWG

- Kayaking is supported from May 1 to Sept 30. (RE-PM-2)

Recreation TTWG Recommended Parameters Evaluated

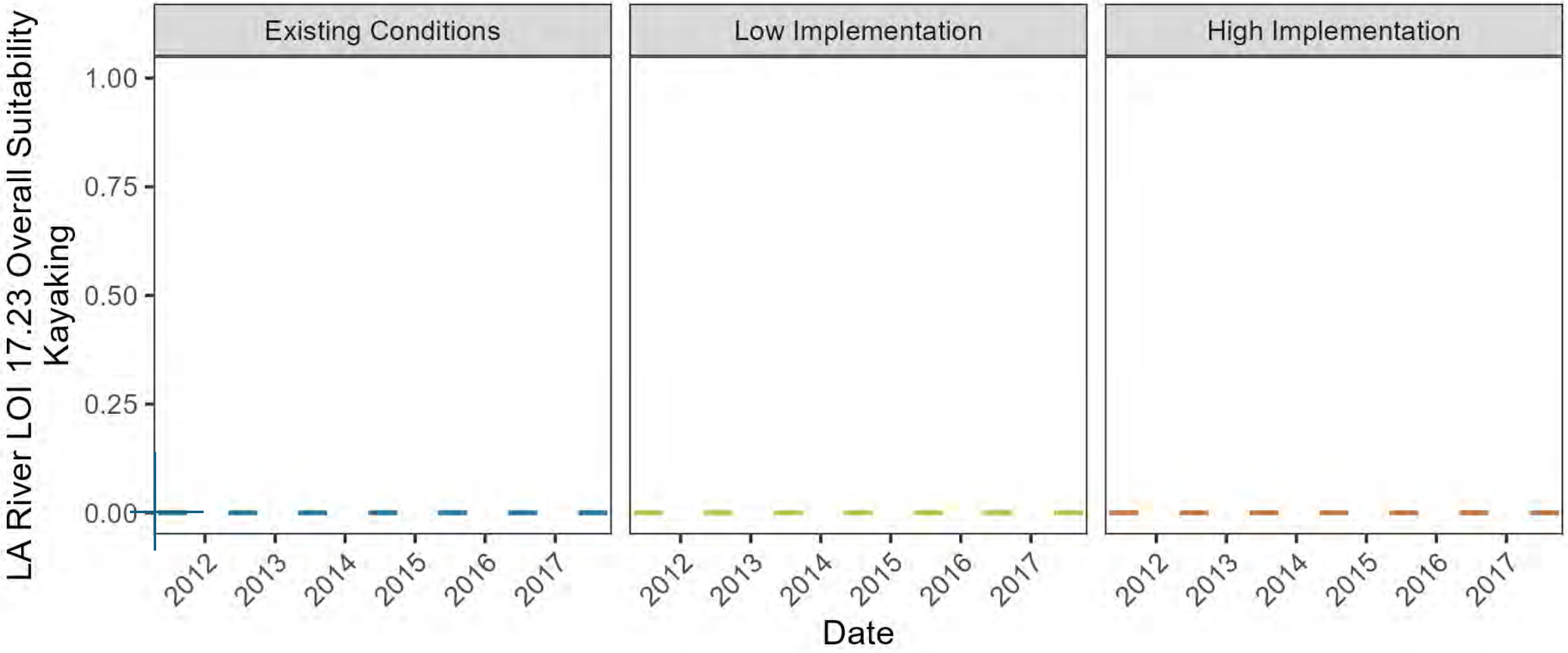
- Water depth
- Water velocity
- Wetted Channel Width
- Unwetted Channel Margin Width
- Access

Recreation TTWG Recommended Parameters **Not** Evaluated

- Channel margin slope
- Basin Plan water quality objectives
- Species diversity
- Functional ecosystems
- Riparian vegetation density
- Parking
- Exposure to traffic
- Usage density

Multiple recommended parameters were not evaluated at this time due to a) data and model limitations, or b) no linkage between flow variations and parameter suitability.

LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results



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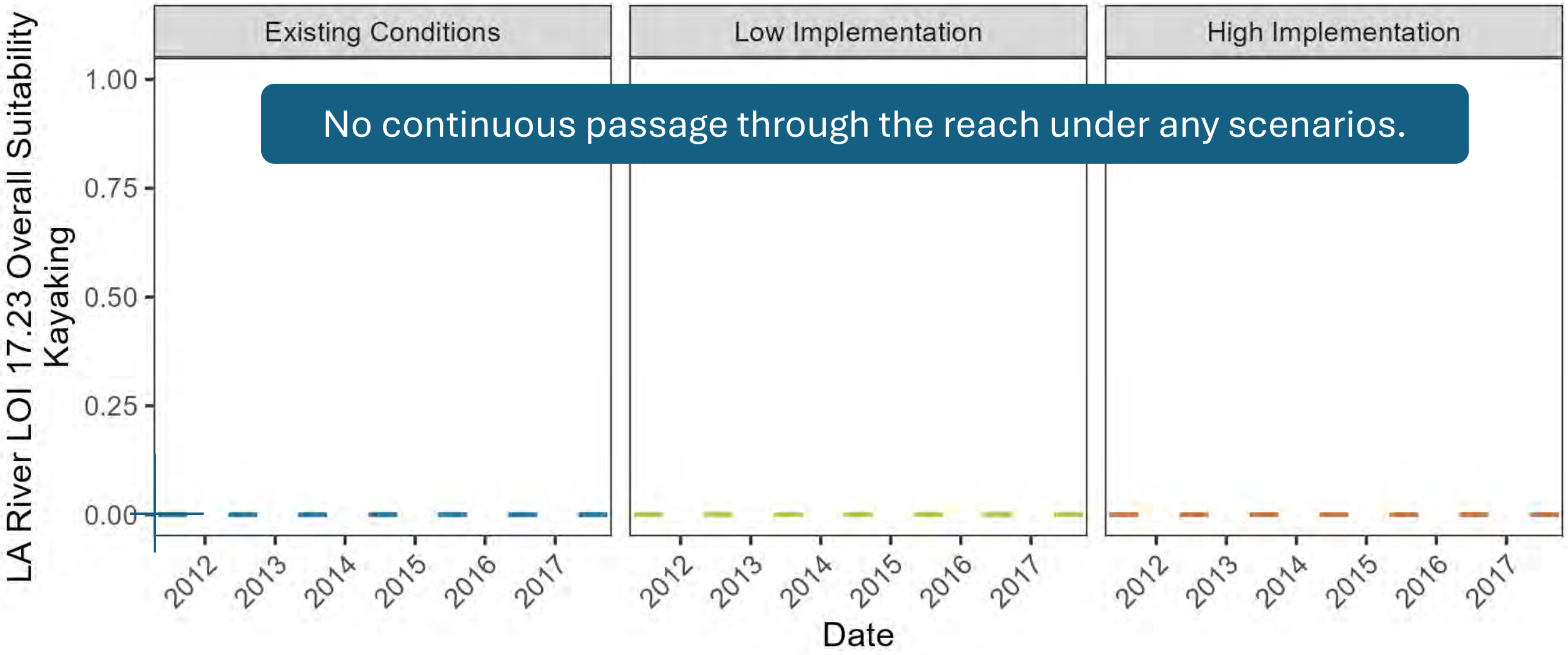
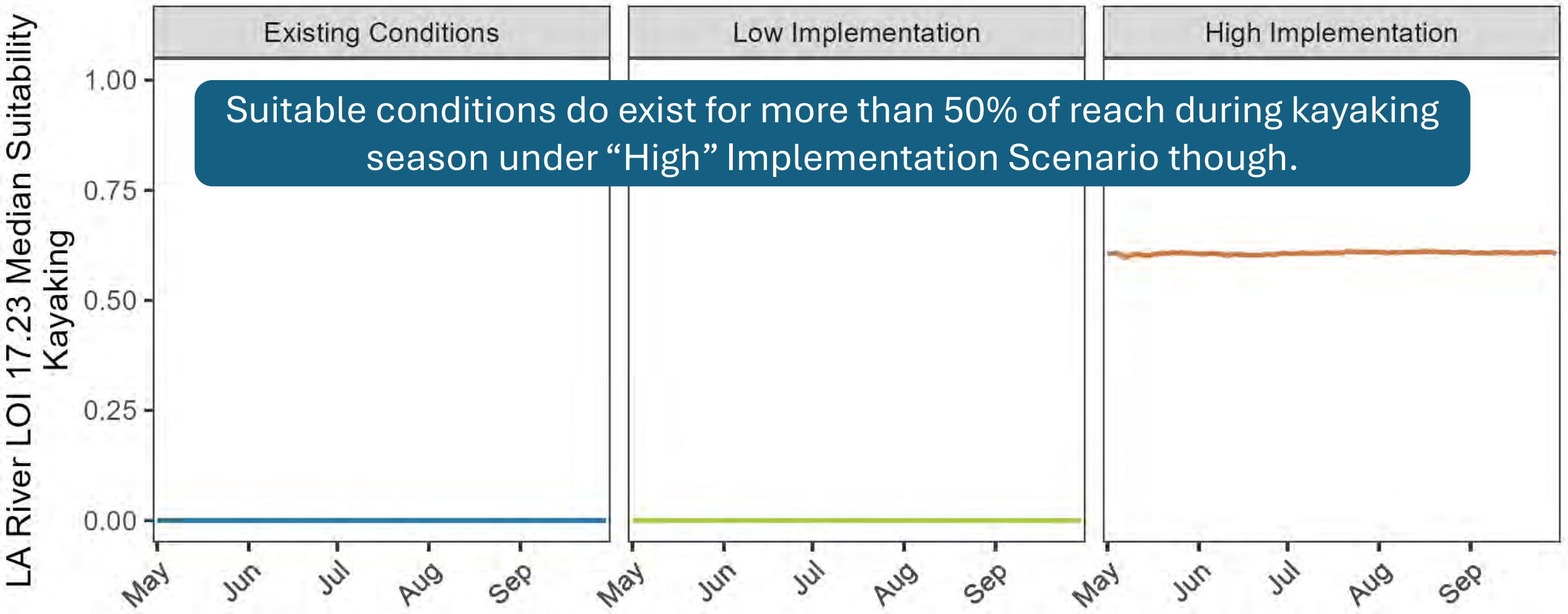
LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results



