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APPENDIX A

Background Document Summaries

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Appendix A-1

**Brief Synopses of Each of the Documents Mentioned in
Introduction, Table I-1**

1. Federal Water Pollution Control Act of 1972, Section 208
Required development by each state of “208 water quality plans” that focused primarily on wastewater planning. The Act as a whole is often referred to as the “Clean Water Act” and was originally established by Congress in 1948.
2. *Technical Report No. 2: Nonpoint Source Pollution in Hawaii: Assessments and Recommendations*
Provided an overview (with maps) of each island’s potential nonpoint sources.
3. Coastal Zone Management Act of 1972
Established federal parameters and funding for a coastal protection and enhancement program to be implemented by a voluntary agreement with individual states and territories.
4. “Coastal Zone Management,” Chapter 205A, Hawaii Revised Statutes
Legal basis for CZM program in Hawaii. The Hawaii Program was developed under the 1972 federal law as amended; when the Hawaii Program was approved by the federal agency, it could receive implementation funds. However, it also, as an “approved program,” has become the recipient of Congressional directives which are not voluntary, such as the §6217 polluted runoff statute.
5. Federal Water Pollution Control Act of 1977, Section 319
Section 319, “Nonpoint Source Management Program,” added to the Clean Water Act in 1987, recognized that nearly 40 years had passed since the Clean Water Act was established but the nation’s waters were still not clean. It required a status report concerning the quality of each state’s waters and established in EPA a grants program for projects that demonstrate techniques to reduce polluted runoff or expands the use of such techniques.
6. *Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems and Hawaii’s Nonpoint Source Water Pollution Management Plan*
These two reports were prepared by DOH-PRC to fulfill the requirement of Section 319 for a status report on the quality of Hawaii’s waters.
7. Coastal Zone Act Reauthorization Amendments of 1990, Section 6217
The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) required that Hawaii, as a State with an approved CZM program, develop and implement a coastal nonpoint pollution control program (CNPCP). The program was to implement a set of 56 “economically achievable” management measures, referred to as the “6217 (g)

measures,” which were set forth in an EPA guidance (Item 8 below) and grouped into six areas: agriculture, forestry, urban areas, marinas, hydromodification, and wetlands and streams. These measures were intended to be the basis for the state coastal nonpoint pollution control program, and states were required to either implement all of the measures in the guidance, or justify why they should not be implemented or why alternative measures have been developed. In addition to the management measures guidance, the CNPCP needed to conform to a Program Development and Approval Guidance published by NOAA.

CZARA allowed a period of several years for states to put in place a polluted runoff program. It also called, however, for reductions in federal funds available to the water quality agency and the coastal zone management agency beginning at 10% in fiscal year 2003 to a maximum of 30% in 2008 as a penalty for not having an approved program by July 1, 2003.

8. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, developed by the U.S. Environmental Protection Agency, and *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, developed by the U.S. Department of Commerce, National Oceanic & Atmospheric Administration and U.S. Environmental Protection Agency

These two documents were created to provide more detailed direction to state water quality and coastal zone management agencies as they developed their programs under CZARA. The management measures are goal statements, which are to be implemented through the application of best management practices. The guidance documents are not regulations but have been used by the federal agencies as yardsticks against which to measure state §6217 programs when they apply for approval.

9. *§6217 in a Nutshell: Summary of the §6217 Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* and *§6217 in a Nutshell: Summary of the §6217 Program Development and Approval Guidance*

These synopses of the guidance documents were prepared by the Hawaii Coastal Zone Management Program to make them more user-friendly for focus group members and other interested citizens. They were distributed at the initial series of public meetings for development of *Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan* (CNPCP) in 1993.

10. “Nonpoint Source Pollution Management and Control,” Chapter 342E, Hawaii Revised Statutes

Until 1993, when Chapter 342E was enacted, there was no specific authority in Hawaii law regarding nonpoint source pollution. For the purposes of *Hawaii’s Nonpoint Source Water Pollution Management Plan* and Section 319 activities, EPA accepted as sufficient legal authority the Governor’s designation of the Department of Health as the State Water Quality Management Agency as well as the statutory requirement of the Director of that agency to prevent, control, and abate water pollution within the state.

Chapter 342E defines such terms as “Nonpoint source pollution,” “Point source pollution,” and “State waters.” It also legally establishes within the Department a nonpoint source pollution management and control program (although the program had existed since 1990). The Director of the Department of Health is given a large number of additional powers and duties by this statute, although all of them may be delegated except the power to make rules.

The chapter also gives the Director certain powers and responsibilities regarding enforcement of any rule adopted under the chapter; it provides for civil penalties for violation of any such rules or obstructing any investigations under such rules. Although the listed powers and duties in the statute cover a very complete nonpoint source pollution control program, the State has not yet adopted rules to implement the items in the list. Nevertheless, a number of the powers and duties have been carried out by the Department’s Polluted Runoff Control Program.

11. *Hawaii’s Coastal Nonpoint Pollution Control Program: Management Plan* (CNPCP), Hawaii Office of State Planning - prepared for the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce and U.S. Environmental Protection Agency (EPA).

Hawaii’s Coastal Nonpoint Pollution Control Program: Management Plan is the state’s extensive response to the guidances and other requirements of CZARA. A chapter is devoted to each land or water use category, giving a brief description of the use in Hawaii, the types of polluted runoff associated with the use, and existing programs addressing those types of polluted runoff. Each management measure for the use is described with its specific applicability. Of the 56 management measures in EPA’s guidance, 49 are adopted in the CNPCP plan (some with minor amendments to make them conform to Hawaii’s conditions) while seven EPA measures are replaced with alternative measures and justifications given. In addition, Hawaii added a management measure addressing golf course development and maintenance. Each chapter also includes a section showing how the management measures would be implemented, and a section on regulatory and non-regulatory mechanisms backing up the management measures.

Along with recommendations for implementing specific management measures, the CNPCP plan also includes general recommendations that cross all sectors. These general recommendations include mechanisms for strengthening existing regulations, improving coordination and enforcement among State, federal, and county agencies, continuing to develop and implement BMPs to control or reduce polluted runoff, and supporting and facilitating community-based watershed management efforts.

In addition, responding to requirements in CZARA and the guidances, the CNPCP plan includes sections covering Critical Coastal Areas and additional management measures, administrative coordination, and monitoring and tracking techniques.

12. *Nonpoint Source Program and Grants Guidance for Fiscal Year 1997 and Beyond* prepared by the U.S. Environmental Protection Agency

This document provides a new framework in which states have the “flexibility to implement their [319] programs in a manner that maximizes their ability to achieve [EPA’s] long-term vision,” which is “All states are implementing dynamic and effective nonpoint source programs designed to achieve and maintain beneficial uses of water.”

The Guidance directs all states to review their Section 319 nonpoint source management programs and revise them as appropriate to reflect nine “key elements” within the state program. The “key elements,” listed on page 2-8, were developed jointly by the EPA and the states to describe the components of effective nonpoint source programs.

13. *Hawaii’s Nonpoint Source Management Program Update* (Preliminary Draft) prepared by the Hawaii Department of Health with the Hawaii Coastal Zone Management Program

This document is the first draft of DOH-Price’s response to the EPA 1997 “Guidance” (see above). It provides an assessment of agency and private activities in Hawaii which fulfill the nine “key elements” and revises the 1990 Hawaii’s Nonpoint Source Water Pollution Management Plan. After public meetings and a public comment period in July and August, which resulted in additional revisions, it was submitted to EPA for review as *Hawaii’s Nonpoint Source Management Program Update - Draft*.

EPA indicated that the revised document and the PRC program met the requirements for recognition as a “Tier I” state. Tier I Nonpoint Source States are considered by the EPA to (1) have incorporated the “key elements” into its revised polluted runoff control program and (2) have a proven track record of effectively implementing nonpoint source programs. The benefits of such recognition include priority for multi-year grant work plans, streamlined review of grants applications, increased technical assistance, reduced reporting requirements, and reduced oversight by the EPA.

The document submitted to EPA, which included an outline of CZARA implementation for Hawaii, served as the base document from which *Hawaii’s Implementation Plan for Polluted Runoff Control* was developed.

14. *Clean Water Action Plan: Restoring and Protecting America’s Waters* (CWAP) prepared by U.S. Environmental Protection Agency and U.S. Department of Agriculture

The CWAP focuses on four major action areas to achieve clean water goals: a watershed approach, strong federal and state standards, natural resource stewardship, and informed citizens and officials. The federal government commits itself in the Plan to support locally led partnerships with a broad array of members to meet clean water and public health goals, to increase financial and technical assistance, and to help restore and sustain the health of aquatic systems on a watershed basis. A large number of “key actions” with specified actors and timeframes are included for the major action areas.

State programs focus on unified watershed assessments and watershed restoration action strategies; the intent of the latter is to restore watersheds that are not meeting clean water and natural resource goals. Hawaii’s program in this regard is described in Chapter 5.

15. *The Hawaii Unified Watershed Assessment* prepared by Hawaii Department of Health, Natural Resources Conservation Service, and Office of Planning

A federal guidance issued in May 1998 directed all states to begin implementation of the CWAP by preparing a “Unified Watershed Assessment” (UWA) that was to be completed by October 1998. The Hawaii UWA used information from existing efforts within the State to place all watersheds into one of four categories. The watersheds included in category I were prioritized for the purpose of distribution of federal funds appropriated specifically for the effort. The Hawaii UWA appears in full as Appendix C.

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Appendix A-2
“Hawaii’s Nonpoint Source Water Pollution Management Plan” (1990)
and
“Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems” (1990)

In response to the directives in Section 319 of the Clean Water Act, the Hawaii Department of Health developed two reports that were published in November 1990. One, *Hawaii’s Nonpoint Source Water Pollution Management Plan*, focused on best management practices, assistance programs, and program milestones. The other, upon which the management plan was built, was *Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems* which reviewed the nature, cause, effect, and extent of nonpoint source pollution in Hawaii, and identified the State’s Water Quality Limited Segments.

The Water Quality Limited Segments are water bodies in the state which cannot reasonably be expected to attain or maintain State Water Quality Standards without additional action to control nonpoint sources of pollution. The Assessment also identified categories of nonpoint source pollution contributing to the Water Quality Limited Segments. It included a targeting scheme that grouped the segments by the likelihood that actions to reduce nonpoint source pollution would improve the segments and within these groups by their level of use and value to the community.

The “*Assessment*” was based not only on interviews with knowledgeable persons and on-site investigations, but also on previous work done under the auspices of the Department of Health, especially in the “*Technical Report No. 2 – Nonpoint Source Pollution in Hawaii: Assessments and Recommendations.*” This report, done in 1978 under the auspices of the “208 Water Quality Program,” contained an island-by-island assessment of areas that contributed to nonpoint source pollution and a series of maps. A revision of the maps is included in the “*Assessment.*”

Public review of the “*Assessment*” occurred in late 1987, after which it was amended and used to help develop the “*Nonpoint Source Water Pollution Management Plan.*”

The “*Nonpoint Source Water Pollution Management Plan*” had five components: assistance programs, activities of Hawaii’s Technical Committee on Nonpoint Source Pollution Control, public information and education, priority projects, and monitoring. These components are discussed below. The “*Plan*” not only targeted Water Quality-limited segments identified in the “*Assessment*” but also supported programs that addressed statewide nonpoint source problems.

A section on Best Management Practices (BMPs) was included in the “*Nonpoint Source Water Pollution Management Plan.*” These are methods, measures, and practices used to prevent or reduce pollution, in this case water pollution. For this purpose, BMPs are applied on land to address nonpoint sources. Although they can be applied individually, they are usually more effective in combination. This section includes a matrix that correlates BMPs used in

Hawaii with nonpoint sources of pollution that affect Hawaii’s waters; also included are descriptions of the specific BMPs.

The section on assistance programs gives brief descriptions of the goals and activities of agencies and organizations that provided assistance with nonpoint source pollution problems; a contact name and number were also given.

The Hawaii Technical Committee on Nonpoint Source Pollution Control was first developed as a Department of Health Advisory Committee during the Clean Water Act Section 208 planning process. The Technical Committee included representatives of Federal and State agencies conducting nonpoint source-related activities and, as a nucleus, the Soil and Water Conservation District representatives, who provided local-level input. The Committee provided review for both the “*Assessment*” and the “*Nonpoint Source Water Pollution Management Plan*.” It also conducted public information education activities assisting in interagency coordination and interaction, reviewed programs, prioritized projects, and provided program revision recommendations.

The Department of Health’s education information activities proposed in the “*Nonpoint Source Water Pollution Management Plan*” included a coloring book, a video program, a quarterly newsletter, an annual Water Week, a poster, and a classroom and field guide for use by teachers.

The section on priority nonpoint source management projects included both ongoing and proposed research, as well as securing permanent state funding for the program and developing memoranda of understanding with other agencies.

At the time the “*Nonpoint Source Water Pollution Management Plan*” was published, the Department of Health was just beginning a revised water quality monitoring program called “Hawaii’s Blue Waters,” supported by increased state funding. This revised program included special designs for monitoring nonpoint sources and planned to monitor water quality limited segments for toxics in the water column, sediments, and tissues of marine organisms. The monitoring was intended to develop baseline levels, especially for metals. Unfortunately, funding for the “Hawaii’s Blue Waters” program was not maintained at the initial level, coastal water monitoring frequency diminished greatly, and special projects could not be funded. The “*Nonpoint Source Water Pollution Management Plan*” was unable to identify funding sources beyond those provided by EPA for the Section 319 program.

Appendix A-3

“Nonpoint Source Pollution Management and Control,” Hawaii Revised Statutes, Chapter 342E (1993)

Until 1993, when Act 345 (codified as Chapter 342E, Hawaii Revised Statutes) was passed by the Legislature and approved by the Governor, Hawaii law had no specific authority in regarding nonpoint source pollution. The facts that the Governor had designated the Department of Health as the State Water Quality Management Agency and that the Director of that agency was required by state statute to prevent, control, and abate water pollution within the state were accepted by the Environmental Protection Agency as sufficient legal authority for the State to carry out Clean Water Act Section 319 activities.

Chapter 342E defines such terms as “Nonpoint source pollution,” “Point source pollution,” and “State waters.” It establishes within the Department a nonpoint source pollution management and control program (although the program had existed since 1990). The Director of the Department of Health is given a large number of additional powers and duties by this statute, although all of them may be delegated except the power to make rules. Duties include:

- ♦ a general charge to “[R] reduce, control, and mitigate nonpoint source pollution”;
- ♦ adopting rules necessary for the purpose of the chapter (rules may include water quality standards for specific areas, types of nonpoint source discharges, or management measures to control nonpoint source pollution “allowing for varying local conditions”);
- ♦ developing necessary plans and other actions to carry out any federal legal directions regarding the management or mitigation of nonpoint source pollution; and
- ♦ working cooperatively with other government agencies to facilitate the monitoring and updating of the list of Water Quality Limited Segments.

Other required activities are derived from Section 319 of the Clean Water Act, including identifying categories of nonpoint source pollution impacting Water Quality Limited Segments and facilitating implementation of Best Management Practices.

Identification of both public and private sources of expertise, convening statewide and regional public forums, providing funding for demonstration of the best available technologies and BMPs, and for public initiatives are also duties under this statute. Lastly, environmental assessments and environmental impact statements are to be reviewed by the Department of Health for the effects a proposed action would have on nonpoint source pollution in the project area. Chapter 342E also gives the Director certain powers and responsibilities regarding enforcement of any rule adopted under the chapter and provides for civil penalties for violation of any such rules or obstructing any investigations under such rules.

However, although the listed powers and duties in the statute cover a very complete nonpoint source pollution control program, the State has not yet adopted rules to implement the chapter. Nevertheless, a number of the powers and duties have been carried out by the Department’s Polluted Runoff Control Program.

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Appendix A-4

“Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan” (1996)

Background

Hawaii’s Coastal Zone Management Program was formally adopted by the state Legislature in 1977 (Hawaii Revised Statutes, Chapter 205A) as a response to the federal Coastal Zone Management Act of 1972 (P.L. 104-150). Chapter 205A builds on existing authorities and relies on a network of authorities and partnerships for implementation; the Coastal Zone Management Program has working relationships with all levels of government as well as with various public and private sector organizations and the general public.

The Hawaii Coastal Zone Management Program has four major elements: (1) federal coordination and state initiatives; (2) state and county coordination; (3) public participation and education; and (4) administration. The first element includes the coastal nonpoint pollution control program developed under Section 6217 of the Coastal Zone Act Reauthorization Amendments. The program was to implement a set of management measures, referred to as the “6217 (g) measures,” set forth in guidance published by Environmental Protection Agency. In addition to the management measures guidance, the “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” to be produced by the program needed to conform to a Program Development and Approval Guidance published by the National Oceanic & Atmospheric Administration.

Shortly after the Coastal Zone Act Reauthorization Amendments were passed¹, the Hawaii Coastal Zone Management Program began working closely with the Department of Health Environmental Planning Office to coordinate the development of a Coastal Nonpoint Pollution Control Program management plan in collaboration with federal, state, and county agencies, non-government organizations, and individuals. A draft management plan, identifying existing and proposed regulatory and non-regulatory mechanisms to reduce polluted runoff to improve coastal water quality and including recommended actions to facilitate effective implementation, went out for public review in December 1995. By June 1996, the completed draft “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” was submitted to the National Oceanic & Atmospheric Administration and the Environmental Protection Agency for review and approval.

Description of “Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan” and its development

The Environmental Protection Agency guidance contains 56 management measures grouped into six areas: agriculture, forestry, urban areas, marinas, hydromodification, and wetlands and streams. These measures are intended to be the basis for the state coastal nonpoint pollution control program, and states are required to either implement all of the measures in the

¹ Section 6217 of Coastal Zone Act Reauthorization Amendments was not actually an amendment of the Coastal Zone Management Act of 1972, but it applied to all states with approved Coastal Zone Management Programs, which included Hawaii.

guidance, or justify why they should not be implemented or why alternative measures have been developed. The measures are to be implemented through regulatory or non-regulatory nonpoint source pollution control mechanisms activated by the application of Best Management Practices (BMPs) applied to land and water.

“*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” is the state’s extensive response to the guidances and other requirements of section 6217 of the Coastal Zone Act Reauthorization Amendments. The Executive Summary (pages i-ii) lists, by land or water use category, the management measures and highlights recommended implementing actions to assure effective implementation. A chapter is devoted to each land or water use category, giving a brief description of the use in Hawaii, the types of polluted runoff associated with the use, and existing programs addressing those types of polluted runoff. Each “6217 (g) guidance” management measure for the use is described with its specific applicability. Of the 56 management measures in the Environmental Protection Agency’s guidance, 49 are adopted (some with minor amendments to make them conform to Hawaii’s conditions) while seven Environmental Protection Agency measures are replaced with alternative measures and justifications given. In addition, Hawaii added a management measure addressing golf course development and maintenance to bring the total to 57. Each chapter also includes a section showing how the management measures would be implemented, and a section on regulatory and non-regulatory mechanisms backing up the management measures.

Along with recommendations for implementing specific management measures, “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” also includes general recommendations that cross all sectors. These general recommendations include mechanisms for strengthening existing regulations, improving coordination and enforcement among State, federal, and county agencies, continuing to develop and implement BMPs to control or reduce polluted runoff, and supporting and facilitating community-based watershed management efforts.

In addition, responding to requirements in Section 6217 of the Coastal Zone Act Reauthorization Amendments and the guidances, “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” includes sections covering Critical Coastal Areas and additional management measures, administrative coordination, and monitoring and tracking techniques.

The first of these sections lists threatened or impaired coastal waters, based on DOH’s list of Water Quality Limited Segments (which were 16 waterbodies at the time, but now include 18) and six other water bodies identified as having water quality problems, due at least in part to polluted runoff. Because of a lack of staffing and funding, “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” did not complete all of the guidance requirements for the first section. Requirements omitted were: identification of the specific land or water uses contributing to the impaired or threatened coastal waters; delineation of “critical coastal areas” adjacent to threatened and impaired waters where new or expanding land or water uses will contribute to future threat or impairment of coastal waters; and development and implementation of additional management measures. On the latter point, Hawaii’s position is that the impacts of the management measures already identified in the “*Hawaii’s Coastal*

Nonpoint Pollution Control Program Management Plan” would need to be monitored for a period of several years before additional management measures are considered.

The chapter on monitoring and tracking lays out an ambitious water quality monitoring program under the auspices of the Clean Water Branch of DOH. Besides an expanded program of chemical parameter monitoring, it includes a number of biomonitoring techniques. The chapter addresses tracking of the implementation of management measures. Although the Plan notes that staff and funding constraints would probably prohibit implementation, it suggests the use of “site inspectors”/“extension agents” who would provide technical assistance to land users and also make sure that installed management measures were operating properly.

“*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” was developed between 1993 and 1996; a working group (addressing broader issues of program development and those issues which cut across all land use categories) and five focus groups (agriculture, forestry, urban, marinas, and streams systems) were formed over the three-year period. The groups were informal advisory groups with voluntary membership, recruited from as broad a range of interests as possible. Because of budget constraints, all meetings were held in Honolulu; however, efforts were made to involve persons across the state by distributing meeting notes to mailing lists. The working group met 10 times during the period, while focus groups met anywhere from 6 to 16 times; in addition, the agriculture focus group formed subgroups which met frequently outside the regular meetings.

There were also three sets of public meetings around the state; a set of 13 introductory meetings was held during August and September 1993. A previously developed mailing list, used along with newspaper advertising to publicize the 1993 meetings, was supplemented by the attendees at these meetings and others who expressed interest, arriving at a total list of more than 1200 names. In June 1995, a second round of seven meetings to provide an update and progress report and collect further community input was held around the state. A draft Plan was distributed in December 1995; and in January and February 1996, another round of seven meetings was conducted to summarize the key recommendations and provide an opportunity for verbal comments. Both verbal and written comments were reviewed extensively in preparing the final draft document submitted to the federal government.

Note: In the process of developing “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*,” five background and informational reports were developed by consultants to the Coastal Zone Management Program. These include:

- ♦ Background Studies of Nonpoint Source Pollution in the State of Hawaii;
- ♦ Review and Inventory of Regulatory and Non-Regulatory Nonpoint Source Pollution Control Mechanisms in Hawaii;
- ♦ *Final Contract Report: State Definition and Delineation of Watersheds*;
- ♦ *Urban Nonpoint Source Pollution Control in the Pacific Islands: Applicability of Pollution Control BMPs* and
- ♦ *Riparian Nonpoint Pollution Control in Hawaii: Impacts and Policy Recommendations*.

Full citations for these studies are given in the “References” section of this document.

Federal Conditional Approval and “Findings”

In June 1998, after extensive discussion between the State and the federal agencies, the National Oceanic & Atmospheric Administration and the Environmental Protection Agency issued “*Findings for Hawaii’s Coastal Nonpoint Pollution Control Program*” which provided conditional approval of “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan,*” with conditions which the State must meet within one to five years. While the State is moving forward with development of a implementation plan based on “*Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan*” (the next step in the Coastal Zone Act Reauthorization Amendments process), the Coastal Zone Management Program continues to have concerns about:

1. the economic achievability of several of the federally mandated management measures,
2. the ability of the Program to address the conditions in the time frames provided given current funding levels, and
3. a potential conflict between County home rule and the federal agencies’ expectation that the State will have oversight or back-up enforcement authority over all aspects of implementation statewide.

The “*Findings for Hawaii’s Coastal Nonpoint Pollution Control Program*” presents, for each of the major nonpoint source categories identified in the 6217 (g) guidance and the administrative elements in the program guidance, a “Finding,” “Rationale,” and where appropriate, “Conditions.”

A “Finding” indicates whether the State program does or does not include management measures in conformity with the 6217 (g) guidance and whether it does or does not include enforceable policies and mechanisms to ensure implementation. If the State has proposed an alternative management measure but has not adopted it as state policy, or if the State has identified a back-up enforceable policy but has not demonstrated the ability of that policy to ensure implementation, the “Finding” will be that the State program is not in conformity.

“Rationale” includes the information or sources of information upon which the “Finding” and “Condition” is based and recognizes State programs and policies which address the measure or administrative element.

