



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
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San Francisco, CA 94105-3901

JAN 25 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 nitrogen and turbidity in the North and South Forks of Kaukonahua Stream. The submittal contained allocations for total nitrogen and turbidity. Based on the Environmental Protection Agency's (EPA's) 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 24, 2009 and received by EPA on September 25, 2009. 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 has 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,

A handwritten signature in black ink, appearing to read "Alexis Strauss".

*AS*  
Alexis Strauss  
Director, Water Division

Enclosure

## TMDL Review Checklist

**State:** Hawaii

**Waterbodies:** North and South Fork of Kaukonahua Stream, Oahu

**Pollutant(s):** Total Nitrogen and Turbidity

**Date of Initial Submission:** September 24, 2009

**Date Received By EPA:** September 25, 2009

**EPA Reviewer:** 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 24, 2009, was received by EPA on September 25, 2009. The submittal includes TMDLs for total nitrogen and turbidity in the North and South Forks of Kaukonahua Stream (Upper Kaukonahua Stream). 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 the North and South Forks of Kaukonahua Stream, Oahu, Hawaii*), dated September 2009. The submittal also includes comments received from the public on the draft TMDL report 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, Section 1.2, Table 1-2 and Section 2.3, Table 2-8)

The submittal addresses the following four waterbody-pollutant combinations, as identified on the State's most current (2006) CWA Section 303(d) list:

North Fork Kaukonahua - TN (*wet and dry season*)  
North Fork Kaukonahua - Turbidity (*wet and dry season*)  
South Fork Kaukonahua - TN (*wet and dry season*)  
South Fork Kaukonahua - Turbidity (*wet and dry season*)

The 2006 CWA Section 303(d) list contains listings for TN, NO<sub>3</sub>+NO<sub>2</sub>, TP, and turbidity. Listings for these pollutants were based on visual assessments. During the course of the TMDL

development, DOH acquired additional water monitoring results. These data, which are summarized in the submittal, support the stream listings for TN and turbidity but do not support the stream listings for TP and  $\text{NO}_3+\text{NO}_2$ . Consequently, TMDLs were not developed for TP and  $\text{NO}_3+\text{NO}_2$  because data indicated attainment of criteria for these two parameters in both the North and South Forks of Kaukonahua Stream.

The State's 2006 CWA Section 303(d) list also indicates that the assessment decisions for enterococci and total suspended solids are unknown. These TMDLs do not address enterococci, but it does address total suspended solids. During the course of the TMDL development, DOH acquired and reviewed monitoring data for total suspended solids and found that the criteria for this pollutant are met. Consequently, TMDLs for suspended solids were not developed. TMDLs were only developed for total nitrogen and turbidity.

See # 13 of this checklist for water segment identifiers.

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

### **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 11-54-3). The Upper Kaukonahua watershed includes both Class 1.b and Class 2 segments. Class 1.b segments are located in the eastern headwaters of the North and South Forks of Kaukonahua Stream, and Class 2 segments are located between the headwaters and the stream outlet. The objectives of Class 1.b waters are to protect domestic water supplies, food processing, protection of native breeding stock, the support and propagation of aquatic life, baseline references from which human-caused changes can be measured, scientific and educational purposes, compatible recreation, and aesthetic enjoyment. The objectives of Class 2 waters are to protect their 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.

Table 1-1 of the submittal clearly summarizes applicable water quality standards for turbidity, total suspended solids (TSS), total nitrogen (TN), nitrate + nitrite ( $\text{NO}_3+\text{NO}_2$ ), and total phosphorus (TP). The standards for all three parameters are defined by three numeric criteria - a geometric mean, and two not-to-exceed (NTE) values (not to exceed the given value 10% of the time and not to exceed the given value 2% of the time) for two seasons, wet and dry. Wet season is defined as Nov 1 – Apr 30, and dry season as May 1- Oct 31. When implemented, these TMDLs will result in attainment of total nitrogen and turbidity criteria in the North and South Forks of Kaukonahua Stream.

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 criteria.

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

*Submission 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, sections 1.2 and 3.4 and Appendix F)

The submittal presents Hawaii's relevant water quality standards, including uses and numeric criteria. The TMDL numeric targets are set equal to or less than the State's criteria for total nitrogen and turbidity, which are defined by three numeric criteria (geometric mean and two not-to-exceed values) for the wet season and the dry season. TMDL targets are identified in Tables 4-4 through 4-6. The TMDL targets are based on flow and the instantaneous numeric targets for total nitrogen and turbidity in the wet season and dry season. Using a modified load-duration curve approach, the instantaneous numeric targets were calculated based on the most restrictive numeric criteria (the 2% NTE values for each season).

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 the North and South Forks of Kaukonahua Stream.

**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.*

(TMDL Decision Document, section 3)

The submittal presents a clear description of point, non-point, and background sources of pollutants. Sample sites were selected to assess the main sources of nutrients and sediment in the watershed. A load analysis for each sampling location and TMDL pollutant was conducted in both forks of the Upper Kaukonahua watershed. Pollutant sources were quantified by land use areas. The pollutant load analyses of the North and South Forks of Kaukonahua Stream were quantified by land use categories in the watershed (urban, agriculture, and conservation).

Section 3 of the TMDL decision document describes the source analysis. NPDES permitted dischargers that are point sources of nutrients and sediment are the Navy MS4 (permit # HIS000006) and the City and County of Honolulu Department of Environmental Services (CCH) MS4 (permit # HIS000002). Both NPDES permits are for discharges from stormwater and represent the urban portion of the watershed. There are no public or industrial treatment facility discharges in the Upper Kaukonahua streams. Nonpoint sources of nutrients and sediment for streams in the Upper Kaukonahua watershed include forested mountain environments, agriculture, construction, urban runoff, and disturbance from military training activities.