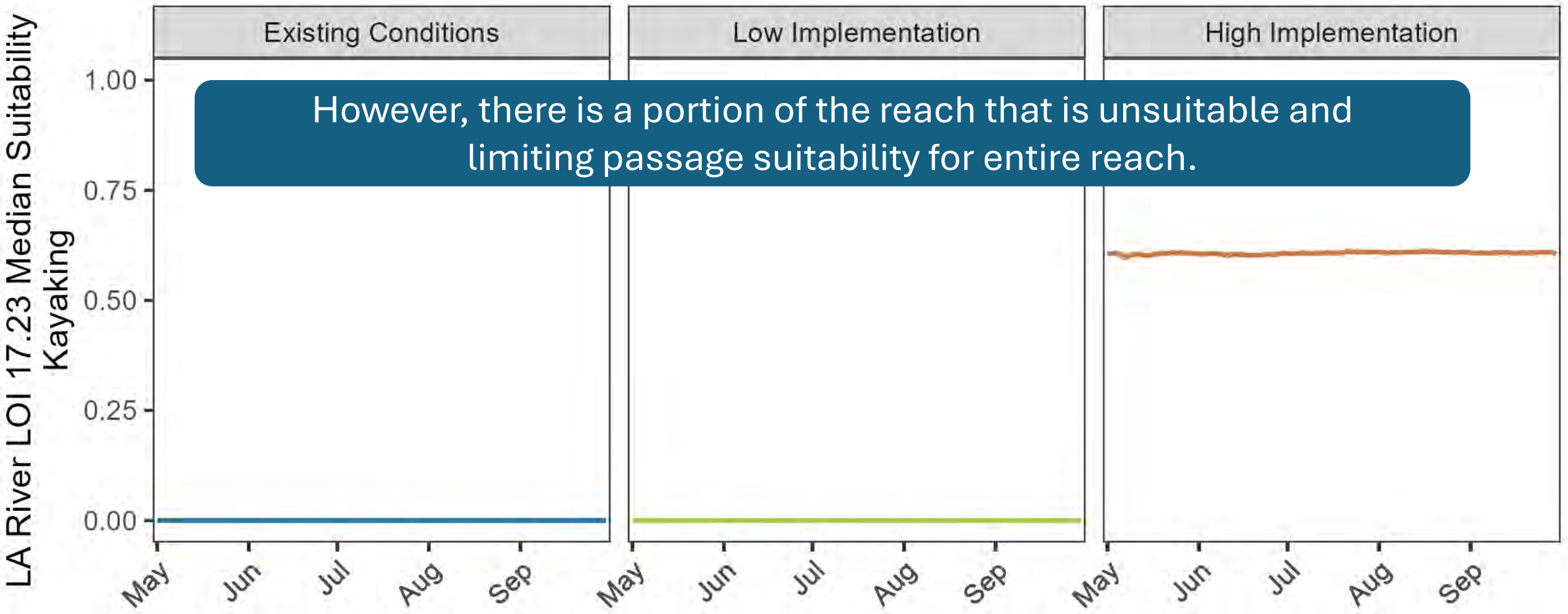
No continuous passage through the reach under any scenarios.

LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results



Suitable conditions do exist for more than 50% of reach during kayaking season under "High" Implementation Scenario though.

LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results



However, there is a portion of the reach that is unsuitable and limiting passage suitability for entire reach.