“Conditions” describe State actions that will be necessary for Hawaii to receive final approval of its CNPCP. Timeframes associated with “Conditions” became effective upon the official date of the “*Findings for Hawaii’s Coastal Nonpoint Pollution Control Program,*” which was July 1, 1998. The “Findings” document is reproduced in Appendix A-5.

Appendix A-5
“Findings for Hawaii’s Coastal Nonpoint Pollution Control Program” (1998)

FOREWORD

This document contains the findings for the coastal nonpoint pollution control program submitted by the State of Hawaii pursuant to Section 6217(a) of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). The findings are based on a review of the *Hawaii’s Coastal Nonpoint Pollution Control Program*, Final Program Submittal, July 1996 , and supplemental material provided by Hawaii after the program submittal. The National Oceanic and Atmospheric Administration (NOAA) and the U.S. Environmental Protection Agency (EPA) reviewed this information and evaluated the extent to which it conforms to the requirements of CZARA.

NOAA and EPA commend the State of Hawaii on the substantial time and effort put into developing this program and appreciate the commitment the State has shown to complete an ambitious task with limited resources. NOAA and EPA will continue to work with coastal states and territories to ensure that these findings represent an accurate assessment of current state and territorial abilities and efforts to address coastal nonpoint source pollution. NOAA and EPA recognize that further administrative changes that will affect these findings may be made to the coastal nonpoint program and, once such changes are finalized, will review these findings in light of the changes and make any necessary adjustments.

APPROVAL DECISION

NOAA and EPA approve the coastal nonpoint pollution control program submitted by the State of Hawaii pursuant to Section 6217(a) of the Coastal Zone Act Reauthorization Amendments of 1990, subject to certain conditions.

This document provides the specific findings used by EPA and NOAA as the basis for the decision to approve the State’s program. It also provides the rationale for the findings and includes the conditions that will need to be met for Hawaii to receive final approval of its program. The timeframes associated with conditions become effective upon the date of the approval letter for these findings.

INTRODUCTION

This document is organized by the major nonpoint source categories and subcategories identified in the Section 6217(g) guidance and the administrative elements identified in the program guidance. Where appropriate, NOAA and EPA have grouped categories and subcategories of management measures into a single finding. The structure of each finding

follows a standard format: Finding and Rationale. The Findings and Rationale are the basis for the Conditions, which are listed in Section XII of this document (beginning on page 19).

Generally, the finding says that the State program: a) includes or does not include management measures in conformity with the 6217 (g) guidance, and b) includes or does not include enforceable policies and mechanisms to ensure implementation. Where the State has proposed a management measure in its program submittal, but has not adopted the management measure as state policy, the finding is that the State's program is not in conformity, pending adoption of the measure. In some cases, the finding reflects that the State has identified a back-up enforceable policy, but has not yet demonstrated the ability of the authority to ensure implementation. The Rationale includes information upon which the Findings and Conditions are based, and recognizes where the State has programs and policies that address the management measure. The Conditions describe the actions necessary for Hawaii to receive final approval of its program. For further understanding of terms used in this document, the reader is referred to the following:

Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA, January 1993);
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance (NOAA and EPA, January 1993);
Flexibility for State Coastal Nonpoint Programs (NOAA and EPA, March 1995).

The references in this document refer to the Hawaii's Coastal Nonpoint Pollution Control Program, Final Program Submittal, July 1996 ("program submittal"). NOAA and EPA have written this document as succinctly as possible. We have relied upon, but do not repeat here, the extensive information that the State included in the program submittal. Further information and analysis is contained in the administrative record for this approval decision and may be reviewed by interested parties at the following locations:

EPA/Office of Wetlands, Oceans and Watersheds
Assessment & Watershed Protection Division
Nonpoint Source Control Branch
401 M St., SW (4503-F)
Washington, DC 20460
Contact: Robert Goo (202/260-7025)

NOAA/Office of Ocean and Coastal Resource Management
Coastal Programs Division
SSMC-4, N/ORM3
1305 East-West Highway
Silver Spring, MD 20910
Contact: Masi Okasaki (301/713-3121, ext. 185)

U.S. EPA Region IX
75 Hawthorne Street (WTR-10)
San Francisco, CA 94105
Contact: Audrey Shileikis (415/744-1968)

EXECUTIVE SUMMARY

The Hawaii Coastal Nonpoint Pollution Control Program (CNPCP) submittal summarizes existing programs to reduce nonpoint sources of pollution and improve water quality, and identifies recommendations to improve the program. The State will be developing an Implementation Plan that will describe how these recommendations will be implemented and what other steps the State will take to meet the conditions identified in the proposed Findings.

The proposed Findings conclude that the State program provides a good foundation for reducing nonpoint source pollution and improving coastal water quality, and that additional work remains to be done to fully address the requirements of CZARA. In summary:

- the State needs to fully describe how the management measures will be incorporated into the State’s CNPCP and how they will be implemented;
- the State will need to describe how existing “back-up” authorities will be used to ensure implementation of the management measures, if voluntary efforts fail;
- the State will need to adequately address the administrative elements related to technical assistance, critical coastal areas, additional management measures and monitoring.

Accordingly, NOAA and EPA’s approval of Hawaii’s CNPCP includes conditions for addressing the above areas. These conditions must be met within one to five years, depending on the condition (see Section XII below), as specified in the March 16, 1995 Flexibility Guidance, for the State to receive full program approval. The State, NOAA and EPA will work together to annually review progress towards meeting these conditions, with the goal of developing a fully approvable Hawaii CNPCP that results in environmental and public health protection and meets the requirements of CZARA.

I. BOUNDARY

FINDING: Hawaii’s 6217 management area, defined as all lands of the State and the area extending seaward to the limit of the State’s power and management authority, including the U.S. territorial sea, is sufficient to control the land and water uses that have or are reasonably expected to have a significant impact on the coastal waters of Hawaii.

II. AGRICULTURE

FINDING: Hawaii’s program includes alternative management measures for confined animal facilities, pesticide and irrigation that are as effective as the 6217(g) management measures. NOAA and EPA cannot determine if the State’s proposed alternative management measures for erosion and sediment control, nutrient management, and grazing are as effective as the 6217(g) management measures until additional information is developed by the State. The State has identified a back-up enforceable authority, but has not yet demonstrated the ability of the authority to ensure implementation of the management measures throughout the 6217 management area.

RATIONALE: Hawaii’s alternative management measures for facility wastewater and runoff from confined animal facilities, pesticides, and irrigation are as effective as the management measures in the 6217(g) guidance. Hawaii has also identified practices to implement these measures. While the State has identified the Natural Resources Conservation Service (NRCS) practices for waste utilization to support the confined animal facility management measure, corresponding guidance is not in the Department of Health’s Draft Guidelines for Livestock Waste Management (Draft Guidelines) which will be used to provide information on management measure implementation to landowners. The Draft Guidelines only apply to new or expanding operations and do not address nutrient management or previously discussed waste utilization. NOAA and EPA strongly encourage the State to revise the Draft Guidelines to incorporate appropriate waste utilization practices.

For the pesticide management measure, Hawaii Administrative Rules (HAR) 11-21 requires anti-backflow devices and HAR 4-66 regulates restricted use pesticides and requires applicators to apply pesticides consistent with the label. Hawaii’s program submittal on pages III-32 - III-33, lists comprehensive State practices based on the NRCS field technical guides for integrated pest management. The Cooperative Extension Service, NRCS, Soil and Water Conservation Districts (SWCDs) and the US Department of Agriculture (USDA) Farm Services Agency are involved in providing information and technical assistance on these practices.

The State has also proposed alternative management measures for erosion and sediment control, nutrient management, and grazing to make them more appropriate for Hawaii.

- o The proposed alternative management measures for erosion and sediment control, and grazing do not incorporate the erosion, and range and pasture components, respectively, of USDA’s Conservation Management System, as specified in the 6217(g) guidance. Hawaii proposes to apply “any combination of conservation practices and management that achieves an acceptable level of treatment.” Hawaii is currently in the process of defining an acceptable level of treatment. When EPA and NOAA determine that Hawaii’s process to define acceptable level of treatment is as effective as the 6217(g) measures, both measures will be acceptable as alternative management measures.

- o Hawaii’s proposed alternative nutrient management measure differs from the 6217(g) measure in three significant ways: 1) the proposed measure will not determine the rate of

availability of the nutrients; 2) the realistic yield expectations will be based on “achievable yields” (to be determined by Cooperative Extension Service, nutrient management planners, farmers, or others), rather than on yield histories (State Land Grant University recommendations, or NRCS soils information); and, 3) the proposed measure will not include soil tests for nitrogen. When EPA and NOAA are able to determine that the information to support Hawaii’s alternative management measure is as effective as the 6217(g) guidance, this measure will be acceptable as an alternative management measure.

The State of Hawaii is proposing a voluntary Agricultural Pollution Prevention Plan (PPP) program for the implementation of all the agricultural management measures. A PPP program would be submitted to the local SWCD for review and approval, and revised every 3-5 years. Proposed incentives to participate in the PPP program include property tax breaks, and exemption from enforcement actions. The State also proposes development of a bad actor law to strengthen the State’s enforcement mechanism.

The State proposes to use Hawaii Revised Statutes (HRS) Chapter 342D, Water Pollution Control, and HAR Chapter 11-54, Water Quality Standards, as back-up enforceable policies and mechanisms for all agricultural management measures.

III. FORESTRY

FINDING: Hawaii’s program does not include management measures in conformity with the 6217(g) guidance for forestry. The State has identified a back-up enforceable authority but has not yet demonstrated the ability of the authority to ensure implementation of the management measures throughout the 6217 management area.

RATIONALE: To date, forestry in Hawaii is a very limited activity and is confined almost exclusively to the Island of Hawaii. However, Hawaii anticipates significant growth in commercial silviculture in the near future as an alternative to the declining sugarcane industry. Based on the expectation that forestry activities may increase into a significant activity in the 6217 management area, Hawaii has presented a draft program outlined on page III-96 through III-100 of its submittal, which would encourage participation in voluntary, incentive-driven programs. Hawaii proposes that these voluntary incentive programs be administered by the Department of Land and Natural Resources under the Tree Farm Program. The State has proposed alternative management measures for timber harvesting and fire management to make them more appropriate for Hawaii. Although these proposed alternative management measures are as effective as the corresponding 6217(g) guidance measures, they need to be adopted as State policy.

Hawaii also proposes to incorporate Best Management Practice (BMP) implementation into Conservation District Use Application (CDUA) permits and timber land licenses. This approach would provide enforceable policies and mechanisms in areas where these programs apply. However, according to Hawaii’s program submittal on page III-64, most potential forestry

operations are likely to be started on agricultural lands, where a CDUA permit would not be required. The State intends to encourage implementation of the management measures through voluntary management plans developed and implemented under the Forest Stewardship and Tree Farm programs. The State also intends that forestry operations on agricultural land will have the same incentives to participate in the voluntary PPP. The State will use HRS Chapter 342D, Water Pollution Control, and HAR Chapter 11-54, Water Quality Standards, as back-up enforceable policies and mechanisms for all forestry management measures.

IV. URBAN

A. New Development

FINDING: Hawaii’s program does not include management measures in conformity with the 6217(g) guidance for new development. The State has identified a back-up enforceable authority for the new development management measure, but has not yet demonstrated the ability of the authority to ensure implementation throughout the 6217 management area.

RATIONALE: In Hawaii, the county planning departments are responsible for regulating the impacts of development projects. County storm drainage standards are implemented through the county departments of public works. According to the State submittal, these standards were only designed for flood control purposes and not for controlling nonpoint source pollution. However, the City and County of Honolulu has the goal to allow no increases in runoff from new developments and are currently in the process of drafting stormwater requirements for new development. Maui County is also engaged in the final stages of developing new rules to address this issue. Both of these proposed rulemakings, when final, are anticipated to be consistent with the goals of the management measures. The County of Hawaii has a policy not to allow runoff to leave the boundaries of a new subdivision and requires the use of injection wells to maintain pre-development hydrology. The County of Kauai has management measures but they are not consistent with the 6217(g) guidance.

The State submittal indicated that the four counties consider the TSS reduction goals of the management measures achievable, but are uncertain if the peak flow rate requirements are achievable. The counties will attempt to achieve the TSS loading reductions by limiting average post-development runoff flow to pre-development levels. However, the State has not provided information regarding specific management measures or described the State’s role in working with the counties to implement the management measures throughout the 6217 management area.

The State will use HRS Chapter 342D, Water Pollution Control and HAR Chapter 11-54, Water Quality Standards as back-up enforceable policies and mechanisms for the new development management measure.

B. Watershed Protection and Existing Development

FINDING: Hawaii’s program does not include management measures in conformity with the 6217(g) guidance for watershed protection and existing development. Hawaii’s program includes enforceable policies and mechanisms to ensure implementation of the watershed protection management measure. The State has identified a back-up enforceable authority for the existing development management measure, but has not yet demonstrated the ability of the authority to ensure implementation throughout the 6217 management area.

RATIONALE: The State submittal references regulatory and non-regulatory mechanisms that partially address the watershed protection management measure. However, these mechanisms do not result in a statewide watershed protection program or policies that preserve areas critical to water quality within all watersheds of Hawaii. The State needs to develop a statewide watershed process to address the management measure element.

The State Land Use Law, Chapter 205 Hawaii Revised Statutes (HRS) divides all lands into four major district classifications: urban, rural, agricultural and conservation. Conservation District lands encompass 47.6% of the State. Within the Conservation District, subzones can be established to protect lands susceptible to erosion (Limited Subzones) and to protect watersheds (Protection Subzones). The Department of Land and Natural Resources regulates the uses in conservation districts through the Conservation District Use Application (CDUA). The four counties have authority to issue development-related permits in the urban district and the agricultural district for projects less than 15 acres. For projects larger than 15 acres, the Land Use Commission must review and approve the permit.

Under Chapter 1-2, Hawaii Administrative Rules (HAR), Special Management Areas (SMA) are designated along the shoreline. Although the Hawaii Coastal Zone Management program reviews development permits in SMAs for consistency with the CZM objectives and policies, each county is responsible for administering the SMA permits, and shoreline setback provisions.

Under Chapter 195, HRS, Natural Reserves System, the State has the authority to designate and bring under its control and management those areas necessary to preserve the unique natural resources of Hawaii. The State’s submittal also indicates that the Counties of Maui and Kauai have authorities limiting the conversion of areas susceptible to erosion through their comprehensive zoning ordinances. Although the county authorities provide a framework that has resulted in the implementation of various aspects of the management measures in specific jurisdictions, it is unclear what role the State has in working with the counties to implement the management measures throughout the 6217 management area.

For the existing development management measure, the State implements the Stream Channel Alteration Permit Program, which can be used to limit destruction of stream channels. The State has also identified HAR 11-54, Water Quality Standards, as a back-up authority. However, the State currently does not have a program nor a schedule for implementing controls to address watershed pollution reduction opportunities from existing development in urbanized areas and a program to establish buffers along surface waterbodies (other than the shorelines covered under

the SMA) and their tributaries. Existing assessments such as the CWA Section 303(d) list, which identifies water quality limited segments, and the Hawaii Stream Assessment and Stream Protection and Management Plan, if updated periodically, can be useful tools in assisting the State to target areas where water quality may be impacted by existing development. Hawaii, however, would still need to incorporate within its program an assessment, prioritization and implementation plan to specifically address individual sites or pollutant sources in developed areas where remedial action is needed. The establishment of waterbody buffers also could be incorporated as one element of such a plan.

EPA and NOAA support the State's effort to implement the recommendations in the program submittal for both the Watershed and Existing Development management measures.

C. Site Development

FINDING: Hawaii's program does not include management measures in conformity with the 6217(g) guidance for site development. The State has identified a back-up enforceable authority for the site development management measure, but has not yet demonstrated the ability of the authority to ensure implementation of the management measure throughout the 6217 management area.

RATIONALE: The State's program submittal references county authorities addressing elements of this management measure. Pursuant to State guidance, all counties in Hawaii have enacted grading ordinances to control soil erosion from land disturbing activities that address elements of this management measure to varying degrees. Although these authorities provide a framework that address the implementation of various aspects of the management measure in the counties, it is unclear what role the State has in working with the counties to implement the management measures throughout the 6217 management area.

EPA and NOAA recommend that the State of Hawaii pursue the recommendations outlined in the program submittal and encourage the development and enhancement of the county programs to address all facets of this management measure. Other potential program enhancements include expanding the scope of existing programs by lowering applicable size thresholds for site development practices; applying the concepts and protective mechanisms currently included in the county subdivision regulations to non-subdivision related developments, e.g., commercial or large noncommercial/nonprofit developments; and promoting county adoption of standards or guidelines regarding the minimization of impervious surfaces. To strengthen statewide implementation, NOAA and EPA encourage the State to assess the use of the nonpoint source pollution and control program established by HRS Chapter 342E-3.

The State will use HRS Chapter 342D, Water Pollution Control and HAR Chapter 11-54, Water Quality Standards as back-up enforceable policies and mechanisms for the site development management measure.

D. Construction Site Erosion and Sediment Control

FINDINGS: Hawaii’s program does not include management measures in conformity with the 6217(g) guidance for construction site erosion and sediment control. The State has identified a back-up enforceable authority for construction site erosion and sediment control but has not yet demonstrated the ability of the authority to ensure implementation of the management measure throughout the 6217 management area.

RATIONALE: Pursuant to HRS 180C, all counties in the State of Hawaii have enacted ordinances for the purpose of controlling soil erosion and sediment. These ordinances contain, to varying degrees, standards, criteria, techniques, and methods for the control of erosion and sediment resulting from land disturbance activities and enforceable policies and mechanisms for implementation. Since all counties have enacted this ordinance, HRS 180C has been repealed.

The State’s submittal references county authorities that address elements of this management measure. Grading projects must receive a permit but erosion and sediment control plans are not required for all sites, and applicability differs widely where required. Drainage and erosion control plans are required by the City and County of Honolulu, and the County of Maui, for sites greater than one acre in area, and cut and fill activities greater than 15 feet in height. In the County of Kauai, drainage and erosion control plans are required for sites greater than 1 acre or on slopes greater than 20%. In the County of Hawaii, all grading of areas of more than fifteen thousand square feet requires an approved contour map prepared by a certified professional that describes erosion and sediment controls. However, as previously mentioned, it is unclear what role the State has in working with the counties to implement the management measure throughout the 6217 management area.

The State’s submission (pages III-122 - III-123) includes regulatory and procedural changes to address the erosion and sediment control management measure. These include changes to the county grading ordinances, development of a BMP manual of construction practices to help standardize acceptable practices in all counties and for State projects, and integrating inspection for erosion and sediment control plan with other construction activities. NOAA and EPA encourage the State to implement these changes and also to assess the use of the nonpoint source pollution and control program established by HRS 342E-3.

The State will use HRS Chapter 342D, Water Pollution Control, and HAR Chapter 11-54, Water Quality Standards, as back-up enforceable policies and mechanisms for the erosion and sediment control management measure.

E. Construction Site Chemical Control

FINDING: Hawaii’s program does not include management measures in conformity with the 6217(g) guidance for construction site chemical control. The State has identified a back-up enforceable authority for construction site chemical control, but has not yet demonstrated the

ability of the authority to ensure implementation of the management measures throughout the 6217 management area.

RATIONALE: Hawaii has rules regulating the use of pesticides and enforceable policies controlling the use of restricted pesticides. In addition, the State rules require that no person shall use any pesticide or pesticide container in any manner which would have unreasonable adverse effects on the environment.

The State, however, lacks management measures to address general housekeeping of construction materials, toxic substances, and nutrients on construction sites. The efforts of the General Contractor’s Association, the City and County of Honolulu, and the State of Hawaii are positive steps to begin addressing this potential source of water pollution. The State is also encouraged to pursue additional recommended implementing actions outlined in the program submittal (pages III-127 - III-128) including the revision of rules to include prevention activities, the training and perhaps the certification of onsite personnel regarding construction chemical usage, and the development of a best practice manual for construction activities which would include chemical usage and runoff control practices. NOAA and EPA encourage the State to implement these changes and also to assess the use of the nonpoint source pollution and control program established by HRS 342E-3.

The State will use HRS Chapter 342D, Water Pollution Control, and HAR Chapter 11-54, Water Quality Standards, as back-up enforceable policies and mechanisms for the construction site chemical control management measure.

F. New and Operating Onsite Disposal Systems (OSDS)

FINDING: Hawaii’s program includes management measures in conformity with the 6217(g) guidance and enforceable policies and mechanisms to ensure implementation throughout the 6217 management area, except for: 1) requirements for denitrifying OSDS, where applicable; and, 2) a program that ensures inspection of OSDS at a frequency adequate to ascertain system failure.

RATIONALE: Though the Hawaii Department of Health OSDS program is generally consistent with the OSDS management measures, the State’s program does not contain requirements for both the periodic inspection of operating OSDS and installation or upgrade of denitrifying OSDS adjacent to nitrogen-limited surface waters.

EPA and NOAA encourage the State to follow the implementing actions in the program submittal (pages III-137 - III-139) regarding program improvements. Priorities include the need for policies addressing adequate system capacity, and an outreach and education program to increase awareness of proper use and operation of OSDS. The State should also work with the counties to provide incentives to encourage homeowners to convert cesspools and seepage pits to a more environmentally sound practices where these disposal methods either potentially or currently impair or threaten water quality.

G. Pollution Prevention

FINDING: Hawaii’s program contains management measures in conformity with the 6217(g) guidance.

RATIONALE: The State of Hawaii has a program that addresses many facets of Nonpoint Source Pollution Prevention. These include litter control, pet waste, general public awareness, recycling program, and illicit discharges of oil and hazardous waste. Other aspects of nonpoint source pollution prevention in which the State may want to strengthen their program include expanded nonpoint source education of commercial entities, and lawn and turf management.

H. Golf Courses

FINDING: EPA and NOAA fully support the State in adoption and implementation of the Golf Course management measure. The measures selected by the State are an excellent foundation with which to manage and operate golf courses. The State may want to consider the development of siting and design guidelines or criteria for new golf courses to avoid, or at least, minimize potential environmental impacts of these facilities.

I. Roads, Highways, and Bridges

FINDING: Hawaii’s program includes management measures in conformity with the 6217(g) guidance for State and Federal roads, highways, and bridges under the Department of Transportation (DOT) jurisdiction, except for the construction site chemical control, runoff systems, and operations and maintenance management measures. Hawaii’s program does not include management measures in conformity with the 6217(g) guidance to address local roads, highways, and bridges. The State has included enforceable policies and mechanisms to ensure implementation of the management measures for roads, highways, and bridges under State DOT jurisdiction, but has not included enforceable policies and mechanisms for local roads, highways, and bridges to ensure implementation throughout the 6217 management area.

RATIONALE: Hawaii’s management measures for planning, siting, and developing roads, highways, and bridges are in conformity with the 6217(g) guidance for projects under the jurisdiction of Hawaii’s DOT. The DOT has adopted standard contract specifications which require environmental assessments for road, highway, and bridge projects and which assure implementation of the construction site erosion and sediment management measures for DOT managed projects. Hawaii does not have similar programs for local roads, highways, and bridges not under DOT jurisdiction. For construction site chemical control measures, see Section IV.E. Construction Site Chemical Control.

In Hawaii, the development, and operation and maintenance of county roads, highways, and bridges are the responsibility of the counties. The counties have construction grading ordinances and inspection procedures but applicability of the counties erosion and sediment control plans differs widely where required. Also, Hawaii does not have a statewide program that requires

DOT to identify and prioritize pollution controls on existing roads, highways, and bridges to meet the runoff systems management measure. Hawaii’s program describes activities for operation and maintenance, but lacks the measure for roads, highways, and bridges and enforceable mechanism to ensure implementation for local roads, highways, and bridges not under DOT jurisdiction.

DOT uses contract clauses as enforceable policies to ensure implementation of the management measures for State and Federal roads, highways, and bridges under DOT jurisdiction. The State management measures and enforceable policies and mechanisms to ensure consistent implementation of the management measures for roads, highways and bridges not under DOT jurisdiction are not identified.

