TERRITORY OF AMERICAN SAMOA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2008

LT Elena Vaouli, Edna Buchan, Barbara Zennaro, Josephine Regis, and Ryan Tuato'o

American Samoa Environmental Protection Agency
American Samoa Government
Pago Pago, American Samoa 96799

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I Overview

The American Samoa Environmental Protection Agency (AS-EPA) has a responsibility to monitor, assess, and protect water quality for the Territory of American Samoa. U.S. federal and American Samoa local environmental legislation and regulations all apply in American Samoa.

This report has been prepared to satisfy the listing requirements of Section 303(d) and the reporting requirements of Section 305(b) and 314 of the Clean Water Act. The report is the principal means by which AS-EPA, Congress, and the public evaluate whether territorial waters meet water quality standards, the progress made in maintaining and restoring water quality, and the extent of remaining problems. The report was prepared in accordance with Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act (USEPA 2005) and 2006 Integrated Report Guidance (IRG). Water quality and associated data from fiscal year 2006 (FY2006) and fiscal year 2007 (FY2007) were used to complete the report.

i Geographical Summary

The Territory of American Samoa lies roughly 14 degrees south of the equator between longitudes 169 and 173 west and about 2,500 miles southwest of Hawaii. The principal islands are Tutuila, Aunu'u, and the Manu'a islands (a cluster of three islands, Ta'u, Ofu and Olosega, located about 65 miles east of Tutuila). Swains Island, a small island with a population of less than 25 and Rose Atoll, an uninhabited atoll about 120 miles east of Tutuila, make up the remainder of the territory. The population of the territory was 57,291 people in the year 2000, of which approximately 97% live on the island of Tutuila.

The islands of American Samoa are volcanic in origin and exhibit the rugged topographic relief common to the Pacific volcanic islands. The climate of the territory is tropical, with uniform high temperatures and high humidity throughout the year. Mean daily temperature during the year varies from about 78 to 82 degrees Fahrenheit. The maximum altitude is about 3,180 ft. above mean sea level at the summit of Lata Mountain on Ta'u Island. Tutuila, with an area of 53 square miles, is the largest island in the territory. It is approximately 20 miles long and ranges in width from less than one mile, to a maximum of 5 miles at the Tafuna-Leone plain. A sharp-crested ridge 1,000 to 2,000 feet high with steeply eroded slopes dominates the entire length of the island.

The steep, variable topography of Tutuila effects localized rainfall amounts. The airport at Tafuna receives about 125 in. (3,180 mm) but Pago Pago receives nearly 200 in (4,090 mm). The crest of the range at Mt. Alava, altitude 1,600 ft. (914 m), receives considerably more than 250 in (6,350 mm). The driest months are June through September and the wettest are December through March, but heavy showers can occur in any month.

ii Territorial Water Quality Review

Fresh Surface Waters

The small, steep watersheds and periodic intense rainfall cause highly variable flows in the nearly 260 miles of American Samoa's perennial streams. Despite these highly variable flows, the streams of American Samoa support a variety of aquatic species, several of which may be harvested for consumption. Designated uses include potable water supplies, support of indigenous wildlife, and aesthetic and recreational enjoyment. Stream water quality is most affected by development along a stream that changes the hydrology and shade along a stream, by development within a watershed that causes erosion and increased turbidity, and by nutrient and bacterial pollution from poorly constructed human and pig waste disposal systems. In some areas, improved service by sewage lines and subsequent decrease in the number of poorly constructed septic systems, as well as improved pig waste management, has improved stream water quality.

Ground Waters

The Tafuna-Leone plain is the site of the majority of American Samoa's residential and business development. The plain is also the site of the majority of the wells that pump ground water for distribution. Because volcanic stratum of Tutuila is highly permeable and does not have a great capacity to filter, there is a constant risk of groundwater contamination as pollution migrates from the surface with rainwater. The greatest threats to groundwater quality in American Samoa are pesticide residues, pollutants associated with automobiles, and pathogen and nutrient pollution from poorly constructed human and pig waste disposal systems. As in many small tropical islands with highly permeable soils, the fresh water aquifer floats on a layer of salt water beneath the ground. Rare dry periods of two- to three-months duration can result in critical drinking water shortages as salt water intrudes on the depleted fresh water lens. The territory suffered its worst drought of historical record in 1974. In 1998 the Territory experienced a drought, but not as severe as the 1974 drought, and there was not a noticeable increase in chlorides in the drinking water.

Wetlands

American Samoa possesses a number of small but very important wetland habitats. The wetlands include coastal mangrove swamps, inland freshwater marshes and some cultivated *taro* fields. Designated uses include support of indigenous aquatic and terrestrial life, fishing, food cultivation and gathering, recreation, flood control and groundwater recharge. Wetlands in the territory are being lost or degraded by urban growth and development as a result of population increase.

Ocean Shoreline

American Samoa has nearly 150 miles of coastline. Fringing coral reefs that surround all of the islands in the territory characterize the embayments and open coastal waters of American Samoa. Designated uses include fishing and food gathering, recreation, support of marine life, mariculture, and scientific investigations. The reefs also provide a buffer for the islands against the impact of waves. The greatest threats to near-shore water quality and to the health of the reefs in American Samoa are from runoff from the land, especially pathogen and nutrient pollution from poorly constructed human and pig waste disposal systems as well as increased turbidity and nutrients from erosion. Solid waste, i.e. improperly disposed of trash, is another source of pollution in open coastal waters and embayments.

Pago Pago harbor is the most industrialized embayment in the Territory, with over a century of development subsequent to the creation of the Territory under the United States. As well as the sources of water quality impairments mentioned above for embayments in general, Pago Pago Harbor is affected by pollution from marina and port traffic, a small shipyard, and in the outer harbor effluent from the tuna canneries and sewage treatment plant. All point sources have National Pollutant Discharge Elimination System (NPDES) permits. Due to the segregation and transportation of cannery waste beyond the inner harbor, better treatment of sewage, and more effective monitoring and prosecution by the Coast Guard of commercial vessels that pollute the harbor, the water quality in the inner harbor has greatly improved in the last decade.

There are special management areas within the Territory's open coastal waters including Fagatele Bay National Marine Sanctuary, the Territorial Marine Park on Ofu and the American Samoa National Park, Ofu segment.

Designated uses of open ocean waters include fishing, scientific investigations, boating, support of marine life, and recreation. While there is a small offshore fishery, it is unknown whether offshore waters are affected by pollution. High strength wastes (high solids, high nitrogen, high phosphorus) from the tuna canneries are dumped in a designated zone approximately five miles offshore. Monitoring shows that the waste has no more than a localized effect, and is in compliance with the canneries Ocean Dumping permit.

II Background

i Total Waters

Table 1. Atlas Description of American Samoa

Topic	Value
Territorial Population	57,291*
Territory Surface Area (square miles)	76.1
Total Miles of Streams (miles)	258
Square Miles of Coral Reef	184
Miles of Ocean Coast	149
Acres of Fresh Water and Tidal Wetlands	396

*From 2000 Census

ii Maps

The Territory of American Samoa is divided into 41 watershed units to simplify management of aquatic and terrestrial resources. Maps with watershed delineations are presented in Appendix B, Figures 1 and 2.

iii Water Pollution Control Program

A. Watershed Approach

The total surface area of American Samoa is very small, only 76.1 sq. miles. This small surface area is divided into 41 watersheds, each with an average size of 1.8 sq. miles (Appendix B, Table 1, Figures 1 and 2). Water quality monitoring, along with coral / fish / benthic monitoring covers 35 out of the 41 watersheds, and also covers >95% of the population of American Samoa. Accordingly, tracking water quality on a watershed scale is fully adequate to meet our monitoring objectives and goals.

B. Point Source Program

There are only seven identified point sources in the Territory. These sources include: Starkist, Samoa Packing COS, Utulei Waste Water Treatment Facility, Tafuna Waste Water Treatment Facility, British Petroleum, Satala Power Plant, and Southwest Marine. Analysis of NPDES monitoring data confirms that overall, these facilities meet the requirements established by individual NPDES permits, and these point sources have negligible impact on water quality.

C. Nonpoint Source Control Program

American Samoa has determined that all threatened or impaired designated uses in the Territory are due to nonpoint sources (NPS). Therefore, watersheds identified as threatened or impaired are considered areas where NPS management measures have not yet improved water quality in the coastal zone. Threatened and impaired watersheds are targeted for enhanced management measures and water quality monitoring.

Full approval of the American Samoa Coastal Nonpoint Pollution Control Program (ASCNPCP) was received July 24, 2003. In FY06 and FY07 program effort was directed towards full implementation of the program plan.

iv Cost / Benefit Assessment

Following are the approximate economic and social costs and benefits of actions necessary to achieve the objective of the Clean Water Act.

Costs:

- Capital investments in municipal facilities in the past 5 years: 12 million dollars
- Capital investments in municipal facilities in the past 10 years: 17 million dollars
- Capital investments in municipal facilities since 1972: 39 million dollars

- Capital investments in industrial facilities in the past 5 years: 1.5 million dollars
- Capital investments in industrial facilities in the past 10 years: 3.5 million dollars
- Capital investments in industrial facilities since 1972: 10 million dollars
- Investments in nonpoint source measures in the past 5 years: 2.5 million dollars
- Investments in nonpoint source measures in the past 10 years: 4.0 million dollars
- Investments in nonpoint source measures since 1972: 6.0 million dollars
- Annual operation and maintenance costs of municipal facilities: 1.0 million dollars
- Annual operation and maintenance costs of industrial facilities: 5.0 million dollars
- Total annual costs of municipal and industrial facilities: 6.5 million dollars
- Annual costs to government to administer water pollution control activities: 2.0 million dollars.

Benefits Information

Benefits to the territory include the protection of the groundwater that supplies the majority of the drinking water for the Territory, the improved quality of Pago Pago Harbor, which has improved recreational and aesthetic enjoyment as well as habitat and coral reef recovery, and the protection of fringing coral reefs from pollution. The coral reefs around American Samoa are used recreationally and supply much of the fresh fish and seafood for the territory. The reefs also provide a buffer for the islands against the impact of waves.

v Special Territorial Concerns and Recommendations

Most special concerns in American Samoa are related to geographical aspects of the islands and cultural aspects of the Samoan people. The main concern is the pressure that the growing population in American Samoa is exerting on natural resources and the local environment. During the past ten years the population of the territory has increased considerably. The population will likely reach 100,000 people within the next 20 years. There is a very limited land base to accommodate this growth. Only one third of Tutuila contains land that is suited for human development (i.e., only 19 square miles have a slope of less than 30%). Development factors such as poor land use permitting, overfishing, and increased production of solid waste and sewage will impact groundwater, streams, and coastal waters.