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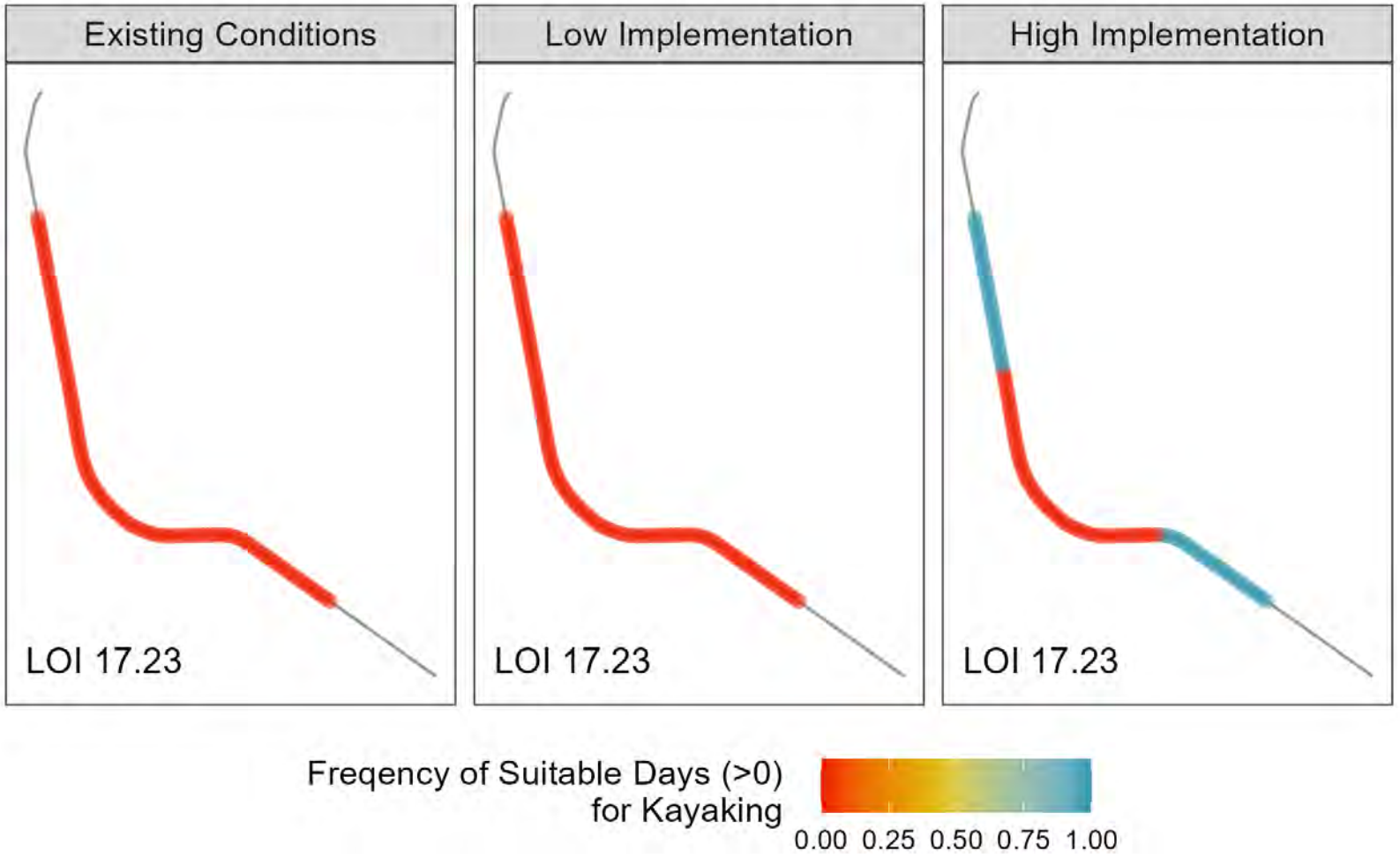
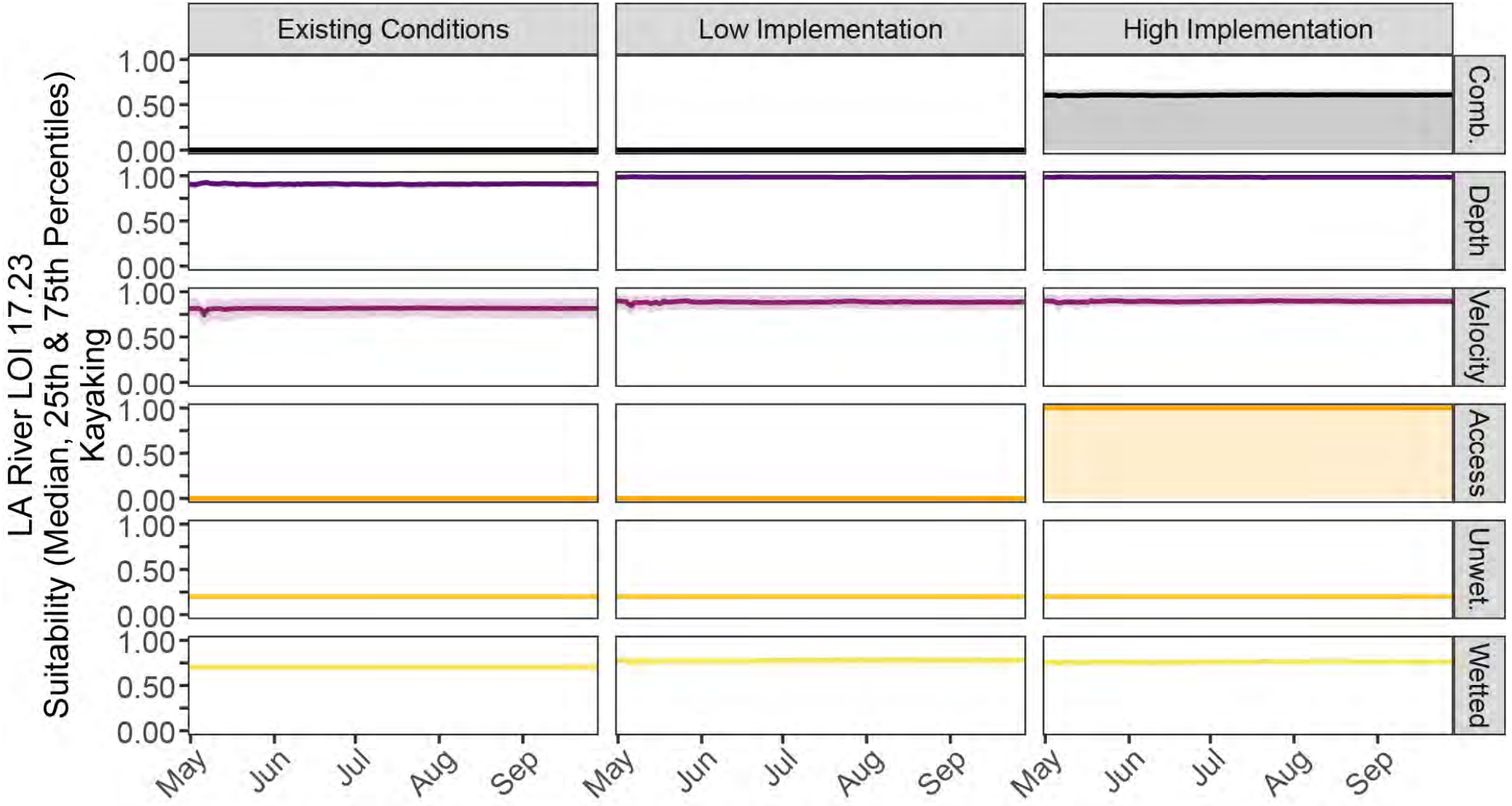
LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results



All 200 ft segments in LOI 17.23 have **zero suitable days** during the kayaking season from WY 2011 – 2017 under existing conditions and low implementation.

Frequency of suitable days better under high implementation scenario, but middle portion of LOI 17.23 still has zero suitable days.

LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results



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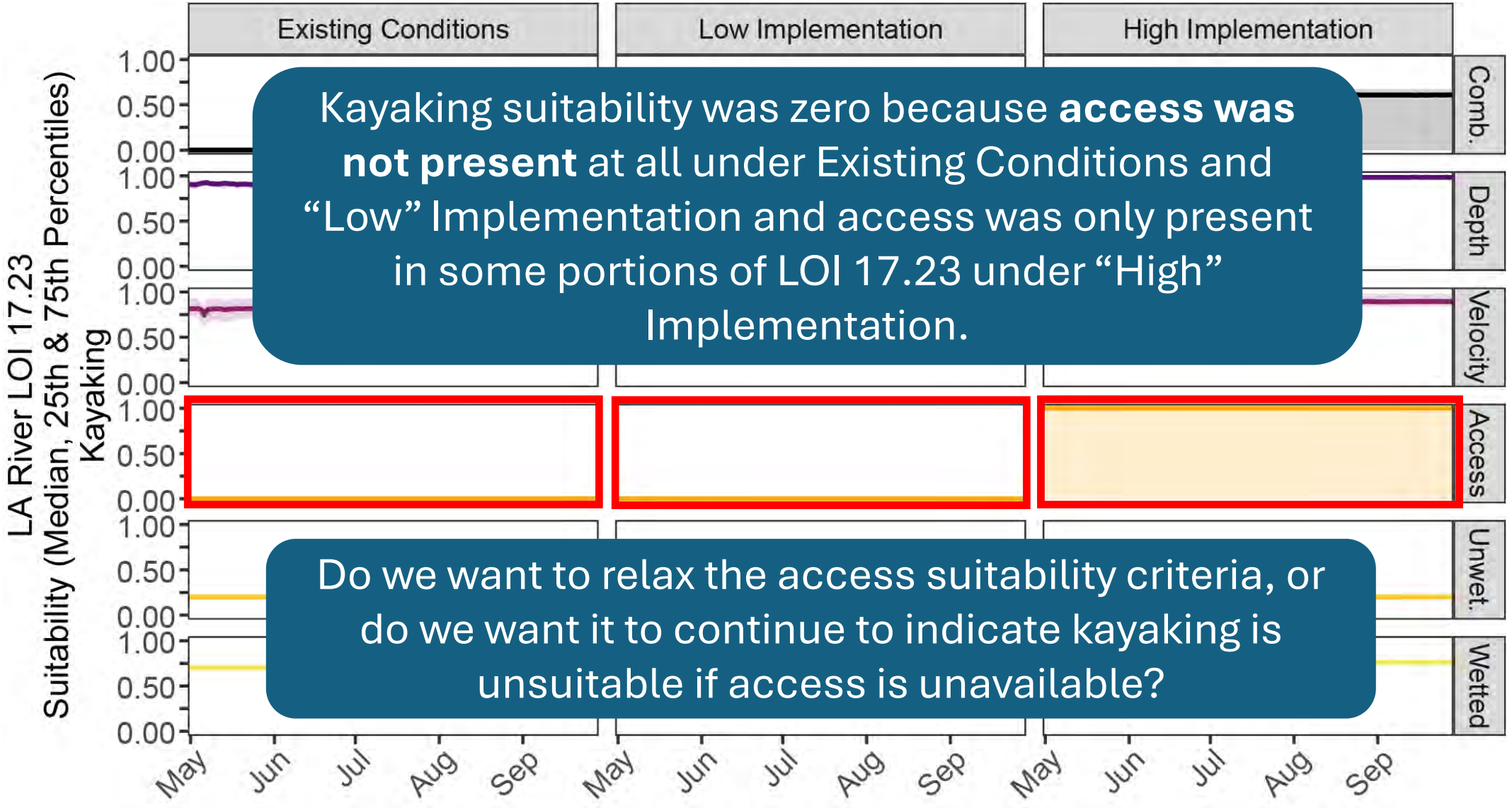
LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results

