

**Chapter 2**  
**Inland Waters**

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## **PART A. SCOPE OF WATERS**

This chapter of the 2008/2010 Integrated Report covers all waters fresh waters of salinity less than 0.5 parts per thousand. Assessment units for the 2008/2010 Integrated Report remain the same as the assessment units applied in the previous report. Inland waters are partitioned according to the Hawaii Administrative Rules (HAR) §11-54 by type. Please see methodology section in Part B.1. for details regarding decision units for attainment decisions.

There were no new inland water data assessed for this 2008/2010 Integrated Report.

## **PART B. MONITORING AND ASSESSMENT**

### **B.1. Assessment Methodology**

#### **Basic Attainment Decision Unit**

As in previous Clean Water Act Section 303(d) listing cycles, the basic (Tier I) attainment decision unit (hereafter "ADU" or "decision unit") for fresh inland Hawaii waters of salinity <0.5 ppt is the entire network (EN in report tables) of hydrologically connected freshwater segments associated with a single listed stream, stream segment, or stream tributary. These freshwater segments, and thus the basic ADU, can include one or more waterbody types as defined by HAR 11-54, including, but not limited to intermittent streams, reservoirs, and wetlands (see Table 1).

#### **Tiered Approach**

A tiered approach, linked with the assessment decision criteria first adopted in the 2002 303(d) listing cycle, was used in past assessments to refine decision units for freshwater stream networks. Tier I ADUs 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 decision units encompass segments and partial segments that can be more narrowly defined and assessed based on existing monitoring locations, data, and boundaries between waterbody types, and are used for attainment decisions on a case-by-case basis. Tier III decision units are those established for TMDL development and other intensive monitoring and analysis purposes. Tier IV decision units are part of Tier III decision units that can be defined based on the most detailed assessment information.

#### **Decision Unit Rationale and Implementation**

HIDOH's current focus on defining ADUs for stream is based on:

- (a) an assumption that streams are the most widespread and important fresh inland waterbody type to assess for reaching marine water quality goals;
- (b) the lack of numeric water quality standards criteria for conventional chemical and physical pollutants in most other fresh waterbody types;
- (c) the unavailability of a complete comprehensive waterbody inventory and present limitations for monitoring and assessing all waterbodies, water quality criteria, and use attainment within each waterbody type.

ADUs for fresh inland waterbodies do not include marine waters or inland brackish or saline waterbody types, such as estuaries and anchialine pools.

Decision unit boundaries for other fresh inland waterbody types are defined on a case-by-case basis when monitoring data and other assessment information is available, but generally encompass the entire waterbody.

### **Decision Unit Delineation, Naming, Coding, and Geolocation**

Numerous conventions for naming, coding, and geolocating Hawaii waterbodies and decision unit boundaries discussed above have been designed and used over time. Building a comprehensive statewide waterbody inventory that standardizes these conventions for use by HDOH and others is an ongoing intergovernmental resource management task. Waterbody IDs for freshwater decision units are based on the Hawaii Stream Assessment (HSA) Coding System (Hawaii Cooperative Park Service Unit, 1990) with some modifications, as noted in the 2006 Integrated Report.

Geolocation of freshwater decision units is based upon various public domain digital coverages, HDOH field data (GPS coordinates, station description, field mapping, stream surveys, and stream assessments) and similar spatial location data submitted with third-party data packages.

### **Application of Criteria to Attainment Decisions**

The 303(d) listings apply to the entire freshwater (salinity <0.5 ppt) portion of a stream system, including all hydrologically-connected reaches, unless a case is documented in which small decision units are justified. The same method also applies to other waterbody types.

We urge non-HDOH entities conducting similar monitoring, analysis, and planning activities to consult with HDOH about sampling designs and information management protocols that will facilitate HDOH's ability to use secondary data for attainment decisions. The entire hydrologic network within a watershed is the largest possible unit of decision for inland fresh waterbodies, and may include the boundaries of the following waterbody types as defined by HAR 11-54-1.

