16401 Paramount Boulevard
Paramount, CA 90723
562.663.6850 phone
562-634-8216 fax

www.gatewaywater.org

*Los Angeles Gateway Region*
*Integrated Regional Water Management*
*Joint Powers Authority*

# AGENDA

***Regular* Meeting of the Board of Directors**
**Thursday, September 8, 2022 at 12:00 PM**

**Meeting Remote Location**
***via WebEx***

***https://koaconsultinginc.my.webex.com/koaconsultinginc.my/j.php?MTID=m528bc60b5481478e1c1b6eeb7ac74de1***

***or via phone***

**1-415-655-0001**

**Meeting number: 2556 864 3846**

**Password:** GatewayH2O (42839294 from phones or video systems)

**(There will be no physical attendance at Progress Park)**

1. **Roll Call**

2. **Determination of a Quorum**

3. **Additions to Agenda (Govt. Code Sec. 54954.2(b))**

4. **Oral Communications to the Board**
   This is an opportunity for members of the public to address the Board on any item under the jurisdiction of the agency. Depending upon the subject matter, the Board may be unable to respond until the item can be posted on the agenda at a future meeting in accordance with provisions of the Brown Act.

5. **Safe Clean Water Program Scientific Study: Gateway Area Pathfinding Analysis (Phase 1) Update Presentation – Craftwater Engineering**

6. **Consent Calendar: (Acted as one item unless withdrawn by request)**
   a. Minutes of the Board Meeting of July 14, 2022 (Enclosure).
   b. Ratify the Warrant Register for August 2022 and Approve the Warrant Register for September 2022 (Enclosures).
   c. Receive and File the Updated Expenditures for Legal Counsel Services (Enclosure).
   d. Reconsider the circumstances of the COVID-19 state of emergency; and at least one of the following circumstances exist:
      1) The COVID-19 state of emergency continues to directly impact the ability of Board Members to meet safely in person; or
      2) State and local officials continue to recommend measures to promote social distancing.

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7. **Discussion/Action Regarding Agreement with City of Compton for Lower Los Angeles River Coordinated Integrated Monitoring Plan Revision (Enclosure).**
   a. Approve the Agreement with the City of Compton for the Administration and Cost Sharing for the Revision of the LLAR Coordinated Integrated Monitoring Plan and authorize the Chair to execute the Agreement.

8. **Discussion/Action GWMA to Serve as Lead Agency for Safe Clean Water Program Scientific Study Application for a Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel (Enclosure).**
   a. Approve GWMA's role as Lead Agency for The Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel Scientific Study and authorize GWMA's name to be added to the Measure W funding application for the proposed study, in place of the City of Lakewood. If awarded, GWMA's official role as the study's Lead Agency is contingent upon Board Approval of an Agreement between Los Angeles County Flood Control District and GWMA that sets forth each agency's role and funding obligation.

9. **Discussion/Action Regarding Proposal for Project Management Services to Closeout the 2015 Proposition 84 Regional Advanced Meter Replacement Grant Project (Enclosure).**
   a. Accept the AMR Project Close Out Proposal from Civiltec Engineering, Inc. as presented and authorize the Executive Officer to sign the proposal and issue a Notice to Proceed.

10. **Safe Clean Water Program – Oral Report**
    a. Lower San Gabriel River "LSGR" WASC Chair – Melissa You
    b. Lower Los Angeles River "LLAR" WASC Chair – Gina Nila

11. **Executive Officer's Oral Report**

12. **Directors' Oral Comments/Reports**

13. **Adjournment to Regular Board Meeting on October 13, 2022.**

    **NOTICE:** GWMA will hold Board Meetings via video conference to meet social distancing recommendations or meet in person at its regular location at Progress Park in Paramount, depending on recommendations from local and State officials. The physical location or video-conference information will be posted with each Board Agenda which can be found at www.gatewaywater.org 72 hours in advance of the meeting.

**MINUTES OF THE GATEWAY WATER MANAGEMENT AUTHORITY**
**LOS ANGELES GATEWAY REGION**
**INTEGRATED REGIONAL WATER MANAGEMENT JOINT POWERS AUTHORITY**
**BOARD**
**VIA VIDEO CONFERENCING**
**THURSDAY, JULY 14, 2022**

A regular meeting of the Board of Directors of the Gateway Water Management Authority was held on Thursday, July 14, 2022 at 12:00 p.m. via WebEx and Phone Conference.

Chair Adriana Figueroa called the meeting to order at 12:12 p.m. Roll was called by Executive Officer Grace Kast and a quorum of the Board was declared.

BOARD MEMBERS PRESENT:

| | |
|---|---|
| Okina Dor | Artesia |
| Veronica Sanchez (alternate) | Bell Gardens |
| Len Gorecki | Bellflower |
| Isabelle Guido (alternate) | Central Basin Municipal Water District |
| Mike O'Grady | Cerritos |
| Gina Nila | Commerce |
| Emma Sharif | Compton |
| Mark Stowell | La Mirada |
| Kelli Pickler | Lakewood |
| Diana Tang | Long Beach Water Dept. |
| Lorry Hempe (alternate) | Lynwood |
| Adriana Figueroa | Paramount |
| Kenner Guerrero (alternate) | Pico Rivera |
| Dylan Porter (alternate) | Port of Long Beach |
| Jesse Serra (alternate) | Santa Fe Springs |
| Gladis Deras (alternate) | South Gate |
| Esther Rojas (alternate) | Water Replenishment District |
| Vicki Smith | Whittier |

STAFF AND GUESTS ON SIGN-IN SHEET:

| | |
|---|---|
| Grace Kast | Executive Officer |
| Traci Gleason | Program Administrative Manager |
| Kekoa Anderson | Funding/Grants Program |
| Nicholas Ghirelli | Legal Counsel |
| Madeline Chan | Central Basin Municipal Water District |
| Sarina Morales Choate | Santa Fe Springs |
| Derek Nguyen | Lakewood |
| Aimee Zhao | Water Replenishment District |
| Yoshi Andersen | Geosyntec Consultants |

## ITEM 3 - ADDITIONS TO THE AGENDA

None.

**ITEM 4 - ORAL COMMUNICATIONS TO THE BOARD**

None.

**ITEM 5 - CONSENT CALENDAR**

Director Sharif moved to approve the consent calendar.

The motion was seconded by Director Nila and was approved by the following voice vote:

**AYES:** **Gorecki, O'Grady, Stowell, Pickler, Tang, Hempe, Figueroa, Guerrero, Porter, Sira, Deras, E. Rojas, Smith.**

**NOES:** **None.**

**ABSTAIN:** **Dor, Sanchez, Guido, Nila, Sharif (Minutes only).**

**ITEM 6 – DISCUSSION/ACTION REGARDING THE FOURTH AMENDMENT TO THE PROFESSIONAL SERVICES AGREMEENT WITH CWE CORPORATION RELATING TO THE IMPLEMENTATION OF THE LOS ANGELES UPPER REACH 2 COORDINATED INTEGRATED MONITORING PROGRAM AND PERMIT REPORTING SERVICES**

The Los Angeles River Upper Reach 2 (LAR UR2) Watershed group is requesting GWMA to amend the Professional Services Agreement (PSA) with CWE Corporation to include LAR UR2 Watershed Management Area (WMA) Coordinated Integrated Monitoring Program (CIMP) implementation services from July 1, 2022 through June 30, 2027 and semi-annual Watershed Management Program Progress and Annual Permit Reporting through December 31, 2027, and to increase compensation for the additional services.

Director Tang moved to approve the fourth amendment to the Professional Services Agreement between GWMA and CWE Corporation for the LAR UR2 Watershed Group, and to authorize the Chair to execute the fourth amendment to the PSA with CWE Corporation. The motion was seconded by Director Nila and was approved by the following voice vote:

**AYES:** **Dor, Sanchez, Gorecki, Guido, O'Grady, Nila, Sharif, Pickler, Tang, Hempe, Figueroa, Guerrero, Porter, Sira, Deras, E. Rojas, Smith.**

**NOES:** **Stowell.**

**ABSTAIN:** **None.**

**ITEM 7 – GWMA REGIONAL GRANT WRITING UPDATE ORAL REPORT**

Yoshi Andersen with Geosyntec Consulting provided the progress update for project development/grant services for recycled water. The information included an updated summary of responses and recycled water funding opportunities. Ms. Andersen then concluded her report by stating that she recommends pursuing the Greater Los Angeles IRWM Round 2 grant opportunity due in the next few months for construction projects that were close to shovel-ready. By general consensus among the board members, staff and Ms. Andersen were directed to move forward with Bell Gardens and Downey because of their project readiness, but requested that Ms. Andersen reach back out to all members that may have recycled projects that are close to 100% design that

are not on the list to see if they can be included. The projects will be submitted to the sub-regional IRWM database by September 13th, 2022.

**ITEM 8 – SAFE CLEAN WATER PROGRAM – ORAL REPORT**

None.

**ITEM 9 – EXECUTIVE OFFICER'S ORAL REPORT**

None.

**ITEM 10 – DIRECTORS' ORAL COMMENTS/REPORTS**

None.

The meeting adjourned at 12:45 p.m.

The next regular Board Meeting of the Directors of the Gateway Water Management Authority will be on Thursday, August 11, 2022 at 12:00 p.m. The meeting will be held via video conference to meet social distancing recommendations or will be held in person at its regular location at Progress Park in Paramount, depending on recommendations from local and State officials. The physical location or video conference information will be posted with each Board Agenda which can be found at www.gatewaywater.org 72 hours in advance of the meeting.

_____ _____

Kelli Pickler, Vice-Chair Date

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September 8, 2022

**AGENDA ITEM 6b – Ratify the Warrant Register for August 2022 and Approve the Warrant Register for September 2022**

## SUMMARY:

The Warrant Register is a listing of general checks issued since the last warrant register. Warrants will be signed by 2 of the 3 Board Officers and released by Traci Gleason, serving as the Administrative/Accounting Manager of the Gateway Water Management Authority, upon Board Approval.

## DISCUSSION:

The Warrant Register for expenditures dated August 2022 in the amount of $448,599.14 is submitted for ratification by the Board, and the Warrant Register for expenditures dated September 2022 in the amount of $104,407.02 is submitted for approval. Invoices and supporting documentation are available for review at the office of the GWMA.

## FISCAL IMPACT:

The Warrant Register totals $553,006.16. Funds to cover payment are available in the GWMA budget.

## RECOMMENDATION:

Ratify the Warrant Register for August 2022, and Approve the Warrant Register for September 2022.

WARRANT REGISTER
DISBURSEMENT JOURNAL
August 2022

| Invoice Date | Vendor | Invoice Number | Description | Amount |
|---|---|---|---|---|
| 4/7/2022 | Anchor QEA | 8193 | HT Downstream - RMC Compliance FY 21/22 (Services through 2/28/2022) | $ 75,679.70 |
| 4/25/2022 | Anchor QEA | 8627 | HT Downstream - Dominguez Channel & LA/LB Harbor Ph. II Impl. Action Status Report TMDL (Services through 3/31/2022) | $ 41,346.05 |
| 4/25/2022 | Anchor QEA | 8639 | HT Downstream - RMC Compliance FY 21/22 (Services through 3/31/2022) | $ 10,236.26 |
| 5/20/2022 | Anchor QEA | 9183 | HT Downstream - RMC Compliance FY 21/22 (Services through 5/15/2022) | $ 8,877.15 |
| 6/21/2022 | Anchor QEA | 9867 | HT Downstream - RMC Compliance FY 21/22 (Services through 6/21/2022) | $ 8,007.77 |
| 8/1/2022 | City of Paramount | 4842 | Office lease (Aug 2022) | $ 390.72 |
| 7/26/2022 | Clifton Larson Allen | 3353967 | Quickbooks On-line Conversion | $ 278.25 |
| 7/26/2022 | Clifton Larson Allen | 3353968 | Accounting Support (June 2022) | $ 1,500.00 |
| 7/31/2022 | Craftwater Engineering, Inc. | 20-099.06 | SCWP Gap Phase 1 - LLAR (July 2022) | $ 7,315.00 |
| 7/31/2022 | Craftwater Engineering, Inc. | 20-100.06 | SCWP Gap Phase 1 - LSGR (July 2022) | $ 7,315.00 |
| 7/15/2022 | CWE | 22310 | LARUR2 (June 2022) | $ 25,702.90 |
| 7/30/2022 | Gateway Cities Council of Governments | 7-30-2022 | Office Supplies (July 2022) | $ 100.00 |
| 7/18/2022 | Geosyntec Consulting | 478902 | GWMA Grant Funding (June 2022) | $ 989.20 |
| 7/13/2022 | Harris & Associates | 53506 | GWMA Grant Funding (May 29-July 2, 2022) | $ 5,090.00 |
| 7/11/2022 | John L Hunter and Associates, Inc. | GWM1GHR12206 | HT Upstream (June 2022) | $ 5,600.64 |
| 7/14/2022 | John L Hunter and Associates, Inc. | GWM1LLA12206 | LLAR WMP (June 2022) | $ 51,421.43 |
| 6/29/2022 | John L Hunter and Associates, Inc. | GWM1LSG12205 | LSGR WMP (May 2022) | $ 26,829.75 |
| 7/12/2022 | John L Hunter and Associates, Inc. | GWM1LSG12206 | LSGR WMP (June 2022) | $ 62,644.94 |
| 8/2/2022 | Koa Consutling, Inc. | K114-01-57 | COG Water-Related Coordination Activities and Executive Officer Services, DAC Chair and DACIP Co-Chair (July 2022) | $ 36,873.00 |
| 7/22/2022 | Richards Watson Gershon | 238085 | Legal Services - General (through June 30, 2022) | $ 375.00 |
| 7/20/2022 | Richard Watson & Associates | 22-192-003-007 | LCC WMP CIMP (June 2022) | $ 72,026.38 |
| | | | **Total** | **$ 448,599.14** |

Reviewed and Approved by:

Thomas Bekele, Signal Hill

WARRANT REGISTER
DISBURSEMENT JOURNAL
September 2022

| Invoice Date | Vendor | Invoice Number | Description | Amount |
|---|---|---|---|---|
| 8/29/2022 | Clifton Larson Allen | 3389749 | Accounting Support (July 2022) | $ 1,500.00 |
| 8/29/2022 | Clifton Larson Allen | 3389848 | Quickbooks Online Subscription and Tech Support | $ 131.25 |
| 8/30/2022 | Craftwater Engineering, Inc. | 20-099.07 | SCWP Gap Phase 1 - LLAR (Aug 2022) | $ 2,327.50 |
| 8/30/2022 | Craftwater Engineering, Inc. | 20-100.07 | SCWP Gap Phase 1 - LSGR (Aug 2022) | $ 2,327.50 |
| 8/30/2022 | Craftwater Engineering, Inc. | 21-055.02 | GWMA Grant Writing Support (services through August 31, 2022) | $ 2,659.50 |
| 8/4/2022 | CWE | 22350 | LARUR2 CIMP (July 2022) | $ 14,306.34 |
| 8-31-2022 ~~7/30/2022~~ | Gateway Cities Council of Governments | 8-31-22 | Office Supplies (August 2022) | $ 100.00 |
| 8/17/2022 | Geosyntec Consulting | 482066 | GWMA Grant Funding (July 2022) | $ 556.43 |
| 8/18/2022 | Harris & Associates | 54052 | GWMA Grant Funding (July 3-July 30, 2022) | $ 2,305.00 |
| 8/26/2022 | Koa Consutling, Inc. | K114-01-58 | COG Water-Related Coordination Activities and Executive Officer Services, DAC Chair and DACIP Co-Chair (Aug 2022) | $ 36,873.00 |
| 8/15/2022 | Richards Watson Gershon | 238368 | Legal Services - General (through July 31, 2022) | $ 350.00 |
| 8/16/2022 | Richard Watson & Associates | 22-192-003-008 | LCC WMP CIMP (July 2022) | $ 40,970.50 |
| | | | **Total** | **$ 104,407.02** |

Reviewed and Approved by:

Thomas Bekele, Signal Hill

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September 8, 2022

**AGENDA ITEM 6c – Status of Total Legal Expenditures for General Legal Counsel Services for Fiscal Year 2022-2023**

## SUMMARY:

At the Board meeting in June 2022, the Board approved the budget for legal counsel services of $30,500 for Fiscal Year (FY) 2022-2023 to address legal issues. The Board has previously directed staff to provide monthly updates on total expenditures for legal counsel services.

Legal Counsel Services Update:

| | |
|---|---|
| $ 30,500.00 | FY 2022-2023 Budget amount for Legal Counsel services |
| $ 350.00 | Expenditures for Legal Counsel services through July 31, 2022 |
| $ 30,150.00 | Remaining budget amount available through June 30, 2023 |

## FISCAL IMPACT:

The total expenditures for Legal Counsel services for FY 2022-2023 through July 31, 2022 total $350.00. Sufficient funds to cover payment for legal counsel services are remaining in the GWMA FY 2022-2023 budget.

## RECOMMENDATION:

Receive and file the status the updated expenditures for Legal Counsel Services.

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September 8, 2022

**AGENDA ITEM 7 – Agreement with City of Compton for Lower Los Angeles River Coordinated Integrated Monitoring Plan "CIMP" Revision**

## SUMMARY:

The Los Angeles River WM Group is requesting that GWMA enter into an individual separate agreement with the City of Compton for the purpose of cost sharing related to the revising the LLAR CIMP. The City of Compton, an individual NPDES permit holder has indicated a desire to be incorporated in the upcoming revision of the CIMP, which will include new monitoring locations in Compton Creek that the City of Compton will solely be financially responsible.

## DISCUSSION:

In 2021, GWMA entered into an individual separate agreement with the City of Compton as an individual National Pollutant Discharge Elimination System (NPDES) permit holder for Coordinated Integrated Monitoring Plan (CIMP) cost sharing purposes for the monitoring data at S10 only (for monitoring conducted in Lower Los Angeles River). The current S10 agreement is for implementation of the CIMP and cost sharing of the monitoring data/reporting.

The City of Compton has indicated a desire to be incorporated in the upcoming revision of the CIMP, which will include new monitoring locations in Compton Creek that the City of Compton will be solely financially responsible. The purpose of the new agreement is for the Permit Holder to cost share in the preparation, submission, and approval process for the revised CIMP associated with including Compton Creek data.

In addition to the annual payment amount (per the original agreement executed in 2021), the City of Compton will be invoiced this one time for the Permit Holder's portion of cost share for revising, submitting, and processing the CIMP to incorporate Compton Creek, plus administrative fees on each payment to cover direct administrative costs. The City of Compton is a GWMA member and therefore, will not be invoiced for indirect administrative costs as members already pay annual membership fees that pay for these costs.

Once the revised CIMP is approved by the Regional Board, a new CIMP implementation agreement would be needed. This is to ensure accurate estimates of Compton's

proportion of the Compton Creek monitoring costs - which they will be 100% responsible. When the future agreement is executed, the existing S10 agreement will be terminated so that Compton is not paying twice for CIMP implementation activities.

## FISCAL IMPACT:

GWMA's Direct Administrative Costs would be collected from the City of Compton.

## RECOMMENDATION:

a. Approve the Agreement with the City of Compton for the Administration and Cost Sharing for the Revision of the LLAR Coordinated Integrated Monitoring Plan and authorize the Chair to execute the Agreement.

# AGREEMENT
# BETWEEN THE LOS ANGELES GATEWAY REGION INTEGRATED REGIONAL WATER MANAGEMENT JOINT POWERS AUTHORITY
# AND
# THE CITY OF COMPTON

## FOR COST SHARING FOR THE REVISION OF THE LOS ANGELES RIVER COORDINATED INTEGRATED MONITORING PLAN AS REQUIRED BY THE REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

This Agreement is made and entered into as of September 8, 2022 by and between the Los Angeles Gateway Region Integrated Regional Water Management Joint Powers Authority ("GWMA"), a California Joint Powers Authority, and the City of Compton, a California charter city ("Permit Holder").

## RECITALS

WHEREAS, the mission of the GWMA includes the equitable protection and management of water resources within its area; and

WHEREAS, for the purposes of this Agreement, the term "Permittees" shall mean the Cities of Downey, Lakewood, Lynwood, Paramount, Pico Rivera, Signal Hill, South Gate, Long Beach, and the Los Angeles County Flood Control District ("LACFCD"); and

WHEREAS, between 2005 and 2016, the United States Environmental Protection Agency approved the Nutrient Total Maximum Daily Load ("TMDL"), Metals TMDL, Los Angeles River Bacteria TMDL, Harbor Toxics TMDL, Beaches/Estuary TMDL with the intent of protecting and improving water quality in the Lower Los Angeles River and the Greater Los Angeles and Long Beach Harbor Waters ("TMDLs"); and

WHEREAS, the TMDLs regulate certain discharges from National Pollutant Discharge Elimination System ("NPDES") permit holders, requiring organization and cooperation among the Permittees; and

WHEREAS, the Permittees and Permit Holder manage, drain or convey storm water into at least a portion of the Lower Los Angeles River ("LLAR") and Compton Creek; and

WHEREAS, the Permittees and Permit Holder comply with the monitoring requirements of the TMDLs by implementing a Coordinated Integrated Monitoring and ("CIMP") for the TMDLs to ensure consistency with other regional monitoring programs and usability with other TMDL related studies; and

WHEREAS, the Permittees shall continue to implement the current CIMP in the form submitted by the Permittees on July 2, 2015 and approved by the Los Angeles Regional Water Quality Control Board's ("Regional Board") Executive Officer; and

WHEREAS, the CIMP must be revised and submitted for approval by the Regional Board as required by the reissued MS4 Permit (Order R4-2021-0105, NPDES No. CAS004004) within 18 months of the effective date of the Order (March 23, 2023); and

WHEREAS, the Permittees and Permit Holder have authorized GWMA to hire and serve as conduit for paying a qualified consultant team, ("Consultant"), approved by the Permittees, to implement and conduct the monitoring set forth in the CIMP; and

WHEREAS, LLAR monitoring locations operated separately by the Permittees and the LACFCD have been established below the confluence of Compton Creek and the Los Angeles River; and

WHEREAS, the City of Compton, an individual NPDES permit holder has indicated a desire to be incorporated in the upcoming revision of the CIMP, which will include new monitoring locations in Compton Creek that the City of Compton will be solely financially responsible for; and

WHEREAS, the Permittees authorized the GWMA to enter into individual separate agreements with such individual NPDES permit holders (which shall not have voting rights in any group relating to the Permittees or the GWMA) for CIMP cost sharing purposes only; and

WHEREAS, the Permit Holder is such an individual NPDES permit holder and desires to obtain monitoring data collected as part of the CIMP at the monitoring station referred to as "S10" and to share in the costs of the implementation of the CIMP.

WHEREAS, the role of the GWMA is to invoice and collect funds from the Permit Holder to cover a portion of the costs of revising the CIMP.

WHEREAS, the Permit Holder and the GWMA are collectively referred to as the "Parties."

NOW, THEREFORE, in consideration of the mutual covenants and conditions set forth herein, the Parties do hereby agree as follows:

Section 1. Recitals. The recitals set forth above are fully incorporated as part of this Agreement.

Section 2. Purpose. The purpose of this Agreement is for the Permit Holder to cost share in the preparation, submission, and approval process for the revised CIMP.

Section 3. Cooperation. The Parties shall fully cooperate with one another to achieve the purposes of this Agreement.

Section 4. Voluntary Nature. The Parties voluntarily enter into this Agreement.

Section 5. Binding Effect. This Agreement shall become binding on GWMA and the Permit Holder.

Section 6. Term. This Agreement shall commence on September 1, 2022 and shall expire on June 30, 2025, unless terminated earlier pursuant to this Agreement.

Section 7. Role of the GWMA.

(a) The GWMA shall invoice and collect funds from the Permit Holder to cover a portion of the costs of hiring and paying the Consultant to prepare, submit, and process the revised CIMP.

(b) The GWMA shall administer the Consultant's contract for revision of the CIMP by contracting with and paying the Consultant.

Section 8. Financial Terms.

(a) The Permit Holder shall pay twelve thousand three hundred dollars ($12,300) to the GWMA in exchange for the Permit Holder's portion of cost share of revising, submitting, and processing the CIMP to incorporate Compton Creek.

(b) In addition to the Annual Payment Amount, the Permit Holder shall pay the GWMA Administrative Fee which is a charge for the Permit Holder's share of the GWMA's staff time for hiring the Consultant and invoicing the Permit Holder, audit expenses and other overhead costs, including reasonable legal fees incurred by the GWMA in the performance of its duties under this Agreement ("Administrative Costs"). The GWMA Board annually establishes the fee rate for recovering its Administrative Costs. The GWMA Administrative fee rate for GWMA members charged to the Permit Holder shall be anywhere between 0 to 5%.

(c) Permit Holder's payment amount is due upon execution of this Agreement and shall cover the current fiscal year and if necessary, the following fiscal year.

(d) Upon receiving an invoice from the GWMA, the Permit Holder shall pay the invoiced amount to the GWMA within thirty (30) days of the invoice's date.

(e) The Permit Holder will be delinquent if its invoiced payment is not received by the GWMA within forty-five (45) days after the invoice's date. If the Permit Holder is delinquent, the GWMA will: 1) verbally contact the representative of the Permit Holder; and 2) submit a formal letter from the GWMA Executive Officer to the Permit Holder at the address listed in Section 12 of this Agreement. If payment is not received within sixty (60) days of the invoice date, the GWMA may terminate this Agreement. However, no such termination may be ordered unless the GWMA first provides the Permit Holder with thirty (30) days written notice of its intent to terminate the Agreement. The terminated Permit Holder shall remain obligated to GWMA for its delinquent payments and any other obligations incurred prior to the date of termination. If the GWMA terminates this Agreement because the Permit Holder is delinquent in its payment, Permit Holder shall no longer be entitled to the monitoring data collected as part of the CIMP.

(f) Any delinquent payments by the Permit Holder shall accrue

compound interest at the average rate of interest paid by the Local Agency Investment Fund during the time that the payment is delinquent.

Section 9. Independent Contractor.

(a) The GWMA is, and shall at all times remain, a wholly independent contractor for performance of the obligations described in this Agreement. The GWMA's officers, officials, employees and agents shall at all times during the term of this Agreement be under the exclusive control of the GWMA. The Permit Holder cannot control the conduct of the GWMA or any of its officers, officials, employees or agents. The GWMA and its officers, officials, employees, and agents shall not be deemed to be employees of the Permit Holder.

(b) The GWMA is solely responsible for the payment of salaries, wages, other compensation, employment taxes, workers' compensation, or similar taxes for its employees and consultants performing services hereunder.

Section 10. Indemnification and Insurance.

(a) The Permit Holder shall defend, indemnify and hold harmless the GWMA and the Permittees and their officers, employees, and other representatives and agents from and against any and all liabilities, actions, suits proceedings, claims, demands, losses, costs, and expenses, including legal costs and attorney's fees, for injury to or death of person(s), for damage to property (including property owned by the GWMA and any Permittee) for negligent or intentional acts, errors and omissions committed by the Permit Holder or its officers, employees, and agents, arising out of or related to that Permit Holder's performance under this Agreement, except for such loss as may be caused by GWMA's own negligence or that of its officers, employees, or other representatives and agents, excluding the Consultant.

(b) GWMA makes no guarantee or warranty that the reports prepared by GWMA and its Consultant shall be approved by the relevant governmental authorities. GWMA shall have no liability to the Permit Holder for the acts or omissions of GWMA's Consultant. The Permit Holder's sole recourse for any act or omission of the GWMA's Consultant shall be against the Consultant and its insurance.

Section 11. Termination.

(a) The Permit Holder may terminate this Agreement for any reason, or no reason, by giving the GWMA prior written notice thereof, but the Permit Holder shall remain responsible for its entire Annual Payment Amount through the end of the current fiscal year during which Permit Holder terminates the Agreement and shall not be entitled to any refund of any portion of said Annual Payment Amount. Moreover, unless the Permit Holder provides written notice of termination to the GWMA by the March 30th immediately prior to the new fiscal year, the Permit Holder shall also be responsible for its Annual Payment Amount through the end of the new fiscal year (*e.g.*, If the Permit Holder terminates on April 1, 2021, Permit Holder is responsible for the Annual Payment Amounts for both FY 2020-2021 and FY 2021-2022. If the Permit Holder terminates on

March 25, 2021, the Permit Holder is responsible for its Annual Payment Amount only for FY 2020-2021, not for FY 2021-2022). If the Permit Holder terminates the Agreement, the Permit Holder shall remain liable for any loss, debt, or liability otherwise incurred through the end of the new fiscal year.

(b) The GWMA may, with a majority vote of the full GWMA Policy Board, terminate this Agreement upon not less than thirty (30) days written notice to the Permit Holder. Any remaining funds not due and payable or otherwise legally committed to Consultant shall be returned to the Permit Holder.

Section 12. Miscellaneous.

(a) Permit Holder has been accepted as a participant in the CIMP and shall not be entitled to appoint a representative or to vote or participate in any way in decisions assigned to Permittees. Participant status entitles Permit Holder only to the monitoring data collected as part of the CIMP for any fiscal year in which the participant has paid its Annual Payment Amount. By entering into this Agreement, neither the GWMA nor its member agencies represent that they condone or support the Permit Holder's business activities or the cause of its discharge.

(b) Notices. All Notices which the Parties require or desire to give hereunder shall be in writing and shall be deemed given when delivered personally or three (3) days after mailing by registered or certified mail (return receipt requested) to the following address or as such other addresses as the Parties may from time to time designate by written notice in the aforesaid manner:

To GWMA:

Ms. Grace J. Kast
GWMA Executive Officer
Gateway Water Management Authority
16401 Paramount Boulevard
Paramount, CA 90723
Phone: (626) 485-0338
Email: gracekast.gateway@gmail.com

To the Permit Holder:

City of Compton
Attn: Thomas Thomas
205 South Willowbrook Avenue
Compton, CA 90220
Phone: (310) 605-5577
Email: contactcm@comptoncity.org

(c) Amendment. The terms and provisions of this Agreement may not be amended, modified or waived, except by a written instrument signed by all Parties.

(d) Waiver. Waiver by either the GWMA or the Permit Holder of any term, condition, or covenant of this Agreement shall not constitute a waiver of any other term, condition, or covenant. Waiver, by the GWMA or the Permit Holder, to any breach of the provisions of this Agreement shall not constitute a waiver of any other provision or a waiver of any subsequent breach of any provision of this Agreement.

(e) Law to Govern: Venue. This Agreement shall be interpreted, construed, and governed according to the laws of the State of California. In the event of litigation between the Parties, venue shall lie exclusively in the County of Los Angeles.

(f) No Presumption in Drafting. The Parties to this Agreement agree that the general rule than an agreement is to be interpreted against the Party drafting it, or causing it to be prepared, shall not apply.

(g) Severability. If any term, provision, condition or covenant of this Agreement is declared or determined by any court of competent jurisdiction to be invalid, void, or unenforceable, the remaining provisions of this Agreement shall not be affected thereby and this Agreement shall be read and construed without the invalid, void, or unenforceable provisions(s).

(h) Entire Agreement. This Agreement constitutes the entire agreement of the Parties with respect to the subject matter hereof and supersedes all prior or contemporaneous agreements, whether written or oral, with respect thereto.

(i) Counterparts. This Agreement may be executed in any number of counterparts, each of which shall be an original, but all of which taken together shall constitute but one and the same instrument, provided, however, that such counterparts shall have been delivered to all Parties to this Agreement.

(j) Legal Representation. All Parties have been represented by counsel in the preparation and negotiation of this Agreement. Accordingly, this Agreement shall be construed according to its fair language.

(k) Authority to Execute this Agreement. The person or persons executing this Agreement on behalf of Permit Holder warrants and represents that he or she has the authority to execute this Agreement on behalf of the Permit Holder and has the authority to bind Permit Holder.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed on their behalf, respectively, as follows:

DATE:_____

LOS ANGELES GATEWAY REGION INTEGRATED REGIONAL WATER MANAGEMENT JOINT POWERS AUTHORITY

_____
Adriana Figueroa
GWMA Chair

_____
Nicholas R. Ghirelli
GWMA General Counsel

DATE: _____

PERMIT HOLDER

City of Compton

_____
Signature

_____
Print Name & Title

16401 Paramount Boulevard
Paramount, CA 90723
562.663.6850 phone
562-634-8216 fax

www.gatewaywater.org


*Los Angeles Gateway Region*
*Integrated Regional Water Management*
*Joint Powers Authority*

September 8, 2022

**AGENDA ITEM 8 – GWMA to Serve as Lead Agency for Targeted Human Waste Source Reduction Strategy for the Los Cerritos Channel**

## SUMMARY:

The Safe Clean Water (SCW) Program was soliciting project applications for Year 4 (the FY 2023-2024 funding year) to be paid from its Regional Program funds (50% of SCWP funds). The deadline for applications was July 31, 2022. As part of the Regional Program, 5% is available for Scientific Studies, as set forth in each watershed area's Stormwater Investment Plan ("SIP"). GWMA was requested by the Los Cerritos Channel Watershed Group to consider serving as the Applicant (Lead Agency) for the Targeted Human Waste Source Reduction Strategy for the Los Cerritos Channel Scientific Study.

## BACKGROUND:

In March 2022, the Los Angeles Regional Water Quality Control Board voted to adopt the Los Cerritos Channel and Estuary, Alamitos Bay, and Colorado Lagoon Indicator Bacteria Total Maximum Daily Load (TMDL). This TMDL establishes water quality objectives for E. coli and Enterococcus consistent with the 2018 Statewide Bacteria Provisions for the named waterbodies with the primary goal of protecting public health and supporting recreational beneficial use goals. The Targeted Human Waste Source Reduction Strategy will provide an effective framework for the Los Cerritos Channel Watershed Management Group to guide and prioritize source identification and source abatement efforts, focusing on reducing sources of human waste, to achieve bacteria-related compliance objectives. This provides the most effective pathway towards improved public health that incorporates significant advances in the state of the science.

This scientific study will utilize a data-driven approach to identify efficient and effective implementation actions watershed-wide. This Strategy is timely given advancements in the development of human markers and other diagnostic tools, successful development of an innovative risk-based approach for Upper Los Angeles River that provides a model for this study, and the need to move expeditiously to reduce public health risks and demonstrate compliance with the pending TMDL.

The application for the Measure W Funding to conduct the scientific study was submitted for Year 4 funding consideration. Since, GWMA is the fiduciary agent for the Los Cerritos Channel Watershed Group, the watershed group has requested for the project lead to be transferred to GWMA. Due to timing of GWMA's Board Meetings and the SCWP's application deadline of July 31st, the project lead identified in the application was the City of Lakewood as a placeholder until GWMA could meet and consider taking the Lead Agency role.

The grant funding requested for the study is $475,000.00 total.

## FISCAL IMPACT:

Currently, nominal staff time is being expended to assist in preparing the information for Board consideration. Costs to prepare the applications, give presentations to Watershed Groups as well as WASCs are being done by other proponents.

If funding is awarded through Measure W, GWMA staff and legal time will be needed to review and develop the funding agreement(s) between GWMA and Los Angeles County Flood Control District for the GWMA Board to consider. In accordance with GWMA Board Policy, once the legal agreements are executed, GWMA's administrative costs of 5% will be covered by Measure W funds.

## RECOMMENDATION:

a. Approve GWMA's role as Lead Agency for The Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel Scientific Study and authorize GWMA's name to be added to the Measure W funding application for the proposed study, in place of the City of Lakewood. If awarded, GWMA's official role as the study's Lead Agency is contingent upon Board Approval of an Agreement between Los Angeles County Flood Control District and GWMA that sets forth each agency's role and funding obligation.

SAFE, CLEAN WATER PROGRAM

# SCIENTIFIC STUDY SUMMARY

*Regional Program Projects Module*

| | |
|---|---|
| STUDY NAME | Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel |
| STUDY LEAD(S) | City of Lakewood |
| SCW WATERSHED AREA(S) | Lower San Gabriel River |
| TOTAL SCW FUNDING REQUESTED | $ 475,000.00 |

**Submitted On: Sunday, July 31, 2022**

**Created By: Kelli Pickler, Director of Public Works, City of Lakewood** (Brianna Datti)

## OVERVIEW

The Scientific Studies Program is part of the Safe, Clean Water Regional Program to provide funding for activities such as scientific studies, technical studies, monitoring, and modeling. Watershed Area Steering Committees will determine how to appropriate funds for the Scientific Studies Program. The District will administer the Scientific Studies Program and will seek to utilize independent research institutions or academic institutions to carry out, help design, or peer review eligible activities. All activities to be funded by the Scientific Studies Program will be conducted in accordance with accepted scientific protocols.

This document summarizes a proposed Scientific Study, based upon inputs to and outputs from the web-based tool called the 'SCW Regional Program Projects Module' (https://portal.safecleanwaterla.org/projects-module/).

## ORGANIZATIONAL OVERVIEW:

# 1 GENERAL INFORMATION

This section provides general information on the proposed Scientific Study.

## 1.1 Overview

**The following table provides an overview of the study and the Study Lead(s):**

| | |
|---|---|
| Study Name: | Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel |
| Study Description: | Data-driven framework to guide and prioritize source ID and abatement efforts, focusing on reducing sources of human waste, for bacteria. |
| SCW Watershed Area: | Lower San Gabriel River |
| Latitude to Display On the SCW Portal Map: | 33.85 |
| Longitude to Display On the SCW Portal Map: | -118.13 |
| Have There Been Other Similar or Related Studies? | Yes |
| If There are Similar or Related Studies Please Explain: | The Upper Los Angeles River Watershed Management Group recently developed a similar risk-based approach to adapt their bacteria strategy. The Load Reduction Strategy Adaptation scientific study was supported by the Upper Los Angeles River and Rio Hondo Watershed Area Steering Committees in the first round of the SCW Regional Program. In the first year of the study, the LRS Adaptation Plan for the ULAR Group was submitted to the Regional Board in July 2021. In the second and beginning third year of the study, the ULAR Group has progressed implementation of the approach and updated dynamic prioritization processes that can be leveraged for the Los Cerritos Channel Group. |
| Call for Projects year: | FY23-24 |
| Total SCW Funding Requested: | $ 475,000.00 |
| Study Lead(s): | City of Lakewood |
| Additional Study Collaborators: | Los Cerritos Channel Watershed Management Group (8 agencies) |

| | |
|---|---|
| Additional Study Collaborators: | N/A |
| Additional Study Collaborators: | N/A |
| Anticipated Study Developer: | Craftwater Engineering |
| Primary Contact (if differs from submitter): | Kelli Pickler, Director of Public Works, City of Lakewood |
| Primary Contact Email (if differs from submitter): | KPickler@lakewoodcity.org |
| Secondary Contact (if differs from submitter): | Konya Vivanti, Environmental Programs Manager, City of Lakewood |
| Secondary Contact Email (if differs from submitter): | KVivanti@lakewoodcity.org |

# 2 DETAILS

This section provides an overview of the study details including problem statement and objectives.

## 2.1 Statement

**The following describes the Study problem statement:**

In the Los Cerritos Channel (LCC) watershed, exceedances of fecal indicator bacteria objectives for recreational contact and limited recreational contact during wet weather are extremely common. Adoption of the Los Cerritos Channel and Estuary, Alamitos Bay, and Colorado Lagoon Indicator Bacteria TMDL will establish bacteria as a Category 1 priority pollutant in the Watershed Management Program (WMP) and sets a more stringent schedule for compliance with objectives of the TMDL. As such, the WMP identified significant required volume capture to reduce bacteria pollutant loads. Typically, the volume capture required to address bacteria loads is higher than any other pollutant in the WMP, thus significantly driving up costs of the program. Currently, the WMP requires over $1.7 Billion in investments of structural BMP costs to address the bacteria volume capture requirements.

While the Group has been successful reducing dry weather flows for bacteria requirements and is making progress on implementation of wet weather volume capture projects, the majority of the required BMP capacity is yet to be built. Feasible locations for effective projects are challenging to find and projects are extremely expensive to build. In addition, it is widely known that these structural controls may not be effective in reducing pathogens or may further exacerbate these problems in some cases. The underlying objective of reducing bacteria loads is to reduce pathogens in recreational waterbodies that could make people sick. There are many sources of bacteria in the environment and although elevated concentrations of traditional fecal indicator bacteria may indicate a higher potential for human health risks, it is exposure to pathogens that can cause illness in recreational water users and threaten or impair beneficial uses. Human waste typically contains a higher concentration of pathogens, as compared to other sources, thereby increasing the risk of gastrointestinal illness (GI) through recreational exposure.

To adapt to implementation challenges and offset the drastic cost of potentially unsuccessful structural BMPs, this study establishes a more effective framework focusing on eliminating sources of human waste to recreational waterbodies. Such a framework involves a comprehensive evaluation of water quality data, bacteria/pathogen source information, and additional factors required to effectively guide implementation actions.