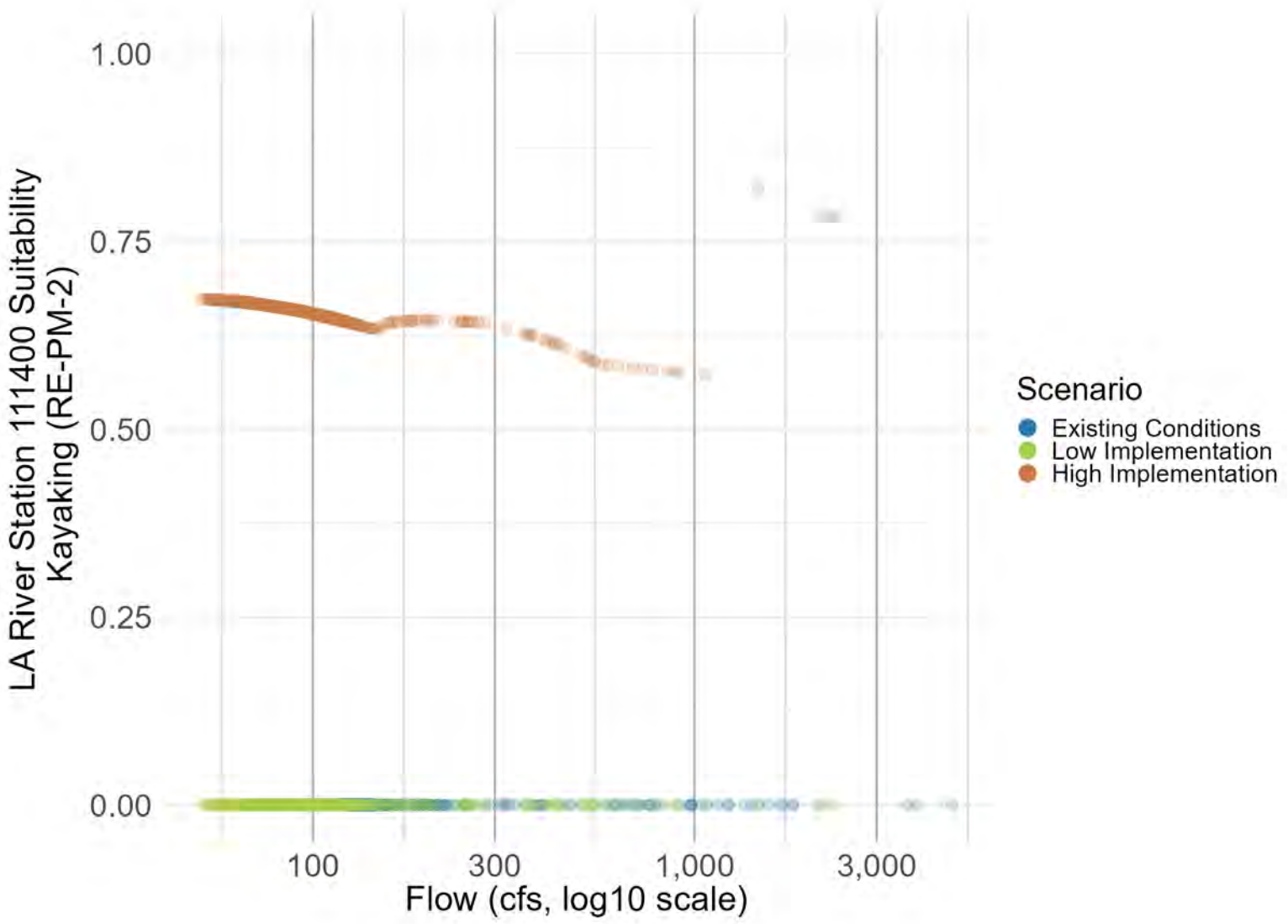


Kayaking suitability was zero because **access was not present** at all under Existing Conditions and "Low" Implementation and access was only present in some portions of LOI 17.23 under "High" Implementation.

Do we want to relax the access suitability criteria, or do we want it to continue to indicate kayaking is unsuitable if access is unavailable?

LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results

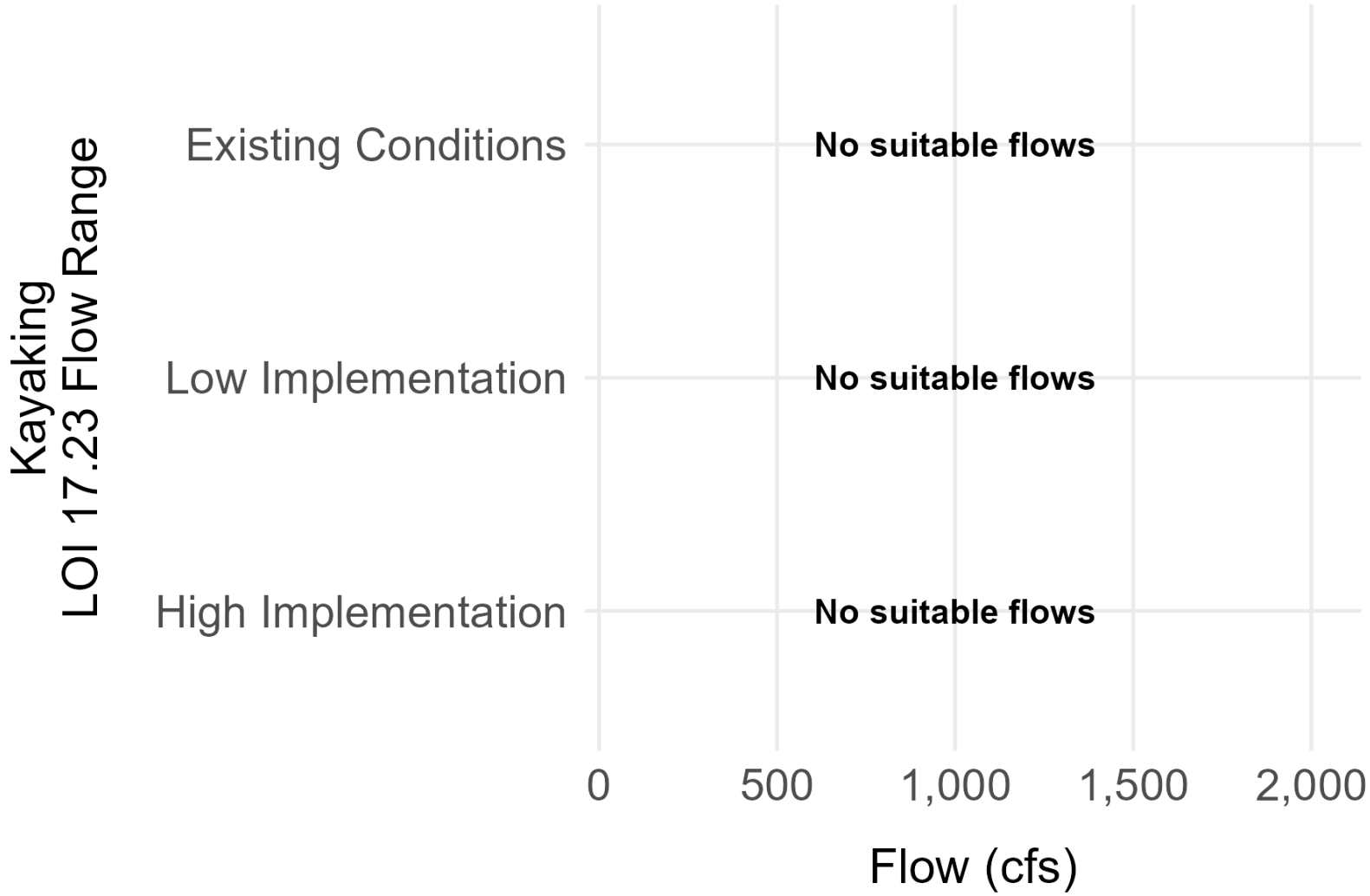
Comparison of flow and overall suitability at a 200 ft segment shows flow range that supports suitable conditions for that 200 ft segment.



LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results

No flow range supports suitable conditions for kayaking throughout entire reach.

