Appendix I

Agua Hedionda Phased Approach Information

Agua Hedionda Lagoon Background Information

The Water Quality Improvement Plan (WQIP) is intended to be a planning document that, through established cycles, is updated and revised to reflect collected data and input. The RAs adaptively manage their programs and priorities based on information and experience obtained from program implementation and assessment of new science and data.

In October 2017, the RAs received a California Department of Public Health's Shellfish Program (CDPH) bacteria dataset from the RB. The RAs analyzed and assessed the data and presented results and recommendations in a Technical Memorandum submitted as Attachment 1 of the Fiscal Year 2017-2018 WQIP Annual Report, see link above. In November 2019, the RAs received a RB comment letter requiring a WQIP Update to analyze bacteria data concerning impacts of the shellfish harvesting (SHELL) and contact recreation (REC-1) beneficial uses in the Agua Hedionda Lagoon.

The Agua Hedionda Lagoon is within the Agua Hedionda Hydrologic Area of the Carlsbad WMA. The Lagoon consists of three basins (i.e., inner, middle, and outer) separated by Highway 101, the railroad, and Interstate 5 (Error! Reference source not found.). Although beneficial uses for SHELL and REC-1 are applicable to all three basins in the Lagoon, commercial shellfish harvesting actively occurs in the Outer Basin and recreational activities typically occur in the Inner Basin.

Figure 1: Agua Hedionda Lagoon Basins

To support the WQIP Update evaluation process, the RAs released a public data request in March 2020. Bacteria data received from the data request along with data from the previously submitted Technical Memorandum were reviewed and analyzed in relation to the protection of SHELL and REC-1 beneficial uses. Additional data collected in Agua Hedionda Creek was received on September 10, 2020 and will be evaluated as part of the FY 2019-2020 Annual Report. **Table 1** summarizes the findings of the data analysis. This information was presented and discussed at the September 3rd Consultation Panel meeting.

Table 1: WQIP Update Data Evaluation

Data Evaluated	Beneficial Use	RA Data Analysis Findings for Agua Hedionda Lagoon and Creek
RA Data (WQIP Development)	REC-1	No indications of water quality impairments in the Lagoon; Potential water quality concerns in the Creek.
	SHELL	No indications of water quality impairments in the Lagoon.
CDPH (2012-2020)	REC-1	No indications of water quality impairments in the Lagoon; Potential water quality concerns in the Creek.
	SHELL	No indications of water quality impairments in the Lagoon, although some elevated wet weather concentrations.

The RAs elevated bacteria for REC-1 and SHELL beneficial uses in the Agua Hedionda Lagoon to priority water quality conditions (PWQCs). The Agua Hedionda Hydrologic Area currently has two highest priority water quality conditions (HPWQCs): riparian habitat degradation and hydromodification impacts. The strategies being implemented to address the HPWQCs have multiple benefits including improved water quality through biological processing of pollutants and physical filtering of sediments and organic material. The RAs also added a strategy to protect SHELL and REC-1 beneficial uses in Agua Hedionda Lagoon. The objectives of the Strategy are as follows:

- Understand and evaluate current conditions and protect SHELL and REC-1 beneficial uses in the Lagoon;
- If conditions indicate that water quality is declining, RAs will perform source assessments to gain a better understanding of the potential sources and their contributions; and
- If source assessments show that the MS4 a significant source causing or contributing to declining water quality conditions, targeted actions will be implemented to address sources that pose the highest risk to consumers of shellfish and/or recreators, as appropriate.

The Strategy will be implemented in three phases as described below.

PHASED APPROACH TO PROTECT SHELL AND REC-1 BENEFICIAL USES IN AGUA HEDIONDA LAGOON

The following information is provided to describe the approach RAs in the Agua Hedionda Hydrologic Area (HA) will take to protect SHELL and REC-1 beneficial uses in Agua Hedionda Lagoon (Lagoon). Updated strategies for the Cities of Carlsbad and Vista and County of San Diego are provided within Section 3.3 of the WQIP.

SHELL BENEFICIAL USES

Phase I

Management Objective(s)

Determine whether water quality conditions support commercial shellfish harvesting operations in the Lagoon under open conditions. [1]

Strategies

- Restoration strategies that are in the process of being implemented to meet current WQIP goals will continue. Examples include the Agua Hedionda Creek Restoration and the Roman Creek Wetlands Projects. These projects will reduce bacteria loading to Agua Hedionda Lagoon as well as increase the overall ecological function of the creek to benefit aquatic organisms and reduce the effects of hydromodification.
- Other current strategies that address bacteria will also continue. Examples include property-based inspections programs, enhanced education programs including outreach to homeowners' associations and property managers, irrigation runoff reduction programs, and others.
- Select human source reduction strategies will also be implemented and have been incorporated into the WQIP as strategies. Examples of strategies that may be implemented include:
    - Strategies to address homelessness in Agua Hedionda HA
    - Implementation of agencies' Sanitary Sewer Management Plans (SSMPs)
    - Investigation of reported Onsite Wastewater Treatment System (OWTS) failures and performance of follow-up inspections
- Science and statewide policies will be tracked
- Potential participation in scientific studies, if warranted
- Relevant studies will be evaluated in Annual Reports

[1] Beneficial uses for commercial shellfish harvesting are monitored and managed by CDPH. Open condition refers to dry weather conditions and rain events <0.4". CDPH practice throughout the State is to suspend harvesting operations following rain events. In Agua Hedionda Lagoon the threshold for "closure" is defined as >0.4"). Once harvesting resumes after 72 hours of dry weather, a depuration process is implemented to ensure that the shellfish are safe for consumption. This is common practice due to the filter feeding nature of shellfish and is not indicative of beneficial use impairment, but rather practical management of shellfish harvesting operations to protect public health. In closures due to extreme weather events, defined as >1.3", a sample below NSSP thresholds is required to resume harvesting operations.

Monitoring and Assessment

Example Monitoring/Assessment Question

Are fecal coliform concentrations in the Outer Basin below CDPH benchmarks (i.e., NSSP standards for geometric mean and 90th percentile) under open conditions?

Overview of Potential Monitoring and Assessment Approach

CDPH fecal coliform data will be evaluated annually, as part of the WQIP annual report, to evaluate conditions to determine whether water quality is supporting shellfish harvesting during open conditions.

Evaluation/Adaptive Management

Are fecal coliform data collected by CDPH continuing to be below CDPH benchmarks?

Phase II

Management Objective(s)

Develop a conceptual model to evaluate potential sources contributing to fecal coliform concentrations in the Outer Basin under the closed condition.