## 2.2 Objectives

**The following describes the Study objectives:**

The goal of the study is to develop the Targeted Human Waste Source Reduction Strategy for the Los Cerritos Channel watershed to align implementation actions to successfully reduce potential health risks to recreators. Meeting bacteria objectives is focused on protection of recreational beneficial uses in receiving waterbodies. Focusing on reducing the sources of human waste maximizes the efficient use of limited resources and results in significant long-term pathogen reduction benefits.

This study will specifically support the following objectives:
• Develop a risk-based framework to expeditiously reduce public health risks and demonstrate compliance with bacteria objectives.
• Characterize highest priority areas in the watershed to invest resources based on water quality conditions, potential sources of human waste, and influence on impaired receiving waters.
• Prioritize identification and abatement of human sources of waste.
• Identify specific sources of bacteria in highest priority areas.
• Identify recommended abatement strategies to reduce the recreational health risk in downstream receiving waters, progressing towards the bacteria compliance objectives.
• Utilize recent scientific advancements in development of human markers and other diagnostic tools for focused source control efforts.
• Collect paired fecal indicator bacteria (FIB) and human marker data to support evaluation of water quality conditions and determining human health risk levels.
• Educate and outreach to stakeholders on bacteria issues.
• Provide technical resources to inform and be leveraged by similar efforts in the region.

## 2.3 Summary

| Attachments for this Section | |
|---|---|
| Attachment Name | Description |
| Los Cerritos Channel Targeted Human Waste Source Reduction Strategy SCWP Application - Summary.pdf | Summary of the Los Cerritos Channel Targeted Human Waste Source Reduction Strategy |

**The following provides additional details on the Study including location of study, date to be collected, study methodology, etc.:**

Please refer to the summary attached for the full study description.

## 2.4 Additional Information

**Additional information regarding Study details is provided as the following attachments:**

| Attachments for this Section | |
|---|---|
| Attachment Name | Description |
| Bellflower Letter of Support - LSGR WASC Scientific Study.pdf | Bellflower Letter of Support for the Scientific Study |
| Paramount Letter of Support - SCWP Scientific Study Proposal_20220729.pdf | Paramount Letter of Support for the Scientific Study |
| Lakewood Letter of Support for SCWP Scientific Study Proposal .pdf | Lakewood Letter of Support for the Scientific Study |
| GWMA Letter of Support-Targeted Human Waste Source Reduction.pdf | Gateway Water Management Authority Letter of Support for the Scientific Study |
| Richard Watson and Associates Letter of Support for LSGR Scientific Study.pdf | Richard Watson and Associates Letter of Support for the Scientific Study as consultant to the Los Cerritos Channel Watershed Group |

# 3 Outcomes

This section provides an overview of the anticipated Study outcomes and the nexus to water supply and water quality.

## 3.1 Nexus

**The following describes the Study's nexus to stormwater, urban runoff and / or water supply:**

Bacteria is one of the most challenging, if not the most challenging, pollutant to address in stormwater management. The large number of stormwater treatment and capture projects required per the Los Cerritos Channel Watershed Management Program (WMP), and in WMPs throughout the LA Region, is driven by bacteria requirements. The Targeted Human Waste Source Reduction Strategy provides the most effective framework to efficiently reduce the highest risk sources of bacteria in the watershed, that otherwise would be transported through stormwater runoff to downstream receiving waters. Water quality assessments and the catchment prioritization to be conducted in this study focuses resources in areas where urban runoff poses the greatest threat to public health of recreational users. The human waste source investigations will identify and directly target abating sources in the urban watershed.

## 3.2 Outcomes

**The following describes the expected outcomes of the Study in terms of implementation of BMPs or development of tools or applications:**

The Targeted Human Waste Source Reduction Strategy guides focused source identification, source abatement, and overall implementation actions that successfully reduce potential health risks to recreators. The Strategy will leverage existing efforts in the watershed to address bacteria impairments while identifying more cost-effective implementation actions. The Strategy also identifies where additional data, including source identification monitoring and identification of potential sources, would be beneficial to help guide recommended implementation actions.

The first phase of the study will develop the Targeted Human Waste Source Reduction Strategy Plan specific for the Los Cerritos Channel (LCC) Watershed Management Area (WMA) in the first year. This includes data collection and review, assessing receiving water and outfall water quality conditions based on existing data, finalizing the catchment prioritization tailored to the LCC WMA, and ultimately publishing the final Plan to be integrated in the LCC WMP. The second phase beginning in year two of the study is focused on implementation of the Strategy, including initial source identification and abatement efforts in selected priority areas. Development of this Strategy will include coordination with Board staff throughout to ensure the methods and outcomes are in line with regulatory expectations. There will be ongoing engagement with the Regional Board to discuss the shift in focus to source control efforts. This engagement is critical to ensure policy directions are consistent with the updated implementation approach the Group is pursuing.

## 3.3 Benefits

**The following describes how the Study is anticipated to improve water quality, increase water**

**supply, or enhance community investments:**

The Targeted Human Waste Source Reduction Strategy aligns implementation actions to successfully reduce potential health risks to recreators. The keys benefits are a targeted approach to decrease health risks due to bacteria-related issues in the watershed, which therefore improves water quality conditions for recreators. The LCC Group, and the Los Angeles region overall, has faced challenges addressing bacteria-related issues. The targeted approach in this study emphasizes source control and provides an expedited pathway for improving water quality conditions, compared to existing efforts that focused primarily on implementing traditional structural controls that may not reduce pathogen concentrations.

## 3.4 Additional Information

**Additional information regarding Study outcomes and its nexus to water quality and supply is provided as the following attachments:**

# 4 Background

This section provides additional background on the Study.

## 4.1 Previous

**The following describes previous / similar studies conducted and how previous efforts will be leveraged for the Study:**

The Los Cerritos Channel (LCC) Watershed Management Program (WMP) identifies over $1.7 billion in structural BMP costs, driven by bacteria objectives. The Group has made significant progress reducing dry-weather flows through water conservation and water capture, with the majority of dry-weather flows eliminated in the watershed. However, addressing wet weather objectives for bacteria continue to be a challenge, with common exceedances during storm events. Larger stormwater capture projects are being pursued in the watershed; however, the Targeted Human Waste Source Reduction Strategy to be developed under this study provides a more effective and feasible strategy to addressing the wet weather bacteria challenges.

Given the scientific advancements in our understanding of addressing the highest risk sources of bacteria, over the past three years the Group has collected microbial source tracking data in the LCC watershed. KEI has collected data since the 2019-2020 season within the Los Cerritos Channel and associated segments during wet weather for Bacteriophage (MS2 and Somatic) and Bacteroidales (HF183). In addition to the standard available fecal indicator bacteria data, this data will be integrated in the assessment of receiving water and outfall water quality conditions and critical to identifying the highest risk areas to focus implementation efforts. The proposed monitoring under this scientific study will continue to be conducted by KEI, leveraging their long-standing experience in the watershed.

The Upper Los Angeles River Watershed Management Group recently developed a similar risk-based approach to adapt their bacteria strategy. The Load Reduction Strategy Adaptation scientific study was supported by the Upper Los Angeles River and Rio Hondo Watershed Area Steering Committees in the first round of the SCW Regional Program. In the first year of the study, the LRS Adaptation Plan for the ULAR Group was submitted to the Regional Board in July 2021. In the second and beginning third year of the study, the ULAR Group has progressed implementation of the approach and updated dynamic prioritization processes that can be leveraged for the LCC Group.

The Targeted Human Waste Source Reduction Strategy aligns key elements of the updated approach with other ongoing LCC projects and priorities. This effort is also tracking and leveraging the results of other key bacteria/pathogen-related projects and initiatives, including the following:
• Implementation of the similar risk-based approach in Upper Los Angeles River for the Load Reduction Strategy Adaptation to Address the LA River Bacteria TMDL
• Implementation of the similar risk-based approach developed in South Orange County for the Comprehensive Human Waste Source Reduction Strategy
• Development of the City of San Diego Human Waste Prioritization Study (leverages the approach used for South Orange County and Upper Los Angeles River)
• Progress on the San Diego River Investigative Order to quantify the sources and transport of

human fecal material in the watershed
• San Diego Region Bacteria TMDL Reopener status and updates
• Ongoing development of potential HF183 threshold values
• Ongoing regulatory discussions with the Regional Board, State Water Board, USEPA, and other agencies
• Statewide Bacteria Summit hosted by the California Water Boards and CASQA (scheduled September 2022)
• Recent scientific advancements in microbial source tracking (MST), special studies, and EPA methods development
• Ongoing development and scientific review of physical, bacterial, viral, and chemical markers for accurate source identification
• Upcoming workshops on the Los Cerritos Channel and Estuary, Alamitos Bay, and Colorado Lagoon Indicator Bacteria TMDL adoption

## 4.2 Regulations

**The following describes state and federal regulations in the study area that will be considered by the Study:**

In March 2022, the Los Angeles Regional Water Quality Control Board voted to adopt the Los Cerritos Channel and Estuary, Alamitos Bay, and Colorado Lagoon Indicator Bacteria Total Maximum Daily Load (TMDL). This TMDL establishes water quality objectives for E. coli and Enterococcus consistent with the 2018 Statewide Bacteria Provisions for the named waterbodies with the primary goal of protecting public health and supporting recreational beneficial use goals. During consideration, the Board voted to include additional workshops with stakeholders to discuss the TMDL and implications, expected in Fall 2022. Given adoption of the TMDL, bacteria will become a Category 1 priority pollutant in the LCC WMP, with the TMDL establishing a 15-year timeline from the effective date for final compliance.

Over the past decade, significant advancements have occurred in the state of the science and understanding of threats to the recreational beneficial use caused by bacteria. Several key regulatory and scientific advancements helped guide development of the Targeted Human Waste Source Reduction Strategy.

2012 USEPA Recreational Water Quality Criteria Recommendations:
In 2012, USEPA adopted nationwide Recreational Water Quality Criteria (RWQC) in an effort to better protect public health and improve consistency (USEPA 2012). Specifically, USEPA recommended for states to adopt one of two numeric threshold values for illness rates: 36 excess illnesses per 1,000 recreators or 32 excess illnesses per 1,000 recreators, which were shown to be equally protective of the primary contact recreation designated use. Additionally, the RWQC recommended the use of either Enterococci or E.coli as indicators of fecal or pathogen contamination in freshwaters, and the use of only Enterococci as an indicator in marine waters. In making these recommendations to the states, USEPA explained these criteria do not take into account different sources of fecal contamination, believing that the science had not yet developed sufficiently to distinguish between human and non-human sources of fecal contamination (USEPA 2012), or apparently endogenous replication of FIB. However, USEPA recognized that some locations could have water quality characteristics that differ from those which the RWQC were based on (e.g. waterbodies impacted by treated wastewater effluent). Recognizing that various scientific studies indicate non-human sources of fecal contamination can pose less risk than human sources, USEPA provided flexibility so that states could address their waterbodies on a human health risk basis.
The sources of fecal contamination in Southern California recreational waters is typically different than those studied in the epidemiological studies that underpin the USEPA 2012

RWQC recommendations (i.e. those studies were generally carried out in waters impacted by secondary treated and disinfected wastewater effluent, whereas recreational waters in Southern California are impacted by other sources including non-point sources).

California Primary Contact Recreation Water Quality Objectives:
States were required to adopt USEPA's 2012 RWQC recommendations into their respective state water quality standards. Accordingly, the SWRCB adopted California's Bacteria Provisions, selecting the 32 illnesses per 1,000 recreators threshold and revised its bacteria standards in Resolution No. 2018-0038 on August 7, 2018. The Resolution accomplished two things: (1) it protected Water Contact Recreation (REC-1) waters by revising state WQOs in the Bacteria Provisions of Part 3 of the Water Quality Control Plan of the Inland Surface Waters, Enclosed Bays and Estuaries of California (ISWEBE Plan), and (2) it maintained the fecal coliform objective contained in the existing Water Quality Control Plan for Ocean Waters of California (Ocean Plan) (SWRCB 2018). In the accompanying staff report, the SWRCB noted that while indicator bacteria are used as an indicator of fecal contamination, the actual risk to human health is caused by pathogenic microorganisms known to cause disease (SWRCB 2018). With the SWRCB's adoption of USEPA's 2012 RWQC in 2018, the Bacteria Provisions provide for consistent implementation of the new criteria on a statewide basis for waters designated with the REC-1 beneficial use. The LARWQCB amended the Los Angeles Region Basin Plan on February 13, 2020 through Resolution No. R20-001, to update the bacteria objectives for fresh, estuarine and marine waters designated for water contact recreation, based on the Statewide Bacteria Provisions.

Other Scientific Advancements:
Even though fecal indicator bacteria (FIB) rarely cause illness and they are ubiquitous in the environment, studies sometimes show a correlation between their presence in recreational waterbodies and GI in users of those waters, especially if the source is of human origin. Testing for pathogens may be more accurate, but measuring pathogens is an expensive and slow endeavor, as compared to analyses for FIB. When other sources are present, FIB measurements may include contributions from wild animals, birds, decaying vegetation, or biologically active surfaces, which may pose substantially less health risk than contributions from human sources (Soller et al. 2010). Speciation of bacteria through microbial source tracking (MST) studies has sometimes proven to be effective in identifying the relative contributions of bacteria from natural and anthropogenic sources in different waterbodies.

The move from FIB to human markers and other methods that correlate better with human health risk in Southern California has been motivated by recent scientific studies, which have revealed a greater understanding of the association between FIB and pathogens to actual human health risk.

One key special study was the surfer health study (SHS), conducted during the winters of 2013-14 and then again in 2014-15 by SCCWRP at Ocean and Tourmaline Beaches in San Diego, the goal of which was to measure illness rates among surfers exposed to bacteria during wet weather.

The SHS Quantitative Microbial Risk Assessment (QMRA) model was used to derive a human fecal marker (HF183) level in a manner that is consistent with the methodology that the USEPA used for deriving the 2012 RWQC. QMRA uses microbial measurements to determine where they can become a danger and estimates their risk to human health. Less expensive than an epidemiology study, risk models like QMRA can yield valuable risk assessment data by looking at the hazard posed by some microbes, the dose-response relationship, exposure, and finally a determination of human health risk. Based on the data collected under the SHS,

the QMRA estimated an excess GI illness rate of 15 illnesses per 1,000 recreators for the conditions observed during the SHS. These results agree with the epidemiological component of the SHS, which reported an excess GI illness rate of 12 illnesses per 1,000 recreators. Through a series of numerical simulations and calculations, it was determined that a median value of 250 copies per 100 mL with a 90th percentile of 2,655 copies per 100 ml corresponds to 15 excess GI illnesses per 1,000 surfers, respectively during wet weather.

The SHS study confirmed the need to differentiate between sources of fecal contamination. This resulted in a number of MST studies that were conducted in recent years in Southern California to identify human and non-human sources of fecal pollution in several waterbodies. The MST studies that have been conducted in the region, are ongoing, or are planned in the future will provide beneficial information on the sources of fecal contamination and will help inform implementation of this Plan. The Southern California Bight Regional Monitoring Program has been advancing the use of quantitative polymerase chain reaction (qPCR) in recreational water quality monitoring. Its studies have shown that qPCR methods result in a more rapid measurement of FIB and can be used to identify sources of fecal contamination (SCCWRP 2017). Bight monitoring also included the collection of human marker data.

SCCWRP has also developed a Microbial Community Analysis (MCA) approach that is intended to provide information about the entire microbial community present in a sample. Using community fingerprinting, microarrays, and next generation DNA sequencing, MCAs could be created and used to match patterns to determine fecal sources and other microbial data. While MCAs are expensive, its potential to identify microbial sources is valuable and generally infeasible with single-marker methods.

A number of other scientific studies are ongoing (e.g., San Diego River Investigative Order) that may lead to advancements in the understanding of the contribution of bacteria and pathogens from human sources. Laboratory methods are constantly being refined to improve the detection of human markers and pathogens, as well as develop new indicators (e.g., coliphage) that may provide additional tools that can be used in the future to help identify sources of human waste. USEPA and other organizations are striving to review and update these methods in order to provide guidance on their application.

## 4.3 Additional Information

**Additional information regarding the Study background is provided as the following attachments:**

| Attachments for this Section | |
|---|---|
| Attachment Name | Description |
| ULAR LRS Adaptation Plan_August2021.pdf | Upper Los Angeles River Load Reduction Strategy Adaptation Plan |

# 5 Cost & Schedule

This section provides an overview of the estimated cost and schedule for the Study.

## 5.1 Cost of Study

The following details the Study cost and breakdown of its cost by SCW Watershed Area.

**Total funding requested: $** 475,000.00

**The following is justification of the total funding requested amount:**

The requested funding in Year 1 is to develop the catchment prioritization for the LCC watershed, including significant data collection, review, and processing for water quality assessments, scoring potential sources of human waste, and incorporating additional factors to identify highest priority areas to focus source identification and abatement efforts. The first year of funding will also be used to develop the formal implementation plan for the Targeted Human Waste Source Reduction Strategy and conduct associated outreach and engagement, with a key focus on Regional Board engagement.

The requested funding in Year 2 is to begin implementation of the plan through conducting source tracking and abatement efforts in selected highest priority areas. The second year of funding will also be used to continue refinement of the catchment prioritization and tools used to update the prioritization based on the latest data available and information as well as continue outreach and engagement.

**The following table details the funding requested per year per watershed:**

| Funding Requested Per Year Per Watershed | | |
|---|---|---|
| Funding Request Year | Watershed Area | Amount for Year |
| Year 1 | Lower San Gabriel River | $ 175,000.00 |
| Total Year 1 | | $ 175,000.00 |
| Year 2 | Lower San Gabriel River | $ 300,000.00 |
| Total Year 2 | | $ 300,000.00 |
| Total Funding | | $ 475,000.00 |

## 5.2 Funding Sources

**The following is a summary of other sources of funding the have been or will be explored for the Study:**

The Los Cerritos Channel Group has invested in additional microbial source tracking over the past three wet seasons. The Group plans to continue similar monitoring which will be used to support the Targeted Human Waste Source Reduction Strategy.

**Is additional funding anticipated to be leveraged as a Cost Share for this Project?**

No

**The following table details the additional funding already attained for the Study:**

| Additional Study Funding Sources | | |
|---|---|---|
| Funding Type | Description | Funding Amount |
| None provided | N/A | N/A |

## 5.3 Schedule

**The following table details is a preliminary schedule required to design, permit, construct, operate, and maintain the Project:**

| Schedule Milestone Table | |
|---|---|
| Milestone Name | Completion Date |
| Catchment Prioritization | 03/29/2023 |
| Targeted Human Waste Source Reduction Strategy Plan | 06/28/2024 |
| Outreach and Engagement | 06/28/2024 |
| Refined Catchment Prioritization and Tools | 12/31/2024 |
| Source Identification and Abatement in Selected Areas of Investigation | 06/30/2025 |
| Outreach and Engagement | 06/30/2025 |

## 5.4 Additional Information

**Additional information regarding Study cost and schedule is provided as the following attachments:**

| Attachments for this Section | |
|---|---|
| Attachment Name | Description |
| Los Cerritos Channel Targeted Human Waste Source Reduction Strategy SCWP Application - Budget.pdf | Budget Summary for the Targeted Human Waste Source Reduction Strategy |

# 6 ATTACHMENTS

Attachments are bundled and organized in the following pages, with cover pages between each subsection.

# ATTACHMENTS FOR SECTION 2.3:

# Illustrative Overview

craftwater engineering, inc.
San Diego | Los Angeles
858.997.8172
craftwaterinc.com

# SUMMARY OF THE LOS CERRITOS CHANNEL TARGETED HUMAN WASTE SOURCE REDUCTION STRATEGY

The proposed study will develop and begin implementation of the Targeted Human Waste Source Reduction Strategy for the Los Cerritos Channel (LCC) Watershed Management Area, which includes areas in Bellflower, Cerritos, Downey, Lakewood, Long Beach, Paramount, Signal Hill, and Unincorporated County. The Strategy is comprised of the following steps:

1. **Assessment of REC-1 Receiving Water Quality Conditions:** Impaired receiving waters for bacteria are assessed based on available water quality data. If conditions are meeting applicable water quality objectives, catchments draining to the receiving water are considered a low priority.
2. **Upstream Assessment of Water Quality Conditions:** Similar assessment of unlisted tributaries and MS4 outfalls based on available water quality data. If conditions are meeting applicable water quality objectives, catchments draining to the tributary/outfall are considered a low priority. Additionally, assess connectivity of the MS4 network to receiving waters, where areas eventually draining to and potentially impacting impaired receiving waters are the focus for prioritization and subsequent investigation and abatement activities.
3. **Catchment Prioritization:** Prioritize upstream catchments based on (1) and (2), potential sources of human waste, and other factors related to the potential impact each catchment may have on water quality conditions in impaired receiving waters. Inform follow-up steps (4) and (5).
4. **Source Identification Monitoring:** Based on the results of (1) – (3) confirm highest priority catchments that may contribute to receiving water impairments through collection of additional receiving water and outfall monitoring data. Identify additional monitoring needs to locate sources within priority areas and guide abatement activities in step (5).
5. **Source Abatement:** Implement human waste control actions based on the findings of (4), tailored in different locations based on identified sources. Where necessary, site feasible projects to effectively reduce priority catchments contribution to receiving water impairments.
6. **Performance Monitoring:** Evaluate impact/success of abatement activities. Monitoring to confirm the source(s) identified were eliminated or successfully mitigated.

The following provides additional details on each step of the framework.

**Assessment of REC-1 Receiving Water Quality Conditions** - supports water quality assessments at water contact recreation (REC-1) receiving waters, with a focus on waterbodies with existing bacteria TMDLs/303(d) impairments especially those known to be popular for recreational use. Assessments are based on available water quality data, where existing available data are primarily fecal indicator bacteria (FIB) measurements collected to support MS4 monitoring requirements and more recent microbial

source tracking data, including for bacteriophage and bacteroidales. If water quality conditions indicate high exceedance levels and/or an elevated human health risk at a particular impaired receiving water, it is a higher priority for further investigation; however, if conditions are meeting applicable water quality objectives (WQOs), based on California's adopted Bacteria Provisions (SWRCB 2018), the associated catchments draining to the receiving water are considered low priority.

Where human marker, HF183, data are available, a value of 500 copies/100mL will be used to support prioritization based on ongoing discussions in the Southern California region regarding establishment of a HF183 (or another alternative marker) compliance pathway and associated threshold value. Threshold values and human marker data used in the prioritization will closely track and adapt as needed based on any outcomes from the ongoing regional discussions on this topic. Where persistent exceedances are observed in REC-1 receiving waters, contributing drainage areas are considered a higher priority for further investigation. The definition of persistent exceedances will be further developed through the strategy and adaptive management process as more HF183 (or another alternative marker) data are collected.

Additional monitoring in REC-1 receiving waters will be conducted, as appropriate, dependent on the catchment prioritization results and determination of the need for additional action. While a significant amount of water quality data is available, continuing to build the dataset of paired FIB and human marker data for REC-1 impaired segments will help improve prioritization and inform targeting of source investigations. The number of monitoring locations will be determined based on a review of recent water quality data and related information, the location and spatial extent of impaired reaches and associated drainages, and consideration of the presence of current and planned projects. Monitoring sites will align with the existing CIMP stations where appropriate. It is expected that this list of monitoring stations will evolve over time based on recommendations from the Group, as additional data is gathered and assessed, or due to changes in impairment status and strategy priorities. The duration of monitoring at a given location will be determined based on location-specific considerations but is generally expected to extend through a minimum of three years to determine trends. The monitoring results will be evaluated annually, and a site may be discontinued as needed (e.g., consistently no bacteria exceedances) or remain active for a longer period. During the wet season, at least three storm events will be targeted.

**Upstream Assessment of Water Quality Conditions -** supports water quality assessments of upstream conditions, including unlisted tributaries and the MS4 network/outfalls. A similar assessment of water quality conditions is conducted for unlisted tributaries and outfalls within the MS4 network. The same decision criteria are used: if water quality conditions indicate high exceedance levels and/or an elevated human health risk, then it is a higher priority for further investigation. However, if conditions are meeting applicable WQOs, based on California's recently adopted Bacteria Provisions, and the HF183 threshold value (as data are available), the associated catchments draining to the tributaries or MS4 outfalls are considered low priority.

Where persistent exceedances are observed in upstream areas (unlisted tributaries or MS4 outfalls), contributing drainage areas are considered a higher priority for further investigation.

Additional monitoring in upstream areas will be conducted, as appropriate, dependent on the catchment prioritization results and determination of the need for additional action. Additional monitoring is expected to include sampling of HF183, or other human marker data, in priority locations. In addition, connectivity of the upstream areas to REC-1 receiving waters is evaluated at this stage. Areas that eventually drain to and may potentially impact REC-1 receiving waters are the focus for prioritization and subsequent investigation and abatement efforts. While a significant amount of water quality data is available, building the dataset of paired FIB and human marker data for outfalls proximal to REC-1 impaired segments will help improve prioritization and inform targeting of source investigations. Determination of additional monitoring locations, duration, and frequency will follow a similar logic as outlined for the receiving water condition assessments.

**Catchment Prioritization –** upstream catchments are prioritized based on a number of key factors that include available information on water quality (as referenced in assessment of receiving water and upstream water quality conditions), potential sources of human waste, and other factors that relate to the potential impact each catchment may have on water quality conditions and beneficial uses in impaired receiving waters. FIB and HF183 monitoring data, proximity to receiving waters and recreational usage rates are primary factors in the prioritization method. The types of potential sources of human waste to be evaluated in the prioritization include sanitary sewer and septic system exfiltration; homeless encampments; sanitary sewer overflows; private lateral deficiencies; fats, oils, and grease impacts; and illicit connections/illicit discharges. An iterative process will be applied to reprioritize catchments based on additional sampling efforts and analysis including HF183 data at initial priority locations. Catchment prioritization results will be used to inform source identification needs and other subsequent steps.

**Source Identification Monitoring -** focuses on source identification based on the results of assessment of receiving water and outfall water quality conditions, and catchment prioritization. Source identification investigations will begin by confirming catchments that may contribute to elevated risk levels and REC-1 impairments through the collection of additional receiving water and outfall monitoring data. Monitoring results will be evaluated relative to a set of “action levels” for the purpose of triggering 1) analysis of paired HF183 samples collected at the time FIB samples were collected, and potentially triggering 2) additional phases of investigation, including catchment outfall sampling and/or up-watershed catchment source investigation. Monitoring and investigation strategies will be used to track and locate sources within priority areas to facilitate source abatement efforts.

Catchment prioritization results will be leveraged to define specific areas of investigation (AOIs) of grouped high priority catchments in the source identification phase. Within these AOIs, if FIB actions levels are exceeded in receiving waters, consistent with the benchmarks referenced for *Enterococcus*

(110 cfu/100ml; for beaches) and *E. coli* (320 cfu/100ml; for creeks), paired HF183 samples will be analyzed using an action level of 1,000 copies/100ml. This action level is derived from Boehm et al. (2018) which evaluated health risk relative to exposure to sewage. This action level may be updated in the future based on HF183 research conducted. Note this action level is lower than the threshold derived for site-specific conditions associated with the Surfer Health Study (2,655 copies/100 mL; SCCWRP 2016), but higher than the compliance-based threshold values being discussed by the San Diego Regional Water Quality Control Board. If greater than 10% of the FIB results and greater than 10% of the HF183 results exceed the applicable action levels, then upstream catchment sampling/investigation would proceed. In upstream areas (e.g., outfalls), the action levels are 320 cfu/100ml for *E. coli* and 4,100 copies/100ml for HF183 (based on Boehm et al. 2018). If greater than 10% of the FIB results and greater than 10% of the HF183 results exceed the applicable action levels, then additional investigation would proceed. Note these action levels were selected for prioritization purposes, not compliance, with an emphasis on using the best available data that relate to human sources/risk to focus resources in a cost-effective manner.

To specifically identify sources of human waste within AOIs, a human waste source investigation (HWSI) will be completed following an efficient and systematic approach. The specific steps of a HWSI to identify human fecal sources are shortened and adapted from *The California Microbial Source Identification Manual*. While AOI-specific monitoring plans will be developed, the general framework for conducting a source investigation are as follows:

(1) **Characterize AOI:** Gather additional details not represented in the prioritization and refine the mapping for the AOI as appropriate. Develop an inventory for the AOI and identify stakeholders.
(2) **Conduct Stakeholder Coordination:** Coordinate with governmental and non-governmental organization, regional monitoring groups, and others involved in the AOI. Gather additional data from partners.
(3) **Gather Additional Data:** Complete more focused data collection within the boundaries of the AOI, including but not limited to additional monitoring data, GIS data, and source data. Visual or sanitary surveys may also be conducted as needed during this stage to identify sources of pollution and gain more familiarity with conditions within the bounds of the AOI.
(4) **Develop Testable Hypothesis:** Define a testable hypothesis related back to the primary goals of the Targeted Human Waste Source Reduction Strategy and specific to targeted AOI. Develop basis for designing an effective investigation and selecting most appropriate source tracking and identification methods. The goal for any monitoring design would be to test the null hypothesis (e.g., that Catchment(s) X, Y, and Z are a source of human fecal contamination at a downstream impaired receiving water) and if the null hypothesis is rejected, to conclude with some level of confidence that the identified catchments are not a source of human fecal contamination
(5) **Develop HWSI Strategy for AOI:** Conduct HWSI in systematic manner to ensure temporal and spatial relevance, sufficient data collected for addressing testable hypotheses, and effective use of limited resources. Develop AOI-specific Monitoring Plans.

(6) **Implement the HWSI:** Conduct HWSI activities in accordance with HWSI strategy and AOI Monitoring Plan.

If a source is clearly identified, the next step is to conduct the recommended source abatement. If the results are inconclusive, the monitoring plan will be adapted and reimplemented.

While HF183 is one of the key tools in human waste source investigations, AOI-specific monitoring plans will use resources as appropriate from a toolbox with a range of methods and techniques used to identify sources of human waste. Monitoring plans will select resources that complement each other in a cost-effective manner based on initial characterization of the AOI. Available tools include physical, bacterial, viral, and chemical markers such as the following:

| Physical Markers | Bacterial Markers | Viral Markers | Chemical Markers |
|---|---|---|---|
| - Dye Testing<br>- Smoke Testing<br>- CCTV<br>- Electroscan Technology<br>- Flow-paced Sampling<br>- GIS<br>- Canine Scent Tracking | - Fecal Indicator Bacteria (FIB)<br>- Human-Specific Bacterial Markers (e.g., HF183, HumM2)<br>- Human Fecal Score (average HF183 gene in water samples)<br>- Microbial Community Analysis (includes community fingerprinting, microarrays, and DNA sequencing) | - Coliphage<br>- Adenovirus<br>- Polyomavirus | - Caffeine<br>- Cotinine<br>- Optical Brighteners<br>- Fecal Sterols |

If recycled water is used within the AOI, analytical results from the HF183 assay may yield false positives, since the current HF183 assays are predictive of all DNA material in the sample, regardless of treatment and subsequent viability of the target organisms (Urban Water Resources Research Council 2014; Aslan, et al. 2013; Nocker et al. 2006; Bae et al. 2009). Therefore, specificity should be confirmed by testing reference fecal pollution (e.g., raw sewage, aged sewage) and sources of treated wastewater (i.e., secondary and tertiary) in the watershed. Additional chemical indicators, such as caffeine, should also be sampled where recycled water is present to provide an additional line of evidence regarding the presence/absence of human fecal contamination.

**Source Abatement** - implements human waste control actions based on the findings of source identification monitoring. Abatement strategies will be tailored in different locations based on the identified sources. Example abatement strategies associated with potential sources identified are highlighted as follows:

| Source Type | Abatement Recommendation |
|---|---|
| Malfunctioning wastewater, water, or recycled water infrastructure | Maintain, repair, or replace the infrastructure |
| Homeless Encampments | Coordinate with appropriate city departments and latest legal policy for allowable actions. Removal of trash and debris. Increase public sanitation facilities. |
| SSOs | Repair of emergent cause and maintenance and/or repair to limit recurrence |
| FOG Impacts | Education and issue notice of violation |
| Illicit connection/illicit discharge | Education, issue notice of violation, and removal of connection |
| Illegal dumping | Education, issue notice of violation, and clean spill area |

**Performance Monitoring -** focuses on evaluating the impact/success of abatement activities for identified sources. Following source abatement, performance monitoring will be conducted to confirm the source(s) identified were eliminated or successfully mitigated through other means. Performance monitoring will generally be conducted within 3 to 12 months of abatement, depending on the source abated, and will primarily consist of collected *E. coli* and HF183 samples at the catchment outfall according to locations, timing, and frequency defined in the source investigations for comparability. An exception may be necessary to expand or change the analytical suite based on the type of corrective action implemented or to change the frequency or type of sample collection to confirm reductions.

# ATTACHMENTS FOR SECTION 2.4:

# Details

The City of Bellflower
*Families. Businesses. Futures.*
16600 Civic Center Drive, Bellflower, CA 90706
Tel 562.804.1424 Fax 562.925.8660 www.bellflower.org

July 29, 2022

Lower San Gabriel River
Watershed Area Steering Committee Members
Safe, Clean Water Program

**Re: Letter of Support for Safe, Clean Water Regional Program Scientific Study Proposal - Targeted Human Waste Source Reduction Strategy**

To Whom It May Concern:

The City of Bellflower (the "City") is writing in support of the proposal for scientific study funding under the Lower San Gabriel River Regional Programs of the Safe, Clean Water Program for the Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel (the "Scientific Study"). As part of the Los Cerritos Channel Watershed Management Group, the City believes development of the Scientific Study will provide an effective foundation to address pathogen health risk and help streamline efforts in our watersheds.

We have made significant progress in eliminating dry weather flows and reducing stormwater pollution to receiving waters in our watersheds, including the development of the Caruthers Park Stormwater and Urban Runoff Capture Project. However, addressing bacteria during wet weather remains one of the greatest challenges for stormwater Permittees. This is due to the ubiquitous nature of all kinds of bacteria and the limited effectiveness of stormwater treatment controls to permanently remove bacteria from the environment. Our primary goal as stormwater managers is to reduce bacteria carried through our system that otherwise would pose a public health risk in our waterbodies.

The proposed Scientific Study will help us establish a feasible framework for the Los Cerritos Channel Watershed Management Group to guide and prioritize source identification and source abatement efforts, focusing on reducing sources of human waste, which are more likely to carry pathogens contributing to recreators getting sick. This provides the most effective pathway towards improved public health that incorporates significant advances in the state of the science. The Scientific Study will utilize a data-driven approach to identify efficient and effective implementation actions for our City and progress towards achieving bacteria-related objectives.

We understand the annual consideration for funding under the Stormwater Investment Plans (SIPs) must balance the objectives of the Safe, Clean Water Program across many proposed studies and projects. The Scientific Study not only achieves many of these objectives but will also help offset more costly, and potentially less effective relative to bacteria reductions, structural projects, allowing the SIP to support the highest priority projects.

On behalf of the City, I respectfully encourage you to consider the Scientific Study for inclusion in the Fiscal Year 2023/2024 SIP for the Lower San Gabriel River Watershed Area. Should you have any questions, you may contact me at 562-804-1424, extension 2217 or at lgorecki@bellflower.org.

Sincerely,

Len Gorecki
Assistant City Manager/Director of Public Works

PARAMOUNT
THE CITY
*Safe, Healthy, and Attractive*

July 29, 2022

Lower San Gabriel River
Watershed Area Steering Committee Members
Safe, Clean Water Program

**Subject: Letter of Support for Safe, Clean Water Regional Program Scientific Study Proposal**

To Whom It May Concern:

The City of Paramount is writing in support of this proposal for Scientific Study funding under the Lower San Gabriel River Regional Programs of the Safe, Clean Water Program. As part of the Los Cerritos Channel Watershed Management Group, the City believes development of the Targeted Human Waste Source Reduction Strategy will provide an effective foundation to address pathogen health risk and help streamline efforts in our watersheds. We have made significant progress in eliminating dry weather flows and reducing stormwater pollution to receiving waters in our watersheds. However, addressing bacteria during wet weather remains one of the greatest challenges for stormwater Permittees. This is due to the ubiquitous nature of all kinds of bacteria and the limited effectiveness of stormwater treatment controls to permanently remove bacteria from the environment. Our primary goal as stormwater managers is to reduce bacteria carried through our system that otherwise would pose a public health risk in our waterbodies.

The proposed study will help establish a feasible framework for the Los Cerritos Channel Watershed Management Group to guide and prioritize source identification and source abatement efforts, focusing on reducing sources of human waste, which are more likely to carry pathogens. This provides the most effective pathway towards improved public health that incorporates significant advances in the state of the science. This scientific study will utilize a data-driven approach to identify efficient and effective implementation actions for our City and progress towards achieving bacteria-related objectives.

We understand the annual consideration for funding under the Stormwater Investment Plans (SIPs) must balance the objectives of the Safe, Clean Water Program across many proposed studies and projects. The Targeted Human Waste Source Reduction Strategy not only achieves many of these objectives but will also help offset more costly, and potentially less effective relative to bacteria reductions, structural projects, allowing the SIP to support the highest priority projects.

On behalf of the City, I respectfully encourage you to consider this Scientific Study for inclusion in the Fiscal Year 2023/2024 SIP for the Lower San Gabriel River Watershed Area. Should you have any questions, you may contact me at (562)220-2100 or via email at afigueroa@paramountcity.com.

CITY OF PARAMOUNT

Adriana Figueroa
Public Works Director

July 29, 2022

Lower San Gabriel River
Watershed Area Steering Committee Members
Safe, Clean Water Program

**Subject: Letter of Support for Safe, Clean Water Regional Program Scientific Study Proposal**

To Whom It May Concern:

The City of Lakewood is writing in support of this proposal for Scientific Study funding under the Lower San Gabriel River Regional Programs of the Safe, Clean Water Program. As part of the Los Cerritos Channel Watershed Management Group, the City believes development of the Targeted Human Waste Source Reduction Strategy will provide an effective foundation to address pathogen health risk and help streamline efforts in our watersheds. We have made significant progress in eliminating dry weather flows and reducing stormwater pollution to receiving waters in our watersheds. However, addressing bacteria during wet weather remains one of the greatest challenges for stormwater Permittees. This is due to the ubiquitous nature of all kinds of bacteria and the limited effectiveness of stormwater treatment controls to permanently remove bacteria from the environment. Our primary goal as stormwater managers is to reduce bacteria carried through our system that otherwise would pose a public health risk in our waterbodies.

The proposed study will help us establish a feasible framework for the Los Cerritos Channel Watershed Management Group to guide and prioritize source identification and source abatement efforts, focusing on reducing sources of human waste, which are more likely to carry pathogens contributing to recreators getting sick. This provides the most effective pathway towards improved public health that incorporates significant advances in the state of the science. This scientific study will utilize a data-driven approach to identify efficient and effective implementation actions for our City and progress towards achieving bacteria-related objectives.

We understand the annual consideration for funding under the Stormwater Investment Plans (SIPs) must balance the objectives of the Safe, Clean Water Program across many proposed studies and projects. The Targeted Human Waste Source Reduction Strategy not only achieves many of these objectives but will also help offset more costly, and potentially less effective relative to bacteria reductions, structural projects, allowing the SIP to support the highest priority projects.

On behalf of the City, I respectfully encourage you to consider this Scientific Study for inclusion in the Fiscal Year 2023/2024 SIP for the Lower San Gabriel River Watershed Area. Should you have any questions, you may contact me at (562) 866-9771 ext. 2500 or kpickler@lakewoodcity.org.

Sincerely,

Kelli Pickler
Director of Public Works

16401 Paramount Boulevard
Paramount, CA 90723
562.663.6850 phone
562-634-8216 fax



*Los Angeles Gateway Region*
*Integrated Regional Water Management*
*Joint Powers Authority*

July 29, 2022

Lower San Gabriel River
Watershed Area Steering Committee Members
Safe, Clean Water Program

**Subject: Letter of Support for Safe, Clean Water Regional Program Scientific Study Proposal**

To Whom It May Concern:

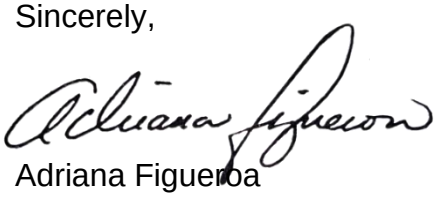
Gateway Water Management Authority (GWMA) is writing in support of this proposal for Scientific Study funding under the Lower San Gabriel River Regional Programs of the Safe, Clean Water Program. As the fiduciary agency for the Los Cerritos Channel Watershed Management Group, we believe development of the Targeted Human Waste Source Reduction Strategy will provide an effective foundation to address pathogen health risk and help streamline efforts in our watersheds. We have made significant progress in eliminating dry weather flows and reducing stormwater pollution to receiving waters in our watersheds. However, addressing bacteria during wet weather remains one of the greatest challenges for stormwater Permittees. This is due to the ubiquitous nature of all kinds of bacteria and the limited effectiveness of stormwater treatment controls to permanently remove bacteria from the environment. Our primary goal as stormwater managers is to reduce bacteria carried through our system that otherwise would pose a public health risk in our waterbodies.

