2018 STATE OF HAWAII WATER QUALITY MONITORING AND ASSESSMENT REPORT:

Integrated Report to the U.S. Environmental Protection Agency and the U.S. Congress
Pursuant to §303(d) and §305(b), Clean Water Act (P.L. 97-117)

The Hawaii State Department of Health
Clean Water Branch
Honolulu, Hawaii

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List of Acronyms

§	Section
AU	Assessment Unit
BEACH	Beaches Environmental Assessment and Coastal Health
CBD	Center of Biological Diversity
CCH	City and County of Honolulu
CCME	Canadian Council of Ministers of the Environment
CFU	Colony Forming Units
Ch.	Chapter
CWA	Clean Water Act
CWB	Clean Water Branch
CWRM	Commission on Water Resources Management
DLNR	Department of Land and Natural Resources
DMR	Discharge Monitoring Report
DOFAW	Division of Forestry and Wildlife
EAC	Environmental Assessment Company
EHASB	Environmental Health Analytical Services Branch
EMD	Environmental Management Division
EPA	United States Environmental Protection Agency
GM	Geometric Mean
GPS	Global Positioning System
HAR	Hawaii Administrative Rules
HIDOH	Hawaii Department of Health
IR	Integrated Report
MCS	Microbiology Consulting Services, LLC
MRC	Marine Research Consultants, Inc
NELHA	Natural Energy Laboratory of Hawaii Authority
NH_4	Ammonium-Nitrogen
NO_3+NO_2	Nitrate + Nitrite - Nitrogen
NPDES	National Pollutant Discharge Elimination System
PO_4	Orthophosphate
QAPP	Quality Assurance Project Plan
QAPrgP	Quality Assurance Program Plan
QA/QC	Quality Assurance/Quality Control
QMP	Quality Management Plan
SLD	State Laboratories Division
STORET	STOrage and RETrieval
STV	Statistical Threshold Value
TDP	Total Dissolved Phosphorus
TDN	Total Dissolved Nitrogen
TMDL	Total Maximum Daily Loads
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
WQC	Water Quality Certification

WQS Water Quality Standard
WWTP Wastewater Treatment Plant

EXECUTIVE SUMMARY

The Hawaii State Department of Health is obligated by the Clean Water Act Sections 303(d) and 305(b) to report on the State's water quality on a two-year cycle. The CWA §305(b) requires states to describe the overall status of water quality statewide, and the extent to which water quality provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allows recreational activities in and on the water. The CWA §303(d) requires states to submit a list of waters that do not attain applicable water quality standards, plus a priority ranking of impaired waters for Total Maximum Daily Loads development based on the severity of pollution and the uses of the waters. The 2018 State of Hawaii Water Quality Monitoring and Assessment Report, known as the Integrated Report (IR), has been prepared to meet the requirements for CWA §303(d) and 305(b).

The IR informs the public on the status of marine and inland (streams and estuaries) water bodies and serves as a planning document to guide other CWA programs. The 2018 Integrated Report incorporates data collected from November 1, 2015 to October 31, 2017 to provide an updated snapshot of water body conditions throughout the State, and carries over the assessment results from previous Integrated Reports. Impaired waters—waters that do not meet the State's water quality standards (WQS)— in the Integrated Report may be targeted for further monitoring activities to develop Total Maximum Daily Loads, to plan and evaluate CWA §319 nonpoint source pollution control projects, and set requirements for National Pollutant Discharge Elimination System permits and §401 Water Quality Certifications. The Integrated Report not only identifies areas in need of restoration, but serves as a baseline to validate the State's efforts to improve water quality and eventually delist impaired waters that have been rehabilitated.

The 2018 Integrated Report follows a standardized assessment methodology for marine and inland waters that evaluates whether the assessment units meet the water quality standards for recreational use and the support of aquatic life. The assessment units that have been used historically consist primarily of points, stretches of beachline, stream segments, and waters located between two geographical locations. These are the same assessment units that are used to evaluate waters within the State during the 2018 IR; however, new assessment units are in the process of being created to allow for a more holistic view of State waters. The new assessment units will be primarily based upon the watersheds established by the State of Hawaii Commission on Water Resource Management (CWRM) and will provide a more uniform geographical reference for the Integrated Report scopes of assessment. This will be consistent with the collaborative framework for implementing the Clean Water Act Section 303(d) Program--*A Long-Term Vision for Assessment, Restoration and Protection under the Clean Water Act Section 303(d) Program* (Vision), announced in December 2013.

At the time this report was prepared, only the CWB watershed assessment units (AUs) established in the 2016 IR, had been created for marine waters located along the coastline. These assessment units are included in the overall assessment of State waters as part of the §305(b), but are not included on the §303(d) list of impaired waters to avoid duplicate listings. The pollutants assessed in this report include bacteria, turbidity, chlorophyll *a*, and nutrients (total nitrogen, nitrate+nitrite-nitrogen, ammonium-nitrogen, total phosphorus), and where applicable, total

dissolved nitrogen, total dissolved phosphorus, total suspended solids, and orthophosphate (Hawaii Administrative Rules Chapter 11-54-6(d)).

Assessment results show that of the 108 marine water bodies assessed, 88 do not attain water quality standards for at least one or more conventional pollutants. Turbidity was the leading cause of impairment for marine waters. This trend is similar to what was observed in previous Integrated Reports, and the Hawaii Department of Health (HIDOH) believes this may be due to polluted runoff entering nearshore waters. Nutrients are the second leading cause of water quality exceedances, with 66% of the marine assessments failing to meet water quality standards for one or more nutrients. This is followed by chlorophyll *a*, with 47% of marine assessments failing to meet water quality standards. Enterococci water quality criteria was met in 91% of the assessed marine waters.

The assessment resulted in 13 new listings and 22 delistings for marine waters. The majority of new listings are on Maui and Oahu, and the majority of delistings are on Hawaii. Turbidity was the pollutant most frequently listed during this IR cycle, which is consistent with previous IR reports.

Marine waters within the larger CWB watershed AUs are also assessed in this cycle. Of the 544 CWB watershed AUs, only 49 were assessed in this IR cycle. All the CWB watershed AUs that were assessed for nutrients did not meet at least one of the water quality standards for nutrients; however, only 10 of the assessed AUs were assessed for nutrients. Almost all (98%) of the assessed CWB watershed AUs failed to meet the water quality standard for turbidity, and only the water quality standard for chlorophyll *a* was met 62% of the time. The water quality standard for enterococci was met in 88% of the assessed CWB watershed AUs.

Five inland waters are assessed in this Integrated Report. Waioli Stream on Kauai is a new impairment listing in the 2018 Integrated Report and exceeds dry season water quality standards for turbidity and enterococci. Heeia Stream on Oahu currently attains all wet season water quality standards resulting in a delisting of NO_3+NO_2. Heeia Stream continues to not attain for TN and NO_3+NO_2 dry season water quality standards. Waipa estuary and Hanalei River (end of Weke Road) on Kauai continue to not meet water quality standards for turbidity and enterococci. Pearl Harbor estuary on Oahu continues to meet the water quality standard for turbidity.

PART A. INTRODUCTION

The purpose of the Integrated Report (IR) is to inform the public of the overall status of water quality statewide, describing the extent to which water quality provides for the protection and propagation of a balanced population of shellfish, fish, and wildlife, and allows recreational activities in and on the water. This report has been prepared to fulfill the requirements for State reporting pursuant to Clean Water Act (CWA) Section (§)303(d) and §305(b), which requires states to provide an assessment every two years on the quality of all their waters (§305(b)), and a list of those waters that are impaired or threatened (§303(d)). This document describes the methodology, datasets, and results used to develop the 2018 IR. The report is intended to guide future management actions for state waters, provide data for long term trend assessment, and document water quality improvements across the state.

The 2018 IR provides water quality assessment results for both marine and inland waters. The marine and inland assessment results are reported by assessment units where possible, and/or by individual sampling locations. The State is currently in the process of establishing assessment units for all state waters so that a more holistic assessment can be performed. Some data has been placed into assessment units (e.g., watershed assessment units), while other data is still assessed by individual sampling locations (e.g. off-shore sampling locations) where assessment units have not yet been established.