HDOH encourages monitoring, analysis, and planning activities that acknowledge and consider the regulatory boundaries between specific waterbody types and demonstrate a rationale for segmenting each waterbody into smaller decision units. The EPA's 2006 Integrated Report Guidance provides a summary of factors to consider in developing these rationales. Water quality criteria and decision unit boundaries for the various waterbody types are shown in Table 1.

**TABLE 1. Applicable Water Quality Criteria and Decision Unit Boundaries for Inland Fresh Waterbodies**

<b>Waterbody Type<sup>1</sup></b>	<b>Applicable Water Quality Criteria<sup>2</sup></b>	<b>Decision unit boundary<sup>3</sup></b>
Flowing seep	Basic/Recreational	Flowpath/Flow Surface
Flowing spring	Basic/Recreational	Flowpath/Flow Surface
Elevated wetland	Basic/Recreational/Wetland	1978 Corps delineation <sup>4</sup>
Low wetland	Basic/Recreational	1978 Corps delineation <sup>4</sup>
Intermittent stream	Basic/Recreational/Water Column/Bottom	Entire network or sub-network <sup>5</sup>
Perennial stream	Basic/Recreational/Water Column/Bottom	Entire network or sub-network <sup>5</sup>
Natural freshwater lake	Basic/Recreational	Lake
Freshwater impoundment <sup>6</sup>	Basic/Recreational	Impoundment
Reservoir	Basic/Recreational	Reservoir
Ditch	Basic/Recreational	Ditch
Flume	Basic/Recreational	Flume
Drainage ditch <sup>7</sup>	Basic/Recreational	Drainage ditch
Canal <sup>7</sup>	Basic/Recreational	Canal

<sup>1</sup>Inland freshwater (salinity <0.5 ppt) waterbody types as defined by HAR §11-54-1. These definitions are applied to the definition of decision units.

<sup>2</sup>Basic criteria (Narrative "free of" and numeric standards for toxic pollutants) established by HAR §11-54-4; Specific (numeric) criteria for inland recreational waters established by HAR §11-54-8(a); Specific (numeric) criteria for stream water column established by HAR §11-54-5.2(b); Specific (numeric) criteria for stream bottom established by HAR §11-54-5.2(b)(2); Specific (numeric) criteria for elevated wetlands established by HAR §11-54-5.2(c).

<sup>3</sup>HAR §11-54-5.1(a) establishes a system of waterbody classification (waterbody class is defined by underlying land use classification) and associated designated uses.

<sup>4</sup>HAR §11-1: "...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)."

<sup>5</sup>According to HAR §11-54-1 "'Stream systems', 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.

<sup>6</sup>This waterbody type is not defined by rule but is included in the definition of "Standing waters".

<sup>7</sup>This waterbody type is not defined by rule but is included in the definition of "State waters".

### **Methodology for Attainment Decisions**

While there are no changes from the 2006 List of impaired waters, it is important to provide both documentation and consistency when making listing decisions. Use of standardized criteria will enable HDOH to periodically collect and assess datasets for use in waterbody assessments. Photos are required for inland waters to ensure location information is correct. Since many places in Hawaii are named identically, photos help to identify the exact location of the sampling event.

Please note that the same information requirements apply to delisting as well as listing decisions. Datasets and supporting documentation are evaluated against both numeric and narrative criteria

where applicable. Listings for inland waters generally apply to the entire freshwater (salinity <0.5 ppt) portion of a stream system unless a case is documented in which the watershed approach is not applicable.

State Water Quality Standards (WQS) set in HAR §11-54 for conventional pollutants, such as nutrients and sediments, are expressed in a statistical format that presents criteria in the form of geometric means not to be exceeded by the geometric mean values computed from datasets. Two storm event allowances are included through the 10% and 2% geometric means not to be exceeded by more than 10% and 2% of the sample values, respectively. The WQS are further divided into "wet" and "dry" criteria, which, for inland waterbodies, refer to the "wet" season as November through April, and "dry" season as May through October. For embayments and coastal waters, these terms refer to the amount of freshwater discharge per shoreline mile.

For statistical significance, "10% of the time" criteria will be evaluated with a minimum sample size of 100 samples, allowing for 10+ samples to exceed the 10% threshold. The "2% of the time" criteria will be evaluated with a minimum sample size of 500 samples, allowing for 10+ samples to exceed the 2% threshold.