Strategies

Implement strategies to assess and evaluate potential sources of bacteria within the HA and/or within the Outer Basin of the Lagoon. Potential strategies could include the use of a conceptual model, sanitary survey, and/or other available information to determine potential sources of bacteria within the HA and assess their potential risk/impacts on SHELL beneficial uses. Factors such as human health risk, magnitude, transport feasibility, frequency, and controllability may be considered.

Monitoring and Assessment

Example Monitoring/Assessment Question

What are the potential contributing sources in the watershed? What genetic source markers are present in the Outer Basin of the Lagoon (e.g., human, avian)?

Overview of Potential Monitoring and Assessment Approach

Monitoring would be designed specifically to evaluate potential sources of risk that may be impacting beneficial uses and could leverage existing programs or be performed as a special study with limited duration (or some combination of the two). A Monitoring Framework will be developed with input from the RB and from stakeholders if Phase II is triggered. Options for consideration in a monitoring design include:

- Leveraging Existing Programs: Perform an evaluation of MS4 outfall data collected within the HA to determine potential for impacts to SHELL beneficial uses; adaptively manage and modify MS4 outfall monitoring sites to collect more relevant information; and/or relocate an existing Mass Loading Station (MLS) to Agua Hedionda Creek and monitor per MS4 Permit requirements.
- Special Study: Implement a special study of limited duration to evaluate potential sources impacting beneficial uses. Potential considerations include: monitoring MS4 outfalls to the Creek and/or Lagoon to determine contribution and potential impacts; supplement current monitoring of MS4 outfalls with monitoring for human markers to assess risk related issues; perform monitoring of genetic markers (e.g., human, avian) in the lagoon to evaluate potential sources and assess potential risk to beneficial uses; and/or implement a plume study to determine impacts of watershed runoff on SHELL beneficial uses.

Evaluation/Adaptive Management

If Phase I monitoring and data evaluations indicate that SHELL beneficial uses are impaired and the evaluation of sources indicates significant potential impacts from the MS4 to the Lagoon, RAs will re-evaluate priorities within the next annual report per the WQIP process and go to Phase III. This re-evaluation of priorities may result in elevating the condition to a highest priority water quality condition (HPWQC), which would trigger the development of numeric goals and schedules per Permit Provision B.3.a. If yes to monitoring questions posed in Phase I and/or Phase II demonstrates that the MS4 is not a significant source contributing to elevated bacteria levels, continue Phase I strategies, and discontinue Phase II monitoring.

Phase III

Management Objective

Implement strategies targeting potential sources of human waste to reduce risk to consumers of shellfish.

Note: Studies conducted to support the 2012 update to EPA's recommended recreational water quality criteria identified that most non-human sources of fecal indicator bacteria are associated with a lower risk to recreators. The general reason for this finding is that viruses from most non-human sources are host specific. [2] *These technical findings have been utilized to support a focus on managing human sources impacting REC-1 beneficial uses (e.g., South Orange County WQIP). While similar technical findings have not been developed specifically for the SHELL beneficial use, the premise of the studies is applicable (i.e. that viruses from most non-human sources are host specific and pose less risk to humans). A risk-based approach to managing sources of bacteria may be the most effective means to manage water quality related to shellfish harvesting and consumption as well. The approach is designed to reduce impacts from potential human sources of bacteria which have been shown to present the highest risk to human health; therefore, reductions in these sources within the watershed are likely to reduce the amount of harmful pathogens within shellfish, directly reducing risk to shellfish consumers. On-going studies in Newport Bay are investigating this linkage. In addition, the State Water Resources Control Board is in the process of addressing challenges in managing bacteria and is considering risk-based approaches to achieve recreational and shellfish related beneficial uses. Both processes are expected to further inform the best approach to managing SHELL in the Lagoon. Further, CDPH has expressed support for this approach to protecting consumers of shellfish from the Lagoon.* [3]

Strategies

Implement strategies focused on investigation and elimination of potential sources of human waste in the HA based on Phase II findings and monitoring of human markers at MS4 outfalls.

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[2] "Generally, viruses from avian and wildlife sources are expected to pose limited risk to humans because they are usually host-specific." Report of the Experts Scientific Workshop on Potential Human Health Risks from Exposure to Fecal Contamination from Avian and Other Wildlife Sources in Recreational Waters. December 21, 2011. U.S. Environmental Protection Agency, Office of Water, Office of Research and Development.

[3] Personal communication between Matt Scanlon (CDPH) and Tim Murphy (City of Carlsbad), February 2020.

Monitoring and Assessment

Example Monitoring/Assessment Question(s)

1. Are MS4 outfalls within the HA conveying significant sources of human fecal waste to the Lagoon?
2. Following source investigation and abatement, have potential sources of human fecal waste in the drainage area been successfully managed or eliminated?

Overview of Potential Monitoring and Assessment Approach

- Monitoring and assessment approach will be based on the best available science and guidance at the time of implementation; potential methods (based on current practices) include:
    - Monitoring within the water column and/or the shellfish themselves for human markers or pathogens to assess potential impacts from human sources;
    - Monitoring at MS4 outfalls using human markers (e.g., HF-183) to identify and prioritize drainage areas with potential sources of human fecal waste;
    - Verification monitoring after source abatement processes to ensure that sources have been successfully managed or eliminated.

Evaluation/Adaptive Management

- Prioritize specific sources or MS4 outfalls in the HA for source investigation and abatement.

REC-1 BENEFICIAL USES

Phase I

Management Objective

Determine whether water quality conditions in the Lagoon are supporting REC-1 beneficial uses.

Strategies

- Restoration strategies that are in the process of being implemented to meet current WQIP goals will continue. Examples include the Agua Hedionda Creek Restoration and the Roman Creek Wetlands Projects. These projects will reduce bacteria loading to Agua Hedionda Lagoon as well as increase the overall ecological function of the creek to benefit aquatic organisms and reduce the effects of hydromodification.
- Other current strategies that address bacteria will also continue. Examples include property-based inspections programs, enhanced education programs including outreach to homeowners' associations and property managers, irrigation runoff reduction programs, and others.
- Select human source reduction strategies will also be implemented and have been incorporated into the WQIP as strategies. Examples of strategies that may be implemented include:
    - Strategies to address homelessness in Agua Hedionda HA
    - Implementation of agencies' Sanitary Sewer Management Plans (SSMPs)
    - Investigation of reported Onsite Wastewater Treatment System (OWTS) failures and performance of follow-up inspections
- Science and statewide policies will be tracked
- Relevant studies will be evaluated in Annual Reports

Monitoring and Assessment

Example Monitoring/Assessment Question

Are exceedances of the REC-1 water quality objective for *Enterococcus* in the Inner Basin below the 303(d) listing threshold for impairment?

