Hawaii's Implementation Plan For Polluted Runoff Control
July 2000

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Acronyms

AFG	Agriculture Focus Group
AG	Department of Attorney General
AWCWIP	Ala Wai Canal Watershed Improvement Project
BLNR	Board of Land and Natural Resources
BMP(s)	Best Management Practice(s)
BOD	Biochemical Oxygen Demand
BWS	CCH, Board of Water Supply
CCH	City and County of Honolulu
CDUA	Conservation District Use Application
CES	UH, Cooperative Extension Service
CFR	Code of Federal Regulations
CFU	Colony Forming Units
CINPAC	Commander in Chief, Pacific
CPNCP	(Hawaii's) Coastal Nonpoint Pollution Control Program
CRI	(Federal) Coral Reef Initiative
CRP	(NRCS) Conservation Reserve Program
CTAHR	UH, College of Tropical Agriculture and Human Resources
CWA	Clean Water Act
CWAP	Clean Water Action Plan
CWB	DOH, Clean Water Branch
CZARA	Coastal Zone Act Reauthorization Amendments of 1990
CZM	(Hawaii) Coastal Zone Management
CZMA	(Federal) Coastal Zone Management Act
DBEDT	Department of Business, Economic Development, and Tourism
DHHL	Department of Hawaiian Home Lands
DLM	DLNR, Division of Land Management
DLNR	Department of Land and Natural Resources
DOFAW	DLNR, Division of Forestry and Wildlife
DOBOR	DLNR, Division of Boating and Ocean Recreation
DOA	Department of Agriculture
DOD	United States Department of Defense
DOH	Department of Health
DOH-CWB	DOH – Clean Water Branch
DOH-PRC	DOH – Polluted Runoff Control
DOI	United States Department of Interior
DOT	Department of Transportation
DPW	Department of Public Works
EEN	Environmental Education Network
EPA	United States Environmental Protection Agency
EMAG	(DOH) Environmental Management Advisory Group
EQIP	(NRCS) Environmental Quality Incentives Program

FFG	Forestry Focus Group
FIP	(NRCS) Forestry Incentives Program
FSA	USDA, Farm Services Administration
GWWP	Hawaii Groundwater Protection Program
HACD	Hawaii Association of Conservation Districts
HAR	Hawaii Administrative Rules
HARC	Hawaii Agricultural Research Center
HFCI	Hawaii Forests and Communities Initiative
HFIA	Hawaii Forest Industry Association
HRS	Hawaii Revised Statutes
HTA	Hawaii Tourism Authority
HUA	Hydrological Unit Area
HUIWAA	Hawaii Unified Interagency Watershed Assessment Advisory Team
INRP	Integrated Natural Resource Management Plan
KBAC	Kailua Bay Advisory Council
KIRC	Kahoolawe Island Reserve Commission
MACZMAG	Marine and Coastal Zone Management Advisory Group
MFG	Marinas and recreational Boating Focus Group
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NGO	Non-governmental organization
NHP	National Historical Park
NOAA	United States National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPS	Nonpoint Source Pollution
NRCS	USDA, Natural Resources Conservation Service
OCEA	DLNR, Office of Conservation and Environmental Affairs
OEQC	Office of Environmental Quality Control
OP	Office of Planning
OSDS	Onsite Disposal System
OSP	Office of State Planning
PPP	Pollution Prevention Plan
PRC	DOH, Polluted Runoff Control Program
PROF	Polluted Runoff Forum
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QMP	Strategy and Quality Management Plan for Surface Water Monitoring and Technology
RFP	Request for Proposal

SFG	Stream Systems Focus Group
SGES	UH, Sea Grant Extension Service
SHWB	DOH, Solid and Hazardous Waste Branch
SMA	Shoreline Management Area
SMZ(s)	Streamside Management Zone(s)
SOEST	UH, School of Ocean and Earth Science and Technology
SPAM	Stream Protection and Management (Plan)
SRF	(DOH-CWB) State Revolving Fund
SWAP	DOH, Source Water Assessment Program
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TNCH	The Nature Conservancy of Hawaii
TORCH	The Ocean Recreation Council of Hawaii
UH	University of Hawaii
UFG	Urban Focus Group
USA	United States Army
USACOE	United States Army Corps of Engineers
USAF	United States Air Force
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USN	United States Navy
UWA	Unified Watershed Assessment
WIA	Waikiki Improvement Association
WHIP	(NRCS) Wildlife Habitat Incentives Program
WIP	(NRCS) Wetlands Incentives Program
WMWMP	West Maui Watershed Management Project
WQMP	Water Quality Management Plan
WHPP	DOH Well-Head Protection Program
WQC	Water Quality Certification
WQEN	Water Quality Education Network
WQLS(s)	Water Quality Limited Segment(s)
WRAS	Watershed Restoration Action Strategies
WRRC	UH, Water Resources Research Center

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Glossary

303(d) – A section of the Clean Water Act which requires states to report a list of the their Water Quality Limited Segments on a regular basis (no set time period but usually called for every two to three years) to the U.S. Environmental Protection Agency (EPA).

305(b) – A section of the Clean Water Act which requires states to submit a biennial report to EPA describing the quality of all navigable waters in the state and the degree to which they are "fishable" and "swimmable" (the goals of the Clean Water Act.

319(h) – A section of the Clean Water Act which provides grants to state water quality programs for activities directed to water quality improvement.

6217 (g) Guidance – Two documents – *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, developed by the EPA, and *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, developed by the U.S. Department of Commerce, National Oceanic & Atmospheric Administration (NOAA) and EPA. They 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.

Ahupuaa – In ancient Hawaii, the division of land known as an ahupuaa generally ran from the sea to the mountains. "A principle very largely obtaining in these divisions of territory was that a land should run from the sea to the mountains, thus affording to the chief and his people a fishery residence at the warm seaside, together with the products of the high lands, such as fuel, canoe timber, mountain birds, and the right of way to the same, and all the varied products of the intermediate land as might be suitable to the soil and climate of the different altitudes from sea soil to mountainside or top."[1]

Algal blooms – Sudden spurts of algal growth, which can affect water quality adversely and indicate potentially hazardous changes to local water chemistry.

Base section 319(h) funds – Base program funds which may be applied to all watersheds affected by nonpoint source pollution, including UWA Category II and Category III watersheds.

Best management practice (BMP) – A practice or combination of practices that are determined to be the most effective and practicable (including technological, economic, and institutional considerations) means of controlling point and nonpoint pollutants at levels compatible with environmental quality goals.

Category I watersheds – UWA watersheds in need of restoration.

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1 In Re Boundaries of Pulehunui, 4 Haw. 239, 241 (1879)

Category II watersheds – UWA watersheds needing preventive action to sustain water quality.

Category III watersheds – UWA watersheds with pristine/sensitive aquatic conditions on lands administered by Federal, State, or Tribal Governments.

Category IV watersheds – UWA watersheds with insufficient data to make an assessment.

Clean Water Act (CWA) – The commonly used name for the Federal Water Pollution Control Act (FWPCA) as amended by Congress in 1977; Congress initially passed the FWPCA in 1972.

Clean Water Action Plan (CWAP) – Plan released in February 1998 that presented a broad vision of watershed protection in which protections for America's coastal and estuarine waters, surface freshwater, wetlands, groundwater, and natural resources are integrated with traditional clean water and human health objectives and includes a new, cooperative approach to restoring and protecting water quality.

Coastal waters – Waters adjacent to the shorelines which contain a measurable quantity or percentage of sea water, including, but not limited to, bays, lagoons, ponds, estuaries, etc.

Coastal zone – Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea. In Hawai`i, the coastal management area is statutorily defined as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea."

Coral Reef Initiative – Federal initiative to identify and implement projects to protect the health of coral reef ecosystems.

Department – For this plan, term refers to the Department of Health.

Ecosystem – A community of plants and animals (including people) interacting with each other and their physical environment. Ecosystems include places as diverse as urban parks, wetland areas, lakes, and major forests.

Estuary – The part of the river or stream that is affected by tides. The region near a river or stream mouth in which fresh water in the river mixes with the salt water of the sea.

Focus group – An informal advisory group, usually made up of members recruited for their special expertise or interest in a given area; these persons generally serve on a voluntary basis.

Geographic Information System (GIS) – A set of computer program used to store, analyze, and present geographical information, such as topography, ecosystem types, vegetation, land uses, and political and transportation systems, among others. A single map can be displayed on the computer screen with additional maps added as overlays to facilitate comparisons.

Ground water – Subsurface water occupying the zone of saturation. In a strict sense, the term is applied only to water below the water table.

Habitat – The environment that supports plant or animal species. Place where an organism naturally lives or grows.

Hawaii Technical Committee on Nonpoint Source Pollution Control – Committee comprised of representatives from Federal and State agencies conducting nonpoint source-related activities and the Soil and Water Conservation Districts, who provide local-level input.

Hydromodification – An alteration of the hydrologic characteristics of coastal and noncoastal waters, which in turn could cause degradation of water resources. In other words, any alteration to a stream or coastal waters, whether a diversion, channel, dam or levee is considered a hydromodification.

Impaired waters – Waters identified by the State as not "fishable" and/or "swimmable." The two categories of beneficial use come from language in the Clean Water Act.

Incremental section 319(h) funds – Funds provided to the State specifically to implement Watershed Restoration Action Strategies under the CWA. The Environmental Protection Agency is encouraging states to utilize this new funding to support restoration activities in selected Category I watersheds.

Management measure – An economically achievable measure for the control of the addition of pollutants from existing and new categories and classes of nonpoint sources of pollution, which reflects the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives.

Nonpoint source pollution – Water pollution that comes from many diffuse sources rather than from a specific point, such as an outfall pipe, and is often the result of human activities. Also called polluted runoff.

Nutrients – Elements, or compounds, essential as raw materials for organism growth and development, such as carbon, nitrogen, calcium, oxygen, phosphorous, sulfur, and magnesium.

Pathogens – Microorganisms (e.g., bacteria, viruses, or parasites) that can cause disease in humans, animals or plants.

Point source pollution – Pollution from any discernible, confined, or discrete conveyance from which pollutants are or may be discharged, including, (but not limited to) pipes, ditches, channels, tunnels, conduits, wells, containers, rolling stock, concentrated animal feeding operations, or vessels.

Polluted runoff – Term has same meaning as nonpoint source pollution and has become the favored term in recent years.

Quality Assurance/Quality Control (QA/QC) – A system of procedures, checks, audits, and corrective actions to ensure that all research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

Riparian area – Vegetated ecosystems along a waterbody through which energy, materials, ands water pass. Riparian areas characteristically have a high water table; they are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of these two landforms; they will not have, in all cases, all of the characteristics necessary for them to be classified as wetlands.

Runoff – That part of precipitation or irrigation water that runs off the land into streams or other surface water. It can carry pollutants from the air and land into the receiving waters.

Sediment – Sediment is the result of erosion. It is the solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, or gravity.

Stakeholder – Any organization, governmental entity, or individual that has a stake in or may be impacted by a given approach to environmental regulation, pollution prevention, energy conservation, etc.

State waters – Includes all waters, fresh, brackish, or salt, around and within the State including, but not limited to, coastal waters, wetlands, streams, rivers, drainage ditches, ponds, reservoirs, canals, groundwaters, and lakes; provided that drainage ditches, canals, ponds, wetlands, and reservoirs required as a part of a water pollution control system or an irrigation system are excluded.

Stream – Any natural water course in which water usually flows in a defined bed or channel, whether or not the flow is constant, uniform, or uninterrupted, and regardless of whether the stream has been altered or channelized. In distinguishing between a stream and other water features such as gullies, the most significant feature of a stream is the existence of a streambed that has graded or sorted deposits consisting primarily of sand, gravel, and boulders.

Surface water – All water whose surface is exposed to the atmosphere; includes ground-level water bodies such as rivers, lakes, reservoirs, bays, and oceans.

Total Maximum Daily Load (TMDL) – This program, established by Section 303(d) of the Clean Water Act, provides for the protection of waters in areas where pollution control is not stringent enough to achieve water quality standards. The program authorizes states to assess water quality and to allocate the total maximum allowable daily load(s) of pollutant discharges to those waters, regardless of the source of the pollutant.

Unified watershed assessment – A cooperative approach to watershed protection and a key element in the Clean Water Action Plan 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 the problem.

Water Quality Limited Segments – Waterbodies 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.

Water quality – A term that reflects the condition of water that has been affected by natural processes and human activities; good water quality may mean that it meets its designated uses, i.e., it is fishable and swimmable.

Water quality standards – State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Watershed – A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, lake, or ocean at a lower elevation.

Watershed approach – A coordinated framework for environmental management that focuses public and private efforts on the highest priority problems within hydrologically-defined geographic areas taking into consideration both ground and surface water flow.

Watershed region – A categorization of a number of watersheds that drain into one WQLS as identified in Hawaii's Unified Watershed Assessment

Watershed restoration action strategies (WRASs) – Strategies that the States have developed for restoration efforts for their watersheds that currently do not meet their water quality goals.

Wetlands – Areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions; wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands help control floods, filter pollutants, and serve as spawning and nursery areas for fish.

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EXECUTIVE SUMMARY

"Nonpoint source water pollution," now more commonly called "polluted runoff," is a term for all the materials originating from natural and human activity that are carried by rainwater from the land and the air into streams and oceans. Pollution of this type especially impacts the State of Hawaii and its citizens. Since the State's longest stream, Kaukonahua, is only 33 miles in length and rain usually falls in torrential bursts, nature provides very little chance for this type of pollution to settle out before it impacts the surface and groundwater we drink and the streams and coastal waters in which we fish and play.