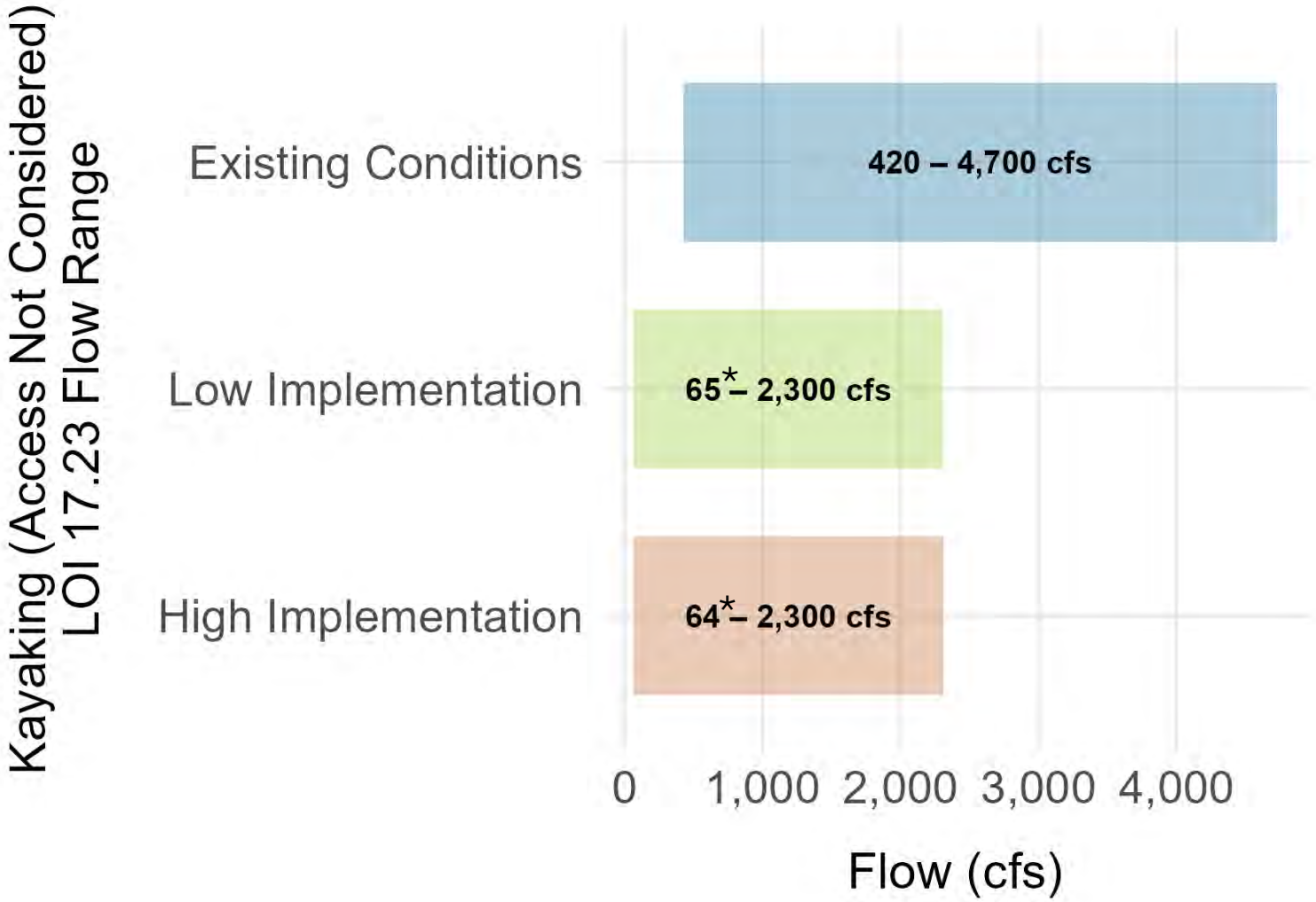
Lack of access will always result in suitability going to zero in middle of the reach.



LA River CEFF Section C – Kayaking (RE-PM-2) LOI 17.23 Results

It is possible to calculate suitable flow range for kayaking assuming access was available.

Flow range that supports suitable conditions for kayaking throughout a reach is calculated.



*Kayaking was never unsuitable during modeling period, so this is the lowest flow during modeling period rather than the limiting low flow.

LA River CEFF Section C – LOI 17.23 Initial Results Key Takeaways

LA River CEFF analysis initial results provide:

- Overall suitability of performance measures for a scenario
- Performance measure suitability statistics
- Spatial data on where performance measures are supported and how frequently
- Flow range to support performance measures **at all 200 ft segments** in a reach
- Average flow range to support performance measures in a reach

LA River CEFF analysis initial results can be used to:

- Determine whether scenario is performing well at time scale or location of interest
- Determine ***where*** refinements are needed to improve performance
- Identify the flow range that supports multiple performance measures in a reach