The proposed study will help establish a feasible framework for the Los Cerritos Channel Watershed Management Group to guide and prioritize source identification and source abatement efforts, focusing on reducing sources of human waste, which are more likely to carry pathogens. This provides the most effective pathway towards improved public health that incorporates significant advances in the state of the science. This scientific study will utilize a data-driven approach to identify efficient and effective implementation actions for our region and progress towards achieving bacteria-related objectives.

We understand the annual consideration for funding under the Stormwater Investment Plans (SIPs) must balance the objectives of the Safe, Clean Water Program across many proposed studies and projects. The Targeted Human Waste Source Reduction Strategy not only achieves many of these objectives but will also help offset more costly, and potentially less effective relative to bacteria reductions, structural projects, allowing the SIP to support the highest priority projects.

On behalf of the Gateway Water Management Authority, I respectfully encourage you to consider this Scientific Study for inclusion in the Fiscal Year 2023/2024 SIP for the Lower San Gabriel River Watershed Area. Should you have any questions, you may contact Ms. Grace J. Kast, GWMA's Executive Officer, at (626) 485-0338 or via email at gracekast.gateway@gateway.com.

Sincerely,



Adriana Figueroa
GWMA Chair

Richard Watson & Associates, Inc.
Urban Planning & Stormwater Quality

July 30, 2022

Lower San Gabriel River
Watershed Area Steering Committee
Safe, Clean Water Program

**Subject: Support for Scientific Study: Targeted Human Waste Source Reduction Strategy to Address Bacteria-Related Compliance Objectives for the Los Cerritos Channel**

**Dear Steering Committee Members:**

I am writing as the consultant to the Los Cerritos Channel Watershed Group to inform the WASC that the Watershed Group, after discussion of the proposed scientific study during two meetings, voted on July 21, 2022, to support submission of the proposal for funding under the Regional Program Safe Clean Water Program. Members of the Watershed Group asked probing questions of the project proponent, Craftwater Engineering, and answers to the questions resulted in the vote to support the submission to the WASC.

The Watershed Group hopes to benefit from what has been learned in a similar project already under way in the Upper Los Angles River Watershed Area. The Los Cerritos Channel project will contribute to the Watershed Group's focus on the riskiest sources of pathogens that cause illness to recreators in inland and ocean waters – human wastes. Together with the Watershed's monitoring of HF 183 – Human Bacteroides; Bacteriophage, MS2, and Bacteriophage, Somatic; and the results of the Regional Pathogen Reduction Study, this study will help the Watershed to better address bacteria, viruses, and other pathogens in stormwater that can and do cause human illnesses.

The Watershed Group has made great progress in reducing the discharge of pathogens to the estuary in dry weather by reducing discharges near the mouth of the channel from an average of 2.18 cfs to an average of 0.2 cfs, largely through outdoor water conservation and the construction of water capture projects. However, it is currently almost impossible to meet water quality standards in wet weather, and this proposed scientific study focuses on wet weather. The emphasis on source identification and source abatement will help move the watershed toward compliance with water quality standards.

I am convinced that the results of this study will also be valuable to other members of the San Gabriel River Watershed Area.

Sincerely,

Richard A. Watson

RICHARD A. WATSON
President, Richard Watson & Associates, Inc. (RWA)

# ATTACHMENTS FOR SECTION 3:

# Outcomes

# ATTACHMENTS FOR SECTION 4:

# Background

ULAR

# ADAPTATION TO THE LOAD REDUCTION STRATEGY

**Presented to** *Los Angeles Regional Water Quality Control Board*
**Submitted by** *Upper Los Angeles River Watershed Management Group*

**August 2021**

# UPPER LOS ANGELES RIVER: LOAD REDUCTION STRATEGY ADAPTATION PLAN

August 2, 2021

PRESENTED TO

**Los Angeles Regional Water Quality Control Board**

PRESENTED BY

**Upper Los Angeles River Watershed Management Group**

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# CONTENTS

## Figures



## Tables

# ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AOI | Area of Investigation |
| BMP | Best Management Practice |
| BSI | Bacteria Source Identification |
| CCTV | close-circuit television |
| Cfs | cubic feet per second |
| cfu | colony forming unit |
| CHWSRS | Comprehensive Human Waste Source Reduction Strategy |
| CIMP | Coordinated Integrated Monitoring Program |
| CIWQS | California Integrated Water Quality System |
| CREST | Cleaner Rivers through Effective Stakeholder-led TMDLs |
| *E. coli* | *Escherichia coli* |
| FIB | Fecal Indicator Bacteria |
| FOG | Fats, Oils, and Grease |
| GI | Gastrointestinal Illness |
| GIS | Geographic Information System |
| GM | Geometric Mean |
| HWSI | human waste source investigation |
| IC/ID | Illicit Connections/Illicit Discharges |
| LACPW | Los Angeles County Public Works |
| LACFCD | Los Angeles County Flood Control District |
| LARWMP | Los Angeles River Watershed Monitoring Program |
| LARWQCB | Los Angeles Regional Water Quality Control Board |
| LFD | Low Flow Diversion |
| LRS | Load Reduction Strategy |
| MS4 | Municipal Separate Storm Sewer System |
| MST | Microbial Source Tracking |
| NPDES | National Pollutant Discharge Elimination System |
| QAPP | Quality Assurance Program Plan |
| QMRA | Quantitative Microbial Risk Assessment |
| REC-1 | Water Contact Recreation Beneficial Use |
| RV | Recreational Vehicle |
| RWQC | Recreational Water Quality Criteria |
| SAP | Sampling and Analysis Plan |
| SHS | Surfer Health Study |
| SSM | Single Sample Maximum |
| SSMP | sewer system management plans |
| SSO | Sanitary Sewer Overflows |
| STV | Statistical Threshold Value |
| SWRCB | State Water Resources Control Board |
| TMDL | Total Maximum Daily Load |
| ULAR | Upper Los Angeles River |
| USEPA | United States Environmental Protection Agency |
| WDR | Waste Discharge Requirements |
| WMA | Watershed Management Area |
| WWTP | Wastewater Treatment Plant |

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# 1 INTRODUCTION

The Upper Los Angeles River Watershed Management Group (Group) has developed this Load Reduction Strategy (LRS) Adaptation Plan to address the challenges encountered during implementation of the LRS and adapt towards a more efficient and effective strategy to address the Los Angeles River Bacteria TMDL (Bacteria TMDL).

## 1.1 Purpose

The LRS Adaptation Plan (Plan) was developed to guide the Group's efforts under the LRS, addressing the Bacteria TMDL, that better protect public health and support recreational beneficial use goals. The Bacteria TMDL was initially developed to protect the recreational beneficial uses in receiving waterbodies by establishing water quality objectives for fecal indicator bacteria (FIB) protective of human health. Although elevated concentrations of traditional FIB, may indicate a higher potential for human health risks, it is exposure to pathogens (microorganisms known to cause disease) that can cause illness in recreational water users and threaten or impair beneficial uses, see Section 1.3 for specific studies on this finding. Human waste typically contains a higher concentration of pathogens, as compared to other sources. Higher concentrations of pathogens in receiving waters increases the risk of gastrointestinal illness (GI) through recreational exposure.

This Plan provides an effective framework to address human health risk from pathogen exposure, by focusing on eliminating sources of human waste to the municipal separate storm sewer system (MS4). The Plan helps to streamline efforts across the Upper Los Angeles River (ULAR) agencies and other stakeholders in the watershed. Recent advancements in the development of human markers and other diagnostic tools are incorporated as well as an enhanced focus on targeted source control efforts. Focusing on reducing the sources of human waste maximizes the efficient use of limited resources and results in significant long-term pathogen reduction benefits.

## 1.2 Load Reduction Strategy Background

The Group has been pursuing the LRS to address the Bacteria TMDL as a compliance pathway to demonstrate attainment with the TMDL waste load allocations. The LRS includes a phased approach towards compliance, based on prioritization of Los Angeles River segments and tributaries. The TMDL prioritized 16 segments and tributaries, for the Group to conduct: (1) Phase I screening, (2) Phase I monitoring and follow-up, (3) implementation actions to control bacteria, and (4) submittal of the LRS. If bacteria exceedances continued based on follow up screening and monitoring, following implementation actions, Phase II would be initiated to determine additional actions and revise the LRS.

The Group is a responsible party for the five segments and eleven tributaries shown in Table 1-1. The LRS efforts have catalogued or screened 2,359 outfalls throughout the ULAR region. An LRS has been submitted for five of the 16 prioritized segments and tributaries, including Arroyo Seco, Compton Creek, Rio Hondo, Segment B and Segment E. In these five segments and tributaries, screening data and modeling were utilized to evaluate *E. coli* loading rates from outfalls and endogenous generation within the receiving waters then prioritize implementation actions based on these loading rates. Monte Carlo modeling was used to identify priority and outlier outfalls, which were defined as follows:

> ***Priority Outfalls:*** Outfalls with the highest loading rates of *E. coli* and consistent, problematic discharges.
>
> ***Outlier Outfalls:*** Outfalls with episodic, high loading rate *E. coli* discharges.

The priority and outlier outfalls are those for which to apply implementation actions. The Group has successfully completed two projects, constructing low flow diversions for Priority Outfalls R2-A and R2-K for Segment B, as well as developing extensive project planning and designs. However, the TMDL focused solely on water quality objectives, while the original LRS approach focused solely on *E. coli* loading rates at outfalls and neither considered potential sources, the feasibility of implementation actions, and the hydraulic connectivity to receiving waters that support the recreational beneficial use. The Group encountered numerous feasibility challenges pursuing LRS implementation, including inconclusive source investigations, unforeseen soil contamination issues, mitigation of road and traffic issues, funding challenges, and other site constraints.

Table 1-1. LRS Segments and Tributaries for the ULAR Group and Bacterial TMDL Deadlines for Submission.

| LA River Segment | Mainstem or Tributary | TMDL Date for LRS Submittal |
|---|---|---|
| Segment B | Mainstem LA River | September 2014 |
| | Arroyo Seco and Rio Hondo | March 2016 |
| Segment A | Compton Creek | March 2018 |
| Segment E | Mainstem LA River | September 2017 |
| | Dry Canyon, McCoy Canyon, Bell Creek and Aliso Canyon Wash | September 2021 |
| Segment C | Mainstem LA River | September 2023 |
| | Tujunga Wash, Burbank Western Channel and Verdugo Wash | September 2023 |
| Segment D | Mainstem LA River | September 2023 |
| | Bull Creek | September 2023 |

Given the narrowed focus of the original LRS approach, the challenges the Group has encountered, as well as the ongoing discussion in the region regarding cost-effective strategies to address recreational human health risk (which is the driver behind the Bacteria TMDL) the Group developed this Adaptation Plan that applies substantially more information and guidance towards an effective and feasible strategy.

## 1.3 Regulatory and Scientific Context

The Bacteria TMDL was adopted by the Los Angeles Regional Water Quality Control Board (LARWQCB) in 2010 and became effective on March 23, 2012. The TMDL was originally based on work under the Cleaner Rivers through Effective Stakeholder-led TMDLs (CREST) stakeholder group, that studied dry weather MS4 inputs to the Los Angeles River, established reference conditions, and developed a dry weather implementation plan. Since then, significant advancements have occurred in the state of the science and understanding of threats to the recreational beneficial use caused by bacteria. The following sections highlight key regulatory and scientific advancements, that have guided the development of the LRS Adaptation. Since September 2019, the Group has met with the Regional Board staff to discuss the intent and approach of the LRS Adaptation on four occasions without dissension.

### 1.3.1 2012 USEPA Recreational Water Quality Criteria Recommendations

In 2012, USEPA adopted nationwide Recreational Water Quality Criteria (RWQC) in an effort to better protect public health and improve consistency (USEPA 2012). Specifically, USEPA recommended for states to adopt one

of two numeric threshold values for illness rates: 36 excess illnesses per 1,000 recreators or 32 excess illnesses per 1,000 recreators, which were shown to be equally protective of the primary contact recreation designated use. Additionally, the RWQC recommended the use of either *Enterococci* or *E.coli* as indicators of fecal or pathogen contamination in freshwaters, and the use of only *Enterococci* as an indicator in marine waters. In making these recommendations to the states, USEPA explained these criteria do not take into account different sources of fecal contamination, believing that the science had not yet developed sufficiently to distinguish between human and non-human sources of fecal contamination (USEPA 2012), or apparently endogenous replication of FIB. However, USEPA recognized that some locations could have water quality characteristics that differ from those which the RWQC were based on (e.g. waterbodies impacted by treated wastewater effluent). Recognizing that various scientific studies indicate non-human sources of fecal contamination can pose less risk than human sources, USEPA provided flexibility so that states could address their waterbodies on a human health risk basis.

The sources of fecal contamination in Southern California recreational waters is typically different than those studied in the epidemiological studies that underpin the USEPA 2012 RWQC recommendations (i.e. those studies were generally carried out in waters impacted by secondary treated and disinfected wastewater effluent, whereas recreational waters in Southern California are impacted by other sources including non-point sources).

### 1.3.2 California Primary Contact Recreation Water Quality Objectives

States were required to adopt USEPA's 2012 RWQC recommendations, Table 1-2, into their respective state water quality standards. Table 1-2 denotes the translation from estimated illness rates to concentration thresholds for FIB. Accordingly, the SWRCB adopted California's Bacteria Provisions, selecting the 32 illnesses per 1,000 recreators threshold and revised its bacteria standards in Resolution No. 2018-0038 on August 7, 2018. The Resolution accomplished two things: (1) it protected Water Contact Recreation (REC-1) waters by revising state WQOs in the Bacteria Provisions of Part 3 of the Water Quality Control Plan of the Inland Surface Waters, Enclosed Bays and Estuaries of California (ISWEBE Plan), and (2) it maintained the fecal coliform objective contained in the existing Water Quality Control Plan for Ocean Waters of California (Ocean Plan) (SWRCB 2018). In the accompanying staff report, the SWRCB noted that while indicator bacteria are used as an indicator of fecal contamination, the actual risk to human health is caused by pathogenic microorganisms known to cause disease (SWRCB 2018). With the SWRCB's adoption of USEPA's 2012 RWQC in 2018, the Bacteria Provisions provide for consistent implementation of the new criteria on a statewide basis for waters designated with the REC-1 beneficial use. The LARWQCB amended the Los Angeles Region Basin Plan on February 13, 2020 through Resolution No. R20-001, to update the bacteria objectives for fresh, estuarine and marine waters designated for water contact recreation, based on the Statewide Bacteria Provisions.

Table 1-2. USEPA 2012 RWQC

| Applicable Waters | Objective Elements | Estimated Illness Rate 32 per 1,000 water contact recreators | |
|---|---|---|---|
| | | Magnitude | |
| | Indicator | GM (cfu/100 mL) | STV (cfu/100 mL) |
| All waters where the salinity is equal to or less than 1 ppt 95 percent or more of the time | *E. coli* | 100 | 320 |
| All waters where the salinity is greater than 1 ppt more than 5 percent of the time | *Enterococci* | 30 | 110 |
| Ocean Waters | *Enterococci* | 30 | 110 |
| | Fecal coliform density | 200 | 400 |

cfu = colony forming unit
GM = geometric mean
STV = statistical threshold value
SSM = single sample maximum

### 1.3.3 Scientific Advancements

Even though FIB rarely cause illness and they are ubiquitous in the environment, studies sometimes show a correlation between their presence in recreational waterbodies and GI in users of those waters, especially if the source is of human origin. Testing for pathogens may be more accurate, but measuring pathogens is an expensive and slow endeavor, as compared to analyses for FIB. When other sources are present, FIB measurements may include contributions from wild animals, birds, decaying vegetation, or biologically active surfaces, which may pose substantially less health risk than contributions from human sources (Soller et al. 2010). Speciation of bacteria through microbial source tracking (MST) studies has sometimes proven to be effective in identifying the relative contributions of bacteria from natural and anthropogenic sources in different waterbodies.

The move from FIB to human markers and other methods that correlate better with human health risk in Southern California has been motivated by recent scientific studies, which have revealed a greater understanding of the association between FIB and pathogens to actual human health risk.

One key special study was the surfer health study (SHS), conducted during the winters of 2013-14 and then again in 2014-15 by SCCWRP at Ocean and Tourmaline Beaches in San Diego, the goal of which was to measure illness rates among surfers exposed to bacteria during wet weather.

The SHS Quantitative Microbial Risk Assessment (QMRA) model was used to derive a human fecal marker (HF183) level in a manner that is consistent with the methodology that the USEPA used for deriving the 2012 RWQC. QMRA uses microbial measurements to determine where they can become a danger and estimates their risk to human health. Less expensive than an epidemiology study, risk models like QMRA can yield valuable risk assessment data by looking at the hazard posed by some microbes, the dose-response relationship, exposure, and finally a determination of human health risk. Based on the data collected under the SHS, the QMRA estimated an excess GI illness rate of 15 illnesses per 1,000 recreators for the conditions observed during the SHS. These results agree with the epidemiological component of the SHS, which reported an excess GI illness

rate of 12 illnesses per 1,000 recreators. Through a series of numerical simulations and calculations, it was determined that a median value of 250 copies per 100 mL with a 90th percentile of 2,655 copies per 100 ml corresponds to 15 excess GI illnesses per 1,000 surfers, respectively during wet weather.

The SHS study confirmed the need to differentiate between sources of fecal contamination. This resulted in a number of MST studies that were conducted in recent years in Southern California to identify human and non-human sources of fecal pollution in several waterbodies. The MST studies that have been conducted in the region, are ongoing, or are planned in the future will provide beneficial information on the sources of fecal contamination and will help inform implementation of this Plan. The Southern California Bight Regional Monitoring Program has been advancing the use of quantitative polymerase chain reaction (qPCR) in recreational water quality monitoring. Its studies have shown that qPCR methods result in a more rapid measurement of FIB and can be used to identify sources of fecal contamination (SCCWRP 2017). Bight monitoring also included the collection of human marker data.

SCCWRP has also developed a Microbial Community Analysis (MCA) approach that is intended to provide information about the entire microbial community present in a sample. Using community fingerprinting, microarrays, and next generation DNA sequencing, MCAs could be created and used to match patterns to determine fecal sources and other microbial data. While MCAs are expensive, its potential to identify microbial sources is valuable and generally infeasible with single-marker methods.

A number of other scientific studies are ongoing (e.g., San Diego River Investigative Order) that may lead to advancements in the understanding of the contribution of bacteria and pathogens from human sources. Laboratory methods are constantly being refined to improve the detection of human markers and pathogens, as well as develop new indicators (e.g., coliphage) that may provide additional tools that can be used in the future to help identify sources of human waste. USEPA and other organizations are striving to review and update these methods in order to provide guidance on their application. The South Orange County MS4 Permittees and the City of San Diego are implementing similar approaches as the LRS Adaptation to address the bacteria issues in their regions through respective Comprehensive Human Waste Source Reduction Strategies (CHWSRS).

Given the lessons learned since development of the original LRS, plus the significant regulatory and scientific advancements in the approach to addressing bacteria-related issues, the Group elected to pursue this adaptation of the existing LRS. The adaptation approach and implementation, leveraging these lessons learned and advancements, are detailed in the following sections.

# 2 ADAPTATION APPROACH

The core elements of the Adaptation include the following:

- Incorporation of existing data gathered through the LRS and other related programs to reprioritize areas of concern to focus implementation actions;
- Identification of data gaps and additional monitoring needs, including monitoring locations and parameters, such as additional analyses for human markers and specific source identification monitoring; and
- Within areas of concern, identification of the most effective abatement efforts, focused on source control and feasible/effective locations for structural BMPs and dry weather controls designed to provide multiple benefits.

To implement these elements, the Plan orients around six key steps (Figure 2-1):

1) Assessment of Receiving Water Quality Conditions
    - Impaired receiving waters for bacteria are assessed based on available water quality data. If conditions are meeting applicable water quality objectives, catchments draining to the receiving water are considered a low priority.
2) Upstream Assessment of Outfall Water Quality Conditions
    - Similar assessment of outfalls based on available water quality data. If conditions are meeting applicable water quality objectives, catchments draining to the outfall are considered a low priority. Additionally, assess connectivity of the MS4 network to receiving waters, where areas eventually draining to and potentially impacting impaired receiving waters are the focus for prioritization and subsequent investigation and abatement activities.
3) Catchment Prioritization
    - Prioritize upstream catchments based on (1) and (2), potential sources of human waste, and other factors related to the potential impact each catchment may have on water quality conditions in impaired receiving waters. Inform follow-up steps (4) and (5).
4) Source Identification Monitoring
    - Based on the results of (1) – (3) confirm highest priority catchments that may contribute to receiving water impairments through collection of additional receiving water and outfall monitoring data. Identify additional monitoring needs to locate sources within priority areas and guide abatement activities in step (5).
5) Source Abatement and Implementation Actions
    - Implement human waste control actions based on the findings of (4), tailored in different locations based on identified sources. Where necessary, site feasible projects to effectively reduce priority catchments contribution to receiving water impairments.
6) Performance Monitoring
    - Evaluate impact/success of abatement activities. Monitoring to confirm the source(s) identified were eliminated or successfully mitigated.

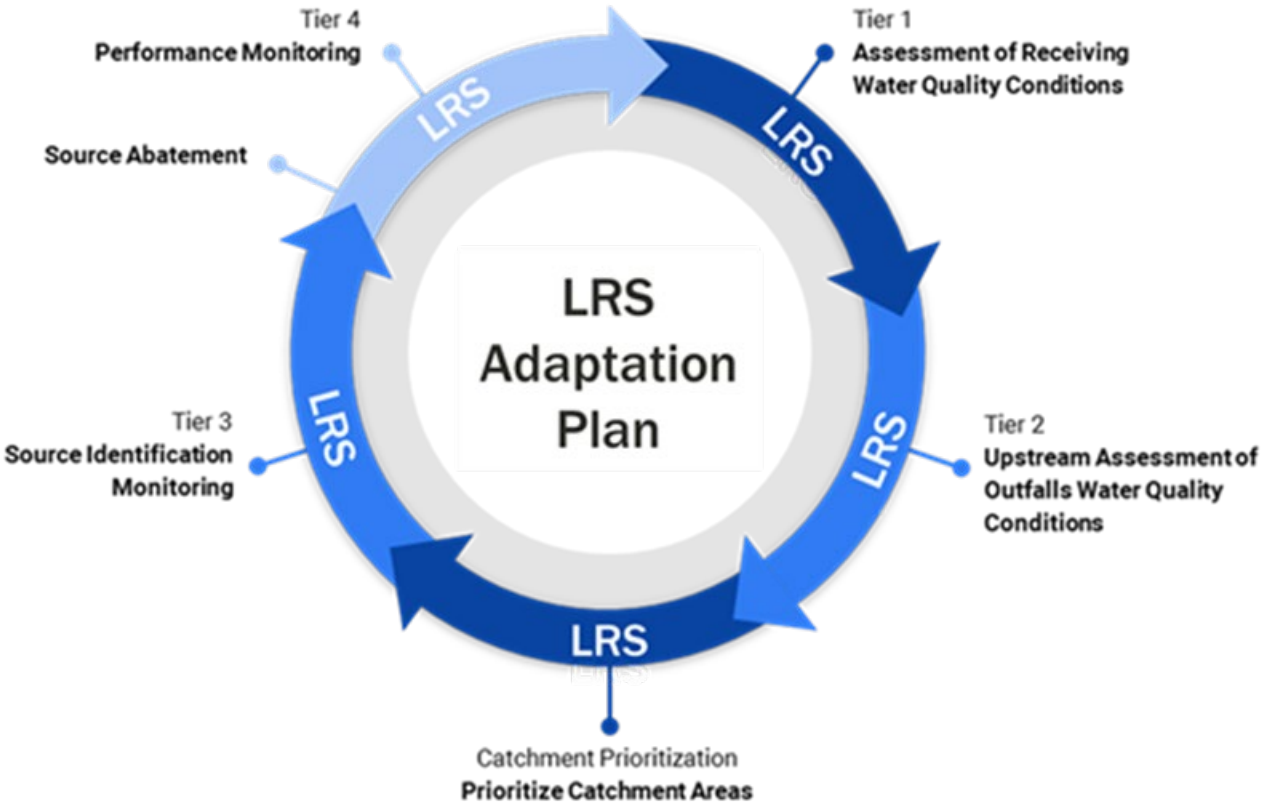


Figure 2-1. LRS Adaptation Plan Steps

## 2.1 Water Quality Condition Assessments

To assess the water quality conditions in the receiving waters and at outfalls (Steps 1 and 2) water quality data within the ULAR watershed was compiled and analyzed. Table 2-1 summarizes the data sources. Data was analyzed separately under dry and wet weather conditions. If the weather conditions were not already designated in the data provided, rainfall records at the Los Angeles County Department of Public Works rain gauge number 375 at the University of Southern California were used to denote wet versus dry weather conditions.

Table 2-1. Data Sources for the Receiving Water and Outfall Water Quality Condition Assessments.

| Data Source | | Period |
|---|---|---|
| Coordinated Integrated Monitoring Program (CIMP) | | 2015 – 2020 |
| Outfall Screenings | Bacteria Source Identification (BSI Study) | 2008 |
| | Rio Hondo and Arroyo Seco LRS | 2015 |
| | CIMP Data (includes multiple segments and tributaries) | 2014 – 2016; 2018 - 2020 |
| City of Los Angeles' Status and Trends Monitoring Program | | 2001 – 2009 |
| Los Angeles River Watershed Monitoring Program (LARWMP) | | 2009 - 2012 |
| LARWMP Recreational/Unregulated Swim Zones | | 2011 – 2019 |
| Water Reclamation Plant Monitoring and Reporting Programs | LA-Glendale | 2012 – 2019 |
| | Donald C. Tillman | 2011 – 2019 |
| | Burbank | 2012 - 2016 |

Most water quality data available in the ULAR watershed at both receiving waters and outfalls are *E. coli*. Therefore, the initial water quality condition assessments conducted for the LRS Adaptation Plan compared the receiving water and outfall *E. coli* data to the STV value established in the Statewide Bacteria Provisions for waters with salinity equal to or less than 1 part per thousand (ppth) 95 percent or more of the time, 320 cfu/100 mL. Across the full available dataset at each receiving water and outfall station the percent exceedance of the 320 cfu/100 mL established STV were calculated under dry and wet weather conditions. The results of the water quality assessments under dry and wet weather are presented in Figure 2-2 and Figure 2-3, respectively. Notably, no outfall bacteria-related water quality data was available in the watershed during wet weather. This data has not historically been collected; however, the Group is pursuing near-term strategic wet weather monitoring at outfalls to collect this data and further inform the wet weather prioritization and strategy. See Section 2.1.1 for additional details and Section 3.2 for the implementation schedule.

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

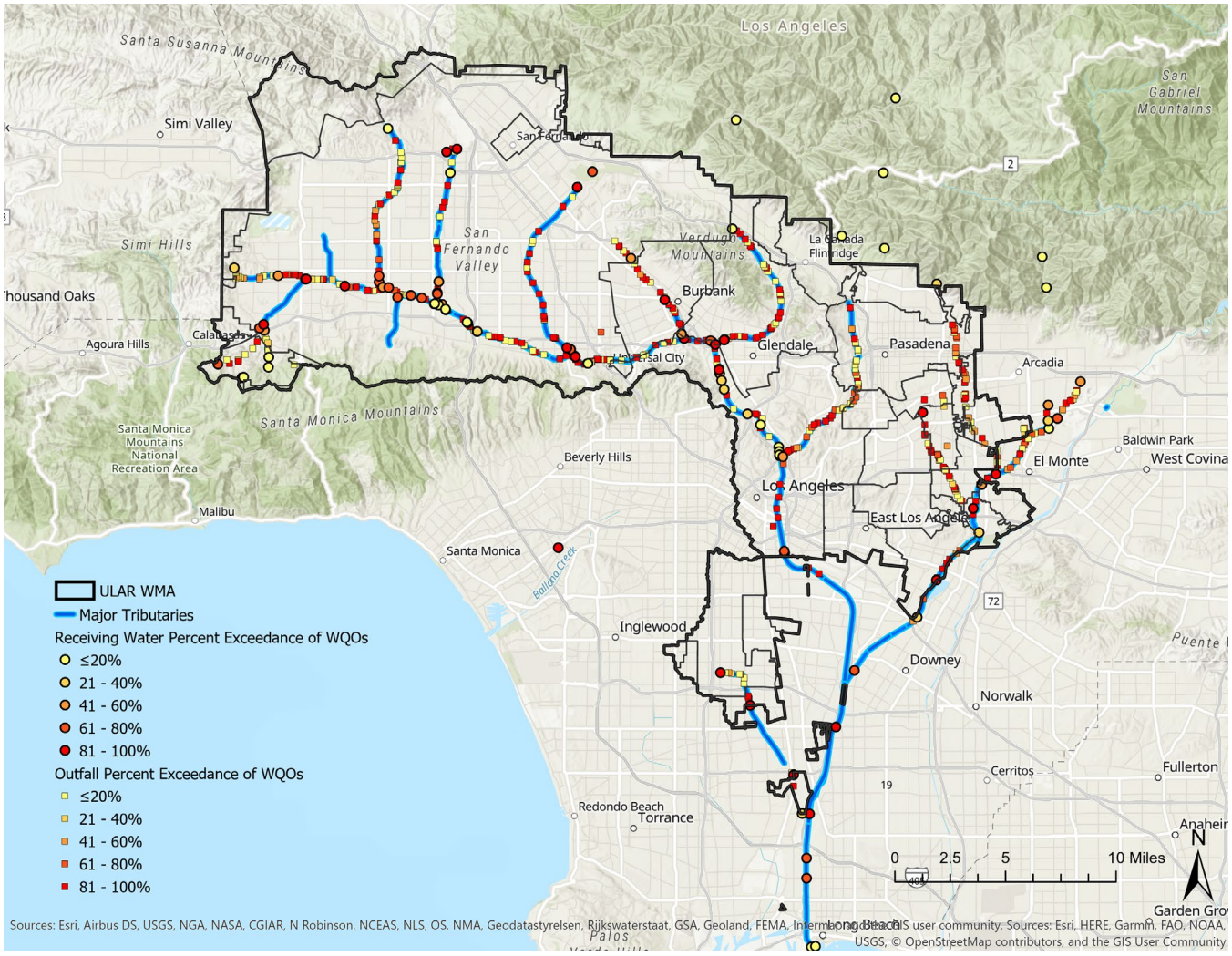


Figure 2-2. Percent Exceedance of WQOs at Receiving Water and Outfall Monitoring Sites during Dry Weather.

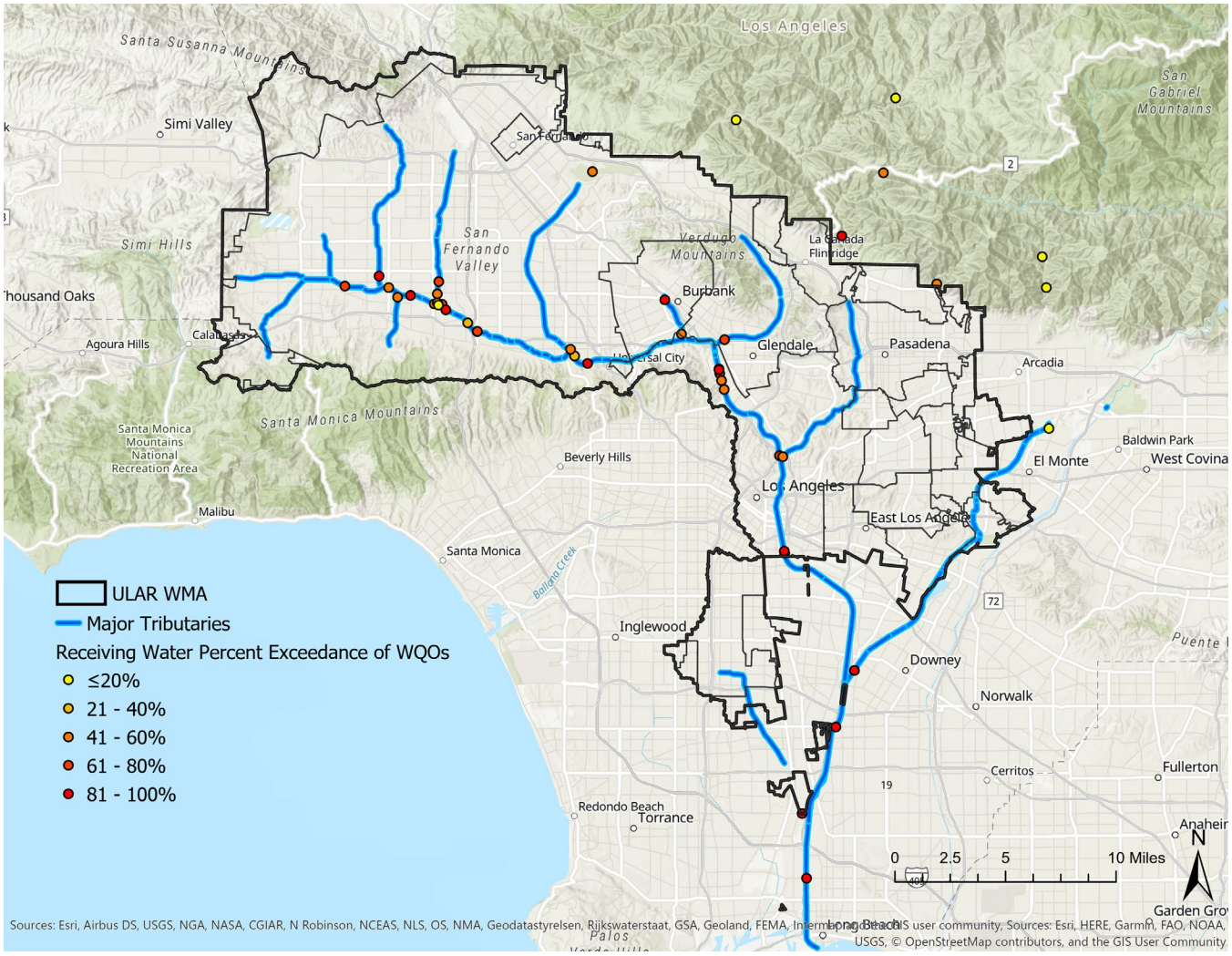


Figure 2-3. Percent Exceedance of WQOs at Receiving Water Monitoring Sites during Wet Weather.

### 2.1.1 Strategic Risk-Based Monitoring Program

The LRS Adaptation Plan framework described herein is intended to provide the Group with the ability to maximize limited resources across the WMA through the synthesis of available data (water quality and human source information) in order to prioritize catchments for further investigation and support REC-1 beneficial use attainment. While a significant amount of water quality data was available at the time of conducting the water quality assessments described above in Section 2.1, a primary data gap is the lack of paired FIB and HF183 data for receiving waters and outfalls proximal to REC-1 impaired segments. During development of the LRS Adaptation Plan, the agencies proactively collected preliminary paired FIB and HF183 data at three outfalls and associated upstream/downstream receiving waters identified as priorities in the Segment B Mainstem, Arroyo Seco and Rio Hondo. This preliminary data collection is discussed further in Appendix A. These data types are critical to evaluating water quality conditions in receiving waters and determining if elevated concentrations exist that may impact human health risk levels. The collection of additional REC-1 impaired receiving water and outfall data in areas where data are limited would help to improve outfall catchment prioritization and inform

the targeting of source investigations. Based on this need, the Group will evaluate potential areas and identify select strategic locations for risk-based monitoring upon approval of this Plan.

The number of monitoring locations will be determined based on a review of recent water quality data and related information, the location and spatial extent of impaired reaches and associated drainages, and consideration of the presence of current and planned LRS projects. Sampling will also depend on the location of prioritized catchments and Areas of Investigation (AOIs), available funding, flow during dry weather, and other considerations. It is expected that this list of monitoring stations will evolve over time based on recommendations from the Group, as additional data is gathered and assessed, or due to changes in impairment status and LRS Adaptation priorities.

The duration of monitoring at a given location will be determined by the Group based on location-specific considerations but is generally expected to extend through a minimum of three years to determine trends. The monitoring results will be evaluated annually, and a site may be discontinued as needed (e.g., continued lack of flow) or remain active for a longer period. During the dry season, the selected locations will be sampled monthly for FIB and HF183, and during the wet season, at least three storm events will be targeted. Where possible, monitoring will leverage current ULAR WMA CIMP locations for efficiency, but will likely include additional locations. The Group will compile the monitoring results and use the data to refine the catchment prioritization presented in Section 2.2 through the adaptive management process and support future source investigations.

## 2.2 Catchment Prioritization

The foundation of the catchment prioritization starts with the outfall catchment delineations, which monitoring data are associated to and within which potential sources are evaluated. Catchments were delineated for monitored outfall stations, including from screening events for flow and sampling of bacteria-related data (Figure 2-4). A total of 1,982 catchments were delineated, with several having multiple outfalls. Select outfall drainage areas were previously developed in the Segment B mainstem, Segment E mainstem, Arroyo Seco, Compton Creek, and Rio Hondo for their respective LRS development. These outfall drainage areas were verified during the development of watershed-wide catchments.

To develop drainage areas to the outfalls monitored in the ULAR watersheds, automated GIS analysis was initially used due to the large number of data points. The primary data sources for drainage area delineations were the storm drain network and 5-foot Digital Elevation Model (DEM). Because drainage area delineation is sensitive to very small differences in data locations and data resolution in combining different datasets to perform this analysis, a sensitivity analysis was performed using a range of geospatial parameters to select the most plausible set of drainage areas for the various points of study in the region. Data for the locations of storm drains, open channels, and culverts was utilized to recondition the DEM in these locations and enforce flow both to them and along them on their way to outfalls and receiving waters. This method helps delineate drainage areas using surface elevations data along subsurface storm drains and is acceptable for use with storm drains because these generally follow the overall hydrologic contours of surface elevations. The reconditioned DEM was then filled to eliminate any internally draining areas and processed to determine flow direction and flow accumulation prior to watershed delineation.

It should be noted that the final accuracy of drainage areas is ultimately a reflection of the accuracy of the input data. The chosen set of drainage areas represents the most plausible across the region based on the data received. Manual inspections were conducted for select areas, mostly focused on previous priority and outlier outfalls identified to confirm the delineated drainage areas. Many of the drainage areas were consistent with

those previously provided. Where differences were noted, manual corrections were performed to ensure the most accurate representation was selected. As the LRS Adaptation process moves forward there are expected further refinements of these drainage areas based on additional manual inspections, field verification, and refinement of the MS4 network represented in the processing.

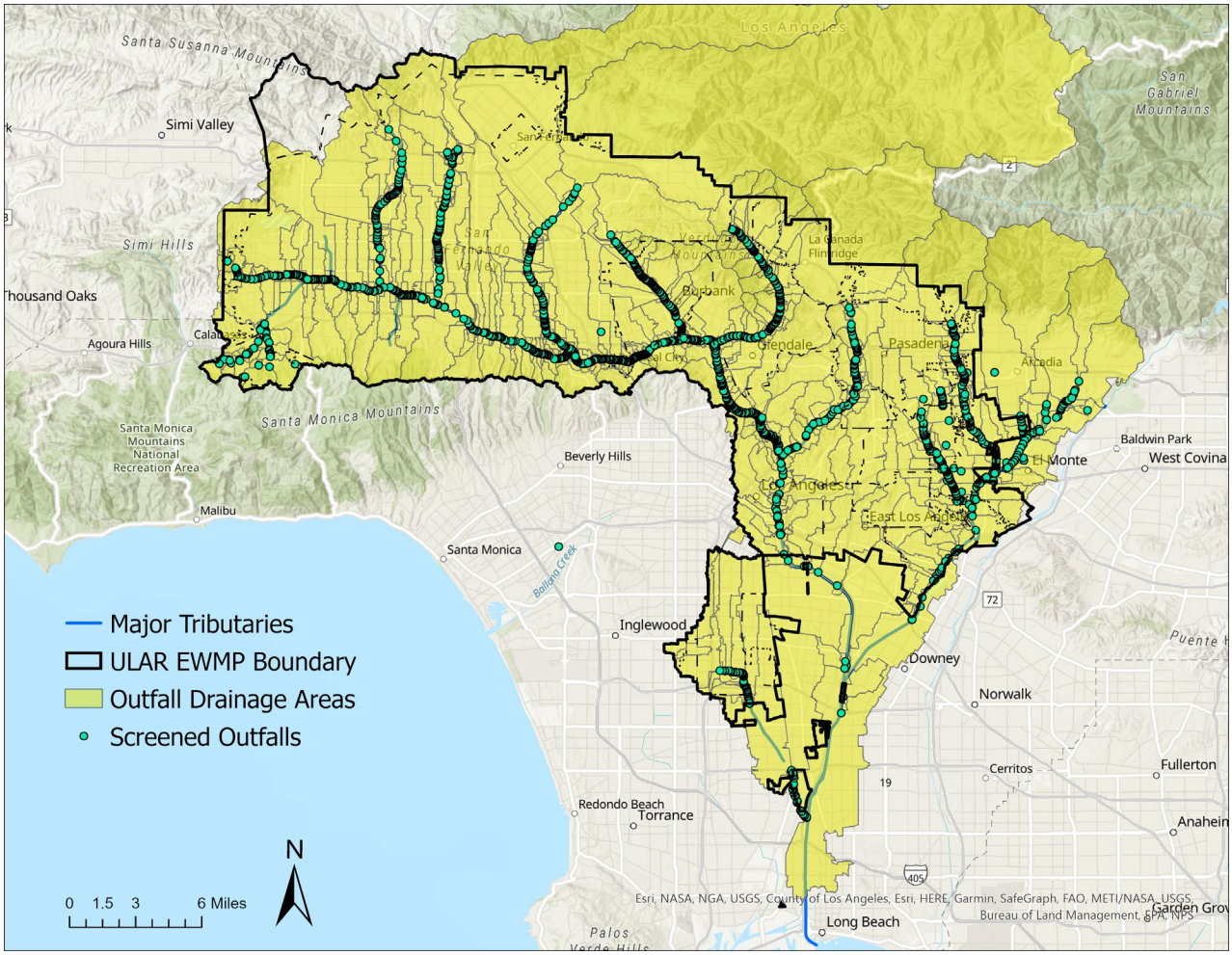


Figure 2-4. ULAR Outfall Catchment Delineations.