Hawaii's Implementation Plan for Polluted Runoff Control is both a culmination of the planning that the State of Hawaii has done in past years for polluted runoff control and, at the same time, the first five-year plan for implementation of activities to be undertaken by State and county agencies, federal agencies, and Hawaii's citizens to control polluted runoff. Polluted runoff is a major cause of water quality degradation nationwide: therefore, the activity in Hawaii is designed not only to respond to Hawaii's problems but also to meet federal requirements.

This Plan:

1. Addresses the nine key elements required by the Environmental Protection Agency (EPA) for State nonpoint pollution control programs to be formally recognized by the EPA as Tier I Nonpoint Source States. Such recognition will allow the Department of Health's (DOH) Polluted Runoff Control program (PRC) to receive priority for multi-year grant work plans, streamlined review of grants applications, increased technical assistance, reduced reporting requirements, and reduced oversight by the EPA;
2. Establishes long and short-term goals and activities to control nonpoint source pollution control in Hawaii as required for the implementation of *Hawaii's Coastal Nonpoint Pollution Control Program*, based on the Coastal Zone Reauthorization Act of 1990 (CZARA) and conditionally approved by EPA and the National Oceanic and Atmospheric Administration (NOAA) in 1998; and
3. Establishes 15-year strategies and 5-year implementation plans to prevent and reduce polluted runoff in six categories (agriculture, forestry, urban, marinas and recreational boating, hydromodification, and wetlands and riparian areas) and schedules to evaluate the effectiveness of these and other polluted runoff controls used in the State.

Chapter 1 of this report introduces the concept of polluted runoff and places it in the context of Hawaii's geography. It describes the biennial assessments of Hawaii's water quality and the meaning of Water Quality Limited Segments (WQLSs). The Chapter closes with a county-by-county description of the health of the watersheds draining into the WQLSs.

Chapter 2 describes the federal requirements and plans, State planning documents and activities, and the programs of the two State agencies (Department of Health, Environmental Management Division, Clean Water Branch, Polluted Runoff Control Program and Department of Business, Economic Development, and Tourism, Office of Planning, Coastal Zone Management Program) charged with implementing polluted runoff control in Hawai`i. The Department of Health and the Office of Planning have established nonpoint source pollution control programs based on the management of principles of cooperation, coordination, communication, and holistic approaches. These derive from the Native Hawaiian ahupua`a approach to resource management. A description of federal programs for water quality carried

on in Hawai`i is followed by three long-term goals, the short-term activities needed to implement them by 2013, and measures of successes.

Chapter 3 identifies the statewide and watershed-based partnerships established to protect and enhance water quality. The State's policy is to engage the stakeholders and ensure the polluted runoff control provisions developed are effective and economically feasible. Both the Department of Health and the Office of Planning are continuously seeking cooperative arrangements and improved coordination among the participating agencies and stakeholders in the development of polluted runoff control measures and programs.

Chapter 4 details the statewide portion of the State's two-tiered approach to polluted runoff control management that is coordinated by the Department of Health and the Office of Planning. While the Department of Health and the Office of Planning were responsible for coordinating and integrating *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*, most of the implementation of the management measures is done by other agencies.

Chapter 5 covers the watershed approach portion of the State's two-tiered approach to nonpoint source pollution management. The key to the watershed approach is tailoring efforts of federal, state, and local governments, and the private and public sector to the particular needs of an individual watershed. The regional watershed approach further complements the State's current conditions from an environmental, economical and communal standpoint. A key component of the State's watershed approach is the Unified Watershed Assessment (UWA). The UWA, one of the programs arising from the federal Administration's C*lean Water Action Plan*, aims to provide a framework for federal, state, and tribal activities related to identifying and prioritizing watersheds in need of restoration.

Chapter 6 covers the progress the State has made in developing 5-year plans and 15-year strategies for the six nonpoint source categories identified in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* - agriculture, forestry, urban areas, marinas and recreational boating, hydromodifications, and wetlands and riparian areas. *Hawaii's Implementation Plan for Polluted Runoff Control* will serve as a road map and guide Hawai`i to attain its three long-term goals by 2013. Following each five-year period, the State will evaluate its progress towards reaching the long-term goals and develop 5-year implementation plans to show how agencies and organizations are implementing the management measures. The State will base its 5-year evaluation on water quality monitoring data and information from the implementation of statewide and watershed based projects.

Six appendices provide a variety of background information, including summaries of documents on which the Plan is based.

INTRODUCTION

I.1 Background

"Non-point source water pollution" or, as it is now more commonly called "polluted runoff,' is a term which describes all those things which are carried from land by rainwater into streams and oceans. Pollution of this type especially impacts the State of Hawaii and its citizens. Since the State's longest stream, Kaukonahua, is only 33 miles in length and rain usually falls in torrential bursts, nature provides very little chance for this type of pollution to settle out before it impacts the surface and groundwater we drink, the streams and coastal waters we fish and play in, and all the life in and uses of those streams and coastal waters.

Hawaii's Implementation Plan for Polluted Runoff Control is both a culmination of the planning that the State of Hawaii has done in past years for polluted runoff control and, at the same time, the first five-year plan for implementation of activities to be undertaken by State and county agencies, federal agencies, and Hawai`i's citizens to control polluted runoff.

Polluted runoff is a major cause of water quality degradation nationwide; therefore, the activity in Hawaii is designed not only to respond to Hawaii's problems but also to meet federal requirements. Table I-1 summarizes the statutes and documents which set forth federal requirements and the resulting State planning documents and activities. Appendix A-1 gives a brief synopsis of each document and full text for some of them.

Two State agencies – the Department of Health, Environmental Management Division, Clean Water Branch, Polluted Runoff Control Program (PRC) and Department of Business, Economic Development, and Tourism, Office of Planning, Coastal Zone Management Program (CZM) – are charged with implementing polluted runoff control in the State of Hawaii.

As Table I-1 shows, the Department of Health's involvement began nearly thirty (30) years ago; it was more focused by the 1987 Clean Water Act amendments, which resulted in publication of *Hawaii's Nonpoint Source Pollution Management Plan* in 1990. A statutory basis for the Department of Health's polluted runoff control activities was established with the adoption of "Nonpoint Source Pollution Management and Control," Chapter 342E, Hawaii Revised Statutes (HRS). When the CZM Program was established in 1977, it included water quality in its objectives and policies (HRS 205A-2).

The passage of the Coastal Zone Act Reauthorization Amendments (CZARA) in 1990 resulted in expansion of the polluted runoff control activities of both agencies. CZARA directed the water quality agency and the coastal zone management agency of each state with a federally approved coastal zone management program to implement the program within the "CZARA boundary." In Hawai`i that boundary was determined to be coterminous with the State's coastal zone management area, which covers "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea."[1].

1 Hawaii Revised Statutes. (1993 as amended). Chapter 205A-1, "Definitions"

I.2 Development of Hawaii's Implementation Plan for Polluted Runoff Control

Table I-1 gives the "genealogy" of the *Implementation Plan*. The draft *Implementation Plan* (circulated for public comment in October 1999) was a further development of *Hawaii's Nonpoint Source Management Program Update* – Draft that DOH-PRC submitted to the Environmental Protection Agency. The *Update* was modified based upon input received from public information meetings for, and written responses to, *Hawaii's Nonpoint Source Management Program Update* (Preliminary Draft, July 1999) (DOH 1999e) and various other contacts. The draft *Implementation Plan* included "State Implementing Strategies and Plans" (Chapter 6) for the six categories of management measures developed in a federal guidance to implement Section 6217 of CZARA. As noted in the Glossary, "management measures" are economically achievable measures for the control of pollutants from existing and new categories and classes of nonpoint sources of pollution providing the greatest degree of pollutant reduction achievable through the application of "best management practices" (BMPs).

I.3 Public Review Processes for Hawaii's Implementation Plan for Polluted Runoff Control

I.3.1 Distribution and Public Meetings

Five hundred (500) copies of the draft *Implementation Plan* were distributed through a variety of means. Copies were sent to members of the Marine and Coastal Zone Management Advisory Group (MACZMAG) and the Polluted Runoff Forum (PROF); see Appendix B for lists. They were also distributed to all 50 public libraries and to persons responding to the notices of the public information meetings, as well as being distributed at the public meetings and at various stakeholder meetings.

Twenty-one (21) public information meetings introducing the draft *Implementation Plan* were held in October and November 1999. Eleven (11) public meetings were held on O`ahu; five (5) on Hawai`i Island, two (2) each on Kaua`i and Maui, and one (1) each on Lana`i and Moloka`i. See Figure I-1 for dates and places. They were announced twice in the official weekly "Hawaii State and County Public Notice" and in the Office of Environmental Quality Control's "Environmental Notice." Press releases were submitted to all major island newspapers, which resulted in mention of the meetings in nearly all of the papers. Articles either preceding or reporting on the meetings appeared in several papers. Postcard notices were sent to a CZM polluted runoff mailing list of over 1,200 people.

Hawaii	Lanai	Oahu
October 25: Honoka`a	October 19: Lanai City	October 18: Aina Haina
October 26: Hilo		October 21: Ewa Beach
October 27 Oceanview	Maui	November 1: Kaneohe
October 27: Kailua-Kona	November 9: Wailuku	November 4: Aiea
October 28: Kamuela	November 10: Lahaina	November 8: Haleiwa
		November 15: Waianae
Kauai	Molokai	November 16: Hauula
November 2: Lihue	October 20: Kaunakakai	November 17: Palolo
November 3: Kilauea		November 18: Makiki
		November 22: Mililani

Figure I-1: Schedule of Public Information Meetings for Draft *Hawaii's Implementation Plan For Polluted Runoff Control*

I.3.2 Comment Period

The official comment period initially ended December 15, 1999 but was later extended to January 5, 2000. As long as the *Implementation Plan* was still being finalized, however, all written comments were considered. The notes taken at the public information meetings were also reviewed, as well as the comments made at the PROF meetings (see next paragraph).

I.3.3 PROF meetings

PROF members were invited to participate in a series of fora, with topics based on the six categories of management measures, from January 10-13, 2000. These fora were open to other participants as well. While a few of the PROF members had attended the public information meetings in the fall, these fora gave many more representatives of agencies and organizations an opportunity to discuss the draft document which had been distributed to them in October 1999.

I.4 Finalization of *Implementation Plan*

This document represents the best efforts of the Hawaii CZM Program and the DOH-PRC Program to respond to the information and concerns shared by all those who commented during the review period. At the same time, it was necessary to give weight to the federal mandates and guidances the two programs are tasked to fulfill. As a result, it is likely that concerned parties will still either feel that the *Implementation Plan* is proposing to accomplish too much too quickly without allowing sufficient flexibility or too little too slowly without sufficient controls.

The State will review the actions proposed in Chapter 6 of the *Implementation Plan* in the final year of each five-year period and develop a revised set of implementing actions for public comment. This will give all concerned an opportunity to review and assess, revise and refine, and hopefully develop agreement on needed additional actions.

I.5 Conclusion

This document describes the goals, programs, and expected outcomes for polluted runoff control mechanisms statewide and the steps that the State will take over the next five years to control polluted runoff.

The DOH-PRC Program and the Hawaii CZM Program thank all the many partners, old and new, who have helped bring this document to fruition. We look forward to working with you, and others we do not yet know, to take actions that will improve the watersheds, streams, coastal and ocean waters of Hawai`i by controlling polluted runoff.

Table I-1
POLLUTED RUNOFF CONTROL IN HAWAII
Federal Statutes and Guidance Documents; State Statutes and Planning Documents

Date Statute or Guidance Enacted	Federal/ State	Statute/ Guidance/ Planning Document	Title	Resulting Document or Action in Hawaii (date)	Implementing Agency
1972	F	S	Federal Water Pollution Control Act of 1972 (P.L. 92-500, Section 208), 33 U.S. Code §1288	*Technical Report No. 2: Nonpoint Source Pollution in Hawaii: Assessments and Recommendations*. Hawaii Department of Health. Technical Committee on Nonpoint Source Pollution Control. (1978)	DOH EPO[2]
1972	F	S	Coastal Zone Management Act of 1972 (P.L. 92-583), 16 USC 1451 et. seq.	"Coastal Zone Management", Chapter 205A, Hawaii Revised Statutes (1977)	CZM
1987	F	S	Federal Water Pollution Control Act of 1977 (P.L. 100-4, Section 319), 33 U.S. Code §1329	*Hawaii's Assessment of Nonpoint Source Pollution Water Quality Problems* and *Hawaii's Nonpoint Source Water Pollution Management Plan*. Hawaii Department of Health – prepared for the U.S. Environmental Protection Agency. (1990)	PRC
1990	F	S	Coastal Zone Act Reauthorization Amendments of 1990 (P.L. 101-508), 16 U.S. Code 1455b, Section 6217.	(see *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* below)	
Key: F= Federal, S = State of Hawaii, G = Guidance, P = Planning document					

2 EPO = Environmental Planning Office

Date Statute or Guidance Enacted	Federal/ State	Statute/ Guidance/ Planning Document	Title	Resulting Document or Action in Hawaii (date)	Implementing Agency
1993	F	G	*Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, U.S. Environmental Protection Agency, Office of Water, Report 840-B-92-002	*§6217 in a Nutshell: Summary of the §6217 Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*, Prepared by the Hawaii Coastal Zone Management Program (January 1993)	CZM
1993	F	G	*Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance*, U.S. Department of Commerce, National Oceanic & Atmospheric Administration and U.S. Environmental Protection Agency, Office of Water	*§6217 in a Nutshell: Summary of the §6217 Program Development and Approval Guidance*, Prepared by the Hawaii Coastal Zone Management Program (January, 1993)	CZM
1993	S	S	"Nonpoint Source Pollution Management and Control", Chapter 342E, Hawaii Revised Statutes		PRC
Key: F= Federal, S = State of Hawaii, G = Guidance, P = Planning document					

Date Statute or Guidance Enacted	Federal/ State	Statute/ Guidance/ Planning Document	Title	Resulting Document or Action in Hawaii (date)	Implementing Agency
(see 1990 above)	S	P		*Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (CNPCP), Hawaii Office of State Planning - prepared for the National Oceanic and Atmospheric Administration, U.S. Department of Commerce and U.S. Environmental Protection Agency. (1996)	CZM network agencies including PRC
1996	F	G	*Nonpoint Source Program and Grants Guidance for Fiscal Year 1997 and Beyond,* U.S. Environmental Protection Agency	*Hawaii's Nonpoint Source Management Program Update* (Preliminary Draft), Hawaii Department of Health with the Hawaii Coastal Zone Management Program (1999)	PRC, CZM
1998	F	G	*Clean Water Action Plan: Restoring and Protecting America's Waters,* U.S. Environmental Protection Agency and U.S. Department of Agriculture	*The Hawai`i Unified Watershed Assessment,* Hawaii Department of Health, Natural Resources Conservation Service, and Office of Planning (1999)	PRC, CZM, NRCS
Key: F= Federal, S = State of Hawaii, G = Guidance, P = Planning document					

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CHAPTER 1
OVERVIEW AND ISLAND ISSUES

It has become increasingly clear that surface and groundwater in Hawaii, as well as the rest of the nation, has serious quality problems. It has been nearly thirty years since the Federal Water Pollution Control Act (commonly called the Clean Water Act) was first authorized to start addressing the water quality problems of the Nation. The early focus of the Clean Water Act was to control or reduce "point source" discharges. Point sources are typically end-of-pipe discharges from factories or sewage treatment plants. Hawaii has had its share of point source problems such as sewage treatment plants discharging close to nearshore waters and areas with poor circulation. With increased management and monitoring of point source discharges, water quality did improve locally as well as nationally.

