



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

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FEB 09 2010

Laurence Lau  
Deputy Director  
Hawaii Department of Health  
P.O. Box 3378  
Honolulu, HI 96801

Dear Mr. Lau:

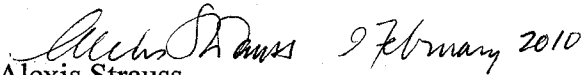
Thank you for submitting the Total Maximum Daily Loads (TMDLs) for total suspended solids, nitrogen, and phosphorus in Kaneohe Stream, Oahu, including Kamooalii Stream (tributary to Kaneohe Stream). The submittal contained allocations for total suspended solids, total nitrogen, and total phosphorus. Based on the Environmental Protection Agency (EPA) review of the TMDL submittal under Section 303(d), I have concluded these TMDLs adequately address the pollutants of concern and, upon implementation, will result in attainment of the water quality standards adopted by the State. Therefore, the TMDLs are hereby approved pursuant to Clean Water Act Section 303(d)(2).

The TMDL submittal was dated September 25, 2009 and received by EPA on October 1, 2009. Additional information clarifying the submittal was provided to EPA on December 15, 2009 and February 4, 2010. These TMDLs include wasteload and load allocations as needed, take into consideration seasonal variations and critical conditions, and provide an adequate margin of safety. The State provided sufficient opportunity for public review and comment on the TMDLs and demonstrated how public comments were considered in the final TMDLs.

The TMDL submittal also contains a general plan for implementing the TMDLs. Current federal regulations do not define TMDLs as containing implementing plans; therefore, EPA is not taking action on the implementation plan provided with the TMDLs. However, EPA generally concurs with the State of Hawaii's proposed implementation approaches.

The enclosed review discusses the basis for this decision in greater detail. If you have questions concerning this approval, please call me at (415) 972-3572 or Peter Kozelka at (415) 972-3448.

Sincerely yours,

  
Alexis Strauss  
Director, Water Division

Enclosure

## TMDL Review Checklist

**State:** Hawaii

**Waterbodies:** Kaneohe Stream (Kaneohe Watershed Area, including Kamooalii Stream tributary to Kaneohe Stream)

**Pollutant(s):** Total Suspended Solids, Nitrogen, and Phosphorus

**Date of Initial Submittal:** September 25, 2009

**Date Received By EPA:** October 1, 2009

**Date of Supplemental Information:** December 15, 2009; February 4, 2010

**EPA Reviewers:** Sara Roser / Peter Kozelka

### 1. Submittal Letter:

*State submittal letter indicates final TMDL(s) for specific water(s)/pollutant(s) were adopted by state and submitted to EPA for approval under 303(d). Acknowledge if any supplemental material was provided and receipt date.*

The submittal letter from Laurence Lau to Alexis Strauss, dated September 25, 2009, was received by EPA on October 1, 2009. Additional information was provided to EPA on December 15, 2009 and February 4, 2010 for clarification of the submittal. The submittal includes TMDLs for total suspended solids (TSS), total nitrogen (TN), and total phosphorus (TP) in Kaneohe Stream, including the Kamooalii tributary. These TMDLs were established by the Deputy Director of the Hawaii Department of Health (HDOH) and submitted for EPA approval under CWA Section 303(d) on September 25, 2009. The submittal includes the TMDL decision document (*Total Maximum Daily Loads (TMDLs) for Total Suspended Solids, Nitrogen and Phosphorus in Kaneohe Stream, Kaneohe, Hawaii*), dated September 2009. The submittal also includes comments received from the public on the draft TMDL decision document and HDOH's response to these comments.

### 2. TMDLs Included:

*The submittal clearly identifies the water segments and pollutants or stressors for which TMDLs were developed. The submittal should include the water segment identifier (e.g., NHD code) for each segment addressed. The submittal should clearly identify the TMDLs adopted for currently 303(d) listed waterbody-pollutant combinations. It should also clarify if TMDLs were adopted for new impairment findings (by waterbody-pollutant combinations) that do not exist on the current 303(d) list. If appropriate, the submittal should describe any assessment decisions that may have resulted in non-impairment status for water/pollutant combinations that exist on State's most current 303(d) list.*

(TMDL Decision Document, Executive Summary, p. ii and Sections 3.2 and 3.3)

TMDLs in this submittal are for the following waterbody-pollutant combinations, based on the State's most recent (2006) CWA Section 303(d) list:

Kaneohe Stream - TSS (*wet season, dry season*)  
Kaneohe Stream - TN (*wet season, dry season*)  
Kaneohe Stream - TP (*wet season, dry season*)  
Kamooalii Stream (tributary to Kaneohe Stream) - TSS (*wet season, dry season*)  
Kamooalii Stream (tributary to Kaneohe Stream) - TN (*wet season, dry season*)  
Kamooalii Stream (tributary to Kaneohe Stream) - TP (*wet season, dry season*)

These waterbody-pollutant combinations are addressed with three TMDLs for Kaneohe Stream, including the Kamooalii tributary. These TMDLs are for total suspended solids, total nitrogen, and total phosphorus in Kaneohe Stream. See Section 13 of this checklist for details on the listings and how the TMDLs relate to the listings.