The catchment prioritization approach factors in the water quality conditions assessments discussed above in Section 2.1. Outfall water quality conditions assessments were assigned to the upstream outfall catchment area delineated. Receiving water stations were clustered where appropriate and water quality condition assessments were assigned to upstream outfall catchment areas for which they represent the most immediate downstream receiving water. From there, potential human sources within the catchment areas were evaluated and scored based on potential presence (Sections 2.2.1). The water quality condition assessments and source criteria scores were then combined to assign an initial priority category to each catchment (Section 0). Lastly, additional factors primarily influencing the hydraulic connectivity of a catchment area to the downstream receiving water were evaluated to finalize the priority category for each catchment (Section 2.2.3). Section 2.2.4 presents the results of this analysis, identifying the highest priority catchments based on all the above factors.

### 2.2.1 Potential Human Sources and Source Criteria Scoring

The vulnerability of a catchment to contribute pathogens through the MS4 and into receiving waters was evaluated in part by the potential presence of human sources in the catchment area. Figure 2-5 depicts potential sources of human waste investigated for the LRS Adaptation Plan. The available data sources for the different sources are summarized in Table 2-2 and the scoring used to evaluate the potential vulnerability of each source is summarized in Table 2-3.

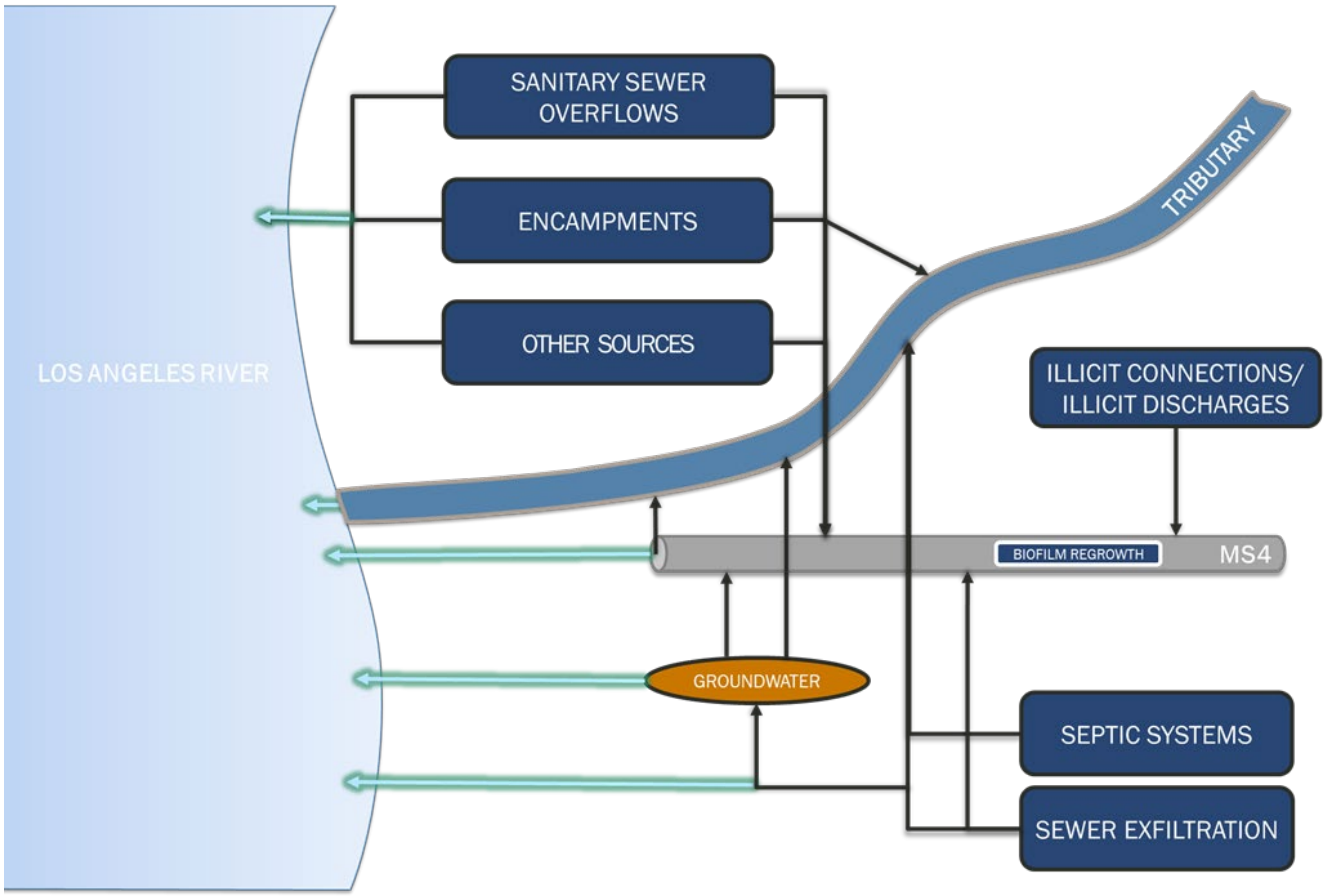


Figure 2-5. Potential Pathogen Sources and Transport Pathways.

Table 2-2. Available Data to Assess Potential Sources of Human Waste.

| Source Criteria | Available Data Sources |
|---|---|
| Sewer Exfiltration/MS4 Infiltration | Sewer GIS Layers<br>Sewer System Management Plans<br>Storm Drain Infrastructure GIS Layers<br>Soil Types based on SSURGO |
| Onsite Sewer System/MS4 Infiltration | Onsite Wastewater Treatment Systems GIS Layers (limited availability by jurisdiction)<br>Onsite Wastewater Treatment Systems Inventories<br>Parcels GIS Layers<br>Storm Drain Infrastructure GIS Layers<br>Soil Types based on SSURGO |
| Private Lateral Exfiltration/MS4 Infiltration | Private Lateral GIS Layers (limited availability by jurisdiction)<br>Storm Drain Infrastructure GIS Layers<br>Soil Types based on SSURGO |
| Homeless Encampments | Hot Spot Encampment Locations based on Call Complaints, Databases, and Anecdotal Locations<br>Los Angeles Homeless Services Authority 2016 – 2019 Homeless Counts by Census Tract |
| Sanitary Sewer Overflows (SSOs) | California Integrated Water Quality System (CIWQS) Reports for 2015 - 2020 |
| Fats, Oils, and Grease (FOG) Impacts | CIWQS Reports, with “Spill Cause” Flagged as FOG for 2015 – 2020<br>FOG Inspections and Violations Reported<br>Los Angeles County Public Health Inspections for Food Facilities for 2015 - 2020<br>Restaurant Locations |
| Illicit Connections/Illicit Discharges (IC/ID) and Illegal Dumping | Historic IC/ID or Illegal Dumping Cases from Call Complaints, Databases, and Reported Dumping<br>Hot Spot IC/ID or Illegal Dumping Locations based on Anecdotal Information |
| Wastewater Treatment Plants (WWTP) | WWTP Facility Locations GIS Layers |
| Other (not explicitly incorporated in the catchment prioritization approach at this time) | Recreational Vehicle (RV) Dump Stations<br>Active NPDES Dischargers from Regional Boards Permit Tool<br>Los Angeles County Public Health Outdoor Pool Inspections for 2015 - 2020 |

Table 2-3. Source Criteria Scores Assigned to Catchments.

| Source Criteria | Response Types | Median Response | Score |
|---|---|---|---|
| Sewer Exfiltration/MS4 Infiltration | Percent of vulnerable pipes[1]; determined based on (1) distance from storm drain; (2) soil type; (3) pipe diameter; (4) pipe age. | 45% | 1 + Percent of Vulnerable Pipes |
| Onsite Sewer System/MS4 Infiltration | Percent of vulnerable pipes[1]; determined based on (1) distance from storm drain; (2) soil type | 69% | |
| Private Lateral Exfiltration/MS4 Infiltration | Percent of vulnerable pipes[1]; determined based on (1) distance from storm drain; (2) soil type; (3) pipe diameter; (4) pipe age. | 28% | |
| Homeless Encampments | Average of the count of encampment locations/hot spots and the area-weighted total unsheltered people from the Homeless Count, over the previous five years | 7 | None Present = 1<br>1 – Median Response Value = 1.5<br>> Median Response Value = 2 |
| Sanitary Sewer Overflows | Number of incidents reported in the previous five years | 1 | |
| Fats, Oils, and Grease Impacts | Count of food facilities and FOG inspections.<br>If catchment area contains an identified hot spot, incidents of FOG-related spills or violation during FOG inspection in the previous five years, it is automatically assigned the maximum score. | 9 | |
| Illicit Connections/Illicit Discharges and Illegal Dumping | Number of incidents in the previous five years.<br>If catchment area contains an identified hot spot, it is automatically assigned the maximum score. | 7 | |
| Wastewater Treatment Plants | Count of WWTP facilities | 1 | |

1: Pipe vulnerability was determined by calculated the Exfiltration Score for pipe segments based on the following table (CBA Steering Committee 2017). If a pipe was recently lined the Exfiltration Score was adjusted to a value of 1. A sanitary sewer pipe is considered vulnerable if scores greater than 2.5 and the onsite sewer systems and private laterals are considered vulnerable if score greater than 2.

| Criteria | Weight | Values | Score |
|---|---|---|---|
| Distance from Storm Drain (nearest distance, vertical and horizontal) | 35% | < 100 ft | 3 |
| | | 100 – 500 ft | 2 |
| | | > 500 ft | 1 |
| Soil Types | 15% | High Permeability (A) | 3 |
| | | Moderate Permeability (B or C) | 2 |
| | | Low Permeability (D) | 1 |
| Sanitary Sewer Pipe Diameter | 15% | 0 – 15 inch | 3 |
| | | 16 – 24 inch | 2 |
| | | > 24 inch | 1 |
| Sanitary Sewer Pipe Age | 35% | > 40 years (pre-1980) | 3 |
| | | 21 – 40 years (1980 – 2000) | 2 |
| | | < 20 years (post-2000) | 1 |

The source criteria composite score for each catchment is calculated as the average of the scores for all eight source criteria. If insufficient data is available for a source criteria category, the average is calculated excluding that category.

### 2.2.2 Combining Water Quality Assessments and Source Criteria Scoring

To combine the water quality assessments and source criteria composite scores, the following steps are taken:

(1) Plot the receiving water percent exceedance of water quality benchmarks versus the source criteria composite score for each catchment (Figure 2-6 and Figure 2-7).

Each dot represents a single catchment; however, note that some of the catchments were associated with the same source criteria composite score and receiving water quality data and thus are overlapping on these plots.

(2) Divide the plots into Low, Medium, and High priority groupings based on the priority lines shown in Figure 2-6 and Figure 2-7.

The priority lines were assigned a negative 0.5 slope. A y-intercept (interpreted here as the source criteria composite score equal to 1, as this is the minimum score indicating none of the potential sources are present) of 50% was selected for the medium priority line. A y-intercept of 100% was selected for the high priority line. Multiple variations of the priority lines were investigated and ultimately selected based on a reasonable distribution of catchments across the priority categories. Catchments falling below the Medium Priority line were designated “Low” priority, catchments between the Medium Priority and High Priority lines were designated “Medium” priority, and catchments above the High Priority line were designated “High” priority.

(3) Repeat steps 1-2 replacing the receiving water percent exceedances with the outfall water quality percent exceedance of benchmarks versus the source criteria composite score for each catchment (Figure 2-8). The same priority lines and rationale used for the receiving water quality analysis were used for the outfall water quality analysis.

(4) Finally, the prioritization of catchments based on the receiving water quality and outfall water quality assessment plots were combined to assign the combined priority category as follows:

- ***Highest Priority:*** High Priority for both receiving water and outfall water quality assessment plots
- ***High Priority:*** High Priority for one of the receiving water or outfall water quality assessments plots and Medium Priority for the other
- ***Medium Priority***: Medium Priority for both receiving water and outfall water quality assessment plots
- ***Low Priority***: Medium Priority for one of the receiving water or outfall water quality assessments plots and Low Priority for the other
- ***Lowest Priority***: Low Priority for both receiving water and outfall water quality assessment plots

For wet weather, since no outfall water quality assessment has been completed due to lack of data, the priority category was assigned solely based on the receiving water quality assessment plot (steps 1 and 2).

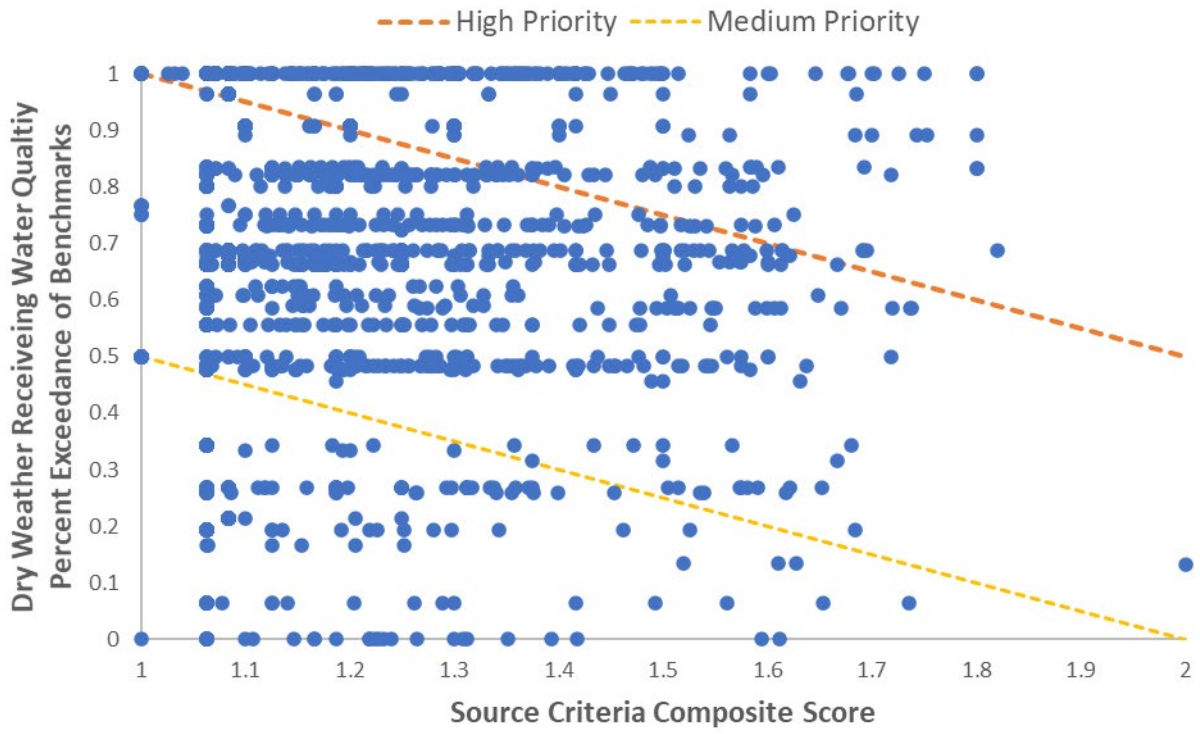


Figure 2-6. Receiving Water Quality Percent Exceedance of Benchmarks During Dry Weather versus Source Criteria Composite Scores.

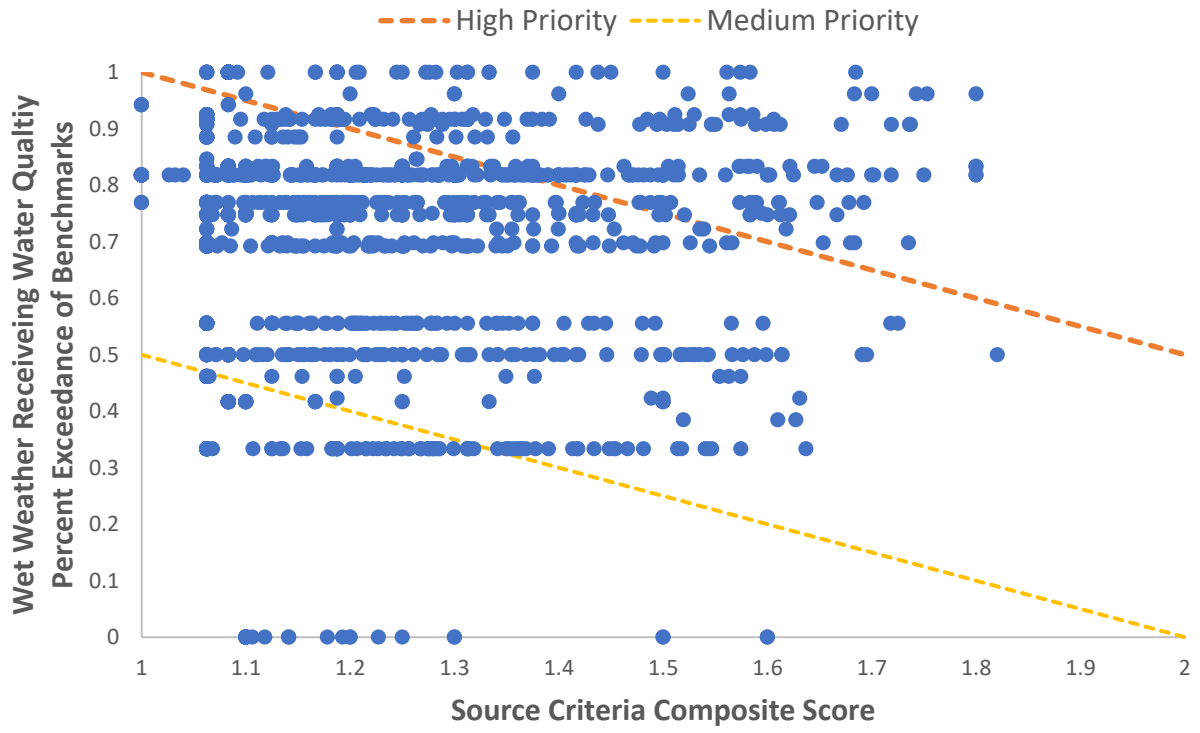


Figure 2-7. Receiving Water Quality Percent Exceedance of Benchmarks During Wet Weather versus Source Criteria Composite Scores.

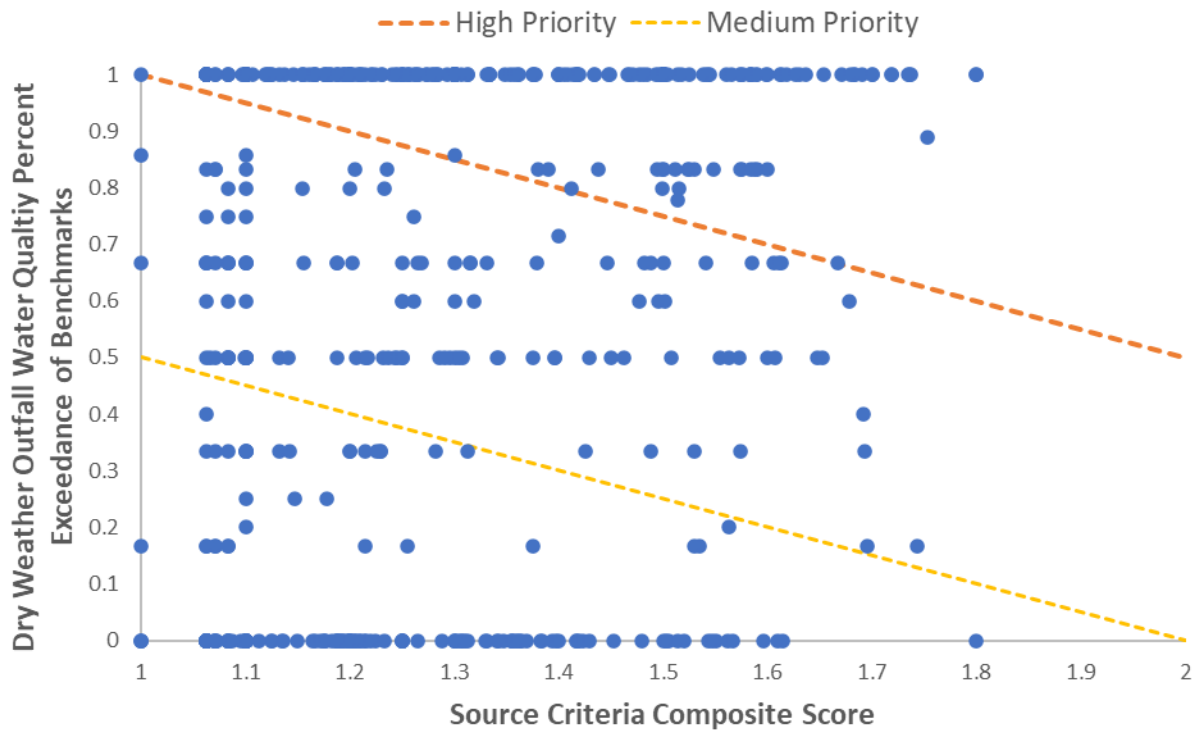


Figure 2-8. Outfall Water Quality Percent Exceedance of Benchmarks During Dry Weather versus Source Criteria Composite Scores.

### 2.2.3 Additional Factors

The dry weather catchment priority category is finally adjusted based on two additional factors, related to the hydraulic connectivity of the outfall catchment to the receiving water. (1) If a catchment is upstream of a built low flow division (LFD) it is automatically assigned as the lowest priority during dry weather. (2) If all the outfall screening events conducted showed no flow present at the outfall (with a minimum of 4 events collected required), the associated catchment is automatically assigned as the lowest priority during dry weather.

### 2.2.4 Catchment Prioritization Results

During dry weather, a total of 76 catchments, distributed throughout the Los Angeles River watershed, were identified as highest priority. The distribution of catchment priorities under each weather condition are summarized in Table 2-4. Figure 2-9 presents the dry weather catchment prioritization results. Figure 2-10 presents the wet weather catchment prioritization results. Compared to the original LRS priority and outlier outfalls identified for the Segment B mainstem, Arroyo Seco, Rio Hondo, Compton Creek, and Segment E mainstem, certain catchments remained as high priorities, whereas others dropped to lower priorities. Conversely, areas not previously identified as a priority in the original LRS were identified as a higher priority under this revised framework, focused on addressing risk. The comparison to the original LRS priorities is shown in Figure 2-11 and Figure 2-12. Ultimately, the catchment prioritization results were used to define Areas of Investigation (AOIs) for each segment and tributary, for which implementation actions will be identified. The definition of the AOIs is discussed further in the below subsection.

Table 2-4. Distribution of Catchment Priorities in the ULAR Watershed.

| Category | Number of Catchments | |
|---|---|---|
| | Dry Weather | Wet Weather |
| Highest Priority | 76 | NA[1] |
| High Priority | 365 | 287 |
| Medium Priority | 691 | 1541 |
| Low Priority | 243 | 150 |
| Lowest Priority | 606 | NA[1] |
| Insufficient Data | 1 | 4 |

1: Not applicable due to lack of outfall water quality data during wet weather.

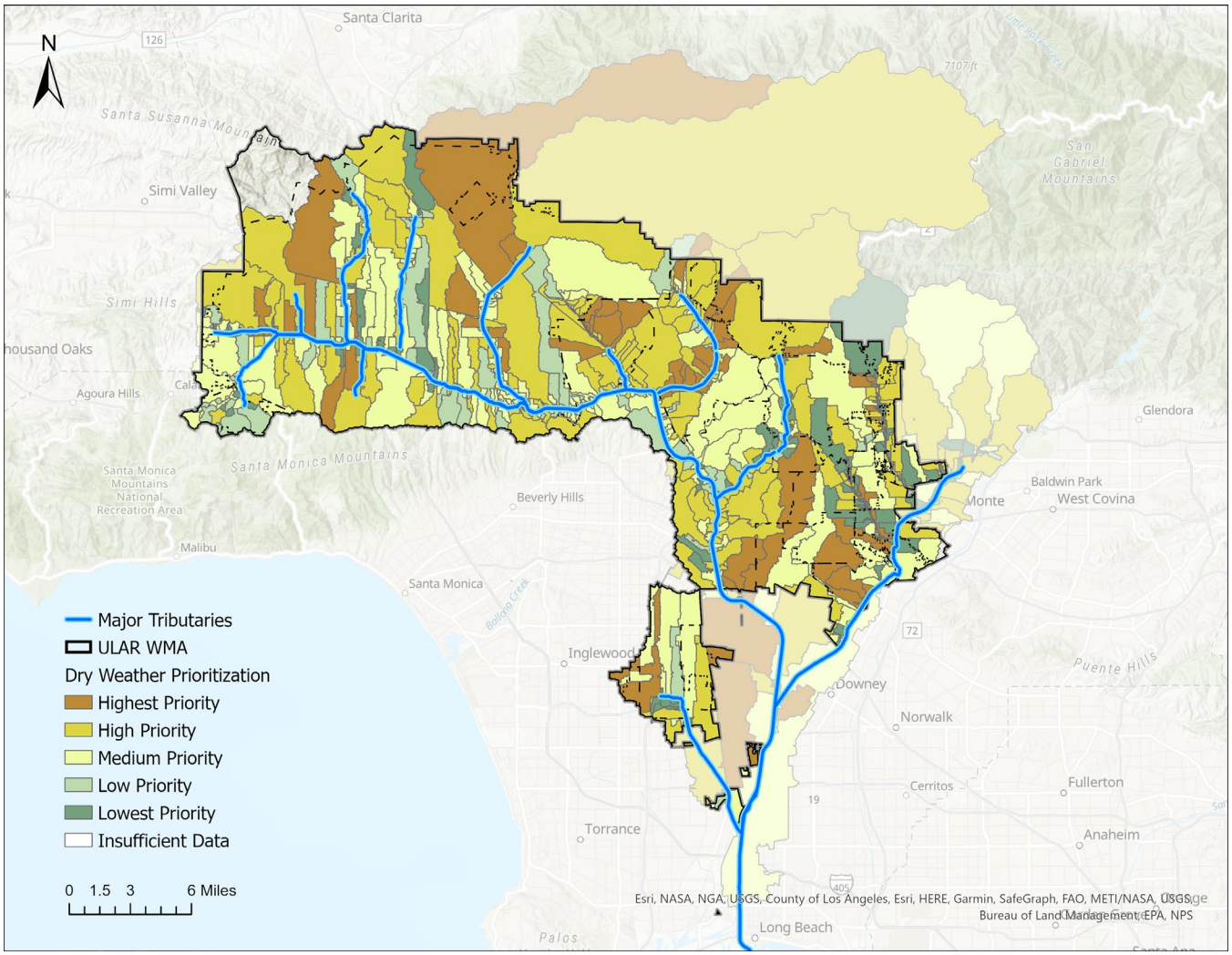


Figure 2-9. Catchment Prioritization Results for Dry Weather.

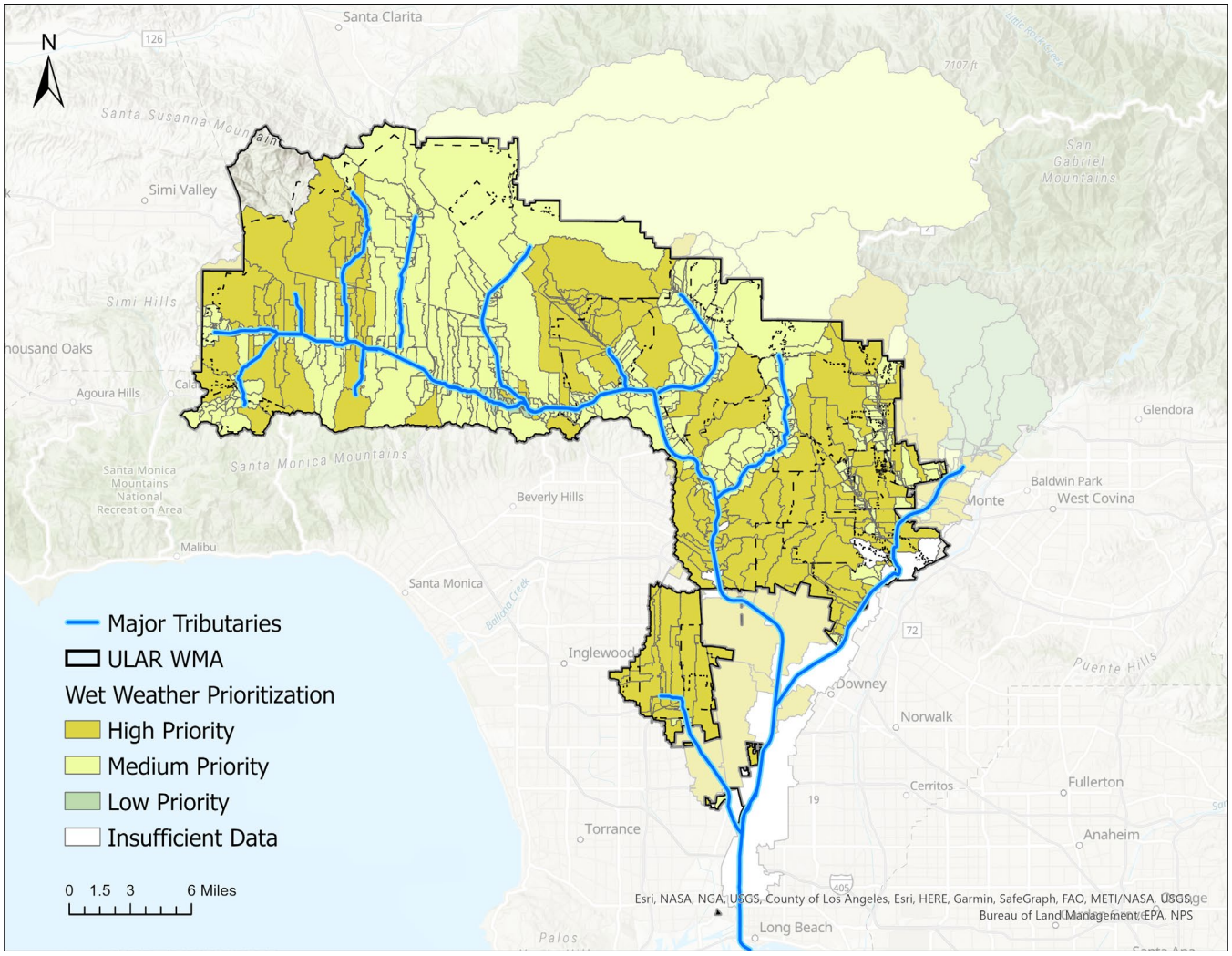


Figure 2-10. Catchment Prioritization Results for Wet Weather.

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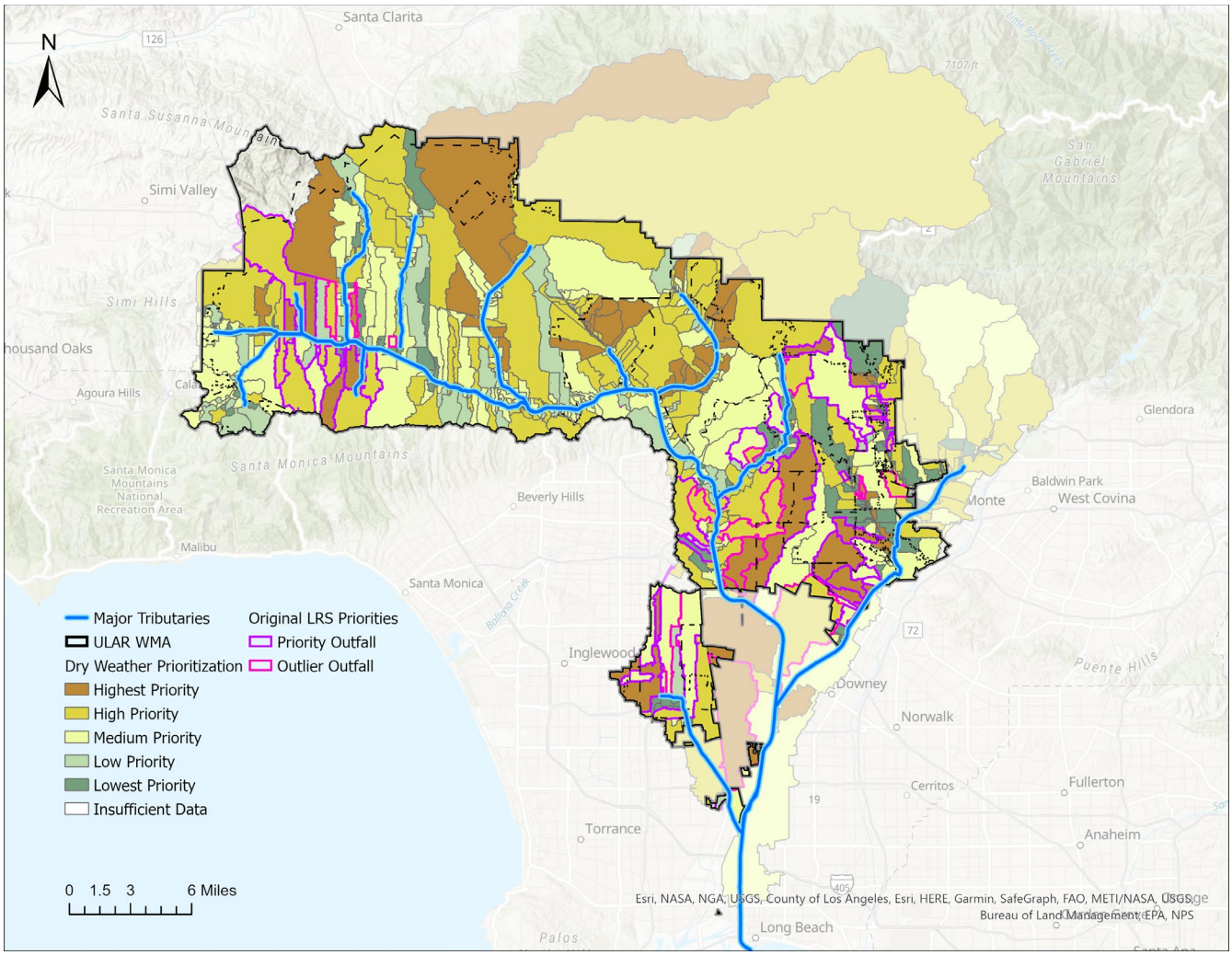


Figure 2-11. Catchment Prioritization Results for Dry Weather Compared to Original LRS Priority and Outlier Outfalls.

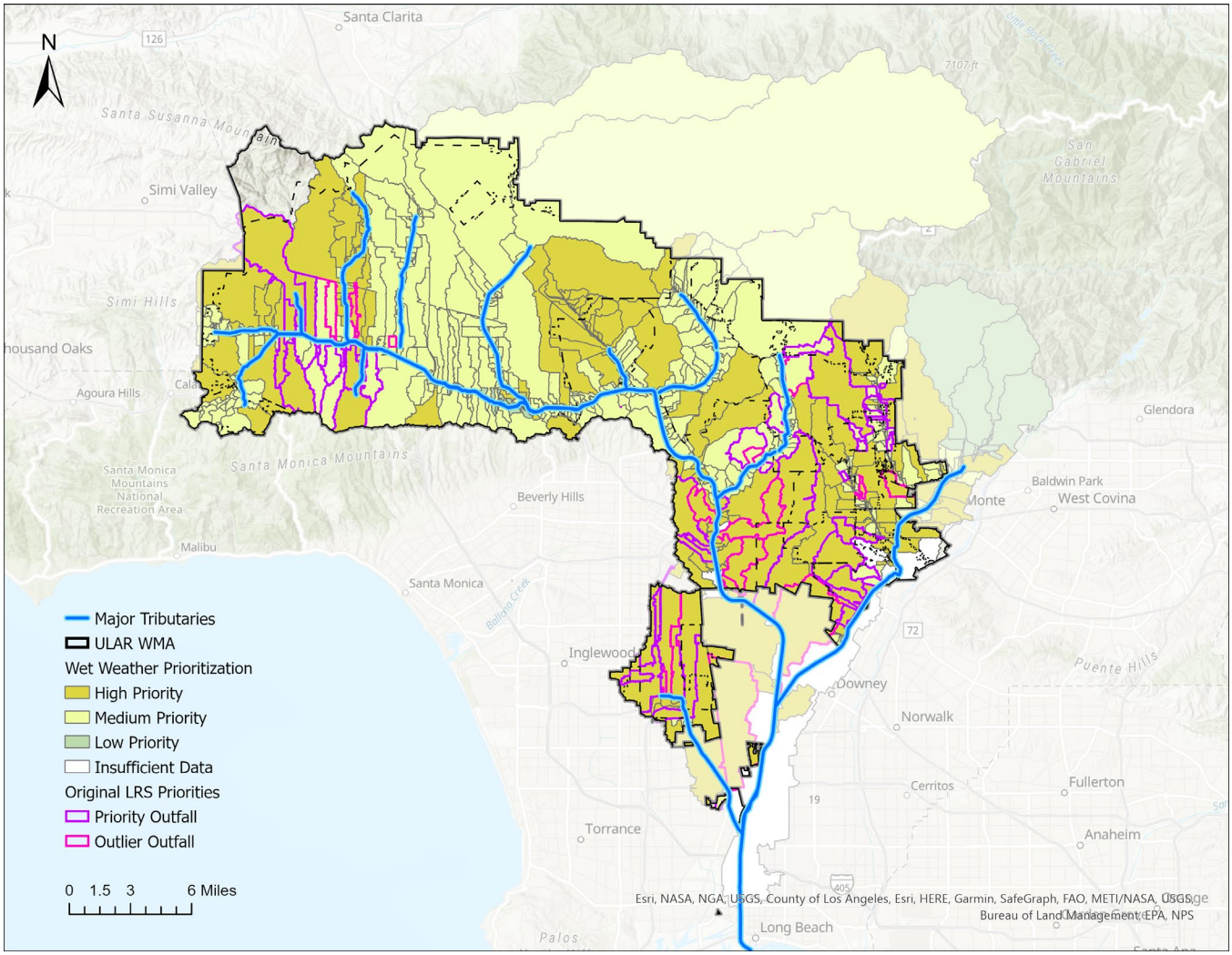


Figure 2-12. Catchment Prioritization Results for Wet Weather Compared to Original LRS Priority and Outlier Outfalls.

### *Alternative Scenarios*

To provide greater confidence in the results of the catchment prioritization, alternative scenarios were investigated that adjusted the methods of the catchment prioritization approach and compared the results. The four scenarios investigated were:

- For the receiving water and outfall water quality condition assessments, only reference data collected within the past five years (rather than the full datasets available) - Figure 2-13
- If insufficient data available for a source criteria category, assign the average score across all catchments (rather than excluding from the source criteria composite score average) - Figure 2-14
- Assign the catchment priorities only based on the outfall water quality assessment plots (rather than a combination of the receiving water and outfalls) - Figure 2-15
- If a catchment is upstream of a planned/proposed LFD or other structural project that diverts flow, automatically assign as the lowest priority during dry weather (rather than only factoring in built projects) - Figure 2-16

Except for the scenario that factors in all planned/proposed structural projects, the results of the alternative scenarios were very consistent with the primary results of the catchment prioritization. This provides greater confidence in the clear highest priority areas to be addressed. Furthermore, it is encouraging that many of the catchments are upstream of a planned/proposed project that can further support progress towards attaining the recreational beneficial use objectives in downstream receiving waters.