V. MARINAS AND RECREATIONAL BOATING

A. Marina Siting and Design

FINDING: Hawaii’s program includes management measures in conformity with the 6217(g) guidance for marina flushing, water quality assessment, and habitat assessment, but does not include management measures for shoreline stabilization, storm water runoff, fueling station design, and sewage facility management. The program includes enforceable policies and mechanisms to ensure implementation of the management measures.

RATIONALE: The State does not currently have formally adopted uniform guidelines and criteria in place for all the marina siting measures which are in conformity with the 6217(g) guidance. The alternative management measure for habitat assessment and the proposed management measure for shoreline stabilization are as effective as the 6217(g) guidance.

The State has enforceable policies and mechanisms, including DLNR’s Conservation District Use Application (CDUA) and the Department of Health’s water quality authority, for siting and design of new and expanding marinas, which include management measures for marina flushing, water quality assessment, and habitat assessment. The State could use these authorities to implement the proposed management measures for shoreline stabilization, storm water runoff, fueling station design, and sewage facilities management by formally adopting guidelines and criteria for these measures, thereby ensuring their implementation through these authorities.

The DLNR’s CDUA permit process is triggered by any proposed marina construction project because submerged lands are included within the Conservation District, as identified under the State Land Use Law, Chapter 205. The CDUA permit process provides the mechanism to address the management measures by including the measures as conditions in permits for new and expanding marinas. The State informally applies review criteria and guidelines found in documents from the International Marina Institute, the Corps of Engineers and the State’s own “Draft Planning and Evaluation Guidelines for Private Sector Marina Development” (1993)

when reviewing private and public marinas. EPA and NOAA encourage the State to consider formally adopting similar measures to meet coastal nonpoint program requirements.

B. Boating Operation and Maintenance

FINDING: Hawaii's program includes management measures in conformity with the 6217(g) guidance, except for maintenance of sewage facilities. The program includes enforceable policies and mechanisms to ensure implementation of the management measures throughout the 6217 management area.

RATIONALE: Hawaii's program includes management measures for marina operation and maintenance, except for sewage facility maintenance. The State's publication entitled "Managing Boat Wastes: A Guide for Hawaii Boaters" addresses boat cleaning and boat maintenance practices. Hawaii's program identifies statutes and regulations that ensure implementation of the operation and maintenance management measures. Hawaii's general water pollution control rule and its water pollution control regulations for boat operation and boat harbors prohibit the discharge of any pollutant into surface waters. Also, State-operated marinas require permits for "do-it-yourself" boat cleaning and maintenance in designated areas. The State's submittal notes that pumpout facilities have been installed in several state harbors, ". . . but accessibility to these facilities are variable, as is the public willingness to use them." Maintenance of the pumpout facilities is also a problem. Although the Hawaii Boating Special Fund can be used to maintain sewage pumpout facilities, the submittal does not include any adopted guidelines or criteria for maintenance of sewage facilities. The State submittal on pages III-201 - 204 also identifies recommendations to fully implement the management measures for marinas and recreational boating.

VI. HYDROMODIFICATION

1. Channelization/Channel Modification

FINDINGS: Hawaii's program includes management measures in conformity with the 6217(g) guidance, and enforceable policies and mechanisms to ensure implementation of the management measures, except for management measures in conformity with the 6217(g) guidance for existing modified channels.

RATIONALE: The Hawaii Commission on Water Resources requires Stream Channel Alteration permits for alteration of stream channels. Proposed projects are reviewed for adverse effects on stream waters and stream ecology. However, there is no State-level program to identify opportunities for improvement of water quality and habitat in existing modified channels. Absent a State program, counties are responsible for the maintenance of channels, and may enforce the implementation of operation and maintenance activities by private property owners if the needed work is deemed a private responsibility. The State's Water Code (§174C-71, HRS) addresses instream flow and habitat restoration for channelization and channel modification. Hawaii implements the management measure promoting habitat restoration

through the activities of the Hawaii Biodiversity Joint Venture and the Nature Conservancy of Hawaii.

2. Dams

FINDINGS: Hawaii’s program includes management measures in conformity with the 6217(g) guidance, and enforceable policies and mechanisms to ensure implementation of the management measures, except for: 1) management measures in conformity with the 6217(g) guidance for erosion and sediment, and chemical and pollutant control; and, 2) enforceable policies and mechanisms to ensure implementation throughout the 6217 management area.

RATIONALE: Hawaii does not have the State-level enforceable policies that address the management measures for erosion and sediment control, and chemical and pollutant control, for dams. However, Hawaii has county programs that address some elements of the erosion and sediment control management measure (see discussion in Section IV.C. Site Development) and for chemical and pollutant control for dams, (see Section IV.E. Construction Site Chemical Control).

Hawaii implements management measures to protect surface water quality and habitat from the effects of dam operation by requiring permits for any withdrawal, diversion, impoundment, or consumptive use of water in any designated water management areas. The Commission on Water Resources Management may impose restrictions on permits for dam operations to protect water resources from serious harm and to restore them to their previous condition.

3. Streambank and Shoreline Erosion

FINDINGS: Hawaii’s program includes management measures in conformity with the 6217(g) guidance, and enforceable policies and mechanisms to ensure implementation of the management measures, except for protecting streambanks and shorelines against erosion due to uses of the adjacent surface waters. The State has proposed an alternative management measure for eroding streambanks and shorelines management that is as effective as the 6217(g) guidance, but does not include a process to identify and solve existing nonpoint source problems caused by streambank or shoreline erosion that are not reviewed under existing permit authorities.

RATIONALE: Hawaii’s proposed alternate management measure for eroding shorelines and streambanks is as effective as the measure in the 6217(g) guidance in applying nonpoint source controls to problems associated with eroding shorelines and streambanks. The management measure is partially implemented with permits required for streambank and shoreline stabilization activities. The Hawaii Coastal Zone Management Program discourages the use of structures for stabilization of eroding shorelines/streambanks. Development in designated Special Management Areas along the shoreline is evaluated for its environmental and ecological effects, thus helping to implement management measures to protect streambanks and shorelines from erosion due to uses of the shorelands, and to protect shoreline or streambank features with the potential to reduce nonpoint source pollution. However, the State’s program does not

describe a process to identify and develop strategies to solve existing nonpoint problems caused by streambank or shoreline erosion that are not reviewed under existing permit authorities. The identification of existing nonpoint problems could be undertaken by using the same process as proposed for the existing development management measure (see page 6).

VII. WETLANDS, RIPARIAN AREAS AND VEGETATED TREATMENT SYSTEMS

FINDING: Hawaii's program includes management measures in conformity with the 6217(g) guidance for restoration of wetlands and riparian areas, vegetated treatment systems, and protecting wetlands and riparian areas within the 6217 management area, except for protecting wetlands and riparian areas from existing development which adversely affects the nonpoint source abatement functions of such areas and enforceable policies and mechanisms to ensure implementation throughout the 6217 management area.

RATIONALE: Hawaii's Coastal Zone Management Program implements management measures for protection of wetlands and riparian areas by reviewing permit applications for new projects in Special Management Areas (SMAs) and shoreline setback areas. New development in these areas is reviewed for any substantial adverse environmental or ecological effect. The State also requires permits for any alteration of stream channels, and proposed projects are reviewed for effects on stream waters or stream ecology. However, Hawaii's program only applies management measures for wetlands and riparian area protection to new projects within wetlands or within SMAs. The program does not include management measures to address existing upland or upstream development which can adversely affect the nonpoint source abatement functions of wetlands and riparian areas.

Hawaii implements management measures promoting restoration of wetlands and riparian areas through the work of the Hawaii Biodiversity Joint Venture and the Nature Conservancy. In addition, Hawaii has county programs that promote the use of vegetative treatment by including requirements for natural vegetation in laws and regulations for grading and clearing activities. However, the program submission also notes that the State does not implement, on a regular and consistent basis, the management measure promoting the use of vegetated treatment systems and constructed wetlands. NOAA and EPA encourage the State to pursue the recommendations for improvement to the management of wetland and riparian areas as described on pages III-242 - III-244 of the program submission.

VIII. PUBLIC PARTICIPATION

FINDING: Hawaii's program provides opportunities for public participation in the development and implementation of the coastal nonpoint program.

RATIONALE: Hawaii's program submittal describes in Section V.1 and V.2 activities that provide opportunities for and encourage public participation in the coastal nonpoint program. The State established a working group and five focus groups to assist in the development of the

agriculture, forestry, urban, marinas, and stream system (hydromodification) portions of the program. The State has also held statewide public informational meetings, given numerous presentations to government officials, industry, and environmental and community organizations, and attended a number of local conferences and workshops to describe the requirements of Section 6217 and to solicit public input regarding the program. The State is developing a nonpoint source pollution outreach advisory committee to establish a long-range communication and outreach plan. This plan will integrate additional public outreach efforts required to facilitate the implementation of the State's coastal nonpoint program. The State has also prepared an extensive response to comments document on Hawaii's coastal nonpoint program.

IX. ADMINISTRATIVE COORDINATION

FINDING: Hawaii's program includes mechanisms to improve coordination among State agencies and State and local officials in implementing the coastal nonpoint program.

RATIONALE: Hawaii's program submittal describes in Part VI existing mechanisms to coordinate State and local efforts to address nonpoint pollution of coastal waters. The administrative coordination section identifies agencies and programs responsible for program implementation and adequately describes their role in implementing the State's 6217 program. There are statutory requirements that agencies' rules, programs, and activities must comply with the Hawaii Coastal Zone Management Program objectives and policies (Chapter 205A, HRS). In addition, the Administrative Procedures Act (Chapter 91, HRS) allows for other State agencies to review and comment on State agency rules under consideration.

X. CRITICAL COASTAL AREAS, ADDITIONAL MANAGEMENT MEASURES AND TECHNICAL ASSISTANCE

FINDING: Hawaii's program does not include a process for the identification of critical coastal areas, or for the development and continuing revision of management measures applicable to critical coastal areas and cases where the 6217 (g) measures are fully implemented but water quality threats or impairments persist. The program does not describe efforts to provide technical assistance to local governments and the public for implementing additional management measures.

RATIONALE: The State of Hawaii had not begun the development of these three programmatic elements at the time of program submission. The State has not outlined in its program a process for identifying critical coastal areas or additional management measures. However, the State submittal has identified and listed all threatened and impaired waters in the State, as well as the major sources of pollutants. The State intends to provide technical assistance relating to additional management measures, as well as relating to 6217(g) measures or comparable alternatives developed by the State. Technical assistance may be provided through ongoing efforts under the Clean Water Act, Section 319 program.

XI. MONITORING

FINDING: Hawaii's program does not include a plan to assess over time the success of the management measures in reducing pollution loads and improving water quality.

RATIONALE: The State of Hawaii is currently in the process of revising its water quality monitoring plan. The plan will include four monitoring categories: core network, recreational bathing waters, watershed protection, and toxic contaminant screening. The overall goal to focus available resources on the most critical needs is appropriate, but the information presented does not include any details regarding how the revised plan will assess over time whether the management measures are reducing pollution loads and improving water quality.

For example, while the core network is intended to assess status and trends, there is no discussion of how the State will associate water quality trends with management measure implementation. Similarly, there is no clear linkage made between management measures and the recreational bathing waters monitoring despite the statement on page VII-14 that nonpoint sources are primarily responsible for impairment in recreational waters. The toxic contaminants screening program is currently inactive. The Ala Wai Canal watershed monitoring program has potential for Section 6217 since it is intended to identify measurable changes in water quality and assess the relative effectiveness of land management and pollution control practices. However, the management measure tracking and evaluation are not explicitly called for in the plan.

Hawaii is encouraged to continue development of its proposed monitoring program. The State should include in its plan information regarding the number and location of monitoring stations, the types and frequency of water quality data being collected, and the analytic approaches that will be employed in conjunction with existing monitoring efforts to assess the success of management measures in achieving water quality objectives. The State should include some inexpensive tracking of management measure implementation in conjunction with water quality monitoring, as such information is needed to assess the success of management measures in achieving water quality objectives.

XII. CONDITIONS

Based on the findings and the corresponding rationale, the following conditions must be met to receive final program approval. The State, within the timeframes indicated below, will include in its Coastal Nonpoint Pollution Control Program the following management measures in conformity with the 6217 (g) guidance. NOAA, EPA, and the State will annually conduct joint reviews to assess progress towards meeting these conditions and to identify needed technical and programmatic assistance.

Management Measures:

1. Within 3 years, the State will include in its CNPCP management measures in conformity with the 6217(g) guidance for the following categories of activities:
 - A) Agriculture:
 1. erosion and sediment control;
 2. nutrient management; and,
 3. grazing.
 - B) Urban:
 1. new development;
 2. watershed protection;
 3. existing development;
 4. site development;
 5. construction site erosion and sediment control;
 6. construction site chemical control;
 7. requirements for denitrifying OSDS, where applicable, and a program that ensures inspection of OSDS at a frequency adequate to ascertain system failures;
 8. roads, highways and bridges under DOT jurisdiction (construction site chemical control, runoff systems, and operation and maintenance); and all management measures for roads, highways and bridges not under DOT jurisdiction.
2. Within 5 years, the State will include in its CNPCP management measures in conformity with the 6217(g) guidance for the following categories of activities:
 - C) Forestry:
 1. preharvest planning;
 2. streamside management;
 3. road construction/reconstruction;
 4. road management;
 5. timber harvesting;
 6. site preparation and forest regeneration management;
 7. fire management;
 8. revegetation of disturbed areas;
 9. forest chemical management; and,
 10. wetlands forest management.
 - D) Marinas and Recreational Boating:
 - Siting and Design:
 1. shoreline stabilization;
 2. storm water runoff;
 3. fuel station design; and,
 4. sewage facilities;
 - Operation and Maintenance:
 5. maintenance of sewage facilities.

E) Hydromodification:

1. existing modified channels;
2. erosion and sediment control of dams;
3. chemical and pollutant control for dams;
4. protection of stream banks and shorelines against erosion due to use of the adjacent surface waters. The state will also develop a process to identify and solve existing nonpoint source pollution caused by streambank or shoreline erosion that are not reviewed under existing permit authorities.

F) Wetlands:

1. protection of wetlands and riparian areas from existing development which adversely affects the nonpoint source pollution abatement functions of such areas.

Administrative Elements:

3. Within 1 year, the State will include in its CNPCP the following program element:
 - A) Monitoring:
 1. A plan that enables the State to assess over time the extent to which implementation of management measures are reducing pollution loads and improving water quality.
4. Within 5 years, the State will include in its CNPCP the following program elements:
 - B) Critical Coastal Areas, Additional Management Measures and Technical Assistance:
 1. A process for the identification of critical coastal areas and a process for developing and revising management measures to be applied in critical coastal areas and in areas where necessary to attain and maintain water quality standards.
 2. The State will also include in its program a process to provide technical assistance in the implementation of additional management measures.

Enforceable Policies and Mechanisms:

5. Within 3 years, the State will include in its CNPCP enforceable policies and mechanisms to ensure implementation of the following management measures throughout the 6217 management area:
 - A) Requirements for denitrifying OSDS, where applicable, and a process that ensures inspection of OSDS at a frequency adequate to ascertain system failure; and,
 - B) All management measures for local roads, highways, and bridges not under DOT jurisdiction.

6. Within 5 years, the State will include in its CNPCP enforceable policies and mechanisms to ensure implementation of the following management measures throughout the 6217 management area:
 - A) Erosion and sediment control, and chemical and pollutant control, for dams; and,
 - B) Protection of wetlands and riparian areas from existing development which adversely affects their nonpoint source abatement function.

Strategies and Evaluations of Back-up Authorities:

7. Within 1 year, the State will:
 - A) Develop a strategy to implement the management measures for agriculture, forestry and urban - new development, watershed protection, existing development, site development, construction site erosion and sediment control, and construction site chemical control, throughout the 6217 management area. This strategy will include a description and schedule for the specific steps the State will take to ensure implementation of the management measure; describe how existing or new authorities can be used to ensure implementation where voluntary efforts are unsuccessful; and identify measurable results which, if achieved, will demonstrate the State's ability to achieve widespread implementation of the management measure using the described approach.
 - B) Develop and apply credible survey tools to demonstrate the ability of the State's approach to achieve widespread implementation of these management measures. The use of credible assessment techniques is necessary in order for NOAA and EPA to evaluate, at the three year period described in the March 16, 1995 guidance issued by NOAA and EPA entitled Flexibility for State Coastal Nonpoint Programs, whether the State's approach has been successful or whether new, more specific authorities will be needed.

Appendix A-6
“Clean Water Action Plan” (1998)

The “*Clean Water Action Plan*” was developed by the Environmental Protection Agency and the United States Department of Agriculture and other federal agencies in response to a directive from the Administration on the 25th anniversary of the Clean Water Act. President Clinton charged these agencies to develop a plan that would provide a blueprint for restoring and protecting the nation’s waters to achieve the original goal of the Clean Water Act: “fishable and swimmable” waters for all Americans.

The “*Clean Water Action Plan*,” published in February 1998, focuses on four major action areas to achieve clean water goals: a watershed approach, strong federal and state standards, natural resource stewardship, and informed citizens and officials. The federal government commits itself in the Plan to support locally led partnerships with a broad array of members to meet clean water and public health goals, to increase financial and technical assistance, and to help restore and sustain the health of aquatic systems on a watershed basis. A large number of “key actions” with specified actors and timeframes have been developed for the major action areas enumerated below.

1. The watershed approach will build on:
 - unified watershed assessments (see below);
 - watershed restoration action strategies (to restore watersheds that are not meeting clean water and natural resource goals);
 - watershed pollution prevention (protecting pristine/sensitive waters and taking preventive action in the face of new pollution threats); and
 - watershed assistance grants (small grants to local organizations willing to lead in developing goals and solutions for restoring their watersheds).

2. Some of the actions called for in the Action Plan to strengthen federal and state standards are:
 - expand programs to reduce contaminants that make marine life unsafe to eat and ensure that clear notice of fish consumption risks gets to public;
 - improve capacity for nearshore water quality monitoring, develop new standards, and use electronic technologies to report public health risks to swimmers;
 - promulgate Phase II stormwater regulations for smaller cities and construction sites (to be published by EPA in 1999) and improve implementation of existing federal storm water requirements;
 - promoting by federal agencies of state establishment of enforceable authorities to ensure the implementation of polluted runoff controls;
 - defining numeric criteria for nutrients (e.g., nitrogen and phosphorus) in different types of water bodies and different ecoregions by EPA in 2000 and assistance to states by EPA to adopt numeric water quality standards based on the criteria; and
 - minimizing the environmental and public health impacts of animal feeding operations through development of a unified national strategy.

3. The Clean Water Action Plan commits all federal natural resource agencies to support the watershed approach and to work with states for the enhancement of critical natural resources essential to clean water by:
- developing a Unified Federal Policy to enhance watershed management on federal lands and in federal land management (Department of Interior (DOI) and USDA to be lead agencies);
 - setting a goal of attaining a net increase of 100,000 wetland acres per year by the year 2005 through making sure that existing wetland programs continue to slow the rate of wetland losses, improving federal restoration programs, and expanding landowners' incentives to restore wetlands;
 - expanding/improving federal programs impacting coastal waters such as monitoring, research about emerging problems (e.g., algal blooms), amendment of Fishery Management Plans to address water quality, and insuring strong state programs to reduce polluted runoff to coastal waters; and
 - increasing technical and financial assistance to private landowners to provide incentives for private land stewardship.

In order to forward the “*Clean Water Action Plan*” goal of better informing citizens and officials, the United States Geological Survey (USGS) will lead federal agencies in working with states to improve monitoring and assessment of water quality. Appropriate federal agencies will also work with states to develop and use systems such as EPA’s Index of Watershed Indicators on the Internet to communicate information to the public about their communities’ water quality condition.

Appendix B

Advisory Group Membership Lists

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POLLUTED RUNOFF FORUM (PROF)

Commander, Naval Base Pearl Harbor
Mr. Charles Ah Toong (Chair, West Oahu Soil and Water Conservation District)
Mr. William Aila
Mr. Steve Anthony (NAQAW Chief, Water Resources Division, Hawaii District Office,
United State Geological Survey, U.S. Department of the Interior)
Mr. Bryan J. Baptiste (Chair, Public Works/Parks Committee, County Council,
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The Honorable Romy M. Cachola (Chair, Water & Land Use Committee,
House of Representatives)
Mr. Skip Cowell (Chair, Kona Soil and Water Conservation District)
Mr. Thomas Crabb (Chair, Hamakua Soil and Water Conservation District)
Mr. Dee Crowell (Planning Director, Planning Department, County of Kauai)
Mr. Eugene P. Dashiell, AICP
Mr. Dan Davidson (Land Use Research Foundation)
Mr. Michael Duponte (Cooperative Extension Service, Hilo CES Office)
Mr. Paul Elia (Chair, Molokai-Lanai Soil and Water Conservation District)
J. B. Friday, Ph.D. (Tropical Forestry Extension, CTAHR, UH-Hilo)
Mr. Randall Fujiki (Director, Department of Planning & Permitting,
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Ms. Virginia Goldstein (Planning Director, Planning Department, County of Hawaii)
The Honorable Colleen Hanabusa (Chair, Water, Land & Hawaiian Affairs, State Senate)
Ms. Laurie Ho (Coordinator, Garden Island Resource Conservation and Development)
The Honorable Steve Holmes (Chair, Environment/Public Works Committee, City Council,
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Mr. Ted Inouye (Chair, East Kauai Soil and Water Conservation District)
Mr. Charles Jencks (Director, Dept. of Public Works & Waste Management, County of Maui)
Ms. Joloyce Kaia (Chair, Hana Soil and Water Conservation District)
Mr. Gary Kam (District Conservationist, Natural Resource Conservation Service,
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Captain Gilbert Kanazawa (Commanding Officer, U.S. Coast Guard)
Mr. Kenneth Kaneshiro (State Conservationist, Natural Resources Conservation
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Mr. Dan Kaniho, Jr. (Chair, Mauna Kea Soil and Water Conservation District)
Mr. Wendell Koga (Executive Director, Hawaii Farm Bureau Federation)
Mr. Rick Kwock (General Contractors Association)
Mr. Stephen Kubota (Ahupua`a Action Alliance)
Ms. Lynn Lee (EIS Planner, Office of Hawaiian Affairs)
Lt. Col. Ronald N. Light (Commander/District Engineer, Honolulu District,
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Mr. Douglas MacCluer (Chair, Central Maui Soil and Water Conservation District)

APPENDIX B – Advisory Group Membership Lists

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Mr. Loren Mochida (Puna Soil and Water Conservation District)
Mr. Rob Morgenweck (Chair, South Oahu Soil and Water Conservation District)
The Honorable Hermina M. Morita (Chair, Energy & Environmental Protection
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The Honorable Bob Nakata (Chair, Labor and Environment Committee, State Senate)
The Honorable Patrick Kawano (Chair, County Council, County of Maui)
Mr. David Nobriga (Chair, West Maui Soil and Water Conservation District)
Mr. Paul Otani (Chair, Olinda-Kula Soil and Water Conservation District)
Ms. Ho`oipo Kalaena`auao Pa (Director, Native Hawaiian Advisory Council)
Mr. Cesar Portugal (County Engineer, Department of Public Works, County of Kauai)
Mr. Dave Raney
Mr. John Ray (President, Hawaii Leeward Planning Conference)
Mr. Chester Saito (General Contractors Association)
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Mr. Gerald Takayesu (Department of Environmental Services, City and County of Honolulu)
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Mr. Mike Tulang (Hawaii Association of Conservation Districts)
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Ms. Kat Brady (Coordinator, Ahupua`a Action Alliance)
Mr. Mike Buck (Administrator, DOFAW, Department of Land and Natural Resources)
Mr. Sean Casey (Director, Youth for Environmental Service)
Mr. Al Chee (Public Affairs Manager, Chevron Oil Company)
Ms. Linda Colburn (Executive Director, Hawaii Nature Center)
Mr. Dan Davidson (Land Use Research Foundation)
Mr. David Kimo Frankel (Sierra Club, Hawaii Chapter)
Dr. Sam Gon (Director of Science, The Nature Conservancy of Hawaii)
Professor Michael Hamnett (Director, Center for Development Studies,
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Mr. Robert Harris (UH Environmental Law Society)
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Ms. Donna Wong (Hawaii's Thousand Friends)
Dr. Lyle Wong (Administrator, Plant Industry Division, Department of Agriculture)
Mr. Darrell Young (Government Activities Representative, Tesoro Hawaii)