EPA concludes that all significant sources of total nitrogen and turbidity 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).*

(TMDL Decision Document, section 3)

The submittal describes the linkage between point and non-point and ambient stream water quality using a load duration curve approach to assess water quality data. The submittal sufficiently describes the link between numeric targets and the sources of nutrients and sediment in the North and South Forks of Kaukonahua Stream.

EPA concludes that the sum of allocated loads will not result in exceedences of loading capacities for total nitrogen or turbidity in the receiving waters.

**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 3 and 4)

**TMDL or Load Capacity**

TMDL allocations were calculated for three flow intervals (high, elevated, and stable) in the wet season and the dry season and also by major storm events (1-year storm, 2-year storm, and peak flow) for all land use categories in the North and South Forks of Kaukonahua Stream. The load capacity was determined using a duration curve framework which assessed the full range of stream flow conditions. The load capacity was determined for total nitrogen and turbidity by multiplying the flow volume by the pollutant geomean concentration at the mid-point of each flow interval zone. The calculated load capacities were allocated to the tributary land use categories (urban, agricultural, conservation) in proportion to the total area in each land use category. Load source categories were then consolidated into loads from and allocations for point and non-point sources. The TMDLs are expressed in mass loads per day. The TMDL for turbidity is expressed in tons per day, and the TMDL for total nitrogen is expressed in pounds per day.

**Allocations**

All NPDES-regulated facilities in the North and South Fork of Kaukonahua Stream sub-basins are location in the urban land use district. WLAs for the urban land use category are divided between the two stormwater permits (CCH and Navy). Waste Load Allocations (WLAs) were assigned to the CCH MS4 and the Navy MS4. Load Allocations (LAs) were assigned to lands in the agricultural and conservation category.

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:**

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

(TMDL Decision Document, Section 3.4)

The TMDLs incorporate an implicit margin of safety. The submittal states the following: Factors contributing to the implicit margin of safety include conservative assumptions employed regarding the use of non-detect samples (estimating the sample value at the detection limit if the detection limit is below the water quality criteria being evaluated). Furthermore, meeting the 2% NTE criteria implies that the load allocation would more than adequately meet the other two criteria given total nitrogen and turbidity load distributions in the Upper Kaukonahua watershed. Introducing load allocations for major storm events based on an instantaneous numeric target concentration in the analysis further ensures that the 2% NTE criteria would be met.

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:**

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

(TMDL Decision Document, Section 4)

The submittal presents TMDLs based on flow intervals (high, elevated, and stable flows) in the wet season (November through April) and dry season (May through October). The submittal also presents TMDLs based on major storm events (1-year storm, 2-year storm, and peak flow) in the wet season and the dry season. Water quality samples assessed during the TMDL development process were collected under baseflow conditions and across a wide variety of storm flow conditions to represent a full range of stream flow and runoff conditions.

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:**

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

(TMDL Decision Document, Chapter 7)

The draft TMDLs were published for public review on August 9, 2009, and a public information meeting was held on August 28, 2009. 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:**

*Submission 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 nutrients and turbidity for the North and South Forks of Kaukonahua Stream.

**12. Reasonable Assurances:**

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

Not applicable

**13. Other:**

The submittal contains four TMDLs that address ten 303(d) water quality limited segment listings within Hawaii as identified on the State's 2006 CWA Section 303(d) list. Implementation of TMDLs calculated for total nitrogen and turbidity will lead to attainment of criteria for these pollutants.

**TMDLs in this submittal are for the following waterbody-pollutant combinations, based on the 2006 303(d) list:**

- North Fork Kaukonahua – TN (*wet season; dry season*)
- North Fork Kaukonahua - Turbidity (*wet season; dry season*)
- South Fork Kaukonahua - TN (*wet season; dry season*)
- South Fork Kaukonahua - Turbidity (*wet season; dry season*)

*Note: TMDLs are for TN and turbidity, although the listing, which was based on visual assessment, was for TN, NO<sub>3</sub>+NO<sub>2</sub>, TP and turbidity. The listing also contained an unknown decision for total suspended solids. Data reviewed in the TMDL development process revealed attainment of criteria for TP, NO<sub>3</sub>+NO<sub>2</sub>, and total suspended solids.*

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

- N. Fork Kaukonahua Stream (ID 3-6-06.02.2), TN (*wet and dry season*)
- N. Fork Kaukonahua Stream (ID 3-6-06.02.2), NO<sub>3</sub>+NO<sub>2</sub> (*wet and dry season*)
- N. Fork Kaukonahua Stream (ID 3-6-06.02.2), TP (*wet and dry season*)
- N. Fork Kaukonahua Stream (ID 3-6-06.02.2), Turbidity (*wet and dry season*)
- N. Fork Kaukonahua Stream (ID 3-6-06.02.2), TSS (?) (*wet and dry season*)
- S. Fork Kaukonahua Stream (ID 3-6-06.02.1), TN (*wet and dry season*)
- S. Fork Kaukonahua Stream (ID 3-6-06.02.1), NO<sub>3</sub>+NO<sub>2</sub> (*wet and dry season*)
- S. Fork Kaukonahua Stream (ID 3-6-06.02.1), TP (*wet and dry season*)
- S. Fork Kaukonahua Stream (ID 3-6-06.02.1), Turbidity (*wet and dry season*)
- S. Fork Kaukonahua Stream (ID 3-6-06.02.1), TSS (?) (*wet and dry season*)