Overview of Potential Monitoring and Assessment Approach

Implementation of a special study and periodic verification monitoring focused on *Enterococcus* to demonstrate that conditions are meeting REC-1 water quality objectives and that the Lagoon continues to be unimpaired per the 303(d) Listing Policy. Consistent with RB Resolution No. R9-2017-0030 supporting the use of Key Beneficial Uses and Key Areas concepts, the special study and verification monitoring will focus on the areas of most importance in the Lagoon and target the Inner Basin where the majority of the REC-1 usage occurs. A Monitoring Framework, including further details, will be developed with input from the RB.

Evaluation/Adaptive Management

Are conditions meeting REC-1 water quality objectives and does the Lagoon continue to meet criteria illustrating that it is not impaired per the 303(d) Listing Policy? Once sufficient *Enterococcus* data is collected, an analysis will be performed to compare the data to the 303(d) Listing Policy using the binomial evaluation to determine whether the Lagoon continues to be unimpaired for REC-1 or if conditions have changed and the Lagoon may be meeting criteria for impairment. If conditions have changed and the Lagoon is considered to be impaired under the Listing Policy, go to Phase II. The priorities will be re-

evaluated per the WQIP prioritization process within the next annual report. If REC-1 use continues to be supported, RAs will continue with Phase I strategies. The RAs will perform periodic sample collection and data assessment, as defined in the Monitoring Framework to confirm that REC-1 uses continue to be supported. If data indicates otherwise, Phase II will be triggered. If Phase II is triggered, the re-evaluation of priorities may result in elevating the condition to a highest priority water quality condition.

Phase II

Management Objective

Determine whether the MS4 is a significant source of bacteria/pathogens that are potentially causing or contributing to impacts to REC-1 beneficial uses in the Lagoon.

Strategies

Implement strategies to assess and evaluate potential sources of bacteria within the HA. These potential strategies could include the use of a conceptual model, sanitary survey, and/or other available information to determine potential sources of bacteria within the HA and assess their potential impact to the REC-1 beneficial use. Factors such as human health risk, magnitude, transport feasibility, frequency, and controllability may be considered.

Monitoring and Assessment

Example Monitoring/Assessment Question

Is the MS4 a significant source of fecal indicator bacteria that may cause or contribute to increased risk related to recreational use in the Lagoon?

Overview of Potential Monitoring and Assessment Approach

If triggered, monitoring will be designed specifically to determine whether the MS4 is a significant source of risk potentially causing or contributing to impacts to beneficial uses. Monitoring may leverage existing programs or be performed as a special study with limited duration (or some combination of the two). A Monitoring Framework will be developed with input from the RB if Phase II is triggered. Some options for consideration in a monitoring design include:

- Leveraging Existing Programs: Perform an evaluation of MS4 outfall data collected within the HA to determine potential for impacts to REC-1 beneficial uses; adaptively manage and modify MS4 outfall monitoring sites to collect more relevant information; and/or relocate an existing Mass Loading Station (MLS) to Agua Hedionda Creek and monitor per MS4 Permit requirements.
- Special Study: Implement a Special Study of limited duration to assess contribution from the MS4s and potential impacts to REC-1 beneficial uses. Potential considerations include: monitoring MS4 outfalls to the Creek and/or Lagoon to determine contribution and potential impacts; supplement current monitoring of MS4 outfalls with monitoring for human markers to assess risk related issues; perform monitoring of human markers in the lagoon to assess potential risk to beneficial uses; and/or implement a plume study to determine impacts of watershed runoff on REC-1 beneficial uses.

Evaluation/Adaptive Management

Are FIB impacting REC-1 beneficial uses in the Lagoon? If receiving water data collected under Phase I indicates potential impacts to REC-1 and Phase II monitoring in the HA indicates that discharges from the MS4 may be causing or contributing to the impacts, RAs will re-evaluate priorities within the next annual report per the WQIP process and go to Phase III. This re-evaluation of priorities may result in

elevating the condition to a HPWQC. Elevation to a HPWQC would trigger the development of numeric goals and schedules per Permit Provision B.3.a. If no to the Phase I and/or Phase II monitoring question(s), continue Phase I strategies and re-evaluate monitoring approach to better understand water quality conditions with respect to REC-1.

Phase III

Management Objective

Implement strategies targeting potential sources of human waste to reduce risk to recreators.

Strategies

Implement strategies focused on investigation and elimination of potential sources of human waste in the HA based on Phase II findings and monitoring of human markers at MS4 outfalls.

Monitoring and Assessment

Example Monitoring/Assessment Question(s)

1. Are MS4 outfalls within the HA conveying significant sources of human fecal waste to the Lagoon?
2. Following source investigation and abatement, have potential sources of human fecal waste in the drainage area been successfully managed or eliminated?

Overview Potential of Monitoring and Assessment Approach

Monitoring and assessment approach will be based on the best available science and guidance at the time of implementation and a Monitoring Framework will be developed with input from the Regional Board. Potential methods (based on current practices) include:

- Monitoring for human markers or pathogens to assess potential impacts from human sources;
- Monitoring at MS4 outfalls using human markers (e.g., HF-183) to identify and prioritize drainage areas with potential sources of human fecal waste;
- Verification monitoring after source abatement processes to ensure that sources have been successfully managed or eliminated.

Evaluation/Adaptive Management

- Prioritize specific sources or MS4 outfalls in the HA for source investigation and abatement.

Appendix I-1

WQIP Prioritization Process

WQIP PRIORITIZATION PROCESS

As requested by RB staff, the RAs in the Agua Hedionda HA have re-examined the priorities for SHELL and REC-1 beneficial uses in light of the public concerns related to recreational use and the reclassification of the shellfish harvesting area to conditionally restricted. Available data and public input were considered as part of each evaluation.

A total of six conditions were evaluated per the WQIP prioritization process in the accepted WQIP for the Carlsbad WMA. These conditions are summarized in the following tables and include:

- SHELL Beneficial Use in Agua Hedionda Lagoon under dry weather conditions (Table 1)
- SHELL Beneficial Use in Agua Hedionda Lagoon under wet weather conditions (Table 2)
- REC-1 Beneficial Use in Agua Hedionda Lagoon under dry weather conditions (Table 3)
- REC-1 Beneficial Use in Agua Hedionda Lagoon under wet weather conditions (Table 4)
- REC-1 Beneficial Use in Agua Hedionda Creek under dry weather conditions (Table 5)
- REC-1 Beneficial Use in Agua Hedionda Creek under wet weather conditions (Table 6)

Results for each evaluation have been incorporated into the updates to the WQIP.