GOALS COMMUNICATION TEAM (GoComm)

(July 1995 – January 1996)

Janie Deuser (Deuser & Assoc.)
Susan Elliott Miller
Mika Ashley-Hollinger (Kauai North Shore Business Council)
Janet Ashman (Hawaii Sugar Planters Association)
Vince Bagoyo (Lanai Co., Inc.)
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Mark Frazier (Cotton & Frazier Consultants, Inc.)
Major Matthew Gogan (HQ USCINCPAC)
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George Kaya (Assistant to the Mayor, County of Maui)
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Pete L'Orange (Hawaii Leeward Planning Conference)
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Colleen Murakami (Department of Education)
James Rispoli (President, M&E Pacific)
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Troy Tanigawa (County of Kauai)
Murray Towill (Hawaii Hotel Association)
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Pat Wong (Manager, Environment Department, Hawaiian Electric Company)
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Representative Jim Shon (Chairman, Energy & Environmental Protection Committee)
Melissa Anderson (Land Use Research Foundation)
Commander Mark Claussen (Naval Base, Pearl Harbor)
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Gary Gill (Director, Office of Environmental Quality Control)
Maureen Hacoen (Ecologic)
Charlotte Kawazoe (HECO)
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Steve Olive (EA Engineering Science & Technology)
Jeri Shikuma (Hawaii Community Services Council)
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Darrell Young (BHP Hawaii)
Bruce S. Anderson, Ph.D. (Deputy Director for Environmental Health, Department of Health)
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**Marine and Coastal Zone Management Advisory Group
(MACZMAG)**

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Major General Edward Correa (Adjutant General, Department of Defense)
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Keoni Fairbanks (Executive Director, Kahoolawe Island Reserve Commission)
Kazu Hayashida (Director, Department of Transportation)
Seiji F. Naya, Ph.D. (Director, Dept. of Business, Economic Development & Tourism)
Bruce Anderson, Ph.D. (Director, Department of Health)
C. Barry Raleigh (Dean, University of Hawaii, School of Ocean & Earth Science & Technology)
David W. Blane (Director, Office of Planning)

Resource People

Robert Smith (Pacific Islands Ecoregion Director, U.S. Fish & Wildlife Service)
Lt. Col. Ronald N. Light (Commander/District Engineer, U.S. Army Corps of Engineers, Honolulu District)
John J. Naughton (Pacific Islands Environmental Coordinator, U.S. National Marine Fisheries Service)
Commander Richard Beseler (Commander, 14th Coast Guard District)
Kenneth M. Kaneshiro (State Conservationist, Natural Resources Conservation Service)
Naomi McIntosh (NOAA, National Marine Sanctuary Program)
Mark Mitsuyasu (Western Pacific Fisheries Management Council)
Raynard Soon (Department of Hawaiian Home Lands)
Sebaston Aloat (Office of Hawaiian Affairs, Land & Natural Resource Division)

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APPENDIX C

“The Hawaii Unified Watershed Assessment”
(text and Category I watershed maps
with priority watershed underlined)

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The Hawaii Unified Watershed Assessment

October 1, 1998

**State of Hawaii, Department of Health
Clean Water Branch
Polluted Runoff Control Program**

**State of Hawaii, Department of Business,
Economic Development, and Tourism,
Office of Planning-Coastal Zone Management Program**

**U.S. Department of Agriculture
Natural Resources Conservation Service**

Introduction

On October 18, 1997, the 25th Anniversary of the 1972 Clean Water Act, the Honorable Albert Gore, Jr., Vice President of the United States directed the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) to work with other federal agencies, state agencies and the public to develop a Clean Water Action Plan (CWAP) that charts a course toward fulfilling the original goal of the Clean Water Act - "fishable and swimmable" waters for all Americans.

A key element in the CWAP is a new cooperative approach to watershed protection called the Unified Watershed Assessment (UWA), in which state, tribal, federal and local governments, and the public first identify the watersheds with the most critical water quality problems and then work together to focus resources and implement effective strategies to solve these problems. Based on the watershed restoration priority setting guidance outlined in the *Final Framework for Unified Watershed Assessment, Restoration Priorities, and Restoration Action Strategies* (U.S. EPA), Hawaii will submit a list of watershed restoration priorities to the U.S. EPA by October 1, 1998. In developing these priorities, the State has identified the highest priority watersheds requiring restoration to be addressed beginning in the 1999-2000 fiscal period; coordinated with existing restoration priorities, including those established under section 303(d) of the Clean Water Act; and developed a preliminary schedule for the restoration of these priority watersheds.

Unified Watershed Assessments Process

The Unified Watershed Assessment process characterizes the conditions of waters and overall health of aquatic systems within watersheds, using the following general framework:

Category I -Watersheds in Need of Restoration.

These watersheds do not currently meet, or face imminent threat of not meeting, clean water and other natural resource goals. Identification of watersheds in need of restoration

is especially important because the CWAP may target new federal funds to these Category I watersheds.

Category II - Watersheds Needing Preventive Action to Sustain Water Quality.

These watersheds meet clean water and other natural resource goals and standards and support healthy aquatic systems. All such watersheds need the continuing implementation of core clean water and natural resource programs to maintain water quality and conserve natural resources.

Category III - Watersheds with Pristine/Sensitive Aquatic System Conditions on Lands Administered by Federal, State, or Tribal Governments.

State/tribes work cooperatively with federal land managers to identify watersheds with exceptionally pristine water quality, other sensitive aquatic system conditions, and drinking water sources that are located on lands administered by federal, state or tribal governments. These areas include currently designated and potential candidate Wilderness Areas, Outstanding Natural Resource Waters, and Wild and Scenic Rivers.

Category IV - Watersheds With Insufficient Data to Make an Assessment. These watersheds lack significant information, critical data elements, or the data density needed to make a reasonable assessment at this time.

To support the new and expanded efforts to restore and protect the nation's waters as proposed in the CWAP, the President's FY1999 budget proposes a Clean Water and Watershed Restoration Budget initiative. (Clean Water Action Plan, Overview, vii). Additional funding may come to the State as a result of this plan, and these funds will be targeted to the selected priority watersheds. At this time, however, it appears that the funding levels proposed under the President's budget initiative have been significantly reduced.

Hawaii's Unified Watershed Assessment Process

After reviewing the CWAP and guidance document, the Hawaii Department of Health (DOH), USDA's Natural Resource Conservation Service (NRCS), and the Hawaii Coastal Zone Management Program (CZM) within the State Department of Business, Economic Development, and Tourism (DBEDT) decided to take an approach based on developing restoration priorities within the scope of *existing efforts* throughout the State. This is consistent with EPA's UWA guidance document. Because of uncertain funding; limited time in which to convene this effort; and limited resources available to dedicate to an unfunded assessment, we directed our efforts to assessing what we already have in place throughout the State. We were very concerned about the short timeframe to accomplish this assessment and facilitate public participation in the process. Furthermore, we were apprehensive about the possible restrictions this process will place on future funding, as funding is only available for those watersheds currently identified as in need of restoration.

Among the eight major islands of the Hawaiian archipelago, there are 551 watersheds (See Table 1). Each Island has been assigned an 8-digit Hydrological Unit Code by the USGS. The DOH, NRCS, and CZM Program decided that the 8-digit Hydrological Unit Code was not specific enough to be useful for our State. Nevertheless, we also agreed that categorizing 551 watersheds would be too time consuming for the UWA. Thus, we decided to use the State's eleven-digit Watershed Unit Code and prioritize watersheds by regions and mountain ranges (see Table 2). We also agreed to gather more participants to make an initial ranking of Category I watersheds. We wanted broader participation from other agencies and interest groups to assess existing efforts statewide. This approach has proven to work well for our needs.

We wanted to be responsive as a State and provide a thoughtful, realistic assessment of watersheds that could be restored, given existing efforts, community participation, and additional funding. At this time, it is not realistic to request additional time from over-burdened agencies and community members to complete the assessment for all watershed as requested. We will undertake the assessment of Categories II-IV watersheds at a time when the process becomes more clearly defined in order for us to begin reprioritizing our already limited resources.

With this in mind, DOH, NRCS and CZM Program held meetings with local agencies to survey environmental restoration activities already underway in watersheds throughout the State. On June 8, 1998, a meeting was convened at the DOH to introduce partner agencies to the UWA concept. At this initial meeting, the national guidance was discussed and agencies were asked to describe current projects that may fit within the framework. Representatives from the U.S. Geological Service (USGS), NRCS, DOH's Clean Water Branch, Environmental Planning Office and Polluted Runoff Control Program, Department of Land and Natural Resources (DLNR), CZM Program and EPA attended this initial meeting.

At this meeting DOH presented information on the Clean Water 303(d) List of Water Quality-Limited Segments for FY 98 & 99, and the process by which this list was developed. In developing the 303(d) list, the public was given the opportunity to nominate for consideration waters they believed were impaired. This waterbody assessment meets the Clean Water Act's requirement that states assess the conditions of its waterbodies and prepare a list of its most polluted waters. The DOH offered the 303(d) list as an initial prioritization effort for Category I watersheds.

Following the national UWA guidance, each participating agency was asked to provide similar information regarding on going environmental restoration activities in watersheds throughout Hawaii. The NRCS provided its Environmental Quality Incentives Program (EQIP) list for FY'98, which included: West Maui, Pelekane Bay, Upcountry Maui, Mo'omomi and Hamakua/Hilo/Ka'u. The USGS priority list included: Waikele Stream, Manoa Stream, Kahana Stream and Punaluu Stream. The DLNR also provided its "hot spots" list, naming its priority areas of concern throughout the State.

Agencies discussed these and other efforts in areas around the State that could possibly meet the criteria of the UWA guidance. In order to make this assessment more oriented toward existing

efforts, we did not set our own specific criteria for nomination; rather we used a multi-voting system. Each attendee was encouraged to nominate watersheds. Then, each was discussed and prioritized, keeping in mind the UWA criteria and level of existing effort in the watershed. Through this process, a preliminary listing of watersheds was developed for broader consideration. Other discussion points included the need for public involvement/ participation and the need for a "landscape" approach to defining watershed districts (not just a single watershed but a watershed district that may encompass more than one watershed that all affects the same water quality limited segment). It was decided that another meeting would be called in July to continue this effort and to invite other agencies to participate.

On July 16th a second meeting was held at the DOH. Representatives from the CZM Program, DOH, NRCS, DLNR, State Department of Agriculture, Hawaii Association of Conservation Districts, National Marine Fisheries Service, U.S. Forestry Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, and U.S. Army Corps of Engineers attended this meeting.

Participants reviewed a watershed listing in a matrix format (Attachment 1) compiled from DOH's 303(d) list, NRCS's EQUIP list, USGS's priority list and DLNR's "Hot Spots" as a starting point for prioritizing watershed districts. They discussed ongoing efforts and developed localized selection criteria. Again, each participant was encouraged to nominate watersheds, discuss existing efforts in the area and the amount of public support for the watershed. All nominated watersheds were discussed, and three were chosen by multi-voting/consensus.

The areas selected at this meeting were:

- West Maui and Mountains
- Pelekane Bay-Kohala Mountains
- Koolaupoko and Mountains

It was agreed that this list would be taken to the NRCS State Technical Committee for final review. The list would then be attached to a letter from Bruce Anderson, Deputy Director of DOH to EPA by August 1, 1998. The committee members, NRCS, CZM Program, and the State Technical Committee requested that this letter come from Dr. Anderson, after they reviewed and approved the final letter.

At the NRCS State Technical Committee meeting on July 27, 1998, the list was presented and criteria discussed with the membership. During this meeting, it was decided that the list include at least one watershed area on each of the five major islands in the State, at least one from each county. The Committee believed it was important to give residents of these islands an opportunity to receive additional funds to meet their watershed restoration goals. As a result, two additional watersheds were added: Nawiliwili (Kauai) and South Molokai.

Public Notice

A Public Notice was published in the Honolulu Advertiser on Wednesday August 19, 1998, requesting comments from the public (Attachment 2). The selected watersheds and criteria for selection, as developed by the participants, were included in the Public Notice:

Criteria:

- Agency interest/focus/existing work that promotes partnerships;
- Existing community interest;
- High probability of success and results transferable to similar areas within State;
- Historic and cultural significance;
- Presence of mixed land uses (agriculture, urban, residential, industrial, military);
- Presence of important natural resource;
- Presence of waterbodies on DOH's Section 303(d) list of Water Quality Limited Segments; and
- Watersheds capturing the "uniqueness" of Hawaii.

List of Watersheds and reasons for selection:

-South Molokai (Molokai) - Erosion control for water quality improvement, coral reef protection and historic/cultural preservation. High probability of success because of current projects and partnerships.

-Pelekane Bay-Kohala Mountains (Hawaii) - Erosion control and resource management for coral reef protection, enhanced recreational usage and historic/cultural preservation. Presence of important natural resources. High probability of success because of current projects and partnerships.

-West Maui-West Maui Mountains (Maui) - Reduce sediments and nutrients for water quality improvement, enhanced recreational usage along coastline and habitat improvement in a National Marine Sanctuary, and historic/cultural preservation. Presence of important natural resources. High probability of success because of current projects and partnerships.

-Koolaupoko District-Windward Koolau Mountains (Oahu) - Habitat restoration and protection, reduction of nonpoint source runoff for enhancement of recreational usage of streams and nearshore waters, and historic/cultural preservation. Mix of land uses. High probability of success because of current projects and partnerships.

-Nawiliwili (Kauai) - Identification and reduction of nonpoint source runoff to restore habitat and enhance recreation usage. Mix of land uses. Presence of important natural resources.

DOH issued a press release at the same time as the public notice. Public comments were accepted until September 16, 1998. Comments submitted (Attachment 3) were discussed with participating agencies and reviewed by DOH, NRCS and CZM Program on September 17, 1998. At this meeting, it was agreed that we did not have enough time to convene a meeting that would bring together the public and agencies to readdress the priority watersheds in Category I. Most of the comments were favorable of the process and only a few additional watersheds outside of the existing Category I listing were nominated. The remaining Category I watersheds not part of the above listed five "first tier" watershed areas are referred to as "second tier" Category I

watersheds. The "second tier" watersheds are all the remaining ones that have or drain into CWA 303(d) listed waterbodies, plus Kaho'olawe. Other nominated watersheds not on the CWA 303(d) list (Waialua-Kauai, East Maui, East Molokai, Kohala and West Hawaii) will be put into appropriate categories and addressed accordingly at a later time.

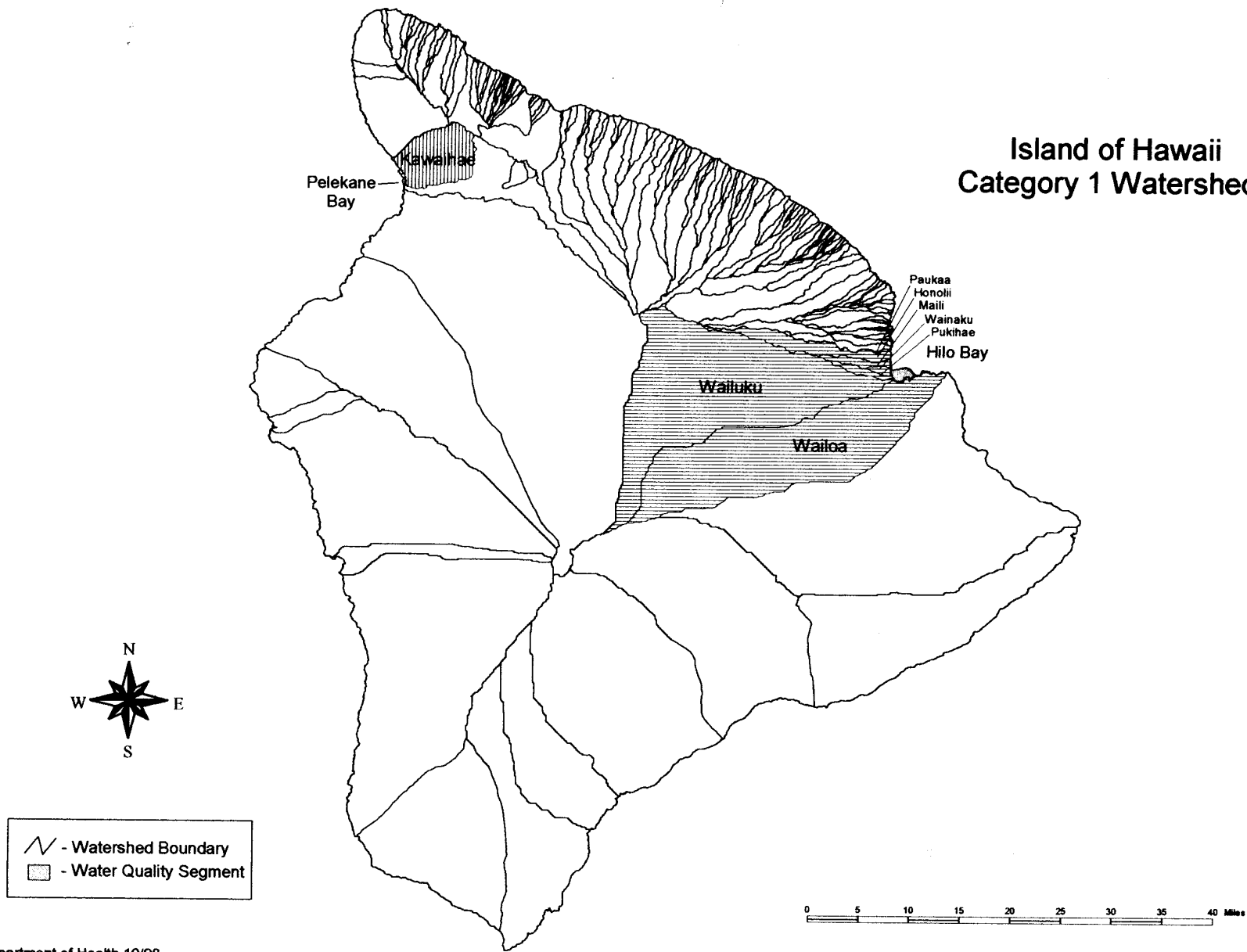
The State recognizes that Kaho'olawe is currently receiving substantial funds from the U.S. Navy for restoration activities. The Kaho'olawe Island Reserve Commission, who oversees this restoration, has volunteered to share information regarding their efforts and successes with other watersheds groups. Based on the fact that a great amount of restoration work is underway and that there is a significant need for habitat and coastal water quality restoration, Kaho'olawe has been included as a Category I watershed.

Results Hawaii's assessment consists of maps of each major island's watersheds and a list of all watersheds (Table 1) within State boundaries, aggregated into 11 -digit hydrologic units. The priority watersheds nominated for Category I are delineated on the maps and Table 2. All remaining Category I watersheds (second tier) are delineated on maps and Table 3.

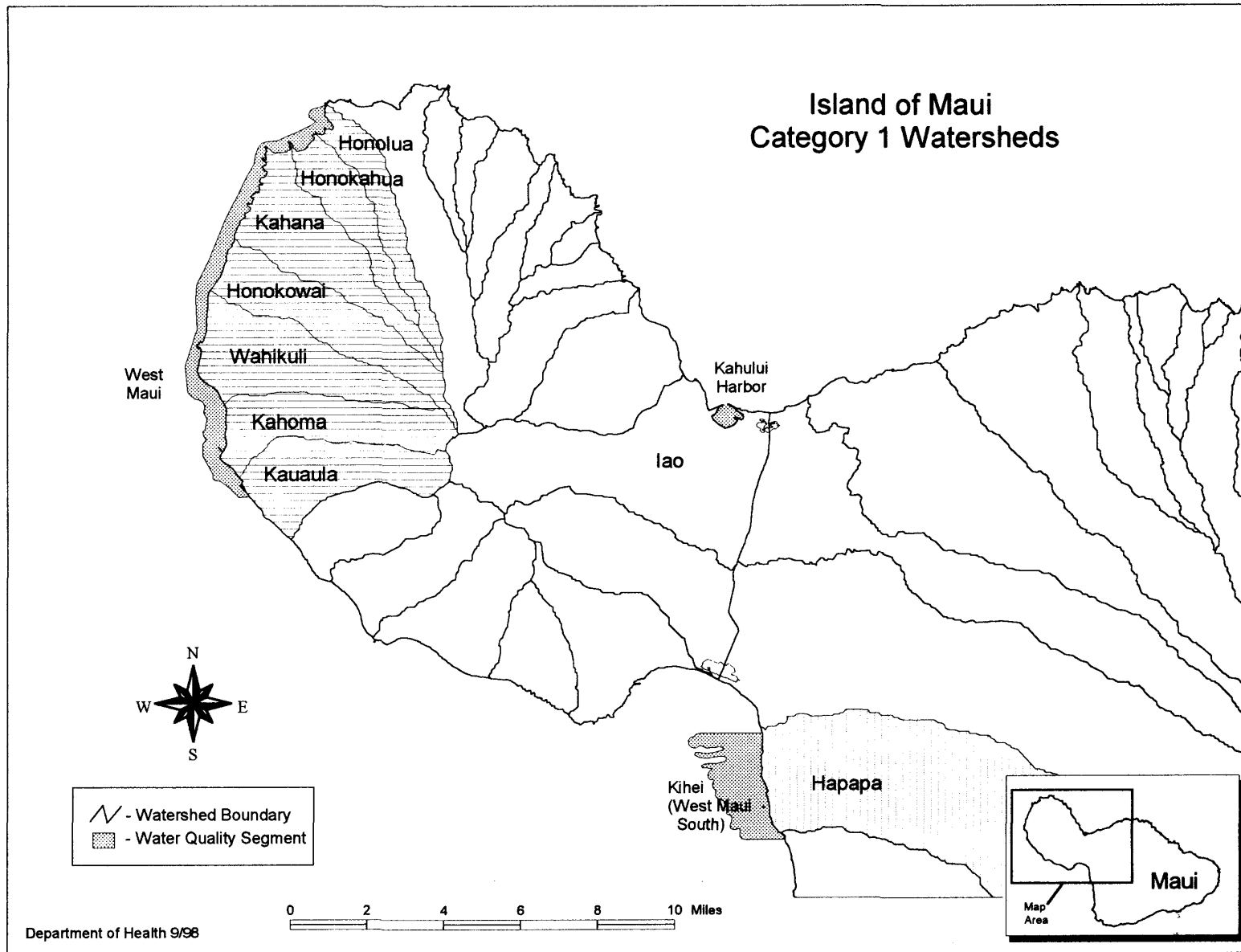
Watershed Restoration Action Strategy

The next step, is for Hawaii to convene a joint agency/public committee to discuss the direction and approach that Hawaii will take in developing restoration strategies and watershed plans for the five priority watersheds. If funding is obtained, implementation of the watershed plans will begin. We will make every effort to complete the ranking of the additional watersheds throughout the State with the guidance and assistance of this committee. Funding is an important component in continuing the CWAP process.