Questions

Look Ahead & Next Steps

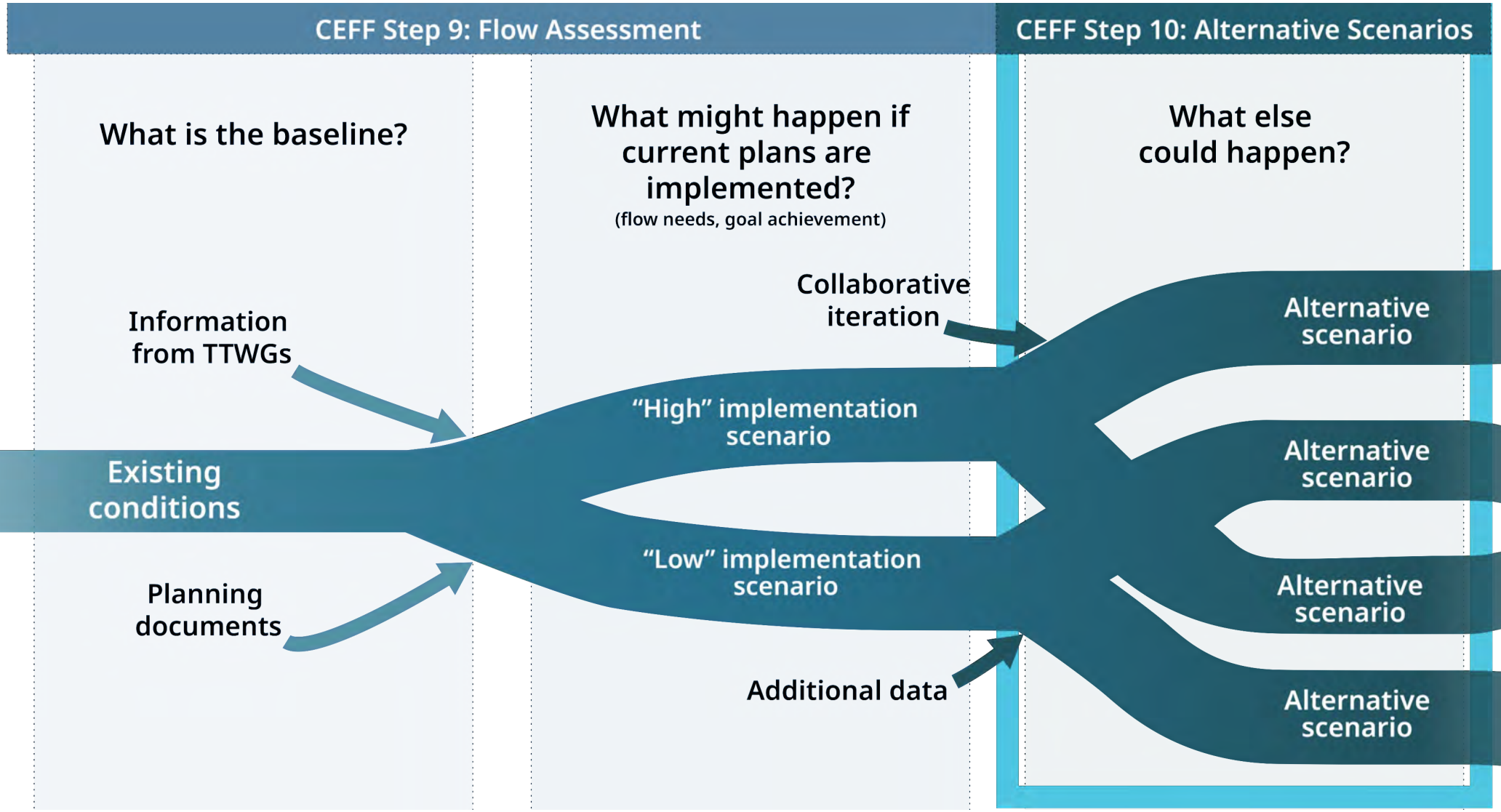
Photo credit: Stillwater Sciences

TWG 5 Preview of Performance Assessment Tool

- Additional LA River CEFF analysis results for LOI 17.23
- Linkage between initial three scenarios, CEFF functional flows, and the LA River CEFF project flow recommendation
- Exploration of how LA River CEFF analysis results for LOI 17.23 can be used to inform alternative scenarios development.


Photo credit: Stillwater Sciences

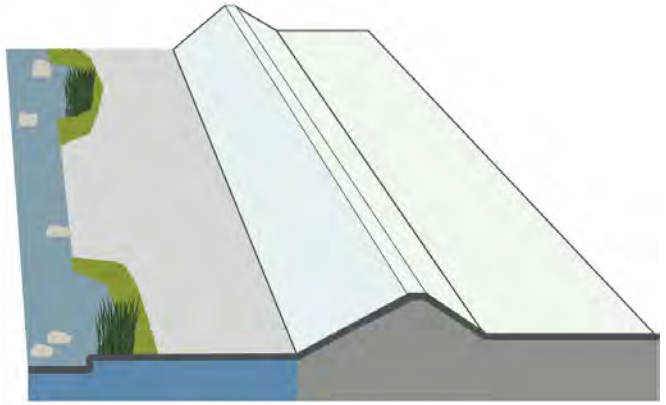
Flow Assessment: Scenarios Approach



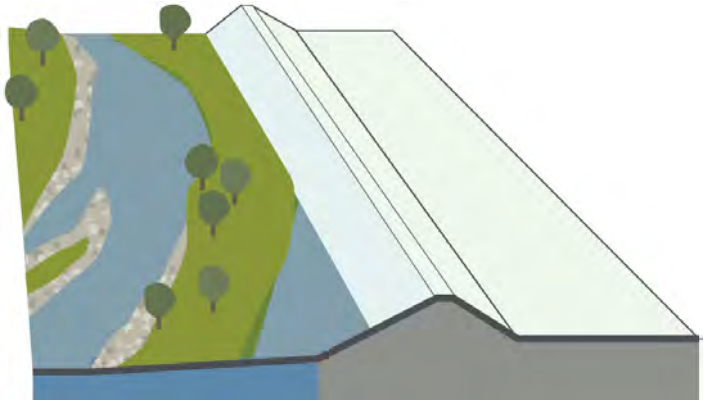
TWG 5 Preview – Alternative Scenarios

- Alternative, high-level scenarios for CEFF Step 10
  - Simple scenarios/ additional ”bookends”
    - Not new detailed master plan alternatives
    - Detailed scenarios in subsequent phases (CEFF Implementation Plan, Flow Optimization Project)
  - Strategic measurements to:
    - Inform flow recommendations
    - Understand potential benefits and tradeoffs
    - Guide future channel form change/flow change feasibility studies (not a feasibility analysis)
- TWG 5 alternative scenarios/levers exploration exercise

Potential Alt. Scenario 4: Natural channel bed from Sepulveda to Ocean



Current Low & High Assumption: Typology MC 1-7 Modified concrete fish passage



Alternative Scenario: Typology SB 4 & 5 Soft bottom with mixed managed vegetation

Questions

Photo credit: Nurit Katz

TWG #5

December 2, 2025

LA River Center and Gardens

Mountains Recreation & Conservation Authority

LA River CEFF

LA River from Fletcher Street Bridge, Los Angeles, CA