Table 2. Prioritization Table for Agua Hedionda Lagoon – SHELL Beneficial Use, Dry Weather

Lines of Evidence		Outcome	Significant		Is the Temporal Extent supported by data?	Priority Water Quality Condition Determination	Is the Condition Subject to a Regulatory Action?	Does the HA have a HPWQC?	Highest Priority Water Quality Condition Determination
			No	Yes					
Regulatory Driver (e.g. BIOL Beneficial use, trash amendments, TMDL, voluntary participation agreement, 303(d) listings)	2006 303(d) list: Listed for Indicator Bacteria	Listed for Indicator Bacteria	X		Undetermined				
	2010 303(d) list: Delisted for Indicator Bacteria	Delisted for Indicator Bacteria	X		Yes				
	2016 303(d) list: - Remain delisted for Indicator Bacteria	Remain delisted for Indicator Bacteria	X		Yes				
	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted (wet weather)	X		Yes				
Responsible Agencies Water Quality Data	2011 Long-Term Effectiveness Assessment (2005-2010)	Limited data availability for time period and constituent of interest in this waterbody.	X		No				
	Annual Monitoring Data	Limited data availability for time period and constituent of interest in this waterbody.	X		No				
Public Input and Other Work Efforts	CDPH Agua Hedionda Lagoon Fecal Coliform Data	Fecal coliform geometric means and 90th percentiles did not exhibit exceedances during dry weather.	X		Yes				
	Coastkeeper/ Other 3rd party data in Lagoon	No data in 903.4	N/A	N/A	N/A				
Priority Water Quality Condition Determination						PWQC not supported by MLOE[1]			
Regulatory Action (e.g. adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements)	N/A	N/A	N/A	N/A			N/A		
HPWQC	N/A	N/A	N/A	N/A				N/A	
Highest Priority Water Quality Condition Determination									N/A

1. MLOE = Multiple Lines of Evidence

Table 3. Prioritization Table for Agua Hedionda Lagoon – SHELL Beneficial Use, Wet Weather

Lines of Evidence		Outcome	Significant		Is the Temporal Extent supported by data?	Priority Water Quality Condition Determination	Is the Condition Subject to a Regulatory Action?	Does the HA have a HPWQC?	Highest Priority Water Quality Condition Determination
			No	Yes					
Regulatory Driver (e.g. BIOL Beneficial use, trash amendments, TMDL, voluntary participation agreement, 303(d) listings)	2006 303(d) list: Listed for Indicator Bacteria	Listed for Indicator Bacteria	X		Undetermined				
	2010 303(d) list: Delisted for Indicator Bacteria	Delisted for Indicator Bacteria	X		Yes				
	2016 303(d) list: - Remain delisted for Indicator Bacteria	Remain delisted for Indicator Bacteria	X		Yes				
	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted (wet weather).		X	Yes				
Responsible Agencies Water Quality Data	2011 Long-Term Effectiveness Assessment (2005-2010)	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
	Annual Monitoring Data	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
Public Input and Other Work Efforts	CDPH Agua Hedionda Lagoon Fecal Coliform Data	Rainfall led to elevated Fecal Coliform concentrations		X	Yes				
	Coastkeeper/ Other 3rd party data in Lagoon	No data in 903.4	N/A	N/A	N/A				
Priority Water Quality Condition Determination →						PWQC is supported by MLOE[1]			
Regulatory Action (e.g. adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements)	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted.	X				No		
HPWQC	Current HPWQC	Yes, there are two HPWQCs in 903.4; each agency in the WMA has an HPWQC		X				Yes	
Highest Priority Water Quality Condition Determination →									No, elevation to HPWQC not supported by MLOE

1. MLOE = Multiple Lines of Evidence

Table 4. Prioritization Table for Agua Hedionda Lagoon – REC-1 Beneficial Use, Dry Weather

Lines of Evidence		Outcome	Significant		Is the Temporal Extent supported by data?	Priority Water Quality Condition Determination	Is the Condition Subject to a Regulatory Action?	Does the HA have a HPWQC?	Highest Priority Water Quality Condition Determination
			No	Yes					
Regulatory Driver (e.g. BIOL Beneficial use, trash amendments, TMDL, voluntary participation agreement, 303(d) listings)	2006 303(d) list: Listed for Indicator Bacteria	Listed for Indicator Bacteria	X		Undetermined				
	2010 303(d) list: Delisted for Indicator Bacteria	Delisted for Indicator Bacteria	X		Yes				
	2016 303(d) list: - Remain delisted for Indicator Bacteria	Remain delisted for Indicator Bacteria	X		Yes				
	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted (wet weather).	X		Yes				
Responsible Agencies Water Quality Data	2011 Long-Term Effectiveness Assessment (2005-2010)	Data does not indicate impacts to REC beneficial uses	X		N/A				
	Annual Monitoring Data	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
Public Input and Other Work Efforts	CDPH Agua Hedionda Lagoon Fecal Coliform Data	Significant evidence to warrant a priority listing was not found in: 1. San Diego Region Basin Plan Evaluation 2. 303(d) Listing Binomial Evaluation 3. Persistent Exceedance Evaluation	X		Yes				
	CDPH Agua Hedionda Watershed Fecal Coliform Data	Fecal coliform data collected in the watershed exceeds single sample maximum water quality objective.		X	Yes				
	Coastkeeper/ Other 3rd party data in Lagoon	No water quality data provided in 903.4. There have been members of the public that have voiced concerns about REC uses.		X	No				
Priority Water Quality Condition Determination						**PWQC supported by MLOE[1]**			
Regulatory Action (e.g. adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements)	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted.	X				No		
HPWQC	Current HPWQC	Yes, there are two HPWQCs in 903.4; each agency in the WMA has an HPWQC		X			Yes		
Highest Priority Water Quality Condition Determination									**No, elevation to HPWQC not supported by MLOE**

1. MLOE = Multiple Lines of Evidence

Table 5. Prioritization Table for Agua Hedionda Lagoon – REC-1 Beneficial Use, Wet Weather