While local environmental education has made great strides in the last decade, there is still a widespread lack of understanding, acknowledgment, and acceptance of environmental issues that affect the Territory. The need to control litter and pig waste is now somewhat understood. However, the effect of pollution from soil erosion, automobiles and untreated sewage is not recognized as a public health and environmental threat. There is a lack of political and public will to enforce most environmental regulations. The regulations themselves are quite comprehensive, but are not seen as a priority for enforcement.

The Malaeimi valley in central Tutuila has been determined to be a major recharge area for the Tafuna-Leone aquifer, which supplies the majority of the drinking water for the Territory. This valley has been proposed as a Special Management Area, and it is critical that the development in the area is carefully controlled to protect groundwater resources. Unfortunately, the Governor has not yet adopted the proposal.

Lastly, the unique coral reef habitat that characterizes the fringing reefs of American Samoa merits special concern. Modern development, leading to road construction, increased solid waste and sewage, and sedimentation, has caused much indirect stress to the coral reefs, while overfishing has directly impacted the reef environment. The concern worldwide for the health and protection of coral reefs is mirrored here in American Samoa. This has led to directed management and research efforts on how to best protect reef habitats.

III Surface Water Assessment

i. Current Surface Water Monitoring Program

A. Monitoring Program Description

American Samoa has identified the following monitoring objectives to insure our monitoring program is efficient and effective in generating data that serve all management needs:

1. To help establish water quality standards for all types of Territorial waters
2. To determine water quality status and trends for all types of Territorial waters
3. To make designated use support determinations and identify impaired waters for all types of Territorial waters
4. To identify causes and sources of water quality problems for all types of Territorial waters
5. To evaluate the effectiveness of Non Point Source Best Management Practices for restoring impaired designated uses for all types of Territorial waters
6. To evaluate the effectiveness of NPDES permits

AS-EPA has developed a Territorial Monitoring and Assessment Program that includes all 10 elements recommended by USEPA. The program incorporates an efficient combination of monitoring plans and strategies to meet all monitoring objectives. The plans/strategies include fixed station, intensive and screening level monitoring, judgmental, and probability designs. Monitoring plans and strategies include:

1. AS-EPA Nearshore Marine Water Quality Monitoring Plan
2. AS-EPA Stream Water Quality Monitoring Plan
3. American Samoa Ocean EMAP
4. AS-EPA Coral Reef and Reef Flat Monitoring Plan
5. Water Quality Monitoring Strategy for Pago Pago Harbor, American Samoa
6. Sediment Toxicity Study for Pago Pago Harbor, American Samoa
7. American Samoa Coastal Nonpoint Source Monitoring Strategy
8. ASPA Drinking Water Systems Water Quality Monitoring Plan

B. Monitoring Schedule

Waters that will be monitored and assessed during the next 2-year integrated report cycle include:

Streams New stream systems will be assessed according to the plan outlined in the AS-EPA Stream Water Quality Monitoring Plan.
Ocean Shoreline Swimming resources will continue to be monitored according to the AS-EPA Nearshore Marine Water Quality Monitoring Plan. Coral reefs will be monitored according to the AS-EPA Coral Reef Monitoring Plan (to assess the effects of NPS pollution on AS Coral Reef Communities).
Wetlands No new wetland assessments will be conducted in the period leading up the next integrated report.

ii. Status of Plan to Achieve Comprehensive Assessments

The expanded AS-EPA Territorial Water Quality Monitoring and Assessment Program was designed to be statistically rigorous and to satisfy USEPA guidelines for water quality monitoring programs. All categories of water bodies directly monitored by agency efforts were depicted and inventoried in the program. Sampling locations were georeferenced with GPS as a collaborative effort with the American Samoa Coastal Management Program (ASCMP). ASCMP is leading an effort to create a Territorial GIS and has the technical staff and equipment to incorporate georeferenced data into that GIS.

The Recreational Beach Monitoring Program and the Stream Monitoring Program were created to develop and implement comprehensive monitoring in these aquatic habitats. 49 recreational beach locations in American Samoa are monitored, 43 weekly, and 6 monthly. This monitoring effort provides excellent coverage for local beach recreational areas. The stream monitoring program is based on a probabilistic model, where a small population of streams are selected at random from the overall population and monitored for 1 year. After that period, a new population of streams is selected at random for monitoring. The first 4 years of stream monitoring data will be analyzed in FY08, and will provide a robust assessment of stream water quality in American Samoa. Other programs, including the American Samoa Ocean EMAP and the AS-EPA Coral Reef Monitoring Program, monitor ocean water quality and coral reef health, and will allow the Territory to achieve comprehensive assessments with the limited resources available.

iii. Assessment Methodology

A. Assessment Methodology

1. The 2008 Integrated Report

AS-EPA assembled and evaluated all existing and readily available data and information from sampling and analyses completed in FY2006 and FY2007, including data and information relating to the categories of waters specified in 40 CFR§130.7(b)(5).

Sources for data for the 2008 report include:
1. AS-EPA Stream Monitoring Program
2. AS-EPA Beach Monitoring Program
3. ASPA/AS-EPA Groundwater Monitoring Program

4. ASPA NPDES Receiving Waters Monitoring (conducted by CH2MHill)
5. Joint Cannery NPDES Receiving Waters Monitoring (conducted by CH2MHill)
6. AS-EPA Tier II Fish Toxicity Study
7. AS-EPA Ocean EMAP
8. AS-EPA Coral Reef Monitoring Program

For this 2008 report, multiple uses based on current water quality standards have been assessed. The primary uses for water bodies in the territory are:
1. Potable water supplies
2. Support and propagation of indigenous aquatic and terrestrial life
3. Compatible recreation and aesthetic enjoyment
4. Fish and Shellfish consumption

Specific criteria for determining attainment of these individual uses have been incorporated in accordance with Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates (USEPA 1997) and are described below in detail.

2. Assessment Information

The primary unit of assessment used by AS-EPA for this report is the watershed. As indicated previously, the total surface area of American Samoa is very small, only 76.1 sq. miles. This small surface area is divided into 41 watersheds, each with an average size of 1.8 sq. miles (Appendix B, Table 1, Figures 1 and 2). Water quality monitoring, along with coral / fish / benthic monitoring, covers 35 of the 41 watersheds and also covers >95% of the population of American Samoa. Accordingly, tracking water quality on a watershed scale is fully adequate to meet our monitoring and assessment objectives and goals.

Because the watershed is the primary assessment unit, AS-EPA recognizes that data from several locations within a watershed need to be reconciled before assessing the overall use support of waters within that watershed. In this regard, when multiple sources of data within one watershed indicated different levels of use support, AS-EPA chose a conservative approach by selecting the least supporting level for the entire watershed.

Two types of assessment information were utilized: “Evaluated” and “Monitored”. “Evaluated waters” are those for which the use support decision is based on information other than site-specific ambient data. This includes data on land use, location of sources, and best professional judgment of qualified biologists. “Monitored waters” are those for which the use support decision is principally based on current, site-specific, ambient monitoring data believed to accurately portray water quality conditions. The majority of the assessments in the 2008 report utilize monitored data.

Each source of Aquatic Life Use Support (ALUS) data, whether “evaluated” or “monitored” is assigned a Data Quality Level in accordance with Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates (USEPA 1997). Data types are grouped into four categories: biological, habitat, toxicological, and physical/chemical. The rigor of a method within each data type is dictated by its technical

components, spatial/temporal coverage, and data quality (precision and sensitivity). Level 4 data are of the highest quality for a data type and provide relatively high level of certainty. Level 1 data represent less rigorous approaches and thus provide a level of information with a greater degree of uncertainty.

3. Guidelines for Determining Levels of Use Support for Primary Uses.

3.1 Potable Water Supplies

The 2005 American Samoa Water Quality Standards added definitions for Class 1 and 2 streams. Class 1 has drinking water as a designated use. Class 2 does not have drinking water as a designated use. The assessment framework used to use support decisions for Class 1 waters is shown in Table 3 below.

Table 3. Assessment Framework for Determining Drinking Water Use Support

Classification	Monitoring Data		Use Support Restrictions
Full Support	Contaminants do not exceed water quality criteria	and/or	Drinking water use restrictions are not in effect.
Full Support but Threatened	Contaminants are detected but do not exceed water quality criteria	and/or	Some drinking water use restrictions have occurred and/or the potential for adverse impacts to source water quality exists.
Partial Support	Contaminants exceed water quality criteria intermittently	and/or	Drinking water use restrictions resulted in the need for more than conventional treatment with associated increases in cost.
Nonsupport	Contaminants exceed water quality criteria constantly	and/or	Drinking water use restrictions resulted in closures.
Unassessed	Source water quality has not been assessed for contaminants used or potentially present.		

3.2 Support and Propagation of Indigenous Aquatic and Terrestrial Life

Of the four data type categories (biological, habitat, toxicological and physical/chemical), three categories, physical/chemical, biological, and habitat, were used during this reporting period for Aquatic Life Use Support (ALUS) determination. These data are of varying data quality levels as

per the hierarchy of data levels for evaluation of aquatic life use attainment of the 1997 305(b) EPA guidance. The guideline for determining ALUS using more than one type of data is shown in Table 4 below.

Table 4. Determination of ALUS Using More Than One Data Type

ALUS Attainment	
Fully Supporting:	No impairment indicated by all data types.
Fully Supporting but Threatened:	No impairment indicated by all data types; one or more categories indicate an apparent decline in ecological quality over time or potential water quality problems requiring additional data or verification or other information suggest a threatened determination.
ALUS Non-Attainment	
*Partially Supporting:	Impairment indicated by one or more data types and no impairment indicated by others.
*Not Supporting:	Impairment indicated by all data types.
*A determination of *Partially Supporting* or *Not Supporting* could be made based on the nature and rigor of the data and site-specific conditions in the results of the data types. If bioassessment (usually Level 3 or 4) indicates impairment, then a determination of *Not Supporting* should be made.	

i. Physical/Chemical Methods

Analytical parameters analyzed by AS-EPA include Temperature, Salinity, Conductivity, pH, Dissolved Oxygen, and Turbidity. These parameters were assessed by the criteria developed by the USEPA for the "Conventional Category". Much of AS-EPA's Physical/Chemical data is considered Low/Moderate quality, based on technical components and spatial/temporal coverages, as defined by Table 3-4 in the 1997 EPA guidance document Hierarchy of Physical/chemical Data Levels for Evaluation of Aquatic Life Use Attainment. The ASWQS provides standards for these parameters presented in Table A1 (Appendix A).

USEPA guidance (1997) states the importance of incorporating the established criteria for conventionals and toxicants in ALUS determinations and to use the "worst case" approach where multiple parameters are available (USEPA, 1997). Tables 5 and 6 below, describe the decision guidelines used for determining ALUS using Physical/Chemical Methods (conventional data and toxicant data).