The assessment period covers a two-year time frame (November 2015 - October 2017), beginning where the 2016 IR assessment cycle ended (October 2015). As part of the IR process, the Hawaii Department of Health (HIDOH) solicited a request for water quality data in June 2017 and that closed on November 1, 2017 via the HIDOH Clean Water Branch (CWB) website and local newspapers. Similarly, a draft of the 2018 IR was provided for a 30-day public comment period from **May 28, 2018 through June 27, 2018**. HIDOH did not receive any comments regarding the 2018 IR within the comment period.

The 2018 IR document includes background information, a brief overview of the surface water monitoring and assessment program, and subsequent chapters describing the assessment methodologies and results used to determine the status of marine and inland waters. Chapter 1 describes the assessment methodology and results for marine waters, and documents changes since the 2016 IR. The inland water assessment methodology, results, and category changes are presented in Chapter 2. Chapter 3 summarizes the current status for all state surface waters.

Although an attempt was made to avoid technical jargon and unnecessary abbreviations, this is a technical report. Acronyms are listed in a table at the beginning of this report and where they first appear in text of the document. In addition, terms used in the report are also defined where they first appear in the text of the document.

PART B. BACKGROUND

B.1. Scope of Waters in the Integrated Report

The State of Hawaii contains approximately 303 miles of recreational shoreline, 3,326 miles of rivers and streams, 37 square miles of bays and harbors and 5 square miles of lakes and reservoirs. The health of Hawaii's inland and marine waters is vital to the communities for subsistence, cultural practices, and recreation. The State's economy is largely dependent on the quality of its shorelines and beaches, which provide opportunities for year-round recreational activities.

B.2. Surface Water Pollution Control Programs

The HIDOH, Clean Water Branch (CWB) is the state agency responsible for protecting and restoring surface water resources for human and environmental health. The CWB's mission is to protect the public health of residents and tourists who recreate in and on Hawaii's coastal and inland water resources, as well as to protect and restore coastal and inland waters for marine life and wildlife.

The CWB implements surface water pollution control programs delegated from the United States Environmental Protection Agency (EPA) in support of the Clean Water Act and the State's goals to protect and restore surface waters to fishable and swimmable standards for the purpose of protecting human and environmental health. The components addressed within the CWB include Water Quality Standards (WQS), Enforcement and Compliance, National Pollutant Discharge Elimination System (NPDES) permits, Water Quality Certifications (WQC), surface water quality monitoring and assessment, Total Maximum Daily Loads (TMDLs), and Polluted Runoff Control (PRC). These programs are intended to work in concert to ensure that Hawaii's surface water resources are protected and restored. In addition, the HIDOH also addresses CWA components within the Safe Drinking Water Branch, which monitors and protects drinking water resources, and the Wastewater Branch, which administers engineering functions related to water pollution control and wastewater systems and treatment.

The State's objectives with regards to surface waters include 1) using an integrated approach to assess state water quality, and 2) addressing sources of water pollution through permits, TMDLs, and watershed based plans. More information on the responsibilities and organizational structure of the CWB can be found in the HIDOH CWB Quality Assurance Program Plan.

B.2.1. Point Source Pollution Control

The CWB has been authorized to administer the state NPDES program for discharges to waters of the United States. The discharge permits are prepared in compliance with the CWA Section 402 and with Hawaii Administrative Rules Title 11, Chapters 54 and 55, and are designed to protect the quality of surface water within the State. These permits authorize the discharge of substances at concentrations that meet either technology or water quality based effluent limits, whichever is more stringent.

The CWB currently receives approximately $1.7 million of federal funds and $845,000 of state funds annually to administer the NPDES program. Under the NPDES program, the CWB regulates discharges of pollutants from point-sources, such as wastewater treatment plants, municipal separate storm sewer systems, and industrial dischargers. The issuance of permits and the enforcement of permit conditions aids in the protection of the quality of waters within the State. In areas where a total maximum daily load (TMDL) has been established, the permit conditions may be more stringent than the established water quality standards, aiding in the improvement of water quality.

B.2.2. Total Maximum Daily Load Process

The TMDL process serves as a roadmap for water body restoration by focusing on improving water quality in impaired surface waters that have been included in the §303(d) list. A TMDL report determines the amount of each pollutant that the impaired water body can assimilate and still meet water quality standards and assigns load allocations to all identified point sources and non-point sources for each pollutant.

A TMDL is currently in preparation for the Waikele Watershed, and it is anticipated that this TMDL will be completed by the end of 2018. Following the completion of the Waikele Watershed TMDL, the creation of a TMDL for West Maui is currently scheduled to begin. It is anticipated that with the implementation of the TMDL water quality will improve within the watershed overtime.

B.2.3. Non-Point Source Pollution Control

Nonpoint sources of pollution in the State primarily consist of cesspools, agricultural land use, urban land use, and feral ungulate activity in conservation lands. Cesspools discharge untreated human waste directly into the ground, where it can contaminate the ocean, streams, and groundwater by releasing nutrients and disease-causing bacteria and viruses. In agricultural areas, fertilizers, herbicides, pesticides, and soil erosion can lead to polluted runoff problems. In urban areas, roads, buildings, and parking lots often prevent rain water from soaking into the ground, which increases the volume of water runoff, increases erosion, and washes pollutants through storm drains into streams and the ocean. On conservation lands, feral ungulates disturb soil and destroy and uproot vegetation, resulting in soil erosion and sediment runoff.

The CWB receives approximately $1.2 million in federal funds annually to address nonpoint pollution within the State through the Clean Water Act Section 319(h) grant program. The CWB addresses nonpoint source pollution through the Polluted Runoff Control (PRC) Program, which administers grant money it receives from the EPA to address polluted runoff. The PRC Program focuses its nonpoint source control projects in CWB priority watersheds (He‘eia, Hanalei, and West Maui) and also implements projects to reduce and prevent nonpoint source pollution in other watersheds that have watershed-based plans. Significantly more resources are needed to adequately control all nonpoint source pollution within the State.

Through the implementation of nonpoint source control projects, the PRC Program has improved water quality in areas throughout the State, particularly in He‘eia watershed. Several Section 319(h) projects in He‘eia watershed have targeted sediment and nutrients, which contributed to de-listings for total phosphorous and turbidity (2016) and nitrate and nitrite (2018) in the wet

season. The reported estimated pollutant load reductions for all Section 319(h) projects conducted within fiscal year 2016 and fiscal year 2017 consisted of:

- Total nitrogen load reduction – 17,119 lb
- Total phosphorus load reduction – 2,866 lb
- Sediment load reduction – 5,257 tons

It is anticipated that with the continued implementation of PRC projects intended to address polluted runoff, similar load reductions can be expected within the next two fiscal years.

B.2.4. Hawaii Water Quality Standards

Hawaii's Water Quality Standards form a legal basis for controlling pollution entering waters within the State, and are described in Hawaii Administrative Rules (HAR), Title 11, Chapter (Ch.) 54, hereafter known as water quality standards (WQS). Water quality standards are regulations that include classification of water bodies (e.g., embayment, open coastal, flowing stream, etc.), identification of the designated uses, water quality criteria necessary to protect the designated uses, and a general policy of water quality antidegradation for all water types:

(a) Existing uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.

(b) Where the quality of the waters exceed levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the director finds, after full satisfaction of the intergovernmental coordination and public participation provisions of the state's continuing planning process, that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located. In allowing such degradation on lower water quality, the director shall assure water quality adequate to protect existing uses fully. Further, the director shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control.

(c) Where existing high quality waters constitute an outstanding resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

(d) In those areas where potential water quality impairment associated with a thermal discharge is involved, the antidegradation policy and implementing method shall be consistent with Section 316 of the Clean Water Act.

The WQS categorize the State's surface waters as inland or marine waters. Inland waters are comprised of water body types such as streams, estuaries, lakes and reservoirs, wetlands, and anchialine pools. Marine water body types are comprised of embayments, coastal, and oceanic waters and classified into class A and AA (both bounded by 100 fathom contour or 600-foot depth contour). The specific numeric water quality criteria applicable to streams, estuaries, embayments, coastal and oceanic waters form the basis for determining whether a waterbody is meeting its intended uses.