Although there has been noted improvement and some waterbodies may be considered excellent in quality, overall water quality can be described in a range of slightly impaired to severely impaired. The reason these waters remain impaired is due to nonpoint source pollution, also known as polluted runoff. Nationally, nonpoint source pollution (NPS) has been recognized as the greatest remaining water quality issue. Hawaii also recognizes that NPS is the greatest threat to water quality in our islands. This recognition comes not only from water quality officials and local scientists but also from the public. The Hawaii Environmental Risk Ranking Project (1994) identified nonpoint source pollution and its impact on stream and coastal water quality as the issue of most concern to communities. Presently there are eighteen waterbodies identified statewide that consistently do not meet state water quality standards due to nonpoint source pollution.

1.1 What is Nonpoint Source Pollution?

Nonpoint source pollution, commonly called polluted runoff, occurs when rainwater moves on the surface or through the ground carrying the pollutants that have been left there by a myriad of sources. This polluted runoff flows to drainage systems and ends up impairing our streams and nearshore coastal waters. It is often difficult to trace polluted runoff to its point of origin since it comes from many different land uses such as urban industrial and residential zones, agricultural lands, marinas, and forests. Significant pollutant types include sediments, nutrients, toxins, floatables, and pathogens. In the simplest terms, nonpoint source pollution is any pollution that is not from a point source.

The consequences of nonpoint source pollution are well known: increased risk of disease from water recreation, algae blooms, fish kills, destroyed aquatic habitats, and turbid waters. Some polluted runoff is from natural sources. Most, however, results from people's activities on the land and water. Since nonpoint source pollution results from how we choose to use our land and the activities we conduct, we all hold the key to its prevention.

The importance of coastal water quality to the State of Hawaii cannot be overstated. Tourism is Hawaii's most important industry. Nearly six million visitors visit our state each year. Hawaii's unique marine and terrestrial environment is among the main reasons it is chosen as a visitor destination. Clean streams and coastal water are an integral component of that desired environment. Water quality is vital to Native Hawaiian cultural practices; leisure and

recreation –swimming, boating, snorkeling, SCUBA diving, paddling and surfing; fishing and other food gathering activities; and research and technology. The State has an economic goal of diversified, high technology development. Major research on innovative ocean power sources, transoceanic fiber optic communications, and marine life is carried out in Hawaii. For instance, designation of a national sanctuary for humpback whales in the Hawaiian Islands occurred in part on the potential for research in these waters. Clean ocean and coastal water is the key to having these industries or research opportunities continue here.

Hawaii is considered the "endangered species capital of the world." Hawaii has a phenomenal number of flora and fauna that are at risk of becoming extinct. There are several reasons for this, one being the degradation of watersheds and associated streams and coastal waters. For example, elevated sediment or nutrient levels can off-set the balance in a riparian system to the point that introduced fish species are able to prosper while native ones cannot compete, lose habitat, and therefore decrease in numbers. Non-native plants and animals have their impact on water quality too. Many non-native plants have successfully replaced native vegetation, and in some situations, they fail to hold soil adequately.

1.2 Hawaii's Unique Geography

The Hawaiian Archipelago is located in the central Pacific Ocean, approximately 3,000 miles from the continental United States. The State of Hawaii consists of eight major and 124 minor islands in the 1,523-mile archipelago. The eight major islands include the islands of Hawaii, Oahu, Maui, Kauai, Molokai, Lanai, Niihau, and Kahoolawe.

The State Capital is Honolulu on the island of Oahu, which is 1,367 miles from Kure Atoll (the westernmost end of the State), 2,397 miles from San Francisco, and 4,828 miles from Washington, D. C. The highest peak in the State is Mauna Kea on the island of Hawaii, 13,796 feet above sea level; the longest stream is Kaukonahua Stream on the island of Oahu, which is 33 miles in length.

Over the span of 25 million years, volcanic shield building followed by erosion, subsidence, and formation of coral reefs formed the islands of the archipelago. This volcanic activity is still occurring on the island of Hawaii. Consequently, the topography, geology, and climate in Hawaii are characterized by remarkable variations, which include unique and diverse microenvironments side-by-side. Within 30 miles on the island of Hawaii, the ecosystem changes from coastal marine coral reefs to the snow-capped summit of Mauna Kea. The highest lake in the nation, Lake Waiau, is located at an elevation of 13,020 feet on Mauna Kea. The extremes of altitude and moisture provide a variety of habitats for many unique plant and animal species. The Alakai Swamp on the island of Kauai receives over 400 inches of rain per year. Mt. Waialeale (elevation 5,148 feet) rising above Alakai Swamp is the world's wettest spot, averaging 444 inches of rainfall annually. Almost every major Hawaiian Island has a pali, steep mountain cliffs, which exceeds 3,000 feet in elevation. These mountains are high enough to cause moisture laden trade winds to rise, condense into clouds, and provide vital rainfall. Rainfall regimes for each island are steep, usually culminating in 200 inches of annual rainfall at

the mountaintops. Hawaii's rainfall regime is unique to the rest of the nation. This rainfall has a lot of erosive potential and is one reason why it is often difficult to retain runoff. Hawaii is subject to very arid conditions as well. The lower Kawaihae watershed on Hawaii Island gets only 9 inches of rainfall per year.

Hawaii's watersheds are unique when compared to the contiguous United States. Hawaii has no extensive river basin system comparable, for example, to the Missouri River Basin. Each of the major islands is a discrete hydrologic system of streams and related drainage areas. Each hydrographic area consists of a large number of small watersheds ranging in size from one or two square miles up to 80 square miles. Most river or stream courses are just a few miles long and are subject to flashy flows. Hawaii's watersheds are steep, with highly permeable volcanic rocks and soils. Many of Hawaii's soils are considered highly erodible. Many of these watersheds are amphitheater shaped, with steep walls ranging from 40-70 degree slopes.

The State of Hawaii has one of the highest percentages of endemic plants and animals on earth and of endangered species in the United States. On the other hand, the rugged topography of the islands has also restricted most human activity and impacts to coastal and lowland areas. Consequently, most of the water quality monitoring activities conducted by the State are restricted to the lowland areas. It is assumed, but unproven, that most upland areas of the State, such as the Alakai Swamp, and many miles of coastline, such as the north coast of East Molokai, are in pristine condition.

The majority of the watersheds and streams are small, with few tributaries that drain a limited number of valley areas. Streams generally run directly from the mountains to the coastlines, so that stretches of coastline have several small streams rather than one or two large rivers draining the inland areas.

While each stream is uniquely affected by the uses of the lands through which it passes, there is a similarity in the cause of their impairments: nonpoint source pollution. The bases for this assessment are stream usage, the lack of point source discharges, knowledge of land use, and an understanding of the ecosystem. Few streams are monitored routinely.

In general, habitat destruction, introduction of alien species, intensive fishing, and surface runoff containing high concentrations of sediments, bacteria, nutrients and other chemicals have, over time, caused alterations in the aquatic community structure and a publicly perceived decrease in the aesthetic qualities of surface waters.

1.3 Surface Water Assessment

In the preparation of the Department of Health's Section 305(b) Report, State waters are assessed and likely contributors to impacts are provided. The majority of the information used in the Section 305(b) Report is gathered from the Clean Water Branch of the Department. Other sources contributing information include the Department's Environmental Planning Office and the Epidemiology Branch, and the Department of Land and Natural Resources (See Tables 1-1 and 1-2).

Based on the Department of Health Administrative Rules, Chapter 11-54 HAR, "Water Quality Standards" (adopted April 17, 2000), all waters in Hawaii serve the following two purposes: fish/wildlife habitat and human-related recreational activities, consistent with the "fishable" and "swimmable" goals established in the Clean Water Act.

All state waters, except those on the island of Kahoolawe, are classified as fishable and swimmable because their water quality can support wildlife and aquatic recreational activities.

The inland waters of the 45 square mile island of Kahoolawe are the only unclassified waters in the State of Hawaii. These inland waters are mainly intermittent streams. This island had been used by the United States Navy as a target range.

Table 1-1
Summary of Fully Supporting, Threatened, and Impaired Waters: Rivers and Streams (Reported in miles)[a]

DEGREE OF USE SUPPORT	ASSESSMENT CATEGORY		TOTAL ASSESSED SIZE
	EVALUATED	MONITORED	
SIZE FULLY SUPPORTING ALL ASSESSED USES	1194.16	6.45	1200.61
SIZE FULLY SUPPORTING ALL ASSESSED USES, BUT THREATENED[b] FOR AT LEAST ONE USE	0.00	0.00	0.00
SIZE IMPAIRED[c] FOR ONE OR MORE USES	2604.29	99.77	2704.06
SIZE NOT ATTAINABLE FOR ANY USE AND NOT INCLUDED IN THE LINE ITEMS ABOVE	0.00	0.00	0.00
TOTAL ASSESSED	3798.45	106.22	3904.67

[a] 1998 State 305(b) Report.
[b] Size threatened is a distinct category of waters and is NOT a subset of the size fully supporting uses. It is added into the totals in the bottom line.
[c] Impaired means partially or not supporting a designated use.

Table 1-2
Individual Use Support Summary: Rivers and Streams (Reported in Miles)[a]

GOALS	USE	SIZE ASSESSED	SIZE FULLY SUPPORTING	SIZE SUPPORTING BUT THREATENED	SIZE PARTIALLY SUPPORTING	SIZE NOT SUPPORTING	SIZE NOT ATTAINABLE	SIZE NOT ASSESSED
	OVERALL	3865.47	1289.50	0.00	657.92	1918.05	0.00	0.00
PROTECT & ENHANCE ECOSYSTEM	AQUATIC LIFE	3904.55	1565.91	0.00	0.00	2338.64	0.00	0.00
PROTECT & ENHANCE PUBLIC HEALTH	FISH CONSUMPTION	3891.85	3878.41	0.00	0.00	13.44	0.00	0.00
	SHELLFISHING	3904.55	3903.95	0.00	0.00	0.60	0.00	0.00
	SWIMMING	3897.81	3897.21	0.00	0.00	0.60	0.00	0.00
	SECONDARY CONTACT	3904.55	3903.95	0.00	0.00	0.60	0.00	0.00
	DRINKING WATER	3889.23	3888.63	0.00	0.00	0.60	0.00	0.00
SOCIAL & ECONOMIC	NON-DEGREDATION	3904.67	1610.75	0.00	69.44	2224.48	0.00	0.00
	AESTHETICS	3880.77	3857.04	0.00	0.00	23.73	0.00	0.00
	AGRICULTURE	3904.55	3903.95	0.00	0.00	0.60	0.00	0.00
	CULTURAL OR CEREMONIAL	3904.55	3903.95	0.00	0.00	0.60	0.00	0.00

[a] 1998 State 305(b) Report.
0 Category applicable, size of waters is zero.

1.4 Estuary and Coastal Assessment

As defined in HAR, Chapter 11-54 (October 1992), estuaries refer to deep, characteristically brackish coastal waters in well-defined basins with a continuous or seasonal surface connection to the ocean that allows entry of marine fauna. Most estuaries in Hawaii are within embayments that generally are not subject to rapid and efficient flushing. Accumulation of silt and organic materials may occur as a result of urban and agricultural runoff. Most of these estuaries support beneficial uses but are impacted by pollutants from land-based sources (i.e. runoff) and may thus appear "not swimmable." However, since the risk of illness is proportional to the amount of Enterococcus bacteria from sewage, not runoff, the estuaries may remain "swimmable" despite the exceedance of the seven CFU/ 100 ml. Standard (See Tables 1-3 and 1-4).

Table 1-3
Summary of Fully Supporting, Threatened, and Impaired Waters: Estuaries
(Reported in Square Miles)[a]

DEGREE OF USE SUPPORT	ASSESSMENT CATEGORY		TOTAL ASSESSED SIZE
	EVALUATED	MONITORED	
SIZE FULLY SUPPORTING	0.04	23.71	23.75
SIZE FULLY SUPPORTING ALL ASSESSED USES, BUT THREATENED[b] FOR AT LEAST ONE USE	0.00	0.42	0.42
SIZE IMPAIRED[c] FOR ONE OR MORE USES	0.90	29.69	30.59
SIZE NOT ATTAINABLE FOR ANY USE AND NOT INCLUDED IN THE LINE ITEMS ABOVE	0.00	0.00	0.00
TOTAL ASSESSED	0.94	53.82	54.76

[a] 1998 State 305(b) Report.
[b] Size threatened is a distinct category of waters and is NOT a subset of the size fully supporting uses. It is added into the totals in the bottom line.
[c] Impaired means partially or not supporting a designated use.