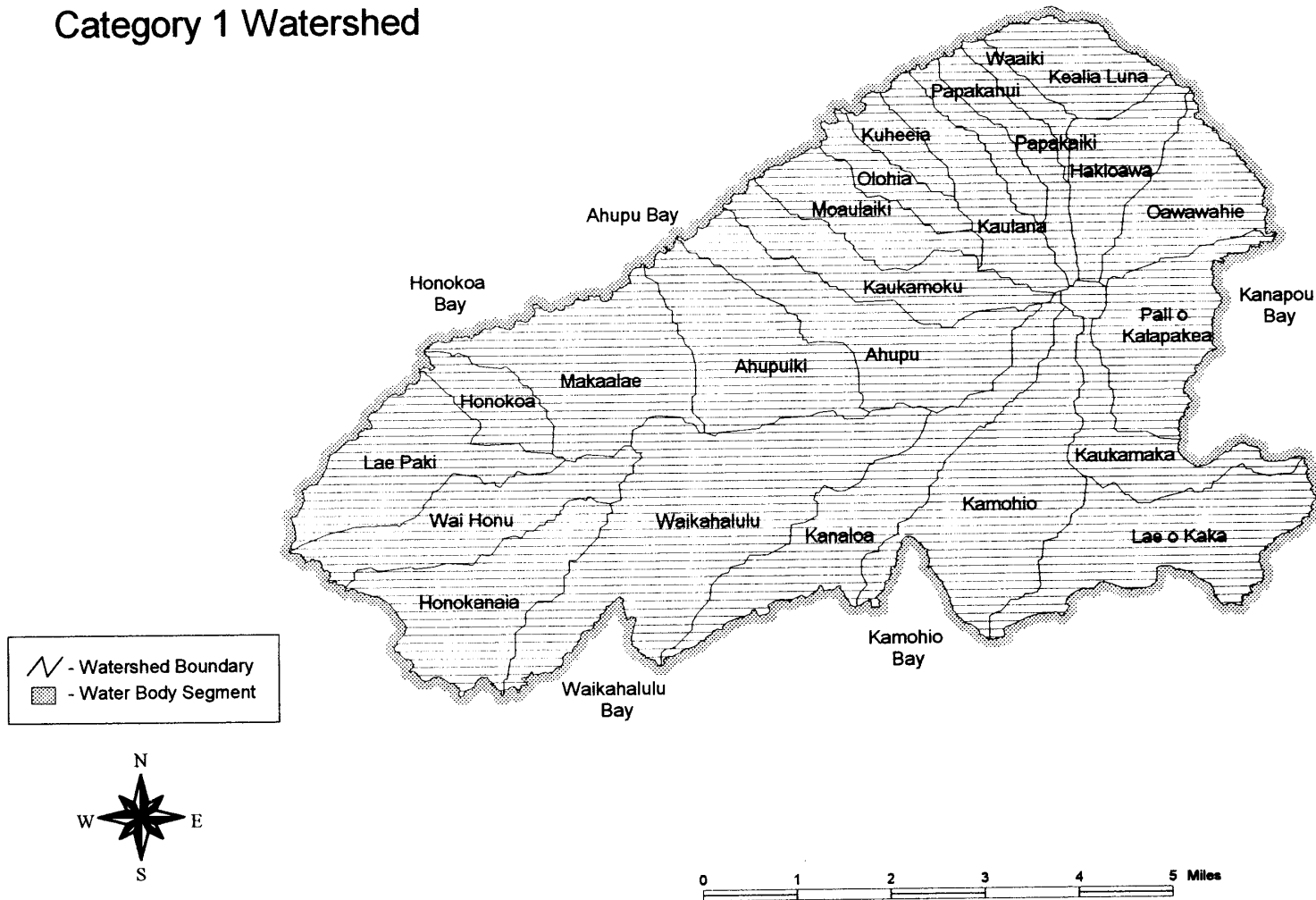
Island of Hawaii Category 1 Watersheds



Department of Health 10/98

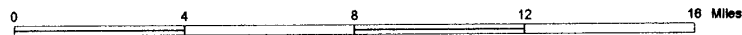
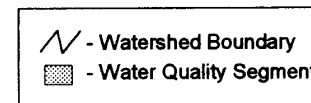
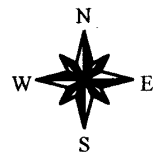
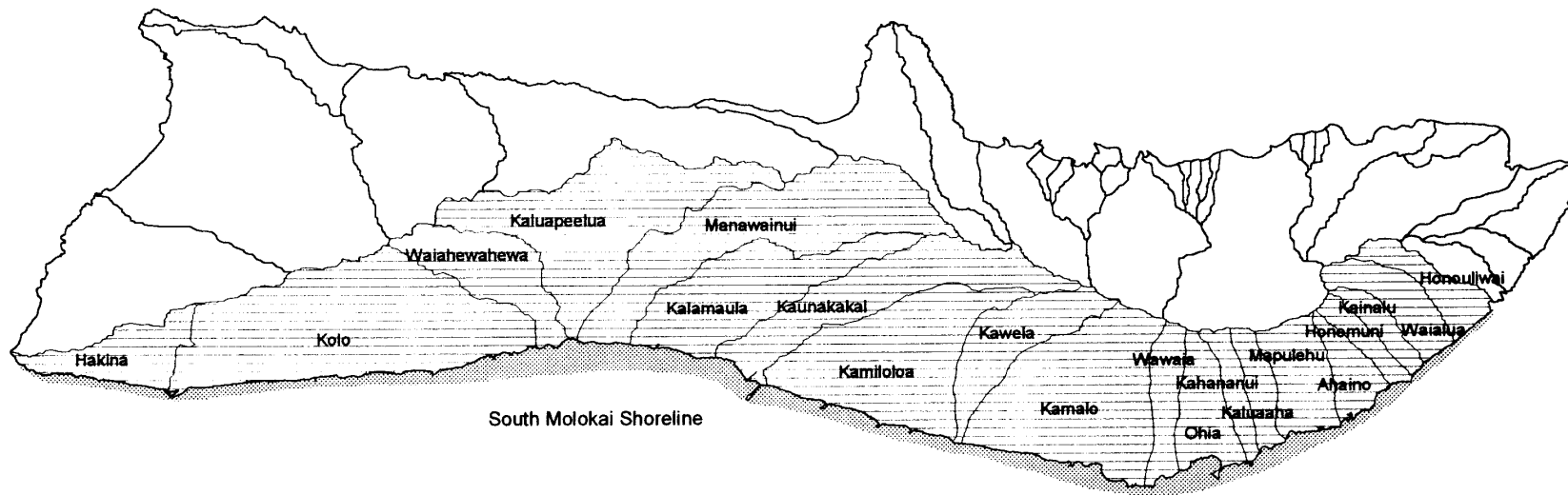


Island of Kahoolawe Category 1 Watershed

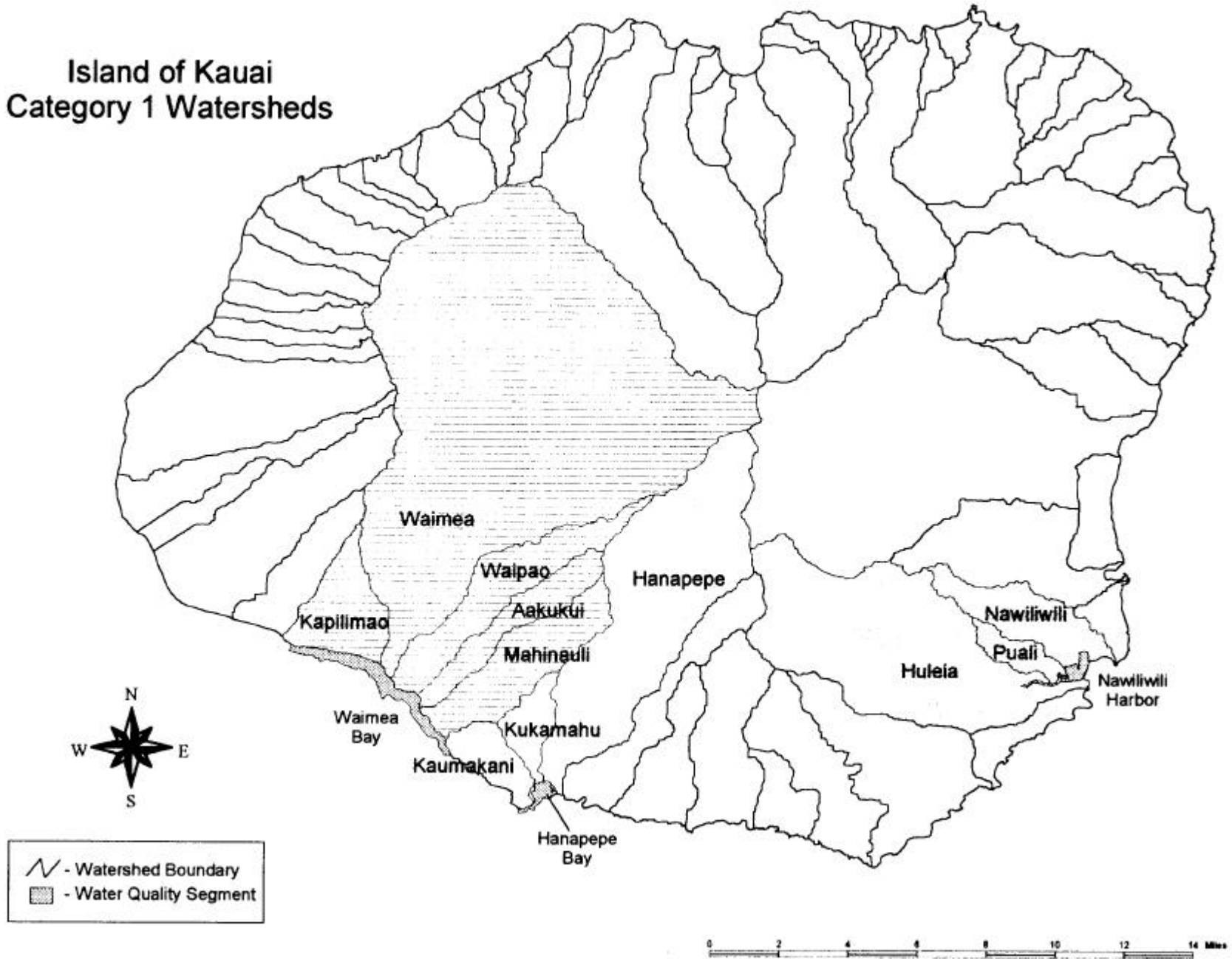


Department of Health 10/98

Island of Molokai Category 1 Watersheds



Island of Kauai Category 1 Watersheds



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APPENDIX D

DOH Polluted Runoff Control Program Section 319(h) Grants: Information and Sample Application Form

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**Hawaii Department of Health
Clean Water Branch
Polluted Runoff Control Program**

**Information on Request for Proposals
FY1999-2000 Grants for Implementation Projects & Loans for HCWSRF**

- DESCRIPTION:** Request for proposals for polluted runoff control management projects to address nonpoint source pollution, statewide polluted runoff within selected Category 1 Watersheds as identified in the State's Unified Watershed Assessment, and to implement portions of the Hawaii Coastal Nonpoint Pollution Control Plan.
- FUNDING SOURCES:**
1. Grant
U. S. Environmental Protection Agency Clean Water Act Section 319(h) Nonpoint Source Pollution Management Grant, Federal Fiscal Years 1999 and 2000.
 2. Loan
Hawaii Clean Water State Revolving Fund Loan
- REQUESTING AGENCY:** Polluted Runoff Control Program
Clean Water Branch
Hawaii State Department of Health
919 Ala Moana Boulevard, Room 301
Honolulu, Hawaii 96814-4912
- CONTACT PERSON:** Mr. Randall Rush
Program Coordinator
Phone: (808) 586-4309 Fax: (808) 586-4352
- PROPOSAL FORMAT:** Submission of a proposal is the first step in the application process. Use the PROPOSAL FORM provided by the requesting agency.
- PROPOSAL DEADLINE:** Mail or hand deliver six copies of the completed form to the requesting agency by 4:00 pm on Friday, June 30, 2000. Contact Randy Rush for copies of the proposal format. Facsimile transmissions will NOT be accepted.
- ELIGIBLE APPLICANTS:** Non-profit organizations, including non-federal government agencies, environmental groups and universities can apply for and receive grant funds. Federal agencies may participate in the project, but may not apply for nor receive grant funds. Non-profit

organizations are required to submit State tax and Federal tax clearance forms to DOH prior to awarding of any grant funds.

**ELIGIBLE PROJECTS
AND ACTIVITIES:**

Projects that prevent, control, and/or reduce nonpoint source pollution of Hawaii's water resources are eligible for funding. Projects may include, but are not limited to, one or more of the following activities: implementation of a portion of the Hawaii Coastal Nonpoint Pollution Control Plan, implementation of best management practices (BMPs), demonstration of a new or innovative BMP or institutional approach to accelerate technology transfer and adoption, restoration of resources, enhancement of resources, information and education programs, and coordination of citizen or volunteer monitoring programs which lead to the implementation of BMPs. Projects that fall within the Category 1 Watersheds as listed in Hawaii's Unified Watershed Assessment shall also be considered.

**ACTIVITIES NOT
ELIGIBLE:**

Include (1) planning, research, or assessment activities other than those conducted to evaluate the project may not be included in projects, except if done in connection with addressing nonpoint source groundwater resource problems or if implemented with non-grant funds and (2) activities undertaken pursuant to National Pollution Discharge Elimination System (NPDES) permit requirements.

FUNDING:

Grant requests of and up to \$120,000 will be considered. Grant funds shall only be used for the implementation of eligible activities and may consist of no more than 50% of the total project costs. A maximum of 10% of the total grant funds can be used for administrative purposes, which include costs related to clerical and fiscal management of the project. Fringe benefits shall not exceed 10% of salaries paid from grant funds. Indirect costs shall not exceed 10% of salaries plus fringe. Grant funds may not be used to pay for out of State travel. Grant funds must be matched 100% with funding or contributions from non-federal sources. Contributions can include purchased or donated labor, equipment, supplies, and materials. Match items shall be subject to the requirements of US EPA 40 CFR Ch.1 (7-1-98 Edition), 31.24 Matching or cost sharing. A copy is attached for your reference. Loan Applicants are also encouraged to apply for Clean Water Act State Revolving Fund Loans to carry out nonpoint source control work. Requests of \$500,000 up to \$2,000,000 shall be considered.

Loans are at a low interest rate (2/3 of the current market rate). Loans can pay 100% of activity cost. Applicants must provide proof of a dedicated payback source and will need to enter into a loan agreement with the Department.

**REQUIRED PROJECT
ACTIVITIES FOR
GRANT APPLICANTS:**

MONITORING activities are required to adequately evaluate project effects and effectiveness so that project objectives, expected results, and benefits can be documented and quantified. Examples, of quantifiable environmental results for ‘on the ground’ type projects include (1) the number of measures implemented (e.g. BMPs), (2) the reduction in pollutant loadings or prevention of new loadings (e.g. lbs. or %), and (3) the improvement in biological or physical parameters. Quantifiable environmental results for ‘information and education’ type projects include (1) the number of events conducted (2) the number of participants in the event(s), and (3) an increase in NPS pollution awareness, education, and knowledge of preventive behaviors or methods of the participants based on pre and post survey analysis.

PUBLIC INFORMATION, EDUCATION AND PARTICIPATION activities are required to adequately educate, inform and/or involve the interested and affected public and to transfer technology. Activities may include, but are not limited to: establishing effective public outreach methods, field demonstration days, brochures, oral presentations, newspaper articles and volunteer citizen participation.

NUTRIENT AND PESTICIDE MANAGEMENT activities in compliance with appropriate Federal/State/local standards must be practiced by and owners or operators of demonstration project sites.

PREPARATION AND MAINTENANCE of all physical measures installed with grant funds must be conducted for an appropriate period of time, depending on the type of measure installed and as specified by appropriate Federal/State/local standards.

REPORTS required: Quarterly Status Reports, Final Project Report, Monthly and Cumulative Expenditure Reports, Monthly and Cumulative Non-federal Contribution Reports.

SELECTION
PROCESS:

This is a multi-step process. Proposals will be evaluated and selected by Clean Water Branch technical staff according to the priorities outlined. Applicants will be notified of Proposal selection or non-selection by August 2nd, 2000.

Applicants with selected proposals will be required to prepare a final project proposal based on the format to be provided. Applicants may request a meeting with the NPS Program staff to discuss preparation of their final project proposals. Six copies of the final proposal must be mailed or hand-delivered to the requesting agency by 4:00 pm on the date designated by the Clean Water Branch. Facsimile transmission will not be accepted. Final project proposals will be evaluated and ranked by an Interagency Review Committee according to the same priorities as for the proposals.

The Department anticipates making final selection or non-selection of projects by October 2, 2000.

Selected project applicants, along with all participating organizations, will be required to meet with NPS staff to review project sites(s) and discuss grant requirements. Project proposals may require revision to meet quality assurance and quality control requirements and to better address the list priorities. State guidance for fiscal years 1999 and 2000 may change due to revisions in Federal guidance from U.S. EPA and changing STATE priorities.

Applicants should expect a 6-8 month period from date of selection notification for a contract to be developed and finalized between the applicant and the Department.

FUNDING
AVAILABILITY:

Grants - Grant funds shall be available to the selected project applicants after the contract for services between the applicant and the Department of Health is fully executed. Grant funds shall be dispersed to the selected project applicants on a **cost-reimbursable basis only**. An advance of one month/project period is available upon request and is available after a contract for services between the applicant and the Department of Health is fully executed. Any agreement arising out of this offer is subject to the approval of the Department of the Attorney General as to form, and to all further approvals, including the approval Governor, required by statute regulation, rule, order or other directive. Due to the STATE

procurement procedures, funds may not be available for approximately nine months after the final proposal is received.
Loans - A loan project will be ranked according to the priorities for project selection as stated below. It will be placed on a State priority list for loan funds available for nonpoint source control projects. Its funding is subject to availability of loan funds in conjunction with meeting all loan application requirements of the Department.

PROJECT
PERIOD:

Grants - Projects shall be funded for a maximum period of 24-months after contract execution including preparation of all reports.

Loans - Projects should be for two years and will have a flexible payback schedule subject to the loan agreement.

PRIORITIES FOR
PROJECT
SELECTION:

Priority consideration will be given to projects that propose to accomplish one or more of the following outcomes:

- Meet all project requirements as shown in this document.
- Implements a portion of Hawaii’s Coastal Nonpoint Pollution Control Management Plan
- Make a significant impact in addressing nonpoint source and/or pollution in watersheds with Water Quality Limited Segments (WQLSs). For instance, the demonstration of an innovative BMP which addresses a major pollutant affecting one or more high priority WQLSs or the implementation of BMPs in a watershed or large-scale basis to address major pollutants affecting a high priority WQLS. (WQLSs, as identified by the Hawaii State Department of Health, do not meet or are not likely to meet State water quality standards without the implementation of additional measures to control NPS pollution).
- Are part of a comprehensive watershed initiative/management effort that address all of the major sources of NPS pollution affecting water quality in watersheds Statewide and Category 1 Watersheds as stated in the Unified Watershed Assessment (see attached list and maps). These watersheds are in need of restoration

and do not meet, or face imminent threat of not meeting clean water and other natural resource goals. Projects may be one phase of a comprehensive plan, a continuation or completion of a previous project, or implementation of a previous demonstration project. If a project is part of a watershed restoration action strategy, it should cite which watershed assessment or management plan it is from. Please note that projects located in Pelekane Bay, West Maui, and Ala Wai Watersheds will not receive points for special geographic targeting. These areas have received federal congressional appropriations and Unified Watershed Assessment implementation funds

Projects should also include one or more of the following specific activities:

Explicit short term and long term goals, objectives, strategies to protect surface and groundwater.

A balanced approach that emphasizes both Statewide nonpoint source programs and on the ground management of individual watersheds where waters are impaired and threatened.

Abatement of water quality impairments from existing sources and prevents threats to water quality from present and future activities.

Environmental Education and development of an Effective Public Outreach Method.

Program integration with other environmental and natural resource management programs.

Demonstrate interagency cooperation by involving other organizations.

A budget that clearly delineates expenditures and seems reasonable in its costs.

Prioritized List of Hawaii’s Category I Watersheds

Watershed & Island	County	Specific Pollutant
First Tier Watersheds		
South Molokai, Molokai	Maui	nutrients, suspended solids, turbidity
Koolaupoko, Oahu	Honolulu	siltation, nutrients, pathogens, turbidity, exotic species, other habitat alterations.
Nawiliwili Bay, Kauai	Kauai	turbidity, metals
Second Tier Watersheds		
Hanapepe Bay, Kauai	Kauai	nutrients
Hilo Bay, Hawaii	Hawaii	turbidity
Honolulu Harbor, Oahu	Honolulu	nutrients, siltation, turbidity
Kahana Bay, Oahu	Honolulu	siltation, suspended solids
Kahoolawe	Maui	siltation, turbidity, metals
Kahului Bay, Maui	Maui	nutrients, pathogens
Keehi Lagoon, Oahu	Honolulu	siltation, suspended solids, turbidity
Kewalo Basin, Oahu	Honolulu	nitrogen
Pearl Harbor, Oahu	Honolulu	nutrients, siltation, turbidity, organic chemicals
Kaiaka-Waialua Bays, Oahu	Honolulu	turbidity
Waimea Bay, Kauai	Kauai	nutrients

The following are also listed as priority watersheds, however they will not qualify for geographic targeting points in this year’s selection process because of increased funding available through Unified Watershed Assessment implementation funds and special congressional appropriations.

Watershed & Island	County	Specific Pollutant
West Maui, Maui	Maui	nutrients, suspended solids, turbidity, pathogens
Pelekane Bay, Hawaii	Hawaii	nutrients, pathogens, turbidity
Ala Wai Canal, Oahu	Honolulu	pesticides, metals, lead, nutrients, nitrogen, phosphorous, siltation, pathogens, turbidity

Criteria for Proposal Evaluation

The Department Review Panel and the Interagency Review Panel will use the following criteria in selection of a proposal:

15%	Water Quality Issue and Pollutant Priority to be Addressed
15%	Potential for Significant Results/Benefits
15%	Geographic Targeting
10%	Demonstration of Interagency Cooperation
10%	Public Outreach and Education
10%	Costs
5%	Watershed Initiative

Hawaii Department of Health
Clean Water Branch
Polluted Runoff Control Program

Proposal Application for Polluted Runoff Control Projects
FY 1999-2000 319(h) Clean Water Act Grant Funds and FY2000 Hawaii CWSRF Loan

This form is to be used for both the Section 319(h) grant application and for the Hawaii CWSRF loan application. If the applicant wants to be eligible for both the grant or loan, check yes or no in the bolded line after item 2, at the bottom of this page. Otherwise, if not checked, the Department assumes the applicant is only interested in competing for the grant.

Please complete the information requested on this form. Do NOT alter this form or attach any additional sheets, unless requested or specifically allowed. Please mail or hand deliver six copies of the completed form to the requesting agency by 4:00 p.m. Friday, June 30, 2000. Facsimile transmissions shall NOT be accepted.

1. PROJECT TITLE:

2. APPLICANT INFORMATION:

Agency/Organization:

Project Manager:

Title:

Address:

Phone:

Facsimile:

Employer Federal Identification Number: 99- _____

If you are a State or County agency, and you are not selected for grant funding, would you like to be considered for a Hawaii CWSRF Loan? **YES** **NO**

3. PROJECT PERIOD (Maximum project length: 24-months, including report preparation.)

Start Date:

End Date:

4. FISCAL SUMMARY:

Grant Funds Requested: \$	%
Non-federal Contributions: \$	% (minimum 100% required)
Total Project Cost: \$	100%

5. PROJECT SITE DESCRIPTION (Fill in the following items and attach a map showing island location and project site boundary.)

Location:

Land Owner:

Land User:

Size of treatment (acres, miles, feet, etc.):

Type of Land Use(s):

[100%]

6. WATER QUALITY PROBLEMS: (Describe the nature and extent of threats or problems necessitating the project and name the water bodies and watersheds affected.)

7. PROJECT PURPOSE: (Describe what is to be demonstrated or implemented, be specific.)

8. PROJECT GOALS: (Describe the NPS pollutants to be prevented, controlled, and/or reduced and to what extent.)

9. PROJECT BENEFITS: (Describe the expected results, impacts, and/or benefits of the project.)

10. RELATIONSHIP TO OTHER PROJECTS: (Describe the relationship to other projects. e.g., Is the project a 'stand alone' project, a continuation of an existing project, or is it part of a larger more comprehensive project?)

11. SCOPE OF WORK:

Describe in chronological order, the activities to be conducted to implement the project. Include activities to be conducted by all participating organizations, including federal. If appropriate, describe work products.

For required project activities (monitoring, public education, nutrient management, O&M, and reports), please use the heading as indicated below. All other activities are considered general project activities.

Grant recipients will not be reimbursed for expenses associated with activities that begin before the contract is fully executed. If activities of this type are to be included in the project, please describe them and identify them as such under general project activities.