The WQS play a central role in the successful implementation of Hawaii's surface water pollution control programs. To evaluate the need for revising or adding to State standards, the CWB is required by the CWA to conduct a comprehensive review of the state water quality standards on a tri-annual basis. The review process allows for the State to determine whether its water quality standards are sufficient to maintain the designated uses for each identified water body type. The next triennial review is expected to be completed in 2018.

B.3. Special State Concerns and Recommendations

A new framework for implementing the CWA Section 303(d) Program, titled *A Long- Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* (Vision), was announced by the EPA in December 2013. The new program vision is intended to enhance the overall efficiency of the CWA Section 303(d) Program by bringing attention to priority waters and acknowledging that states have other available options besides TMDLs to attain water quality restoration and protection (EPA 2015). While the vision does not alter the State's CWA §303(d) regulatory obligations, it allows the states the flexibility to implement its responsibilities in the context of the State's overall water quality goals.

Ocean Acidification

The CWB recognizes that ocean acidification is an emerging global issue that may have various negative impacts on aquatic life. The CWB has conducted a thorough review of all the comments and information submitted regarding ocean acidification during this IR cycle and appreciates the opportunity to review this material. Due to the complex nature of ocean acidification and subsequent lack of an assessment method to accurately determine whether a water body is impaired due to ocean acidification, the CWB did not assess the water bodies for this parameter in the 2018 IR.

B.4. Future Monitoring Recommendations

It is anticipated that future monitoring efforts will continue to focus on collecting data for statewide watershed assessments, allowing for a more seamless integration of water body types and surrounding land use. Upcoming reports will continue to utilize State watershed delineations for inland and nearshore marine waters, as well as other geographical attributes. Currently, the CWB is in the process of developing GIS maps illustrating the assessment units. These maps were unable to be completed in time for the 2018 Integrated Report due to insufficient resources; however, it is anticipated that they should be available by 2020 for public use via the CWB website.

PART C. SURFACE WATER MONITORING AND ASSESSMENT OVERVIEW

C.1 Surface Water Monitoring and Assessment

The CWB conducts year-round monitoring of surface waters throughout the state to provide data to support BEACH Act requirements, §303(d) and 305(b) assessments, TMDL development, and CWA §319 watershed implementation projects. The CWB also participates in statistical survey designs as part of the National Aquatic Resource Surveys sponsored by the EPA, such as the National Reef Flat Assessment that occurred in Kaneohe Bay, Oahu in 2015. This statewide monitoring program maintains staff on Kauai, Oahu, Maui, and Hawaii.

C.2 Assessment Methodology

State surface waters are monitored to determine if water quality conditions support public health while recreating in and on the water (recreational health) and ecosystem health. Recreational health is assessed by enumerating enterococci, the recommended EPA fecal indicator bacteria for coastal recreational waters. Ecosystem health is assessed by comparing nutrients and other pollutants to the applicable water quality criteria. The nutrient pollutants assessed in this report include total nitrogen (TN); nitrate+nitrite-nitrogen (NO_3+NO_2); ammonium-nitrogen (NH_4); total phosphorus (TP); and where applicable, total dissolved nitrogen (TDN), total dissolved phosphorus (TDP), and orthophosphate (PO_4) (HAR Ch. 11-54-6(d)). Other parameters collected for assessment purposes include chlorophyll *a*, total suspended solids (TSS), and field parameters such as pH, temperature, turbidity, salinity, and dissolved oxygen. Chapters 1 and 2 contain more detailed assessment methods specific to marine and inland waters, respectively.

Decisions for listing/delisting water bodies for nutrients, bacteria, and other pollutants are based on the quality and quantity of data, water body type, and applicable numeric criteria (Figure 1.). A majority of the data assessed in the 2018 IR originated from beach samples collected along the coastline, as most of the CWB's monitoring efforts are currently focused on routine beach monitoring. There was limited inland water monitoring conducted. Additional sources of data considered for the 2018 IR include receiving water quality data from NPDES permitted facilities, private contractors, and non-governmental organizations (NGOs) (Appendix A).

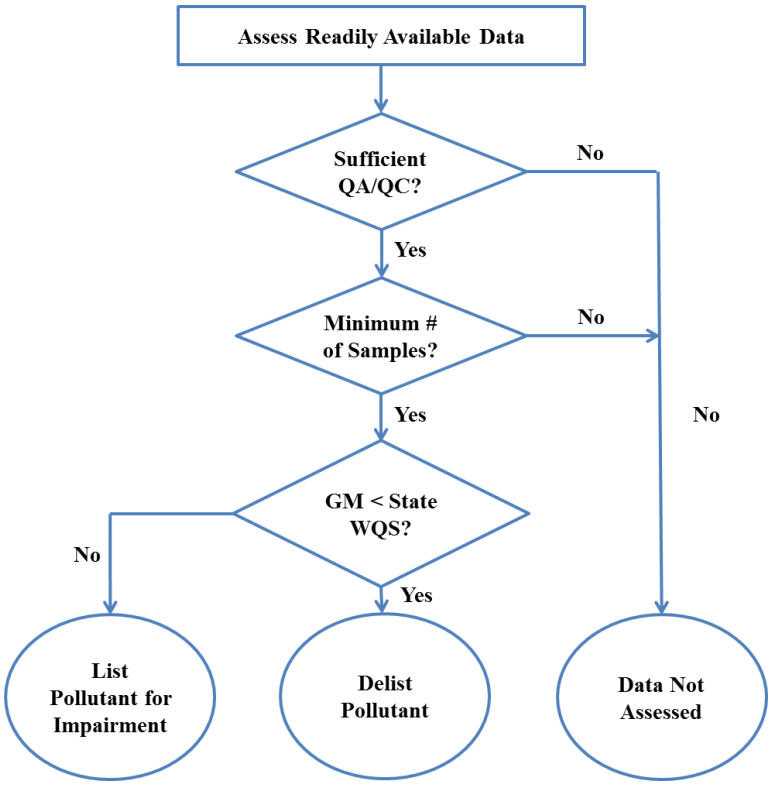

Figure 1. Flow chart of the listing/delisting process for enterococci, TN, NO_3+NO_2, NH_4, TP, PO_4, turbidity, TSS, and chlorophyll *a*.

Assessed water bodies are then assigned to categories according to EPA's 2006 Integrated Water Quality Monitoring and Assessment Report Guidance. The attainment of WQS for one pollutant but not another can result in the assignation of one or more categories to a water body.

Category 1: All designated uses are supported; no use is threatened;
Category 2: Available data and/or information indicate that some, but not all the designated uses are supported;
Category 3: There is insufficient available data and/or information to make a use support determination;
Category 4: Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a Total Maximum Daily Load (TMDL) is not needed;
4a: A TMDL to address a specific segment/pollutant combination has been approved or established by EPA;
4b: A use impairment caused by a pollutant is being addressed by the State through other pollution control requirements;
4c: A use is impaired, but the impairment is not caused by a pollutant;
Category 5: Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.

Water bodies that attain State numeric water quality criteria are classified in either Category 1 or 2. Water bodies that do not meet State numeric water quality criteria are classified into Category 5 and constitute the CWA §303(d) list of impaired waters. A water pollution reduction plan, or TMDL, is required for water bodies that are impaired or not expected to meet State numeric water quality criteria, even after the application of technology-based effluent limitations in NPDES permits. Water bodies that have an approved TMDL are classified into Category 4a. Previously impaired water bodies (Category 5) that currently attain State numeric water quality criteria are "delisted" and reclassified into Category 1 or 2.

C.3 Assessment Units

Historically, non-uniform scopes of assessment have been used to assess the State's waters in previous IRs. These have included a point, stretch of coastline, segments of streams, and waters contained between two geographical locations. To provide a more holistic and consistent assessment of the waters within the State, new assessment units are in the process of being created. The new assessment units (AUs) will be primarily based on the watersheds established by the State of Hawaii (DLNR) Commission on Water Resources Management (CWRM).