Table 1-4:
Summary of Fully Supporting, Threatened,
and Impaired Waters: Coastal Shoreline
(Reported in Miles)[a]

DEGREE OF USE SUPPORT	ASSESSMENT CATEGORY		TOTAL ASSESSED SIZE
	EVALUATED	MONITORED	
SIZE FULLY SUPPORTING ALL ASSESSED USES	644.99	137.08	782.07
SIZE FULLY SUPPORTING ALL ASSESSED USES, BUT THREATENED[b] FOR AT LEAST ONE USE	6.20	4.25	10.45
SIZE IMPAIRED[c] FOR ONE OR MORE USES	6.50	84.82	91.32
SIZE NOT ATTAINABLE FOR ANY USE AND NOT INCLUDED IN THE LINE ITEMS ABOVE	0.00	0.50	0.50
TOTAL ASSESSED	657.69	226.65	884.34

[a] 1998 State 305(b) Report.
[b] Size threatened is a distinct category of waters and is NOT a subset of the size fully supporting uses. It is added into the totals in the bottom line.
[c] Impaired means partially or not supporting a designated use.

1.5 Water Quality Limited Segments

Impaired waterbodies of the State are designated in several plans: State 303(d) List, State 305(b) Report, and Clean Water Act Section 208 Water Quality Management Plans (WQMP) for all four counties.

Each coastal water segment is linked with an associated land area. Each island is divided into hydrographic areas based on surface topography. Subareas are defined by the related drainage area, stream system, geography, and coastal water segment. A coastal water quality limited segment coincides with those coastal waters that receive discharges from point and nonpoint sources located within that defined area.

Water Quality Limited Segments are defined in Section 303 of the Clean Water Act and EPA regulations as water areas where existing water quality does not meet, and will not meet, applicable water quality standards even after effluent limitation requirements on point source discharges are applied.

The segments have been designated by the Department of Health based on common hydrological characteristics, existing water quality, and water quality standards. Population distribution, sewer districts, and water distribution were also used to determine segment boundaries. Segment designation as a Water Quality Limited Segment reflects the amount of flow, type and quantity of pollutants, the degree of violation of water quality standards, and the interactive and dispersive capacity of the receiving waters. In addition, consideration is given to public health hazards, the actual uses of the receiving waters, the impediments to controlling pollutant discharges, and compliance with water quality limited and effluent limitation requirements, based on the best available data and information. *In every instance, the reason a segment is designated as a Water Quality Limited Segment is due to the high pollution emissions discharged by nonpoint sources*.

Section 319 was added to the Clean Water Act in 1987 specifically to addresses nonpoint sources of pollution. It requires each state to identify navigable waters which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain state water quality standards. Since nonpoint source pollution is the reason for designation of specific waterbodies as Water Quality Limited Segments, all waterbodies in Hawaii to be identified under the Section 319 requirement are Water Quality Limited Segments.

The Water Quality Limited Segments identified by Department of Health in 1973 to meet the requirements of Section 303(d) of the Clean Water Act were later incorporated into State of Hawaii reports required by Section 305(b) of the Clean Water Act. These biennial 305(b) reports are the mechanism by which states report on the status of their water quality. The report describes the nature and extent of state water pollution and, along with other requirements, identifies Water Quality Limited Segments. Hawaii's most recent 305(b) report (1998) identifies 18 Water Quality Limited Segments in the State (see Table 1-5 and Figure 1-1).

The 18 segments were selected by Department of Health from areas where the State had sufficient information to make judgments about water quality. Two levels of assessments were used: segment identification based on ambient water quality monitoring, and segment identification based on other information. Areas not identified as Water Quality Limited Segments are identified as Effluent Limited Segments and are assumed to meet or will likely meet applicable water quality standards after point source discharge controls are applied. This list is reviewed every two years as required by Section 303(d), Clean Water Act. In January 1996, the Department of Health began soliciting nominations from the public for impaired waterbodies, and conducting an assessment on each nominated waterbody. The list of priority watersheds in Table 1-5 reflects the list of Water Quality Limited segments finalized in 1997.

Table 1-5
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-Waialua Bays, Oahu	Honolulu	Turbidity
Keehi Lagoon, Oahu	Honolulu	Siltation, suspended solids, turbidity
Kewalo Basin, Oahu	Honolulu	Nitrogen
Koolaupoko, Oahu: -Kaneohe Bay -Kapaa Stream -Kawa Stream -Waimanalo Stream	Honolulu	 -siltation -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
Waimea Bay, Kauai	Kauai	Nutrients
Kahului Bay, Maui	Maui	Nutrients, pathogens
South Molokai, Molokai	Maui	Nutrients, suspended solids, turbidity
West Maui, Maui	Maui	Nutrients, suspended solids, turbidity, pathogens

Figure 1-1: Hawaii's Water Quality Limited Segments

1.6 Island-by-island Overview of Water Quality Limited Segments and Their Health

1.6.1 City and County of Honolulu (Oahu)

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

1.6.1.1 Kahana Bay

Kahana Bay is a drowned river valley, located on the northeast coast of Windward Oahu. The bay has a total area of 294 acres (DOH 1990a, 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.

Kahana Bay is a natural embayment, used for swimming, boating, and other water recreational sports. 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 1990a, p. V-7).

There are no point source discharges into the bay. There are, however, some cesspools used by the estimated 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 Department of Health 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. The high levels of nitrogen and phosphorus are primarily due to the lush vegetative growth in the valley and the stream estuary.

1.6.1.2 Kaneohe Bay

Kaneohe Bay is the largest embayment in the State of Hawaii with a surface area of 18 square miles. Its watershed is 40 square miles and average stream flows are 64 mgd (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, which caused extensive sedimentation of the bay. Also the bay itself

was severely stressed by a massive coral reef dredging (about 11 million cubic yards) between 1939 and 1942 as part of seaplane landing area construction; the spoil 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. Urbanization in the late 1950s through the 1970s brought uncontrolled grading which exacerbated the prior stresses of erosion and sedimentation.

In addition, 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. Most of the urban areas are served by municipal sewers, but the rural areas from Ahuimanu to Waikane are still being served by 270 household cesspools (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. 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. 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, as well as 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).

Estimates of sediment loading into Kaneohe Bay from storm runoff range from 33,000 to 131,000 tons per year. The entire bay is affected by suspended particles, especially in the southern section of the bay where the residence time has been estimated to be almost 24 days (C&C of Honolulu 1990, p. 8-22).

1.6.1.3 Ala Wai Canal

The Ala Wai Canal is a manmade canal completed in 1929 to reclaim marshlands fed by the perennial Manoa and Palolo streams and to control mosquitoes. The marsh, located in what is now the McCully-Kapiolani District and adjacent to Waikiki, consisted of taro patches, rice paddies, and duck and fish ponds. The Ala Wai Boat Harbor is located at the mouth of the canal C&C of Honolulu 1990, p. 8-22).

The water quality limited segment includes the 9,770-foot long canal, the 126-acre 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.

Major contributions to water quality problems 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 1.60 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 non-sewered areas have household cesspools and serve an estimated population of 1,300 people (C&C of Honolulu 1990, p. 8-24).

The average flow into the Ala Wai Canal from its tributary streams is estimated to be between 20-30 mgd. It also receives storm runoff from Manoa, Palolo, Makiki, Waikiki, and other areas. Sediments are deposited in the Canal because the low flow velocity in the canal is less than the settling velocity of the sediment. It is believed that large quantities of sediment are generated in the watershed areas by natural erosion processes. The canal was dredged by the City in 1966 and again by the State in the late 1970s. 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.

1.6.1.4 Kewalo Basin

Kewalo Basin is a manmade harbor, approximately 78 acres in area. Constructed by the U.S. Navy in 1945, it is homeport 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, as well as park space at Kakaako and Ala Moana. Kewalo Basin is classified as an embayment. The water limited quality segment encompasses the entire basin and channel out to the 30-foot depth contour (C&C of Honolulu 1990, pp. 8-25).

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 Kewalo Basin is hindered by its design. Consequently, the urban pollutants that collect in the basin remain concentrated for extended periods (DOH 1990a, pp. V-11 and V-12).

The primary sources of pollutants entering Kewalo Basin are the seven drains collecting urban runoff from commercial, industrial, and residential sectors of Honolulu, which bring street debris, oil, chemicals, nutrients, and heavy metals into the Basin. There are no discharges of any sediment from streams since the drainage area is entirely urbanized (C&C of Honolulu 1990, p. 8-27).

1.6.1.5 Keehi Lagoon

Keehi Lagoon's 1,116 acres make it the largest lagoon in the State. It is located in a heavily industrialized area between Kapalama-Sand Island and Honolulu International Airport. 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 on Honolulu 1990, p. 8-27).

The lagoon is used intensively 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. Other pollutants come from the streams and industrial areas (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, but it could be as many as 150.

In residential areas, trash, plant cuttings and yard debris are frequently dumped in the stream channels and reach the lagoon. Policing of illegal dumping is difficult because it can occur at any time (C&C of Honolulu 1990, p. 8-30).

1.6.1.6 Honolulu Harbor

Honolulu Harbor is the largest commercial deep-draft harbor in the State. The harbor, with a water surface area of 537 acres, is protected from the open ocean by coral reefs and Sand Island, a 500-acre manmade island. 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 limited segment encompasses the entire harbor from Keehi Lagoon to the Fort Armstrong main channel entrance to the 30-foot depth contour. Both Nuuanu (draining 8.4 square miles) and Kapalama Stream (draining 1.6 square miles) bring runoff from industrial, commercial, and residential developments into the harbor (C&C of Honolulu 1990, p. 8-31).

The most frequently violated parameters are total nitrogen, total phosphorus, turbidity, dissolved oxygen, and pH. Before about 1972, pineapple canneries and an industrial gas

company discharged a biochemical oxygen demand (BOD) load equivalent to a raw sewage discharge from 150,000 people. More recently, Kapalama Canal's wasteload 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 Department of Health sampling. Storm drain outlets discharge into the harbor throughout its the periphery (C&C of Honolulu 1990, p. 8-31).

No sediment data from the streams 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).

1.6.1.7 Pearl Harbor

Pearl Harbor is the State's largest estuary and is almost 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. Headquarters for the 14th Naval District are also sited at the harbor. 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 4 dry-docks 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 Quality Limited Segment includes the entire harbor, the mouths of perennial streams discharging into the harbor, and extends to the 30-foot depth contour from the Reef Runway to Oneula Beach (C&C of Honolulu 1990, p. 8-32).

Because of its geologic origin, Pearl Harbor has been the "sink" of the southern coastal plain of Oahu. 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 area draining into the lochs totals 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 operated by the U.S. Navy within the harbor, one (Fort Kamehameha STP) discharging at the main ship channel, and a nonmilitary point source, Waiau Power Plant, which discharges thermal water. Most of the urban areas around the harbor are served by municipal sewers; an estimated number of 400 households are on cesspools (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.

1.6.1.8 Kaiaka-Waialua Bay

This Water Quality Limited Segment includes two adjacent waterbodies on the North of Oahu. Kaiaka Bay is classified as an embayment, while the much broader Waialua Bay is classified as marine waters. Haleiwa Boat Harbor, located at the original mouth of Anahulu River, is also an embayment within the Water Quality Limited Segment's boundary.

Both bays receive drainage from major streams. Kiikii Stream (with tributaries Poamoho and Kaukonahua streams) and Paukauila Stream (which includes Helemano and Opaeula streams) flows into Kaiaka Bay. The area of the drainage basin is 79.8 square miles (C&C of Honolulu 1990, p. 8-39). Leakage of fresh water through caprock into Opaeula, 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 cubic feet per second (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 Department of Health 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. 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. Thirteen private STPs and one municipal wastewater treatment plant (primary) in the Waialua and Haleiwa communities discharge effluent into seepage pits or injection wells. 2,312 household cesspools in the Waialua and Haleiwa area, serving a population of 7,232 people, discharge an estimated 0.578 mgd into the groundwater, which eventually reaches the coastal waters.

1.6.1.9 Koolaupoko Streams: Kawa, Kapaa, and Waimanalo

Three fresh waterbodies are listed as water quality limited segments: Kawa, Kapaa, and Waimanalo streams. All three streams are within the Koolaupoko Watershed Region of Oahu. All three streams are listed as severely impaired in *Hawaii's Water Quality-Limited Waters: The 1997 Assessment* (DOH 1997, pp. 5-6). The severe impairment category is limited to waterbodies that have both extensive water quality criteria violations, as determined through site assessments, and reliable numeric water quality data supporting the observed violations. Severely impaired waterbodies are characterized by advanced degradation; their ability to support plant and animal communities or human recreation is in serious jeopardy.

Kawa Stream is located in the southern part of the Kaneohe Bay drainage system. Kawa Stream drains both conservation lands and urban /residential areas. In its urban section, it passes

by Hawaiian Memorial Park Cemetery, Castle High School, and Bay View Golf Course and discharges into Kaneohe Bay near the Waikalua Fishpond. The water quality of Kawa Stream exceeds levels for turbidity, nitrate, nitrite/nitrogen, total nitrogen, and total phosphorous. Nutrient management of large land users and residential community is the potential source of impairment. Channelization in portions of this stream contributes to impairment (DOH 1997, Appendix F).