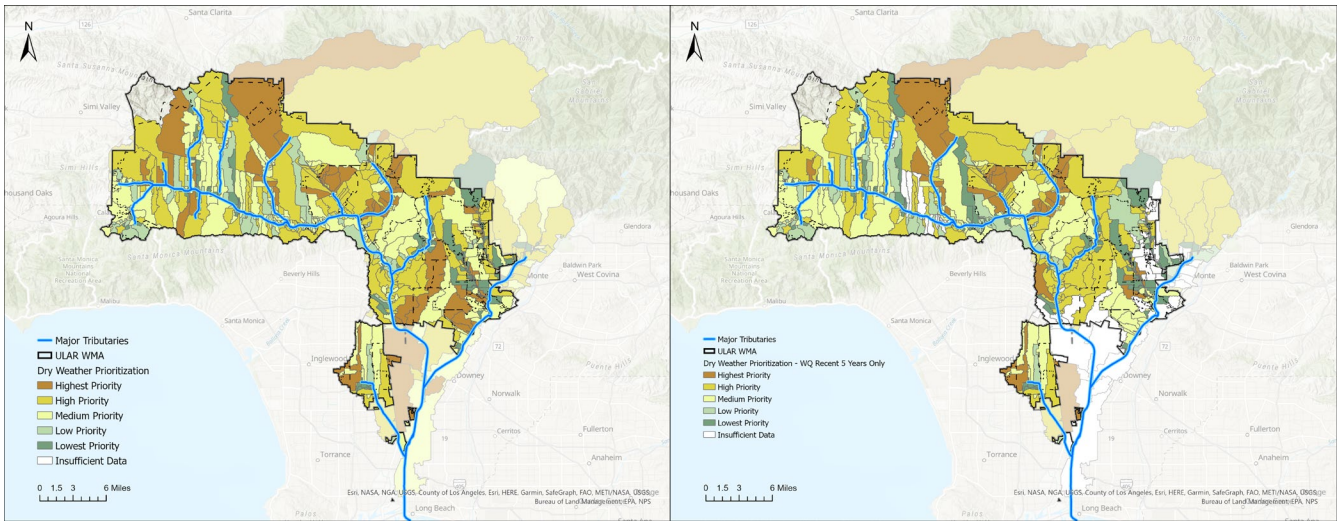


Figure 2-13. Catchment Prioritization Results for Dry Weather (left) Compared to the Alternative Scenario Only Referencing Water Quality Data Collected within the Past Five Years (right).

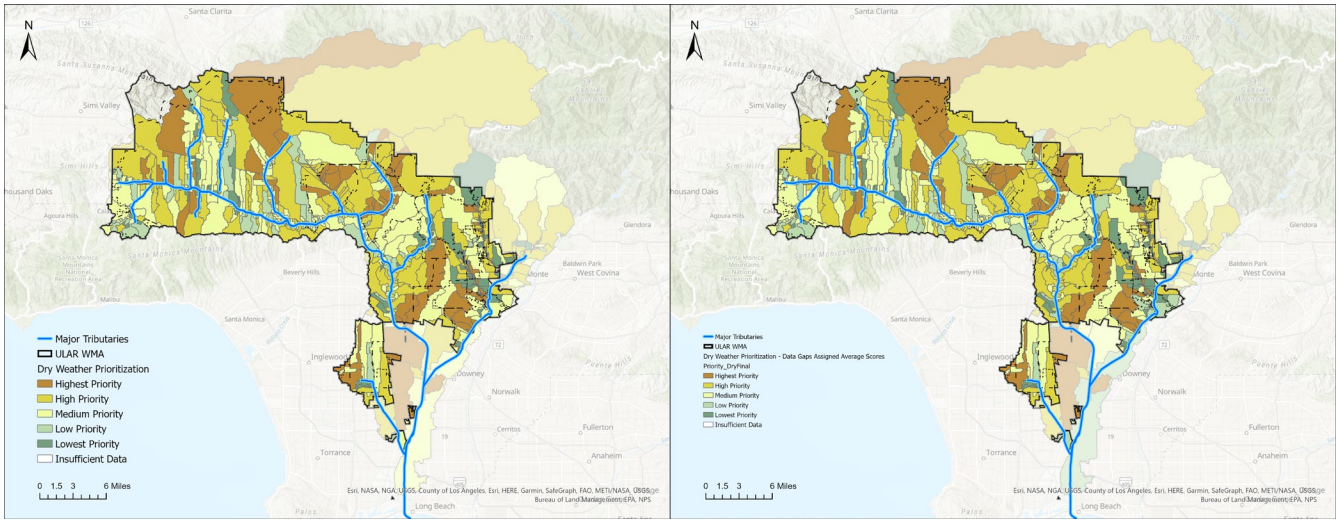


Figure 2-14. Catchment Prioritization Results for Dry Weather (left) Compared to the Alternative Scenario Assigning the Average Source Criteria Score for Data Gaps (right).

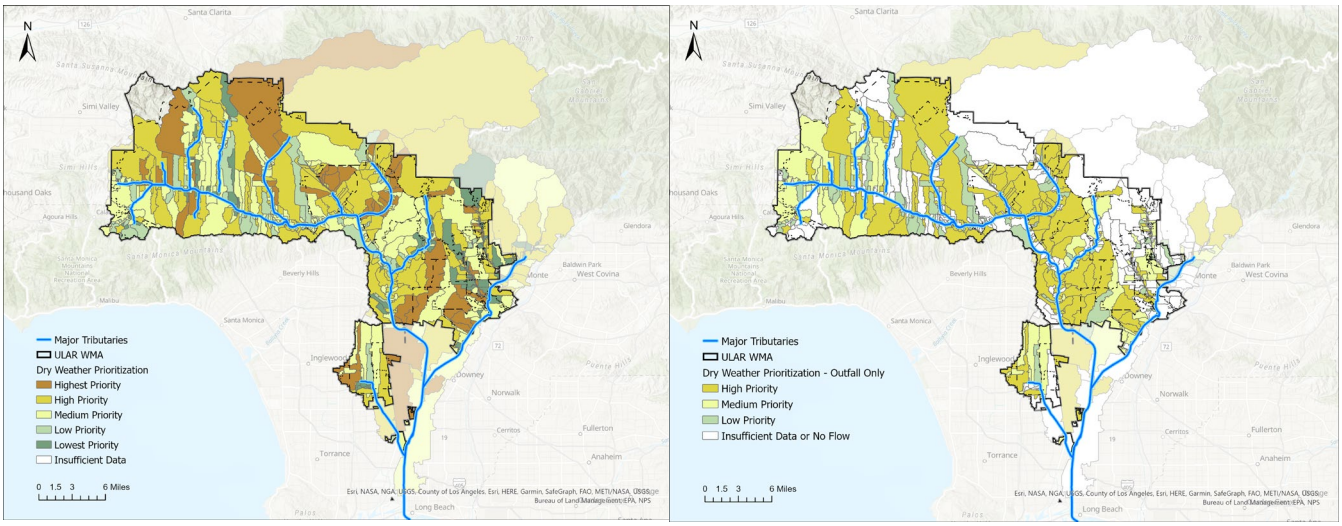


Figure 2-15. Catchment Prioritization Results for Dry Weather (left) Compared to the Alternative Scenario based on Outfall Water Quality Assessment Plots Only (right).

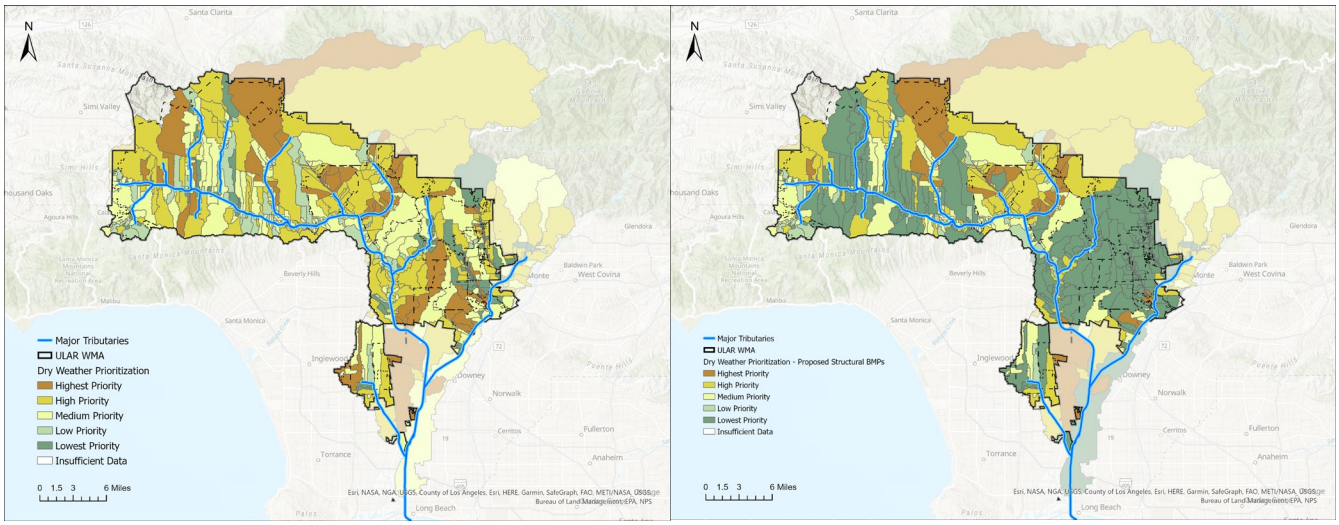


Figure 2-16. Catchment Prioritization Results for Dry Weather (left) Compared to the Alternative Scenario Assigning the Lowest Priority if Upstream of a Planned/Proposed Structural Project (right).

### *Define Areas of Investigation*

Based on the catchment prioritization results AOIs were delineated for each segment and tributary. AOIs are clusters of the individual catchments for the purpose of implementing efficient and effective source investigations, discussed in Section 2.3. A combination of spatial analysis, considering the proximity of outfalls and the total area of the combined catchments, and best professional judgement were implemented to group the higher priority catchments. From this process 43 total AOIs were identified, comprising 166 outfall catchments. Figure 2-17 shows the location of these AOIs and Table 2-5 summarizes the number of AOIs and number of outfall catchments comprising these AOIs within each segment and tributary. The details of each AOI, including the outfall catchment areas comprising the AOI and their respective dry and wet weather catchment priorities are listed in Table 2-6. Table 2-6 also identifies if any portion of the outfall catchment area drains to a built or planned structural project with potential of addressing dry weather flows and reducing bacteria loads.

For AOIs with a significant portion of the area expected to be addressed by a built or funded planned project, these projects will be identified as the priority implementation action, while other areas will focus first on implementing the source investigations, as outlined in Section 2.3. An AOI may be determined to be addressed through implementation of a project or through the source investigation and control framework detailed in Section 2.3. If project challenges arise or designs change impacting the effectiveness of the structural project, then agencies may pursue source investigation efforts in these areas as well as consider other structural project alternatives. Table 2-6 also identifies the responsible agencies and respective proportions of the jurisdictional area within the catchment. The catchment prioritization and delineating of AOIs was completed on a watershed-scale for consistency with the driving intent of the Bacteria TMDL to protect the REC-1 beneficial use in the receiving waters. Therefore, select AOIs include portions of jurisdictions outside the ULAR WMA. The ULAR agencies are only responsible for addressing their contributions to the AOI, but will notify adjacent cities of any findings of the AOIs and encourage a collaborative effort, as discussed further in Section 2.3.2 and Section 3.2.

As additional information is gathered through these efforts, the catchment prioritization and defined AOIs are subject to refinement through the adaptive management process in order to reflect the best available information.

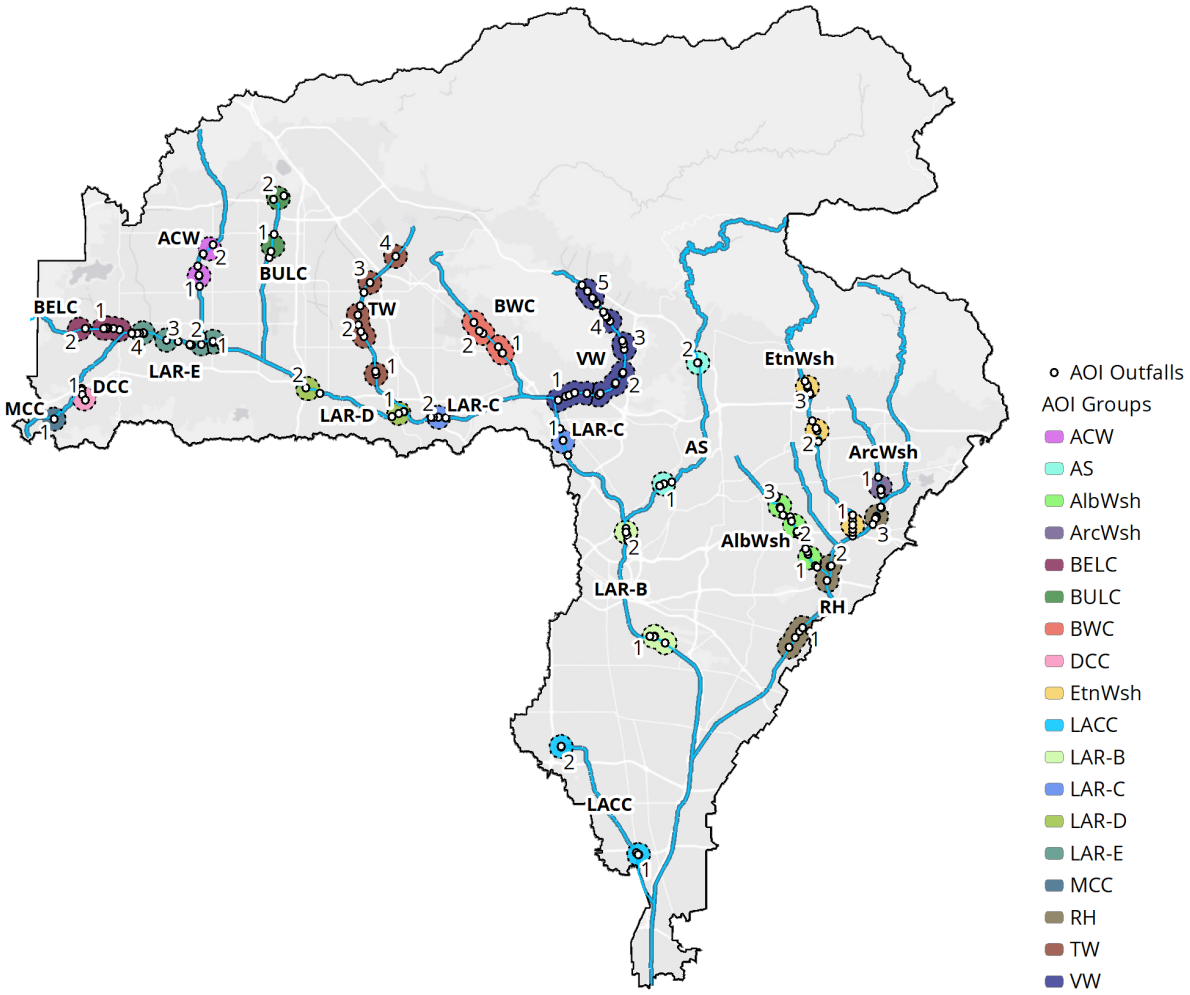


Figure 2-17. AOIs Identified based on the Catchment Prioritization.

Table 2-5. Summary of AOIs Identified.

| Segment/Tributary | Number of AOIs | Number of Outfall Catchments | Total Area (acres) |
|---|---|---|---|
| Segment B Mainstem | 2 | 9 | 11,359 |
| Arroyo Seco | 2 | 5 | 21,668 |
| Rio Hondo - Mainstem | 3 | 13 | 5,329 |
| Rio Hono - Alhambra Wash | 3 | 18 | 4,260 |
| Rio Hondo - Arcadia Wash | 1 | 5 | 5,709 |
| Rio Hondo - Eaton Wash | 3 | 18 | 3,445 |
| Compton Creek | 2 | 5 | 16,561 |
| Segment E Mainstem | 4 | 15 | 9,710 |
| Aliso Canyon Wash | 2 | 6 | 7,662 |
| Bell Creek | 2 | 7 | 874 |
| Dry Canyon | 1 | 4 | 290 |
| McCoy Canyon | 1 | 1 | 258 |
| Segment C Mainstem | 2 | 7 | 8,753 |
| Burbank Western Channel | 2 | 6 | 4,071 |
| Tujunga Wash | 4 | 10 | 41,159 |
| Verdugo Wash | 5 | 24 | 11,026 |
| Segment D Mainstem | 2 | 7 | 3,245 |
| Bull Creek | 2 | 6 | 8,342 |

Table 2-6. AOI Details.

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| Segment B Mainstem | LAR-B_AOI_1 | LAR-B-R2-NEW-14 | Highest Priority | High Priority | NA | Hollenbeck Park Lake Rehabilitation (34%) | Los Angeles (82%), Unincorporated (16%), Vernon (2%) | 1,752.23 |
| | | LAR-B-R2-04 | Highest Priority | High Priority | NA | Alhambra Wash Dry-Weather Diversion (2%) & R2-G Mission Rd/LA Rver Removal & Reuse Urban F (1%) | Alhambra (24%), Los Angeles (23%), Monterey Park (7%), Pasadena (1%), South Pasadena (22%), Unincorporated (20%), Vernon (3%) | 6,390.71 |
| | | LAR-B-R2-P | Highest Priority | High Priority | NA | NA | Los Angeles (85%), Unincorporated (1%), Vernon (15%) | 239.63 |
| | | LAR-B-R2-NEW-13 | High Priority | High Priority | NA | NA | Los Angeles (1%), Unincorporated (4%), Vernon (95%) | 154.22 |
| | LAR-B_AOI_2 | LAR-B-R2-A | High Priority | High Priority | Albion-Riverside Park (6%) | NA | Los Angeles | 162.70 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | LAR-B-R2-NEW-2 | High Priority | High Priority | NA | NA | Los Angeles | 61.44 |
| | | LAR-B-R2-01 | High Priority | High Priority | Albion-Riverside Park (12%) | R2-G Mission Rd/LA Rver Removal & Reuse Urban F (1%) | Los Angeles (95%), South Pasadena (4%), Unincorporated (1%) | 2,418.37 |
| | | LAR-B-R2-C | High Priority | High Priority | Albion-Riverside Park (46%) | NA | Los Angeles | 1.01 |
| | | LAR-B-R2-B | High Priority | High Priority | NA | NA | Los Angeles | 179.20 |
| Arroyo Seco | AS_AOI_1 | AS-17 | High Priority | Medium Priority | NA | AS-15 Sycamore Grove Park Stormwater Enhancement (2%) | Los Angeles | 291.20 |
| | | AS-G | High Priority | Medium Priority | NA | NA | Los Angeles | 55.13 |
| | | AS-H | High Priority | Medium Priority | NA | NA | Los Angeles | 30.95 |
| | AS_AOI_2 | ARS-234 | Highest Priority | Medium Priority | NA | San Rafael Wetlands (98%) & 2% (Rubio Wash Dry-Weather Diversion) | Pasadena (8%), Unincorporated (92%) | 770.69 |
| | | ARS-234_MOD_Up | High Priority | Medium Priority | NA | Rubio Wash Dry-Weather Diversion (2%) & Winery Canyon Channel (1%) & | La Canada Flintridge (20%), Pasadena (7%), Unincorporated (72%) | 20,519.89 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Hay Canyon Channel (1%) & San Rafael Wetlands (1%) | | |
| Rio Hondo - Mainstem | RH_AOI_1 | RH-078 | Highest Priority | High Priority | NA | East LA Sustainable Median (59%) | Montebello (40%), Monterey Park (59%), Unincorporated (1%) | 2,708.11 |
| | | RH-090 | Highest Priority | High Priority | NA | East LA Sustainable Median (1%) | Montebello | 949.81 |
| | | RH-092 | Highest Priority | High Priority | NA | NA | Montebello | 132.76 |
| | | RH-085 | Highest Priority | High Priority | NA | NA | Montebello | 23.79 |
| | RH_AOI_2 | RH-098 | Highest Priority | High Priority | NA | Alhambra Wash Dry-Weather Diversion (13%) | Rosemead (28%), Unincorporated (72%) | 326.18 |
| | | RH-100 | Highest Priority | High Priority | NA | NA | Rosemead (86%), Unincorporated (14%) | 150.91 |
| | | RH-DOWN | High Priority | High Priority | NA | NA | El Monte (28%), South El Monte (71%), Unincorporated (1%) | 978.29 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | RH_AOI_3 | ArcWsh-24a | High Priority | Medium Priority | NA | NA | El Monte | 0.11 |
| | | RH-22 | High Priority | Medium Priority | NA | NA | El Monte | 18.90 |
| | | RH-26 | Highest Priority | Medium Priority | NA | NA | El Monte | 39.90 |
| | | RH-28 | Highest Priority | Medium Priority | NA | NA | El Monte | 0.52 |
| | | RH-30 | High Priority | Medium Priority | NA | NA | El Monte | 0.10 |
| | | RH-34 | High Priority | Medium Priority | NA | NA | El Monte | 0.07 |
| Rio Hondo - Alhambra Wash | AlbWsh_AOI_1 | AlbWsh-03 | Highest Priority | High Priority | NA | Alhambra Dry-Weather Diversion (83%) & East LA Sustainable Median (1%) | Monterey Park (64%), Rosemead (12%), Unincorporated (24%) | 865.85 |
| | | AlbWsh-01 | High Priority | Medium Priority | NA | NA | Rosemead | 0.09 |
| | | AlbWsh-22 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | Rosemead | 0.08 |
| | | AlbWsh-36 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (65%) | Rosemead | 70.24 |
| | | AlbWsh-39 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (99%) | Rosemead | 2.46 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | AlbWsh-55 | High Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | Rosemead | 0.17 |
| | AlbWsh_AOI_2 | AlbWsh-131 | High Priority | High Priority | NA | Alhambra Dry-Weather Diversion (100%) | Alhambra (90%), San Gabriel (10%) | 292.05 |
| | | AlbWsh-143 | Highest Priority | High Priority | NA | Alhambra Dry-Weather Diversion (100%) | San Gabriel | 12.57 |
| | | AlbWsh-101 | High Priority | High Priority | NA | Alhambra Dry-Weather Diversion (100%) | Alhambra (90%), San Gabriel (10%) | 315.72 |
| | | AlbWsh-133 | Highest Priority | High Priority | NA | Alhambra Dry-Weather Diversion (62%) & Rubio Wash Dry-Weather Diversion (36%) & Vincent Lugo Park (2%) | San Gabriel | 148.32 |
| | | AlbWsh-64 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | Rosemead | 3.96 |
| | | AlbWsh-72 | Highest Priority | High Priority | NA | Alhambra Dry-Weather Diversion (97%) | San Gabriel | 156.15 |
| | AlbWsh_AOI_3 | AlbWsh-179 | High Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | Alhambra | 70.27 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | AlbWsh-106 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | San Gabriel | 0.02 |
| | | AlbWsh-116 | High Priority | High Priority | NA | Alhambra Dry-Weather Diversion (96%) & Rubio Wash Dry-Weather Diversion (1%) | Alhambra (32%), Pasadena (53%), San Marino (6%), South Pasadena (9%) | 2,248.07 |
| | | AlbWsh-167 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | Alhambra | 6.34 |
| | | AlbWsh-183 | Highest Priority | Medium Priority | NA | Alhambra Dry-Weather Diversion (100%) | Alhambra (61%), San Gabriel (39%) | 0.45 |
| | | AlbWsh-185 | High Priority | High Priority | NA | Alhambra Dry-Weather Diversion (54%) & Rubio Wash Dry-Weather Diversion (42%) | Alhambra (7%), San Gabriel (93%) | 67.38 |
| Rio Hondo - Arcadia Wash | ArcWsh_AOI_1 | ArcWsh-19 | High Priority | Medium Priority | NA | NA | Temple City | 16.18 |
| | | ArcWsh-21 | High Priority | Medium Priority | NA | NA | Temple City | 0.36 |
| | | ArcWsh-25 | High Priority | Medium Priority | NA | NA | Temple City | 5.20 |
| | | ArcWsh-26 | High Priority | Medium Priority | NA | NA | Arcadia (30%), Temple City (70%) | 275.58 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | ArcWsh-RW-UP | High Priority | High Priority | NA | Eaton Wash Dry-Weather Diversion (1%) | Arcadia (70%), Sierra Madre (22%), Unincorporated (8%) | 5,411.20 |
| Rio Hondo - Eaton Wash | EtnWsh_AOI_1 | EtnWsh-23 | High Priority | High Priority | NA | Eaton Wash Dry-Weather Diversion (97%) & Rubio Wash Dry-Weather Diversion (4%) | El Monte (8%), Rosemead (63%), San Gabriel (3%), Temple City (2%), Unincorporated (24%) | 678.93 |
| | | EtnWsh-02 | High Priority | Medium Priority | NA | NA | El Monte | 20.98 |
| | | EtnWsh-04 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (17%) | El Monte (46%), Rosemead (54%) | 0.58 |
| | | EtnWsh-18 | Highest Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (96%) | El Monte (96%), Rosemead (4%) | 6.95 |
| | | EtnWsh-26 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | El Monte (91%), Rosemead (9%) | 0.48 |
| | | EtnWsh-33 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | El Monte (20%), Rosemead (80%) | 2.55 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | EtnWsh_AOI_2 | EtnWsh-132 | Highest Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena (71%), San Marino (17%), Unincorporated (12%) | 82.11 |
| | | EtnWsh-155 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena (78%), Unincorporated (22%) | 183.11 |
| | | EtnWsh-110 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (94%) & Rubio Wash Dry-Weather Diversion (13%) | Pasadena (13%), San Marino (24%), Unincorporated (63%) | 213.55 |
| | | EtnWsh-112 | Highest Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena (2%), Unincorporated (98%) | 20.34 |
| | | EtnWsh-133 | Highest Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Unincorporated | 0.33 |
| | | EtnWsh-159 | Highest Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena | 85.25 |
| | EtnWsh_AOI_3 | EtnWsh-162 | High Priority | High Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena | 34.73 |
| | | EtnWsh-172 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (97%) | Pasadena (24%), Unincorporated (76%) | 1,582.92 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | EtnWsh-211 | Highest Priority | High Priority | NA | Eaton Wash Dry-Weather Diversion (83%) & Rubio Wash Dry-Weather Diversion (23%) | Pasadena (93%), Unincorporated (7%) | 401.51 |
| | | EtnWsh-221 | Highest Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena | 66.28 |
| | | EtnWsh-225 | High Priority | Medium Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena | 0.68 |
| | | EtnWsh-233 | Highest Priority | High Priority | NA | Eaton Wash Dry-Weather Diversion (100%) | Pasadena (56%), Unincorporated (44%) | 63.40 |
| Compton Creek | LACC_AOI_1 | LACC-028 | Highest Priority | High Priority | NA | NA | Compton (30%), Long Beach (2%), Lynwood (26%), South Gate (34%), Unincorporated (8%) | 6,566.79 |
| | | LACC-030 | High Priority | Medium Priority | NA | NA | Compton | 1.06 |
| | | LACC-RW-UP2 | High Priority | High Priority | Roosevelt Park (2%) | NA | Carson (1%), Compton (52%), Huntington Park (1%), Los Angeles (11%), | 7,011.20 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lynwood (1%), Unincorporated (34%) | |
| | LACC_AOI_2 | LACC-154 | High Priority | High Priority | NA | Main St Between 108th & 107th St (98%) | Los Angeles | 121.99 |
| | | LACC-155 | Highest Priority | High Priority | NA | Compton Creek Urban Runoff Project No.2 (87%) & Main St Between 108th St & 107th St (29%) & Algin Sutton Recreation Center (27%) & Algin Sutton Recreation Center (1%) & Jefferson Blvd Stormwater Treatment and Infiltration Project (1%) | Los Angeles (80%), Unincorporated (20%) | 2,859.64 |
| Segment E Mainstem | LAR-E_AOI_1 | LAR-E-038 | High Priority | Medium Priority | NA | Lindley Ave & Victory Blvd (4%) | Los Angeles | 11.73 |
| | | LAR-E-048 | Highest Priority | High Priority | NA | LAR Segment E Urban Runoff Project No. 2 (100%) | Los Angeles | 853.56 |

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| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | LAR-E-050 | Highest Priority | High Priority | NA | Etiwanda Ave & Kittridge St (8%) & Reseda Ave & Kittridge St (78%) & Wilbur Ave & Vanowen St (1%) | Los Angeles | 421.54 |
| | LAR-E_AOI_2 | LAR-E-058 | Highest Priority | Medium Priority | NA | LAR Segment E Urban Runoff Project No. 3 (100%) | Los Angeles | 1,312.72 |
| | | LAR-E-064 | High Priority | Medium Priority | NA | Tampa Ave & Kittridge St (5%) | Los Angeles | 18.34 |
| | | LAR-E-065 | High Priority | Medium Priority | NA | LAR Segment E Urban Runoff Project No. 4 (100%) | Los Angeles | 787.70 |
| | | LAR-E-066 | High Priority | Medium Priority | NA | Tampa Ave & Kittridge St (86%) & Corbin Ave & Kittridge St (1%) & Wilbur Ave & Vanowen St (3%) | Los Angeles | 785.42 |
| | LAR-E_AOI_3 | LAR-E-074 | High Priority | Medium Priority | NA | NA | Los Angeles | 246.89 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | LAR-E-081 | Highest Priority | High Priority | NA | LAR Segment E Urban Runoff Project No. 6 (100%) & Aliso Limekiln Restoration (1%) & Corbin Ave & Kittridge St (2%) | Los Angeles | 1,165.98 |
| | LAR-E_AOI_4 | LAR-E-096 | High Priority | High Priority | NA | LAR Segment E Urban Runoff Project No. 7 (100%) | Los Angeles | 2,263.98 |
| | | LAR-E-097 | Highest Priority | High Priority | NA | LAR Segment E Urban Runoff Project No. 8 (100%) | Los Angeles | 535.66 |
| | | LAR-E-099 | High Priority | Medium Priority | NA | NA | Los Angeles | 51.94 |
| | | LAR-E-101 | High Priority | Medium Priority | NA | NA | Los Angeles | 61.30 |
| | | LAR-E-109 | High Priority | High Priority | NA | NA | Los Angeles | 526.21 |
| | | LAR-E-110 | High Priority | High Priority | NA | LAR Segment E Urban Runoff Project No. 9 (100%) & Topanga Canyon Blvd & Kittridge St (1%) | Los Angeles | 666.70 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| Aliso Canyon Wash | ACW_AOI_1 | ACW-018 | High Priority | High Priority | NA | Wilbur Ave & Vanowen St (98%) | Los Angeles | 124.29 |
| | | ACW-025 | Highest Priority | High Priority | NA | Aliso Limekiln Restoration (98%) | Los Angeles (82%), Unincorporated (18%) | 6,793.59 |
| | | ACW-026 | High Priority | High Priority | NA | Aliso Limekiln Restoration (95%) & Reseda Blvd & Nordhoff St (40%) | Los Angeles | 575.34 |
| | | ACW-029 | High Priority | High Priority | NA | Aliso Limekiln Restoration (100%) | Los Angeles | 13.98 |
| | ACW_AOI_2 | ACW-040 | High Priority | High Priority | NA | Aliso Limekiln Restoration (100%) | Los Angeles | 90.77 |
| | | ACW-048 | High Priority | High Priority | NA | Aliso Limekiln Restoration (100%) | Los Angeles | 63.91 |
| Bell Creek | BELC_AOI_1 | BELC-008 | Highest Priority | Medium Priority | NA | NA | Los Angeles | 25.69 |
| | | BELC-013 | Highest Priority | Medium Priority | NA | NA | Los Angeles | 42.57 |
| | | BELC-016 | Highest Priority | High Priority | NA | NA | Los Angeles | 692.86 |
| | | BELC-018 | Highest Priority | Medium Priority | NA | NA | Los Angeles | 27.55 |
| | | BELC-019 | Highest Priority | Medium Priority | NA | NA | Los Angeles | 17.95 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | BELC-022 | Highest Priority | Medium Priority | NA | NA | Los Angeles | 41.16 |
| | BELC_AOI_2 | BELC-032 | High Priority | Medium Priority | NA | NA | Los Angeles | 26.24 |
| Dry Canyon | DCC_AOI_1 | DCC-007 | High Priority | Medium Priority | NA | NA | Los Angeles | 4.21 |
| | | DCC-011 | High Priority | Medium Priority | NA | NA | Los Angeles | 27.09 |
| | | DCC-012 | High Priority | Medium Priority | NA | NA | Calabasas (6%), Los Angeles (94%) | 27.83 |
| | | DCC-015 | High Priority | Medium Priority | NA | Topanga Canyon Blvd & Kittridge St (5%) | Calabasas (16%), Los Angeles (84%) | 230.63 |
| McCoy Canyon | MCC_AOI_1 | MCC-015.55 | High Priority | Medium Priority | NA | NA | Calabasas | 258.29 |
| Segment C Mainstem | LAR-C_AOI_1 | LAR-C-093 | High Priority | Medium Priority | NA | LAR Segment C Urban Runoff Project No. 6 & 4 (97%) | Glendale (86%), Los Angeles (14%) | 526.95 |
| | | LAR-C-103 | High Priority | Medium Priority | NA | NA | Los Angeles | 19.77 |
| | | LAR-C-110 | High Priority | High Priority | NA | LAR Segment C Urban Runoff Project No. 6 & 4 (97%) | Glendale (98%), Los Angeles (2%) | 933.59 |
| | LAR-C_AOI_2 | LAR-C-221 | High Priority | High Priority | NA | LAR Segment C Urban Runoff Project No. 8 (98%) | Los Angeles (96%), Unincorporated (4%) | 791.13 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | LAR-C-233 | High Priority | Medium Priority | NA | LAR Segment C Urban Runoff Project No. 8 & 9 (98%) | Los Angeles | 6,346.86 |
| | | LAR-C-241 | High Priority | Medium Priority | NA | LAR Segment C Urban Runoff Project No. 1 & 9 (9%) | Los Angeles | 118.84 |
| | | LAR-C-244 | High Priority | Medium Priority | NA | LAR Segment C Urban Runoff Project No. 10 (8%) | Los Angeles | 15.79 |
| Burbank Western Channel | BWC_AOI_1 | BWC-048 | Highest Priority | High Priority | NA | LAR Segment D Urban Runoff Project No. 17 (100%) | Burbank (82%), Los Angeles (18%) | 891.41 |
| | | BWC-049 | Highest Priority | High Priority | NA | LAR Segment D Urban Runoff Project No. 17 (88%) | Burbank (93%), Glendale (7%) | 1,190.56 |
| | | BWC-053 | Highest Priority | High Priority | NA | LAR Segment D Urban Runoff Project No. 17 (100%) | Burbank | 1,047.71 |
| | BWC_AOI_2 | BWC-072 | Highest Priority | High Priority | NA | NA | Burbank (98%), Los Angeles (2%) | 541.53 |
| | | BWC-075 | Highest Priority | High Priority | NA | NA | Burbank | 49.93 |
| | | BWC-091 | Highest Priority | High Priority | NA | NA | Burbank (85%), Los Angeles (15%) | 350.10 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| Tujunga Wash | TW_AOI_1 | TW-040 | Highest Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 2 & 10 (93%) & Alexandria Park (2%) & Valley Plaza Park South (1%) | Los Angeles | 433.58 |
| | | TW-044 | High Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 3 (4%) | Los Angeles | 56.33 |
| | TW_AOI_2 | TW-067 | Highest Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 10 (5%) & Valley Plaza Park South (3%) | Los Angeles | 255.77 |
| | | TW-072 | High Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 10 (1%) & Whitsett Fields Park Noth (1%) | Los Angeles | 225.55 |
| | | TW-075 | Highest Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 5 (3%) | Los Angeles | 291.40 |
| | | TW-079 | Highest Priority | Medium Priority | NA | NA | Los Angeles | 1,732.87 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | TW-083 | High Priority | Medium Priority | NA | NA | Los Angeles | 24.29 |
| | TW_AOI_3 | TW-095 | High Priority | Medium Priority | NA | Strathern Park North (37%) & Whitsett Fields Park North (3%) & LAR Segment C Urban Runoff Project No. 10 (1%) | Los Angeles | 16.45 |
| | | TW-105 | Highest Priority | Medium Priority | NA | City of San Fernando Regional Park Infiltration Project (3%) & David M. Gonzales Recreation Center (2%) | Los Angeles (32%), San Fernando (4%), Unincorporated (64%) | 37,408.81 |
| | TW_AOI_4 | TW-110 | Highest Priority | Medium Priority | NA | David M. Conzales (https://www.laparks.org/reccenter/david-m-gonzales) Recreation Center (2%) | Los Angeles | 713.64 |
| Verdugo Wash | VW_AOI_1 | VW-003 | Highest Priority | Medium Priority | NA | NA | Glendale | 97.02 |
| | | VW-012 | Highest Priority | Medium Priority | NA | NA | Glendale | 138.81 |
| | | VW-013 | Highest Priority | Medium Priority | NA | LAR Segment C Urban Runoff | Glendale | 110.47 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Project No. 6 & 4 (3%) | | |
| | | VW-016 | Highest Priority | Medium Priority | NA | NA | Glendale | 399.14 |
| | | VW-022 | Highest Priority | Medium Priority | NA | NA | Glendale | 114.40 |
| | | VW-023 | Highest Priority | Medium Priority | NA | NA | Glendale | 307.76 |
| | VW_AOI_2 | VW-033 | Highest Priority | Medium Priority | NA | LAR Segment C Urban Runoff Project No. 4 (49%) | Glendale | 126.45 |
| | | VW-034 | Highest Priority | Medium Priority | NA | NA | Glendale | 103.53 |
| | | VW-044 | Highest Priority | Medium Priority | NA | LAR Segment C Urban Runoff Project No. 4 (17%) | Glendale | 49.90 |
| | | VW-047 | Highest Priority | Medium Priority | NA | NA | Glendale | 250.43 |
| | | VW-059 | Highest Priority | Medium Priority | NA | NA | Glendale | 512.40 |
| | | VW-061 | Highest Priority | Medium Priority | NA | NA | Glendale | 242.60 |
| | VW_AOI_3 | VW-090 | Highest Priority | Medium Priority | NA | NA | Glendale | 267.42 |
| | | VW-095 | Highest Priority | Medium Priority | NA | Winery Canyon Channel (5%) | Glendale (44%), La Canada Flintridge | 1,049.17 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | (44%), Unincorporated (12%) | |
| | | VW-099 | High Priority | Medium Priority | NA | NA | Glendale | 162.89 |
| | VW_AOI_4 | VW-106 | Highest Priority | Medium Priority | NA | NA | Glendale (4%), La Canada Flintridge (63%), Unincorporated (33%) | 1,368.97 |
| | | VW-109 | High Priority | Medium Priority | NA | NA | Glendale (4%), La Canada Flintridge (5%), Unincorporated (91%) | 1,885.73 |
| | | VW-111 | High Priority | Medium Priority | NA | NA | Glendale | 472.43 |
| | | VW-113 | High Priority | Medium Priority | NA | NA | Glendale (91%), Unincorporated (9%) | 84.33 |
| | VW_AOI_5 | VW-118 | High Priority | Medium Priority | NA | NA | Glendale | 555.98 |
| | | VW-123 | High Priority | Medium Priority | NA | NA | Glendale (24%), Unincorporated (76%) | 1,544.09 |
| | | VW-124 | Highest Priority | Medium Priority | NA | NA | Glendale | 35.74 |

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | VW-127 | Highest Priority | Medium Priority | NA | NA | Glendale (76%), Los Angeles (1%), Unincorporated (23%) | 893.83 |
| | | VW-131 | High Priority | Medium Priority | NA | NA | Glendale (71%), Los Angeles (29%) | 252.83 |
| Segment D Mainstem | LAR-D_AOI_1 | LAR-D-024 | High Priority | Low Priority | NA | LAR Segment D Urban Runoff Project No. 1 (56%) | Los Angeles | 96.32 |
| | | LAR-D-027 | High Priority | Low Priority | NA | NA | Los Angeles | 4.15 |
| | | LAR-D-030 | High Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 1 (84%) | Los Angeles | 1,256.41 |
| | | LAR-D-043 | High Priority | Low Priority | NA | LAR Segment D Urban Runoff Project No. 1 (1%) | Los Angeles | 96.17 |
| | LAR-D_AOI_2 | LAR-D-108 | High Priority | Low Priority | NA | LAR Segment D Urban Runoff Project No. 11 (1%) | Los Angeles | 36.25 |
| | | LAR-D-120 | High Priority | High Priority | NA | LAR Segment D Urban Runoff Project No. 12 (63%) & LFTF 2 Ballona Creek TSO Project (1%) | Los Angeles | 1,122.70 |