Table 5. Decision Guidelines for Conventionals (and additional parameters) Used to Assess ALUS in Freshwater Rivers and in Marine Waters

Degree of Aquatic Life Use Support	**Criteria**
Fully Supporting	For any one pollutant, ASWQS exceeded in ≤10 percent of measurements.
Partially Supporting	For any one pollutant, ASWQS exceeded in 11 to 25 percent of measurements.
Not Supporting	For any one pollutant, ASWQS exceeded in >25 percent of measurements.

Table 6. Decision Guidelines for Toxicants (priority pollutants, metals, chlorine and ammonia) Used to Assess ALUS in Freshwater Rivers and in Marine Waters

Degree of Aquatic Life Use Support	**Criteria**
Fully Supporting	For any one pollutant, no more than 1 exceedance of acute criteria within a 3-year period based on grab or composite samples and no more than 1 exceedance of chronic criteria within a 3-year period based on grab or composite samples
Partially Supporting	For any one pollutant, acute or chronic criteria exceeded more than once within a 3-year period, but in ≤10 percent of samples.
Not Supporting	For any one pollutant, acute or chronic criteria exceeded in >10 percent of samples.

ii. Habitat Assessment and Bioassessment

In FY06 and FY07, the AS-EPA stream monitoring program included a habitat assessment. No stream bioassessment data were collected during this period. Guidelines from the USEPA guidance (1997) for ALUS determination using habitat assessment data are provided in Table 7 below.

In FY06 and FY07, the AS-EPA Coral Reef Monitoring Program included bioassessments. Guidelines from the USEPA guidance (1997) for ALUS determination using bioassessment data are provided in Table 8 below.
United States Environmental Protection Agency (USEPA) aquatic life use support (ALUS) determinations were calculated using benthic and coral community data (EPA, 1997, 2002). Based upon significant correlation results, four biological measures were selected for 'health' assessment and used as biocritera to evaluate water quality. These are coral diversity per unit area, total diversity, community evenness, and the benthic substrate ratio (4). Four rankings were calculated for each site following:

$$\sum \frac{\text{Biological Measure (x)}}{\text{Biological Measure (x) (max value for Geomorphology class)}}$$

The overall ALUS rank, or reef 'health' score, is equally dependent upon the coral and benthic community following:

$$\text{ALUS Rank} = \frac{\text{Average of total coral diversity, diversity per unit area, and community evenness rank} + \text{Benthic substrate rank}}{2}$$

Final ALUS determinations are based from this average as follows; 0.8 – 1.0 = "fully supportive", 0.6 – 0.8 = "partially supportive", and 0.0 – 0.6 = "not supportive" for aquatic life (EPA, 1997, 2002).

To examine temporal trends at each site further ANOSIM tests were conducted between survey years using coral abundance data. These tests of significant community-level changes were depicted using site-based PCA plots that display the most influential gradients between sites and survey years, and directional changes. For the benthic assemblages paired t-tests were employed to compare the benthic substrate ratio between survey years, defined by:

$$= \frac{\text{\% cover of (coral + soft coral + all other coralline algae)}}{\text{\% cover of (macroalgae + turf algae + inhibitive coralline algae)}}$$

Site-based ANOSIM and t-tests were subsequently used to establish United States Environmental Protection Agency (USEPA) aquatic life use support (ALUS) determinations (EPA, 1997, 2002). In accordance with reference material three categories were used for the rankings: fully, partially, and not supportive for aquatic life use support. Houk and Musburger (2007) reported initial assessments for each site. Given the emergence of temporal data, assessments are now based upon directional trends following: 1) if benthic and coral data show statistically significant changes that are attributed to an improved community state then a 'fully supportive' ranking is made, 2) if benthic and coral data show now significant changes then rankings remain the same as reported by Houk and Musburger (2007), and 3) if benthic and coral data show statistically significant changes that are attributed to a declining community state then a 'non-supportive' ranking is made.

Table 7. ALUS Determination Based on Habitat Assessment Data

Degree of Aquatic Life Use Support	Criteria
Fully Supporting	Reliable data indicate natural channel morphology, substrate composition, bank/riparian structure, and flow regime of region. Riparian vegetation of natural types and of relatively full standing crop biomass (i.e., minimal grazing or destructive pressure).
Partially Supporting	Modification of habitat slight to moderate usually due to road crossings, limited riparian zones because of encroaching land-use patterns, and some watershed erosion. Channel modification slight to moderate.
Not Supporting	Moderate to severe habitat alteration by channelization and dredging activities, removal of riparian vegetation, bank failure, heavy watershed erosion or alteration of flow regime.

Table 8. ALUS Determination Based on Bioassessment Data

Degree of Aquatic Life Use Support	Criteria
Fully Supporting	Reliable data indicate functioning, sustainable biological assemblages (e.g. fish, macroinvertebrates, or algae) none of which has been modified significantly beyond the natural range of the reference condition.
Partially Supporting	At least one assemblage (e.g. fish, macroinvertebrates, or algae) indicates moderate modification of the biological community compared to the reference condition.
Not Supporting	At least one assemblage indicates nonsupport. Data clearly indicate severe modification of the biological community compared to the reference condition.

Data levels for the three data type categories were ranked according to the hierarchy provided in the USEPA guidance (1997).

3.3 Recreation and Aesthetic Enjoyment

The current ASWQS lists *Enterococci* and *E.coli* as the microbiological indicators for fresh surface waters and *Enterococci* as the indicator for microbiological quality in marine waters.

Microbiological criteria used to determine use support for waters designated for whole body contact recreation are depicted in Table 10 below. Assessment methodology used in previous reports for determining whole body recreational contact was based on absolute number of single sample density exceedances over the reporting period. Due to the remoteness of many

watersheds limited data are available relative to other watersheds for determining use support. To account for this difference in data availability across watersheds, the assessment methodology was changed from using absolute numbers of single sample density and geometric mean exceedances to percent exceedances only over the 2008 reporting period (Table 10). This methodology is consistent with other States and Territories. However, at the request of USEPA, AS-EPA will consider using a different methodology that includes consideration of geometric mean exceedances for the 2010 report.

3.4 Fish and Shellfish Consumption

Based on the results of the AS-EPA Tier II Fish Toxicity study, the fish consumption advisory continues to exist for fish and shellfish in the inner Pago Pago harbor. The USEPA guidance document (1997) provided classification hierarchy for use support status based on fish/shellfish consumption advisory data as depicted in Table 9 below.

Table 9. Fish/Shellfish Consumption Use Support Determination Based on Advisory Data

Degree of Aquatic Life Use Support	**Criteria**
Fully Supporting	No fish/shellfish restrictions or bans are in effect.
Partially Supporting	"Restricted consumption" of fish in effect. Restricted consumption is defined as limits on the number of meals or size of meals consumed per unit of time for one or more fish/shellfish species. Or, a fish or shellfish ban in effect for a subpopulation that could be at potentially greater risk, for one or more fish/shellfish species.
Not Supporting	"No consumption" of fish or shellfish ban in effect for general population for one or more fish/shellfish species, or commercial fishing/shellfishing ban in effect.

Table 10. Whole Body Contact Recreation (all surface and marine water designations)

Level of Recreation Use Support	**Criteria**			
	Fresh Surface Water	Ocean Waters	Embayments: Pago Pago Harbor, Fagatele Bay, Pala Lagoon	All Other Embayments, Open Coastal Waters
Fully Supporting	*E. coli*: The single sample density of 576 *E. coli* per 100 mL is exceeded in ≤10 percent of measurements. *Enterococci*: The single sample density of 151 *enterococci* per 100 mL is exceeded in ≤10 percent of measurements.	*Enterococci*: The single sample density of 276 *enterococci* per 100 mL is exceeded in ≤10 percent of measurements.	*Enterococci*: The single sample density of 104 *enterococci* per 100 mL is exceeded in ≤10 percent of measurements.	*Enterococci*: The single sample density of 124 *enterococci* per 100 mL is exceeded in ≤10 percent of measurements.
Partially Supporting	*E. coli*: The single sample density of 576 *E. coli* per 100 mL is exceeded in 11 to 25 percent of measurements. *Enterococci*: The single sample density of 151 *enterococci* per 100 mL is exceeded in 11 to 25 percent of measurements.	*Enterococci*: The single sample density of 276 *enterococci* per 100 mL is exceeded in 11 to 25 percent of measurements.	*Enterococci*: The single sample density of 104 *enterococci* per 100 mL is exceeded in 11 to 25 percent of measurements.	*Enterococci*: The single sample density of 124 *enterococci* per 100 mL is exceeded in 11 to 25 percent of measurements.
Not Supporting	*E. coli*: The single sample density of 576 *E. coli* per 100 mL is exceeded in >25 percent of measurements. *Enterococci*: The single sample density of 151 *enterococci* per 100 mL is exceeded in >25 percent of measurements.	*Enterococci*: The single sample density of 276 *enterococci* per 100 mL is exceeded in >25 percent of measurements.	*Enterococci*: The single sample density of 104 *enterococci* per 100 mL is exceeded in >25 percent of measurements.	*Enterococci*: The single sample density of 124 *enterococci* per 100 mL is exceeded in >25 percent of measurements.

4. Guidelines for Determining Consolidated Assessment and Listing Methodology (CALM) Categories

The Consolidated Assessment and Listing Methodology (CALM) categories for the 2008 report were determined from the Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act (USEPA 2005). Each water body type was assigned a CALM category, based on the following descriptions.

- Category 1 Water body meets all designated uses. No use is impaired.
- Category 2 Water body meets some of the designated uses. There is insufficient data to evaluate any remaining designated uses.
- Category 3 There are insufficient data to evaluate any designated uses.
- Category 4a Water body is impaired for one or more designated uses, but a TMDL has already been prepared and completed.
- Category 4b Water body is impaired for one or more designated uses, but a TMDL is not necessary because other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.
- Category 4c Water body is impaired for one or more designated uses, but a TMDL is not necessary because a pollutant does not cause the impairment.
- Category 5 Water body is impaired, and a TMDL is required [303(d) list].

In this report, waters that were assessed as Fully Supporting but Threatened (Threatened) were not considered impaired. Instead, AS-EPA regards threatened waters to be "waters for which monitoring or evaluative data indicate potential water quality problems requiring additional data or verification" (Guidelines for Preparation of the Comprehensive State Water Quality Assessments (305(b) Reports) and Electronic Updates, USEPA 1997). For instance, waters that had minor violations of the American Samoa Water Quality Standards (ASWQS) numeric criteria, or for which data were considered of low quality, or situations where too few samples precluded examining data with respect to the water quality standards, were considered Threatened. Waters assessed as Threatened are not expected to exceed WQS by the next listing cycle.

iv. Streams Water Quality Assessment

Using the guidelines presented above, American Samoa's stream waters were assessed according to levels of use support. This information is presented in Tables A2 through A4 in Appendix A and summarized in Appendix C.