A. General Project Activities:

B. Monitoring Activities: (Describe what will be monitored and for what purpose.)

C. Public Education, Information, and Participation Activities: (Describe activities to be conducted, target audience, and for what purpose.)

D. Nutrient and Pesticide Management Activities: (For demonstration sites, describe current activities being conducted and/or planned project activities.)

E. Operation and Maintenance Activities: (Identify all physical measures to be installed with grant funds and describe activities to be conducted and time period.)

F. Reports: (list the organization or person that will be responsible for the preparation of the following required reports.)

1. Quarterly Status Reports:
2. Final Project Report:
3. Monthly and Cumulative Expenditure Reports:
4. Monthly and Cumulative Non-federal Contribution Reports:

12. PROFILE OF APPLICANT ORGANIZATION:

Purpose of Organization:

Employer Federal Identification Number: 99- _____

Experience with Similar Projects:

Role/Contribution to Project:

13. PROFILE OF PROJECT MANAGER:

Educational Background:

Relevant Work History (position, agency, job description, time period.):

Experience with Similar Projects:

Role/Contribution to Project:

14. INTERAGENCY COOPERATION:

Provide the following information for all organizations, agencies, or groups actively participating in the proposed project. Additional sheets may be attached, if more than two organizations are participating in the project.

For all organizations other than the applicant, please provide documentation of agency commitment to carry out it's role or contribute to the project. Provide a single copy of any formal

cooperative agreements, such as a “Memorandum of Understanding” or letters indicating commitment.

1. Participating Organization Name:
 Contact Person: Role/Contribution to Project:
 Phone:
 Facsimile:
 E-mail:

2. Participating Organization Name:
 Contact Person: Role/Contribution to Project:
 Phone:
 Facsimile:
 E-mail:

**CALENDAR AND CHECKLIST
Polluted Runoff Control Program
FY-1999 and 2000 Grant/Loan Application**

Calendar

May 8-17, 2000	Request for project proposals published in local newspapers.
June 30, 2000	Deadline for proposals in multi-tier process.
July 5, 2000	Proposal review.
August 2, 2000	Deadline for Department to notify applicants of proposal selection or non-selection for multi-tier process. Information and requirements for final proposals mailed to selected proposal applicants.
August 31, 2000	Deadline for final proposals.
September 27, 2000 second	Deadline for Interagency Review Committee to select proposals for second tier for funding.
October 2, 2000	Deadline for Department to notify applicants of selection or non-selection, and award amount. Applicant must anticipate a 6-8 month period from notification date for a contract to be developed between applicant and Department.
Approximately December 1, 2002	Estimated deadline for project completion.

PROPOSAL CHECKLIST:

Please check that your proposal package meets the following requirements:

- _____ Six copies of the proposal form filled out completely.
- _____ A copy of documentation showing participating agencies' commitment to the project attached to each of the six proposal forms (proposal form item 14).
- _____ Mailed or hand-delivered to requesting agency by 4:00pm Friday, June 30, 2000. (Facsimile transmissions will NOT be accepted.)

Requesting Agency:
Polluted Runoff Control Program
Clean Water Branch, Room 301
919 Ala Moana Boulevard
Honolulu, Hawaii 96814-4912

APPENDIX E

Distribution of CWA 319(h) Grants in Hawai`i for 1990-1999 by Categories

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Figure E-1
Distribution of Section 319(h) Grants by Island (1990-1999)

- Oahu (\$1,156,545)
- Hawaii (\$ 568,377)
- Maui (\$ 418,740)
- Molokai (\$ 277,000)
- Kauai (\$ 177,498)

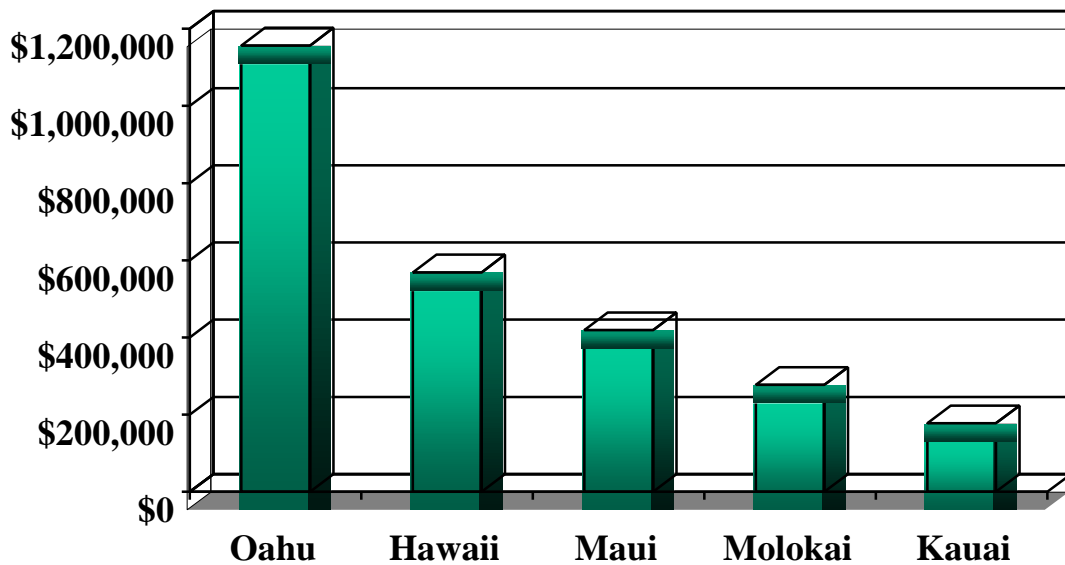


Figure E-2
Distribution of Section 319(h) Grants According to Land Use (1990-1999)

- Agriculture (\$1,728,110)
- Wetlands/Riparian areas (\$ 328,333)
- Urban (\$ 198,000)
- Forestry (\$ 56,000)
- General education (\$ 383,155)
- Volunteer monitoring (\$ 179,333)

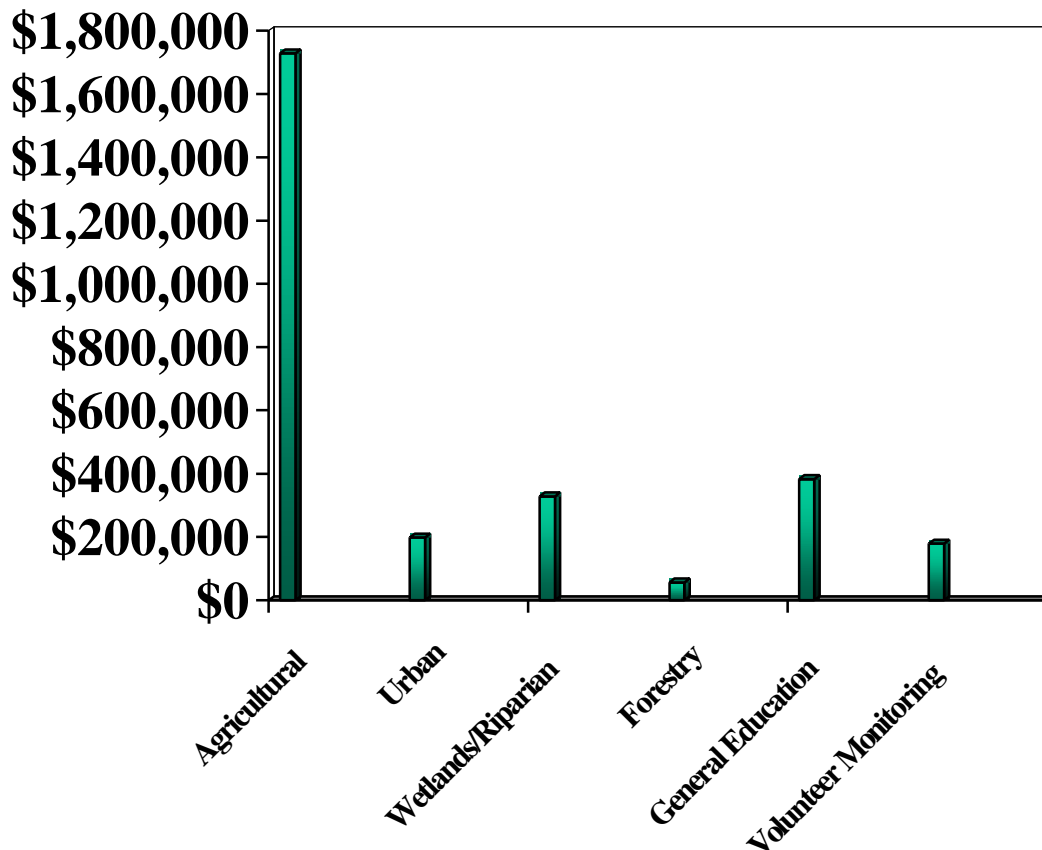


Figure E-3
Distribution of 319 funds for Agricultural Land Use Activities (1990-1999)

- Agriculture -- \$1,728,110
 - Field crops (\$784,285)
 - Range management (\$541,000)
 - Livestock mgt. & Aquaculture (\$253,875)
 - Education (\$148,950)

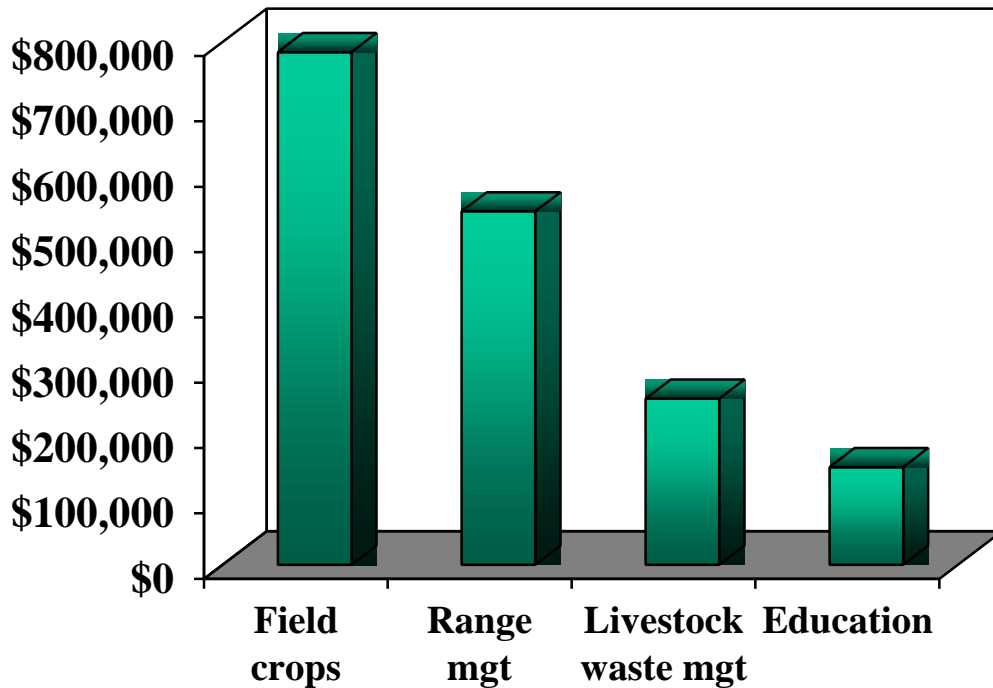
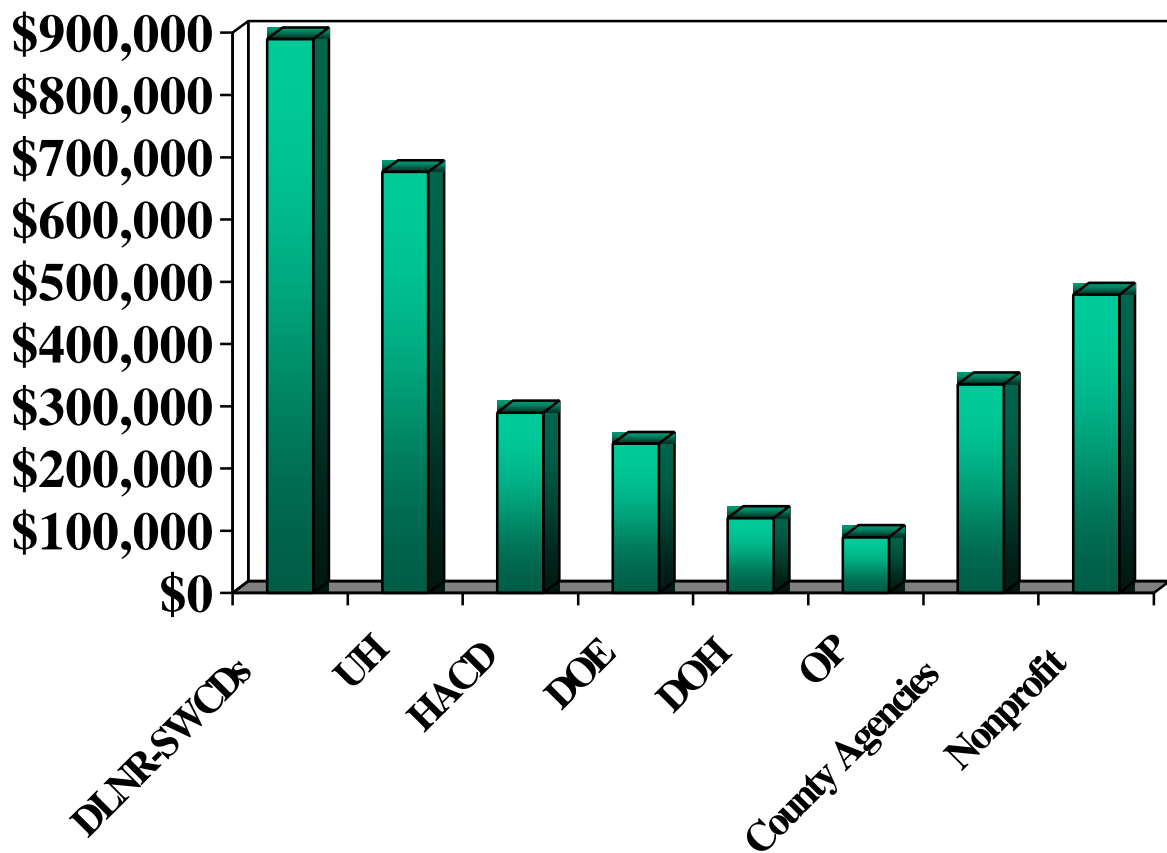


Figure E-4
Distribution of Section 319(h) Grants by Contractor (1990-1999)



APPENDIX F

Detailed Descriptions of Hawaii's 18 Water Quality Limited Segments

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APPENDIX F

Detailed Descriptions of Hawaii’s 18 Water Quality Limited Segments

This appendix is a county by county overview of island watersheds and associated water quality health. A summary table listing the Water Quality Limited Segments and their associated pollutants is on the last page of the appendix.

CITY AND COUNTY OF HONOLULU (OAHU)

The following descriptions of the Water Quality Limited Segments (WQLSs) on Oahu are based on information contained in the 1998 State 305 (b) Report, 1997 State 303(d) list, *Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems* (DOH 1990), *Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan* (1996), and the *Water Quality Management Plan for the City and County of Honolulu* (C&C of Honolulu 1990). There are eleven WQLSs on Oahu. Since polluted runoff is mostly due to human activity, it is understandable that the most populous island has the most WQLSs.

Kahana Bay

Kahana Bay is a drowned river valley, located on the northeast coast of Windward Oahu. Its boundary is the 30-foot depth contour from Mahie Point to where the 30-foot and 18-foot contours converge. One mile of Kahana Stream is also included. The bay has a total area of 294 acres (DOH 1990, p. V-7). The Kahana State Park, with an area of 7.96 square miles, covers almost the entire drainage area of 8.33 square miles. The offshore boundary of the segment extends from Mahie Point northward to the 30-foot depth contour, then westward along the 30-foot contour following northward until the 30-foot and 18-foot contours converge to meet the shoreline.

Kahana Bay is a natural embayment, used for swimming, boating, and other water recreational sports (C&C of Honolulu 1990, p. 8-16). It is an example of a waterbody where natural events have a greater influence on water quality than human activities. The entire valley is a State Park. It is essentially a pristine area, with only limited development at the lower end of the valley (DOH 1990, p. V-7).

There are no point source discharges into the bay. However there are some residential cesspools. The resident population is estimated to be 130 people living in 30 households. The existing cesspools will be eliminated as homes are refurbished. Public convenience stations are located in the State Park and the City Beach Park and discharge wastes into cesspools. Sediments and nutrients are transported into the bay by Kahana Stream and overland routes (C&C of Honolulu 1990, p. 8-18).

Total freshwater runoff into the bay is estimated at 30 million gallons per day(mgd). Of the eight parameters tested by the DOH at its monitoring station, five parameters have values exceeding the maximum criteria allowed for that parameter. Major violations have been found for ammonia nitrogen, total nitrogen, total phosphorus, turbidity, and chlorophyll (C&C of Honolulu 1990, p. 816). The high levels of nitrogen and phosphorus are primarily due to the lush vegetative growth in the valley and the stream estuary.

Kaneohe Bay

Kaneohe Bay is the largest embayment in the State of Hawaii with a surface area of 18 square miles. It is 7.9 miles long and 2.6 miles wide and has a volume of 70,263 million gallons. Mean depth is 27 feet. The land area of the basin is 40 square miles and average stream flows are 64 mgd. Subareas of Kaneohe Bay include Heeia Boat Harbor, Kaneohe Yacht Club, and Kaneohe Marine Corps Air Station Harbor. The water quality limited segment boundary extends northwestward from Pyramid Rock along the 18-foot depth contour to Chinaman's Hat, and westward to Kualoa Point (C&C of Honolulu 1990, p. 8-19).

Historically, Kaneohe Bay teemed with marine life. Major problems arose as a result of the introduction of hoofed animals, and more significantly, because of the extensive farming of pineapple prior to 1940. Pineapple cultivation caused extensive sedimentation of the bay. Also the bay itself was severely stressed by a massive (about 11 million cubic yards) coral reef dredging between 1939 and 1942 as part of seaplane landing area construction. Most of this material was used for landfill in the bay, primarily at what is now known as Marine Corps Base Hawaii. The bay was again stressed by the construction of a sewage disposal outfall in the center of the south bay that introduced unnaturally large amounts of nutrients. After these stresses came urbanization in the late 1950s through the 1970s. One major problem was uncontrolled grading which exacerbated the stresses of erosion and sedimentation from pineapple cultivation, and brought new sediments to the bay. It is now well documented that major inflows of freshwater from high intensity rainfall can build up in the bay, creating a lens which can reach up to 5 feet in depth floating on the surface of the bay. Runoff problems are compounded by channelization in the watershed, the paving over of formerly permeable surfaces in the basin, and the filling and loss of wetlands and fishponds along the shores, which acted in the past to detain stormwater runoff.

The bay has shown improvement in water quality over the past two decades, and today is somewhat stabilized. Elimination of all municipal effluent discharges into the bay has been accomplished. Municipal sewers serve most of Kaneohe, Ahuimanu, and Kahaluu, but the rural areas from Ahuimanu to Waikane are still being served by household cesspools. The estimated number of cesspools in the drainage basin prior to Kahaluu’s sewer development in 1995 was 2,880, serving a population of 10, 160 people. Since Kahaluu has been sewerred, there are approximately 270 remaining cesspools in the Waiahole and Waikane areas (C&C of Honolulu 1990, p. 8-21).

There has been a dramatic decline in phosphorus and turbidity since 1979, when sewage discharge was diverted from the bay (C&C of Honolulu 1990, p. 7-6). The termination of sewage discharges and better management of construction activities has resulted in improved survival of some species of coral and other organisms. However, urban runoff continues to be a major source of pollution to the bay (DOH 1990, p. V-10). The water quality parameters frequently violated are turbidity and nitrogen during winter storms. The major sources affecting turbidity and suspended solids parameters are natural runoff, urban stormwater, and small farming. The same sources plus winter storms affect the nitrogen parameters. Direct groundwater seepage into the bay is estimated to be 60 mgd and storm runoff, 40 mgd (C&C of Honolulu 1990, p. 8-19).

Runoff from the numerous streams during winter storms conveys large quantities of silt and other material which settle into the bay. The entire bay is affected by suspended particles, especially in the southern section of the bay where the residence time with respect to the ocean has been estimated to be almost 24 days. Estimates of sediment loading into Kaneohe Bay from storm runoff range from 33,000 to 131,000 tons per year (C&C of Honolulu 1990, p. 8-22).

Ala Wai Canal

The Ala Wai Canal is a manmade canal extending southeast by northwest from Kapahulu Avenue to Ala Moana Park. The Ala Wai Boat Harbor is located at the mouth of the canal. The canal was completed in 1929 to reclaim marsh lands fed by the perennial Manoa and Palolo streams and to control mosquitoes. The marsh, located in what is now the McCully-Kapiolani District, consisted of taro patches, rice paddies, and duck and fish ponds. The canal was originally dredged to Kewalo Basin, and then out to the sea. Later in the 1950s, the present channel at the Ala Wai Boat Harbor was dredged and the channel along Ala Moana Park was filled in (C&C of Honolulu 1990, P. 8-22).

The canal is 9,770 feet long. Its width varies from 160 to 260 feet and depth from 15.0 feet to -6.0 feet. The area of the canal and boat harbor is 126 acres. The water quality limited segment includes the entire length of the canal, the boat harbor, and the boat channel to the 30-foot depth contour. The harbor is recognized as an embayment. A portion of the canal is an estuary (C&C of Honolulu 1990, p. 8-22).

The major contributions come from erosion in the forest reserve areas at the upper end of Manoa Valley; groundwater inflow; storm runoff from residential and commercial developments; direct runoff from Ala Wai Field, Park, and Golf Course; dumping of household and yard wastes into the Manoa and Palolo streams; and two minor point source discharges, washwater from the Ala Wai Marine Railway dry dock operation (only under emergency conditions), and 2.60 mgd discharge of warm water from the air conditioning system of the Yacht Harbor Condominium. The entire drainage area is served by municipal sewers except for the Crater Road area of West Kaimuki and Makiki-Puowaina. These areas have household cesspools and serve an estimated population of 1,341 people (C&C of Honolulu 1990, p. 8-24).

The Ala Wai serves as a sedimentation basin for its tributary streams and receives storm runoff from Manoa, Palolo, Makiki, Waikiki and other areas. The average stream flow into the canal is estimated to be between 20-30 mgd. Sediments are deposited in the Ala Wai Canal because the low flow velocity in the canal is less than the settling velocity of the sediment. Large quantities of sediment are believed to be generated in the watershed areas by natural erosion process. The canal was dredged by the City in 1966 and again by the State in the late 1970s (C&C of Honolulu 1990, p. 8-24). From the results of present and past studies of sediments in the canal, it is estimated that the rate of siltation has been relatively consistent at 9,000 to 11,000 cubic yards per year (Edward K. Noda & Associates 1992b, p. 4). Without the canal, much of this sediment would be released into coastal waters.

As the collecting point for the Makiki, Manoa, Palolo, and Kapahulu watersheds, the canal accumulates sediments, nutrients, some heavy metal contaminants, and solid waste trash. Consequently, water in the canal is discolored by phytoplankton growth, suspended sediments, and visually objectionable trash. In addition, some incidences of bacterial infections have been reported (Edward K. Noda & Associates 1993, p. 2-6). Water circulation from the point where the Manoa Stream meets the canal to the end of the canal near Kapahulu is poor. Floating debris collects under the makai side of the McCully Street Bridge, creating an unsightly mess.

Kewalo Basin

Kewalo Basin is a manmade harbor, approximately 78 acres in area. Constructed by the U.S. Navy in 1945, it is home port for the local tuna fleet, chartered sport fishing boats, and excursion craft serving the tourist industry. The basin is surrounded by shopping centers, a major highway, and the light industrial areas, commercial shops, and restaurants of Kakaako and Kewalo, and park space at Kakaako and Ala Moana. Kewalo Basin is classified as an embayment. The water quality segment encompasses the entire basin and channel out to the 30-foot depth contour (C&C of Honolulu 1990, pp. 8-25 and 8-26).