Kapaa Stream is located mauka of Kawainui Marsh and discharges into the marsh. Kapaa Stream drains a small watershed which includes a rock quarry (Kapaa Quarry) and a closed county landfill which contributes large amounts of nitrogen, phosphorous, and sediments to the stream (DOH 1997, p. 6). The land uses in the area are urban and conservation. Water quality monitoring data show exceedances of the water quality criteria for nitrogen and phosphorous. Visual assessments have cited large amounts of floating algae, water hyacinth, and oil film. A significant amount of litter has been found in the stream and the surrounding area. In its lower portion the channel has been straightened and cleared (DOH 1997, Appendix F).

Waimanalo Stream is located in the southeast portion of the Koolaupoko Watershed Region. Waimanalo Stream receives runoff from conservation land, agriculture, roads and highways, a golf course, and lands used by the military (Bellows Air Field Station). It discharges into Waimanalo Bay, just north of Bellows Field Beach Park. Livestock raised nearby is one possible source of pollution. Algal blooms have been noted near the bridge where the Kalanianaole Highway crosses. Portions of the stream have been channelized and cleared of vegetation. There is evidence of stream bank erosion and the stream is turbid during strong flows. This waterbody consistently exceeds water quality standards for total nitrogen, nitrate, and nitrite (DOH 1997, Appendix F)

1.6.2 Maui County:

The following descriptions of the Water Quality Limited Segments in Maui County are based on information contained in the 1998 State 305 (b) Report, 1997 State 303(d) list, *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (1996), *Hawaii's Assessment of Nonpoint Source Pollution Water Quality Problems* (Department of Health 1990), supplemented by information from the *Water Quality Management Plan for the County of Maui* prepared jointly by Department of Health and the County of Maui (Department of Health 1993). There are three Water Quality Limited Segments in Maui County: two on the island of Maui and one on Molokai. (See Appendix F for additional details.) The following description covers the three Water Quality Limited Segments and their watersheds.

1.6.2.1 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 runoff from the urban centers of Wailuku and Kahului. In addition, ship and barge traffic, the Kahului airport, lands used for sugarcane cultivation, and the eastern portions of the West Maui mountains (forested 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 1990a, p. V-8).

Kahului Harbor is the main port of the Island with an estimated 98.9% of all goods coming into Maui transported through the harbor. Harbor activities include ship operation and maintenance, oil handling and bunkering, warehousing, trucking, storage, stevedoring, marine repair, and limited dry-docking (DOH 1990a, p. V-9). In addition, a cluster of hotels, beaches, the Kahului Breakwater Park, and a public boat ramp border the Bay. Shoreline access to the bay 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.

1.6.2.2 West Maui

The West Maui area was designated as a Water Quality Limited Segment 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 nearshore 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. Department of Health 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 the Department of Health to establish Total Maximum Daily Loads (TMDLs) for this Water Quality Limited Segment.

1.6.2.3 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 is 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. The dirt roads, fire-damaged areas, and poorly managed pastureland are of particular concern.

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 Palaau coastal plains located just west of Kaunakakai (DOH 1990a, 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 south coast of the Island where there once were 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.

1.6.3 Kauai County:

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

1.6.3.1 Nawiliwili Harbor

Nawiliwili Harbor and its adjacent bay are located on the southeast coast of Kauai, two miles from Lihue. A well-developed embayment of 333 acres, 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 and flowing 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 decomposing along the streams as well as seasonal input from storm water sources, which transports silt and nutrients from sugarcane land into the bay and give it a brown color at times. (DOH 1993b, p. V-13)

Nawiliwili Harbor supports a deep-draft commercial harbor and a small boat harbor with charter fishing operations. Periodic dredging is required to maintain navigable depths in the

harbor. 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).

1.6.3.2 Hanapepe Bay

Hanapepe Bay is located on the southwest corner of Kauai, between Hanapepe and Port Allen. The boundary of the Hanapepe Bay segment encloses 297 acres of water surface (DOH 1993b, p. V-3).

The Hanapepe River travels from forested uplands 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 because of flood flow discharges is a common occurrence. However, the waters generally clear rapidly.

An important Native Hawaiian salt production area and salt marshes with great wildlife value are located on the east banks of the bay. Some commercial activity occurs in Hanapepe Bay at Port Allen 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).

1.6.3.3 Waimea Bay

The Waimea Bay Water Quality Limited Segment is located on the southwest coast of Kauai. It comprises 1,214 acres and includes the Waimea River and Kiki a Ola Boat Harbor. Two rivers flow into the bay, Waimea and Makaweli.

The watershed has conservation lands at its headwaters and agriculture land use is dominant 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 was 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 of irrigation tailwater (DOH 1993b, p. V-17). There are small urban runoff issues since the town of Waimea is located within this water quality limited segment. Sediment is the major water quality pollutant.

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 torchlight fishing (DOH 1993b, p. V-18).

1.6.4 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 Coastal Nonpoint Pollution Control Program Management Plan* (1996), Hawaii's *Assessment of Nonpoint Source Pollution Water Quality Problems* (Department of Health 1990), 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 (Department of Health 1993a). (See Appendix F for additional details.) Hilo Bay is the only Water Quality Limited Segment on Hawaii Island.

1.6.4.1 Hilo Bay

Hilo Bay is located on the northeast coast of the Island of Hawaii. It covers an area of 1,788 acres and includes Waiakea Pond and Wailoa River (DOH 1990a, p. V-4).

Five natural discharges enter 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. Cattle graze the Puu Oo area above the forest reserve and the mauka fringe of the city of Hilo. Sugar, which was formerly the principal crop of the island, was grown 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. An example 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 also. Cattle, hogs, poultry, vegetables, flowers, and landscaping plants are also grown in the area surrounding Hilo. Urban runoff come from such sources 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 or 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 lower waters of the bay is generally insufficient to flush out suspended silts from the bay. Silt and mud that accumulate contribute to the turbidity of the Bay (DOH 1990a, p. V-5).

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. These high arsenic levels resulted from waste discharges containing arsenic trioxide, a compound used in a former kenec manufacturing facility to treat fiber boards to prevent termite damage. Other contaminants found in Hilo Bay included lead, zinc, chromium, chlordane residues, and polychlorinated biphenols (PCBs). Despite these high levels, however, there is no indication of any health hazard.

Hilo Bay is also affected by seepage from cesspools. A study confirmed Department of Health 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.

In spite of its water quality problems, Hilo Bay is an important wildlife and fishery area. In addition, Hilo Bay is highly visible to residents and tourists and supports a fair amount of recreational boating.

1.7 Other UWA priority watersheds that do not contain a Water Quality Limited Segment

The previously mentioned water bodies and their associated watersheds all contain a Water Quality Limited Segment. Such a designation means that the waterbody exceeds State water quality standards on a regular basis due to polluted runoff. This designation is one criterion for a waterbody to be listed as a Category I watershed in Hawaii's Unified Watershed Assessment (UWA) Plan (1998).

However, there are two other watersheds listed in the Hawaii UWA Plan as Category I watersheds due to criteria such as significant cultural resources, habitat restoration, and minor water quality diminishment. The following is a description of these watersheds and their associated environmental issues.

1.7.1 Kahoolawe Island[1]

The coastal waters that surround and their associated watersheds for the Island of Kahoolawe have been designated as a Category I watershed in the Hawaii Unified Watershed Assessment Plan. It is not listed as a WQLS as are most of the other watersheds listed in that plan. Kahoolawe is listed because reasons of cultural significance and habitat destruction.

The Kahoolawe Island Reserve Commission (KIRC) manages the Reserve on behalf of the State and utilizes a Native Hawaiian approach to resource management and restoration. The KIRC has adopted a vision statement where, "The kino (physical manifestation) of Kanaloa is restored. Forests and shrublands of native plants and other biota clothe its slopes and valleys. Pristine ocean waters and healthy reef ecosystems are the foundation that supports and surround the island…". The Hawaiian concept of aina recognizes the inter-relationships of land and

1 The information contained in this section was provided by the Kahoolawe Island Reserve Commission.

ocean; appropriately and necessarily then, preservation and restoration of marine habitats will in no small measure depend on the effectiveness of the terrestrial revegetation efforts.

On Kahoolawe, over 50 watersheds have been grouped into eight land divisions (ili) consistent with the Native Hawaiian practices. Each ili is characterized by an eroded upland which consists of exposed, unfertile hardpan and severe gullying, drainage basins lined with predominantly alien dry land vegetation, and ephemeral streams which discharge sediment laden water into a variety of marine environments, including coral reef ecosystems.

In fulfilling its responsibilities, the KIRC is confronted by numerous environmental, logistical, and financial challenges. The severely eroded uplands, which resulted from 200 years of feral ungulate grazing, now cover approximately one-third of the island. An estimated 1.9 million tons of soil continues to be lost each year as a result of wind and water erosion. Only 25 inches of rain falls at the summit, with perhaps less than 10 inches per year at the coast. Most plants on Kahoolawe are hardy alien species (i.e., kiawe, bufflegrass, and koa haole) with a few small native plant populations. In addition, unexploded ordnance from 50 years of military use and sensitive archaeological sites complicate environmental and marine restoration efforts.

An Environmental Restoration Plan and an Ocean Management Plan guide the KIRC in managing and restoring the Reserve. Both plans provide a merging of Native Hawaiian and western approaches to habitat and environmental restoration. Implementation of the plans rests with the KIRC's Restoration and Ocean Management staff who periodically conduct volunteer trips to Kahoolawe for planting native species and erosion control projects in areas cleared of UXO[2]. In addition, volunteer trips into the Reserve waters are conducted aboard the KIRC's research/monitoring vessel, *Hakilo*, for data collection and resource observation.

Progress to date has provided valuable insight and data for future restoration efforts. However, considerable program development and long term efforts will be necessary to reverse the course erosion and degradation and realize the KIRC's vision.

1.7.2 Pelekane Bay (Kawaihae Watershed)

Pelekane Bay is located just south of the Kawaihae State Boat Harbor, in the South Kohala District, on the island of Hawaii. The drainage area of Pelekane Bay makes up nearly half of the Kawaihae Watershed. The Kohala Mountains are at top of the watershed, which passes down near Waiaka, basically paralleling State Highway 19, the Kawaihae Road, to the ocean; on its north side it parallels the Makahuna Gulch drainage from the harbor up past Kawaihae Uka to the top of the mountains. It has an elevation range from 1,600 feet to sea level. It has a varied rainfall regime that is only 5-6 inches annually at the Kawaihae Harbor to 150 inches annually at its summit. It is not a heavily populated watershed with most of the population being in Kawaihae Village. There is one large poultry producer. Much of the land is used for range cattle, mostly under management of Parker Ranch.

2 UXO stands for "unexploded ordnance"; it is also the name of a contractor that is clearing the ordnance.

Pelekane Bay has been listed as a Category I watershed less for water quality issues and more for significant cultural and habitat resource issues. There has been water quality degradation but not to the extent that the water body of Pelekane Bay is listed as a WQLS. However silt built up in the bay and apparent changes in fish and other life in the bay have been observed. Much of the silt is from past practices of overgrazing lands and vegetation destruction due to range fires.

Pelekane Bay includes Puukohola Heiau that is managed by the National Park Service. In addition to this cultural resource, there are ancient rock walls, house platforms, and agriculture mounds found throughout the watershed. There is evidence that a submerged shark heiau exists buried under sediment in the bay. Controlling the pollution load into the bay and dredging out the bay will aid in restoring this cultural resource. This will also improve the habitat of the Bay for fishery.

The need for restoration of native habitats is another reason Pelekane Bay has been listed as a Category I watershed. Native vegetation has been lost because of fires and range cattle. The Mauna Kea Soil and Water Conservation District has put together a coordinated resource management plan for Pelekane Bay that identifies many of the issues that need to be addressed, as well as some of the projects that could be implemented to allow this watershed to be reclassified as a healthy one.

CHAPTER 2
HAWAII'S PROGRAMS AND GOALS

2.1 Hawaii's Vision and Mission Statements

The Department of Health (DOH), with the help of the Goals Communication Team, its multi-sectoral and statewide advisory group, has established vision and mission statements for Hawaii's environment. To achieve these ideals, the State seeks to develop programs that will achieve ecosystem integrity, economic efficiency, and social equity.

Vision Statement: An island environment that is clean and safe.

Mission Statement: Protect and enhance environmental quality for the people of Hawaii, thus preserving our quality of life.

To reach these ideals, the State seeks to improve watershed management by incorporating more holistic approaches to land, water, and ocean management. The 551 watersheds in the main Hawaiian Islands are relatively small and characterized by streams flowing rapidly from the mountains to the sea. Traditionally, Hawaiians managed these areas as whole units, known as ahupuaa, instead of functional jurisdictions that divide a watershed. The ahupuaa management system recognizes that what happens at the headwaters of streams affects ecosystems throughout the watershed and coastal waters. Given the linkages between land uses, fresh and coastal water quality, and the physical characteristics of Hawaii's watersheds, DOH and the Office of Planning have established nonpoint source pollution control programs based on the management principles of cooperation, coordination, communication, and holistic approaches – concepts that form the basis of ahupuaa management systems.

While there are numerous nonpoint source pollution control measures implemented by Federal, State and County agencies, as well as stakeholder groups, the State has established two programs that seek to coordinate efforts and encourage the development of cooperative projects and programs to control polluted runoff. One is administered by DOH's Polluted Runoff Control Program, which implements Section 319 of the Federal Water Pollution Control Act (commonly called the Clean Water Act). The other is coordinated by the Department of Business Economic Development and Tourism (DBEDT), Office of Planning's Coastal Zone Management (CZM) Program, which administers Section 6217 of the Coastal Zone Act Reauthorization Amendments (commonly called CZARA). *Hawaii's Implementation Plan for Polluted Runoff Control* is intended to integrate the coordination functions of these programs. This implementation plan will serve as a guide for the development and implementation of nonpoint source pollution control measures in the State over the next 15 years (see Figure 2-1 for a graphic representation of these processes). More specifically, the implementation plan will be used by the State to target Federal, State, and County resources towards nonpoint source pollution controls that will improve and enhance coastal water quality in the State.