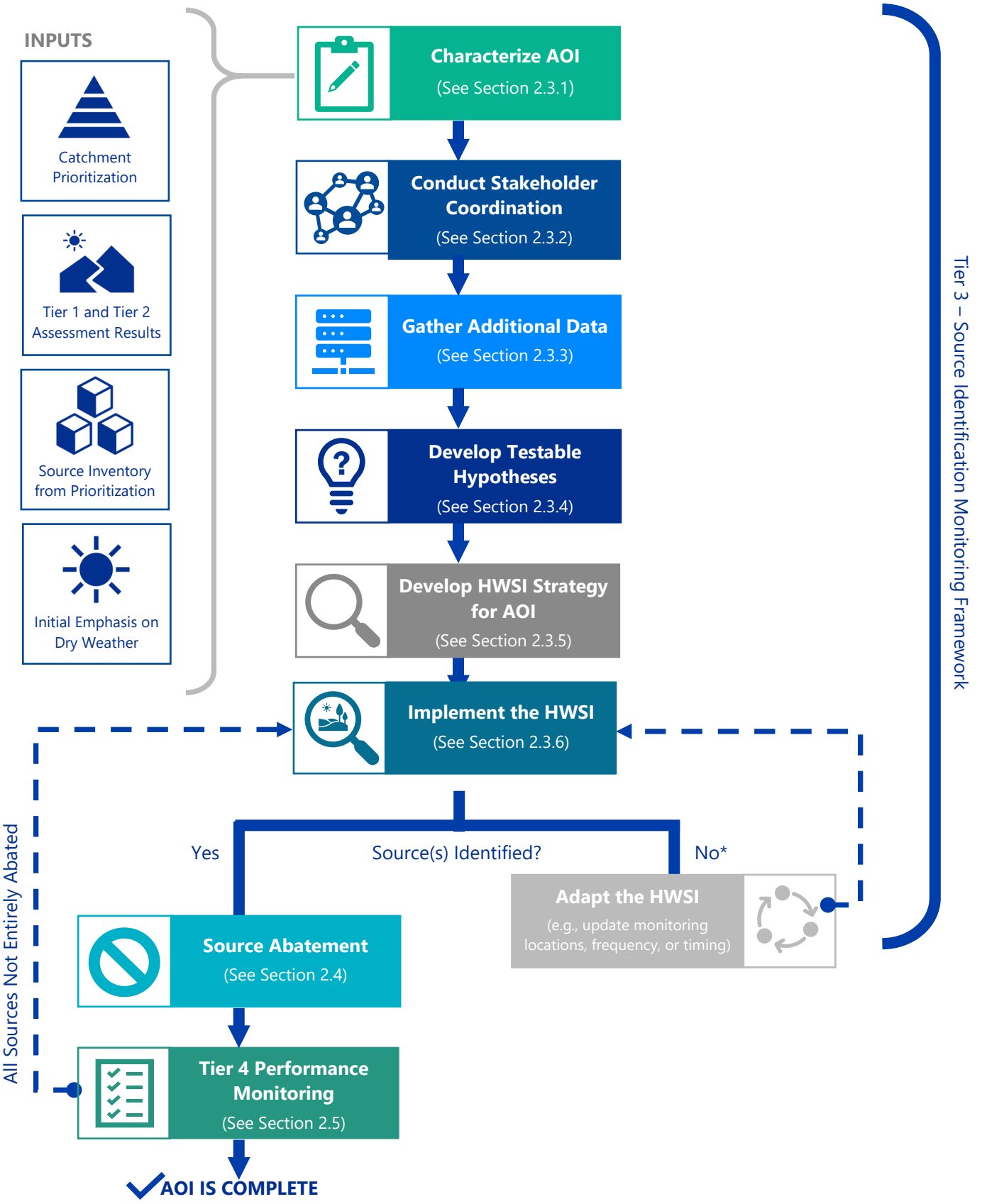
**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

| Segment/Tributary | AOI Number ID | Outfall ID | Outfall Catchment Priority (Dry Weather) | Outfall Catchment Priority (Wet Weather) | Does the Catchment Drain to a Built Project (Percent of Catchment within Project Drainage Area) | Does the Catchment Drain to a Planned Project (Percent of Catchment within Project Drainage Area) | Responsible Agencies (Percent of Catchment Area) | Drainage Area (acres) |
|---|---|---|---|---|---|---|---|---|
| | | LAR-D-132 | High Priority | Medium Priority | NA | LAR Segment D Urban Runoff Project No. 12 & 13 (99%) | Los Angeles | 633.10 |
| Bull Creek | BULC_AOI_1 | BULC-056 | High Priority | Medium Priority | NA | NA | Los Angeles | 59.19 |
| | | BULC-064 | High Priority | Medium Priority | NA | Aliso Limekiln Restoration (2%) | Los Angeles | 1,977.69 |
| | | BULC-074 | High Priority | Medium Priority | NA | NA | Los Angeles | 668.15 |
| | BULC_AOI_2 | BULC-109 | High Priority | Medium Priority | NA | NA | Los Angeles | 0.00 |
| | | BULC-RW-EAST-UP | High Priority | Medium Priority | NA | NA | Los Angeles (58%), Santa Clarita (2%), Unincorporated (40%) | 4,139.03 |
| | | BULC-RW-WEST-UP | High Priority | Medium Priority | NA | NA | Los Angeles | 1,498.25 |

## 2.3 Source Investigation Framework

If an AOI is to be addressed through source abatement, rather than a project, the following framework for source investigations will be implemented. To identify sources of human waste within an AOI, a human waste source investigation (HWSI) will be completed following an efficient and systematic approach. AOI Monitoring Plans will be developed in combination with the *ULAR LRS Sampling and Analysis Plan/Quality Assurance Program Plan* (SAP/QAPP, [ULAR WMG, 2020]) to guide future HWSIs in the ULAR WMA that will help to achieve the objectives of the LRS Adaptation Plan. This section describes the general steps the Group will use to identify human fecal sources, tracking tools, and key considerations that should be made at the time of developing a localized monitoring strategy. Figure 2-18 depicts the specific steps the Group will use to identify human fecal sources, which are shortened and adapted from *The California Microbial Source Identification Manual* (SCCWRP, 2013) and account for the significant compilation and assessment of source, monitoring, infrastructure, and BMP data that was completed during the development of this Plan. By leveraging the water quality condition assessments and catchment prioritization, the Group will be able to efficiently develop and complete HWSIs throughout the WMA.

Refer to Appendix B for an example of the application of the source identification monitoring framework for the AS-17 AOI.




**Reasons to adapt an HWSI can be driven by other factors (e.g., additional stakeholder input, additional data, new scientific techniques, etc.)*

Figure 2-18. Framework for Source Identification and Relationship to Source Abatement and Performance Monitoring Activities

### 2.3.1 Characterize AOI

As shown in Figure 2-19, following catchment prioritization and AOI selection, additional details about the AOI should be gathered that will inform the HWSI. Potential sources of human fecal contamination may be known but not represented in the prioritization. Examples include but are not limited to recreational vehicle dumping sites, conditional permits such as swimming pool discharges, WDRs for agriculture or recycled water, or other NPDES permits.

Desktop GIS analysis to refine mapping for the AOI will also occur during this stage. Refinements may include identification of areas with data gaps, updates to municipal boundaries or parcel ownership, and catchment delineation for field investigations or other HWSI planning purposes. Maps summarizing the AOI-specific information may be used to assist with HWSI planning, stakeholder coordination, and monitoring site and methodology selection.

During AOI characterization, stakeholder groups will be identified, and an inventory developed so that coordination with can be initiated before developing the monitoring plan. Following the AOI characterization, stakeholder coordination will be conducted.

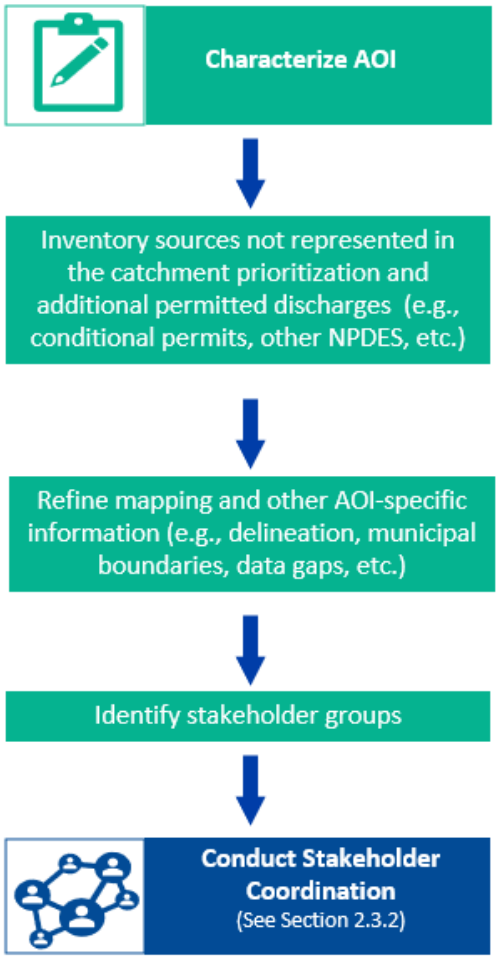



Figure 2-19. AOI Characterization Activities

### 2.3.2 Conduct Stakeholder Coordination

Stakeholders may include both governmental and non-governmental organizations (water/wastewater agencies, Caltrans, Phase II Permittees, other permitted dischargers, etc.), regional monitoring groups such as the Southern California Monitoring Coalition, and others. The entities identified during the AOI characterization will be contacted as appropriate and additional data gathered from these partners may help to fill data gaps or provide additional support for HWSI efforts. In addition, during HWSI strategy development, the Group may work with various stakeholders for access, rights of entry, and other needed monitoring coordination. Depending on the size, location, and number of jurisdictions within an AOI, a Regional AOI Team may be formed and will include key stakeholder groups. Potential considerations for forming a Regional AOI team are presented in Figure 2-20.

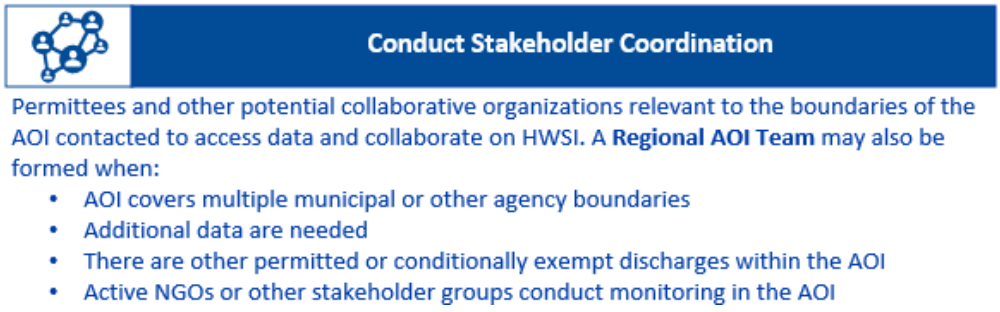



Figure 2-20. Stakeholder Coordination Considerations

### 2.3.3 Gather Additional Data

To address inherent site-specific characteristics and generate testable hypotheses for a particular AOI, the Group will complete more focused data collection within the boundaries of the AOI. Permittees will work with the local agencies identified in AOI characterization and associated with the Regional AOI Team to compile additional monitoring data (e.g., presence/ frequency/ locations of non-stormwater MS4 discharges, etc.), GIS data (e.g., sewer/storm drain locations, ages, material, condition at last inspection, invert elevation, etc.), source data, MS4 outfall dry and wet weather monitoring data, and other relevant information. Visual or sanitary surveys may also be conducted as needed during this stage to identify sources of pollution and gain more familiarity with conditions within the bounds of the AOI. Of particular importance for dry weather HWSIs will be verifying that the outfalls associated with an AOI have persistent non-stormwater discharges. While the catchment scoring and prioritization summarized in Section 2.2 leverages data produced by the dry weather outfall screening events, additional confirmation is needed prior to finalizing any HWSI strategy. Figure 2-21 lists potential additional data sources and activities to fill data gaps.

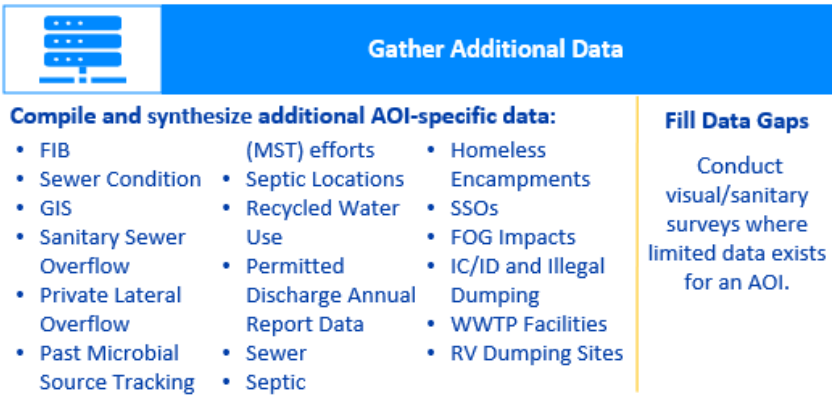



Figure 2-21. Potential Additional Data

### 2.3.4 Develop Testable Hypotheses

With the understanding that resources are limited, monitoring methods are expensive, and results are potentially highly variable, the Group will define testable hypotheses which tie back to the primary goals of the LRS Adaptation Plan and are specific to the targeted AOI. Well-defined hypotheses are the basis for designing an effective investigation that selects the most appropriate source tracking and identification methods. The goal for any monitoring design associated with the LRS Adaptation Plan would be to test the null hypothesis (e.g., that Catchment(s) X, Y, and Z are a source of human fecal contamination at a downstream impaired receiving water) and if the null hypothesis is rejected, to conclude with some level of confidence that the identified catchments are not a source of human fecal contamination (Figure 2-22). Accordingly, monitoring the variables (e.g., differing times of the day), pertinent locations (i.e., catchment outfalls), as well as monitoring close to the impaired receiving water will usually produce the data necessary to test the hypothesis. The following summarizes several typical hypotheses that the Group can expect to apply, as appropriate to specific site conditions, given the range of AOIs defined:

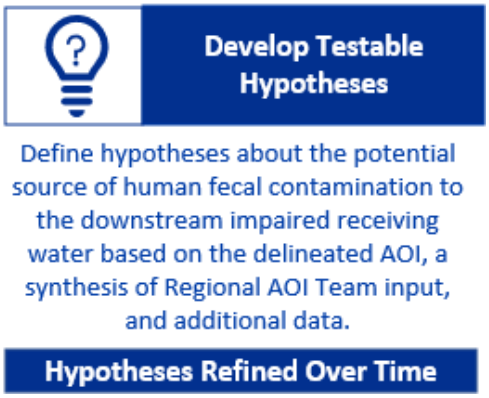



Figure 2-22. Description of Testable Hypotheses

- Catchments X, Y, Z within the AOI are a significant and continuing source of human fecal contamination at a downstream impaired receiving water.
- Encampments are a major source of human fecal contamination within the MS4 of Catchment X.
- Contaminated groundwater is infiltrating into the MS4 of Catchment Y.
- The sanitary sewer system is leaking, and raw sewage is infiltrating into the MS4.
- The creek is a major source of human fecal contamination at the downstream impaired receiving water.

The Group may define additional questions to help guide sequential evaluations, which depend on whether a previous, relevant hypothesis was accepted or rejected. After analyzing data collected pursuant to an AOI Monitoring Plan, the Group will revise the hypotheses, as needed, to further investigate the spatial and temporal patterns observed.

### 2.3.5 Develop Human Waste Source Identification Strategy

HWSIs must be accomplished in a systematic manner to ensure temporal and spatial relevance, sufficient data is collected for addressing testable hypotheses, and effective use of limited resources. This will be accomplished through the development of an AOI-specific Monitoring Plan. These plans will be used in combination with the ULAR LRS SAP/QAPP to establish site-specific parameters for HWSIs. The components and major considerations for developing these plans are presented in Figure 2-23 with additional details provided below. The following information is presented to guide HWSI efforts, but ultimately will be tailored based on AOI-specific Monitoring Plans.

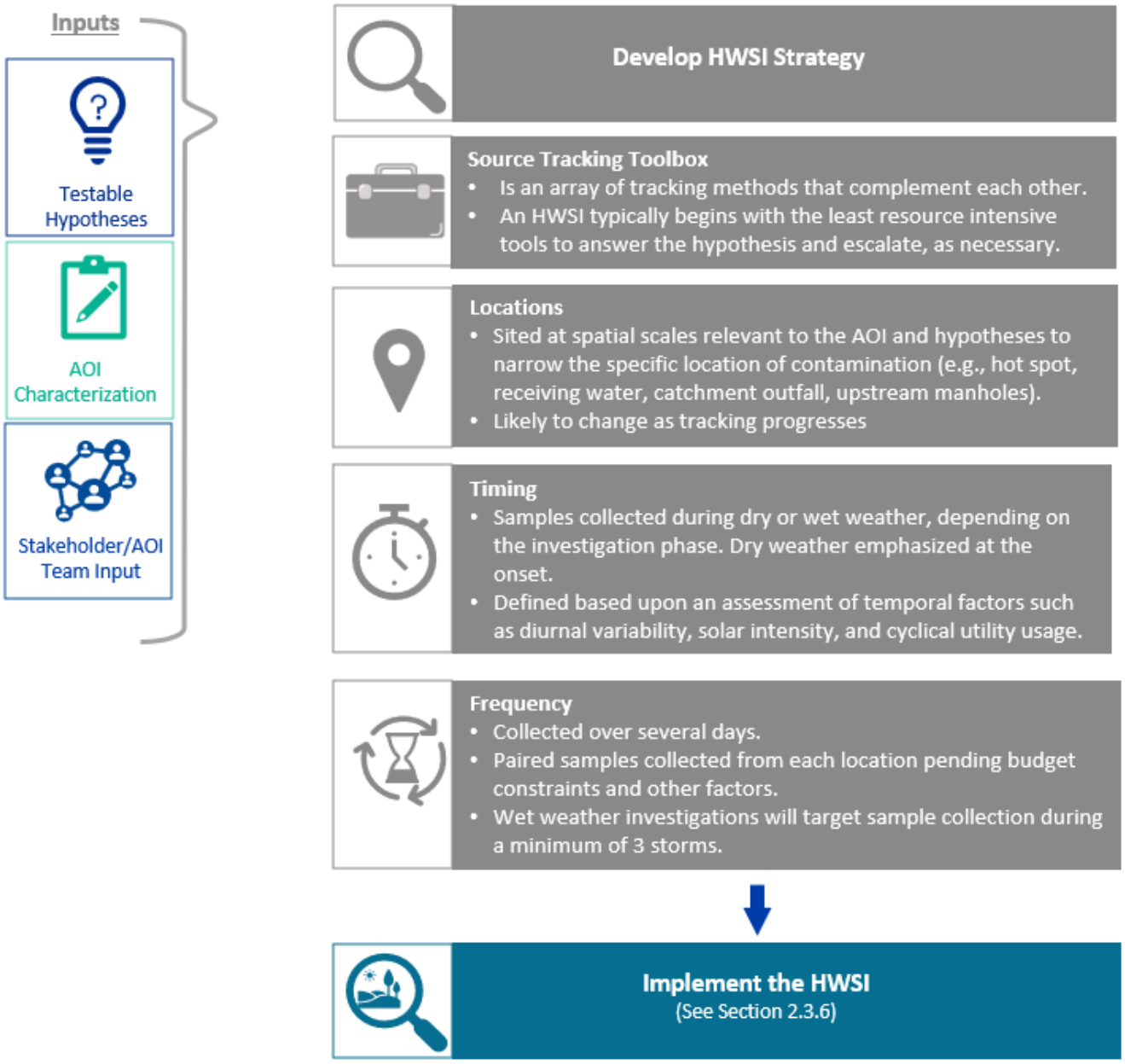



Figure 2-23. Considerations for Developing an AOI-Specific HWSI Strategy

### Human Waste Source Tracking Toolbox

The HWSI Toolbox presented in the LRS SAP/QAPP describes a range of methods or techniques which can be used to identify sources of human waste. These include conventional methods, such as the collection of FIB data, dye and smoke testing, and close-circuit television (CCTV); as well as non-traditional indicators. Each tool has its own set of benefits and drawbacks and the added consideration of costs and availability. As such, a toolbox approach whereby multiple source identification tools are considered offers the best strategy for effectively identifying sources of human waste. Source identification tools can be generally categorized according to the type of indicator each uses to identify the presence of human waste. More specifically, bacterial markers include FIB and human source markers, such as HF183; viral markers use the presence of

viruses; chemical markers rely on a variety of chemicals to indirectly track the presence of human waste, such as caffeine, fecal sterols, and optical brighteners; and physical markers such as dye testing, smoke testing, and CCTV represent more traditional methods historically used by municipalities.

The Group will develop each AOI-specific HWSI and monitoring plan using resources from the toolbox that complement each other to provide a dataset capable of definitively rejecting or accepting the testable hypotheses. Generally, a cost-effective and comprehensive source identification strategy follows a tiered approach that begins with relatively easy and low-cost tools, followed by increasingly complex and/or expensive tools. The easiest and most low-cost tool to be implemented first would include a desktop review of available GIS coverages followed by a "windshield" or visual survey of the catchments in question. This visual survey can be an informal assessment of potential sources or conducted according to a formal Sanitary Survey protocol. This initial approach serves to gather as much accurate data as possible about the AOI.

The next intermediate phase of the strategy would employ the use of paired sampling for traditional (i.e., *E. coli*) and non-traditional indicators (i.e., HF183). If existing information warrants it, dye or smoke testing, or CCTV/ electroscan could be used at this stage to identify any illicit connections or sewage leakages into the storm drain catchment. Depending on the phase of an investigation, another tool could be flow-paced sampling for bacterial indicators, if sporadic pulses of dry weather runoff are observed in the catchment or reported flowing to the receiving water. Similarly, chemical indicators could be used for the purposes of screening outfalls (note, they should not be used during receiving water investigations as they can quickly become diluted to non-detection levels). For additional details pertaining to the use of chemical markers for dry and wet weather outfall investigations, refer to the LRS SAP/QAPP.

At sites where FIB results indicate the presence of fecal contamination, it is important to pair this result with sampling that distinguishes between fecal sources to determine if human fecal material is present. It should also be noted though that if recycled water is used within the AOI, analytical results from the HF183 assay may yield false positives, since the current HF183 assays are predictive of all DNA material in the sample, regardless of treatment and subsequent viability of the target organisms (Urban Water Resources Research Council 2014; Aslan, et al. 2013; Nocker et al. 2006; Bae et al. 2009). Therefore, specificity should be confirmed by testing reference fecal pollution (e.g., raw sewage, aged sewage) and sources of treated wastewater (i.e., secondary and tertiary) in the watershed. Additional chemical indicators, such as caffeine, should also be sampled in catchments where recycled water is present to provide an additional line of evidence regarding the presence/absence of human fecal contamination (Urban Water Resources Research Council 2014). While there are several more expensive and complicated tools that can still be used (i.e., human-specific viral markers), this tiered approach strikes the right balance of effort and cost and should yield enough data and analytical insight to be able to answer the testable hypotheses.

### Sampling Locations

The selection of monitoring sites at the time of developing a monitoring design will ultimately depend on the testable hypotheses derived by the Group and the specific phase of any source identification investigation. Early phases of the investigation will likely focus on narrowing down potential "hot spots" by way of receiving water and/or catchment outfall sites, whereas later phases of investigations will focus on locations within a Permittee's MS4.

To obtain a clear idea of where contamination may be greatest within an AOI, samples will be collected at relevant spatial scales to narrow the specific location of potential contamination. For a receiving water, sampling

above and below the confluence of tributaries, as well as bracketing catchment outfalls, will allow for the Group to narrow down possible upstream urban sources. At a receiving water, this may involve sampling from stream banks at fixed intervals to determine where contamination is the highest (i.e., a "hot spot"). Note, locations may not be directly associated with the segment deemed impaired. Within the MS4, this may involve synoptic sampling (i.e., collection of samples from many locations during a short period of time) up-watershed to understand where in the MS4 the contamination begins or intensifies, similar to the Group's current approach to IDDE investigations. The Group will focus sampling in places that represent "worst-case conditions" so that if results come back negative for human source markers, it is more likely that contamination problems truly do not exist.

#### Sampling Timing and Frequency

The LRS Adaptation Plan focuses on the identification and abatement of dry weather sources followed by wet weather sources; therefore, source investigations will inherently include a seasonal component. However, as *The California Microbial Source Identification Manual* describes in detail, understanding the temporal variability (i.e., trends over time) of historical data will greatly assist with the design of a source investigation (SCCWRP 2013). Accordingly, the Group will consider temporal factors during the planning phase of an investigation to better define the timing of sample collection associated with human fecal source investigations, including:

1. Portions of the MS4 that may be physically diverted to the sanitary sewer system or a separate treatment system during certain times of the year.
2. Whether diurnal trends exist in the historical data. Diurnal trends associated with receiving waters may suggest the potential for bathers as a possible source or the impact of solar radiation.
3. Whether there is no temporal trend associated with receiving water impairments, which may suggest intermittent sources such as illegal dumping.

During dry and wet weather, sampling at a regular time scale over one or more days at all sampling locations should reveal if contamination is affected by solar intensity or affected by cyclical usage of utilities such as the sanitary sewer. The Group will also attempt to specify sample collection times that represent "worst-case conditions" so that if results come back negative for human-specific markers, it is more likely that contamination problems do not truly exist.

Samples should be collected over several days representing typical conditions to obtain a sufficient number of paired samples from each sample location; however, budgetary constraints and other monitoring design elements will ultimately specify the final target sample count per site. For wet weather investigations, the Group will look for confirmation of results over multiple storms, with a minimum of three storms sampled.

### 2.3.6 HWSI Implementation

Once the individual HWSI strategy and AOI Monitoring Plan have been developed, HWSI activities will be conducted in accordance with the LRS SAP/QAPP. The processes outlined in Figure 2-24 for dry and wet weather represent generalized HWSIs; however, based on the specific conditions of the AOI and the hypotheses, the methods may vary.

**Upper Los Angeles River: Load Reduction Strategy Adaptation Plan**

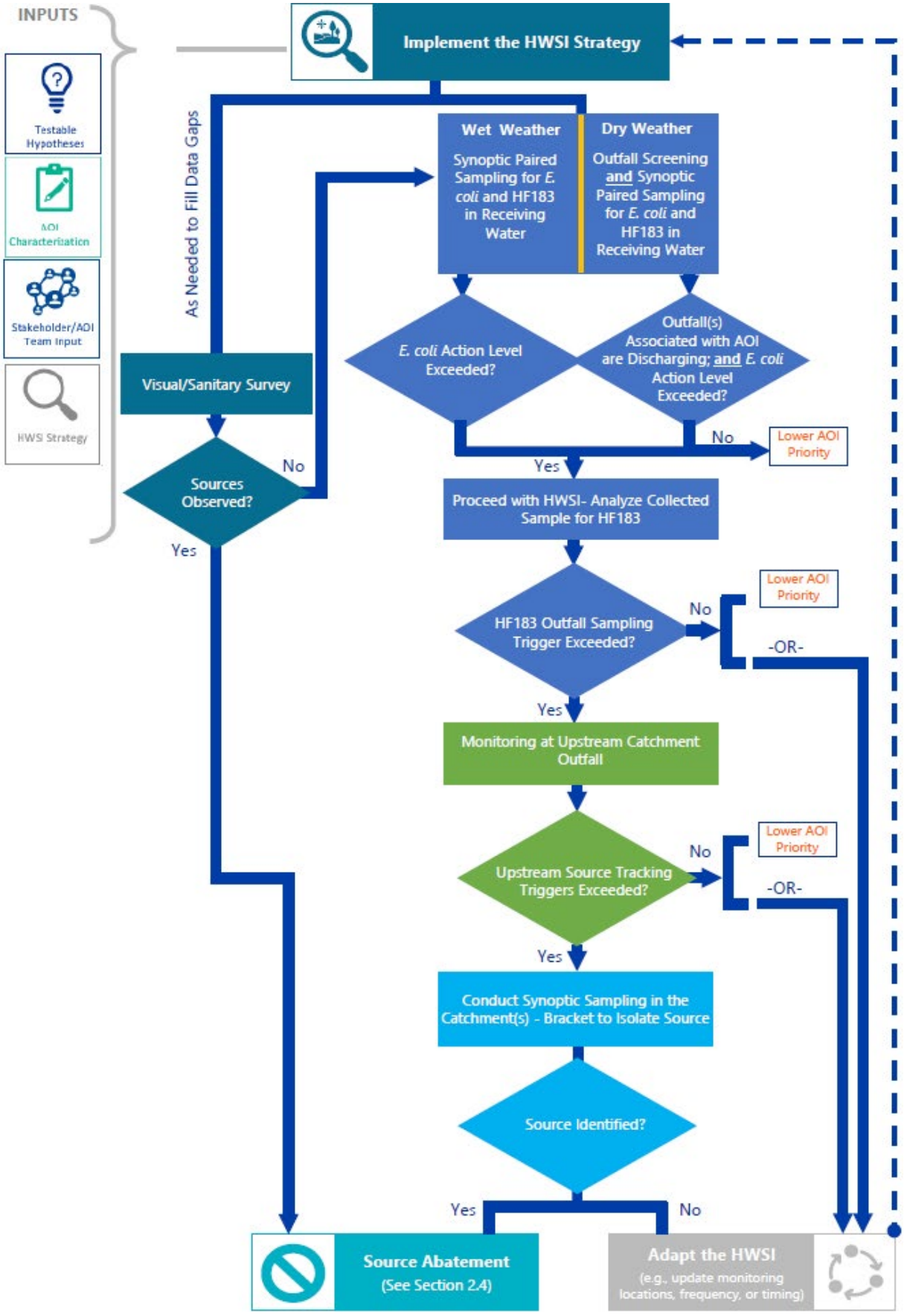



Figure 2-24 Conceptual Process of a Human Waste Source Investigation

### Action Levels

The Group will utilize a combination of water quality and regulatory criteria and specific monitoring triggers to help guide source investigations. Dry and wet weather data assessment methods will generally consist of traditional quality assurance/quality control and statistical analysis techniques for the purpose of analyzing and describing monitoring results. The Group will consider three different triggers and associated action levels to guide decision making throughout the HWSI:

1. When to analyze paired Fecal Indicator Bacteria (FIB)/HF183 samples;
2. When to perform catchment outfall sampling; and
3. When to initiate catchment source tracking.

The action levels for the three triggers are presented in Table 2-7 below. For the catchment outfall sampling and source tracking triggers, when *E. coli* results are below the specified action levels, the paired HF183 sample will not be analyzed given that recreational health risks are expected to be low. In order to trigger catchment outfall and catchment source tracking, both the *E. coli* and HF183 concentrations must exceed the action levels.

Table 2-7: Summary of Action Levels Triggering HWSI Source Tracking Steps

| Indicator | Action Level | |
|---|---|---|
| **1. Receiving Water FIB Action Level** | | |
| *E. coli* | >320 CFU/100 mL | >10% results exceed action level |
| **2. Catchment Outfall Sampling Triggers-** Determined from receiving water | | |
| *E. coli* | >320 CFU/100 mL | >10% results exceed action level |
| HF183 | >1,000 copies/100 mL | >10% results exceed action level |
| **3. Catchment Source Tracking Triggers-** Determined from catchment outfall and continuing up-catchment | | |
| *E. coli* | >320 CFU/100 mL | >10% results exceed action level |
| HF183 | >4,100 copies/100 mL | >10% results exceed action level |

The LRS SAP/QAPP describes the techniques Permittees will use to verify and validate the monitoring data is useful for its intended purposes (i.e., Section 18.0 of the SAP/QAPP and the specific action levels that will be used to guide HWSIs in SAP/QAPP Section 2.2.2). The following sections summarize each of these triggers and their application during a source investigation.

### *Receiving Water FIB Action Level-Trigger for HF183 Sample Analysis*

Paired *E. coli* and HF183 samples will be collected at the HWSI receiving water sites; however, it may not always be necessary to analyze for HF183 if low concentrations of *E. coli* are consistently detected. Both dry and wet weather FIB results at the receiving water sample sites will be evaluated relative to the relevant statistical threshold values (STV) defined in the *Bacteria Provisions and Variance Polic*y (adopted on August 7, 2018 [Resolution No. 2018-0038], which is a component of the SWRCB's *Water Quality Control Plan for Ocean Waters in California* (the California Ocean Plan) and Part 3 of the *Water Quality Control Plan for Inland Surface Waters, Enclosed Bays and Estuaries of California*. Table 2-8 presents the pertinent STV concentrations for receiving waters in the ULAR WMA. This STV, which was derived from values presented in USEPA's 2012 *Recreational Water Quality Criteria*, represents the predicted 90th percentile value for a water quality distribution corresponding to ~32 illnesses per 1,000 water contact recreators. Should an *E. coli* sample result exceed the STV, the paired HF183 sample (collected at the same time) will be analyzed.

Table 2-8: Receiving Water FIB Action Level

| Receiving Water Conditions | Fecal Indicator Bacteria | Action Level (CFU/100 mL) |
|---|---|---|
| Receiving water where the salinity is equal to or less than 1 ppt 95 percent or more of the time | *E. coli* | 320 |

### *Triggers for Catchment Outfall Sampling*

Upon evaluating receiving water results, the Group will decide whether to perform catchment outfall sampling. This determination will be based on the combination of *E. coli* and HF183 sample results from the receiving water sampling. An action level derived from recent studies will be used as a reference point for making decisions about how to proceed with source investigations. Specifically, *E. coli* results will be compared to the STV presented in Table 2-7, and HF183 sample results will be compared to an action level of 1,000 copies/100 mL. This action level, derived from Boehm et al. (2018), is health-protective because it represents:

1. The density of HF183 corresponding to a median risk of approximately 30 illnesses per 1,000 recreators;
2. Assumes any sewage contamination in the receiving water is aged 2.5 days, which can be considered a worst-case scenario for surface water contamination; and
3. Is lower than the threshold derived for site-specific conditions associated with the Surfer Health Study (2,655 copies/100 mL).

More recently, new research indicates that for recreational health risk in receiving waters, 525 copies/100 mL of HF183 corresponds to a recreational risk threshold of 32 illnesses/1,000 recreators (Boehm and Soller, 2020). While in the future, the action level may be adapted to reflect this lower threshold, the 1,000 copies/100 mL action level allows the group to manage limited resources to implement a more streamlined and cost efficient HWSI while still effectively controlling risk. If additional investigation is needed to identify problem areas, the HWSI can be adapted to utilize a lower HF183 threshold. It is also expected that the values may change over time, and ultimately, the assessment of potential risk will be based on the most scientifically defensible data.

Concluding an HWSI and AOI closeout will occur based on performance monitoring (see Section2.5). AOI completion will be determined by assessing risk from the MS4 system within the AOI to the receiving water based on the latest science. The thresholds used to assess risk will be subject to change over time.

#### *Triggers for Catchment Source Tracking*

If catchment outfall sampling is triggered, catchment outfall sample analysis for *E. coli* and HF183 will proceed using the same triggers presented in Table 2-7. Pursuant to these triggers, when *E. coli* results for a catchment outfall discharge are below the STV, the paired HF183 sample will not be analyzed as the discharge poses little risk to downstream recreators. However, when an STV is exceeded, the paired HF183 sample will be analyzed. The Group will use HF183 results to determine whether human fecal sources exist at levels that pose an elevated risk to recreators, and if so, will trigger source tracking within the catchment draining to the outfall.

At the catchment outfall, *E. coli* results will be compared to the action level presented in Table 2-7, and HF183 sample results will be compared to an action level of 4,100 copies/100 mL. This action level, derived from Boehm et al. (2018), represents a median risk of approximately 30 illnesses per 1,000 water contact recreators for contamination of unknown age. Although the HF183 action level for triggering *catchment outfall sampling* uses a more health-protective assumption regarding the age of contamination, this source tracking phase uses a more robust and comprehensive assumption that the age of the contamination is unknown. This action level may be updated through the adaptive management process, discussed further in Section 3.4, as advances in the science or regulatory updates occur.

### Lowering the Priority of an AOI

During the course of a HWSI, the AOI may be deemed a lower priority when monitoring results at the receiving water or catchment outfall indicate that the risk to recreators from the discharge is below accepted risk-based thresholds (RBTs) (see Figure 2-24). The RBTs for the HWSI will consist of the *E. coli* and HF183 catchment outfall action levels identified in Section 2.3.6 and Table 2-7. Recent advancements in the state-of-the-science that identify lower HF183 concentrations (i.e., 525 copies/100 mL, [Boehm and Soller, 2020]) may be used in the future to reflect a more conservative determination of potential risk. If the action levels are not exceeded at the receiving water or catchment outfall, the HWSI will be closed, or the AOI ranked a lower priority. The AOI may also be considered a lower priority or the AOI boundaries refined for dry weather HWSIs when catchment outfalls are determined to be dry during three visits, consistent with the Non-Stormwater (NSW) Outfall Program.

### HWSI Adaptation

A HWSI can be adapted over time based on the monitoring results to update locations, frequency, timing, or tools to increase the effectiveness of the monitoring strategy in supporting or refuting the hypotheses. The HWSI may also be updated to reflect scientific advances, constructed structural BMPs, new permitted discharges, or regulatory updates that affect the AOI or appropriate action levels.

## 2.4 Source Abatement Strategies

Following identification of a source or sources of human waste through the HWSI, the applicable ULAR agencies will implement human waste control actions to abate identified human sources (e.g., coordinating with wastewater agencies or private lateral owners to address identified sewer leaks and/or illicit connections, referral to responsible departments on encampment waste sources, and addressing any other identified illicit discharges to the MS4). Coordination with wastewater agencies as well as other agencies is an important step in the process.

There are many strategies which can be used to abate sources of human waste. The selection of appropriate strategies should be driven by data obtained during source investigation activities. Selected strategies will vary based on the identified source(s) within a catchment and the extent to which each source could be contributing to the human waste indicators within the catchment's discharge. Some strategies may be used to abate sources that are contributed during dry and wet weather conditions and others may only be effective in abating dry weather sources. It is also important to note that many of the investigation procedures outlined in Section 2.3 of this Plan will also trigger simultaneous abatement. For example, if an illicit connection/illicit discharge is discovered during investigation, that source will be immediately eliminated per Permit requirements. Likewise, any SSOs which occur during plan implementation would be abated.

The institutional control measures detailed in the ULAR EWMP remain key tools for the ULAR agencies to control sources prior to entering receiving waters. The following programs and activities in particular provide valuable human waste source abatement:

***Illicit Connections and Illicit Discharges Elimination Program:*** Respond to sewage and other spills that may discharge into the MS4.

***Public Agency Activities Program:*** Maintain the MS4, including catch basin cleaning, channel maintenance, and implementation of controls to prevent and eliminate infiltration of seepage from sanitary sewers to the MS4.

***Industrial/Commercial Facilities Program:*** Conduct regular facility inspections and issue violations.

***Progressive Enforcement:*** Conduct and track enforcement through (1) follow-up inspection; (2) enforcement action; (3) records retention; (4) referral of violations; (5) investigation of complaints; (7) assistance with Regional Board enforcement actions.

***Public Information and Participation Program:*** Lead robust education and outreach efforts that measurably increases knowledge and changes behavior.

The State Water Resources Control Board (SWRCB) adopted Statewide General Waste Discharge Requirements (WDRs) for Sanitary Sewer Systems, Water Quality Order No. 2006-0003 (Sanitary Sewer Systems WDR) on May 2, 2006. The WDRs require public agencies that own or operate sanitary sewer systems to develop and implement sewer system management plans (SSMPs) and report all SSOs and private lateral overflows to the SWRCB's online SSO database. The WDRs include directives for owners and operators of sanitary sewer systems to demonstrate adequate and efficient management, operation, and maintenance of the sanitary sewer system. Generally, the WDRs require that:

- In the event of an SSO or private lateral overflow, all feasible steps shall be taken to control the released volume and prevent untreated wastewater from entering storm drains, creeks, etc.
- If an SSO or private lateral overflow occurs, it must be reported to the SWRCB using the CIWQS, the online reporting system developed by the SWRCB.
- A SSMP, with all mandatory elements, must be developed and approved by the governing body that owns or is responsible for the operation of the sanitary sewer system.

Overflow Emergency Response Plans generally include provisions to ensure that:

- Sewage spill sites are thoroughly cleaned as soon as possible after an overflow. No residue will be left that may impact future water quality.

- Sewage spill sites are secured to prevent public contact until the site has been thoroughly cleaned.
- Wherever possible, the affected area is thoroughly flushed and cleaned of any sewage. Wash-down water shall be contained. Solids and debris shall be flushed, swept, raked, or picked-up by hand, and hauled away for proper disposal.
- Wherever appropriate (typically in areas with hard surfaces), the affected area will be deodorized. The materials used for this purpose shall be confined to the immediate area.