Watersheds will be used as the primary basis for the creation of new AUs since water quality assessments using watershed AUs consider the influence of watershed characteristics (e.g. land used, precipitation, and land-cover) on water quality downstream and in coastal areas. Marine waters fronting watersheds are largely influenced by streams and groundwater sources located in the associated watershed. Coastal waters, especially near shore marine recreational waters, can be viewed as an extension of the watershed.

The 2016 IR established CWB watershed AUs for Kauai, Maui, Oahu, Molokai, and Lanai. These CWB watershed AUs consist of marine waters that front the watershed. It is anticipated that by the 2020 IR cycle, new AUs will have been established for inland, open coastal, and oceanic waters. Maps for the AUs are currently under development and should also be available for the next IR cycle.

Since the new AUs have not been established for much of the waters within the State, the individual water bodies established in previous IRs are the primary basis for the current assessment and §303(d) listing. These may include points, stretches of coastline, segments of streams, and waters contained between two geographical locations. The water quality within the CWB watershed AUs that were established in the 2016 IR were assessed in the 2018 IR; however, they have not been issued a water body ID and are not included on the §303(d) list of impaired waters. They are currently intended to only provide an overall assessment of the quality of the marine waters that front the watersheds.

CHAPTER 1: MARINE WATERS

PART A. SCOPE OF WATERS

Part C of the Introduction describes the general methodology used to complete the assessment of both marine and inland waters. Chapter 1 further describes the assessment methodology and results applicable to marine waters as described in Hawaii's WQS, Hawaii Administrative Rules, Title 11, Chapter 54 (HAR Ch. 11-54). Marine waters are characterized according to water body type: embayments, open coastal, and oceanic waters. Specific numeric criteria applicable to each water body type are the primary basis for listing and delisting decisions.

The scopes of assessment for marine waters in the 2018 IR (i.e., stretches of coastline, beach segments, individual sampling stations, and CWB watershed AUs) are based upon the water body types described in the WQS and the premise that the water quality in near shore marine recreational waters is likely to be different than waters located offshore. For the purposes and consistency of the IR, nearshore recreational waters will continue to be categorized as coastal waters within 300 meters of shoreline and offshore waters beyond 300 meters.

A.1. Assessment Units

The AUs used to assess marine waters in the 2018 IR consist primarily of points, stretches of coastline, and waters contained within two geographical locations. CWB watershed AUs were established for Kauai, Maui, Oahu, Lanai, and Molokai, and the marine water quality within each CWB watershed AU was assessed if sufficient data was available during this cycle. To avoid duplicate listings, CWB watershed AUs were not given a water body ID and are not included on the §303(d) list of impaired waters. The CWB watershed AUs are only used to assess the overall status of the State's waters as part of the §305(d). The results of the assessment are included in Appendix B.

PART B. ASSESSMENT METHODOLOGY

Decisions for listing/delisting water bodies are based on the quality and quantity of data, water body type, and applicable State WQS. Numerous categories may be applicable to describe the current status of a water body because each AU is assessed for multiple pollutants. The attainment of WQS for one pollutant but not another, can result in the assignation of one or more categories to a water body.

Data collected in State receiving waters are placed into the appropriate assessment unit. The AUs are assessed based on water body types described in the WQS as well as the type of data available. AUs are assessed for recreational health and ecosystem heath, where data is available.

B.1. Recreational Health Assessment

Recreational health is assessed by enumerating enterococci, the recommended EPA fecal indicator bacteria for marine coastal recreational waters. Bacterial evaluations using enterococci inform both daily assessments and long term decisions (e.g. the IR) about whether public health is being protected while participating in water contact activities. The presence of enterococci in sufficient numbers "indicates the potential for human infectious diseases" as defined in the CWA §502(23) (EPA Office of Water 2012). Exceedance of the WQS for enterococci is generally

thought to indicate the presence of human fecal contamination and, hence, the presence of pathogens.

Daily assessments using enterococci are primarily used to support decisions made in the context of the BEACH Act. Recipients of BEACH Act grant funds, such as Hawaii, are required to notify the public when enterococci levels either exceed or are likely to exceed the applicable water quality standards at specific beach locations. Daily assessments apply to specific beach locations, and not larger assessment units. In Hawaii, the public must be notified when the enterococci concentrations in any given sample are at or above 130 colony forming units (CFUs)/100 mL of water.

The long-term decisions captured in IR assessments are based on monthly geometric means calculated from data collected from the AU over a two-year time. For IR purposes an AU is typically considered impaired if the enterococci geometric mean (GM) in not less than five samples over any 30-day interval exceeded 35 CFU/100 ml or more than 10% of samples over the same 30-day interval exceeded the statistical threshold value (STV) of 130 CFU/100 mL (Table 1).

In instances where one monthly enterococci GM for an AU does not meet the recreational WQS, but the remaining monthly enterococci geomeans meet the recreational WQS, an additional assessment is conducted prior to determining that the AU is impaired. The further assessment consists of reviewing field notes, brown water advisories that may have been in effect at the time the samples were collected, and the other geomeans that were calculated within the assessment cycle. If it is determined based upon assessment of this data, that the elevated GM for enterococci is likely due to a one-time occurrence and is unlikely to be representative of the health of the water body, the water body will not be listed as impaired.

Table 1. Enterococci recreational WQS attainment/non-attainment based on frequency, GM, and STV.

Frequency	Recreational WQS Attained	Recreational WQS Not Attained (Impaired)
30-day interval, minimum of 5 samples	GM ≤ 35 CFU/100 mL	GM > 35 CFU/100 mL
30-day interval, minimum of 5 samples	10% or less of total samples ≤ 130 CFU/100 mL	More than 10% of total samples > 130 CFU/100 mL

B.2. Ecosystem Health Assessment

Ecosystem health assessments are based on a GM calculation of the nutrient and field parameters identified in HAR §11-54-6. Assessments require a minimum of 30 samples to be collected from within the AU over a two-year assessment cycle. When assessing CWB watershed AUs, the 30 samples may come from multiple stations located within the larger watershed-based AU and should be representative of seasonal variation where possible. In contrast to the monthly GM used to assess recreational health, ecosystem health assessment is based on one calculated GM for the two-year period. In addition, nutrient WQS vary depending on marine water body type, whereas bacterial WQS remain the same for all marine waters (Table 2). For marine waters

where transect data are available at multiple depths, data are grouped according to distance from shoreline and combined for assessment decisions.

Table 2. Applicable water body type and WQS for marine water bodies

Water Body Type	Description	Recreational WQS	Nutrient WQS
Embayments	As defined in §11-54-6	HAR §11-54-8	Embayment, HAR Ch. 11-54-6 (a)
Near Shore Marine Recreational Waters	Shoreline to 300 m offshore	HAR §11-54-8	Open Coastal, HAR Ch. 11-54-6 (b)
Open Coastal Marine Waters	Shoreline to 183 m (600 ft) depth contour	HAR §11-54-8	Open Coastal, HAR Ch. 11-54-6 (b)
Oceanic Waters	183 m (600 ft) depth contour to 3 miles offshore	HAR §11-54-8	Oceanic, HAR Ch. 11-54-6 (c)

B.3. Water Body ID (*formally* Geocode ID)

Two sets of water body ID codes exist in the Hawaii structure: a 2-letter alphanumeric (HI) set and 3-letter alphanumeric (HIW) set. The numeric portion of both codes is preceded by the State abbreviation (HI) as per EPA protocol. The 2-letter code is from an existing structure of the EPA's BEACH program that identifies recreational waters across the State. The 3-letter code is generated in response to areas where BEACH codes do not exist and areas that are divided into small subsections. Each code is comprised of a total of eight characters and is not ordered. Marine geocode IDs listed in former IRs were renamed to water body IDs in the 2016 IR because they serve as an internal unique identifier and do not relate to geospatial information. The 2018 IR keeps with the same naming convention as the 2016 IR. Currently, GIS maps for the §303(d) impaired waters list and §305(b) water bodies for marine waters are under development and upon completion may be made available for public use via the CWB website.

B.4. Data Sources

A formal call for data was announced in June 2017 and closed November 1, 2017. Marine water quality data collected between November 2015 and October 2017 are assessed in this report. Sources of data assessed in this report originated from NPDES permitted facilities, private consulting firms, non-profit organizations, and routine and special sampling conducted by the CWB or partnering entities (Appendix A). New, readily available data that meet the CWB's Quality Assurance/Quality Control (QA/QC) requirements are considered for assessment in the 2018 IR.