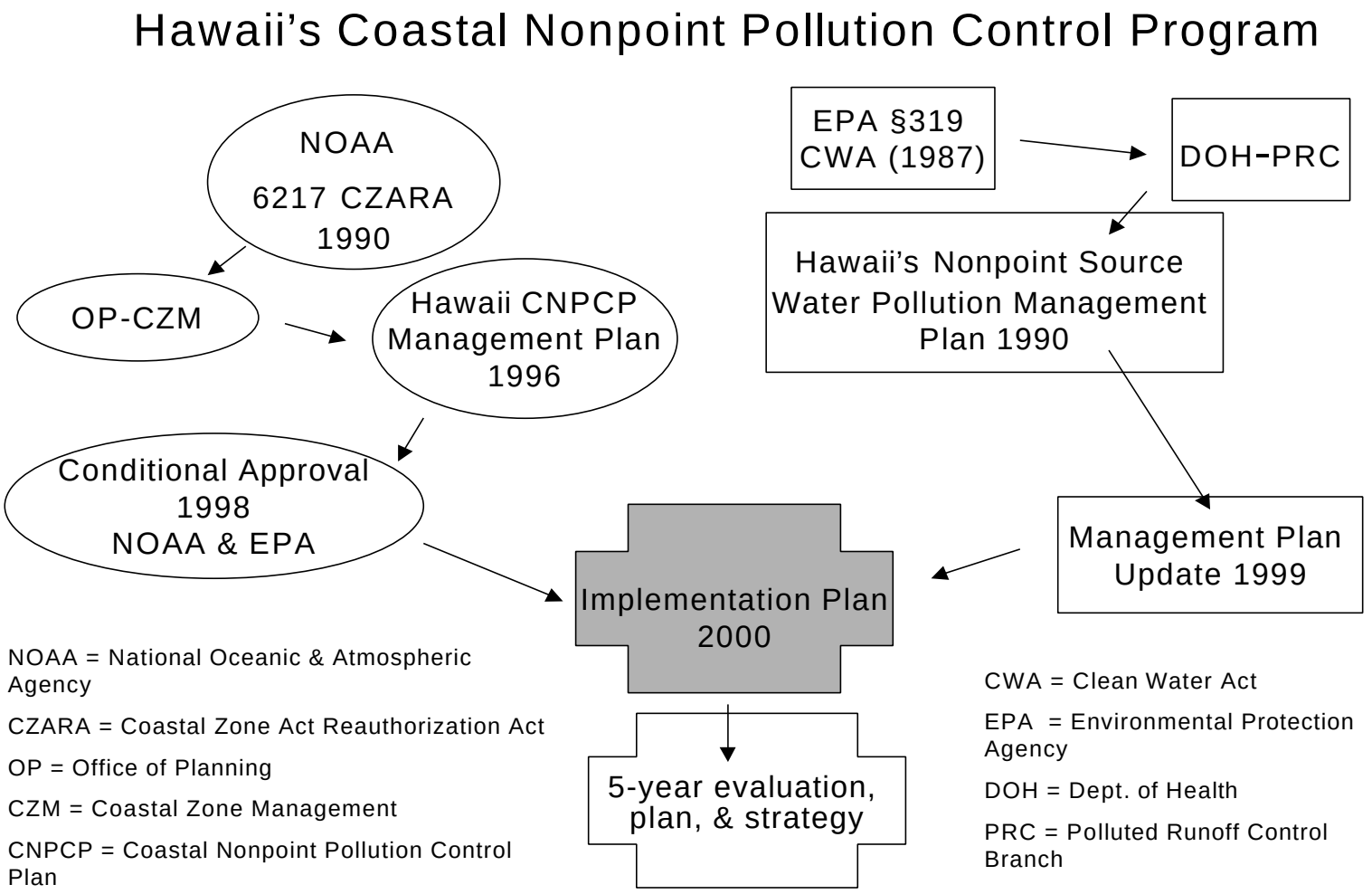

Figure 2-1 Hawaii's Coastal Nonpoint Pollution Control Program

Before completing its implementation plan, the State first had to update its 1990 *Hawaii's Nonpoint Source Water Pollution Management Plan*[1] as required by the Environmental Protection Agency (EPA) by October 1999. The updated plan, which has been incorporated in this *Implementation Plan* as a part of Chapters 1-5, described the State's priorities for the next five years to significantly reduce water quality problems caused by nonpoint source pollutants. More specifically, the updated plan:

- addressed the nine key elements required by the EPA for State nonpoint source pollution control programs;
- established long and short-term goals, strategies, and schedules to control nonpoint source pollution in Hawaii; and
- established measures and schedules to evaluate the effectiveness of nonpoint source pollution controls used in the State.

2.2 State Programs

2.2.1 The Department of Health's Polluted Runoff Control Program

Located within the DOH's Clean Water Branch since 1996, the Polluted Runoff Program administers grants and programs to improve water quality in water bodies impacted by nonpoint source pollutants. The mission of the program is to:

> Protect and improve the quality of water resources for enjoyment of and use by the people of Hawaii through preventing and reducing nonpoint source pollution, balancing health, environmental, economic and social concerns.

The Mission Statement of the Program is consistent with the Clean Water Branch's mission which is:

> To protect the public health of the residents and tourists who recreate and place a constant demand on the coastal and inland water resources and to also protect and restore inland and coastal waters for marine life and wildlife.

The Clean Water Branch's mission is accomplished through statewide coastal water surveillance and watershed environmental management using a combination of permit issuance, monitoring, enforcement, sponsorship of polluted runoff control projects, and public education. Chapter 342E, Hawaii Revised Statutes[2] establishes nonpoint source pollution management and control within the DOH and defines such terms as "nonpoint source pollution," "point source pollution," and "State waters."

The Polluted Runoff Program administers grants for projects that prevent, control, and/or reduce pollution that enters inland or marine waters. It also seeks to restore water bodies, known

1 See Appendix A-2.

2 See Appendix A-3.

as Water Quality Limited Segments, where water quality standards cannot reasonably be attained or maintained without additional action to control nonpoint sources of pollution. These water bodies were originally identified in *Hawaii's Assessment of Nonpoint Source Pollution Water Quality Problems* in 1990. The State's list of Water Quality Limited Segments is updated every two years by the DOH and is referred to as the Clean Water Act Section 303(d) list. The Polluted Runoff Control Program targets a portion of its Clean Water Act Section 319 grants to address water quality problems in these water bodies.

2.2.2 The Office of Planning's Coastal Zone Management Program

The DOH is also working closely with DBEDT's Office of Planning to develop and implement Hawaii's Coastal Nonpoint Pollution Control Program. Other states have a nonpoint source pollution control program for areas impacting coastal waters and another program for inland watersheds. Often these programs are led and implemented by separate agencies. Because all lands in Hawaii have the potential to impact coastal waters, the State seeks to develop a single, coordinated program to address nonpoint source pollution with the DOH and the Office of Planning designated as the lead coordinating agencies. These efforts are consistent with the State's Coastal Zone Management Act, which defines the coastal zone boundary as "all lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea" (Hawaii Revised Statutes, 205A-1). Because the DOH and the Office of Planning have different responsibilities and Federal funding sources – Section 319 of the Clean Water Act and Section 6217 of the Coastal Zone Act Reauthorization Amendments, respectively – they will maintain separate programs. Nevertheless, both lead agencies will use a single document, *Hawaii's Implementation Plan for Polluted Runoff Control* , as a guide to coordinate statewide efforts to control nonpoint source pollution.

Hawaii Revised Statutes, Chapter 205A established Hawaii's CZM Program. The Program is responsible for ensuring that the activities and authorities of Federal, State and County agencies are consistent with the objectives and policies contained in Chapter 205A. The objectives and policies reflect the State's goal of balancing economic growth with the protection and sustainable use of coastal resources and ecosystems. Thus, the CZM Program is an umbrella agency that builds on existing authorities and relies on a network of authorities and partnerships for the implementation of these policies and objectives.

The Hawaii CZM Program, with assistance from the DOH, prepared *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*[3] and submitted the plan to the National Oceanic Atmospheric Administration and the EPA in 1996 for review and approval. These Federal agencies conditionally approved Hawaii's Management Plan in 1998 and set conditions that the State must meet by 2003. (See Appendix A-5 for the full text of the "Findings" document.)

3 See Appendix A-4.

Hawaii's Coastal Nonpoint Pollution Control Program Management Plan contains 57 management measures grouped into six categories - agriculture, forestry, urban areas, marinas and recreational boating, hydro-modification, and wetlands and riparian areas. It also identifies critical coastal areas in need of additional nonpoint source pollution controls; provisions for public participation; descriptions of administrative coordination; and monitoring and tracking techniques. In addition, the management plan includes recommendations to improve nonpoint source pollution within each of the above categories and describes watershed management efforts being implemented in the State.

2.3 County Programs

The Counties implement numerous nonpoint source pollution control measures in the State. In the Counties of Kauai, Maui, and Hawaii, the Departments of Public Works and Planning Departments have the authority to issue permits and implement ordinances that contain polluted runoff controls. These functions are also performed by the City and County of Honolulu's Department of Environmental Services and the Department of Planning and Permitting. *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* provides more information about these authorities.

2.4 Federal Programs

2.4.1 Section 319 of the Clean Water Act

Following the amendment of the Clean Water Act in 1987, Hawaii established a Nonpoint Source Pollution Management program as called for in Section 319 of the Act. In 1990, the State submitted *Hawaii's Nonpoint Source Water Pollution Management Plan* to the EPA that described:

(1) best management practices and measures to reduce pollutants from nonpoint sources;
(2) programs and funding assistance to support the implementation of the best management practices; and
(3) a schedule for implementing the best management practices including annual milestones and the utilization of available program funding resources (CWA §319(b)(A-E)).

To comply with Section 319, the State seeks to continue to:

(1) update its list of Water Quality Limited Segments;
(2) identify categories of nonpoint source pollution that keep these areas from meeting water quality standards;
(3) describe processes to identify best management practices and measures for reducing these categories of nonpoint source pollution; and
(4) identify and describe state and local programs that control nonpoint source pollution entering these Water Quality Limited Segments and improve water quality (CWA §319(a)(1)(A-D)).

2.4.2 Section 6217 of the Coastal Zone Act Reauthorization Amendments

Section 6217 of the Coastal Zone Act Reauthorization Amendments calls for States to "develop and improve management measures for nonpoint source pollution to restore and protect coastal waters, identifying State and County authorities and non-regulatory programs designed to control nonpoint source pollution" (§6217(a)(1)). The National Oceanic and Atmospheric Administration and the EPA issued a guidance document that listed management measures that these Federal agencies expect States to follow in order to comply with Section 6217.

2.4.3 Clean Water Action Plan

The *Clean Water Action Plan*[4] was formulated by Federal agencies in response to a directive from the Clinton Administration on the 25th anniversary of the Clean Water Act. The plan provides a blueprint for restoring and protecting the nation's waters to achieve the original goal of the Clean Water Act, which is to ensure that the waters of the nation are "fishable and swimmable" for all Americans.

Published in 1998, the Clean Water Action Plan focuses on four major themes to achieve clean water goals, which include:

- a watershed management approach;
- strong federal and state standards;
- natural resource stewardship; and
- informed citizens and officials.

The plan commits Federal agencies 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. It also commits 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.

2.4.4 Unified Watershed Assessment

One of the key elements in the Clean Water Action Plan is a cooperative approach to watershed protection called the Unified Watershed Assessment. This approach calls for all levels of governments and the public to identify watersheds with the most critical water quality problems and to work together to focus resources and implement effective strategies to solve the problems.

In response to the Clean Water Action Plan, the State prepared *The Hawaii Unified Watershed Assessment*[5] that identifies priority watersheds where the State intends to focus resources to improve water quality. Chapters 4 and 5 of this document provide more details about the State's priorities.

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4 See Appendix A-6.

5 See Appendix C.

2.5 State Goals

To continue to receive Federal funds for nonpoint programs, the State's Polluted Runoff Control program must achieve the nine key elements established by EPA (Figure 2-2). The first key element calls for the State to have explicit short and long-term goals. The State has established three long-term goals with a series of short-term goals, action items, and measures of success for each long-term goal. These long-term goals include:

- a goal established by the DOH's Goals Communication Advisory Group for Hawaii's coastal waters (see Appendix B for a list of members);
- a goal to improve water quality in the State's Water Quality Limited Segments; and
- a goal to fully implement management measures for six categories of nonpoint source pollutants.

Figure 2-2. Nine Key Elements

Key Element #1: Explicit short- and long-term goals, objectives, and strategies to protect surface and ground waters.

Key Element #2: Strong working partnerships and collaboration with appropriate State, interstate, Tribal, regional, and local entities (including conservation districts), private sector group, citizen groups, and Federal agencies.

Key Element #3: A balanced approach that emphasizes both statewide nonpoint source programs and on-the-ground management of individual watersheds where waters are impaired or threatened.

Key Element #4: The State program (a) abates known water quality impairment resulting from nonpoint source pollution and (b) prevents significant threats from present and future nonpoint source activities.

Key Element #5: An identification of waters and watersheds impaired or threatened by nonpoint source pollution and a process to progressively address these waters.

Key Element #6: The State reviews, upgrades, and implements all program components required by section 319(h) of the Clean Water Act, and establishes flexible, targeted, iterative approaches to achieve and maintain beneficial uses of water as expeditiously as practicable.

Key Element #7: An identification of Federal lands and activities that are not managed consistent with State nonpoint source program objectives.

Key Element #8: Efficient and effective management and implementation of the State's nonpoint source program, including necessary financial management.

Key Element #9: A feedback loop whereby the State reviews, evaluates, and revises its nonpoint source assessment and its management program at least every five years.