AS-EPA gathered water quality data from streams in the Territory. All data were Monitored Data, no Evaluated Data was used for this report. The assessment of these data covers 116.0 miles out of 257.5 total stream miles (Table C2). The Assessed Goals were to Protect and Enhance Public Health and Protect and Enhance Ecosystems. All other categories were either "Not Applicable" or "Applicable but no data was available" for this reporting period (Table A2). The Major Causes/Stresses identified for this reporting period were Nutrients, Pathogen Indicators, and Habitat Alterations (Table A3). The Major assessed sources of impairment were Collection System Failure,

Intensive Animal Feeding Operations and Habitat Modifications (not-hydromod) (Table A4). Trend analyses will be developed as stream monitoring continues and data accrues.

For the goal Protect and Enhance Ecosystems (Aquatic Life), 116.0 stream miles were assessed. Of those miles, 30.3 were found to be “Fully Supporting”, 41.3 were found to be “Fully Supporting but Threatened”, 30.0 miles were found to be “Partially Supporting”, and 14.4 miles were found to be "Not Supporting". For the goal to Protect and Enhance Public Health, 116.0 stream miles were assessed for Swimming and all found to be “Not Supporting” (Table A2).

The following CALM categories were assigned based on the assessments for Aquatic Life Use Support and Swimming (Tables C2 and C2). Twenty of 31 watersheds were placed in Category 3 (141.5 miles). Eleven watersheds were placed in Category 5 (116.0 miles). Eleven watersheds were classified as "Not Supporting" based on the Swimming, two watersheds were "Not Supporting" based on ALUS

v. Ocean Shoreline Assessment

Using the guidelines presented above, American Samoa’s ocean shoreline waters were assessed according to levels of use support. This information is presented in Tables A5 through A7 in Appendix A and summarized in Appendix C.

For this reporting period, the total sized assessed in shoreline miles was 123.1 out of 149.5 total shoreline miles (Table C2). The Assessed Goals were 1) Protection and Enhancement of Ecosystems (Aquatic Life) and 2) Protection and Enhancement of Public Health (Fish Consumption and Whole Body Contact Recreation/Swimming). All other categories were either “Not Applicable” or “Applicable but no data was available” for this reporting period (Table A5). The Major Causes/Stresses identified for this reporting period were PCBs, Metals (Mercury), Pathogen Indicators and Undetermined NPS Stressors, (Table A6). The Major sources of impairment were Collection System Failure, Intensive Animal Feeding Operations, and Multiple Nonpoint Sources (Table A7). Trend analyses will be developed as the territorial coral reef and marine monitoring program continues and data accrues.

For the goal Protect and Enhance Ecosystems (Aquatic Life) 49.8 miles were assessed. Of those miles, 18.8 miles were found to be “Fully Supporting” , 15.0 miles were found to be “Partially Supporting”, and 16.0 miles were found to be "Not Supporting". For the goal to Protect and Enhance Public Health, 102.6 shoreline miles were assessed for swimming. Of this total, 30.5 miles were “Fully Supporting,” 20.9 miles were “Partially Supporting,” and 51.2 miles were “Not Supporting”. For the goal to Protect and Enhance Public Health, 7.9 shoreline miles were assessed for fish consumption, and 7.9 miles were found to be "Not Supporting" (Table A5).

The following CALM categories were assigned based on the assessments for Aquatic Life Use Support and Swimming (Tables C1 and C2). Six of the 41 watersheds in American Samoa were given a CALM Category 2 (44.8 miles). Nine watersheds

received a Category 3 rating (26.4 miles), while twenty six watersheds received a Category 5 rating (78.3 miles). NOTE: Watershed 24 would have received a Category 4A rating based on the assessment for Fish Consumption (TMDL completed 11 April 2007); however, the watershed received a Category 5 rating based on the Swimming Assessment.

vi. Wetlands Assessment

No wetlands assessments were conducted during this reporting period. All watersheds that contained wetlands (14 out of 41) were placed in CALM category 3 (396.0 acres). Wetlland assessment information if presented in Tables A8 through A10.

vii. Schedule for Establishing TMDLs / 303 (d) List

A TMDL priority list (303(d) list) for Category 5 waters is given in Appendix C.

Most pollutants on the 303 (d) TMDL list are land based pollutants that move down streams to the ocean shoreline. The AS-EPA Non Point Source Pollution Prevention Program is persistently working to reduce pollutant loads to streams, with the ultimate goal of elimination of the pollutant loads. Therefore, all streams have been placed on the high priority list and ocean shorelines on the medium priority list.

viii. Segment/Pollutant Combinations Removed from Year 2006 Section 303(d) List

AS-EPA removed Watershed 24 (Waterbody Type Ocean Shoreline, Pollutants PCBs and Mercury) from the 2006 303(d) list and placed it into Category 4A for the 2008 Integrated Report. The TMDL for this Waterbody (Pago Pago Harbor) was completed and approved by USEPA on 11 April 2007. Arsenic in fish and shellfish tissue is naturally occurring in American Samoa. Arsenic as found in biota from the Inner Harbor does not support a fish advisory. Section 24.0210(2) of the American Samoa Water Quality Standards provides an exemption for naturally occurring toxicants. Consequently, AS-EPA believes that there was a flaw in original listing, and removed arsenic as a pollutant for Watershed 24 on the 2006 303(d) list.

AS-EPA removed Watershed 40 (Waterbody Type Ocean Shoreline, Pollutant Pathogen Indicators) from the 2006 303(d) list and placed it in Category 2 for the 2008 Integrated Report. Previous listing in Category 5 was inconsistent with new assessment methodology used for the 2008 report. Assessment methodology used in previous reports for determining whole body recreational contact was based on absolute number of single sample density exceedances over the reporting period. Due to the remoteness of many watersheds, including Watershed 40, limited data are available relative to other watersheds for determining use support. To account for this difference in data availability across watersheds, the assessment methodology was changed from using absolute numbers of single sample density exceedances to percent exceedances over the reporting period (Table 10). This methodology is consistent with other states and territories.

ix. Results of Probabilistic-based Surveys

The Ocean EMAP Monitoring Plan was developed in 2004 to address the need to evaluate and assess water quality of American Samoa's coastal waters (0.25 mi. from the mean high water mark). Parameters were chosen to measure concentrations of the priority pollutants causing impairment, as well as related ecological indicators. This plan was developed as a collaborative effort between AS-EPA and the National Park of American Samoa (NPSA). Technical assistance was provided by the USEPA, Gulf Ecology Division.

The method selected for this assessment was the USEPA's Environmental Monitoring and Assessment Program (EMAP). This method employs a probabilistic (random) approach to site selection and leads to a statistically rigorous comprehensive assessment. Fifty (50) coastal sampling locations were selected from around American Samoa's main islands (Rose Atoll and Swain's Island were excluded for logistical reasons). Of these fifty (50), thirty (30) were within the marine boundaries of the National Park; the remaining twenty (20) were randomly selected from the entire Territorial region (0.25 mi. from the mean high water mark). Thus, there was a bias to sample sites reflecting the Park's needs. However, the site selection method insures that a Territorial comprehensive assessment will result. As currently designed, this assessment was for one time only. Future assessments will be done as needed. Monitoring parameters included:

Water Quality Indicators

Hydrographic Profile

- Dissolved oxygen
- Salinity
- pH
- temperature
- depth
- light attenuation (PAR, transmittance)
- secchi depth

Water Quality Samples

- dissolved nutrients (ortho-phosphates, nitrites, nitrates, ammonia)
- chlorophyll *a*
- total suspended solids (TSS)
- *Enterococcus*

Sediment Quality

- sediment contaminants (organics and metals)
- sediment TOC
- percent silt/clay

Biota

Fish/Shellfish

- tissue contaminants (organics and metals)
- external pathology (fish)

Benthos

- community structure (standard grab – 0.04 m^2)

Habitat

- SAV (presence/absence)
- Basic habitat type
- Marine debris (presence/absence)

Results are presented in Table 11 below.

Table 11. Attainment Results Calculated Using Probabilistic Monitoring Designs

Project Name	American Samoa EMAP
Target Population	All Territorial estuaries, plus waters extending up to 0.25 miles from shore
Type of Waterbody	Pago Pago Harbor and Open Coastal Waters
Size of Target Population	85
Units of Measurement	km^2
Designated_Use	Aquatic Life Use Support
Percent_attaining	77%
Percent_not attaining	23%
Percent nonresponsive	n/a
Indicator	Physical-chemical-bacteriological
Assessment date	20080115
Precision	90%

x. Cumulative Use Support Summary

Table C1 in Appendix C summarizes use support for data collected only between FY 2006 and FY 2007. To account for historical data not reflected in Table C1, a second assessment for use support was completed using data collected between FY 2003 and FY 2007. This cumulative assessment is summarized in Appendix D. 305b Use Support / CALM Assessment Category Summary (Cumulative: Includes all FY03 to FY07 data). For this summary, the lowest level of use support was used for watersheds where use support determination differed from year to year. In addition, since wetland data was low precision evaluated data, all wetlands were assigned to CALM Category 3.

IV Groundwater Assessment

Tables 12 to 14 report on the quality of the Tutuila, Ofu/Olosega and Ta'u aquifers that provide the majority of American Samoa's ground water resources. Table 12 provides an overview of the most important sources of ground water contamination. Best professional judgment provided the methodology and justification for prioritization of the sources

indicated. In the same table, letters in the third column correspond with the following factors used to select each contaminant source.

A. Human health and/or environmental risk (toxicity)
B. Size of population at risk
C. Location of sources relative to drinking water sources
D. Number and/or size of contaminant sources
E. Hydrogeologic sensitivity
F. Territorial findings, other findings
H. Geographic distribution/occurrence

As well, letters in the fourth column correspond with the contaminants/classes of contaminants considered to be associated with each of the sources that was checked.

A. Inorganic pesticides
B. Organic pesticides
C. Halogenated solvents
D. Petroleum compounds
E. Nitrate
G. Salinity/brine
H. Metals
I. Radionuclides
J. Bacteria
K. Protozoa
L. Viruses

Table 13 provides a summary of American Samoa's ground water protection efforts. AS-EPA and other cooperating government agencies have increased efforts to monitor and protect groundwater resources. Table 14 provides and ground water contaminant summary for the Tutuila aquifer. Tables 15-22 provide the occurrence of particular groups of contaminants for each hydrogeologic setting in American Samoa.