In accordance with priority ranking and listing/delisting criteria, waterbodies are sorted into one of three priority categories. Priority 1 waters have sufficient data to clearly support a listing/delisting decision based on separate wet and/or dry conditions. Priority 2 waters have limited data, which requires HDOH to use a weight-of-evidence approach. Priority 3 waters have extremely limited data and require future monitoring before a listing decision can be made. For conventional pollutants, a minimum of ten samples from the wet and ten samples from the dry season is required for Priority 1. A minimum of ten samples from a combined grouping of wet and dry conditions is required for Priority 2a, and five to nine samples for Priority 2b. Any fewer than five samples result in the assignment of the waterbody and its numeric data into Priority 3.

For toxic pollutants, such as pesticides and heavy metals, which often require expensive analyses, a minimum sample size of three is required for eligibility for Priority 1. Toxic pollutants for freshwaters are characterized by acute and chronic concentration criteria and fish consumption criteria.

Enterococci are the indicator bacteria now used in freshwaters to evaluate waters for public health risks. Enterococci counts are evaluated using data within a 25 to 30 day temporal increment, and compared to applicable geometric mean and the single sample maximum value.

Biological surveys of aquatic communities, fish consumption advisories, and reports of contaminated sediments are also eligible sources of listing information. These surveys are most likely to be placed in Priority 3. Datasets for evaluation of narrative criteria must include at least three sampling events and represent conditions in both wet and dry seasons. These narrative criteria may be evaluated using HDOH-approved habitat or biological assessment methodologies as long as they can be directly correlated to specific narrative criteria in HAR §11-54-04. Also, in accordance with HAR §11-54-04(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, provided that HDOH deems them appropriate for use in the Hawaiian environment (CCME 1999; NYSDEC 1999).

### **Data Sources Reviewed**

There were no new data reviewed for the 2008/2010 cycle.

### **Quality Assurance/Quality Control Consideration**

Quality Assurance/Quality Control (QA/QC) procedures document data quality by describing data collection and analysis procedures. HDOH's Clean Water Branch and Laboratory operate under the terms of the "Quality Management Plan for Surface Water Quality Monitoring" approved by EPA Region IX (December 9, 1999).

Other data submitted from sources outside the HDOH will be evaluated against the Quality Assurance Project Plan (QAPP).

## **B.2. Assessment Results**

### **B.2.1. Review of Data**

There were no new data reviewed for the 2008/2010 cycle.

### **B.2.2. Hawaii's 2008/2010 303(d) List**

The 2008/2010 303(d) List contains the waterbodies that were in the 2006 List of Impaired Waterbodies. There are no newly listed streams in the current list. Complete assessment decisions are found in Chapter 3. Waterbodies are prioritized as High, Medium, or Low for Total Maximum Daily Load (TMDL) development. High, medium, or low priorities were assigned to each waterbody based on the number of parameters listed and the severity of exceedances.

## **B.3. Wetlands Program**

Responsibilities for wetland protection are diffused among various federal, state, and county authorities. There is no formal wetland program in HDOH.

## **B.4. Public Health Issues**

### Leptospirosis Threat

Leptospirosis is not included as a specific water quality standard parameter. However, all freshwaters within the state are considered potential sources of Leptospirosis infection by the epidemiology section of the HDOH. 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 fresh waters of the state.



### Fish Consumption Advisory

Several locations have been identified and posted as areas where fish and shellfish should not be consumed. These areas include: Pearl Harbor, Ala Wai Canal, and urban streams of Honolulu. Contamination of fish and shellfish include organochlorine pesticides and/or PCBs and lead.

## **LIST OF REFERENCES**

Canadian Council of Ministers of the Environment (CCME). 1999. *Canadian Sediment Quality Guidelines for the Protection of Aquatic Life*. (<http://www.ec.gc.ca/ceqg-rcqe>).

Commission on Water Resources Management – State of Hawaii (CWRM) and the National Parks Service (NPS). 1990. *Hawaii Stream Assessment: A Preliminary Appraisal of Hawaii's Stream Resources*. Report R-84.

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