2.5.1 Long-term Goal #1

Ensure that Hawaii's coastal waters are safe and healthy for people, plants, and animals and protect and restore the quality of Hawaii's streams, wetlands, estuaries, and other inland waters for fish and wildlife, recreation, aesthetic enjoyment and other beneficial uses by 2013.

Short-term Goals	**Timeframe**
1. Develop statewide strategies to restore and maintain protected uses for inland and marine waters through a phased approach and assess the Statewide strategy.	Phase I by 2003 Phase II by 2008 Phase III by 2013
2. Review and update the classification and beneficial uses for marine and inland water quality standards.	By 2003
3. Increase the use of Best Management Practices and assess their effectiveness.	By 2003
4. Continue to support and encourage a variety of education programs by increasing the number of people participating in educational programs and assessing the effectiveness of the programs within the Section 319(h)-grant cycle.	Annually
5. Assist in the implementation of the Clean Water Action Plan and the U.S. all Islands Coral Reef Initiative Strategy and assess their impacts on water quality.	By 2002

Action Items/Activities

1. Phased approach: The State will pursue a series of five-year plans to achieve the long-term goal by 2013. The 1999 update of the State's Nonpoint Source Management Plan will be incorporated into *Hawaii's Implementation Plan for the Control of Nonpoint Source Pollution* by July 2000. The State intends to update this plan and strategies every five years (2003, 2008, and 2013).

2. Water Quality Standards: Complete revisions to classifications and beneficial uses in the State's water quality standards for inland and marine waters by 2001.

3. Best Management Practices (BMPs): Since the completion of *Hawaii's Nonpoint Source Water Pollution Management Plan* in 1990, the State has focused on the development of BMPs, priority projects, educational programs, and monitoring. The State will continue to develop BMPs for various land uses starting with land uses most likely to have a negative impact on water quality. More specifically, the State will in the next five years:
    a. continue to work closely with the Counties to develop and monitor the use of BMPs in urban areas;
    b. continue to work closely with the Soil and Water Conservation Districts to develop and evaluate the effectiveness of BMPs in agricultural areas with an emphasis on soil erosion control and nutrient management;

c. promote the restoration and stabilization of highly erodible areas through the use of BMPs and improved land management controls;
d. promote and expand the use of BMPs demonstrated to be effective (DOH Strategic Plan); and
e. develop mechanisms to track BMP implementation.

4. Educational Programs: The State has developed and implemented numerous successful educational programs. The State will continue to implement educational programs in the following categories:
    a. education and outreach efforts targeted to the general public;
    b. education and outreach efforts targeted to students;
    c. education and outreach efforts targeted to land users and industry; and
    d. education and outreach efforts targeted to specific cultural groups.

5. Clean Water Action Plan and Coral Reef Initiative:
    a. continue to pursue inter-agency cooperative arrangements to facilitate the implementation of these initiatives;
    b. submit recommended projects to the Coral Reef Task Force by November, 1999;
    c. support projects to reduce nonpoint source pollutants that adversely impact coral reef ecosystems; and
    d. provide feedback to Federal agencies regarding the effectiveness for these initiatives by 2002.

Measures of Success

1. Evaluation of the effectiveness of Hawaii's Coastal Nonpoint Pollution Control Program every 5 years.
2. Improved water quality in areas monitored for nonpoint source pollutants. Decrease in the number of beach closures due to nonpoint source pollutants.
3. Ten percent increase in the percentage of lands operated under BMPs, conservation plans, and other conservation programs. Ten percent increase in the use of effective BMPs statewide. Establishment of a management system to track the use and effectiveness of BMPs. Improved water quality in water bodies threatened by nonpoint source pollutants, but not yet on the State's 303 (d) list.
4. Evidence of increased knowledge of polluted runoff sources among targeted groups. Ten percent increase in number of participants in Polluted Runoff Control outreach activities. Ten percent increase in the number of volunteers participating in watershed activities or other community cleanup projects.
5. Measurable improvements in coral reef ecosystem health in areas with increased nonpoint source pollution controls.

2.5.2 Long-term Goal#2

Identify impaired water bodies and restore their designated uses through a Statewide approach to watershed management within 15 years.

Short-term Goals	**Timeframe**.
1. Following a phased approach, develop and implement watershed management plans and assessments for Category I watershed regions as identified in the State's Unified Watershed Assessment. The State will target projects in the five priority watershed regions within five years; second tier Category I watersheds region within ten years; and any additional watershed regions in need of restoration within fifteen years.[6]	Phase I by 2003 Phase II by 2008 Phase III by 2013
2. Complete the categorization and prioritization of all watershed regions as part of the State's Unified Watershed Assessment within five years.	By 2003
3. Implement watershed restoration action strategies and implementing plans and test the effectiveness of best management practices under different conditions.	Phase I by 2003 Phase II by 2008 Phase III by 2013
4. Support watershed educational programs in priority watersheds and evaluate their effectiveness.	Annually
5. Establish water quality monitoring programs in Category I watersheds.	By 2004
6. Complete Total Maximum Daily Loads for section 303(d) listed waters.	2012
7. Update and implement water quality monitoring objectives, strategies, and methodologies (DOH Strategic Plan).	2004

Action Items/Activities

1. a. develop watershed assessments and plans that address the major sources of nonpoint source pollution in the five priority watersheds in Category I by 2002; and
   b. foster partnerships with other governmental, business, and nonprofit organizations in these watershed regions.

2. Convene inter-agency group to categorize all watershed regions in the State within two years.

6 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, 1998), the State identified Category I watershed regions as those watersheds that drain into one of the State's Water Quality Limited Segments.

3. Watershed restoration action strategies and best management practices implementation:
   a. begin to test and disseminate information on the effectiveness of BMPs in priority watersheds within two years;
   b. establish mechanisms for watershed groups to meet and share information about their projects within three years; and
   c. support demonstration projects relating to nonpoint source control.

4. Educational program implementation:
   a. continue to encourage 319(h) grant proposals for educational projects, especially for projects in priority watersheds;
   b. continue to disseminate information from successful educational projects to other watersheds;
   c. support *farm-a-syst* and *home-a-syst* projects for the State and target the use of these materials in priority watersheds within three years;
   d. continue to promote community-based watershed management through education and voluntary compliance; and
   e. conduct a watershed management workshop within two years.

5. Implement water quality monitoring programs in the five priority watershed regions by 2003.

6. Total Maximum Daily Loads (TMDLs) Schedule:
   a. prepare a schedule to complete TMDLs for section 303(d) listed waters by the end of 1999, with annual review and modifications, if necessary;
   b. complete TMDL demonstration project in Waimanalo by 2001;
   c. develop a strategy and appropriate methodologies to address TMDLs for waters listed on the State's section 303(d) by 2002;
   d. select one or two water bodies each year and prepare a TMDL and identify management measures needed to improve the quality of the listed water body; and
   e. complete TMDLs for section 303(d) listed water bodies by 2012, if adequate funding is available and effective methodologies are developed.

7. Water Quality Monitoring:
   a. complete Quality Assurance Quality/Control plan by the end of 1999;
   b. on a biennial basis and with assistance from the EPA, update Hawaii's section 303(d) listed waters;
   c. establish baseline data for toxic chemicals for the purpose of adopting standards to control waste discharges (DOH Strategic Plan);
   d. determine the percentage of assessed rivers and estuaries with healthy aquatic communities (DOH Strategic Plan);
   e. assess the impact of streams entering recreational beaches through a joint monitoring program with the City and County of Honolulu and address the problem at the source (DOH Strategic Plan);
   f. develop protocols and resources in cooperation with the University of Hawaii to monitor pathogens in polluted runoff and waste water (DOH Strategic Plan);

g. develop partnership with the community through a water quality monitoring program using volunteers from various neighborhoods in the State (DOH Strategic Plan);
h. prepare a biennial report on the overall condition of the State's recreational waters and submit to the EPA (DOH Strategic Plan);
i. increase the number of chemical and biological databases to develop scientifically valid criteria (DOH Strategic Plan); and
j. establish institutional measures that promote and increase DOH efforts to use innovative technologies, methods, and procedures in assessment of human health risks associated with water quality (DOH Strategic Plan).

Measures of Success

1. Increase in the number of Memorandums of Agreement and other instruments documenting partnerships among agencies and stakeholder groups. Degree of sustainability of partnerships.
2. Completed classification of the State's watershed regions with interagency agreements to work in priority areas.
3. Measurable water quality improvements in Water Quality Limited Segments. Number of projects implemented as identified in watershed restoration action strategies. Level of commitment to fully implement watershed restoration action strategies.
4. Increase in the number of participants in watershed projects. Increase in watershed education programs in priority watershed regions. Number of participants using materials from the Hawaii Pollution Prevention Information project. Evidence of changes in individual and land users' behaviors indicating knowledge of polluted runoff control measures.
5. Increase in water quality data collected in priority watershed regions.
6. Measurable water quality improvements in Water Quality Limited Segments.
7. Improved methodologies for water quality monitoring. Establishment of a system to link the effectiveness of management practices in the watershed to water quality improvements.

2.5.3 Long-term Goal #3

Develop and implement economically achievable management measures, as identified in Section 6217 of the Coastal Zone Act Reauthorization Amendments, which are appropriate to Hawaii's physical, economical, cultural, and social environment by 2013.

Short-term Goals	**Timeframe**
1. Integrate the updated Nonpoint Source Management Program Plan with Hawaii's Implementation Plan for Polluted Runoff Control.	2000
2. Following a phased approach, prioritize management measures and focus implementation efforts.	Phase I by 2003 Phase II by 2008 Phase III by 2013
3. Have the Attorney General conduct a review of the State's enforceable policies and mechanisms for polluted run-off control.	By 2000
4. Based on the Attorney General's review, prepare a strategy to address gaps in enforceable policies and mechanisms.	By 2000
5. Receive program approval of the State's Coastal Nonpoint Pollution Control Program from the National Oceanic Atmospheric Administration and the EPA.	By 2003

Action Items/Activities

1. Develop a 5-year Implementation Plan and a 15-year strategy for the six nonpoint categories identified in *Hawaii's Coastal Nonpoint Pollution Control Program* (Agriculture, Forestry, Urban Areas, Marinas and Recreational Boating, Hydromodifications, and Wetlands). This plan and strategy will include:
   a. a description of regulatory and non-regulatory (incentive-based) programs the State will use to implement management measures;
   b. a description of the process that links the incentive-based program with back-up enforcement authorities; and
   c. a description of the methods the State intends to use to evaluate the effectiveness of management measure implementation.

   The State will complete a draft of the 5-year Implementation Plan and conduct public meetings on all the major islands by December 1999. The final version of the plan (this document: *Hawaii's Implementation Plan for Polluted Runoff Control*) will be prepared by August 2000.

2. Based on the strategies and priorities identified in *Hawaii's Implementation Plan for Polluted Runoff Control*, the State will address the 57 management measures in phases. The State intends to focus on 20 management measures in Phase I, another 20 in Phase II, and the remaining management measures in Phase III. Management measures will be prioritized

based on State and County priorities, stakeholder input, and Federal guidance. Current State priorities are focused on agricultural and urban area management measures. The availability of funds and technical assistance will influence the pace at which the State implements the management measures.

Towards the end of each 5-year phase, the State will:

a. evaluate the progress made in the previous 5 years;
b. prepare a 5-year implementation plan for the next phase; and
c. evaluate and update the State's 15-year strategy.

3. The State's Attorney General will review State statutes to determine if such authorities can be used to prevent nonpoint pollution and require management measure implementation. The State will initiate this review in 2000.

4. After completion of the Attorney General's review of State statutes, the State will develop a strategy to address identified gaps in its enforceable policies and mechanisms.

5. By 2003, the State will address the conditions placed on *Hawaii's Coastal Nonpoint Pollution Control Program* by the National Oceanic Atmospheric Administration and the EPA. The State will pursue a phased approach by addressing agriculture and urban area management measures by 2001 and forestry, marinas and recreational boating, hydromodifications, and wetlands by 2003. The State will identify critical coastal areas and develop additional management measures, if necessary, by 2003.

Measures of Success

1. Completed implementation plan with priority projects identified.
2. Number of agreements and partnerships among agencies to implement management measures in Hawaii's Coastal Nonpoint Pollution Control Program. Effective implementation of the management measures.
3. Completed review by the State's Attorney General.
4. New or revised enforceable policies and mechanisms based on the Attorney General's review and provisions in Hawaii's Coastal Nonpoint Pollution Control Program.
5. An approved Coastal Nonpoint Pollution Control Program for Hawaii.

While the DOH and the Office of Planning are the lead agencies for coordinating the development of Hawaii's Coastal Nonpoint Pollution Control Program, many of the State's nonpoint pollution control measures are implemented by other Federal, State, and County agencies, as well as stakeholder groups. Partnerships among these agencies and stakeholders are critical to the successful implementation of these measures.

Summary of Activities by Year

2000

- Complete a schedule to complete Total Maximum Daily Loads for section 303(d) listed waters.
- Implement water quality monitoring objectives, strategies, and methodologies (DOH Strategic Plan).
- Conduct a review, by the Attorney General, of the State's enforceable policies and mechanisms for polluted run-off control.
- Prepare a strategy to address gaps in enforceable policies and mechanisms based on the Attorney General's review.

2001

- Complete Total Maximum Daily Load - demonstration project in Waimanalo.

2002

- Continue to assist in the implementation of the Clean Water Action Plan and the U.S. All Islands Coral Reef Initiative and assess their impacts on water quality.
- Provide feedback to Federal agencies regarding the effectiveness for the Clean Water Action Plan and the U.S. All Islands Coral Reef Initiative.
- Develop a strategy and appropriate methodologies to address Total Maximum Daily Loads for waters listed on the State's section 303(d).

2003

- Receive program approval of the Hawaii's Coastal Nonpoint Pollution Control Program from the National Oceanic Atmospheric Administration and the EPA.
- Prioritize management measures and focus implementation efforts following phased approach.