B.4.1. Quality Assurance/Quality Control

The CWB Monitoring and Analysis Section QA/QC is governed by the CWB Beach Monitoring Quality Assurance Project Plan (QAPP), which was approved by EPA Region IX on February 2, 2018, and the Coastal Chemistry Monitoring QAPP, which was submitted to EPA Region IX for review on March 12, 2018. In addition to the CWB QAPPs, the data quality necessary for assessment purposes are specified in the Environmental Management Division Quality Management Plan (EMD QMP), which was approved by EPA Region IX on November 15, 2013. Other data submitted from sources outside the HIDOH are evaluated for conformance with the CWB QAPP and the EMD QMP.

B.4.2. Laboratory Analytical Support

The HIDOH uses three Hawaii-based laboratories for analysis of samples: the Environmental Health Analytical Services Branch (EHASB) of the State Laboratories Division (SLD), the Natural Energy Laboratory of Hawaii Authority (NELHA), and Microbiology Consulting Services, LLC (MCS). The State maintains microbiology laboratories on the four largest islands (Kauai, Oahu, Maui, and Hawaii), which conduct bacterial analysis for their respective islands, with the exception of West Hawaii. MCS has analyzed bacterial samples for West Hawaii since July 2007. The EHASB analyzes bacterial samples collected by HIDOH personnel on Oahu and chemical samples collected by HIDOH personnel on Kauai, Oahu, Maui, and Hawaii.

B.4.3. Data Storage, Management, and Sharing

The CWB bacterial dataset extends from 1973 to the present, and the nutrient and water quality indicator dataset extends from 2006 to the present. Water quality data currently generated from CWB coastal monitoring is available on the CWB's website and EPA's STOrage and RETrieval (STORET) database. The STORET database contains all post-1999 sampling data from the CWB's fixed network of routine monitoring stations. Data collected before 1999 are stored in the Legacy STORET Database. The end-users of the STORET database system include government agencies, consultants, students and the general public.

The 2018 IR data will be uploaded into EPA's Assessment and Total Maximum Daily Load Tracking and Implementation System (ATTAINS) database. The ATTAINS database is currently under development and is scheduled to be completed in 2018.

PART C. RESULTS

C.1. Marine Water Body Assessment Results

Statewide

Marine water bodies that had new, readily available data were assessed in this report. Out of the 108 marine water bodies assessed, 88 do not attain WQS for at least one or more conventional pollutants (Tables 3 and 4). It should be noted that not all pollutants are assessed for every water body due to unavailability of new data.

Of the marine waters assessed, the pollutant that most frequently met WQS during this cycle was bacteria (91%), followed by chlorophyll *a* and nutrients (53% and 44%, respectively). The pollutant that met WQS the least frequently for the assessed waters was turbidity (16%). This is consistent with the results of previous assessments.

The assessment of the available water quality data resulted in the listing of 13 new water body/pollutant combinations onto the §303(d) list of impaired waters, and most of the new listings are associated with Oahu and Maui. The assessment also resulted in the delisting of 22 water body/pollutant combinations from the list of impaired waters, and most of the delistings are associated with Hawaii. No marine water bodies were assessed this cycle for Molokai, and only one water body was assessed for Lanai.

Table 3. Assessed marine water bodies in the 2018 IR cycle.

Island	Total Assessed Water Bodies this Cycle	New Impaired Waters Listings	New Impaired Waters Delistings
Kauai	20	1	1
Oahu	49	5	2
Molokai	0	0	0
Lanai	1	1	0
Maui	18	5	2
Hawaii	20	1	17
Total	**108**	**13**	**22**

Table 4. Assessed marine water body attainment (A) and non-attainment (N) of WQS for pollutants summarized by island. -- = not assessed.

Island	Total Assessed Water Bodies this Cycle	Bacteria		Nutrients		Turbidity		Chlorophyll *a*	
		A	N	A	N	A	N	A	N
Kauai	20	11	2	1	4	0	16	2	2
Oahu	49	41	1	7	2	5	27	1	7
Molokai	0	--	--	--	--	--	--	--	--
Lanai	1	--	--	0	1	1	0	1	0
Maui	18	7	3	0	10	3	14	2	4
Hawaii	20	11	1	7	2	5	15	10	1
Total	**108**	**70**	**7**	**15**	**19**	**14**	**72**	**16**	**14**

By Island.
Assessed water bodies on all islands mostly met attainment of the bacteria WQS (70% to 98%). Assessed marine water bodies on Oahu and Hawaii have the highest rate of attainment of the nutrient WQS (78%), while only 25% of Kauai's and none of Maui's assessed marine water bodies attain the numeric nutrient WQS. Attainment of the turbidity WQS was predominately not met for most islands (Kauai, Oahu, Maui, and Hawaii). The rate of attainment of the turbidity WQS ranged from 0% to 25%. Attainment of chlorophyll *a* WQS is identified in 91% of marine water bodies assessed on Hawaii. Most of the assessed water bodies on Oahu and Maui do not attain the chlorophyll *a* WQS (13% and 33%, respectively). (Table 4).

C.2. Watershed Assessment Results

In an effort to provide a more holistic assessment of the waters within the State, the water quality within the established CWB watershed AUs was assessed. At the time this report was prepared, CWB watershed AUs have only been established for Kauai, Oahu, Maui, Molokai, and Lanai.

Statewide
Approximately 544 CWB watershed AUs have been established. Based on new, readily available water quality data, 49 CWB watershed AUs on Kauai, Oahu, Lanai, and Maui are assessed in this report. Approximately 24% of the CWB watershed AUs on Oahu, 19% of CWB watershed

AUs on Kauai, 12% of CWB watershed AUs on Maui, and 3% of CWB watershed AUs on Lanai were assessed for at least one pollutant in the 2018 IR. Hawaii is not included in this assessment because its marine water bodies have not been organized into their respective CWB watershed AUs. CWB watershed AUs for Hawaii should be available in the 2020 IR. In addition, no new data for CWB watershed AUs on Molokai and limited data for CWB watershed AUs on Lanai was available during this IR cycle.

Of the 49 CWB watershed AUs assessed, 46 do not attain State WQS for at least one or more conventional pollutants. It should be noted that not all pollutants are assessed for every water body due to unavailability of new data. The WQS for nutrients were exceeded the most frequently (100% of assessed CWB watershed AUs), followed by turbidity (98% of assessed CWB watershed AUs). Despite the high percentage of exceedances for nutrients, only 20% of the total assessed CWB watershed AUs were assessed for nutrients. Approximately 62% of the assessed CWB watershed AUs attain the chlorophyll *a* WQS, and attainment of the bacteria water quality standard is observed in 88% of CWB watershed AUs assessed (Table 5).

Table 5. Assessed watershed AUs attainment (A) and non-attainment (N) of WQS for pollutants summarized by island. -- = not assessed.

Island	Total Assessed Watershed AUs	Bacteria		Nutrients		Turbidity		Chlorophyll *a*	
		A	N	A	N	A	N	A	N
Kauai	14	10	1	0	2	0	14	1	1
Oahu	21	20	1	--	--	0	18	--	--
Molokai	--	--	--	--	--	--	--	--	--
Lanai	1	--	--	0	1	1	0	1	0
Maui	13	8	3	0	7	0	13	1	4
Hawaii	--	--	--	--	--	--	--	--	--
Total	**49**	**38**	**5**	**0**	**10**	**1**	**45**	**3**	**5**

By Island

Kauai, Oahu, and Maui show the highest percentage of turbidity impairments (100%) in assessed CWB watershed AUs. Approximately 88% of assessed CWB watershed AUs attained for the bacteria water quality standard (95% for Oahu, 91% for Kauai, and 73% for Maui) (Table 3). Limited data for nutrients and chlorophyll *a* were available to assess in the 2018 IR cycle, and subsequently only 10 CWB watershed AUs were assessed for nutrients and only 8 CWB watershed AUs were assessed for chlorophyll *a*. None of the assessed CWB watershed AUs attained for nutrients, and only 37% of assessed CWB watershed AUs attained for chlorophyll *a*.