The State's 2006 CWA Section 303(d) list identifies Kaneohe and Kamooalii streams as impaired by elevated levels of total nitrogen, nitrate + nitrite nitrogen ( $\text{NO}_3+\text{NO}_2$ ), total phosphorus, and turbidity. The State's 303(d) list also indicates that the assessment decision for total suspended solids is unknown. The TMDL submittal states the following:

- TMDLs calculated for total suspended solids and nutrients will lead to the attainment of turbidity criteria; and
- Implementing TMDLs for total nitrogen and total phosphorus will lead to attainment of nitrate + nitrite nitrogen criteria.

Therefore, the following waterbody-pollutant combinations are also addressed with this TMDL submittal although there are no TMDLs for nitrate + nitrite nitrogen or turbidity:

Kaneohe Stream –  $\text{NO}_3+\text{NO}_2$  (*wet season, dry season*)  
Kaneohe Stream – Turbidity (*wet season, dry season*)  
Kamooalii Stream (tributary to Kaneohe Stream) –  $\text{NO}_3+\text{NO}_2$  (*wet season, dry season*)  
Kamooalii Stream (tributary to Kaneohe Stream) – Turbidity (*dry season*)

The State's 2006 CWA Section 303(d) list presents an unknown listing for TSS. A clarification by DOH states the following: "Although Tables 3.2 and 3.3 of the submittal show that the value of certain TSS data points exceeded the value of the associated TSS water quality criterion, our analysis of the values of all TSS data points, within the statistical framework of each TSS water quality criterion, indicates that there were no exceedances of water quality criteria for TSS. Therefore, the TMDL decision incorporates a new assessment decision that the waterbody is not impaired for TSS, as shown in Table 3.4." However, the waterbodies are impaired for turbidity. In the submittal, TMDLs for TSS were calculated as a surrogate for addressing the turbidity impairment.

EPA finds the State's analysis concerning waterbody impairment associated with nutrients and sediment to be reasonable and consistent with the requirements of Section 303(d).

The 2006 CWA Section 303(d) list identifies dieldrin as a pollutant in Kaneohe Stream. Dieldrin impairment is not included in this TMDL submittal because of insufficient data. The State's 303(d) list also indicates that the assessment decision for enterococci in Kaneohe and

Kamooalii Streams is unknown. These TMDLs do not address enterococci.

Although there are multiple listings for marine waters in Kaneohe Bay on the 2004 303(d) list, separate TMDLs for Kaneohe Bay have not been developed at this time and therefore are not included in the submittal.

### **3. Water Quality Standards Attainment:**

*TMDL and associated allocations are set at levels adequate to result in attainment of applicable water quality standards.*

(TMDL Decision Document, Section 1.2)

The TMDLs are designed to implement Hawaii water quality standards (HAR Section 11-54-5.2) for the above mentioned waters. Kaneohe Stream is a Class 2 Inland Water (Perennial Shallow Stream). The objectives of Class 2 waters as they apply to Kaneohe Stream and its tributaries (including Kamooalii tributary) are to protect beneficial uses for recreational purposes, the support and propagation of fish and other aquatic life, and agricultural and industrial water supplies. Uses to be protected include all uses compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. Existing recreational uses include fishing, swimming, hiking, and aesthetics.

The submittal clearly summarizes applicable water quality standards for total suspended solids, nitrate + nitrite nitrogen, total nitrogen, total phosphorus, and turbidity. The standards for all five parameters are defined by three numeric criteria—a geometric mean, and two exceedence values (2% and 10%) for each of two seasons, wet and dry. Wet season is defined as November 1 – April 30, and dry season is defined as May 1- October 31.

The State reasonably concluded that attainment of the numeric targets and associated TMDLs, wasteload allocations, and load allocations will result in attainment of the applicable numeric water quality objectives.