In February 2021, the SWRCB issued an informal staff draft Statewide Sanitary Sewer Systems General Order (Order WQ 202X-XXXX-DWQ). The informal staff draft looks to:

- Clarify existing prohibition of untreated waste discharge to waters of the State;
- Update the existing statewide General Order with implementation of State Water Board regulations and resolutions adopted since the 2006 adoption of the existing Order;
- Provide increased public transparency of sewer spill data, SSMPs, and sewer system performance;
- Enhance Regional Water Board enforcement for General Order enrollees failing to proactively reduce sewage spills;
- Address sewer system resiliency through proactive planning to:
- Identify system-specific impacts due to climate change, infrastructure age, population growth and other impacts, and
- Prevent future spills;
- Increase coordination with other utility agencies in the sewer service area;
- Update monitoring and reporting requirements to address cost of compliance and data quality assurance;
- Incentivize system owner employment of certified collection system operators; and
- Expand Order coverage to allow discretionary regulation of privately owned systems, allowing a Regional Water Board to require a privately owned system to obtain coverage under the Order.

Table 2-9 provides general abatement recommendations based on the source identified. The specific abatement strategy will vary based on conditions of the site and source(s) identified.

Table 2-9. Recommended Source Abatement by Source Type.

| Source Type | Abatement Recommendation |
|---|---|
| Malfunctioning wastewater, water, or recycled water infrastructure | Maintain, repair, or replace the infrastructure |
| Homeless Encampments | Coordinate with appropriate city departments[1]. Removal of trash and debris |
| SSOs | Repair of emergent cause and maintenance and/or repair to limit recurrence |
| FOG Impacts | Education and issue notice of violation |
| Illicit connection/illicit discharge | Education, issue notice of violation, and removal of connection |

1: Stormwater departments will refer the issue of homeless encampments to the appropriate departments, which will be subject to the latest legal policy on allowable actions to address. Management decisions will need to be made in line with the current legal approach.

In addition to the general abatement strategies discussed above and in Table 2-9, the Group will explore potential new abatement strategies, learning from other efforts in the region, further interpretation of monitoring data, and scaling abatement responses based on progress in the ULAR WMA. The following list describes potential new abatement strategies, including those that could require further collaboration between the ULAR MS4 Permittees and wastewater, or other, agencies:

- *Coordinate a ULAR WMA-wide sanitary sewer and MS4 vulnerability assessment which integrates pipe condition, rehabilitation efforts, and investigation outcomes;*
- *Develop a septic pump out rebate program for high priority areas;*
- *Develop a cost-share program to help pay for connecting residents to sanitary sewer;*
- *Develop a cost-share program to help pay for lateral repairs or replacements for properties which voluntarily inspect and discover deficiencies;*
- *Develop ordinances which require proactive private lateral inspections;*
- *Establish safe parking programs which provide sanitation services for transient communities;*
- *Provide "seasonal" public restrooms through the use of portable composting toilets;*
- *Contract with mobile dump station contractor to service transient community;*
- *Provide vouchers to the transient community to use existing dump stations;*
- *Fund and build new dump stations;*
- *Increase FOG inspections in high priority catchments;*
- *Coordinate ICID teams to focus on responding, identifying, tracking, and abating "incidents of human waste"; and*
- *Develop education outreach materials to distribute to facilities in high priority catchments which are likely to manage human waste disposal in outdoor facilities.*

If a source originates from a jurisdiction outside of the ULAR, the responsible party in the external jurisdiction will be notified so action may be taken to eliminate. If the responsible party is not responsive or otherwise does not eliminate the source in a timely manner, the ULAR agencies may notify the LARWQCB.

## 2.5 Performance Monitoring Framework

Performance monitoring focuses on evaluating the effectiveness of abatement activities for identified sources. After sources are abated according to the methods described in Section 2.4, the Group will conduct performance monitoring to assess the effectiveness of the abatement actions. Performance monitoring will generally be conducted within 3 to 12 months of abatement, depending on the source abated, and will primarily consist of collecting *E. coli* and HF183 samples at the catchment outfall according to locations, timing, and frequency defined in the AOI Monitoring Plan, for comparability. An exception may be necessary to expand or change the analytical suite based on the type of corrective action implemented or to change the frequency or type of sample collection to confirm reductions. For example, residual waste in sediment and groundwater may require more time to attenuate compared to repair of a private sewer lateral or sanitary sewer main. The action levels specified in Section 2.3.6 will be used to evaluate exceedances for AOI closeout, or more conservative values for HF183 may be used. The AOI completion metrics will likely change over time with the state-of-the-science and regulatory updates. Should performance monitoring results indicate an exceedance of the specified action levels, source tracking will be re-initiated and additional sources abated.

The Group may reach a point after repeated attempts of identifying human fecal sources within the same receiving water reaches and AOIs that additional investigation is unlikely to yield any benefits. This may occur if

there is a low, diffuse, and persistent source of contamination unrelated to the Permittee's MS4, such as groundwater contamination. Alternative compliance approaches will be examined in these situations.

Refer to Appendix B for an example of the application of performance monitoring for the AS-17 AOI.

# 3 PLAN IMPLEMENTATION

The LRS Adaptation Plan serves to update the ULAR Group's strategy to address the Bacteria TMDL for both dry and wet weather. This plan adapts previous LRS's submitted for Segments B, Arroyo Seco, Rio Hondo, Compton Creek and Segment E, as well as providing the outstanding segment and tributary LRS plans due in September 2021 (Aliso Canyon Wash, Bell Creek, Dry Canyon, and McCoy Canyon) and March 2023 (Segment C, Burbank Western Channel, Tujunga Wash, Verdugo Wash, Segment D, and Bull Creek). The outstanding wet weather plan due in March 2022 is also covered within this LRS Adaptation Plan.

The source investigation and abatement strategies in Section 2.3 and Section 2.4 provide the framework for ULAR agencies to implement. Each agency has the flexibility to address their responsible AOIs in the manner most appropriate to their needs and resources.

## 3.1 Reporting

Progress and findings in addressing the AOIs per the schedule in Section 3.2 will be reported to the LARWQCB through the ULAR Group's Annual Reports. These reports will clearly identify if an AOI is being addressed through a constructed project or with source abatement strategies. The culmination of the LRS Adaptation implementation process will be determining whether the constructed projects or source abatement strategies implemented are adequate to eliminate persistent human marker detections and FIB exceedances. If the performance monitoring demonstrates that persistent human marker detections and FIB exceedances have been eliminated, then the need for additional control measures to address human waste sources is eliminated. If persistent human marker detections have been eliminated, but FIB exceedances continue, then either structural treatment BMPs will continue to be pursued or an alternative compliance approach will be proposed. In addition, LRS reports will clearly flag any findings through the source investigation efforts where the identified source is outside of the MS4 responsibility.

## 3.2 Schedule and Next Steps

Table 3-1 presents the milestones for the LRS Adaptation implementation. These milestones reflect the schedule necessary to comply with the Bacteria TMDL, Table 9-5 in the TMDL, consistent with this adaptation representing a second phase of the LRS the Group is proactively pursuing.

Table 3-1. LRS Adaptation Milestones.

| Segment/Tributary | Action | Milestone |
|---|---|---|
| All | Initiate wet weather strategic monitoring at outfalls | October 2021 |
| All | Approval of the LRS Adaptation Plan | January 2022 |
| Segment B Mainstem | Complete dry weather source investigations or structural project plans in 100% of AOIs | August 2024 |
| | Complete dry weather source abatement or implementation of structural controls in AOIs and verification[1] | August 2026 |
| Arroyo Seco and Rio Hondo | Complete dry weather source investigations or structural project plans in 100% of AOIs | February 2026 |
| | Complete dry weather source abatement or implementation of structural controls in AOIs and verification[1] | February 2028 |
| Segment E Mainstem | Complete dry weather source investigations or structural project plans in 100% of AOIs | August 2027 |
| | Complete dry weather source abatement or implementation of structural controls in AOIs and verification[1] | August 2029 |
| Compton Creek | Complete dry weather source investigations or structural project plans in 100% of AOIs | February 2028 |
| | Complete dry weather source abatement or implementation of structural controls in AOIs and verification[1] | February 2030 |
| Aliso Canyon Wash, Bell Creek, Dry Canyon, and McCoy Canyon | Complete dry weather source investigations or structural project plans in 100% of AOIs | August 2031 |
| | Complete dry weather source abatement or implementation of structural controls in AOIs and verification[1] | August 2033 |
| Segment C Mainstem, Burbank Western Channel, Tujunga Wash, Verdugo Wash, Segment D Mainstem, Bull Creek | Complete dry weather source investigations or structural project plans in 100% of AOIs | February 2033 |
| | Complete dry weather source abatement or implementation of structural controls in AOIs and verification[1] | February 2035 |
| All | Complete additional wet weather source investigations in 100% of AOIs with remaining wet weather priorities | February 2035 |
| All | Complete follow-on wet weather source abatement or implementation of structural controls in remaining AOIs and verification[1] | February 2037 |
| All | Report progress on initiated AOIs and implement adaptive management[2], as appropriate. | Annually |

1: Completion of source abatement may be contingent on activities by others outside of the authority of the ULAR MS4 Permittees.
2: Through the adaptive management process, specific AOIs may be added or removed, based on findings of the source investigations and strategic monitoring.

## 3.3 Stakeholder Collaboration

Stakeholders will be continuously involved in the process during the LRS Adaptation implementation and adaptive management. As the Group moves forward to address the AOIs identified, one of the first steps is identifying and engaging with local stakeholders. This will include collaboration with multiple jurisdictions as

needed within an AOI, as well as engaging any jurisdictions outside of the ULAR identified. Upon initiation of a source investigation for an AOI involving multiple jurisdictions, all parties will be notified and encouraged to participate through all phases of the process.

Feedback from all stakeholders will be provided via the review of annual reports and periodic updates to the LRS Adaptation, as necessary, in collaboration with the LARWQCB and local stakeholders.

The ULAR Group is using additional methods to engage the general public during the LRS Adaptation implementation, including providing information and updates through the ULAR Groups website: https://ularwmg.com/.

## 3.4 Adaptive Management Process

The LRS Adaptation Plan will be adapted based on information obtained during implementation, in the results from source identification studies and key scientific and regulatory advancements. As such, the Plan may need to be updated whenever a related bacteria strategy, goal, or schedule is revised, this may also include updates to the initial AOIs identified. Any data gaps identified during source investigations could result in an update as well. Future adaptations could be triggered by verification sampling of dry and wet weather human waste abatement activities, which will directly inform the Group about the progress and efficacy of non-structural abatement strategies.

To aid in these adaptive management efforts, data and information obtained during the Performance Monitoring will be used to track progress and identify any additional collaboration needed to maximize efficiency, reduce risk, use resources effectively and meet compliance determination requirements.

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# APPENDIX A: PRELIMINARY PAIRED FECAL INDICATOR BACTERIA AND HF183 DATA COLLECTION

# 1 BACKGROUND AND PURPOSE

The Upper Los Angeles River (ULAR) Watershed Management Group (WMG) is adaptively addressing the Los Angeles River Bacteria TMDL and its Load Reduction Strategy (LRS), incorporating a more targeted framework for human source control to reduce pathogen health risks to downstream recreators, via the approach and implementation plan outlined in the main body of the LRS Adaptation Plan. A core tool of this plan and the ability to target human source control, is using indicators in source investigations that identify the presence of human sources. The presence of human sources may be indicated by the human-associated microbial source tracking (MST) marker HF183.

This appendix summarizes sampling that was conducted to start gathering this type of information in the ULAR watershed. Based on preliminary catchment prioritization results, focused in Segment B and associated tributaries watershed (which have the earliest LRS deadlines), the Group proactively identified three areas of investigation (AOIs), shown in **Figure 1**. The preliminary catchment prioritization approach was similar to that outlined in Section 2.2 of the main body of the LRS Adaptation Plan. The Group then conducted screening of paired FIB and HF183 concentrations at an outfall in each AOI and associated receiving waters. The outfalls were identified as highest priorities and further selected based on stakeholder input. Descriptions and locations of the sampled outfalls are summarized in **Table 1**.

**Table 1.** ULAR HF183-Sampled Outfalls.

| Outfall Name | Site Description | Latitude | Longitude |
|---|---|---|---|
| AS-17 | Arroyo Seco Priority #1 Outfall | 34.10251 | -118.19737 |
| LAR-B-R2-04 | Segment B Mainstem Priority #1 Outfall | 34.0037 | -118.196075 |
| RH-078 | Rio Hondo Priority #1 Outfall | 34.001145 | -118.102958 |

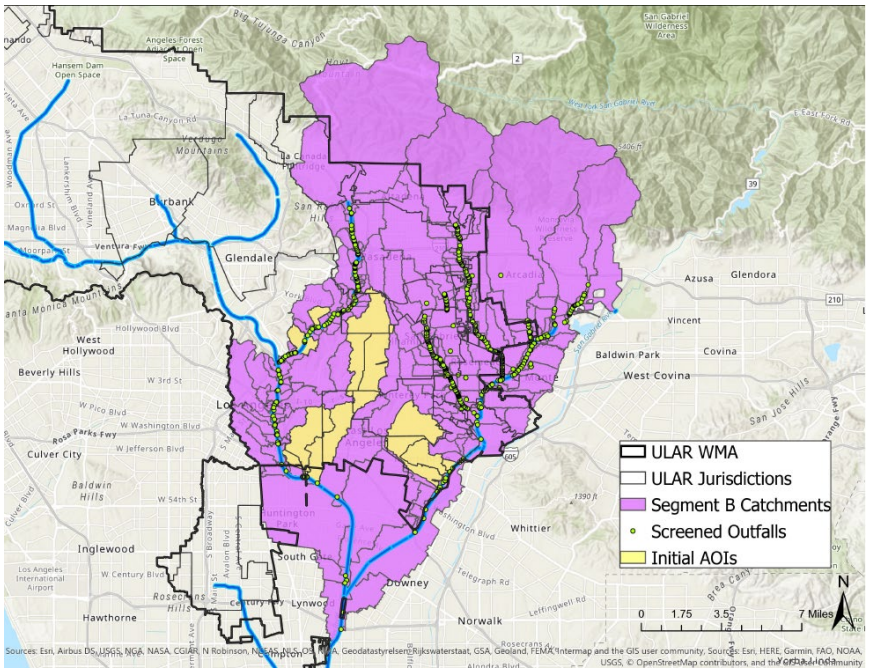



**Figure 1.** Initial AOIs identified in the Segment B watershed.

**Figure 2**, **Figure 3**, and **Figure 4** illustrate site photos taken at the outfall location and receiving water bodies for the AS-17, LAR-B-R2-04, and RH-078 outfalls, respectively.

**Figure 2.** AS-17 Outfall Taken on August 5, 2020 (Left) and Upstream View of AS-17 Outfall from Downstream Receiving Water Body Location Taken on November 6, 2020 (Right).

**Figure 3.** LAR-B-R2-04 Outfall Taken on January 13, 2021 (Left) and Downstream View from Downstream Receiving Water Body Location Taken on January 13, 2021 (Right).

**Figure 4.** RH-078 Outfall Taken on August 5, 2020 (Left) and Upstream View of RH-078 Outfall from Downstream Receiving Water Body Location Taken on August 5, 2020 (Right).

# 2 MONITORING ACTIVITIES

Monitoring activities of the selected outfalls took place on four sampling dates as detailed in **Table 2**. The following were monitored on each sampling date:

- Verification of flow status, estimation of flow rates, and visual observations
- Collection of samples for analysis of *Escherichia coli* (*E. coli*) and HF183

**Table 2.** Monitoring Activities Event Details and Comments.

| Event | Date | Monitoring Notes |
|---|---|---|
| Event 1 | August 5, 2020 | Grab samples at 9 locations, including field quality assurance (QA) samples. The 9 locations included 3 outfalls plus paired upstream and downstream receiving water locations for each outfall[1]. |
| Event 2 | November 6, 2020 | Grab samples at 7 locations, including field QA samples. The 7 locations included 3 outfalls, plus paired upstream and downstream receiving water locations for 2 out of 3 outfalls. The receiving water locations for the third outfall were dry. |
| Event 3 | December 7, 2020 | Grab samples at 8 locations, including field QA samples. The 8 locations included 3 outfalls, plus paired upstream and downstream receiving water locations for 2 out of 3 outfalls. The upstream receiving water location for the third outfall was dry, but the downstream receiving water location was sampled. |
| Event 4 | January 13, 2021 | Grab samples at 9 locations, including field QA samples. The 9 locations included 3 outfalls plus paired upstream and downstream receiving water locations for each outfall. |

Samples were received and analyzed within holding times by laboratories, except for one Event 2 HF183 sample filtered outside of the recommended 8-hour hold time. Field QA samples, which included field duplicates (analyzed for *E. coli* only) and field blanks (analyzed for HF183 and/or *E. coli*), indicated field sampling procedures did not introduce contamination or bias[2].

[1] Paired receiving water samples were collected approximately 15 meters upstream or downstream from the outfall discharge at AS-17 and RH-078 and approximately 80 meters upstream and downstream from LAR-B-R2-04 to capture representative (e.g., well-mixed) downstream conditions.
[2] The field blanks analyzed for HF183 and *E. coli* were non-detect and the field duplicates analyzed for *E. coli* had results in the same order of magnitude as the corresponding primary samples.

# 3 MONITORING RESULTS

HF183 has not yet been assigned a water quality objective (WQO) or action level by federal, state, or regional regulators. Several prioritization thresholds for HF183 have been defined in the main body of the LRS Adaptation Plan as described in **Table 3**. These prioritization thresholds are triggers identified to accomplish the Human Waste Source Identification Strategy in a systematic manner to ensure temporal and spatial relevance, sufficient data is collected for addressing testable hypotheses, and effective use of limited resources. It is important to note that the science that would support development of a WQO for HF183 is actively and rapidly evolving[3].

**Table 3.** LRS HF183 Prioritization Thresholds.

| Waterbody Type | HF183 Prioritization Threshold (copies/100 mL) | Additional Information | |
|---|---|---|---|
| | | Relevance | Reference |
| Outfall | 4,100 | Catchment source tracking trigger – determined when >10% of paired *E. coli* and HF183 results in the receiving water exceed the 320 CFU/100 mL and > 1,000 copies/100 mL action levels, respectively (LRS Adaptation Plan, 2021).<br><br>Corresponds to a median illness risk of 30 illnesses per 1,000 recreators in waters contaminated with contamination of unknown age. | Boehm et al., 2018 |
| Receiving Water | 1,000 | Catchment outfall sampling trigger – determined when >10% of *E. coli* results in the receiving water exceed the 320 CFU/100 mL action level (LRS Adaptation Plan, 2021).<br><br>Corresponds to a median illness risk of 30 illnesses per 1,000 recreators in waters contaminated with 2.5 day old sewage. | Boehm et al., 2018 |

[3] For example, the scientific experts that authored the thresholds presented in **Table 3** refined their thresholds in September 2020 (Boehm and Soller, 2020). These thresholds have not yet been incorporated at the regulatory level thus are not presented herein for comparison with sample concentrations.

Results of the monitored activities are summarized in **Table 4** for *E. Coli* and **Table 5** for HF183.

**Table 4.** *E. coli* Concentrations at Selected Outfalls and Representative Upstream/Downstream Conditions for Each Sampling Event.

| Event | Outfall Flow Status (cubic feet per second) | Site Group | *E. coli* (MPN/100 mL)[1,2] | | |
|---|---|---|---|---|---|
| | | | AS-17 | LAR-B-R2-04 | RH-078 |
| Event 1 *August 5, 2020* | Outfalls were flowing. Flow rates ranged from 0.00085 to 0.21 cfs. | Upstream | **990** | **9,200** | 41 |
| | | Outfall | 200 | **44,000** | **400** |
| | | Downstream | **960** | **14,000** | 220 |
| Event 2 *November 6, 2020* | Outfalls were flowing or ponded. Flow rates from two flowing outfalls ranged from 0.00087 to 0.073 cfs. | Upstream | **880** | **9,200** | NS |
| | | Outfall | **6,100** | 200 | *260*[3] |
| | | Downstream | **960** | **6,500** | NS |
| Event 3 *December 7, 2020* | Outfalls were flowing or ponded. Flow rates from two flowing outfalls ranged from 0.01 to 0.07 cfs. | Upstream | 134 | **2,577** | NS |
| | | Outfall | **3,654** | **12,033** | **441**[4] |
| | | Downstream | 107 | **2,142** | **369**[4] |
| Event 4 *January 13, 2021* | Outfalls were flowing or ponded. Flow rates from two flowing outfalls were 0.001 cfs. | Upstream | **1,400** | **3,700** | 41 |
| | | Outfall | *320* | **9,800** | 20[3] |
| | | Downstream | **1,200** | **930** | *300* |

[1] 235/100 mL is the single sample limit for *E. coli* defined in the Los Angeles River Bacteria TMDL.
[2] 320/100 mL is the statistical threshold value for *E. coli* defined in California's recently adopted Bacteria Provisions.
[3] The outfall sample from RH-078 was collected from ponded water at the outfall to inform site conditions in the absence of receiving water flow.
[4] The outfall and downstream receiving water samples from RH-078 were collected from ponded water to inform site conditions in the absence of upstream receiving water flow.
Bolded *E. coli* values exceed 320/100 mL and 235/100 mL. Italicized *E. coli* values exceed 235/100 mL.
NS = not sampled due to lack of flow.

**Table 5.** HF183 Concentrations at Selected Outfalls and Representative Upstream/Downstream Conditions for Each Sampling Event.

| Event | Outfall Flow Status (cubic feet per second) | Site Group | HF183 (copies/100 mL) | | |
|---|---|---|---|---|---|
| | | | AS-17 | LAR-B-R2-04 | RH-078 |
| Event 1 *August 5, 2020* | Outfalls were flowing. Flow rates ranged from 0.00085 to 0.21 cfs. | Upstream | 524 | 196 | ND |
| | | Outfall | ND | ND | 562 |
| | | Downstream | **1,895** | 57 | 88 |
| Event 2 *November 6, 2020* | Outfalls were flowing or ponded. Flow rates from two flowing outfalls ranged from 0.00087 to 0.073 cfs. | Upstream | **2,147** | 524 | NS |
| | | Outfall | 1,219 | BLOQ | BLOQ[1] |
| | | Downstream | **2,211** | 253 | NS |
| Event 3 *December 7, 2020* | Outfalls were flowing or ponded. Flow rates from two flowing outfalls ranged from 0.01 to 0.07 cfs. | Upstream | **3,537** | **10,926** | NS |
| | | Outfall | **303,158** | ND | 992[2] |
| | | Downstream | **3,284** | **7,958** | 259[2] |
| Event 4 *January 13, 2021* | Outfalls were flowing or ponded. Flow rates from two flowing outfalls were 0.001 cfs. | Upstream | **44,400** | **11,937** | ND |
| | | Outfall | **10,295** | ND | **69,032**[1] |
| | | Downstream | **95,432** | **9,211** | **72,063** |

[1] The outfall sample from RH-078 was collected from ponded water at the outfall to inform site conditions in the absence of receiving water flow.
[2] The outfall and downstream receiving water samples from RH-078 were collected from ponded water to inform site conditions in the absence of upstream receiving water flow.
BLOQ = below the limit of quantification. Limits of quantification (LOQs) for BLOQ samples ranged from 36-39 copies/100 mL.
NS = not sampled due to lack of flow.
Bolded HF183 values exceed the relevant thresholds identified in **Table 3**.

The following subsections further summarize the results at each selected outfall and associated receiving waters. **Figure 5**, **Figure 6**, and **Figure 7** summarize HF183 sample concentrations observed during each event for AS-17, LAR-B-R2-04, and RH-078, respectively.

## 3.1 AS-17 Outfall

Concentrations of HF183 at the AS-17 upstream/downstream receiving water bodies consistently increased over the course of the four sampling events. While *E. coli* concentrations generally decreased after the confluence of the AS-17 outfall drainage, HF183 concentrations increased after the confluence. Nearly all the upstream/downstream HF183 concentrations were above the relevant 1,000 copies/100 mL action level. Because the majority of the upstream HF183 concentrations were already above the 1,000 copies/100 mL action level prior to the confluence of the AS-17 outfall catchment, this may indicate an upstream source of human fecal contamination not within the catchment; therefore, it may be of interest to strategically investigate potential consistent sources of human fecal pollution in upstream outfall catchments draining to the receiving water body location proximal to the AS-17 outfall.

The first two events at the outfall did not have HF183 concentrations above the 4,100 copies/100 mL action level whereas the last two outfall events had HF183 concentrations significantly above the 4,100 copies/100 mL action level. These outfall results may indicate an intermittent source of human fecal contamination within the outfall catchment, e.g., conditional discharge permits, illegal dumping, RV dumping, sanitary sewer overflow.

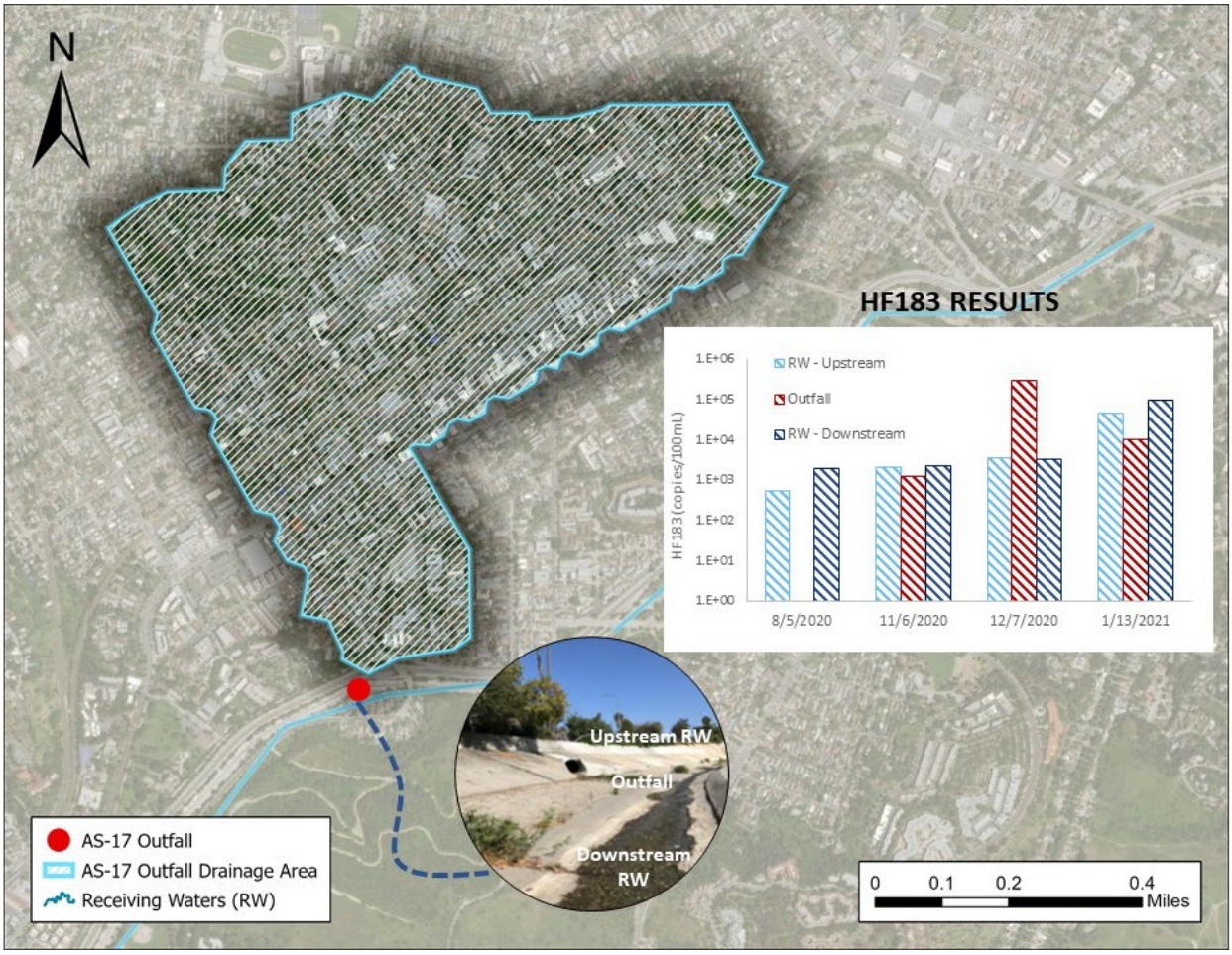



**Figure 5.** HF183 Results for AS-17 Outfall and Paired Receiving Water Sampling Locations.

## 3.2 LAR-B-R2-04 Outfall

Consistent lack of quantification of HF183 in the outfall indicates human sources of fecal pollution are likely not major dry weather contributors of fecal indicator bacteria upstream of the outfall.

Generally, the HF183 concentration downstream of the confluence of the LAR-B-R2-04 outfall was lower than upstream of the confluence, indicating that flows from the LAR-B-R2-04 outfall may be diluting the HF183 concentration downstream of the outfall. A similar trend was observed for paired *E. coli* concentrations in which *E. coli* concentrations were consistently elevated/of the same order of magnitude during all events in the upstream receiving water whereas *E. coli* concentrations in the downstream receiving water were generally lower by an order of a magnitude (except for Event 1). HF183 concentrations in the receiving water increased by two to three orders of magnitude over time and were above the 1,000 copies/100 mL action level for two of the sampling events in both the upstream and downstream receiving waters. This may indicate a potential human

source of fecal pollution in outfall catchments upstream of the receiving water body location proximal to the LAR-B-R2-04 outfall.

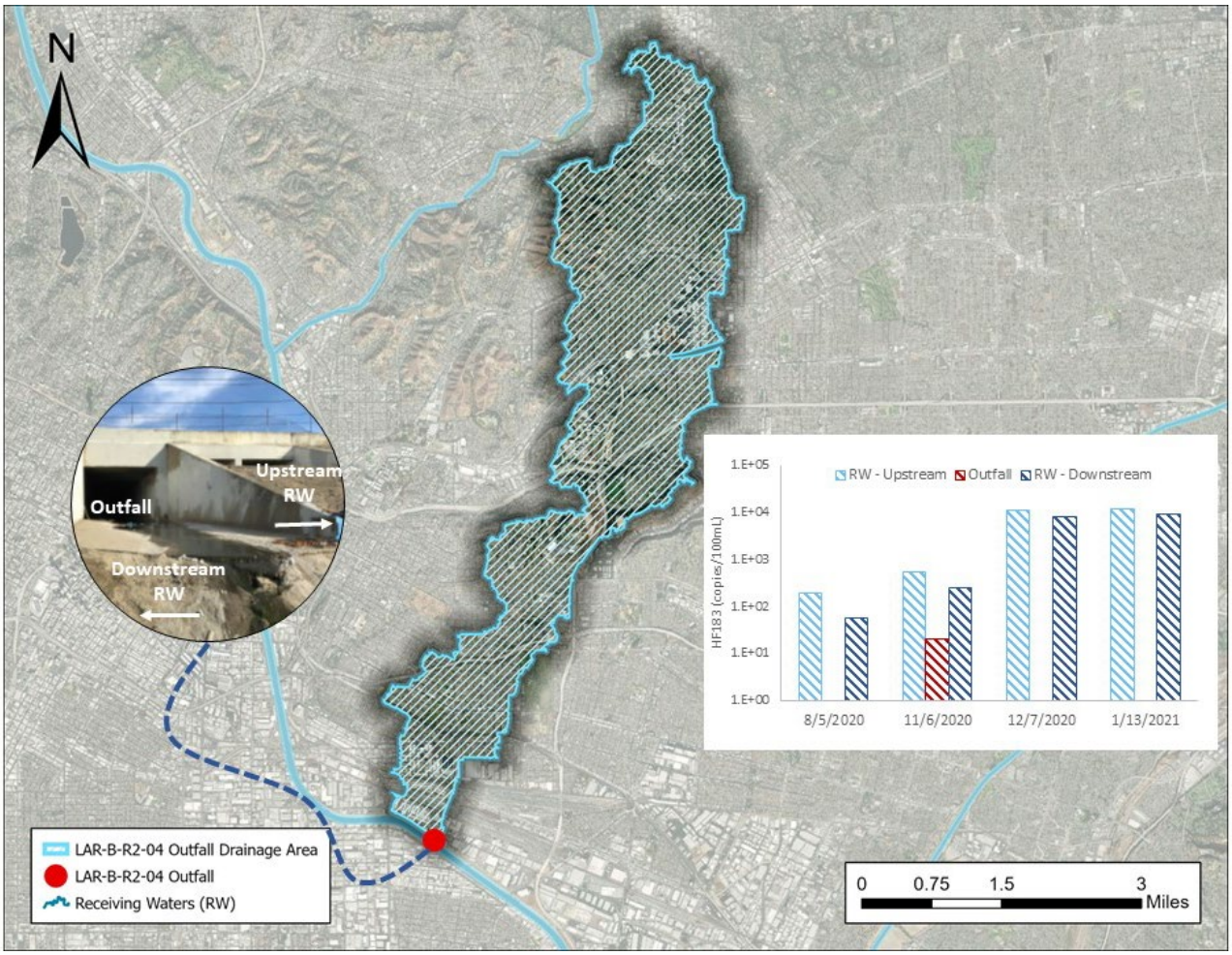



**Figure 6.** HF183 Results for LAR-B-R2-04 Outfall and Receiving Water Sampling Locations.

## 3.3 RH-078 Outfall

HF183 concentrations are variable in the outfall (ranging from BLOQ to 69,032 copies/100 mL, which is above the 4,000 copies/100 mL action level) and receiving water flow status is inconsistent, resulting in limited data for full receiving water characterization. The variable HF183 concentrations throughout the four sampling events may indicate a potential intermittent source of human fecal pollution within the catchment, e.g., conditional discharge permits, illegal dumping, RV dumping, sanitary sewer overflow. The upstream receiving water, when sampled, had very low *E. coli* concentrations and non-detect HF183 concentrations whereas the downstream receiving water, when sampled, had slightly elevated *E. coli* concentrations (between 200 to 400 MPN/100 mL) and variable HF183 concentrations (88 to 72,063 copies/100 mL). The elevated HF183 concentration in the downstream receiving water corresponded to the sample day with the elevated HF183 concentration in the outfall; the non-detect HF183 concentration in the upstream receiving water on the same sample day indicates that there is likely not a potential upstream source of human fecal pollution.

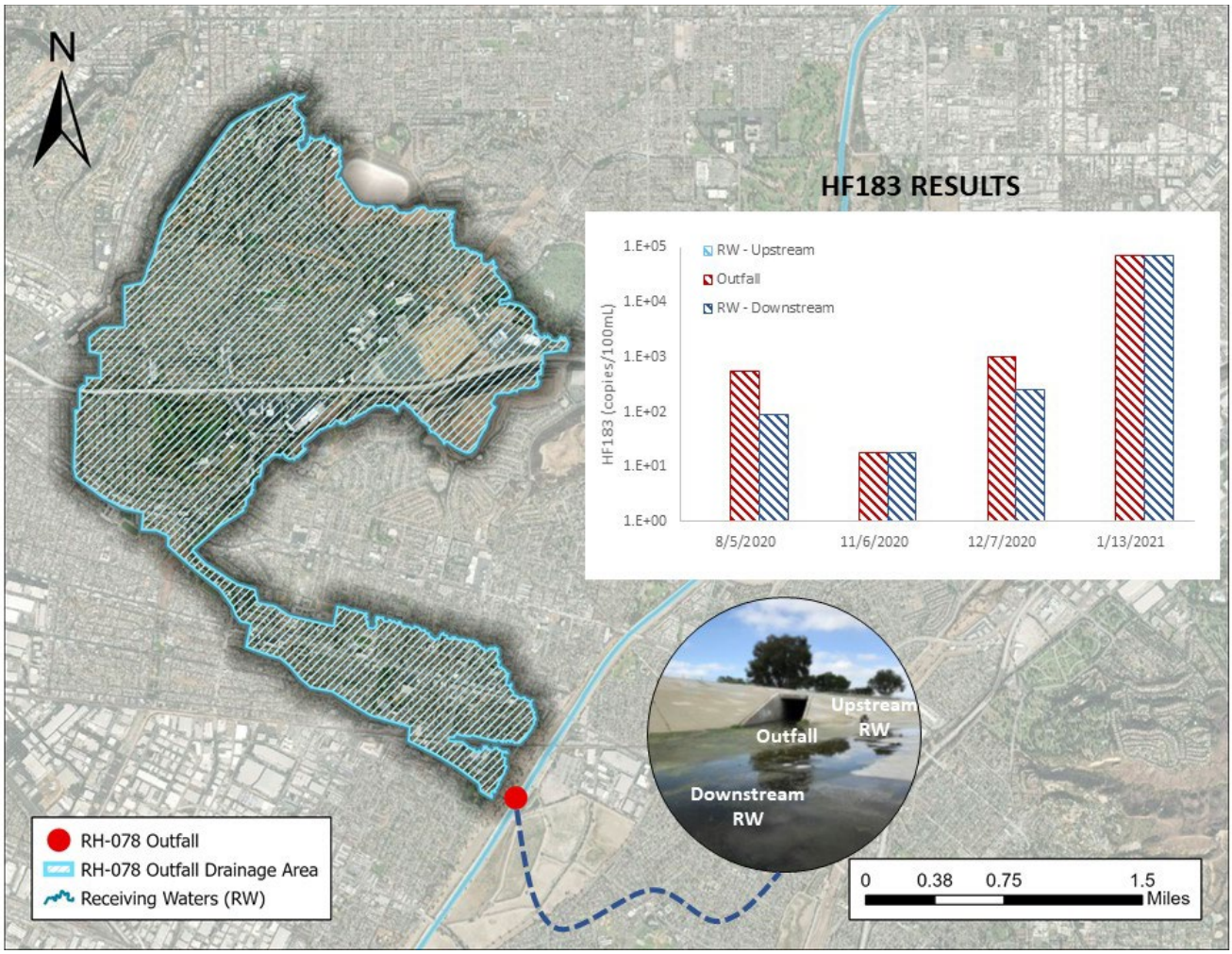



**Figure 7.** HF183 Results for RH-078 Outfall and Paired Receiving Water Sampling Locations.

# 4 PRELIMINARY TAKEAWAYS & NEXT STEPS

The preliminary samples only covered four sampling events at three separate outfalls and associated receiving waters, but already point towards the value human marker data can present to better understand risk. However, the sampling effort is still only a small sample size and for comprehensive conclusions on the outfall and receiving water conditions enhanced representation of sampling is required, following the framework outlined in Section 2.3 of the main body of the LRS Adaptation Plan. Specific follow-up sampling will be contingent on the identification of areas of investigation and human waste source investigation needs, as described further in the main body of the LRS Adaptation Plan.

The following summarizes recommended initial next steps based on the findings for each outfall.

## 4.1 AS-17

Timely follow up is recommended to address highly elevated Event 3 and 4 AS-17 outfall and receiving water concentrations. Additional sample collection at the outfall and/or inclusion of additional constituents indicative of sewage may provide more information. If sewage remains a potential source of the HF183, upstream source tracking in the MS4 is recommended to identify the source. Refer to Appendix B for additional information on the proof of concept and additional sampling conducted for the AS-17 catchment.

## 4.2 LAR-B-R2-04

Though HF183 was consistently not quantified in the LAR-B-R2-04 outfall, HF183 concentrations in the receiving water increased by two to three orders of magnitude over time. If increased understanding of the HF183 prevalence in the receiving water is desired, desktop analysis and additional monitoring would improve characterization of microbial water quality and may help identify other sources to the receiving water (e.g. permitted discharges that may contain HF183, upstream outfall discharges, illicit discharges, etc).

## 4.3 RH-078

HF183 concentrations in the RH-078 outfall were highly variable. Timely follow up is recommended to address highly elevated Event 4 RH-078 outfall and downstream concentrations. Additionally, lack of flow limited characterization of receiving water microbial water quality. Additional sampling is recommended to improve characterization of both the outfall and the receiving water at this location.

# 5 REFERENCES

Boehm, Alexandria B., et al. 2018. Can We Swim Yet? Systematic Review, Meta-Analysis, and Risk Assessment of Aging Sewage in Surface Waters. Environmental Science & Technology. September.

Boehm, Alexandria B. and Jeff A. Soller. 2020. Refined ambient water quality thresholds for human-associated fecal indicator HF183 for recreational waters with and without co-occurring gul fecal contamination. Microbial Risk Analysis. September.

Mayer, Rene E., et al. 2018. Global Distribution of Human-Associated Fecal Genetic Markers in Reference Samples from Six Continents. Environmental Science & Technology. May.

South Orange County Permittees. 2020. Comprehensive Human Waste Source Reduction Strategy (CHWSRS) Work Plan for the South Orange County (San Juan Hydrologic Unit) Water Quality Improvement Plan (WQIP). February.