Table 12: Major Sources of Ground Water Contamination

Contaminant Source	Ten Highest Priority Sources	Factors Considered in Selecting a Contaminant Source	Contaminants
Agricultural Activities			
Agricultural chemical facilities			
Animal feedlots	x	A,B,C,D,E,G	E,J,K,L
Drainage wells			
Fertilizer applications	x	A,B,C,D,E,G	E,J,K,L
Irrigation practices			
Pesticide applications	x	A,B,C,D,E,G	A,B
On-farm agricultural mixing and loading procedures			
Land application of manure (unregulated)			
Storage and Treatment Activities			
Land application (regulated or permitted)			
Material stockpiles			
Storage tanks (above ground)			
Storage tanks (underground)	x	A,B,C,D,E,G	D
Surface impoundments			
Waste piles			
Waste tailings			
Disposal Activities			
Deep injection wells			
Landfills	x	A,E	A,B,C,D,E,H,I,J,K,L
Septic systems	x	A,B,C,D,E,G	E,J,K,L
Shallow injection wells			
Other			
Hazardous waste generators			
Hazardous waste sites			
Large industrial facilities			
Material transfer operations			
Mining and mine drainage			
Pipelines and sewer lines	x	A,B,C,D,E,G	E,J,K,L
Salt storage and road salting			
Salt water intrusion	x	A,B,C,D,E,F,G	G
Spills			
Transportation of materials			
Urban runoff	x	A,B,C,D,E,G	C,D
Small-scale manufacturing and repair shops	x	A,C,E,G	C,D,H
Other sources (please specify)			

Table 13: Summary of American Samoa's Ground Water Protection Programs.

Programs or Activities	Check	Implementation Status	Responsible State Agency
Active SARA Title III Program	x	under development	AS-EPA/TEMCO
Ambient ground water monitoring system	x	fully established	ASPA/AS-EPA
Aquifer vulnerability assessment	x	fully established	AS-EPA/ASPA
Aquifer mapping	x	under development	AS-EPA/ASPA
Aquifer characterization	x	under development	AS-EPA/ASPA
Comprehensive data management system	x	fully established	AS-EPA/ASPA
EPA-endorsed Core Comprehensive State Ground Water Protection Program (CSGWPP)	x	under development	AS-EPA/ASPA
Ground water discharge permits			
Ground water Best Management Practices	x	under development	AS-EPA/ASPA
Ground water legislation	x	fully established	AS-EPA/ASPA
Ground water classification	x	under development	AS-EPA/ASPA
Ground water quality standards	x	fully established	AS-EPA
Interagency coordination for ground water protection initiatives	x	fully established	AS-EPA/ASPA
Non point source controls	x	fully established	AS-EPA/ASPA/DOC
Pesticide State Management Plan	x	fully established	AS-EPA
Pollution Prevention Program	x	fully established	AS-EPA
Resource Conservation and Recovery Act (RCRA) Primacy			
Source Water Assessment Program			
State Superfund			
State RCRA Program incorporating more stringent requirements than RCRA Primacy			
State septic system regulations	x	fully established	ASPA/Public Health
Underground storage tank installation requirements	x	fully established	AS-EPA
Underground storage tank remediation fund			
Underground storage tank permit program	x	fully established	AS-EPA
Underground injection control program			
Vulnerability assessment for drinking water/wellhead protection	x	fully established	AS-EPA/ASPA
Well abandonment regulations	x	fully established	AS-EPA/ASPA
Wellhead Protection Program (EPA approved)	x	under development	AS-EPA/ASPA
Well installation regulations	x	fully established	AS-EPA/ASPA
Brownfields 128(a) Program	x	Under development	AS-EPA

Table 14: Ground Water Contamination Summary

Source Type	Number of Sites	Number of sites that are listed and/or have confirmed releases	Number of sites with confirmed ground water contamination	Contaminants	Number of site investigations	Number of sites that have been stabilized or have had the source removed	Number of sites with corrective action plans	Number of sites with active remediation	Number of sites with cleanup completed
NPL	0								
CERCLIS (non-NPL)	0								
DOD/DOE	2	2	0	Petroleum	2	1	2	2	1
LUST	1	1	0	Petroleum	1	0	0	0	0
RCRA Corrective Action	0								
Underground Injection	0								
State Sites	3	3	0	PCB, Petroleum	3	2	3	1	2
Non-Point Sources	0								
Other (specify)	0								

NPL - National Priority List
CERCLIS (non-NPL) - Comprehensive Environmental Response, Compensation, and Liability Information System
DOE - Department of Energy
DOD - Department of Defense
LUST - Leaking Underground Storage Tanks

Table 15. Aquifer Monitoring Data
Hydrogeologic Setting: Tutuila
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	38	**VOC**	1	1	28	28	0	0	0	0	0
		SOC	1	1	27	27	1	1	1	0	0
		NO_3	0	0	37	37	0	0	0	0	0
		Other2	0	0	1	1	28	0	0	0	10

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only

Table 16. Aquifer Monitoring Data
Hydrogeologic Setting: Aoa
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	1	**VOC**	-	-	-	-	-	-	0	0	0
		SOC	-	-	-	-	-	-	0	0	0
		NO_3	0	0	1	1	0	0	0	0	0
		Other2	-	-	-	-	-	-	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only.

Table 17. Aquifer Monitoring Data
Hydrogeologic Setting: Fagasa
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	2	**VOC**	1	1	1	1	0	0	0	0	0
		SOC	1	1	1	1	0	0	0	0	0
		NO_3	1	1	1	1	0	0	0	0	0
		Other2	0	0	0	0	2	0	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only.

Table 18. Aquifer Monitoring Data
Hydrogeologic Setting: Masefau
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	2	**VOC**	0	0	1	1	0	0	0	0	0
		SOC	0	0	1	1	0	0	0	0	0
		NO_3	0	0	2	2	0	0	0	0	0
		Other2	0	0	1	1	0	0	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only.

Table 19. Aquifer Monitoring Data
Hydrogeologic Setting: Vatia
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	1	**VOC**	-	-	-	-	-	-	0	0	0
		SOC	-	-	-	-	-	-	0	0	0
		NO_3	0	0	1	1	0	0	0	0	0
		Other2	-	-	-	-	-	-	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only.

Table 20. Aquifer Monitoring Data
Hydrogeologic Setting: Aunu'u
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	2	**VOC**	2	2	0	0	0	0	0	0	0
		SOC	2	2	0	0	0	0	0	0	0
		NO_3	-	-	-	-	-	-	0	0	0
		Other2	0	0	0	0	2	0	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only.

Table 21. Aquifer Monitoring Data
Hydrogeologic Setting: Ofu/Olosega
Data Reporting Period: FY06and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	0	**VOC**	-	-	-	-	-	-	0	0	0
		SOC	-	-	-	-	-	-	0	0	0
		NO_3	-	-	-	-	-	-	0	0	0
		Other2	-	-	-	-	-	-	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only.

Table 22. Aquifer Monitoring Data
Hydrogeologic Setting: Ta'u-Faleasao/Fitiuta
Data Reporting Period: FY06 and FY07

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l **AND** No detections of parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l **OR** Other parameters are detected at concentrations exceeding the MDLs but less than or equal to the MCLs	One or more parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of wells Requiring Special Treatment1	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate ≤ 5mg/l AND VOC, SOC, and other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Untreated Water Quality Data from Public Water Supply Wells		**VOC**									
		SOC									
		NO_3									
		Other									
Finished Water Quality Data from Public Water Supply Wells	2	**VOC**	-	-	-	-	-	-	0	0	0
		SOC	-	-	-	-	-	-	0	0	0
		NO_3	1	1	1	1	0	0	0	0	0
		Other2	-	-	-	-	-	-	0	0	0

1 All groundwater wells required chlorination treatment.
2 Includes inorganic chemical contaminants only

V Public Participation Process

As part of the integrated report process, AS-EPA announced the completion of the Integrated Water Quality Monitoring and Assessment Report and solicited public comments over a 30-day period. The public announcements were advertised in a local newspaper, and the document was made available to any interested member of the public to review and provide comments. No comments were received.

VI Appendix A

Table A1: Summary of American Samoa Water Quality Standards

Parameters	Fresh Surface Waters	Embayments	Pago Harbor Embayment	Embayments (Fagatele Bay and Pala Lagoon)	Open Coastal Waters	Ocean Waters
Temperature	-not to deviate more than 1.5 ^{o}F from ambient and not to fluctuate more than 1 ^{o}F on an hourly basis or to exceed 85 ^{o}F (except when due to natural causes)					
Light Penetration Depth	not < 65.0 ft (to exceed given value 50% of the time)	not < 120.0 ft (to exceed given value 50% of the time)	not < 65.0 ft (to exceed given value 50% of the time)	not < 130.0 ft (to exceed given value 50% of the time)	not < 130.0 ft (to exceed given value 50% of the time)	not < 150.0 ft (to exceed given value 50% of the time)
PH	6.5-8.6 range (+/- 0.2 pH units of that which would naturally occur)	6.5-8.6 range (+/- 0.2 pH units of that which would naturally occur)	6.5-8.6 range (+/- 0.2 pH units of that which would naturally occur)	6.5-8.6 range (+/- 0.2 pH units of that which would naturally occur)	6.5-8.6 range (+/- 0.2 pH units of that which would naturally occur)	6.5-8.6 range (+/- 0.2 pH units of that which would naturally occur)
Dissolved Oxygen	not < 75% saturation or not <6.0 mg/L	not < 70% saturation or not <6.0 mg/L	not < 70% saturation or not <6.0 mg/L	not < 80% saturation or not <6.0 mg/L	not < 80% saturation or not <6.0 mg/L	not < 80% saturation or not <6.0 mg/L
Turbidity	not > 5.0 NTU	not > 0.35 NTU	not > 0.75 NTU	Fagatele Bay not >0.25 NTU; Pala Lagoon not >0.75 NTU	not > 0.25 NTU	Not > 0.20 NTU
Chlorophyll-a	N/A	not >0.5 ug/L	not >1.0 ug/L	not >0.35 ug/L	not >0.25 ug/L	not >0.18 ug/L
E. coli / Enterococcus	*E. coli*: Single sample density not > 576 *E. coli* per 100 mL. *Enterococci*: Single sample density not > 151 *enterococci* per 100 mL. Geometric mean not > 33 *enterococci* per 100 mL.	*Enterococci*: Single sample density not > 124 *enterococci* per 100 mL. Geometric mean not > 35 *enterococci* per 100 mL.	*Enterococci*: Single sample density not > 104 *enterococci* per 100 mL. Geometric mean not > 35 *enterococci* per 100 mL.	*Enterococci*: Single sample density not > 104 *enterococci* per 100 mL. Geometric mean not > 35 *enterococci* per 100 mL.	*Enterococci*: Single sample density not > 124 *enterococci* per 100 mL. Geometric mean not > 35 *enterococci* per 100 mL.	*Enterococci*: Single sample density not > 276 *enterococci* per 100 mL. Geometric mean not > 35 *enterococci* per 100 mL.

