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April 6, 2022

Mr. Rick Whetsel
Santa Ana Watershed Project Authority
11615 Sterling Avenue
Riverside, CA 92503

Subject: Amendment for the Regional Bacteria Monitoring Program for 2022-2023 to Incorporate Special Study of Feral Pigs as an Uncontrollable Source of Fecal Bacteria in the MSAR TMDL Waters

Dear Mr. Whetsel:

A recent Homeless Encampment Phase 1A study of bacteria in the vicinity of homeless encampments on the Santa Ana River Reach 3 and 4 has shown that much of the bacteria was typed to the presence of feral pigs and not to the presence of humans or dogs (GEI, CWE and CDM Smith, 2022). Analysis for pig bacteria markers (and dog markers) was added to the project's scope for the final two of four rounds of sampling following the recommendation of the Task Force during its November 2021 meeting. This finding along with anecdotal reports of a large herd of feral pigs in the vicinity warrant further investigation into the extent of pig-related bacteria impacts in this stretch of the Santa Ana River. The study can be performed cost effectively by including the sample collection for bacteria markers in the routine dry weather sampling program. The goal of this special study is further understand feral pigs as an uncontrollable bacteria sources in the river and the relationship to general indicator bacteria within the TMDL segments.

Background

The Phase 1A Homeless Encampment study included data collection of water samples, field parameter measurements, a rapid trash assessment. Four rounds of dry weather samples were collected between September 2021 and January 2022. In the September and October sampling rounds, water samples were analyzed for total suspended solids, *E. coli*, and the human bacteria marker HF183. The final sampling rounds (November and January) included analysis for the bacteria markers for dogs (DG37) and pigs (Pig2Bac). Samples were collected on the upstream and downstream sides of three bridges on stretch of the Santa Ana River Reach at three areas of concentrated homeless encampments activity: Market Street Bridge, Mission Blvd. Bridge, and Van Buren Bridge (Figure 1, which also include proposed sampling locations for this proposed study). The findings of the bacteria samples are presented in Table 1 (attached).