Upper Los Angeles River Watershed Management Group, 2015. Coordinated Integrated Monitoring Program for the Upper Los Angeles River Watershed. August

# APPENDIX B: SOURCE IDENTIFICATION MONITORING FRAMEWORK: AS-17 PROOF OF CONCEPT

# 1 AS-17 SOURCE IDENTIFICATION MONITORING BACKGROUND

The Upper Los Angeles River (ULAR) Watershed Management Group (WMG) is adaptively addressing the Los Angeles River Bacteria TMDL and its Load Reduction Strategy (LRS), incorporating a more targeted framework for human source control to reduce pathogen health risks to downstream recreators, via the approach and implementation plan outlined in the main body of the LRS Adaptation Plan. The Plan provides an effective foundation to address pathogen health risk and will help to streamline efforts across agencies and other stakeholders. The Plan helps to identify the most effective pathway towards improved public health and attainment of bacteria-related water quality objectives through an adaptive management process that incorporates significant advances in the state of the science.

A primary component of the Plan is conducting human waste source investigations (HWSI) within delineated Areas of Investigation (AOI). The Plan defines a model framework (see LRS Adaptation Plan Section 2.3 and Figure 2-1) for performing HWSIs including key considerations, a 'toolbox' of potential methods, and action levels for efficient and objective decision making. HWSIs developed based on this framework will be performed using traditional and non-traditional illicit discharge/illicit connection investigation techniques. The use of molecular techniques, such as human source marker HF183, to analyze samples are emphasized during HWSIs.

To identify sources of human waste within an AOI, a HWSI will be completed following an efficient and systematic approach. The inputs to this framework include catchment prioritization, water quality condition assessment results, and source inventory from prioritization. As outlined in the Plan, the framework steps are:

1. characterize the AOI,
2. conduct stakeholder coordination,
3. gather additional data,
4. develop testable hypotheses,
5. develop a HWSI monitoring plan, and
6. implement the HWSI Monitoring Plan.

The results of the HWSI will inform the recommended next steps that may include source abatement if sources are identified, or designation of the AOI as a lower priority if monitoring results provide sufficient evidence that there is a low risk of the AOI impacting human health.

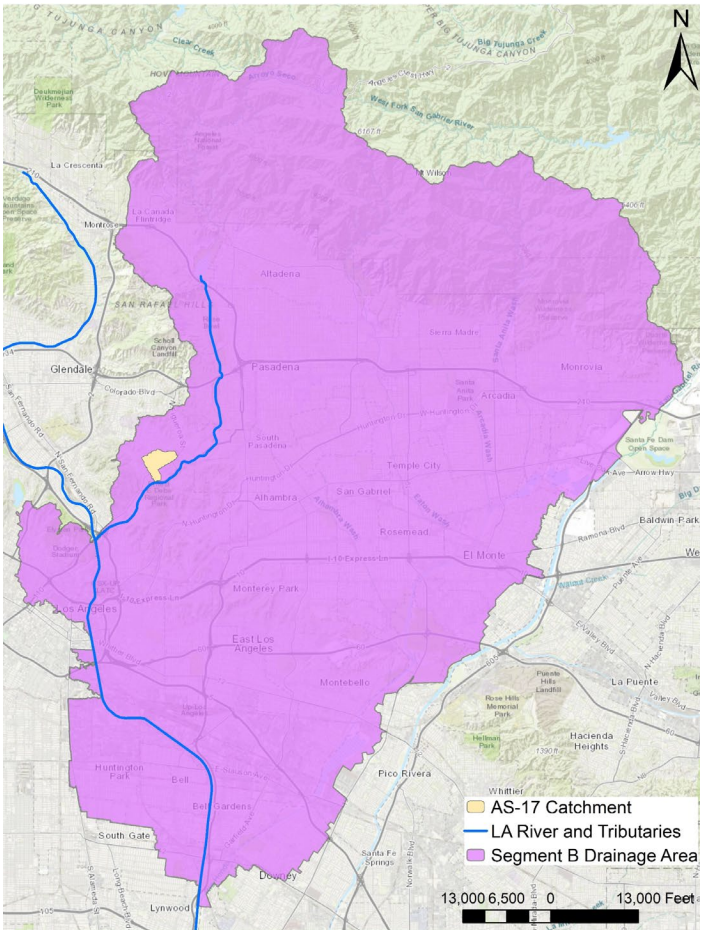



**Figure B-1. Map of AS-17 Catchment within the Segment B Drainage Area**

The AS-17 outfall and its associated catchment were selected by the ULAR Group as a proof of concept AOI for the source identification monitoring framework based on:

- historical concerns about illicit discharge/connections which led to an investigation by the LASAN Watershed Protection District in 2016;

- the catchment being identified as a high priority during initial catchment prioritization under the LRS Adaptation
- preliminary stakeholder input on potential human waste sources in the catchment; and
- outfall and receiving water monitoring performed between August 2020 and January 2021.

As shown in Figure B-1, the AS-17 outfall is located within the Segment B drainage of the Los Angeles River within the Upper Los Angeles River watershed. The following sections detail the considerations and activities involved in implementing the Source Identification Monitoring Framework for the AS-17 AOI.

# 2 SOURCE IDENTIFICATION MONITORING FRAMEWORK STEPS

## Characterize AOI

The AS-17 AOI is located entirely within the City of Los Angeles. Land use within the AOI is a mix of residential and commercial areas. At the upstream end of the catchment is the Highland Park Recreation Center (Rec Center), which includes a gym, baseball field, playground, pool, and other amenities. During the limited outfall and receiving water monitoring in 2020, flow was observed at manholes near the Rec Center. There was also an abundance of homeless encampments around the Rec Center area. Refer to Appendix A for additional details on the preliminary outfall and receiving water monitoring conducted at AS-17. Between the Rec Center and the outfall, the MS4 runs down Figueroa St., with lateral lines along the perpendicular avenues (e.g., N. Avenue 61) – see Figure B-2 for a map of the AS-17 AOI and MS4 Network. Figueroa St. is filled with a mixture of businesses, from retail to restaurants. Site reconnaissance of the AS-17 AOI was performed with the City of Los Angeles Department of Public Works Bureau of Sanitation (LASAN) on May 27, 2021 to additionally characterize the AOI ahead of sampling.

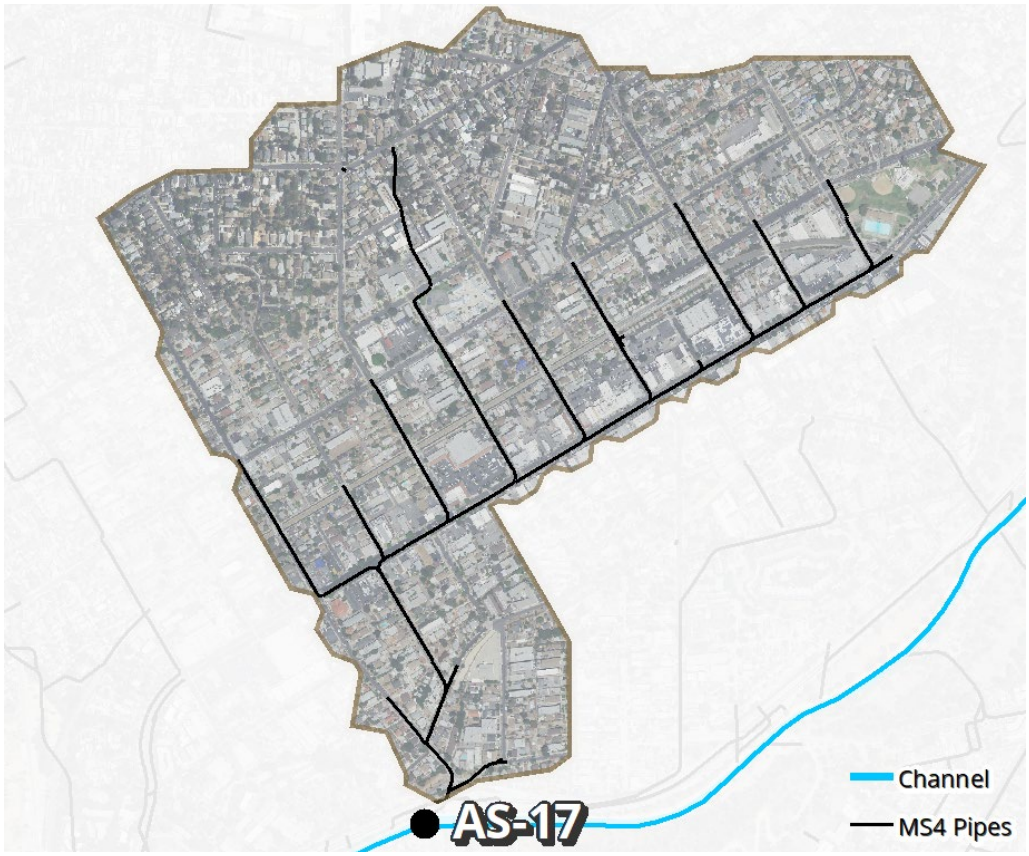



**Figure B-2. Map of AS-17 AOI and MS4 Network**

## Conduct Stakeholder Coordination

Stakeholder coordination is crucial to conducting an effective HWSI as it provides for sharing of information/knowledge of a given AOI, as well as helps to build consensus about potential sources, and investigation objectives and methods. Important stakeholders for the AS-17 catchment included the LRS Technical Advisory Committee (TAC) and the ULAR Group. Additionally, because the AOI is relatively small and is located entirely within the boundaries of the City of Los Angeles, different City departments were also primary stakeholders. Other groups and agencies could potentially become part of the stakeholder coordination process, such as the Regional Board and wastewater agencies. Specific stakeholder interaction and important findings are noted below:

- The LRS TAC and ULAR Group are comprised of Permittees or their representatives, located in the ULAR WMA. LRS TAC and ULAR Group meetings served as key coordination and information sharing forums.
- LASAN representatives played a significant role in the AS-17 HWSI. The LASAN Watershed Protection Division guided the investigation based on their lead role with LRS implementation and awareness of past source investigations in the AS-17 catchment. The LASAN Watershed Protection Division also assisted with coordinating site reconnaissance and obtaining rights of entry/access. Finally, crews from the LASAN Clean Water Conveyance Division - South, provided traffic control each monitoring day.
- The City's Illicit Connection and Illicit Discharge (ICID) team presented recent ICID cases for reference, as well as shared details regarding a past source investigation within the catchment.

- The City's Department of Recreation and Parks, Aquatics Division, provided details regarding Highland Park Pool operations and maintenance, observations regarding homeless encampments, and parcel plans for the area.

## Gather Additional Data

While detailed data are aggregated across the watershed during catchment prioritization, conditions within each AOI are variable. Collecting relevant scientific and anecdotal data is imperative to address AOI-specific characteristics and fill data gaps thereby developing a fuller picture of conditions and potential influences within the catchment. As a result of the aforementioned stakeholder coordination and other data gathering efforts with various City departments and the LRS TAC, the following additional data were obtained:

- AS-17 catchment-specific data from the catchment prioritization consisted of several geographic datasets including sanitary and MS4 networks; locations of homeless encampments; sanitary sewer overflows; private lateral sewer discharges; fats, oils, and grease (FOG) inspection locations and restaurants; and ICID hotspots.
- The ICID cases provided by the City's ICID team included the applicable zip code, and these were parsed out to identify the ones specifically in the AS-17 catchment area. Of particular note, three ICID cases flagged as "Biological Waste - Feces" were documented on 9/9/2020, 10/26/2020, and 11/8/2020 within the AS-17 AOI.
- Dry weather flows from the AS-17 outfall and the adjacent channel were sampled on four separate occasions between August 2020 and January 2021. Samples were analyzed for *E. coli* and HF183. HF183 was detected at the outfall during three of the four events (1,219 copies/100 mL, 303,158 copies/100 mL, and 10,295 copies/100 mL respectively), with two of these samples exceeding the HF183 outfall action level (4,100 copies/100mL) specified in the Plan. Refer to Appendix A for additional details on the preliminary outfall and receiving water monitoring conducted at AS-17.
    - Initial dry weather sampling at the AS-17 outfall was conducted in January through June 2015. Of the six screening events, five observed flows at the AS-17 outfall, ranging from 0.0001 cfs up to 0.035 cfs. *E. coli* concentrations for the five flowing events were 620 copies/100 mL, 640 copies/100 mL, 16,000 copies/100 mL, 82,000 copies/100 mL, and 3,100 copies/100 mL.
- Coordination with the City's Department of Recreation and Parks, Aquatics Division, resulted in new information regarding the status of the pool at the time of prior outfall sampling and analysis that yielded high *E. coli* and HF183 results. Specifically, the Highland Park Pool was empty during monitoring performed between August 2020 through January 2021, therefore it could not account for any discharges. The Aquatics Division also described a homeless encampment that was located at the south end of the Rec Center, including observations of human waste being dumped into nearby stormwater catch basins.
- During site reconnaissance on May 27, 2021, the homeless encampment that was once observed at the south end of the Rec Center was no longer present, there were no signs of dry weather runoff, and numerous manholes identified through desktop analysis as potential sampling sites were buried under asphalt and thus not accessible.

## Develop Testable Hypotheses

To efficiently use resources and reduce variability in results, testable hypotheses allow the Group to ensure a HWSI is directly tied to LRS Adaptation Plan goals, and the hypotheses are targeted to the AOI. Based on stakeholder coordination and additional data gathering, two hypotheses were derived for the potential source of human waste in the AS-17 catchment.

1. Exfiltration from the sanitary sewer is a source of human waste in the AS-17 catchment; and
2. Homeless encampments at or near the Rec Center area are a source of human waste in the AS-17 catchment.

### Develop HWSI Strategy for AOI

The HWSI synoptic monitoring was initially planned for two days in June 2021, with two rounds of monitoring per day – one round early in the morning, and the second round in the afternoon. Paired sampling of *E. coli* and HF183, along with discharge velocity measurements (i.e., to calculate discharge flow) were the selected monitoring methods from the source tracking toolbox.

After reconnaissance of the AS-17 catchment and due to previous observations pointing to potential sources centered around the Rec Center, two primary strategies for investigating human sources were created, Plan A and Plan B. The Plan implemented would be based on whether flow was observed at a manhole adjacent to the Rec Center (i.e., the top of the catchment). Plan A would be implemented if there was flow at the Highland Park Rec Center manhole, and Plan B would be carried out if there was low/no flow at the Rec Center manhole. These two options helped provide adaptability and flexibility in the field. At the start of each monitoring event, a flow check would be performed at the manhole near the Rec Center (located at the intersection of N. Avenue 61 and Figueroa St.), and depending on flow levels there, Option A or Option B would be selected as appropriate. Ultimately, monitoring would be performed according to conditions observed each day of monitoring including, but not limited to the presence/absence of flow and site accessibility.

Additionally, although Option A and Option B were created to drive the plan of action for the HWSI, ultimately, the sites monitored each day depended on flow, presence, and accessibility.

## Implement the HWSI Monitoring Plan

Based on limited flow in the catchment, monitoring was ultimately expanded to a four-day period: June 1, June 3, June 7, and June 8, 2021. Tables B-1 through B-4 summarize each day of monitoring including the sites visited and associated conditions. Figure B-3 depicts the sites that were monitored over the four-day period.

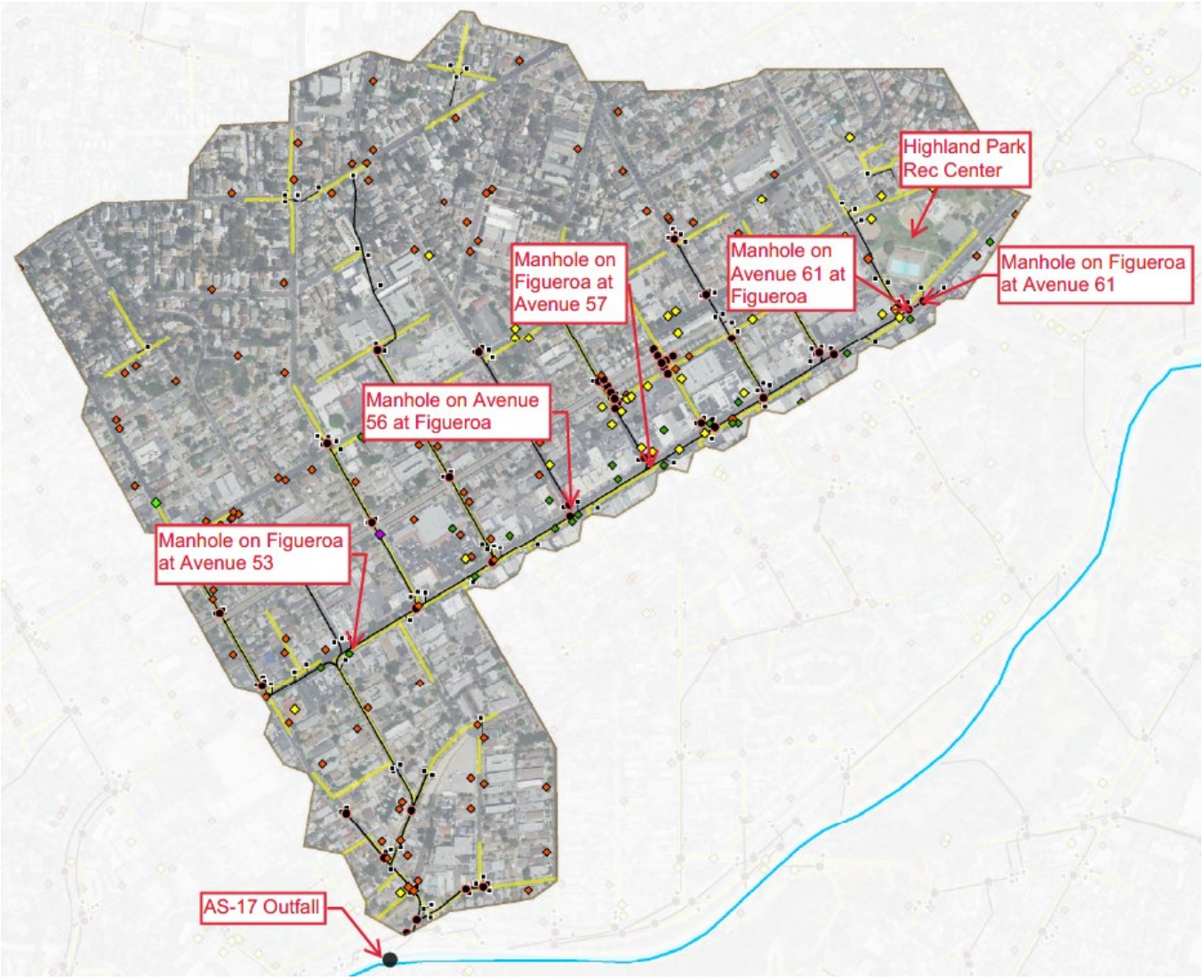



**Figure B-3. Map of AS-17 HWSI Monitoring Sites**

### DAY 1

On Day 1, a greater number of sites were visited than other days to gather more information about the catchment. Some of these sites were deemed unsuitable for the HWSI and discontinued. Ultimately, none of the sites exhibited flow; thus, no samples were collected. Based on the field observations of the morning monitoring event, and upon coordination with the LASAN Watershed Protection District, it was determined that no separate afternoon monitoring event would be conducted. Table B-1 and Figure B-4 provide a summary and photos, respectively, of the first day of monitoring.

**Table B-1. Monitoring Day 1 Summary**

| Date/Time (XXXX hrs) | Site | Wet or Dry | Flow Present? | Samples Collected? | Notes |
|---|---|---|---|---|---|
| 6/1/21 0831 | Manhole on N. Ave. 61 at Figueroa St. | Dry | No | No | |
| 6/1/21 0842 | Manhole on Figueroa St. at N. Ave. 61 | Wet | No | No | |
| 6/1/21 0907 | Manhole on Longfellow St. at S. Ave. 53 | N/A | N/A | N/A | Determined to be sewer manhole, not storm drain – site discontinued |
| 6/1/21 0942 | Manhole on Figueroa St. at N. Ave. 53 | Wet | No | No | |
| 6/1/21 1005 | Manhole on N. Ave. 55 at Figueroa St. | N/A | N/A | N/A | Manhole buried under asphalt and could not be raised – site discontinued |
| 6/1/21 1027 | Manhole on Figueroa St. at N. Ave. 57 | Wet | No | No | |
| 6/1/21 1241 | AS-17 outfall | Wet | No | No | Arroyo Seco flowing; no flow at AS-17 (i.e. no connectivity to the Arroyo Seco) |

Site #5 (Manhole on N. Avenue 61 at Figueroa St.)

Site #4 (Manhole on Figueroa St. at N. Avenue 61)

Manhole on Figueroa St. at N. Avenue 53

Manhole on Figueroa St. at N. Avenue 57

AS-17 outfall

**Figure B-4. Photos of Monitoring Sites on June 1, 2021**

### DAY 2

The sampling plan on Day 2 followed an adaptive approach based on the observations from the first day of monitoring. Monitoring began in the morning with a flow check at the AS-17 outfall. Since there was flow, paired *E. coli* and HF183 samples were taken at the outfall. Two manholes were subsequently monitored: the manhole on N. Avenue 61 at Figueroa St. and the manhole on Figueroa St. at N. Avenue 53. Both manholes were wet but were not flowing, so samples were not collected. Based on the field observations of the morning monitoring event, and upon coordination with the LASAN Watershed Protection District, it was determined that no separate afternoon monitoring event would be conducted. Table B-2 and Figure B-5 provide a summary and photos, respectively, of the second day of monitoring.

**Table B-2. Monitoring Day 2 Summary**

| Date/Time (XXXX hrs) | Site | Wet or Dry | Flow Present? | Samples Collected? | Notes |
|---|---|---|---|---|---|
| 6/3/21 0843 | AS-17 outfall | Wet | Yes; 0.0000312 cfs | Yes | Water was slightly yellow and had floatables; homeless encampments in channel.<br><br>AS-17 flow connected with Arroyo Seco. Arroyo Seco was flowing. |
| 6/3/21 1000 | Manhole on Figueroa St. at N. Ave. 61 | Wet | No | No | Grass on N. Ave. 61 was wet, possibly from irrigation |
| 6/3/21 1020 | Manhole on Figueroa St. at N. Ave. 53 | Wet | No | No | Grass nearby was dry |

AS-17 outfall

Manhole on N. Avenue 61 at Figueroa St.

Manhole on Figueroa St. at N. Avenue 53

**Figure B-5. Photos of Monitoring Sites on June 3, 2021**

### DAY 3

On Day 3, monitoring began with a flow check at the AS-17 outfall. Since there was flow, paired *E. coli* and HF183 samples were taken at the outfall. The manhole on N. Avenue 61 at Figueroa St. was monitored; it was wet but without flow, so samples were not collected. Based on the field observations of the morning monitoring event, and upon coordination with the LASAN Watershed Protection District, it was determined that no separate afternoon monitoring event would be conducted. Table B-3 and Figure B-6 provide a summary and photos, respectively, of the third day of monitoring.

**Table B-3. Monitoring Day 3 Summary**

| Date/Time (XXXX hrs) | Site | Wet or Dry | Flow Present? | Samples Collected? | Notes |
|---|---|---|---|---|---|
| 6/7/21 0800 | AS-17 outfall | Wet | Yes; 0.000321 cfs | Yes | Water was light yellow; homeless encampments in channel.<br><br>AS-17 flow connected with Arroyo Seco. Arroyo Seco was flowing. |
| 6/7/21 0848 | Manhole on Figueroa St. at N. Ave. 61 | Wet | No | No | Private maintenance crews at Rec Center potentially related to pool repairs. |

AS-17 outfall

Manhole on N. Avenue 61 at Figueroa St.

**Figure B-6. Photos of Monitoring Sites on June 7, 2021**

### DAY 4

The fourth and final day of sampling consisted of two rounds of monitoring, one in the morning and the other in the afternoon. During the morning event, the AS-17 outfall was flowing and was sampled for *E. coli* and HF183. The manhole on N. Avenue 61 at Figueroa St. and the manhole on Figueroa St. at N. Avenue 53 were visited, and both were wet but not flowing; thus, samples were not taken. In the afternoon, the AS-17 outfall was flowing and was sampled for *E. coli* and HF183; the water was darker in color and more turbid than that morning. Afterward,

when sampling personnel were driving to N. Avenue 61, they observed City tree trimming crews on Figueroa St. near N. Avenue 54. The next site, the manhole on N. Avenue 61 at Figueroa St., was observed to be wet but had no flow and was not sampled. At the Rec Center, sampling personnel spoke with a City of LA Rec and Parks employee and she stated the following about potential sources of flow in the area:

- Previously, people experiencing homelessness at and surrounding the Rec Center would urinate and defecate in buckets and dump them in the Arroyo Seco or storm drains. However, Port-a-Potties were setup at and around the Rec Center over the past year, and individuals now empty their buckets in the Port-a-Potties. The Port-a-Potties are emptied every morning before 0800 hours.
- Previously, there were homeless encampments at and near the Rec Center, but they have migrated elsewhere.
- Sprinklers at the Rec Center are turned on twice per week.
- Businesses in the area could be power washing their businesses, sidewalks, walls, etc. to remove graffiti.

The third site visited, the manhole on Figueroa St. at N. Avenue 53, was flowing and was sampled for *E. coli* and HF183. Sampling personnel observed a weekly farmers market at Marmion Way and N. Avenue 57, which could have contributed to flows. The final site visited, a manhole on N. Avenue 56 at Figueroa St., was slightly wet but was not flowing, so was not sampled. Table B-4 and Figure B-7 and Figure B-8 provide summaries and photos, of the fourth and last day of monitoring.

**Table B-4. Monitoring Day 4 Summary**

| Date/Time (XXXX hrs) | Site | Wet or Dry | Flow Present? | Samples Collected? | Notes |
|---|---|---|---|---|---|
| 6/8/21 0746 | AS-17 outfall | Wet | Yes; 0.000289 cfs | Yes | Water was slightly yellow and had floatables; homeless encampments in channel.<br><br>AS-17 flow connected with Arroyo Seco. Arroyo Seco was flowing. |
| 6/8/21 0825 | Manhole on Figueroa St. at N. Ave. 61 | Wet | No | No | Grass on N. Ave. 61 had dew; a pile of belongings was observed near the Rec Center pump house, along with a City truck |
| 6/8/21 0840 | Manhole on Figueroa St. at N. Ave. 53 | Wet | No | No | Grass nearby was dry |
| 6/8/21 1313 | AS-17 outfall | Wet | Yes; 0.000212 cfs | Yes | Water was light brown and very turbid; homeless encampments in channel. AS-17 flow connected with Arroyo Seco. See above narrative for additional notes. |
| 6/8/21 1349 | Manhole on Figueroa St. at N. Ave. 61 | Wet | No | No | Pool was being filled and started at around 09:30. See above narrative for additional notes. |

| Date/Time (XXXX hrs) | Site | Wet or Dry | Flow Present? | Samples Collected? | Notes |
|---|---|---|---|---|---|
| 6/8/21 1405 | Manhole on Figueroa St. at N. Ave. 53 | Wet | Yes; 0.0875 cfs | Yes | Water was light yellow and smelled slightly fishy |
| 6/8/21 1451 | Manhole on N. Ave. 56 at Figueroa St. | Wet | No | No | See above narrative for notes. |

**Morning**

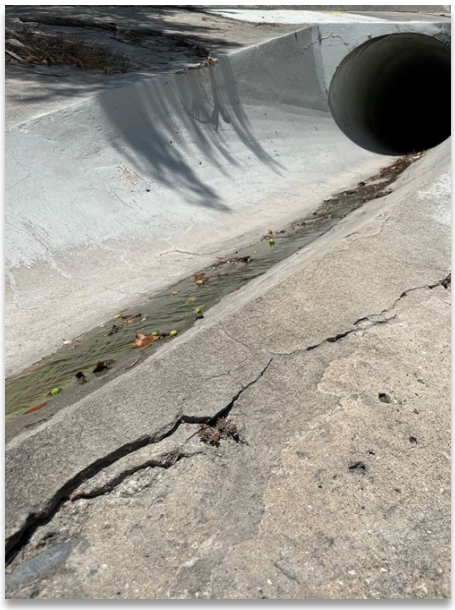
AS-17 outfall

Manhole on N. Avenue 61 at Figueroa St.

Manhole on Figueroa St. at N. Avenue 53

**Figure B-7. Photos of Morning Monitoring Sites on June 8, 2021**

**Afternoon**



AS-17 outfall

Manhole on N. Avenue 61 at Figueroa St.

Manhole on Figueroa St. at N. Avenue 53

Manhole on N. Avenue 56 at Figueroa St.

**Figure B-8. Photos of Afternoon Monitoring Sites on June 8, 2021**

### HWSI Results

Over the course of the four days of monitoring, four samples of *E. coli* and HF183 were collected and analyzed; three of each of these samples were taken at the AS-17 outfall, while one was taken at the manhole on Figueroa St. at N. Avenue 53. Table B-5 provides a summary of these monitoring results.

**Table B-5. Monitoring Results**

| Date/Time | Site | *E. coli* (cfu/100 mL) | HF183 (copies/100 mL) |
|---|---|---|---|
| 6/3/21 09:05 | AS-17 | 260 | 208 |
| 6/7/21 08:04 | AS-17 | 6,100 | 625 |
| 6/8/21 07:50 | AS-17 | 480 | 278 |
| 6/8/21 13:20 | AS-17 | 7,700 | 152 |
| 6/8/21 14:25 | Manhole on Figueroa St. at N. Avenue 53 | 5,000 | 19[1] |

[1] Below level of quantification

The results were compared to the action levels and monitoring triggers identified in the Plan (see Plan Section 2.3.6 Table 2-1). Three of the four AS-17 outfall samples exceeded the action level for *E. coli* (i.e., 320 cfu/100 mL) that would trigger subsequent source tracking in the upstream catchment; however, all HF183 samples collected from the AS-17 outfall were below the action level for outfalls (4,100 copies/100 mL). Of particular note, on June 8 at AS-17, *E. coli* results increased greatly between morning and afternoon, but HF183 results decreased slightly. HF183 results were highest for AS-17 on June 7 out of all the sampling dates. Overall, only one manhole had flow and was sampled: the manhole on Figueroa St. at N. Avenue 53 on June 8 in the afternoon. Based on these limited results, further sampling upstream would not be required due to the low potential for human health risk. However, the samples collected to date represent a relatively small sample population, so additional dry weather investigation is warranted to confirm these preliminary findings and to rule out the AS-17 catchment as a potential pathogen health risk to downstream recreators.

# 3 NEXT STEPS

The current results indicate the AS-17 catchment poses no pathogen health risk to potential downstream recreators; however, given the limited number of dry weather observations, it is recommended additional dry weather monitoring (i.e., observations and possibly sampling) be conducted. If flow is observed at the outfall, collection of paired *E. coli*/HF183 samples at the outfall and possibly upstream manholes, should be performed. If additional dry weather monitoring yields similar results, then there will be sufficient evidence that dry weather pathogen health risk from the AS-17 catchment to recreators in the receiving water is low, and the catchment should be deemed a low priority for further dry weather investigation and load reduction. If the additional dry weather monitoring results indicate potential risk, further investigation efforts should target the potential sources previously identified during the source investigation process such as over-irrigation, power washing, and homeless encampments. Associated iterative changes to the source investigation framework may be needed to gather additional data, revise the testable hypotheses, and update monitoring strategies for the targeted sources.

# ATTACHMENTS FOR SECTION 5:

# Cost & Schedule

craftwater engineering, inc.
San Diego | Los Angeles
858.997.8172
craftwaterinc.com

# SCIENTIFIC STUDY BUDGET

**Scientific Study Budget Summary:**

| Task | Task Name | Fiscal Year | Total |
|---|---|---|---|
| 1 | Project Management | FY23/24 | $ 20,000.00 |
| | | FY24/25 | $ 25,000.00 |
| 2 | Catchment Prioritization | FY23/24 | $ 60,000.00 |
| | | FY24/25 | $ 30,000.00 |
| 3 | Targeted Human Waste Source Reduction Strategy | FY23/24 | $ 75,000.00 |
| | | FY24/25 | $ - |
| 4 | Source Identification & Abatement | FY23/24 | $ - |
| | | FY24/25 | $ 225,000.00 |
| 5 | Outreach & Engagement | FY23/24 | $ 20,000.00 |
| | | FY24/25 | $ 20,000.00 |
| | | **FY 23/24 TOTAL** | $ 175,000.00 |
| | | **FY 24/25 TOTAL** | $ 300,000.00 |
| | | **GRAND TOTAL** | $ 475,000.00 |

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Paramount, CA 90723
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www.gatewaywater.org


*Los Angeles Gateway Region*
*Integrated Regional Water Management*
*Joint Powers Authority*

September 8, 2022

**AGENDA ITEM 9 – Proposal for Project Management Services to Closeout the 2015 Proposition 84 Regional Advanced Meter Replacement Grant Project**

## SUMMARY:

In 2016, GWMA retained Civiltec Engineering, Inc.'s services through a Request for Proposal process as a pre-qualified consultant on the approved On-Call Consultant List to provide Project & Grant Management Services for the 2015 Proposition 84 Regional Advanced Meter Replacement (AMR) Grant Project. The project included the following subrecipients: Long Beach Water Department, Pico Water District, and the Cities of Commerce, Downey, Lakewood, Norwalk, Pico Rivera, South Gate and Whittier. The subrecipients were to replace water meters at customer connections with AMR units that have advanced reading technology capabilities. An amendment to the agreement with Civiltec is now being requested to close out the grant.

## BACKGROUND:

The 2015 Proposition 84 Integrated Regional Water Management (IRWM) Implementation Grant provides funding from the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 to Los Angeles County Flood Control District (LACFCD) to assist in financing implementation projects associated with the Greater Los Angeles County Region Integrated Regional Water Management Plan. For the Region's IRWM projects funded under the Grant Agreement, the LACFCD has been designated as the regional entity to apply for grants on behalf of all proposed projects for the Region through the IRWM Process. GWMA, a member of the Greater Los Angeles County (GLAC) IRWM Region, has an Memorandum of Understanding with the County for four projects to be included in the 2015 Proposition 84 Grant Program. The Advanced Water Meter Replacement Project is one of the four GWMA projects that was awarded funding under this Grant to save approximately 423 acre-feet per year (AFY) of water supply and improve regional water use efficiency.

The participants of the project used different methods and timing for implementing their portion of the regional project which resulted in a longer than expected period of time to complete. In addition, meters had to be redistributed throughout the course of the project. The project originally encompassed the service areas of 12 participating GWMA entities which over time concluded with the same number of meters but with 9 participants. The project is now complete. However, many documents need to be coordinated, organized and submitted for grant closeout. Once the documents are submitted and verified, the outstanding retention would be released.

Civiltec was retained by GWMA to facilitate managing the grant project. As mentioned previously, the project schedule had extended longer than originally planned, primarily due to the timing of the subrecipients implementing their portion of the project. The additional request is in the amount of $6,920.

## FISCAL IMPACT:

Civiltec's original proposed fee was a not-to-exceed amount of $72,828. The additional requested amount of $6,920 would bring the total fee to $79,748. The grant reimbursed $50,000 for project management with the remainder of $22,828 shared by the project participants collected back in 2016.

## RECOMMENDATION:

a. Accept the AMR Project Close Out Proposal from Civiltec Engineering, Inc. as presented and authorize the Executive Officer to sign the proposal and issue a Notice to Proceed.

CIVILTEC
engineering inc.
*Civil, Water, Wastewater, Drainage, Transportation and*
*Electrical/Controls Engineering ● Construction Management ● Surveying*
*California ● Arizona*

August 29, 2022

Gateway Water Management Authority
16401 Paramount Blvd.
Paramount, CA 90723

Sent Via Email: tgleason.gateway@gmail.com

**ATTN: Traci Gleason | Program Manager**

**RE: Proposal for Traci Gleason**
**Advanced Water Meter Replacement Project Close Out**
**Civiltec Proposal No. PF22076**

Dear Traci,

***Civiltec engineering, inc. (Civiltec)*** appreciates the opportunity to provide professional surveying and engineering services to Gateway Water Management Authority (GWMA) for the above referenced project. We understand this project is to close out the Advanced Water Meter Replacement Project that replaced 4,200 water meters with Advanced Meter Reading units in 10 service areas. The project will consist of coordinating with agencies previously involved to deliver the documents necessary to close out this project and secure the payment retention. Our efforts assume that the majority of the documentation will be made available by the agencies involved and we will coordinate securing the retention amounts for each agency.

## AUTHORIZED RESPONSIBLE ENGINEERS

***Civiltec*** proposes to assign C. Shem Hawes, PE, as company representative. He is a Principal in the firm and the Fullerton Branch Manager. He will be responsible for the firm's timely response and quality completion. He has complete authority to handle all contractual matters, commit ***Civiltec's*** resources as necessary and take all action necessary to meet your requests. Shem will be assisted by Jason Sigaran as the staff engineer. ***Civiltec*** will manage this project directly from our Fullerton office.

## SCOPE OF SERVICES

Based on our project understanding and professional experience, we have identified the following scope of services.

## Phase 1. Grant Management

### Task 1. Meetings

We will conduct a monthly progress meeting by way of a conference call with GWMA. The meeting will provide progress updates and discussions of grant requirements that must be met for retention. We will also make ourselves available to respond to participant questions as necessary.

***Civiltec*** will establish a conference call number by way of "Teams", for joint participation and will generate meeting minutes and action items from each call. It is assumed that the conference calls will each have an hour duration.

### Task 2. Grant Documentation and Progress Reports

We will coordinate with the various agencies to obtain and compile the necessary documentation. We will review the documentation to ensure the grant requirements are being followed. We will make this information available on a share file. The information will be updated on a monthly basis.

We will also facilitate compliance with the grant requirements by reasonably managing participants, consultants, and contractors that are involved in the program.

## EXCLUSIONS

This proposal does not include the following:

- Field verification or inspection,
- Regular individual progress meetings with each participant,
- Presentation or attendance to City Councils, Boards of Directors, etc. ***Civiltec***

## SCHEDULE

***Civiltec*** is available to commence this project immediately. Based on the scope of work described previously, we can complete this project by December of 2022.

## FEE DISTRIBUTION SCHEDULE

Professional fees for the above-described services will be billed on a time and materials, not to exceed basis as summarized below. A breakdown of our hours and fees is included as Attachment A.

| | |
|---|---|
| Task 1. Meetings | $1,280.00 |
| Task 2. Grant Documentation and Progress Reports | $5,640.00 |
| **Total** | **$6,920.00** |

Any work not authorized within 3 months of the date of this proposal will be subject to renegotiations based on current rates. Capacity and impact fees associated with application filings shall be the responsibility of the GWMA. Additional services may be authorized by GWMA based on ***Civiltec's*** Hourly Rate Schedule. ***Civiltec*** will bill monthly for all work performed and expenses incurred on the project's behalf.

If this proposal is acceptable, please return a signed copy to our office. Again, thank you for the opportunity to submit this proposal. We look forward to working with you on this project. Please contact the undersigned directly with any comments or questions.

Sincerely,

***Civiltec engineering, inc.***

C. Shem Hawes, PE (shawes@civiltec.com)
Principal, Senior Engineer

CSH:amv

Attachment(s): A – Breakdown of Hours and Fees

**Proposal Acceptance:**
The Terms and Conditions of this proposal are:

Accepted this _____ day of _____ 2022.

By Authorized GWMA Representative:

_____ _____
Name and Title Date

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# Attachment A
# Breakdown of Hours and Fees

**GWMA Meter Replacement Project Close Out PF22076**
**Paramount, CA**
**Time and Fee Estimate**

**Date: August 29, 2022**

| Scope of Work | HOURS BY SrE $ 240.00 | HOURS BY SE $ 155.00 | HOURS BY Admin $ 80.00 | TOTAL COST |
|---|---|---|---|---|
| **Phase 1 - Grant Management** | | | | **$ 6,920.00** |
| Task 1 - Meetings | 4 | | 4 | $ 1,280.00 |
| Task 2 - Grant Documentation and Progress Reports | 8 | 24 | | $ 5,640.00 |
| **HOURS** | **12** | **24** | **4** | **40** |
| **BUDGET** | **$ 2,880.00** | **$ 3,720.00** | **$ 320.00** | **$ 6,920.00** |

SR. PIC = Sr. Principal Engineer
SrPM = Sr. Project Manager
SrPE = Sr. Project Engineer
SE = Staff Engineer
CADT = CAD Technician
Admin = Administrative Assistant/Clerical
SM = Survey Manager
PIC = Principal Engineer
PrEE = Principal Electrical Engineer
PE = Project Engineer
D = Designer
JrE = Junior Engineer
CO = Resident Eng./Const. Observer
SLS = Staff Land Surveyor
SrE = Senior Engineer
PM = Project Manager
SrD = Sr. Designer
DD = Designer/Drafter
PT = Planning Technician
2MS = Two Person Survey Crew