### **4. Numeric Target(s):**

*Submittal describes applicable water quality standards, including beneficial uses, applicable numeric and/or narrative criteria. Numeric water quality target(s) for TMDL identified, and adequate basis for target(s) as interpretation of water quality standards is provided.*

(TMDL Decision Document, Table 1.1 in Section 1.2 and Table 5.1 in Section 5.1)

Table 1.1 of the TMDL submittal contains Hawaii state water quality criteria for TSS, NO<sub>3</sub>+NO<sub>2</sub>, TN, TP, and turbidity. These criteria include a geometric mean and two not-to-exceed values (10% and 2%) for both wet and dry seasons. Table 5.1 of the submittal contains the TMDL numeric targets for TSS, TN, and TP.

The TMDLs were developed for six conditions: baseflow, 10% storm event, and 2% storm event for both wet and dry seasons. Baseflow conditions were analyzed based on the geometric mean water quality criteria for each season. Likewise, 10% and 2% rainfall events were assessed according to water quality criteria not to be exceeded more than 10% and 2% of the time, respectively. Comparison of Tables 1.1 and 5.1 confirms that the numeric targets for TMDLs for 10% and 2% are equal to the Hawaii state standards. The numeric targets for TMDLs for

baseflow are lower (more stringent) than the Hawaii geometric mean criteria.

EPA concludes that the State's approach to developing these TMDLs, based on existing numeric water quality standards, is reasonable and protective of the beneficial uses of Kaneohe Stream, including the Kamooalii tributary.

#### **5. Source Analysis:**

*Point, non-point, and background sources of pollutants of concern are described, including the magnitude and location of sources. Submittal demonstrates all significant sources have been considered. Point, nonpoint, and background sources of pollutants of concern are described, including the magnitude and location of sources. The submittal demonstrates all significant sources have been considered.*

(TMDL Decision Document, Sections 4.2 – 4.8, 5.5)

There are no public or industrial treatment facility discharges in the Kaneohe Stream watershed. Large NPDES permitted dischargers that are point sources of these pollutants in the watershed are Hawaii Department of Transportation (DOT) MS4 (permit # HIS000001) and City and County of Honolulu Department of Environmental Services (CCH ENV) MS4 (permit # HIS000002). Small MS4 permit holders include Hawaii Department of Education (DOE) (permit # HIS000003) and Windward Community College (WCC) (#HI07KC937). Future permit holders, for which allocations are established in this TMDL submittal, include Hawaii Department of Defense (DOD) and Hawaii Department of Health (DOH) State Hospital.

The submittal provides a clear description of the non-point sources in the watershed, utilizing all available water quality data related to these pollutants. Nonpoint pollution sources are the forest, agriculture, and open water areas, Koolau Golf Course, and the portion of Memorial Cemetery that lies in the Kaneohe watershed. All areas are considered as nonpoint sources of baseflow volume and quantity.

Pollutant sources were quantified by land use areas (e.g., forest, agricultural, parks, residential, etc.) on a basin by basin basis. Analysis of pollutant sources was based on hydrologic properties, streamflow hydraulics, baseflow pollutant concentrations (from USGS NAWQA) and storm runoff pollutant concentrations (from EPA's National Urban Runoff Program Event Mean Concentration data), and other estimates of nonpoint source pollutant loading rates (from cited studies).

EPA concludes that all significant sources of TSS, TN, and TP have been considered in the source analysis for the TMDLs.

#### **6. Loading Capacity Linkage Analysis:**

*Submittal describes relationship between numeric target(s) and identified pollutant sources. Submittal clearly identifies loading capacity. For each pollutant, describes analytical basis for conclusion that sum of allocations and margin of safety does not exceed the loading capacity of the receiving water(s).*

There is no linkage analysis included in these TMDLs; however this is not a federally required element of a TMDL. The TMDL submittal contains a brief discussion of TSS and nutrient concentrations as surrogate numeric targets for turbidity. Implementation of TMDLs calculated for total suspended solids and nutrients will lead to attainment of criteria for turbidity and nitrate

+ nitrite nitrogen criteria, respectively.