Lines of Evidence		Outcome	Significant		Is the Temporal Extent supported by data?	Priority Water Quality Condition Determination	Is the Condition Subject to a Regulatory Action?	Does the HA have a HPWQC?	Highest Priority Water Quality Condition Determination
			No	Yes					
Regulatory Driver (e.g. BIOL Beneficial use, trash amendments, TMDL, voluntary participation agreement, 303(d) listings)	2006 303(d) list: Listed for Indicator Bacteria	Listed for Indicator Bacteria	X		Undetermined				
	2010 303(d) list: Delisted for Indicator Bacteria	Delisted for Indicator Bacteria	X		Yes				
	2016 303(d) list: - Remain delisted for Indicator Bacteria	Remain delisted for Indicator Bacteria	X		Yes				
	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted (wet weather).	X		Yes				
Responsible Agencies Water Quality Data	2011 Long-Term Effectiveness Assessment (2005-2010)	Data does not indicate impacts to REC beneficial uses	X		N/A				
	Annual Monitoring Data	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
Public Input and Other Work Efforts	CDPH Agua Hedionda Lagoon Fecal Coliform Data	Significant evidence to warrant a priority listing was not found in: 1. San Diego Region Basin Plan Evaluation 2. 303(d) Listing Binomial Evaluation 3. Persistent Exceedance Evaluation	X		Yes				
	CDPH Agua Hedionda Watershed Fecal Coliform Data	Fecal coliform data collected in the watershed exceeds single sample maximum water quality objective.		X	Yes				
	Coastkeeper/ Other 3rd party data in Lagoon	No water quality data provided in 903.4. There have been members of the public that have voiced concerns about REC uses.		X	No				
Priority Water Quality Condition Determination →						PWQC supported by MLOE[1]			
Regulatory Action (e.g. adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements)	CDPH Downgrade of Shellfish Classification:	Downgrade of shellfish growing area from Restricted to Conditionally Restricted.	X				No		
HPWQC	Current HPWQC	Yes, there are two HPWQCs in 903.4; each agency in the WMA has an HPWQC		X				Yes	
Highest Priority Water Quality Condition Determination →									No, elevation to HPWQC not supported by MLOE

Table 6. Prioritization Table for Agua Hedionda Creek – REC-1 Beneficial Use, Dry Weather

Lines of Evidence		Outcome	Significant		Is the Temporal Extent supported by data?	Priority Water Quality Condition Determination	Is the Condition Subject to a Regulatory Action?	Does the HA have a HPWQC?	Highest Priority Water Quality Condition
			No	Yes					
Regulatory Driver (e.g. BIOL Beneficial use, trash amendments, TMDL, voluntary participation agreement, 303(d) listings)	2010 303(d) list:	Listed for Indicator Bacteria		X	Yes				
	2016 303(d) list:	Remain listed for Indicator Bacteria		X	Yes				
Responsible Agencies Water Quality Data	2011 Long-Term Effectiveness Assessment (2005-2010)	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
	Annual Monitoring Data	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
Public Input and Other Work Efforts	CDPH Agua Hedionda Creek Fecal Coliform Data	No current water quality objective for fecal coliform in the creek; however, based on evaluation of fecal coliform data against previously applicable water quality objective, there were exceedances.		X	Yes				
	Coastkeeper/ Other 3rd party data in Creek	No data in 903.4	N/A	N/A	N/A				
Priority Water Quality Condition Determination						PWQC is supported by MLOE[1]			
Regulatory Action (e.g. adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements)	None	None	X				No		
HPWQC	Current HPWQC	Yes, there are two HPWQCs in 903.4; each agency in the WMA has an HPWQC	N/A	N/A				Yes	
Highest Priority Water Quality Condition Determination									Elevation to HPWQC not supported by MLOE

1. MLOE = Multiple Lines of Evidence

Table 7. Prioritization Table for Agua Hedionda Creek – REC-1 Beneficial Use, Wet Weather

Lines of Evidence		Outcome	Significant		Is the Temporal Extent supported by data?	Priority Water Quality Condition Determination	Is the Condition Subject to a Regulatory Action?	Does the HA have a HPWQC?	Highest Priority Water Quality Condition
			No	Yes					
Regulatory Driver (e.g. BIOL Beneficial use, trash amendments, TMDL, voluntary participation agreement, 303(d) listings)	2010 303(d) list:	Listed for Fecal Coliform, Enterococcus		X	Yes				
	2016 303(d) list:	Remain listed for Fecal Coliform, Enterococcus		X	Yes				
Responsible Agencies Water Quality Data	2011 Long-Term Effectiveness Assessment (2005-2010)	Data above water quality objectives		X	N/A				
	Annual Monitoring Data	Limited data availability for time period and constituent of interest in this waterbody.	X		N/A				
Public Input and Other Work Efforts	CDPH Agua Hedionda Creek Fecal Coliform Data	No current water quality objective for fecal coliform in the creek; however, based on evaluation of fecal coliform data against previously applicable water quality objective, there were exceedances.		X	Yes				
	Coastkeeper/ Other 3rd party data in Creek	No data in 903.4	N/A	N/A	N/A				
Priority Water Quality Condition Determination						PWQC is supported by MLOE[1]			
Regulatory Action (e.g. adopted TMDLs, alternative TMDL processes, resolutions, and formal agreements)	None	None	X				No		
HPWQC	Current HPWQC	Yes, there are two HPWQCs in 903.4; each agency in the WMA has an HPWQC	N/A	N/A				Yes	
Highest Priority Water Quality Condition Determination									Elevation to HPWQC not supported by MLOE

1. MLOE = Multiple Lines of Evidence

Appendix I-2

Data Analysis Information

DATA EVALUATION

As part of their responsibility for ensuring commercial shellfish harvested in the Outer Basin of Agua Hedionda Lagoon are safe for human consumption, the California Department of Public Health (CDPH) periodically collects water samples and analyzes bacteria data in the Lagoon and upstream watershed. Water samples were collected at varied frequencies throughout the year from five locations in the upstream watershed and 16 sites within the Lagoon as illustrated in **Figure 2**. To support the process to prioritize conditions in the Agua Hedionda Watershed, per the accepted WQIP, the Responsible Agencies in the Agua Hedionda Hydrologic Area analyzed data collected by CDPH between January 2010 – January 2020 to assess water quality conditions in the Lagoon with respect to recreational and shellfish harvesting beneficial uses.

Data Limitations

The data set is spatially and temporally robust, containing 610 individual samples collected in the Lagoon and 94 samples collected in the upstream watershed under dry and wet conditions. Water samples were analyzed for a single indicator, fecal coliform, for comparison to water quality benchmarks set by the National Shellfish Sanitation Program (NSSP). Comparison to NSSP benchmarks provides the basis for the evaluation of shellfish harvesting beneficial uses. Because the data set is limited to fecal coliform only, comparison to current recreational water quality objectives set by the State Water Resources Control Board[4] is not feasible (current water quality objectives are based on *Enterococcus* in salt water and e.coli in fresh water). Instead, data was compared data to the former water quality objectives for fecal coliform as set forth in the Water Quality Control Plan for the San Diego Basin[5] (San Diego Basin Plan). Water quality benchmarks used for the analysis are shown in **Table 8**.

[4] State Water Resources Control Board. *Part 3 of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California – Bacteria Provisions and a Water Quality Standards Variance Policy*, February 4, 2019.

[5] San Diego Regional Water Quality Control Board. *Water Quality Control Plan for the San Diego Basin.* September 8, 1994, with amendments effective on or before May 17, 2016.