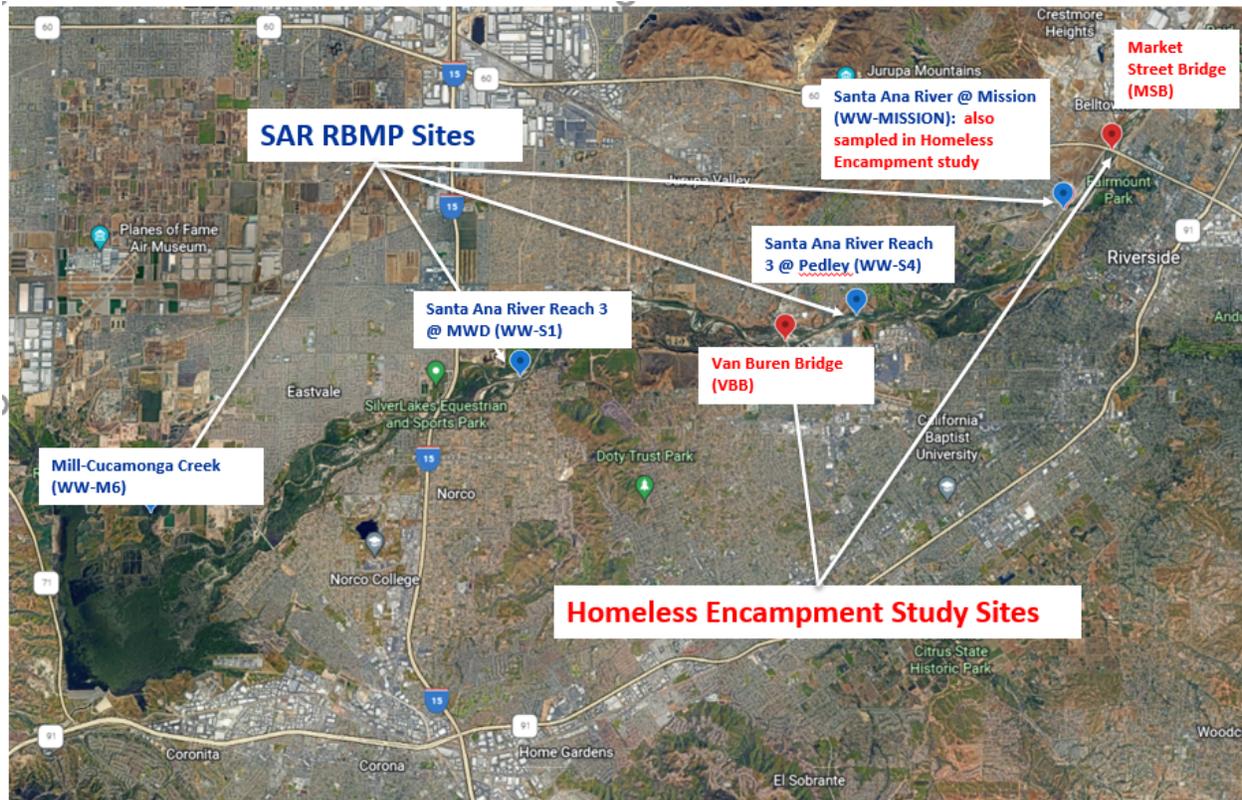


Figure 1. Sampling Locations for this Proposed Study (SAR RBMP locations) and the Homeless Encampment Study

Scope

The proposed study would involve the following components:

- Collect additional water quality data during the 2022 dry season at four of the Priority 2 TMDL compliance monitoring locations (WW-M6, WW-MISSION WW-S1, and WW-S4)
- Reach out to California Fish and Game to obtain information about feral pigs in the Santa Ana River watershed
- Analyze the results of these samples in combination with those collected in the Phase 1A Homeless Encampment study, assess whether correlation exists between gene copy and general *E. coli* bacteria concentrations, and provide recommendations to the Task Force on next steps



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Task 1 – Water Quality Sampling for Pig DNA

CDM Smith team partner CWE will collect samples for every other of the 20 dry weather events at the four sampling locations (Figure 1): Santa Ana River @ Mission (WW-MISSION). Santa Ana River Reach 3 @Pedley (WW-S4), Santa Ana River Reach 3 @MWD (WW-S1), and Mill-Cucamonga Creek (WW-M6). Samples will be collected at the same locations used in the SAR RBMP. Including QA samples, a budget for 48 samples has been included. Samples will be collected, processed, and couriered to the laboratory. Pig qPCR testing will be conducted using the Pig2Bac bacteria marker.

Task 2 – Research on Pig Presence

CDM Smith will contact California Fish and Game to obtain available information on feral pig presence in the Santa Ana River watershed. Among the information that will be sought includes: known locations, habitat presence, populations, concerns and any planned or considered programs for population control.

Task 3 – Technical Memorandum

CDM Smith will prepare a draft technical memorandum on the findings of the pig bacteria marker sampling results, which will be combined with those collected as part of the Phase 1A Homeless Encampment Study. These will be integrated with information obtained from California Fish and Game to describe the presence of feral pigs and their likely contribution to the uncontrollable source of bacteria in the TMDL waters. In addition, the memorandum will recommend whether samples that have been frozen should be analyzed for any additional bacteria markers.

CDM Smith will present the findings of the study to the Task Force. The technical memorandum will then be finalized addressing comments from the Task Force, and the information will be included in the 2022 Annual Report for the RMBP.

Budget

The proposed budget for this effort is \$27,900 and includes CWE time to collect and process the additional samples and transport them to the laboratory, laboratory analytical time for Weston Solutions, and CDM Smith time to research pig presence, compile and analyze the data and prepare the technical memorandum.

Task	Cost
1 – Water Quality Sampling for Pig DNA	\$ 22,000
2 – Research on Pig Presence	\$ 1,700
3 – Technical Memorandum	\$ 4,200
Total	\$ 27,900





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We look forward to working with the Task Force to investigation this potentially significant source of uncontrollable bacteria. Please let me know if you have questions or comments on the proposed scope.

Sincerely,

A handwritten signature in blue ink, appearing to read "Alberto Acevedo". The signature is stylized and fluid.

Alberto Acevedo
CSL | Sr Project Manager
CDM Smith Inc.