### **7. TMDL and Allocations:**

*TMDL—Submittal identifies the total allowable load, which is set equal to or less than the loading capacity. TMDL is expressed in terms of mass-based, concentration-based or other equivalent approaches that are consistent with federal requirements. If TMDL has seasonal features then please describe. TMDLs and allocations should be expressed in terms of daily time steps. If the TMDL and/or allocations are also expressed in terms other than mass loads per day, the submittal explains why it is reasonable and appropriate to express the TMDL in those terms.*

*Allocations—Submittal identifies appropriate waste load allocations for all point sources and load allocations for all non-point sources. Allocations are expressed in terms of mass-based, concentration-based or other equivalent approaches, the submittal explains why it is reasonable and appropriate to express in those terms. If point sources are present, submittal identifies existing NPDES permits by name and number. More discussion of point sources in watershed. If no point sources are present, waste load allocations are zero. More discussion of non-point sources. If no non-point sources are present, then load allocations are zero.*

(TMDL Decision Document, Sections 5.2 and 5.5)

#### **TMDL or Loading Capacity**

The TMDLs are expressed as mass loads (kg) per day. TMDL allocations were calculated for three conditions (baseflow, 10% runoff, and 2% runoff) for both dry season and for wet season. Allocations are separated out among six segments of the stream (segments 1.0, 1.1, 2, 3, 4, and 5.0).

The loadings were calculated such that the sum of all the loadings to the receiving water would not cause an exceedence of TMDL numeric targets. Load capacities for each stream segment were calculated for each tributary sub-basin source and compared to the existing loads. Where the existing loads were less than the calculated load capacity, the existing load became the allowable loading capacity. This approach conforms to the non-degradation policy in Hawaii's water quality standards.

EPA concludes that the sum of the allowable loads from watershed sources will not exceed the loading capacity of the receiving water.

Load source categories and their allocations have been consolidated into existing loads from and allocations to areas that are serviced by agencies that hold or should hold NPDES permits, and nonpoint sources. There are six consolidated allocations for areas based on present or future NPDES permits (DOT, DOD, DOE, DOH, CCH ENV, and WCC) and one allocation for all other nonpoint sources.

#### **Wasteload Allocations**

Under 10% runoff and 2% runoff conditions (both dry and wet season), the six consolidated allocations for areas based on NPDES permits have wasteload allocations (WLAs). Load reductions required to achieve these WLAs are presented.

#### **Load Allocations**

There are load allocations for nonpoint sources for 10% runoff, 2% runoff, and baseflow

conditions (both wet and dry season). In addition, under baseflow conditions (both dry and wet season), the six consolidated allocations for areas based on NPDES permits also have load allocations in addition to WLAs. Load allocations associated with NPDES permits address nonpoint sources within the service area covered by the permit. Load reductions required to achieve these allocations are presented.

EPA concludes the State's approach of setting the TMDLs and allocations is appropriate for the waters and pollutants of concern and consistent with the provisions of CWA and federal regulations. See 40 CFR 130.2(i).

**8. Margin of Safety:**

*Submittal describes explicit and/or implicit margin of safety for each pollutant.*

(TMDL Decision Document, Section 5.4)

The TMDLs include an implicit margin of safety. Three examples of how the implicit margin of safety was incorporated are given. 1) The critical 10% and 2% rainfall events were determined from the 24-hour days of recorded rainfall, though actual durations (and corresponding increased pollutant loadings) are usually significantly less. 2) In storm runoff calculations, average soil moisture conditions are assumed, while for a significant number of the 10% and 2% rainfall events, dry soil moisture conditions are more likely. 3) Existing loads were assigned as allocations instead of load capacity in cases where the existing load is less than the load capacity.

EPA considers this a permissible and appropriate approach for dealing with uncertainty concerning the relationship between TMDL, wasteload allocations, load allocations, and water quality conditions.

**9. Seasonal Variations and Critical Conditions:**

*Submittal describes method for accounting for seasonal variations and critical conditions in the TMDL(s).*

(TMDL Decision Document, Section 5.2)

Baseflow and pollutant load contributions were calculated for individual land use areas during dry season (May-October) and wet season (November-April) non-runoff conditions. Analysis of pollutant sources on a seasonal basis was based on hydrologic properties, streamflow hydraulics, baseflow pollutant concentrations (from USGS NAWQA) and storm runoff pollutant concentrations (from EPA's National Urban Runoff Program Event Mean Concentration data), and other estimates of nonpoint source pollutant loading rates (from cited studies). The submittal develops TMDLs for the wet and dry seasons so that wet and dry water quality criteria would be attained during the appropriate season.

EPA concludes that the State's analysis adequately accounts for the seasonal variations in critical conditions by establishing TMDLs and allocations that vary in response to differences in flow conditions.

**10. Public Participation:**

*Submittal documents provision of public notice and public comment opportunity; and explains how public comments were considered in the final TMDL(s).*

(TMDL Decision Document, Section 7)

The draft TMDLs were published for public review on August 15, 2008, and a public information meeting was held on August 28, 2008. The submittal included responses to public comments.

EPA finds the State provided sufficient opportunities for public comment and considered public comments in its final decision by providing reasonably detailed responsiveness summaries.