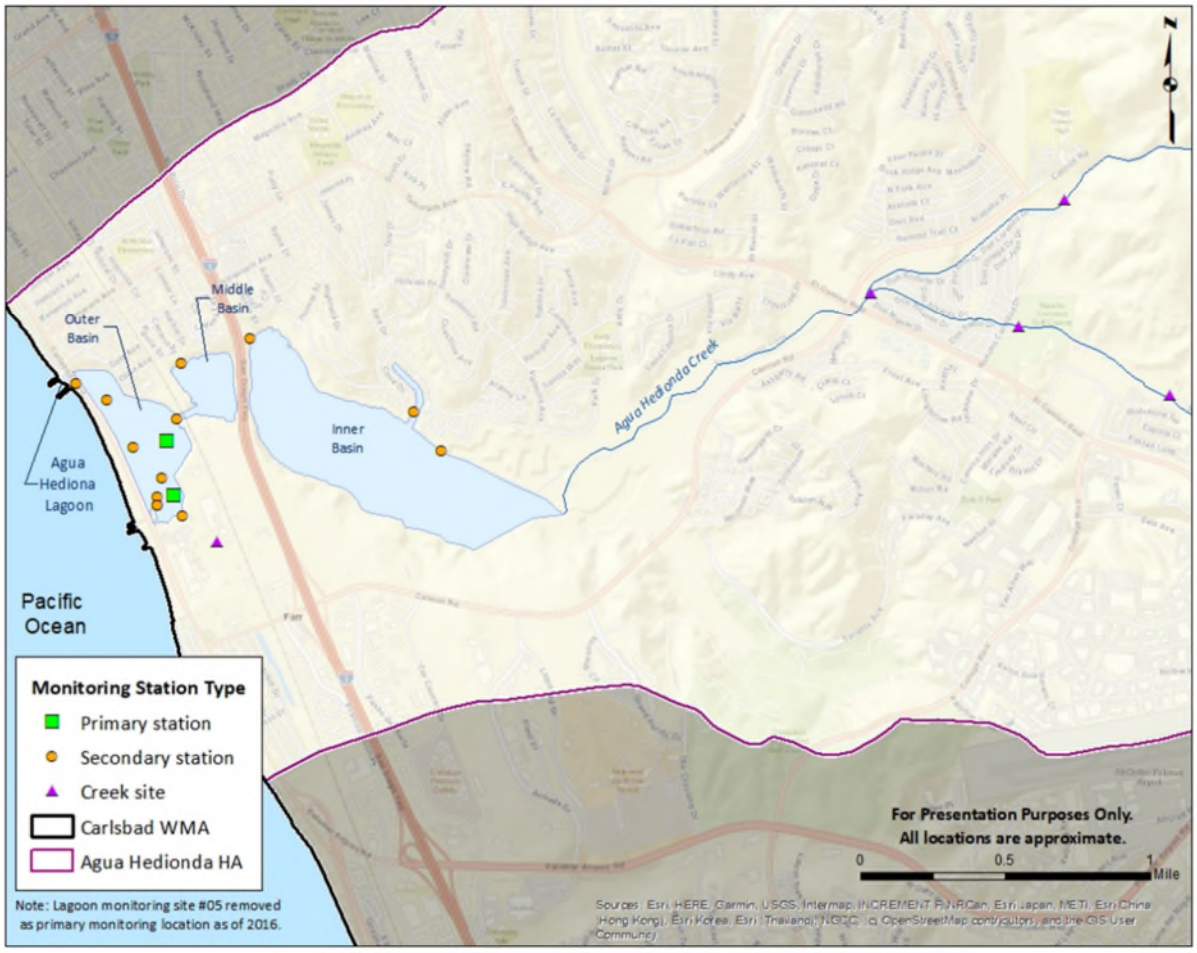

Figure 2. Approximate California Department of Public Health Monitoring Locations, Agua Hedionda Hydrologic Area

Table 8. Water Quality Benchmarks for the Evaluation of Bacteria Data, Agua Hedionda Hydrologic Area

Beneficial Use	Waterbody	National Shellfish Sanitation Program (NSSP) benchmark[1]	Water Quality Control Plan for the San Diego Basin[2] (San Diego Basin Plan) Water Quality Objective	Notes
SHELL	Lagoon	Fecal Coliform • Median or geometric mean shall not exceed 88 MPN/100 ml) • 90th percentile shall not exceed 260 MPN/100 ml (5-tube decimal dilution test)	Total Coliform • Median for any 30-day period shall not exceed 70 organisms/100 ml • No more than 10% of samples collected during any 30-day period exceed 230 organisms/100 ml (5-tube decimal dilution test) or 330 organisms/100 ml (3-tube decimal dilution test)	The San Diego Basin Plan establishes water quality objectives for total coliform to protect shellfish harvesting beneficial uses and does not establish equivalent water quality objectives for fecal coliform. The NSSP prescribes the use of fecal coliform for CDPH to evaluate shellfish harvesting conditions. No total coliform data was available for this analysis; therefore, available fecal coliform data were compared to NSSP benchmarks consistent with CDPH evaluation.
REC-1	Lagoon Inland Surface Waters	N/A	Fecal Coliform • Geometric Mean - Based on minimum of 5 samples for any 30-day period, log mean [geometric mean] shall not exceed 200 organisms/100 ml) • Single sample maximum - Concentration shall not exceed 400 organisms/100 ml for more than 10% of the total samples during any 30-day period	The fecal coliform water quality objectives for REC-1 contained in in the San Diego Basin Plan have been superseded by the Statewide Bacteria Provisions, adopted by the State Water Resources Control Board, and approved by USEPA on March 22, 2019. The Statewide Bacteria Provisions set new water quality objectives for saltwater using *Enterococcus* and for fresh water using e.coli. Data were not available for either indicator for this analysis; therefore, available fecal coliform data were compared to the *former* water quality objectives in the San Diego Basin Plan.

1. Restricted and conditionally restricted classifications.
2. San Diego Regional Water Quality Control Board. Water Quality Control Plan for the San Diego Basin. September 8, 1994, with amendments effective on or before May 17, 2016.

Results – SHELL Analysis

Available fecal coliform data collected in the Lagoon were compared to benchmarks set by the National Shellfish Sanitation Program (NSSP), consistent with CDPH evaluations. Data collected under open conditions at primary stations (#05 from 2011 – 2015, #05N and #05S from 2016 – 2019) were analyzed by CDPH against their geometric mean and 90th percentile benchmarks. Each data point represents the 30 most recent compliance samples for the reporting period. Details of the CDPH data analysis can be found in their Triennial Sanitary Survey Updates for Agua Hedionda Lagoon[6]. **Figure 5** and **Figure 6** illustrate the fecal coliform data in comparison to the geometric mean and 90th percentile benchmarks for the Lagoon, respectively.