C.3. Assessment Results Summary

The 2018 IR continues to implement a multi-category listing method (Category 1-5) to characterize current water quality status (e.g. new impairment listing, delisting, etc.) across the State. The following table details how a marine water body is assigned a different numerical category and includes reasons for those changes. Overall, there were 13 new listings and 22 delistings for pollutants for the 2018 IR assessment cycle (Tables 6 through 10).

Maui and Oahu had the greatest number of new listings (5 each), followed by Kauai, Lanai, and Hawaii (1 each). Hawaii had the greatest number of delistings (17), followed by Oahu, Maui, and Kauai (2, 2, and 1, respectively). Turbidity was the most frequent pollutant to cause a water body to be listed during this cycle. This is consistent with previous integrated reports, and may be due to increased polluted runoff entering near-shore waters.

CHAPTER 2: INLAND WATERS

PART A. SCOPE OF WATERS

Chapter 2 of the 2018 IR covers all inland waters. Assessment units for the 2018 IR remain the same as in previous IRs. Inland freshwaters are partitioned by type according to the HAR Ch. 11-54.

PART B. MONITORING AND ASSESSMENT

B.1. Basic Assessment Unit

The basic (Tier I) assessment unit for the State's inland freshwaters is the entire network of hydrologically connected freshwater segments associated with a single listed stream, stream segment, or stream tributary. These freshwater segments and AUs can include one or more water body type as defined by HAR Ch. 11-54, including, but not limited to, intermittent streams, reservoirs, and wetlands (Table 11).

Table 11. Applicable water quality criteria and decision unit boundaries for inland freshwater bodies.

Water Body Type[1]	Applicable Water Quality Criteria[2]	Decision Unit Boundary[3]
Flowing Seep	Basic/Recreational	Flowpath/Flow Surface
Flowing Spring	Basic/Recreational	Flowpath/Flow Surface
Elevated Wetland	Basic/Recreational/Wetland	1987 Corps Delineation[4]
Low Wetland	Basic/Recreational	1987 Corps Delineation[4]
Intermittent Stream	Basic/Recreational/Water Column/Bottom	Entire Network or Sub-network[5]
Perennial Stream	Basic/Recreational/Water Column/Bottom	Entire Network or Sub-network[5]
Natural Freshwater Lake	Basic/Recreational	Lake
Freshwater Impoundment[6]	Basic/Recreational	Impoundment
Reservoir	Basic/Recreational	Reservoir
Ditch	Basic/Recreational	Ditch
Flume	Basic/Recreational	Flume
Drainage Ditch[7]	Basic/Recreational	Drainage Ditch
Canal[7]	Basic/Recreational	Canal
Estuary	Basic/Recreational/Pearl Harbor	Entire Network or Sub-network[5]

[1]HAR Ch. 11-54-1 inland freshwater water body types; these definitions are applied to the definition of decision units. [2]HAR Ch. 11-54-4 basic water quality criteria applicable to all waters; HAR Ch. 11-54-8(a) specific criteria for inland recreational waters; HAR Ch. 11-54-5.2(b) specific criteria for stream water column; HAR Ch. 11-54-5.2(b)(2) bottom criteria for streams; HAR Ch. 11-54-5.2(c) specific criteria for elevated wetlands; HAR Ch. 11-54-5.2(d) specific criteria for estuaries. [3]HAR Ch. 11-54-5.1(a) establishes a system of water body classification and associated designated uses. [4]HAR Ch. 11-54-1 "...the identification and delineation of wetland boundaries shall be done following the procedures described in the U.S. Army Corps of Engineers' Wetland Delineation Manual (USACE 1987)." [5]HAR Ch. 11-54-1 "Stream system" means the aggregate of water features comprising or associated with a stream, including the stream itself and its tributaries, headwaters, ponds, wetlands, and estuary. A stream system is geographically delimited by the boundaries of its drainage basin or watershed. For stream attainment decision purposes, "associated" is interpreted as "hydrologically connected" and estuaries, ditches, flumes, drainage ditches, and canals are not included in the assessment. [6]This water body type is not defined by rule but is included in the definition of "Standing waters." This water body type is not defined by rule but is included in the definition of "State waters."

B.1.1. Tiered Approach

A tiered approach, linked with the assessment decision criteria first adopted in Hawaii's 2002 §303(d) list of impaired waters, was used in past assessments to refine AUs for inland freshwater stream networks. Tier I AUs are used for initial attainment decisions as governed by the current §303(d) listing criteria and for defining the geographic scope of "legacy" listings based on visual assessments. Tier II AUs encompass segments and partial segments that can be more narrowly defined and assessed based on existing monitoring locations, data, and boundaries between water body types, and are used for attainment decisions on a case-by-case basis. Tier III AUs are established for TMDL development and other intensive monitoring and analysis purposes. Tier IV AUs are part of Tier III assessment units and defined based on the most detailed assessment information.

B.1.2. Assessment Unit Rationale and Implementation

HIDOH's current focus on defining AUs for inland freshwaters is based on:

(a) An assumption that streams are the most widespread and important inland freshwater body type to assess for achieving marine water quality goals;
(b) The lack of numeric water quality standards criteria for conventional chemical and physical pollutants in most other freshwater body types;
(c) The unavailability of a complete water body inventory and present limitations for monitoring and assessing all water bodies, water quality criteria, and use attainment within each water body type.

AU boundaries for other inland freshwater body types are defined on a case-by-case basis when monitoring data and other assessment information is available, but generally encompass the entire water body.

B.1.3. Application of Criteria to Attainment Decisions

The §303(d) list of impaired waters applies to the entire inland freshwater portion of a stream system, including all hydrologically connected reaches, unless a case is documented in which smaller decision units are justified. The same method also applies to other water body types.

The HIDOH recommends non-HIDOH entities conducting similar monitoring, analysis, and planning activities to consult with HIDOH about sampling designs and information management protocols that will facilitate HIDOH's ability to use secondary data for attainment decisions. The entire hydrologic network within a watershed is the largest possible assessment unit for inland freshwater bodies, and may include the boundaries of the following water body types as defined by HAR Ch. 11-54-1.

HIDOH encourages monitoring, analysis, and planning activities that acknowledge and consider the regulatory boundaries between specific water body types and demonstrate a rationale for segmenting each water body into smaller assessment units. The EPA's 2006 IR Guidance (U.S. EPA Watershed Branch 2005) provides a summary of factors to consider in developing these rationales.

B.2. Quality Assurance/Quality Control

The data quality necessary for assessment purposes are specified in the CWB Quality Assurance Program Plan (QAPrgP) and the EMD QMP, which were approved by EPA Region IX on May 5, 2013 and November 15, 2013, respectively. An updated CWB QAPrgP is currently in preparation and should be completed within 2018. Other data submitted from sources outside the HIDOH are evaluated for conformance with the CWB QAPP and the EMD QMP.

B.3. Assessment Methodology

Standardized criteria enable HIDOH to periodically collect and assess datasets for water body evaluations. Datasets and supporting documentation are evaluated against numeric water quality criteria, henceforth referred to as WQS, where applicable, for listing/delisting decisions. New, readily available data that meet the CWB's QA/QC and data submittal requirements are considered for assessment in the 2018 IR.

The WQS described in HAR Ch. 11-54 for recreational, nutrient, and water quality indicators in inland freshwaters are divided into "wet" (November through April) and "dry" (May through October) season criteria. This is in contrast to the "wet" and "dry" WQS applicable in marine waters, which are dependent on the amount of freshwater discharge per shoreline mile. Water quality standards for estuaries are not divided into "wet" and "dry" seasons.

Similar to marine waters, enterococci are the indicator bacteria used to evaluate recreational health in inland waters, while nutrients (TN, NO_3+NO_2, NH_4, and TP) and water quality indicators (TSS, turbidity, and chlorophyll *a*) are used to determine ecosystem health. These pollutants are evaluated for inland waters in the same manner as for marine waters, which is described in Chapter 1, Part B. The minimum number of samples required to evaluate inland waters for enterococci and nutrients (30 samples collected over 2 years) is the same as required to evaluate marine waters.