Low levels of dissolved oxygen and unsatisfactory pH levels have been measured at the outlet of the Ala Moana Park drains to the northeast sector of the basin. It is suspected that allowable limits for the nitrogen, phosphorus, and turbidity parameters are exceeded during periods of heavy storm runoff. Circulation of water in the basin is hindered by its design. As a result, the urban pollutants that collect in the basin remain concentrated for extended periods (DOH 1990, pp. V11 and V- 12).

The primary sources of pollutants entering Kewalo Basin are the drains collecting urban runoff from commercial, industrial, and residential sectors of Honolulu. There are seven drains including three that serve major facilities: Ala Moana Park drain (canal), Ward Avenue drain, and Kakaako drain. About one half of the peak discharge from Ala Moana Park canal enters Kewalo Basin, the other half drains into Ala Wai Boat Harbor (C&C of Honolulu 1990, p. 8-26). Street debris, oil, chemicals, nutrients, and heavy metals are transported by urban runoff into

Kewalo Basin. There are no discharges of any sediments from streams since the drainage area is entirely urbanized (C&C of Honolulu 1990, p. 8-27).

Keehi Lagoon

Keehi Lagoon, with an area of 1,116 acres, is the largest lagoon in the State. It is located in a heavily industrialized area between Kapalama-Sand Island and Honolulu International Airport in the east-west direction. The Mapunapuna and Shafter Flats industrial parks and the Middle Street interchange of H-1 are located to the north. Keehi Boat Harbor and Keehi Marine Drydock are located along the Kapalama shoreline and serve boating and sailing interests. Kalihi Stream from the northeast and Moanalua Stream from the northwest meet at the head of the lagoon at Keehi Lagoon Beach Park. Keehi Lagoon is classified as an embayment; Keehi Harbor and Keehi Drydock Boat Harbor are classified as shallow draft recreational harbors. The water quality segment encompasses the entire lagoon to the 30-foot depth contour (C&C of Honolulu 1990, p. 8-27).

The lagoon is used intensely for bait fishing, crabbing, paddling, and other water contact sports. Boating activities are especially heavy during weekends and holidays. A boat washing facility is part of the boat harbor (C&C of Honolulu 1990, p. 8-27). Although circulation in Keehi Lagoon is good, it regularly experiences violations of water quality parameters for phosphorus and turbidity. Currents may transport polluted waters from Honolulu Harbor into the lagoon and recirculate suspended matter within it (DOH 1990, p. V-11). Other pollutant sources are sediments deposited in the lagoon by Moanalua and Kalihi streams; storm runoff from industrial areas of Mapunapuna, Shafter Flats, Kapalama, and Kalihi Kai; and the resuspension of settled sediments in shoals by boating activities (C&C of Honolulu 1990, pp. 8-27 and 8-28).

The elimination of the municipal and U.S. Army raw sewage discharges in nearshore waters off Sand Island and the airport outfall off Ahua Point have greatly improved water quality in the lagoon. The number of cesspools receiving commercial and industrial wastes in the Mapunapuna and Kapalama areas is not known. Considering the number of lots in the tracts, the number of cesspools could be as many as 150.

Nutrients, plant cuttings, and sediment loads are discharged in Keehi Lagoon by Kalihi and Moanalua streams. In residential areas, trash, plant cuttings, and yard debris are frequently dumped in the stream channel and reach the lagoon. Policing of illegal dumping is difficult because it can occur at any time (C&C of Honolulu 1990, p. 8-28).

Honolulu Harbor

Honolulu Harbor is the largest commercial deep draft harbor in the State. The harbor is crescent shaped, with a water surface area of 537 acres. It is about 2 miles long and from 600 to 2,900 feet wide. Coral reefs and Sand Island, a 500-acre manmade island, protect the harbor from the open ocean. Goods and freight processed at the harbor cover the entire spectrum, from

pineapple and cattle to automobiles and petroleum products. The harbor handles over 11 million tons of cargo annually (C&C of Honolulu 1990, p. 8-30).

Honolulu Harbor is classified as an embayment. The water quality segment encompasses the entire harbor from Keehi Lagoon to the Fort Armstrong main channel entrance to the 30-foot depth contour (C&C of Honolulu 1990, p. 8-30). Both Nuuanu and Kapalama streams discharge into the harbor. Nuuanu Stream extends from Pier 15 to its watershed area in the Koolau Range. The drainage area of 8.4 square miles consists of industrial, commercial, and residential developments. Kapalama is an interrupted stream with a drainage area of 2.6 square miles (C&C of Honolulu 1990, p. 8-31).

The most frequently violated parameters are total nitrogen, total phosphorus, turbidity, dissolved oxygen, and pH. Prior to about 1972, the pineapple canneries and Gasco discharged 10.3 mgd of industrial wastes into Kapalama Canal and Honolulu Harbor. The BOD load was equivalent to raw sewage discharge from 150,000 people. Now, the wasteload into Kapalama Canal has been limited to the discharge of thermal water.

Studies of the harbor indicate that nitrogen, phosphorus, and turbidity levels in the water regularly exceed State water quality standards. Significant levels of copper, zinc, chromium, nickel, lead, chlordane, and dieldrin have been identified in DOH sampling (DOH 1990, p. V-6). Pollutants enter the harbor mainly from nonpoint sources. Kapalama Stream (canal) discharges into Kapalama Basin at Pier 39, and the larger Nuuanu Stream enters the main basin at Pier 15, upstream of Pier 11. Storm drain outlets discharge into the harbor throughout its the periphery (C&C of Honolulu 1990, p. 8-31).

Most of the sediments deposited in Honolulu Harbor come from Nuuanu and Kapalama streams. No data are available, but the U.S. Army Corps of Engineers (USACOE) estimated that 50,000 cubic yards of sediments are discharged in the harbor each year from all sources. According to USACOE, the sediments are composed of high percentages of land derived silty clays and a small percentage of sand. The harbor is dredged at about five year intervals (C&C of Honolulu 1990, p. 8-32).

Pearl Harbor

Pearl Harbor is the State's largest estuary. It is nearly completely surrounded by federal military installations. The U.S. Navy installation with its associated shipyard, maintenance supply center, public works center, and ammunition depot is located around the harbor. It is headquarters for CINCPAC and the 14th Naval District. The harbor consists of East Loch, Middle Loch, West Loch, Southeast Loch, and Ford Island, and has a water surface area of about 8 square miles. More than 12 miles of docks and four drydocks are available for ship repairs. The US Air Force’s Hickam Air Force Base borders a small portion of Pearl Harbor's eastern shoreline.

The Water Limited Quality Segment includes the entire harbor and the mouths of perennial streams discharging into the harbor. The offshore boundary of the segment extends to the 30-foot depth contour between the Reef Runway to Oneula Beach (C&C of Honolulu 1990, p. 8-32).

As a result of its geologic origin, Pearl Harbor has been the "sink" of the southern coastal plain of Oahu. Its three lochs represent the drowned valleys of three major stream systems. These "valleys" have been altered in shape by marine erosion and sediment. The most drastic changes to the harbor are those which occurred during and after World War II (DOH 1990, p. V-14).

Five streams -- Halawa, Aiea, Kalauao, Waimalu, and Pearl City -- are tributary to East Loch. Waiawa enters Middle Loch, and Waikele and Honouliuli drain into West Loch. The drainage area for the lochs are 23.7, 26.4, and 60 square miles, respectively, for a total of 111 square miles (C&C of Honolulu 1990, p. 8-32).

Beneficial uses identified for Pearl Harbor include bait fish and shellfish propagation in West and East Lochs, shipping, navigation, industrial water in East Loch, and water fowl habitat in Middle and West Lochs.

There are five point source discharges within the harbor operated by the U.S. Navy and one (Fort Kamehameha STP) discharging at the main ship channel. The nonmilitary point source, Waiiau Power Plant, discharges thermal water. Municipal sewers serve most of the urban areas between Aiea-Halawa and Waipahu. The number of household cesspools in Aiea-Waiiau and Waipahu is estimated to be 400 (C&C of Honolulu 1990, p. 8-36).

Water quality parameters that are frequently violated in Pearl Harbor include nitrogen, phosphorus, turbidity, fecal coliform, temperature, and chlorophyll a.

Kaiaka-Waiialua Bay

This WQLS includes two adjacent waterbodies on the North Shore of Oahu. Kaiaka Bay is classified as an embayment, while the much broader Waiialua Bay is classified as marine waters. Haleiwa Boat Harbor, located at the original mouth of the Anahulu River, is also an embayment. The WQLS's boundary extends westerly from Puaena Point to the 60-foot depth, then along the 60-foot depth contour towards Kaena Point past Kaiaka Bay, then southwest toward the shore at Kaimana Place.

Both bays receive drainage from major streams. The Poamoho and Kaukonahua streams are tributaries of Kiiiki Stream that flows into Kaiaka Bay together with Paukauila Stream that includes Helemano and Opaepala streams. The area of the drainage basin is 79.8 square miles and extends eastward to the Koolau mountain range and southward to the Waianae mountain range (C&C of Honolulu 1990, p. 8-39).

Leakage of fresh water through caprock into Opaepala, Helemano, Poamoho, and Kaukonahua streams and the bay is estimated to be 7.05 mgd. Peak storm flows (100 year storm) estimated for Kiikii Stream are 39,000 cfs; and for Paukauila Stream, 18,700 cfs. As much as 70% of the streams are diverted for agriculture. Anahulu River and its tributaries (Kawaiiki and Kawainui streams) discharge into Waialua Bay. At Waialua Bay, Anahulu River has a drainage area of 16.0 square miles and a 100-year peak discharge of 16,200 cfs.

Data collected at the DOH monitoring station indicate that the maximum allowable levels of most parameters are exceeded except for dissolved oxygen. Most noteworthy are total phosphorus, nitrate and nitrite nitrogen, chlorophyll a, and turbidity (C&C of Honolulu 1990, pp. 8-39 and 8-41). The major sources of pollutants discharging into the embayments are sediments from the drainage basins, household cesspools, injection wells from treatment plants, and a point source discharge of thermal water. There are 13 private STPs and one municipal wastewater treatment plant (P) in the Waialua and Haleiwa communities. The effluents from these plants are discharged into seepage pits or injection wells.

There are 2,312 household cesspools in the Waialua and Haleiwa area, serving a population of 7,232 people. The estimated 0.578 mgd discharge into the groundwater eventually reaches the coastal waters.

MAUI COUNTY:

The following descriptions of the Water Quality Limited Segments of Maui County are based on information contained in the 1998 State 305 (b) Report, 1997 State 303(d) list, *Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems* (DOH 1990), *Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan* (1996), supplemented by information from the *Water Quality Management Plan for the County of Maui* prepared jointly by DOH and the County of Maui (DOH 1993c). There are three WQLSs in Maui County, two on the island of Maui and one on Molokai. The three WQLSs and their watersheds are described below.

Kahului Bay

Kahului Bay is located on the north coast of the Island of Maui between the slopes of two volcanoes, Haleakala and West Maui. It covers an area of 242 acres and is bounded by the breakwaters which extend from the west and east shores at about right angles to each other. Kahului Harbor is located on the southern portion of the Bay.

Drainage into Kahului Bay is largely in the form of runoff from the urban centers of Wailuku and Kahului. In addition, ship and barge traffic, the Kahului airport, lands used for sugarcane cultivation, and east portions of the West Maui mountains (forest land) contribute pollutants. No streams or springs enter Kahului Bay.

State monitoring of Kahului Bay indicates that water quality standards for nitrogen, phosphorus, and turbidity are regularly exceeded. Incidents of bacterial contamination which result from cruise ship spills and storm drain outputs have been reported. The waters of the bay are generally poor in quality. The powerful long shore current, which sweeps around the north tip of East Maui, likely affects the residence time of pollution in Kahului Bay. Waters at the mouth of the harbor are generally turbid, and underwater visibility is generally poor due to strong winds that keep waters turbulent and murky (DOH 1990, p. V-8).

A number of activities occur in Kahului Bay. Kahului Harbor is the Island's main port. An estimated 98.9% of all goods coming into Maui are transported through Kahului Harbor. Harbor activities include ship operation and maintenance, oil handling and bunkering, warehousing, trucking, storage, stevedoring, marine repair, and limited drydocking (DOH 1990, p. V-9). In addition, a cluster of hotels, beaches, the Kahului Breakwater Park, and a public boat ramp border the Bay. The bay's shoreline access is excellent. People fish along the piers, breakwaters, and the coast between the harbor and Nehe Point. Large surf breaks in the harbor during periods of North Pacific swells.

West Maui

The West Maui area was designated as a WQLS in 1992 primarily because of the algal blooms that have been occurring there and which are suspected to be caused by excessive nutrients from runoff. The near shore coastal waters of Kihei are also included in this

designation. Violations in this area are all for nitrogen parameters: total Kjeldahl nitrogen, nitrate-nitrite N, and ammonia nitrogen. Federal funds obtained by EPA and NOAA are being used to support a watershed coordinator; additional applied research projects have been conducted on the link between land use activities and surface and ground water quality. DOH intends to incorporate the results from these projects into nutrient/sediment watershed management plans for West Maui and similar sensitive coastal areas throughout the State (DOH 1993c, p. VII-14). This information will also be used by EPA and DOH to establish TMDLs for this WQLS.

South Molokai

The South Molokai segment is bounded by the 18-foot depth contour from Laau Point eastward to Honouliwai, just east of Waialua. Many streams within this area, mostly the eastern portion, are perennial in their upper reaches and intermittent or nonexistent at the coastline. During heavy rains, however, these streams will fill with water, overflow their banks, and flood the entire southern coastline with turbid runoff. Runoff transported by these streams are generated from abandoned pineapple fields, cropland, pastures, a State highway system, a network of dirt roads, feral animal activity, damaged areas from range fires and the town of Kaunakakai. Of particular concern are the dirt roads, fire damaged areas, and poorly managed pasture land.

On Molokai, drought conditions and incessant strong winds reduce soil moisture, preventing the growth of adequate cover. When rains do occur, they are often intense and heavy, creating immense amounts of runoff that can transport sediments and pollutants. Flows into South Molokai are heaviest into the Palaa coastal plains located just west of Kaunakakai (DOH 1990, p. V-15).

The waters of South Molokai are classified as open coastal waters. State monitoring of South Molokai shows significant violations of water quality standards for suspended solids and nutrients. Suspended solids have been noted to exceed the standard by 100 times.

Mudflats predominate on the island's south coast where there were once a large number of fishponds. Valued water activities along the southern coast include fishpond restoration for commercial and subsistence use, support of an important wildlife area, and enhancement of park facilities. Parks and recreational facilities on Molokai's south shore include: Kakahaia National Wildlife Refuge, One Alii Beach Parks 1 & 2, and Malama Park.

KAUAI COUNTY:

The following descriptions of the Water Quality Limited Segments in Kauai County are based on information contained in the 1998 State 305 (b) Report, 1997 State 303(d) list, *Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems* (DOH 1990), *Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan* (1996), supplemented by information from the *Water Quality Management Plan for the County of Kauai* prepared jointly by DOH and the County of Kauai (DOH 1993b). There are three WQLSs on Kauai. A description of the segments and their drainage areas follows.

Nawiliwili Harbor

Nawiliwili Harbor and its adjacent bay is located on the southeast coast of Kauai, two miles from Lihue. It is a well-developed embayment of 333 acres, bounded by an imaginary line from Kukii Point to the breakwater. It is formed by the confluence of three streams, Huleia, Puali, and Nawiliwili. Huleia is the largest stream, arising from the Waialeale-Kawaikini mountains in central Kauai. It flows through forest, agricultural, pasture, and other lands. The lower part of Huleia Stream widens into a significant estuary. Although the Nawiliwili and Puali streams drain flatter and less erosive lands they also contribute nonpoint pollutants. A rock quarry located on the Nawiliwili Stream is a major contributor of sediment to the bay (DOH 1993b, p. V-12).

Although there are no longer any point source discharges into Nawiliwili Bay, State monitoring shows that water quality standards for nitrogen and turbidity are regularly exceeded. These levels are suspected to be the product of vegetative growth along the river and seasonal input from storm water sources. Dense growths of hau and American (red) mangrove decompose and introduce considerable amounts of organic material into the bay. In addition, heavy rains transport silt and nutrients from sugarcane land into the bay and give it, at times, a brown color (DOH 1993b, p. V-13).

Nawiliwili Harbor supports a deep draft commercial harbor and a small boat harbor with charter fishing operations. The bottom consists of fine sand and silt. Depths range from 70 to 100 feet; periodic dredging is required to maintain navigable depths in the harbor (DOH 1993b, p. V-13). Recreational activities include fishing and crabbing in the bay and adjoining Huleia River, and surfing and canoe paddling in the area fronting Kalapaki Beach on the north shore of the bay (DOH 1993b, p. V-14).

Hanapepe Bay

Hanapepe Bay is located on the southwest corner of Kauai, between Hanapepe and Port Allen. The boundary of the Hanapepe Bay segment extends along the 1,000 foot long breakwater on the eastern shore and the 30-foot depth contour to a point south of Pualo Point, enclosing 297 acres of water surface (DOH 1993b, p. V-3).

The Hanapepe River begins in forest uplands and travels through pasture and range land, coffee lands, sugar cane lands, and the small towns of 'Eleele, Port Allen, and Hanapepe. Hydrologic modifications have greatly affected the bay. Erosion of the western end of the one-

half-mile-long beach at the head of the bay has been accelerated because of construction of a breakwater (DOH 1993b, p.V-3).

State water monitoring records indicate that the waters of the bay regularly exceed State standards for turbidity. Discoloration of the bay as a result of flood flow discharges is a common occurrence. However, the waters generally clear rapidly.

An important Hawaiian salt production area and salt marshes with great wildlife value are located on the east banks of the bay. Some commercial activity occurs at Port Allen in Hanapepe Bay but for the most part, activity in the bay is recreational. Activities include swimming, pole and line fishing, and small boating (DOH 1993b, p. V-4).

Waimea Bay

The Waimea Bay WQLS is located on the southeast coast of Kauai. It is bounded by the 18-foot contour from Oomano Point to Koki Point and includes the Waimea River and Kiki a Ola Boat Harbor. It comprises 1,214 acres. Two rivers flow into the bay, the Waimea and the Makaweli.

The watershed has conservation lands at its headwaters and agriculture land use dominates below. Currently, crops are grown for commercial seeding operations and agricultural research. Historically, sugar mills discharged cane trash and wastewater into the coastal waters of southern Kauai. These discharges contained silt that were carried by ocean currents to Waimea Bay. Bagasse (cane waste) is now used as a fuel source and the mill wastewater is returned to sugar cane fields for irrigation. The only remaining discharges are irrigation tailwater (DOH 1993b, p. V-17). There are small urban runoff issues with the town of Waimea located within this water quality limited segment. Sediment is the major water quality issue here.

There is a boat launching ramp at Kiki a Ola light draft vessel harbor. Uses of Waimea Bay include pole and line fishing, throw netting, board surfing, canoe paddling, limu gathering, gill netting, and torching (DOH 1993b, p. V-18).

HAWAII COUNTY:

The following description of the Water Quality Limited Segment in Hawaii County is based on information contained in the 1998 State 305 (b) Report, 1997 State 303(d) list, *Hawaii’s Assessment of Nonpoint Source Pollution Water Quality Problems* (DOH 1990), *Hawaii’s Coastal Nonpoint Pollution Control Program Management Plan* (1996), supplemented by information from the *Water Quality Management Plan for the County of Hawaii* prepared jointly by the Hawaii State Department of Health and the County of Hawaii (DOH 1993a). Hilo Bay is the only WQLS on Hawaii.

Hilo Bay

Hilo Bay is located on the northeast coast of the Island of Hawaii. It is bounded by the 30-foot depth contour, from the tip of the 10,079-foot long breakwater to Paukaa Point, and covers an area of 1,788 acres. Included in the segment is the Waiakea Pond and Wailoa River (DOH 1990, p. V-4).

Five natural discharges enter into the Hilo Bay segment: Wailoa River, Wailuku River, Pukihae Stream, Pohakaunanaka (intermittent stream), and Maili Stream. These rivers and their tributaries originate on the slopes of Mauna Kea and Mauna Loa, and drain forests, pasture and range land, agricultural fields, and urban areas. In the higher elevations, eucalyptus trees are raised. Cattle graze the Puu Oo area above the forest reserve and the mauka fringe of the city of Hilo. Sugar, the principal crop of the island, is grown in the Hilo Bay watershed in the rural areas north of Hilo along the Belt Highway. Major agricultural changes have occurred in recent times with the closures of sugar plantations. As an example, there is the conversion of 8,000 acres of sugar cane land to macadamia nut orchard. Commercial raising of trees, mostly eucalyptus, is expanding in this area. Specialty crops such as ginger are grown nearby. Cattle, hogs, poultry, vegetables, flowers, and landscaping plants are also grown in the area surrounding Hilo. Urban runoff come from sources such as stream channelization, Hilo's parks, business and residential zones, infrastructure, and harbor.

The Wailuku (300 mgd) and Wailoa rivers (100 mgd to 300 mgd), compose the major discharges of water and sediment to the bay. Large surface and subsurface flows enter the bay and form a fresh water layer on the surface of the bay. The vertical stratification, which is maintained by the prevailing shoreward trade winds of the area, prolongs the residence time of water in the bay and encourages the growth of phytoplankton in its upper fresh water layer. In addition, the slow seaward movement of the bay's lower waters are generally insufficient to flush out suspended silts from the bay. Silt and mud that accumulate contribute to the bay's turbidity (DOH 1990, p. V5).

Nutrient-rich waters, which enter as both surface and subsurface flows, increase the growth of microscopic life and algae contributing to the turbidity of the bay. Nutrient-rich flows include the surface flows of the Wailoa River as well as subsurface flows from sources near Reeds Bay, Coconut Island, and the Keaukaha area. Subsurface flows contribute flow volumes as high as 200 mgd.

State monitoring of water for Hilo Bay shows frequent violations of water quality standards for nitrogen, phosphorus, and turbidity. A study found exceptionally high levels of arsenic in sediments in Hilo Bay and, in particular, from Waiakea Pond. Other contaminants found in Hilo Bay included lead, zinc, chromium, chlordane residues, and PCBs (DOH 1990, p. V-5). Despite these high levels, however, there is no indication of any health hazard.

The high levels of arsenic in the bay and in Waiakea Pond resulted from waste discharges containing arsenic trioxide, a compound used in a kenec manufacturing plant to treat fiber boards to prevent termite damage.

Hilo Bay is also affected by seepage from cesspools. A study confirmed DOH monitoring results and notes that Hilo Bay, its estuaries and adjacent marine waters are subject to chronic nonpoint source sewage pollution. The data in the study report indicate that high bacterial counts are not the result of sewage treatment plant failures but rather sewage contained in freshwater runoff, with the ultimate source commercial and residential cesspools [Dudley and Hallacher (n.d.), pp. 32-341.

In spite of its water quality problems, Hilo Bay is an important wildlife and fishery area. Hilo Bay, in addition, is highly visible to residents and tourists and supports a fair amount of recreational boating (DOH 1990, p. V-6

TABLE F-1

HAWAII’S PRIORITY WATERSHEDS BASED ON WATER QUALITY LIMITED SEGMENTS

Watershed & Island	County	Specific Pollutants
Hilo Bay, Hawaii	Hawaii	turbidity
Ala Wai Canal, Oahu	Honolulu	pesticides, metals, lead, nutrients, nitrogen, phosphorous, siltation, pathogens, turbidity
Honolulu Harbor, Oahu	Honolulu	nutrients, siltation, turbidity
Kahana Bay, Oahu	Honolulu	siltation, suspended solids
Kaiaka-Waiialua Bays, Oahu	Honolulu	turbidity
Keehi Lagoon, Oahu	Honolulu	siltation, suspended solids, turbidity
Kewalo Basin, Oahu	Honolulu	nitrogen
Koolaupoko, Oahu: -Kapaa Stream -Kawa Stream -Waimanalo Stream	Honolulu	-nutrients, siltation, pathogens -nutrients, siltation, pathogens, turbidity, exotic species -nutrients, siltation, other habitat alterations, pathogens, exotic species
Pearl Harbor, Oahu	Honolulu	nutrients, siltation, turbidity, organic chemicals
Hanapepe Bay, Kauai	Kauai	nutrients
Nawiliwili Bay, Kauai	Kauai	turbidity, metals
Kahului Bay, Maui	Maui	nutrients, pathogens
South Molokai, Molokai	Maui	nutrients, suspended solids, turbidity
West Maui, Maui	Maui	nutrients, suspended solids, turbidity, pathogens

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APPENDIX G

Text of All Management Measures

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Text of All Management Measures¹

Agriculture

A. Erosion and Sediment Control Management Measure

Apply any combination of conservation practices and management that achieves an acceptable level of treatment to minimize the delivery of sediment from agricultural lands to surface waters, or

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

B. Management Measure for Wastewater and Runoff from Confined Animal Facility

Limit the discharge from the confined animal facility to surface waters by:

- (1) Containing both the wastewater and the contaminated runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24-hour frequency storm event. Storage structures should be of adequate capacity to allow for proper wastewater utilization and constructed so they prevent seepage to groundwater; and
- (2) Managing stored contaminated runoff and accumulated solids from the facility through an appropriate waste utilization system.