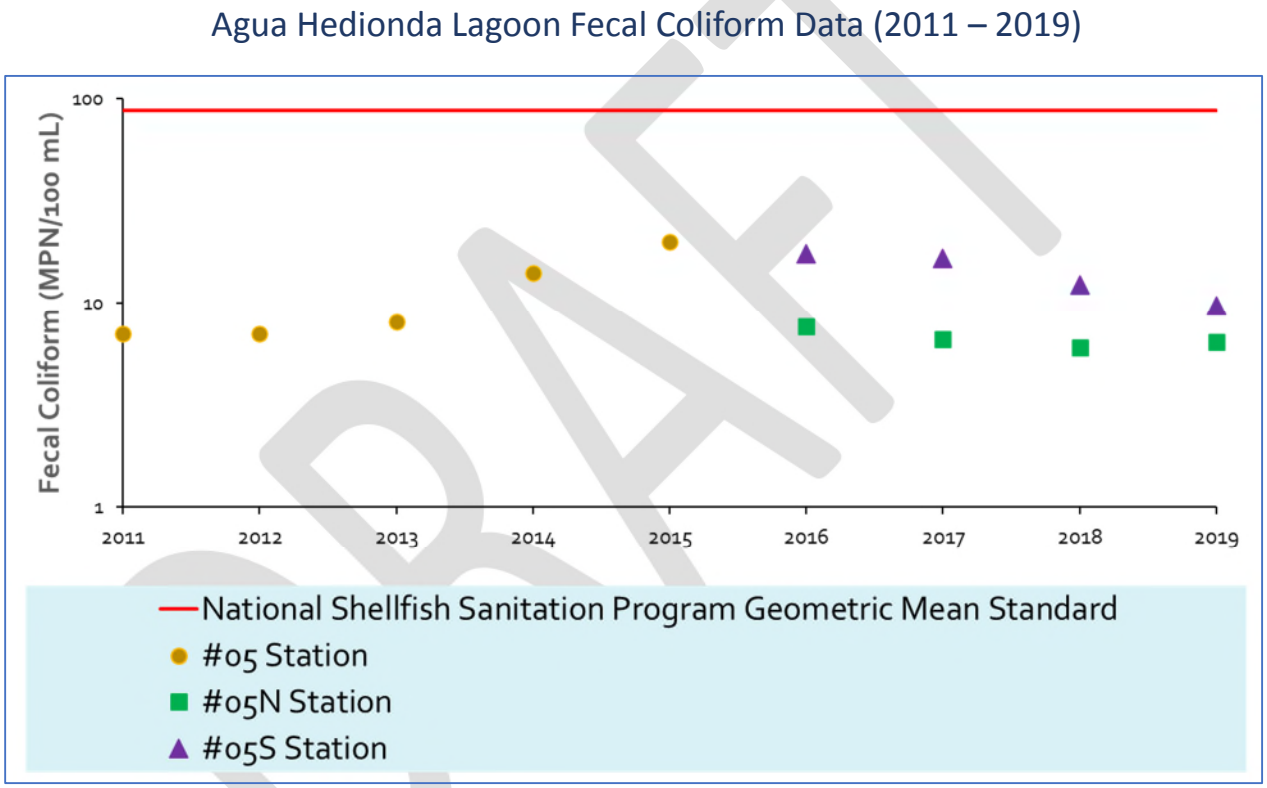

Figure 3. Fecal Coliform Data as Compared to National Shellfish Sanitation Program Geometric Mean benchmark for Restricted and Conditionally Restricted Shellfish Harvesting, Agua Hedionda Lagoon (2011 – 2019), CDPH

[6] Scanlon, Matt, and S. Rankin. California Department of Public Health, Division of Radiation Safety and Environmental Management, Environmental Management Branch. *Triennial Sanitary Survey Update Report: 2017 – 2019, Shellfish Growing Area Classification for Agua Hedionda Lagoon, California.* February 2020.

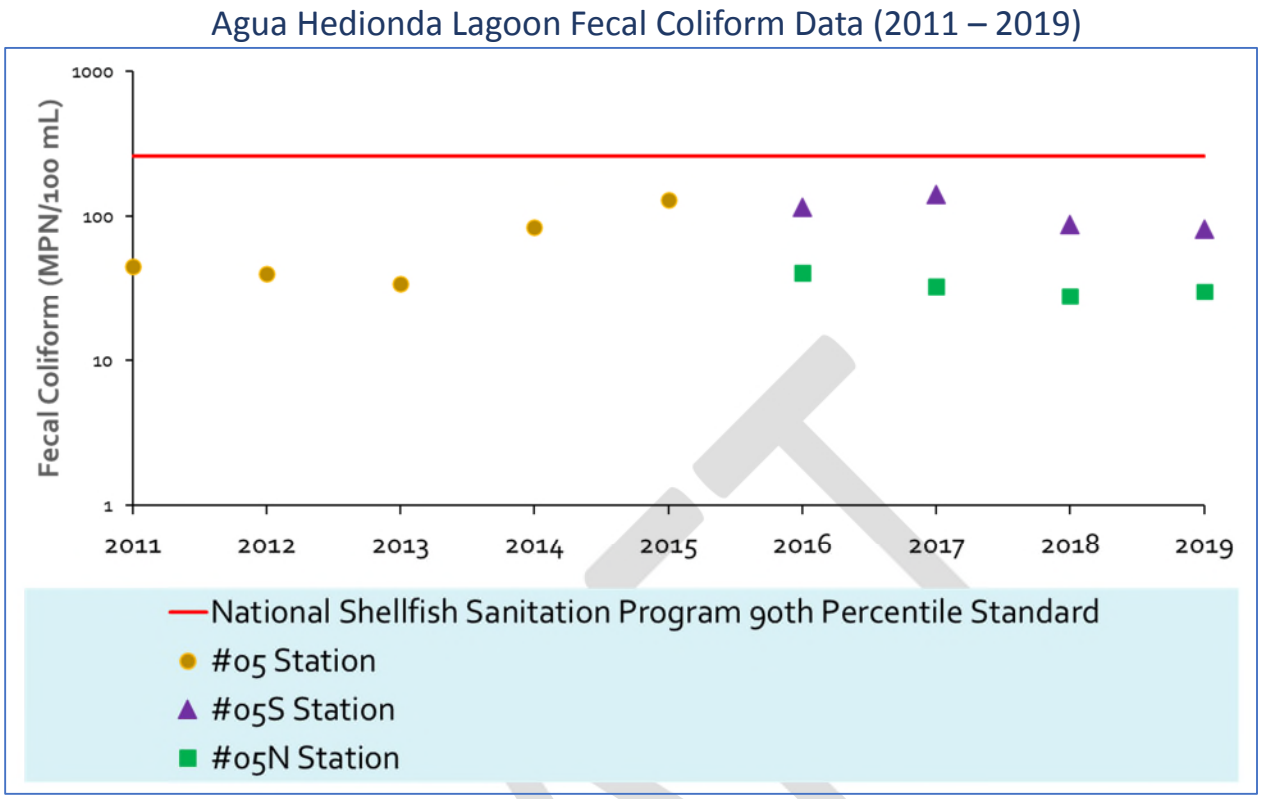

Figure 4. Fecal Coliform Data as Compared to National Shellfish Sanitation Program 90th Percentile benchmark for Restricted and Conditionally Restricted Shellfish Harvesting, Agua Hedionda Lagoon (2010 – 2019), CDPH