Decisions for listing/delisting (§303(d)) conventional pollutants for inland waters follow the same protocol as marine waters (Figure 1). For the 2018 IR, inland waters follow the same assessment methodology as marine waters for recreational and ecosystem health water quality assessment, with the exception of 30 minimum sample size. Similar to marine waters, nutrient WQS vary depending on water body type, whereas bacterial WQS remain the same for all marine waters (Table 12).

Table 12. Applicable water body type and WQS for inland water bodies.

Water Body Type	Description	Recreational WQS	Nutrient WQS
Estuaries	As defined in HAR Ch. 11-54-1	HAR Ch. 11-54-8	Estuary, HAR Ch. 11-54-5.2(d)(1)
Streams	As defined in HAR Ch. 11-54-1	HAR Ch. 11-54-8	Embayment, HAR Ch. 11-54-5.2(b)

For toxic pollutants, such as pesticides and heavy metals, which often require expensive analyses, a minimum sample size of three is required for assessment. Toxic pollutants for inland freshwaters are characterized by acute and chronic concentration criteria and fish consumption criteria.

Biological surveys of aquatic communities, fish consumption advisories, and reports of contaminated sediments are also eligible sources of listing information. Datasets for evaluation of narrative criteria must include at least three sampling events and represent conditions in wet and dry seasons. These narrative criteria may be evaluated using HIDOH-approved habitat or biological assessment methodologies as long as they can be directly correlated to specific narrative criteria in HAR Ch. 11-54-4. Also, in accordance with HAR Ch. 11-54-4(b)(2)(A), acute toxicity standards for the contamination of sediment may be evaluated using broadly accepted standards such as those developed in Canada and New York (Canadian Council of Ministries of the Environment 1999; New York State Department of Environmental Conservation 1999), provided that HIDOH deems them appropriate for use in Hawaii.

B.3.1. Water Body ID

Numerous conventions for naming and coding Hawaii's water bodies and AU boundaries have been designed and used over time. Building a comprehensive statewide water body inventory that standardizes these conventions for use by HIDOH and others is an ongoing intergovernmental resource management task. Geocode ID (or water body identification) for inland freshwater assessment units are based on the Hawaii Stream Assessment Coding System (Hawaii Cooperative Park Service Unit 1990) with some modifications, as noted in the 2006 IR. Similar to marine waters, geocode IDs for inland waters were renamed to water body ID in the 2016 IR because they serve as an internal unique identifier and do not relate to geospatial information. Development of GIS maps for the §303(d) impaired waters list and §305(b) water bodies for inland waters will coincide with the development of the standardized assessment methodology for inland waters and therefore come at a later date.

B.4. Inland Waters Assessment Results

Two inland freshwater bodies and three estuaries are assessed in this report. These assessed inland water bodies are summarized in Table 13. A summary of category changes for inland waters is located in Tables 14 and 15.

- Waioli Stream (Kauai) (dry season)
- Heeia Stream (Oahu) (wet and dry seasons)
- Hanalei River estuary (end of Weke Road) (Kauai)
- Waipa estuary (Kauai)
- Pearl Harbor estuary (Oahu)

Table 13. Assessed Inland Water Bodies in the 2018 IR Cycle

Island	Total Assessed Water Bodies this Cycle	New Impaired Waters Listings	New Impaired Waters Delistings
Kauai	3	2	0
Oahu	2	0	1
Molokai	0	0	0
Lanai	0	0	0
Maui	0	0	0
Hawaii	0	0	0
Total	**5**	**2**	**1**

Streams Wet Season

Oahu
Heeia Stream initially exceeded wet season WQS for NO_3+NO_2 in the 2004 IR and was subsequently listed for turbidity and TP impairment in the 2006 IR and 2014 IR, respectively. In the 2016 IR, turbidity and TP were delisted for Heeia Stream. Total nitrogen and TSS concentrations in Heeia Stream indicate current attainment of WQS, as in previous IRs. New numerical data indicate that Heeia Stream currently attains WQS for NO_3+NO_2, resulting in a delisting of Heeia Stream for NO_3+NO_2 (Table 15). Heeia Stream currently does not have any impairment listings for wet season WQS.

Over the past 10 years, the PRC program has funded four projects to address polluted runoff within the Heeia Watershed. This has led to an increased public awareness of water quality and water health within Heeia Stream. It is also likely that the implementation of these projects has positively impacted the water quality within the stream, as is evidenced by the delisting of three wet season WQS for the stream within the past two IR cycles.

Streams Dry Season

Kauai
Waioli Stream was previously assessed for TSS, NO_3+NO_2, TN, TP, and turbidity, and met the associated WQS. In the 2018 IR, numerical data for enterococci and turbidity were available for assessment (Table 14). The newly assessed numerical data indicate that Waioli Stream currently does not attain WQS for enterococci and turbidity, resulting in a listing for both pollutants.

Oahu
Heeia Stream was initially listed as impaired for TN and NO_3+NO_2 during the dry season in the 2006 IR. In the 2014 IR, Heeia Stream attained the dry season TN WQS, resulting in a delisting for this pollutant; however, it was relisted for TN WQS in the 2016 IR. Heeia Stream continues to exceed the dry season TN and NO_3+NO_2 WQS. It continues to attain the dry season TP, turbidity, and TSS WQS, as in previous IRs.

Estuaries

Kauai
Hanalei River (end of Weke Road) estuary was initially listed as impaired for enterococci prior to the 2002 IR and for turbidity in the 2004 IR. TMDLs for enterococci and turbidity were approved in 2008. Newly assessed numerical data indicate Hanalei River estuary continues to not attain WQS for enterococci and turbidity.

Waipa estuary was initially listed as impaired for turbidity in the 2008 IR and for enterococci in the 2014 IR. In 2008, a TMDL was approved for turbidity for Waipa estuary. Newly assessed numerical data indicate this water body continues to not attain WQS for enterococci and turbidity.

Oahu
Pearl Harbor estuary was listed as impaired for turbidity prior to the 2002 IR and continued to be listed until the 2012 IR, in which it became delisted and attained WQS for turbidity. Newly assessed numerical data indicate this water body continues to attain WQS for turbidity.

B.5. Wetlands Program

Responsibilities for wetland protection are diffused among various federal, state, and county authorities. There is no formal wetland program in HIDOH. However, HIDOH does utilize their authority under CWA §401 to certify, waive, or deny water quality certification for CWA §404 permits issued by the USACE for dredge/fill activities in U.S. waters.

B.6. Public Health Issues

Leptospirosis Threat
Leptospirosis is not included as a specific water quality standard pollutant. However, all inland freshwaters within the State are considered potential sources of Leptospirosis infection by the Disease Outbreak Control Division of HIDOH. No direct tests have been approved or utilized to ascertain the extent of the public health threat through water sampling. Epidemiologic evidence has linked several illness outbreaks to contact with freshwater, leading authorities to issue blanket advisories for all inland freshwaters of the State.

Fish Consumption Advisory
Pearl Harbor and Ala Wai Canal have been identified and posted as areas where fish and shellfish should not be consumed. Contamination of fish and shellfish include organochlorine pesticides and/or polychlorinated biphenyls and lead.

CHAPTER 3: 2018 §303(d) and §305(b) WATER BODY ASSESSMENTS FOR HAWAII

2018 §303(d) and §305(b) Water Body Assessments for Hawaii

States are required to obtain and review all existing and readily available State surface water quality data and related information to compare against the applicable water quality standards and characterize water quality. Hawaii's water quality standards established numeric criteria for various pollutants at levels protective of the water body's ability to support "fishable and swimmable" conditions. The 2018 State of Hawaii Water Quality Monitoring and Assessment Report presents the results of water body assessments primarily based on the numeric criteria appropriate for supporting environmental health and human recreational health. This report in conjunction with the EPA water quality reporting database serve as the primary vehicles for informing Congress and the public about general water quality conditions in the United States.