Table A2: Individual Use Support Summary for Streams (miles) Streams = 258

Goals	Use	Size Assessed (miles)	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Insufficient Data
Protect & Enhance Ecosystems	**Aquatic Life**	116.0	30.3	41.3	30.0	14.4	141.5
Protect & Enhance Public Health	**Fish Consumption**	-	-	-	-	-	-
	Shellfishing	-	-	-	-	-	-
	Swimming	116.0	0	0	0	116.0	141.5
	Drinking Water	*	*	*	*	*	*
Social & Economic	**Agricultural**	*	*	*	*	*	*
	Cultural/Ceremonial	*	*	*	*	*	*

Notes:
zero (0) = Category applicable, but size of water in category is zero
dash (-) = Category applicable no data available
Asterisk (*) = category not applicable

Table A3: Total Sizes of Waters Impaired by Various Cause/Stressor Categories
Type of Waterbody: Streams

Cause/Stressor Category	Size of Waters Impaired (miles)
Cause/Stressor Unknown	-
Unknown Toxicity	-
Pesticides	-
Priority Organics	-
Non-point Organics	-
PCBs	-
Dioxins	-
Metals	-
Ammonia	-
Cyanide	-
Sulfates	-
Chloride	-
Other Inorganics	-
Nutrients	38.4
pH	-
Siltation	-
Organic Enrichment/low DO	-
Salinity/TDS/Chlorides	-
Thermal Modifications	*
Flow Alterations	-
Other Habitat Alterations	6.0
Pathogen Indicators	116.0
Radiation	*
Oil and Grease	-
Taste and Odor	-
Suspended Solids	-
Noxious Aquatic Plants (Macrophytes)	*
Excessive Algal Growth	-
Total Toxics	-
Turbidity	-
Exotic Species	-
Other (specify)	*

Notes: zero (0) = Category applicable, but size of water in category is zero
dash (-) = Category applicable no data available
asterisk (*) = category not applicable

Table A4. Total Sizes of Waters Impaired by Various Source Categories
Type of Waterbody: Streams

Source Category	Size of Waters Impaired (miles)
Industrial Point Sources	-
Municipal Point Sources	-
Combined Sewer Overflows	-
Collection System Failure	116.0
Domestic Wastewater Lagoon	*
Agriculture	-
Crop-related sources	*
Grazing-related sources	*
Intensive Animal Feeding Operations	116.0
Silviculture	*
Construction	-
Urban Runoff/Storm Sewers	-
Resource Extraction	*
Land Disposal	-
Hydromodification	-
Habitat modification (non-hydromod)	6.0
Marinas and recreational Boating	*
Erosion from Derelict Land	-
Atmospheric Deposition	-
Waste Storage/Storage Tank Leaks	-
Leaking Underground Storage Tanks	-
Highway maintenance and Runoff	-
Spills (Accidental)	-
Contaminated Sediments	-
Debris and Bottom Deposits	-
Internal Nutrient Cycling (Primary lakes)	*
Sediment Resuspension	*
Natural Sources	-
Recreational And Tourism Activities	*
Salt Storage Sites	*
Groundwater Loadings	*
Groundwater Withdrawal	*
Other Specify	-
Unknown Source	-
Sources Outside State Jurisdiction	*

Notes: asterisk (*) = category not applicable
dash (-) = Category applicable no data available
zero (0) = Category applicable, but size of water in category is zero

Table A5: Individual Use Support Summary for Ocean Shoreline (shore miles) Total Miles of Ocean Shoreline = 149.5

Goals	Use	Size Assessed (miles)	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Insufficient Data
Protect & Enhance Ecosystems	**Aquatic Life**	49.8	18.8	*	15.0	16.0	99.7
Protect & Enhance Public Health	**Fish Consumption**	7.9	-	-	-	7.9	141.6
	Shellfishing	-	-	-	-	-	-
	Swimming	102.6	30.5	*	20.9	51.2	46.9
	Drinking Water	*	*	*	*	*	*
Social & Economic	**Agricultural**	*	*	*	*	*	*
	Cultural/Ceremonial	*	*	*	*	*	*

Notes:
zero (**0**) = Category applicable, but size of water in category is zero
dash (**-**) = Category applicable no data available
Asterisk (*****) = category not applicable

Table A6: Total Sizes of Waters Impaired by Various Cause/Stressor Categories
Type of Waterbody: Ocean Shoreline

Cause/Stressor Category	Size of Waters Impaired (miles)
Cause/Stressor Unknown	--
Unknown Toxicity	-
Pesticides	-
Priority Organics	-
Non-point Organics	-
PCBs	7.9
Dioxins	-
Metals (Mercury)	7.9
Ammonia	-
Cyanide	-
Sulfates	-
Chloride	-
Other Inorganics	-
Nutrients	-
PH	-
Siltation	-
Organic Enrichment/low DO	-
Salinity/TDS/Chlorides	-
Thermal Modifications	*
Flow Alterations	-
Other Habitat Alterations	-
Pathogen Indicators	72.1
Radiation	*
Oil and Grease	-
Taste and Odor	-
Suspended Solids	-
Noxious Aquatic Plants (Macrophytes)	*
Excessive Algal Growth	-
Total Toxics	-
Turbidity	-
Exotic Species	-
Other (Undetermined NPS stressor)	31.0

Notes: zero (**0**) = Category applicable, but size of water in category is zero
dash (**-**) = Category applicable no data available
asterisk (*****) = category not applicable

PCBs and Metals Categories: TMDL was completed in 2007 for Watershed 24, Pago Pago Harbor (7.9 miles)

Undetermined NPS Stressor Category: This category is used for all watersheds determined to be impaired for ALUS by Coral Reef Bioassessments

Table A7. Total Sizes of Waters Impaired by Various Source Categories
Type of Waterbody: Ocean Shoreline

Source Category	Size of Waters Impaired (miles)
Industrial Point Sources	-
Municipal Point Sources	-
Combined Sewer Overflows	-
Collection System Failure	72.1
Domestic Wastewater Lagoon	-
Agriculture	-
Crop-related sources	*
Grazing-related sources	*
Intensive Animal Feeding Operations	72.1
Silviculture	*
Construction	-
Urban Runoff/Storm Sewers	-
Resource Extraction	*
Land Disposal	-
Hydromodification	-
Habitat modification (non-hydromod)	-
Marinas and recreational Boating	*
Erosion from Derelict Land	-
Atmospheric Deposition	-
Waste Storage/Storage Tank Leaks	-
Leaking Underground Storage Tanks	-
Highway maintenance and Runoff	-
Spills (Accidental)	-
Contaminated Sediments	-
Debris and Bottom Deposits	-
Internal Nutrient Cycling (Primary lakes)	*
Sediment Resuspension	*
Natural Sources	-
Recreational And Tourism Activities	*
Salt Storage Sites	*
Groundwater Loadings	*
Groundwater Withdrawal	*
Other Specify (Multiple Nonpoint Sources)	31.0
Unknown Source	-
Sources Outside State Jurisdiction	*

Notes: asterisk (*) = category not applicable
dash (-) = Category applicable no data available
zero (0) = Category applicable, but size of water in category is zero

Table A8: Individual Use Support Summary for Wetlands (acres) Wetlands = 396

Goals	Use	Size Assessed (acres)	Size Fully Supporting	Size Fully Supporting but Threatened	Size Partially Supporting	Size Not Supporting	Size Insufficient Data
Protect & Enhance Ecosystems	**Aquatic Life**	-	-	-	-	-	396
Protect & Enhance Public Health	**Fish Consumption**	*	*	*	*	*	*
	Shellfishing	*	*	*	*	*	*
	Swimming	*	*	*	*	*	*
	Drinking Water	*	*	*	*	*	*
Social & Economic	**Agricultural**	-	-	-	-	-	396
	Cultural/Ceremonial	-	-	-	-	-	396
	Recreational	-	-	-	-	-	396

Notes:
zero (**0**) = Category applicable, but size of water in category is zero
dash (**-**) = Category applicable no data available
Asterisk (*****) = category not applicable

Table A9: Total Sizes of Waters Impaired by Various Cause/Stressor Categories
Type of Waterbody: Wetlands

Cause/Stressor Category	Size of Waters Impaired (acres)
Cause/Stressor Unknown	-
Unknown Toxicity	-
Pesticides	-
Priority Organics	-
Non-point Organics	-
PCBs	-
Dioxins	-
Metals	-
Ammonia	-
Cyanide	-
Sulfates	-
Chloride	-
Other Inorganics	-
Nutrients	-
PH	-
Siltation	-
Organic Enrichment/low DO	-
Salinity/TDS/Chlorides	-
Thermal Modifications	*
Flow Alterations	-
Other Habitat Alterations	-
Pathogen Indicators	-
Radiation	*
Oil and Grease	-
Taste and Odor	-
Suspended Solids	-
Noxious Aquatic Plants (Macrophytes)	*
Excessive Algal Growth	-
Total Toxics	-
Turbidity	-
Exotic Species	-
Other (habitat loss)	-

Notes: zero (**0**) = Category applicable, but size of water in category is zero
dash (**-**) = Category applicable no data available
asterisk (*****) = category not applicable

Table A10. Total Sizes of Waters Impaired by Various Source Categories
Type of Waterbody: Wetlands

Source Category	Size of Waters Impaired (acres)
Industrial Point Sources	-
Municipal Point Sources	-
Combined Sewer Overflows	-
Collection System Failure	-
Domestic Wastewater Lagoon	-
Agriculture	-
Crop-related sources	*
Grazing-related sources	*
Intensive Animal Feeding Operations	-
Silviculture	*
Construction	-
Urban Runoff/Storm Sewers	-
Resource Extraction	*
Land Disposal	-
Hydromodification	-
Habitat modification (non-hydromod), i.e., filling	-
Marinas and recreational Boating	*
Erosion from Derelict Land	-
Atmospheric Deposition	-
Waste Storage/Storage Tank Leaks	-
Leaking Underground Storage Tanks	-
Highway maintenance and Runoff	-
Spills (Accidental)	-
Contaminated Sediments	-
Debris and Bottom Deposits	-
Internal Nutrient Cycling (Primary lakes)	*
Sediment Resuspension	*
Natural Sources	-
Recreational And Tourism Activities	*
Salt Storage Sites	*
Groundwater Loadings	*
Groundwater Withdrawal	*
Other Specify	-
Unknown Source	-
Sources Outside State Jurisdiction	*