**11. Technical Analysis:**

*Submittal provides appropriate level of technical analysis supporting TMDL elements.*

The technical analysis supporting the TMDLs included considerations of available water quality and flow data and detailed descriptions of watershed sub-basins and sources. It utilized a methodology for calculating load capacities and TMDLs that is conceptually sound.

EPA concludes that the State was reasonably diligent in its technical analysis of TSS, TN, and TP in the Kaneohe Stream watershed system.

**12. Reasonable Assurances:**

*If waste load allocations are made less stringent based on inclusion of load allocations that reflect nonpoint source reductions, Submittal describes how there are reasonable assurances necessary nonpoint source reductions will occur.*

Not applicable

**13. Other:**

The submittal contains three TMDLs that address eight 303(d) water quality limited segment listings (for TN, TP, NO<sub>3</sub>+NO<sub>2</sub>, and turbidity) within Hawaii as identified on the State's 2006 CWA Section 303(d) list. The State's 2006 CWA Section 303(d) list also lists two unknown decisions for TSS in Kaneohe and Kamooalii streams. The TMDL submittal incorporates a new decision that these streams are not impaired for TSS. However, TSS TMDLs are included to address the turbidity impairment. Implementation of TMDLs calculated for total suspended solids, total nitrogen, and total phosphorus will also lead to attainment of criteria for turbidity and nitrate + nitrite.

TMDLs in this submittal are for the following waterbody-pollutant combinations, based on the 303(d) list:

- Kaneohe Stream (ID 3-2-10), TSS\* in the dry and wet season
- Kaneohe Stream (ID 3-2-10), TN† in the dry and wet season
- Kaneohe Stream (ID 3-2-10), TP† in the dry and wet season
- Kamooalii Stream (tributary to Kaneohe Stream) (ID 3-2-10.01), TSS\* in the dry and wet season
- Kamooalii Stream (tributary to Kaneohe Stream) (ID 3-2-10.01), TN† in the dry and wet season
- Kamooalii Stream (tributary to Kaneohe Stream) (ID 3-2-10.01), TP† in the dry and wet season

Although the submittal does not contain TMDLs for nitrate + nitrite nitrogen or turbidity, the following waterbody-pollutant combinations from the 303(d) list are indirectly addressed with

this TMDL submittal:

Kaneohe Stream –  $\text{NO}_3+\text{NO}_2$  (wet season, dry season)

Kaneohe Stream – Turbidity (wet season, dry season)

Kamooalii Stream (tributary to Kaneohe Stream) –  $\text{NO}_3+\text{NO}_2$  (wet season, dry season)

Kamooalii Stream (tributary to Kaneohe Stream) – Turbidity (dry season)

*Note: All TMDLs are for both wet and dry seasons.*

*\* Listing decision for TSS was unknown; listing was for turbidity. TMDLs are for TSS. Criteria for turbidity are met through implementation of TMDLs for TSS, TN, and TP.*

*† Listing was for TN,  $\text{NO}_3+\text{NO}_2$ , and TP; TMDLs are for TN and TP. Criteria for  $\text{NO}_3+\text{NO}_2$  are met through implementation of TMDLs for TN and TP.*

**The 2006 303(d) list had the following relevant waterbody-pollutant combinations:**

Kaneohe Stream (ID 3-2-10), Total N in the dry season

Kaneohe Stream (ID 3-2-10),  $\text{NO}_3+\text{NO}_2$  in the dry season

Kaneohe Stream (ID 3-2-10), Total P in the dry season

Kaneohe Stream (ID 3-2-10), Turbidity in the dry season

Kaneohe Stream (ID 3-2-10), TSS(unknown) in the dry season

Kaneohe Stream (ID 3-2-10), Total N in the wet season

Kaneohe Stream (ID 3-2-10),  $\text{NO}_3+\text{NO}_2$  in the wet season

Kaneohe Stream (ID 3-2-10), Total P in the wet season

Kaneohe Stream (ID 3-2-10), Turbidity in the wet season

Kaneohe Stream (ID 3-2-10), TSS(unknown) in the wet season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), TN in the dry season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01),  $\text{NO}_3+\text{NO}_2$  in the dry season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), TP in the dry season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), Turbidity in the dry season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), TSS (unknown) in the dry season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), TN in the wet season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01),  $\text{NO}_3+\text{NO}_2$  in the wet season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), TP in the wet season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), Turbidity (unknown) in the wet season

Kamooalii Stream (tributary to Kaneohe stream) (ID 3-2-10.01), TSS (unknown) in the wet season