Results – REC-1 Analysis

Available fecal coliform data collected in the Lagoon were compared to the former water quality objectives for fecal coliform contained in the San Diego Basin Plan. The data set contained 610 samples. The former geometric mean water quality objective required a minimum of five samples in a 30-day period to calculate the geometric mean. Five samples were only available for twelve 30-day periods over the 10-year data period. None of the geometric means of the twelve 30-day periods exceeded 200 organisms/100 ml. For the single sample maximum analyses, of the 610 samples, there were 25 exceedances of the single sample water quality objective (4.1%). **Figure 5** and **Figure 6** illustrate the fecal coliform data in comparison to the single sample maximum water quality objective and the overall exceedance rate for the Lagoon, respectively.

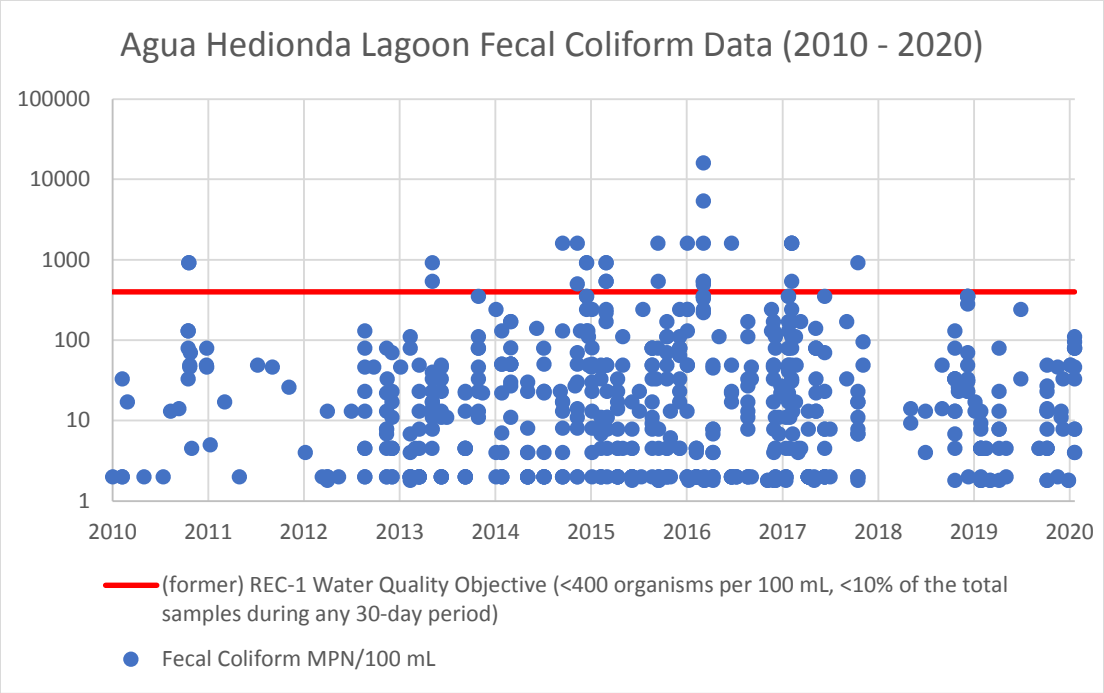

Figure 5. Single Sample Maximum Analysis, Fecal Coliform, Agua Hedionda Lagoon (2010 – 2020)

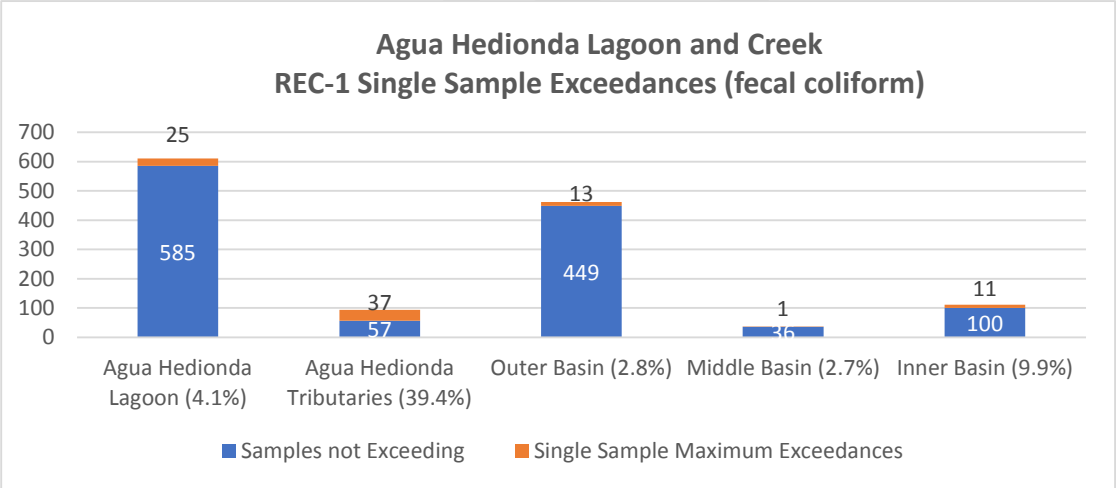

Figure 6. Percent of Samples Exceeding former REC-1 Water Quality Objective, Agua Hedionda Lagoon (2010 – 2020)

Available fecal coliform data collected in the tributaries upstream of the Lagoon also compared to the former REC-1 water quality objectives for fecal coliform contained in the San Diego Basin Plan. The data set contained 94 samples. The former REC-1 geometric mean water quality objective required a minimum of five samples in a 30-day period to calculate the geometric mean. There were no 30-day periods with 5 or more samples collected at the same location; therefore, there were no geometric mean values calculated from the data set. For the single sample maximum analyses, of the 94 samples, there were 37 exceedances of the REC-1 single sample maximum water quality objective (39.4%).