Notes: asterisk (*) = category not applicable

Dash (-) = Category applicable no data available

Zero (0) = Category applicable, but size of water in category is zero

VII Appendix B

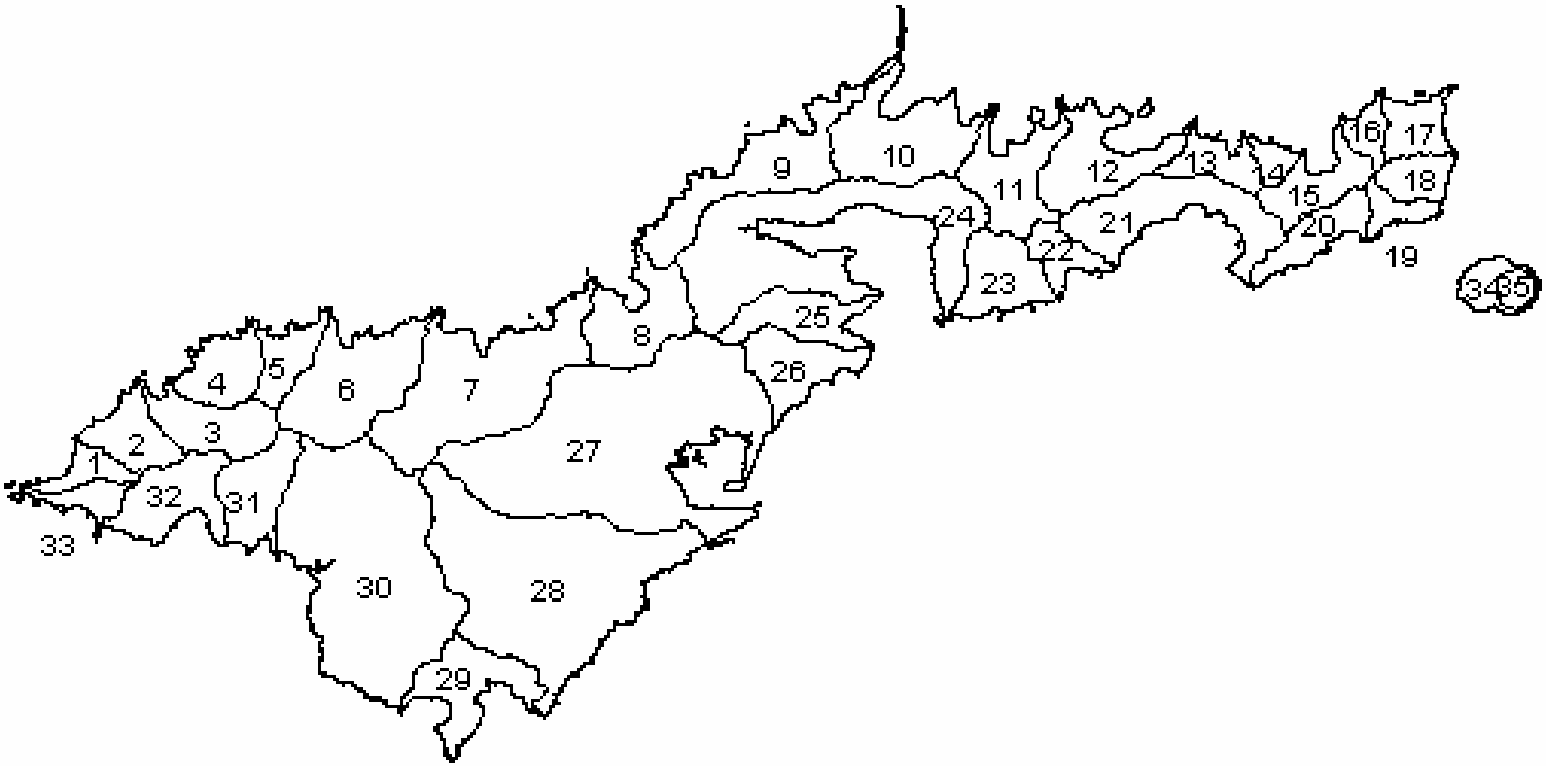
Table B1. Area and aquatic resources information for watersheds of American Samoa.

Watershed	Number	Watershed Area (mi^2)	Perennial Stream Miles	Ocean Shoreline Miles	Wetland Acres	Latitude	Longitude
Poloa	1	0.42	1.6	1.4	0	170° 50' 05.21" W	14° 19' 02.57" S
Fagalii	2	0.80	6.6	1.8	0	170° 49' 34.48" W	14° 18' 24.30" S
Maloata	3	1.08	7.7	0.9	0	170° 48' 59.11" W	14° 18' 14.45" S
Fagamalo	4	1.30	7.3	3.2	0	170° 48' 26.06" W	14° 17' 36.76" S
Aoloau Sisifo	5	0.62	5.1	3.3	0	170° 47' 27.50" W	14° 17' 25.16" S
Aoloau Sasae	6	2.05	15.9	2.6	0	170° 46' 26.61" W	14° 17' 35.02" S
Aasu	7	3.27	16.0	4.5	0	170° 45' 10.66" W	14° 17' 46.61" S
Fagasa	8	1.35	6.0	2.3	0	170° 43' 18.75" W	14° 17' 13.56" S
Fagatuitui	9	2.00	14.4	8.6	0	170° 42' 06.27" W	14° 15' 15.27" S
Vatia	10	1.89	14.4	4.0	34.1	170° 39' 54.64" W	14° 14' 50.92" S
Afono	11	1.29	7.2	3.4	0	170° 38' 53.76" W	14° 15' 22.23" S
Masefau	12	1.42	7.7	4.5	43.1	170° 37' 52.29" W	14° 15' 23.39" S
Masausi	13	0.60	4.5	1.7	0	170° 36' 28.22" W	14° 15' 21.65" S
Sailele	14	0.26	0	1.5	0	170° 35' 48.79" W	14° 15' 23.39" S
Aoa	15	0.85	3.3	1.5	23.5	170° 35' 14.58" W	14° 15' 41.95" S
Onenoa	16	0.30	2.9	0.9	0	170° 34' 48.48" W	14° 14' 58.46" S
Tula	17	0.60	3.6	2.5	8.0	170° 33' 41.80" W	14° 14' 44.54" S
Alao	18	0.52	4.2	0.7	15.5	170° 33' 48.76" W	14° 15' 47.17" S
Auasi	19	0.40	1.8	1.7	0	170° 34' 22.97" W	14° 16' 17.32" S
Amouli	20	0.80	4.3	2.4	0	170° 35' 16.32" W	14° 16' 38.19" S
Fagaitua	21	1.88	14.4	3.7	2.0	170° 36' 47.93" W	14° 16' 05.14" S
Alega	22	0.51	2.8	1.3	0	170° 38' 14.33" W	14° 16' 48.05" S
Laulii-Aumi	23	0.70	6.0	2.0	0	170° 39' 01.88" W	14° 17' 18.20" S
Pago Pago	24	4.00	21.1	7.9	0.6	170° 41' 58.11" W	14° 16' 20.29" S
Fagaalu	25	0.96	6.5	1.3	0	170° 40' 58.92" W	14° 17' 28.92" S
Matuu	26	1.00	7.5	2.2	0	170° 41' 20.33" W	14° 18' 07.33" S
Nuuuli Pala	27	6.70	24.0	8.8	122.9	170° 42' 38.40" W	14° 18' 58.97" S
Tafuna Plain	28	5.50	0	6.9	0	170° 43' 26.26" W	14° 20' 51.99" S
Fagatele-Larson	29	1.23	0	5.7	0	170° 45' 34.39" W	14° 22' 25.49" S
Leone	30	5.67	26.2	4.9	96.8	170° 47' 11.99" W	14° 20' 56.08" S
Afao-Asili	31	1.07	3.2	1.2	0	170° 47' 57.98" W	14° 20' 02.84" S
Nua-Seetaga	32	1.20	7.5	2.6	0	170° 48' 58.35" W	14° 19' 53.87" S
Amanave	33	0.40	3.2	1.8	0	170° 50' 03.81" W	14° 19' 30.26" S
Aunuu Sisifo	34	0.38	0	3.4	111.9[a]	170° 33' 38.94" W	14° 16' 58.98" S
Aunuu Sasae	35	0.22	0	0.1		170° 32' 47.75" W	14° 17' 04.82" S
Ofu Saute	36	1.78	0	5.2	5.9	169° 40' 09.18" W	14° 11' 08.81" S
Ofu Matu	37	1.06	0	4.2	0	169° 39' 28.09" W	14° 09' 56.41" S
Olosega Sisifo	38	1.00	0	4.1	7.4	169° 37' 54.65" W	14° 10' 08.65" S
Olosega Sasae	39	1.20	0	3.4	0	169° 36' 33.94" W	14° 10' 21.85" S
Tau Matu	40	14.20	ND	18.7	36.0	169° 28' 18.79" W	14° 12' 55.30" S
Tau Saute	41	3.30	0.6	6.4	0	169° 27' 35.81" W	14° 14' 57.18" S
Totals		75.78	257.5	149.4	396.0		

[a]represents total wetlands in both watersheds 34 and 35 (Aunuu Sisifo and Aunuu Sasae)

[nd]no data

Figure 1. Map of Tutuila and Aunu'u, American Samoa, and the 35 watersheds that comprise the islands.



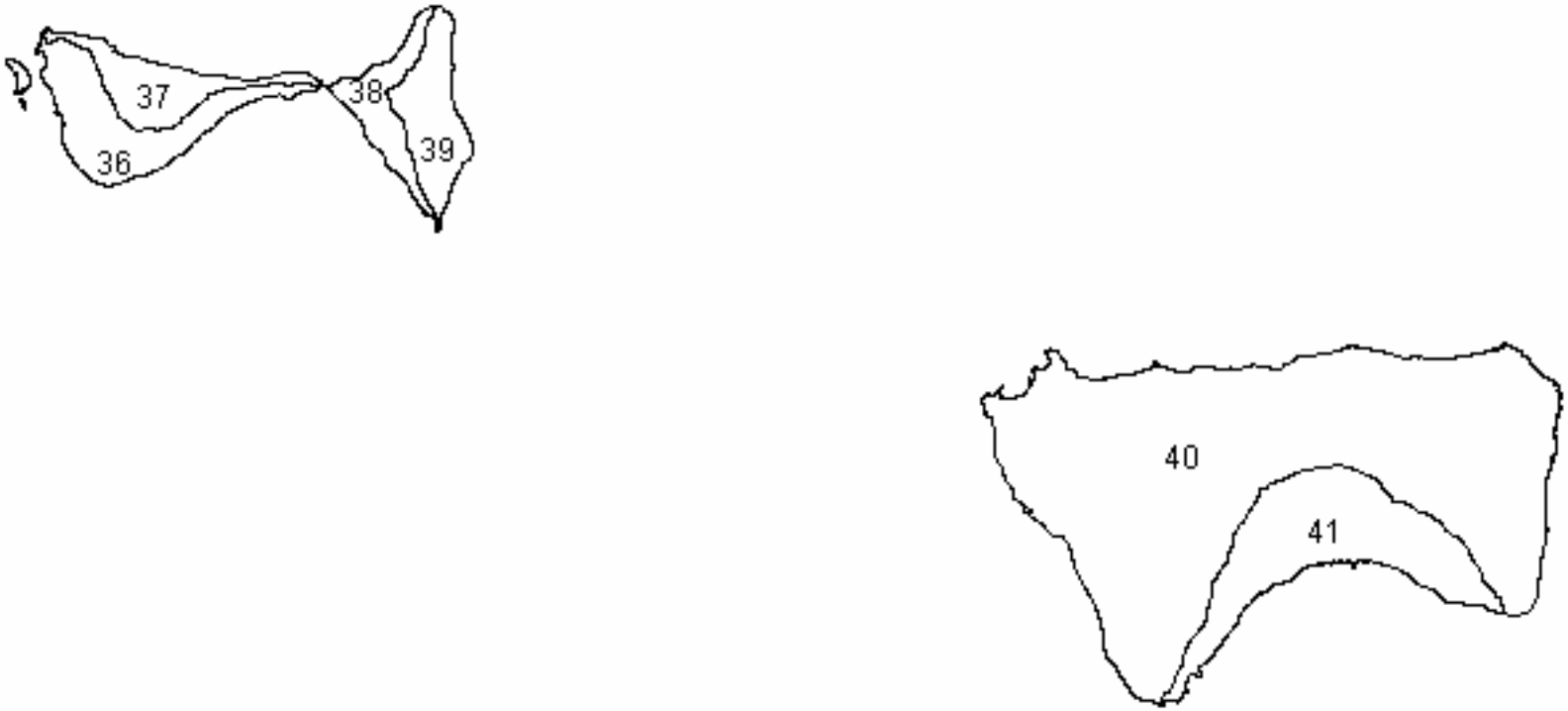


Figure 2. Map of the Manu'a Islands (Ofu, Olosega, and Ta'u), American Samoa, and the 6 watersheds that comprise the islands.