C. Nutrient Management Measure

Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value. Determine and credit the nitrogen contribution of any legume crop. Soil and/or plant tissue testing should be used at a suitable interval. Nutrient management plans contain the following core components:

- (1) Farm and field maps showing acreage, crops, soils, and waterbodies.
- (2) Realistic yield expectations for the crop(s) to be grown, based on achievable yields for the crop. Individual producer constraints and other producer's yields would be considered in determining achievable yields.
- (3) A summary of the soil condition and nutrient resources available to the producer, which at a minimum would include:
 - An appropriate mix of soil (pH, P, K) and/or plant tissue testing or historic yield response data for the particular crop;

¹Excerpted from *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*, Section III

- Nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable);
 - Nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and
 - Other significant nutrient sources (e.g., irrigation water).
- (4) An evaluation of field limitations based on environmental hazards or concerns, such as:
- Lava tubes, shallow soils over fractured bedrock, and soils with high leaching or runoff potential,
 - Distance to surface water,
 - Highly erodible soils, and
 - Shallow aquifers.
- (5) Best available information is used in developing recommendations for the appropriate mix of nutrient sources and requirements for the crops.
- (6) Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible during periods of leaching or runoff.
- (7) Methods and practices used to prevent soil erosion or sediment loss.
- (8) Provisions for the proper calibration and operation of nutrient application equipment.

D. Pesticide Management Measure

To eliminate the unnecessary release of pesticides into the environment and to reduce contamination of surface water and ground water from pesticides:

- (1) Use integrated pest management strategies where available that minimize chemical uses for pest control.
- (2) Manage pesticides efficiently by:
- (a) calibrating equipment;
 - (b) using appropriate pesticides for given situation and environment;
 - (c) using alternative methods of pest control; and
 - (d) minimizing the movement of pest control agents from target area.
- (3) Use anti-backflow devices on hoses used for filling tank mixtures.
- (4) Enhance degradation or retention by increasing organic matter content in the soil or manipulating soil pH.

E. Grazing Management Measure

Protect range, pasture, and other grazing lands:

- (1) By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, near coastal waters/shorelines, and riparian zones):
- (a) Exclude livestock,
 - (b) Provide stream crossings or hardened watering access for drinking,
 - (c) Provide alternative drinking water locations,

- (d) Locate salt and additional shade, if needed, away from sensitive areas, or
 - (e) Use improved grazing management (e.g., herding) to reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock; and
- (2) By achieving either of the following on all range, pasture, and other grazing lands:
- (a) Implement range and pasture conservation and management practices that achieve an acceptable level of treatment to reduce erosion, or
 - (b) Maintain range, pasture, and other grazing lands in accordance with activity plans established by the Division of Land Management of DLNR, federal agencies managing grazing land, or other designated land management agencies.

F. Irrigation Water Management Measure

To reduce nonpoint source pollution of surface waters caused by irrigation:

- (1) Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as a minimum:
 - (a) the measurement of soil-water depletion volume and the volume of irrigation water applied;
 - (b) uniform application of water; and
 - (c) application rate which does not exceed infiltration rate in the field.
- (2) When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.

The following limitations and special conditions apply:

- (1) In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.
- (2) By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.
- (3) The time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible.

- (4) In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.
- (5) Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the “saved water” to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.
- (6) In some locations, sprinkler irrigation is used for crop cooling or other benefits (e.g., watercress). In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should not contribute to erosion or pollution.

Forestry

A. Preharvest Planning Management Measure

Perform advance planning for forest harvesting that includes the following elements, where appropriate:

- (1) Identify the area to be harvested including location of waterbodies and sensitive areas such as wetlands, threatened or endangered aquatic species habitats, or high erosion-hazard areas (landslide-prone areas) within the harvest unit.
- (2) Time the activity for the season or moisture conditions when the least impact occurs.
- (3) Consider potential water quality impacts and erosion and sedimentation control in the selection of silvicultural and regeneration systems, especially for harvesting and site preparation.
- (4) Reduce the risk of occurrence of landslides and severe erosion by identifying high erosion-hazard areas and avoiding harvesting in such areas, to the extent practicable.
- (5) Consider additional contributions from harvesting or roads to any known existing water quality impairments or problems in watersheds of concern.

Perform advance planning for forest road systems that includes the following elements, where appropriate:

- (1) Locate and design road systems to minimize, to the extent practicable, potential sediment generation and delivery to surface waters. Key components are:
 - locate roads, landings, and skid trails to avoid, to the extent practicable, steep grades and steep hillslope areas, and to decrease the number of stream crossings;
 - avoid, to the extent practicable, locating new roads and landings in Streamside Management Zones (SMZs); and
 - determine road usage and select the appropriate road standard.

- (2) Locate and design temporary and permanent stream crossings to prevent failure and control impacts from the road system. Key components are:
 - size and site crossing structures to prevent failure;
 - for fish-bearing streams, design crossings to facilitate fish passage.
- (3) Ensure that the design of road prism and the road surface drainage are appropriate to the terrain and that road surface design is consistent with the road drainage structures.
- (4) Use suitable materials to surface roads planned for all-weather use to support truck traffic.
- (5) Design road systems to avoid high erosion or landslide hazard areas. Identify these areas and consult a qualified specialist for design of any roads that must be constructed through these areas.

Each State should develop a process (or utilize an existing process) that ensures that the management measures in this chapter are implemented. Such a process should include appropriate notification, compliance audits, or other mechanisms for forestry activities with the potential for significant adverse nonpoint source effects based on the type and size of operation and the presence of stream crossings or SMZs.

B. Streamside Management Zones (SMZs)

Establish and maintain a streamside management zone along surface waters, which is sufficiently wide and which includes a sufficient number of canopy species to buffer against detrimental changes in the temperature regime of the waterbody, to provide bank stability, and to withstand wind damage. Manage the SMZ in such a way as to protect against soil disturbance in the SMZ and delivery to the stream of sediments and nutrients generated by forestry activities, including harvesting. Manage the SMZ canopy species to provide a sustainable source of large woody debris needed for instream channel structure and aquatic species habitat.

C. Road Construction/Reconstruction Management Measure

- (1) Follow preharvest planning (as described under Management Measure A) when constructing or reconstructing the roadway.
- (2) Follow designs planned under Management Measure A for road surfacing and shaping.
- (3) Install road drainage structures according to designs planned under Management Measure A and regional storm return period and installation specifications. Match these drainage structures with terrain features and with road surface and prism designs.
- (4) Guard against the production of sediment when installing stream crossings.
- (5) Protect surface waters from slash and debris material from roadway clearing.
- (6) Use straw bales, silt fences, mulching, or other favorable practices on disturbed soils on unstable cuts, fills, etc.
- (7) Avoid constructing new roads in SMZs, to the extent practicable.

D. Road Management

- (1) Avoid using roads, where possible, for timber hauling or heavy traffic during wet periods on roads not designed and constructed for these conditions.
- (2) Evaluate the future need for a road and close roads that will not be needed. Leave closed roads and drainage channels in a stable condition to withstand storms.
- (3) Remove drainage crossings and culverts if there is a reasonable risk of plugging or failure from lack of maintenance.
- (4) Following completion of harvesting, close and stabilize temporary spur roads and seasonal roads to control and direct water away from the roadway. Remove all temporary stream crossings.
- (5) Inspect roads to determine the need for structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or seeding of road surfaces, and, in extreme cases, slope stabilization or removal of road fills, where necessary to maintain structural integrity.
- (6) Conduct maintenance activities, such as dust abatement, so that chemical contaminants or pollutants are not introduced into surface waters, to the extent practicable.
- (7) Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood that
 - (a) stream overflow will divert onto roads, and
 - (b) fill erosion will occur if the drainage structures become obstructed.

E. Timber Harvesting

The timber harvesting management measure consists of implementing the following:

- (1) Timber harvesting operations with skid trails or cable yarding follow layouts determined under Management Measure A.
- (2) Install landing drainage structures to avoid sedimentation, to the extent practicable. Disperse landing drainage over sideslopes.
- (3) Construct landings away from steep slopes and reduce the likelihood of fill slope failures. Protect landing surfaces used during wet periods. Locate landings outside of SMZs. Minimize size of landing areas.
- (4) Protect stream channels and significant ephemeral drainages from logging debris and slash material.
- (5) Use appropriate areas for petroleum storage, draining, and dispensing. Establish procedures to contain and treat spills. Recycle or properly dispose of all waste materials in accordance with State law.

For cable yarding:

- (1) Limit yarding corridor gouge or soil plowing by properly locating cable yarding landings.
- (2) Locate corridors for SMZs following Management Measure B.

- (3) Cable yarding should not be done across perennial or intermittent streams, except at improved stream crossings.

For groundskidding:

- (1) Within SMZs, operate groundskidding equipment only at stream crossings, to the extent practicable. In SMZs, fell and endline trees to avoid sedimentation.
- (2) Use improved stream crossings for skid trails which cross flowing drainages. Construct skid trails to disperse runoff and with adequate drainage structures.
- (3) On steep slopes, use cable systems rather than groundskidding where groundskidding may cause excessive sedimentation.
- (4) Groundskidding should not be done across perennial or intermittent streams, except at improved stream crossings.

F. Site Preparation and Forest Regeneration Management Measure

Confine on-site potential nonpoint source pollution and erosion resulting from site preparation and the regeneration of forest stands. The components of the management measure for site preparation and regeneration are:

- (1) Select a method of site preparation and regeneration suitable for the site conditions.
- (2) Conduct mechanical tree planting and ground-disturbing site preparation activities on the contour of erodible terrain.
- (3) Do not conduct mechanical site preparation and mechanical tree planting in SMZs.
- (4) Protect surface waters from logging debris and slash material.
- (5) Suspend operations during wet periods if equipment used begins to cause excessive soil disturbance that will increase erosion.
- (6) Locate windrows at a safe distance from drainages and SMZs to control movement of the material during high runoff conditions.
- (7) Conduct bedding operations in high water-table areas during dry periods of the year. Conduct bedding in erodible areas on the contour.
- (8) Protect small ephemeral drainages when conducting mechanical tree planting.

G. Fire Management

Prescribe fire or suppress wildfire in a manner that reduces potential nonpoint source pollution of surface waters:

- (1) Prescribed fire should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of subcanopy and herbaceous vegetation roots, especially in SMZs, in streamside vegetation for small ephemeral drainages, or on very steep slopes.
- (2) Prescriptions for fire should protect against excessive erosion or sedimentation, to the extent practicable.

- (3) All bladed firelines, for prescribed fire and wildfire, should be plowed on contour or stabilized with water bars and/or other appropriate techniques if needed to control excessive sedimentation or erosion of the fireline.
- (4) Wildfire suppression and rehabilitation should consider possible nonpoint source pollution of watercourses, while recognizing the safety and operational priorities of fighting wildfires.

H. Revegetation of Disturbed Areas

Reduce erosion and sedimentation by rapid revegetation of areas disturbed by harvesting operations or road construction:

- (1) Revegetate disturbed areas (using seeding or planting) promptly after completion of the earth-disturbing activity. Local growing conditions will dictate the timing for establishment of vegetative cover.
- (2) Use mixes of species and treatments developed and tailored for successful vegetation establishment for the region or area.
- (3) Concentrate revegetation efforts initially on priority areas such as disturbed areas in SMZs or the steepest areas of disturbance near drainages.

I. Forest Chemical Management

Use chemicals when necessary for forest management in accordance with the following to reduce nonpoint source pollution impacts due to the movement of forest chemicals off-site during and after application:

- (1) Conduct applications by skilled and, where required, licensed applicators according to the registered use, with special consideration given to impacts to nearby surface and ground waters.
- (2) Carefully prescribe the type and amount of pesticides appropriate for the insect, fungus, or herbaceous species.
- (3) Establish and identify buffer areas for surface waters. (This is especially important for aerial applications.)
- (4) Prior to applications of pesticides and fertilizers, inspect the mixing and loading process and the calibration of equipment, and identify the appropriate weather conditions, the spray area, and buffer areas for surface waters.
- (5) Immediately report accidental spills of pesticides or fertilizers into surface waters to the appropriate State agency. Develop an effective spill contingency plan to contain spills.

J. Wetlands Forest Management

Plan, operate, and manage normal, ongoing forestry activities (including harvesting, road design and construction, site preparation and regeneration, and chemical management) to adequately protect the aquatic functions of forested wetlands.

Urban Areas

Urban Runoff:

A. New Development Management Measure

- (1) By design or performance:

- (a) After construction has been completed and the site is permanently stabilized, reduce the average annual total suspended solid (TSS) loadings by 80%. For the purposes of this measure, an 80% TSS reduction is to be determined on an average annual basis,² or
 - (b) Reduce the postdevelopment loadings of TSS so that the average annual TSS loadings are no greater than predevelopment loadings, and
- (2) To the extent practicable, maintain postdevelopment peak runoff rate and average volume at levels that are similar to predevelopment levels.

Sound watershed management requires that both structural and nonstructural measures be employed to mitigate the adverse impacts of storm water. The nonstructural Watershed Protection and Site Development Management Measures can be effectively used in conjunction with the New Development Management Measure to reduce both the short-and long-term costs of meeting the treatment goals of this management measure.

B. Watershed Protection Management Measure

Develop a watershed protection program to:

- (1) Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;
- (2) Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota; and
- (3) Site development, including roads, highways, and bridges, to protect to the extent practicable the natural integrity of waterbodies and natural drainage systems.

C. Site Development Management Measure

Plan, design, and develop sites to:

- (1) Protect areas that provide important water quality benefits and/or are particularly susceptible to erosion and sediment loss;
- (2) Limit increases of impervious areas, except where necessary;
- (3) Limit land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss; and
- (4) Limit disturbance of natural drainage features and vegetation.

Construction Activities:

A. Construction Site Erosion and Sediment Control Management Measure

- (1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

² Based on the average annual TSS loadings from all storms less than or equal to the 2-year/24-hour storm. TSS loadings from storms greater than the 2-year/24-hour storm are not expected to be included in the calculation of the average annual TSS loadings.

- (2) Prior to land disturbance, prepare, and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

B. Construction Site Chemical Control Management Measure

- (1) Limit application, generation, and migration of toxic substances;
- (2) Ensure the proper storage and disposal of toxic materials; and
- (3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

Existing Development:

A. Existing Development Management Measure

Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:

- (1) Identify priority local and/or regional watershed pollutant reduction opportunities, e.g., improvements to existing urban runoff control structures;
- (2) Contain a schedule for implementing appropriate controls;
- (3) Limit destruction of natural conveyance systems; and
- (4) Where appropriate, preserve, enhance, or establish buffers along surface waterbodies and their tributaries.

Onsite Disposal Systems

A. New Onsite Disposal Systems Management Measure

- (1) Ensure that new Onsite Disposal Systems (OSDS) are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters.
Where necessary to meet these objectives:
 - (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and
 - (b) where low-volume plumbing fixtures have not been installed in new developments or redevelopments, reduce total hydraulic loadings to the OSDS by 25%.Implement OSDS inspection schedules for preconstruction, construction, and postconstruction;
- (2) Direct placement of OSDS away from unsuitable areas. Where OSDS placement away from unsuitable areas is not practicable, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water that is closely hydrologically connected to surface water. Unsuitable areas include, but are not limited to, areas with poorly or excessively drained soils; areas with shallow water tables or areas with high seasonal water tables; areas overlaying fractured bedrock that drain directly to ground water; areas within floodplains; or areas where nutrient and/or

- pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive waterbodies;
- (3) Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect waterbodies and/or contribute to a public health nuisance;
 - (4) Establish protective separation distances between OSDS system components and groundwater, which is closely hydrologically connected to surface waters. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and type of OSDS;
 - (5) Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50% to groundwater that is closely hydrologically connected to surface water.

B. Operating Onsite Disposal Systems Management Measure

- (1) Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into groundwaters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15% (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters;
- (2) Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing;
- (3) Consider replacing or upgrading OSDS to treat influent so that total nitrogen loadings in the effluent are reduced by 50%. This provision applies only:
 - (a) where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant groundwater nitrogen loadings from OSDS, and
 - (b) where nitrogen loadings from OSDS are delivered to groundwater that is closely hydrologically connected to surface water.

Pollution Prevention:

A. Pollution Prevention Management Measure

Implement pollution prevention and education programs to reduce nonpoint source pollutants generated from the following activities, where applicable:

- (a) The improper storage, use, and disposal of household hazardous chemicals, including automobile fluids, pesticides, paints, solvents, etc.;

- (b) Lawn and garden activities, including the application and disposal of lawn and garden care products, and the improper disposal of leaves and yard trimmings;
- (c) Turf management on golf courses, parks, and recreational areas;
- (d) Improper operation and maintenance of onsite disposal systems;
- (e) Discharge of pollutants into storm drains including floatables, waste oil, and litter;
- (f) Commercial activities including parking lots, gas stations, and other entities not under NPDES purview; and
- (g) Improper disposal of pet excrement.

B. Golf Course Management Measure

- (1) Develop and implement grading and site preparation plans to:
 - (a) Design and install a combination of management and physical practices to settle solids and associated pollutants in runoff from heavy rains and/or from wind;
 - (b) Prevent erosion and retain sediment, to the extent practicable, onsite during and after construction;
 - (c) Protect areas that provide important water quality benefits and/or are environmentally-sensitive ecosystems;
 - (d) Avoid construction, to the extent practicable, in areas that are susceptible to erosion and sediment loss;
 - (e) Protect the natural integrity of waterbodies and natural drainage systems by establishing streamside buffers; and
 - (f) Follow, to the extent practicable, the amended U.S. Golfing Association (USGA) guidelines for the construction of greens.
- (2) Develop nutrient management guidelines appropriate to Hawaii for qualified superintendents to implement so that nutrients are applied at rates necessary to establish and maintain vegetation without causing leaching into ground and surface waters.
- (3) Develop and implement an integrated pest management plan. Follow EPA guidelines for the proper storage and disposal of pesticides.
- (4) Develop and implement irrigation management practices to match the water needs of the turf.

Roads, Highways, and Bridges

A. Management Measure for Planning, Siting, and Developing Roads and Highways
Plan, site, and develop roads and highways to:

- (1) Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;
- (2) Limit land disturbance such as clearing, grading and cut and fill to reduce erosion and sediment loss; and
- (3) Limit disturbance of natural drainage features and vegetation.

B. Management Measure for Bridges

Site, design, and maintain bridge structures so that sensitive and valuable aquatic ecosystems and areas providing important water quality benefits are protected from adverse effects.

C. Management Measure for Construction Projects

- (1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and
- (2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

D. Management Measure for Construction Site Chemical Control

- (1) Limit the application, generation, and migration of toxic substances;
- (2) Ensure the proper storage and disposal of toxic materials; and
- (3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

E. Management Measure for Operation and Maintenance

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

F. Management Measure for Road, Highway, and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

- (1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures); and
- (2) Establish schedules for implementing appropriate controls.

Marinas and Recreational Boating

Siting and Design:

A. Marina Flushing Management Measure

Site and design marinas such that tides and/or currents will aid in flushing of the site or renew its water regularly.

B. Water Quality Assessment Management Measure

Assess water quality as part of marina siting and design.

C. Habitat Assessment Management Measure

Site and design marinas to protect against adverse effects on coral reefs, shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or federal governments.

D. Shoreline Stabilization Management Measure

Where shoreline erosion is a serious nonpoint source pollution problem, shorelines may need to be stabilized. Vegetative methods are strongly preferred. Structural methods may be necessary where vegetative methods cannot work and where they do not interfere with natural beach processes or harm other sensitive ecological areas.

E. Storm Water Runoff Management Measure

Implement effective runoff control strategies which include the use of pollution prevention activities and the proper design of hull maintenance areas.

Reduce the average annual loadings of total suspended solids (TSS) in runoff from hull maintenance areas by 80%. For the purposes of this measure, an 80% reduction of TSS is to be determined on an average annual basis.

F. Fueling Station Design Management Measure

Design fueling stations to allow for ease in cleanup of spills.

G. Sewage Facility Management Measure

Install pumpout, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage into surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.

Marina and Boat Operation and Maintenance:

A. Solid Waste Management Measure

Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats to limit entry of solid wastes into surface waters.

B. Fish Waste Management Measure

Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.

C. Liquid Material Management Measure

Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid material, such as oil, harmful solvents, antifreeze, and paints, and encourage recycling of these materials.

D. Petroleum Control Management Measure

Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

E. Boat Cleaning Management Measure

For boats that are in the water, perform cleaning operations to minimize, to the extent practicable, the release to surface waters of harmful cleaners, solvents, and paint from in-water hull cleaning.

F. Public Education Management Measure

Public education/outreach/training programs should be instituted for boaters, as well as marina owners and operators, to prevent improper disposal of polluting material.

G. Maintenance of Sewage Facilities Management Measure

Ensure that sewage pumpout facilities are maintained in operational condition and encourage their use.

H. Boat Operation Management Measure (applies to boating only)

Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.

Hydromodifications

Channelization and Channel Modifications

A. Management Measure for Physical and Chemical Characteristics of Surface Waters

- (1) Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters in coastal areas;
- (2) Plan and design channelization and channel modification to reduce undesirable impacts; and
- (3) Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.

B. Instream and Riparian Habitat Restoration Management Measure

- (1) Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas;
- (2) Plan and design channelization and channel modification to reduce undesirable impacts; and
- (3) Develop an operation and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.

Dams Management Measures:

A. Management Measure for Erosion and Sediment Control

- (1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and
- (2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

B. Management Measure for Chemical and Pollutant Control

- (1) Limit application, generation, and migration of toxic substances;
- (2) Ensure the proper storage and disposal of toxic materials; and,
- (3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

C. Management Measure for Protection of Surface Water Quality and Instream and Riparian Habitat

Develop and implement a program to manage the operation of dams in coastal areas that includes an assessment of:

- (1) Surface water quality and instream and riparian habitat and potential for improvement and
- (2) Significant nonpoint source pollution problems that result from excessive surface water withdrawals.

Streambank and Shoreline Erosion Management Measure:

A. Management Measure for Eroding Streambanks and Shorelines

- (1) Where streambank or shoreline erosion is a serious nonpoint source pollution problem, streambanks and shorelines may need to be stabilized. Vegetative methods are strongly preferred. Structural methods may be necessary where vegetative methods cannot work and where they do not interfere with natural beach processes or harm other sensitive ecological areas.
- (2) Protect streambank and shoreline features with the potential to reduce nonpoint source pollution.
- (3) Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.
- (4) Where artificial fill is eroding into adjacent streams or coastal waters, it should be removed.

Wetlands, Riparian Areas, and Vegetated Treatment Systems

A. Management Measure for Protection of Wetlands and Riparian Areas

Protect from adverse effects wetlands and riparian areas that are serving a significant nonpoint source pollution abatement function and maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative composition and cover, hydrology of surface water and ground water, geochemistry of the substrate, and species composition.

B. Management Measure for Restoration of Wetland and Riparian Areas

Promote the restoration of the pre-existing functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve a significant nonpoint source pollution abatement function.

C. Management Measure for Vegetated Treatment Systems

Promote the use of engineered vegetated treatment systems such as constructed wetlands or vegetated filter strips where these systems will serve a significant nonpoint source pollution abatement function.

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