The water body assessment results are categorized per EPA's 2006 Integrated Report guidance (Table 16). Water bodies with pollutant concentrations below the numeric criteria are evaluated as "attaining" (A) and assigned to either category 1 or 2. Water bodies that did not have enough data for evaluation purposes are coded with a "-" and assigned to Category 3. Category 4 describes waters that are not meeting designated uses but do not require a TMDL for various reasons: there is an approved TMDL in place (4a), the impairment is being addressed through other pollution control requirements (4b), or the impairment is not caused by a pollutant (4c). Water bodies that exceed the numeric criteria for one or more pollutantss and need a TMDL are evaluated as "not attaining" (N) and assigned to category 5. The water bodies with a category 5 designation constitute the CWA §303(d) list of impaired waters, which is included in Appendix C.

Table 16. Water Body Assessment Categories

Category	
1	All designated uses are supported; no use is threatened;
2	Available data and/or information indicate that some, but not all the designated uses are supported;
3	There is insufficient available data and/or information to make a use support determination;
4	Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed;
4a	A TMDL to address a specific segment/pollutant combination has been approved or established by EPA;
4b	A use impairment caused by a pollutant is being addressed by the State through other pollution control requirements;
4c	A use is impaired, but the impairment is not caused by a pollutant;
5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed.

A water pollution reduction plan, or TMDL, is required for water bodies that are impaired or not expected to meet State WQS (Category 5), even after the application of technology-based effluent limitations in NPDES permits. The prioritization (low, medium, high) of water bodies

for TMDL development is based on the number of pollutants not attaining state WQS, severity of exceedances, and resource availability.

The 2018 water body assessments primarily indicate where sampling has occurred within the State. The 2018 IR marine assessments also include CWB watershed AUs first introduced in the 2016 IR that provide a more holistic view of the coastline waters within the State. There are some CWB watershed AUs listed twice due to containing individual water bodies that are classified as an embayment or coastal water body type and thus are compared to different WQS. The results of the assessment do not reflect all water bodies in the State. Prior assessments confirmed with new data are shaded gray, and any category changes for previously assessed waters are bolded, italicized, underlined, and shaded gray. The §305(b) assessment of State waters is located in Appendix B, and the §303(d) list of impaired waters is located in Appendix C.

Each water body assessment is categorized according to EPA methods for inland and marine waters. Estuarine waters moved from marine waters to inland waters in the 2016 IR because HAR Ch. 11-54 classifies estuaries as inland waters. Water bodies are sorted by island and then by inland (streams and estuaries) and marine waters. For both inland and marine waters the following applies:

- **Inland Waters Scope of Assessment**
  - EN = Entire Network
  - EE = Entire Estuary
  - ER = Entire Reservoir
  - EW = Entire Wetland
  - EL = Entire Lake

- **Marine Water Body Type**
  - B = Embayment (as specified within HAR Ch. 11-54-6)
  - C = Open Coastal (marine waters from the shoreline to 183 m (600 ft) depth contour)
  - O = Oceanic (marine waters from the 183 m (600 ft) depth contour to 3 miles offshore)
  - E = Estuary
  - K = Kona (all marine waters of Hawaii Island from Loa Point, South Kona District, clockwise to Malae Point, North Kona District, excluding Kawaihae Harbor and Honokohau Harbor, and for all areas from the shoreline at mean lower low water to a distance 1000 m seaward (HAR Ch. 11-54-6))
  - P = Pearl Harbor

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APPENDIX A: Data Sources

City and County of Honolulu (CCH)

The CCH collects bacteria, nutrient and water quality indictor (turbidity, TSS and chlorophyll *a*) samples from shoreline, near shore, and offshore locations on Oahu as part of their NPDES permit requirements for wastewater treatment plants (WWTP). Bacteria water quality data collected from control stations located in receiving water bodies on Oahu between November 1, 2015 and October 31, 2017 are included in the 2018 IR assessment. Nutrient and water quality indicator data did not meet the CWB QA/QC criteria and subsequently were not evaluated in this IR cycle. The WWTPs are located in Waianae, Honouliuli, Sand Island, and Kailua (Mokapu).

Clean Water Branch

The CWB collects shoreline bacteria, nutrient and water quality indicator (turbidity, TSS, and chlorophyll *a*) samples as part of EPA's BEACH program. Shoreline data collected between November 1, 2015 and October 31, 2017 on Kauai, Maui, Oahu, and Hawaii were included in the 2018 IR assessment. Sufficient shoreline data was not collected on Lanai or Molokai within that timeframe. The CWB monitoring and analysis section QA/QC is governed by the CWB Beach Monitoring and Coastal Chemistry Monitoring QAPP.

Discharge Monitoring Reports (DMRs)

NPDES permitted facilities throughout the State (e.g. Sunrise Capital, Port Allen Generating Station, Wailua WWTP, Chevron Hawaii Refinery, East Honolulu WWTP, HECO, Kahului Generating Station, Kulaimano WWTP, Papaikou-Paukaa WWTP, Hilo WWTP, and Keahole Point Fish) are required to monitor and submit bacteria, nutrient, and water quality indicator (turbidity and chlorophyll *a*) data via DMRs. Water quality data collected from control stations in receiving water bodies on Kauai, Maui, Oahu, and Hawaii between November 1, 2015 and October 31, 2018 are included in the 2018 IR assessment. Discharge monitoring reports help provide additional water quality information to the monitoring and analysis program to ensure that Hawaii's water resources are protected and restored.

Environmental Assessment Company (EAC)

EAC is a private research company headed by Richard Brock, PhD. EAC collects nutrient and water quality indicator (turbidity and chlorophyll *a*) samples for the south-southeastern coast of Lanai, and the western Kona coast of Hawaii. Data that was collected between November 1, 2015 and October 31, 2017 were used in the 2018 IR assessment. All data follow a prepared methodology and comply with the West Hawaii Coastal Monitoring Program Monitoring Protocol Guidelines (1992). Laboratory analysis follows Standard Methods (1999).

Marine Research Consultants (MRC)

MRC is a private research company headed by Steve Dollar, PhD. MRC collects nutrient and water quality indicator (turbidity and chlorophyll *a*) samples for Makena Resort Corporation to characterize coastal water quality (according to HAR §11-54-6), for Ocean Pointe (formerly the Ewa Marina) on Oahu and Makena Resort on Maui, respectively. All data were collected between November 1, 2015 and July 31, 2017 and follow a prepared sampling methodology and documented analysis methodology (Strickland and Parsons 1968, Grasshoff 1983), and utilize EPA rated laboratories (Marine Analytical Specialists).

Natural Energy Laboratory of Hawaii Authority (NELHA)

NELHA is a state funded facility that provides the CWB with nutrient and water quality indicator (turbidity and chlorophyll *a*) data via their Annual Comprehensive Environmental Monitoring Report. The monitoring efforts fulfill regulatory requirements to ensure the protection of Keahole Point's environmental resources on Hawaii.

The data collected between November 1, 2015 and October 31, 2017 were used in the 2018 IR assessment. NEHLA has implemented the standard sampling procedure and analytical protocol of the August 31, 2004, HAR Ch. 11-54 for its quarterly ocean transect sampling program. The NELHA Water Quality Laboratory follows Standard Methods for the Examination of Water and Wastewater 20th Edition (Clesceri et al 1998) and EPA test methods for its analytical procedures.

Hui O Ka Wai Ola

Hui O Ka Wai Ola is a non-profit program whose goal is to increase the capacity for monitoring water quality in Maui coastal waters. The program collects nutrient and water quality indicator (turbidity) data from the Maui shoreline. Data collected between June 2016 and October 2017 were used in the 2018 IR assessment. The program was developed with assistance from the CWB to ensure that data collected will meet the required quality assurance and quality control parameters. The program follows the 2017 CWB-approved Quality Assurance Project Plan.

Center for Biological Diversity (CBD)

The CBD submitted a letter regarding ocean acidification for consideration in the 2018 IR. The letter contained information that consisted primarily of carbon dioxide concentrations, as well as pH and temperature values collected at various locations in Hawaii between June 2008 until mid-2018. The raw data was not provided to the CWB, and the letter was received after the request for data period had closed. The CWB has reviewed the letter that was submitted and is not able to address it in the context of the IR at this time.

APPENDIX B: §305(b) Assessment of State Waters

APPENDIX C: §303(d) List of Impaired Waters