VIII Appendix C

VIII Appendix C. Table C1. 305b Use Support / CALM Assessment Category Summary (FY06 and FY07 data)

WATERSHED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Development Category	mi	mi	pr	pr	pr	pr	mi	in	pr	mi	mi	mi	mi	mi	in	in	in	ex	mi	in	in	mi	ex	ex	ex	in	ex	ex	pr	ex	mi	in	in	ex	pr	mi	pr	mi	pr	pr	pr
Waterbody Type Designated Use																																									
Streams																																									
Aquatic Life	F	F	F	T				T		F									T		N		P				P			T											
Swimming	N	N	N	N				N		N									N		N		N				N			N											
Drinking Water **																																									
CALM Assessment Category	5	5	5	5	3	3	3	5	3	5	3	3	3		3	3	3	3	5	3	5	3	5	3	3	3	5			5	3	3	3								3
Ocean Shoreline																																									
Aquatic Life							N	N	F			F	P		P						N		N		N	N		P	F	P											
Swimming			N					N		N	N	N		P	N	N	F	P	P	N	N	N	N	N	N	P	N	P		N	N	P	P	P		F		F		F	
Fish Consumption																								N																	
CALM Assessment Category	3	3	5	3	3	3	5	5	2	5	5	5	5	5	5	5	2	5	5	5	5	5	5	5*	5	5	5	5	2	5	5	5	5	5	3	2	3	2	3	2	3
Wetlands																																									
Aquatic Life																																									
Agriculture																																									
Cult./Ceremonial																																									
Recreation																																									
CALM Assessment Category										3		3			3		3	3			3			3			3			3				3	3	3		3		3	

***** In watersheds where samples were taken at more than one site, the lowest level of use support was used for the summary.

Legend

Shaded areas indicate watersheds that do not have the waterbody type for evaluating designated use, or, the designated use does not apply for the waterbody in that watershed.

Designated Use Support Level
F - Fully Support (good)
T - Threatened (good)
P - Partially Support (fair)
N - Not Support (poor)

Development Category
pr - pristine
mi - minimal
in - intermediate
ex - extensive

CALM Assessment Category
1 - All Designated Uses (DUs) met
2 - Some DUs met; insufficient data to evaluate remaining DUs
3 - Insufficient data to evaluate any DUs
4 - Water is impaired; TMDL not needed
5 - Water is impaired; TMDL needed

* Watershed 24 (Pago Pago) placed in Category 4a for Fish Consumption (TMDL completed in 2007) but remains in Category 5 for Swimming

** All Waterbodies (Streams) have only ASWQS Class 2 designated uses

Table C2. Size of Surface Waters Assigned to Reporting Categories for 2008

Waterbody Type	Category							Total in Territory	Total Assessed
	1	2	3	4a	4b	4c	5		
Stream, Miles	0.0	0.0	141.5	0.0	0.0	0.0	116.0	257.5 miles	116.0
Ocean Shoreline, Miles	0.0	44.8	26.4	7.9*	0.0	0.0	78.3	149.5 miles	123.1
Wetlands, Acres	0.0	0.0	396.0	0.0	0.0	0.0	0.0	396.0	0.0

CALM Assessment Category

1-- All Designated Uses (DUs) met.

2-- Some DUs met; insufficient data to evaluate remaining Dus.

3-- Insufficient data to evaluate any DUs.

4-- Water is impaired; TMDL not needed.

4a- Impaired or threatened for one or more designated uses but does not require the development of a TMDL because TMDL had been completed.

4b- Impaired or threatened for one or more designated uses but does not require the development of a TMDL because other pollution control requirements are reasonably expected to result in the attainment of the water quality standard in the near future.

4c- Impaired or threatened for one or more designated uses but does not require the development of a TMDL because impairement is not caused by a pollutant.

5-- Water is impaired; TMDL needed.

* Watershed 24 (Pago Pago) placed in Category 4a for Fish Consumption (TMDL completed in 2007) but remains in Category 5 for Swimming

Table C3. 303 (d) and TMDL Priority List 2008

Category 5 Waters (303(d)) High Priority List

Waterbody Type	Watershed Number	Pollutant	Year Listed	Projected TMDL Submittal Date
Streams	2	TN, TP, turbidity, DO / Enterococcus	2004 / 2008	2012
	20	TN, TP, turbidity, DO	2004	2012
	21	TN, TP, turbidity, DO / Enterococcus	2004 / 2008	2012
	24	TN, TP, turbidity, DO	2004	2012
	25	TN, TP, turbidity	2004	2012
	26	TN, TP, turbidity, DO	2004	2012
	27	TN, TP, turbidity, DO / Enterococcus	2004 / 2008	2012
	7	TN, TP	2006	2012
	1	Enterococcus	2008	2012
	3	Enterococcus	2008	2012
	4	Enterococcus	2008	2012
	8	Enterococcus	2008	2012
	10	Enterococcus	2008	2012
	19	Enterococcus	2008	2012
	23	Enterococcus	2008	2012
	30	Enterococcus	2008	2012

Table C3. 303 (d) and TMDL Priority List 2008

Category 5 Waters (303(d)) Medium Priority List

Waterbody Type	Watershed Number	Pollutant	Year Listed	Projected TMDL Submittal Date
Ocean Shoreline	23	Enterococcus / Undetermined NPS Stressor	2004 / 2008	2015
	24	Enterococcus	2004	2015
	25	Enterococcus / Undetermined NPS Stressor	2004 / 2008	2015
	26	Enterococcus / Undetermined NPS Stressor	2004 / 2008	2015
	27	Enterococcus	2004	2015
	3	Enterococcus	2006	2015
	8	Enterococcus / Undetermined NPS Stressor	2006 / 2008	2015
	10	Enterococcus	2006	2015
	12	Enterococcus	2006 / 2008	2015
	14	Enterococcus	2006	2015
	15	Enterococcus/ Undetermined NPS Stressor	2006 / 2008	2015
	21	Enterococcus / Undetermined NPS Stressor	2006 / 2008	2015
	30	Enterococcus/ Undetermined NPS Stressor	2006 / 2008	2015
	32	Enterococcus	2006	2015
	33	Enterococcus	2006	2015
	7	Undetermined NPS Stressor	2008	2015
	11	Enterococcus	2008	2015
	13	Undetermined NPS Stressor	2008	2015
	16	Enterococcus	2008	2015
	18	Enterococcus	2008	2015
	19	Enterococcus	2008	2015
	20	Enterococcus	2008	2015
	22	Enterococcus	2008	2015
	28	Enterococcus / Undetermined NPS Stressor	2008	2015
	31	Enterococcus	2008	2015
	34	Enterococcus	2008	2015

VIV Appendix D

VIV Appendix D. 305b Use Support / CALM Assessment Category Summary (Cumulative: Includes all FY03 to FY07 data)

WATERSHED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
Development Category	mi	mi	pr	pr	pr	pr	mi	in	pr	mi	mi	mi	mi	mi	in	in	in	ex	mi	in	in	mi	ex	ex	ex	in	ex	ex	pr	ex	mi	in	in	ex	pr	mi	pr	mi	pr	pr	pr
Waterbody Type Designated Use																																									
Streams																																									
Aquatic Life	T	N	T	T			P	T	T	T		T	T		T	T	T		T	N	N	T	P	N	P	N	N			T	T	T									
Swimming	N	N	N	N				N		N									N		N		N				N			N											
Drinking Water **																																									
CALM Assessment Category	5	5	5	5	3	3	5	5	2	5	3	2	2		2	2	2	3	5	5	5	2	5	5	5	5	5			5	2	2	3								3
Ocean Shoreline																																									
Aquatic Life			F				N	N	F	T		F	P		P						N		N	T	N	N		P	F	P						F					
Swimming			N					N		N	N	N		P	N	N	F	P	P	N	N	N	N	N	N	P	N	P		N	N	P	P	P		F		F		F	
Fish Consumption	F																				F		F	N	F	F				F						F					
CALM Assessment Category	2	3	5	3	3	3	5	5	2	5	5	5	5	5	5	5	2	5	5	5	5	5	5	5*	5	5	5	5	2	5	5	5	5	5	3	1	3	2	3	2	3
Wetlands																																									
Aquatic Life										F		T			F		P				P			P			T			T				F	F						
Agriculture										F		F			F		F				F			P			T			F				F	F						
Cult./Ceremonial										F		F			F		P				F			P			T			F				F	F						
Recreation										P		T			F						P						T			T				F	F						
CALM Assessment Category										3		3			3		3	3			3			3			3			3				3	3	3		3		3	

***** In watersheds where samples were taken at more than one site, the lowest level of use support was used for the summary.

Legend

Shaded areas indicate watersheds that do not have the waterbody type for evaluating designated use, or, the designated use does not apply for the waterbody in that watershed.

Designated Use Support Level
F - Fully Support (good)
T - Threatened (good)
P - Partially Support (fair)
N - Not Support (poor)

Development Category
pr - pristine
mi - minimal
in - intermediate
ex - extensive

CALM Assessment Category
1 - All Designated Uses (DUs) met
2 - Some DUs met; insufficient data to evaluate remaining DUs
3 - Insufficient data to evaluate any DUs
4 - Water is impaired; TMDL not needed
5 - Water is impaired; TMDL needed

* Watershed 24 (Pago Pago) placed in Category 4a for Fish Consumption (TMDL completed in 2007) but remains in Category 5 for Swimming

** All Waterbodies (Streams) have only ASWQS Class 2 designated uses

Note: In watersheds where use support determination differed from year to year the lowest level of use support was used for this summary

Note: Wetland data was low precision evaluated data, therefore, all wetlands were assigned to CALM Category 3.