2004

- Complete revisions to classifications and beneficial uses in the State's Water Quality Standards for inland and marine waters.
- Develop and implement watershed management plans and assessments for Category I watershed regions as identified in the State's Unified Watershed Assessment.
- Develop statewide strategies to restore and maintain protected uses for inland and marine waters through a phased approach and assess the statewide strategy.
- Review the classification and beneficial uses for marine and inland water quality standards.
- Implement Quality Assurance/Quality Control Plan and follow timelines contained in the plan.
- Increase use of best management practices and assess their effectiveness.
- Establish water quality monitoring programs in Category I watersheds.

2008

- Implement watershed restoration action strategies and implementing plans and test the effectiveness of best management practices under different conditions.
- Prioritize management measures and focus implementation efforts following phased approach.

2012

- Complete Total Maximum Daily Loads for section 303(d) listed water bodies.
-

2013

- Achieve long-term goals.

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CHAPTER 3
PARTNERSHIPS TO PROTECT AND ENHANCE WATER QUALITY

3.1 Background

From the beginning of Hawaii's nonpoint source pollution programs, the State has sought the participation of stakeholders and the public in the control of polluted runoff and the improvement of water quality. In fostering these objectives, the State relied on the advice and guidance of local experts, researchers, and land users to develop nonpoint pollution control mechanisms in response to Hawaii's geographic features and ecosystem diversity. The State's policy is to engage the stakeholders and ensure the polluted runoff control provisions developed are effective and economically feasible.

3.2 Statewide Partnerships and Watershed-based Partnerships

The Department of Health (DOH) and the Office of Planning are continuously seeking cooperative arrangements and improved coordination among the participating federal, State, and local agencies, non-profit organizations, and stakeholders. These efforts have led to the implementation of best management practices; support for environmental educational programs and promotion of coordinated pollution control projects.

The State's nonpoint source pollution coordinators in the DOH and the Office of Planning facilitate the development of plans and strategies, with scientists, engineers, and land users in government, non-government, and private organizations. Some of these coordinated efforts occur on a statewide basis and others on a watershed basis and include some formalized agreements such as Memorandums of Understanding and Memorandums of Agreements and some informal arrangements involving Working/Advisory Groups, Technical Committees, etc. Examples of the various partnerships that occur on a statewide basis and their purpose are shown on Table 3-1. Similarly, examples of watershed-based partnerships and their purpose are displayed on Table 3-2.

The State will continue to develop more partnerships to help maximize the strengths and resources needed to address water quality problems. The State intends to formalize the partnerships through *Memorandum of Understandings.* As an example, the State Department of Health has signed a Memorandum of Understanding with the Hawaii Association of Conservation Districts, and the U.S. Environmental Protection Agency (EPA), Region IX to work together to reduce nonpoint source pollution and improve water quality for the benefit of the State's environment, economy, lifestyle, and future. The State expects that such partnerships will continue to improve the mechanisms for controlling polluted runoff and will continue to result in accomplishments and favorable outcomes. Some of the accomplishments, outcomes, and expectations from these partnerships are summarized in Table 3-3.

Table 3-1
Statewide Partnerships

STATEWIDE PARTNERSHIPS (meeting schedule)	**PARTICIPANTS**	**PURPOSE**
Polluted Runoff Forum (PROF) (semi-annually)	Federal, State, and County agencies, and diverse stakeholder groups	Update and solicit input from essential stakeholder groups on the development and implementation of Hawaii's Coastal Nonpoint Pollution Control Program Implementation Plan
Focus groups (as needed)	Key stakeholders from government, business, university, and NGOs	Provide in-depth analysis of specific issues
Environmental Management Advisory Group (EMAG) (bimonthly)	Government, business, and NGOs representatives	Provide policy advice to the DOH's Environmental Programs
Marine and Coastal Zone Management Advisory Group (MACZMAG) (bimonthly)	State and County agencies and non-government representatives	Advise the Office of Planning regarding the State's Coastal Zone Management network.
NRCS State Technical Committee (quarterly)	Federal and State agencies, UH-CES, land owners and operators, NGOs	Provide input for the Natural Resource Conservation Service's programs
Hawaii Association of Conservation Districts (HACD) (quarterly)	HACD officers and SWCD representatives	Provide updates on activities sponsored by Hawaii Association of Conservation Districts and the Soil & Water Conservation Districts
Hawaii Technical Committee for Nonpoint Source	Federal, State, and County agencies, SWCDs, UH-CTAHR	Provide technical advice and guidance on the development of polluted runoff control mechanisms
Wetlands Policy Inter-agency Workgroup (monthly)	Federal, State, and County agencies, and NGOs	Develop a wetlands policy for the State
Water Quality Education Network (WQEN) (semi-annually)	NGOs, government agencies, and UH-CES	Provide updates on the water quality educational programs sponsored by the participants

Table 3-2
Watershed-based Partnerships

WATERSHED-BASED PARTNERSHIPS	PARTICIPANTS	PURPOSE
Ala Wai Canal Watershed Improvement Project (AWCWIP), Waikiki watershed region, Oahu	Community and business groups, NGOs, and government agencies	Promote community-based projects to improve water quality in the Ala Wai Canal
West Maui Water Quality Improvement Project West Maui (Kauaula through Honolua)	West Maui SWCD, landowners, community groups, UH-SOEST, and federal, State, and county agencies	Develop and implement a community-based watershed management process to protect water quality and ocean resources
Mamala Bay Water Quality Monitoring (Diamond Head to Barbers Point)	Federal, State, and county agencies, University, NGOs	Provide information about water quality monitoring programs
Kailua Bay Advisory Council (KBAC), Koolaupoko watersheds, Oahu	Participants determined by consent decree– County, community groups, NGOs, and Sea Grant	Develop and implement water quality improvement projects
Kaiaka-Waialua Bay Hydrological Unit Area project, Oahu	West Oahu SWCD, NRCS, DOH, DLNR, DOA, HACD, USGS, USFWS, US-Army, UH-CTAHR, UH-WRRC, and HARC	Implement Memorandum of Understanding signed by the participants to carry out the Coordinated Resource Management Plan for the Kaiaka-Waialua Bay Hydrological Unit Area
Pearl Harbor watershed region, Oahu	South and West Oahu SWCDs, USGS, USFWS, U.S. Navy, Air Force, and Army, USACOE, NRCS, DOH, UH-CTAHR, UH-WRRC, DOT, C&C of Honolulu, HACD	Implement Memorandum of Understanding signed by the participants to carry out the Pearl Harbor Estuary Program Interagency Committee mission of developing nonpoint source pollution prevention projects, seeking funding for the projects and guiding project implementation and evaluation
Pelekane Bay watershed region, Hawaii	Mauna Kea SWCD, Queen Emma Foundation, federal and State agencies, UH-Hilo, large landowners	Develop and implement Watershed Restoration Action Strategies to improve coastal water quality

Table 3-2 (continued)
Watershed-based Partnerships

WATERSHED-BASED PARTNERSHIPS	PARTICIPANTS	PURPOSE
South Molokai watershed region, Molokai	Currently developing partnerships led by the Molokai/Lanai SWCD	Develop and implement Watershed Restoration Action Strategies to improve coastal water quality
Nawiliwili Bay watershed region, Kauai	Currently developing partnerships led by the East Kauai SWCD	Develop and implement Watershed Restoration Action Strategies to improve coastal water quality
Kalunawaikaala Watershed Initiative	Federal and State agencies, City and County of Honolulu, elected representatives, West Oahu SWCD, and community association members.	To responsibly manage the Kalunawaikaala watershed by coordinating and integrating programs, tools, and resources of community members, other stakeholders, and agencies.
East Maui Watershed Partnership	DLNR, The Nature Conservancy of Hawaii, Haleakala Ranch, East Maui Irrigation, Keola Hana Maui, County of Maui, National Park Service	Develop a long-term inventory and management plan for the greater watershed and a strategy to target known alien species, and prevent new alien species from entering the watershed.
West Maui Mountains Watershed Partnership	DLNR, The Nature Conservancy of Hawaii, Kamehameha Schools, Maui County Board of Water Supply, C. Brewer and Co., Maui Land and Pineapple, AMFAC/JMB Hawaii, County of Maui	Protect the West Maui watershed and prevent further degradation.
Koolau Mountains Watershed Partnership	DLNR, DHHL, Kamehameha Schools, Honolulu Board of Water Supply, Agribusiness Development Corp., U.S. Army, Queen Emma Foundation, Bishop Museum	Eliminate or reduce the threats of damage to the watershed by implementing a pro-active management approach.

Table 3-2 (continued) Watershed-based Partnerships		
East Molokai Watershed Partnership	EPA, DOH, DLNR-DOFAW, Kalaupapa NHP, Kamehameha Schools, Kapualei Ranch, Maui County, Maui BWS, Molokai Enterprise Community Governance Board, Molokai-Lanai SWCD, USDA-NRCS, TNCH, USFWS, and USGS	Bring all entities and individuals concerned with the watershed together, jointly recognize the importance of the watershed, and encourage development of watershed management plans and projects.

Table 3-3
Accomplishments, Outcomes and Expectations from Partnerships

PARTNERSHIPS	**ACCOMPLISHMENTS, OUTCOMES AND EXPECTATIONS**
PROF	Central forum to disseminate information and solicit advice for developing and implementing Hawaii's Coastal Nonpoint Pollution Control Program management and implementation plans.
Focus Groups	Responsible for guiding the development of the Hawaii's Coastal Nonpoint Pollution Control Program management measures and implementation actions.
EMAG	Set the vision, mission statement, and goals for DOH. Provided comments on the DOH's strategic plan.
MACZMAG	Passed a resolution supporting partnerships and community-based watershed management projects.
NRCS State Technical Committee	Instrumental in identifying priority watersheds as part of the Unified Watershed Assessment and in setting the criteria to select these watersheds. Influential in developing the criteria to select projects proposed for NRCS program funds (EQIP, CRP, WIP, etc.) and commenting on FOTGS.
HACD	Implements Memorandum of Understanding between Hawaii Association of Conservation Districts, the DOH, the Soil & Water Conservation Districts, and the EPA to discuss the status of cooperative activities for coordination of nonpoint source pollution controls and to protect water quality.
Wetlands	Established a State policy for wetland management.
WQEN	Disseminates information about water quality educational programs statewide.
West Maui	Implemented numerous land-based nonpoint source pollution controls.

Table 3-3 (continued)
Accomplishments, Outcomes and Expectations from Partnerships

PARTNERSHIPS	ACCOMPLISHMENTS, OUTCOMES AND EXPECTATIONS
Mamala Bay	Coordinating water quality monitoring efforts in Mamala Bay area.
KBAC	Implementing a Consent Decree by funding land-based nonpoint source pollution controls and educational projects.
Kaiaka-Waialua Bay	Created a suburban/agriculture partnership working on water quality; demonstrated use of agricultural cover crops for erosion control on roads and fields; monitored differential contributions of sediments, nutrients, and toxic organic to coastal water pollution
Pearl Harbor	Developed nonpoint source pollution public education and outreach materials, including Apoha video; road cut erosion control risk assessment; contaminant control in surface and groundwater; early warning indicators of groundwater contamination, differential impacts of plantation and diversified agriculture on nitrate contamination of groundwater.
Pelekane Bay	Developing and implementing watershed restoration action strategies as part of the State's Unified Watershed Assessment.
South Molokai	Developing and implementing watershed restoration action strategies as part of the State's Unified Watershed Assessment.
Nawiliwili, Kauai	Developing and implementing watershed restoration action strategies as part of the State's Unified Watershed Assessment.
Kalunawaikaala Watershed Initiative	Develop and implement community accepted, technically feasible ecological solutions, and promote the use best management practices.
East Maui Watershed Partnership	Reduce and prevent alien species in the watershed region.
West Maui Mountains Watershed	Protect the water recharge area for west, central, and south Maui's urban, industrial, and agricultural needs as well as for sustaining the island's ecological resources.
Koolau Mountains Watershed Partnership	Eliminate and reduce the impacts of weeds, insects, disease, feral ungulates, and human activities in the watershed region.
East Molokai Watershed Partnership	Jointly develop watershed management plans, general programs and management projects in the watershed region

3.3 Unified Watershed Assessment Partnerships

The DOH hosted partnering meetings in June and July 1998 to discuss Hawaii's watershed assessment and restoration priorities. Agencies and groups attending these meetings included the United States Geological Survey, the USDA-Natural Resources Conservation Service, the Department of Land and Natural Resources, Coastal Zone Management, EPA, the Hawaii Association of Conservation Districts, the United States National Marine Fisheries

Service, the United States Forest Service, the United States Fish and Wildlife Service, and the United States Army Corps of Engineers. In late September 1998, Hawaii's final *Unified Watershed Assessment and Watershed Restoration Priorities* were submitted to the Unified Watershed Assessment Action Team (USDA and EPA) (See Chapter 4 for more information on the process and Appendix C for text of the document.)

3.4 Summary

The State will continue to rely on these partners to develop and implement *Hawaii's Implementation Plan for Polluted Runoff Control*. Special consideration will be given to involving additional partners such as the Department of Hawaiian Home Lands, Board of Water Supply, the Department of Land and Natural Resources (for State Lands), the United States Department of Defense (for Federal Lands), environmental groups, local community associations, etc., as the opportunity arises. The DOH and the Office of Planning will seek to replicate successful partnerships and outcomes in other watersheds using Memorandum of Agreements to target resources, share information, collect water quality data, etc. These agencies will also use the expertise of the Polluted Runoff Control Forum, the Hawaii Association of Conservation Districts, and the United States Department of Agriculture, Natural Resources Conservation Service to implement the State's five-year plans and strategies and evaluate the State's progress every five years.

The State intends to enhance partnerships with businesses and community groups to address polluted runoff problems in urban areas. The Ala Wai Canal Watershed Improvement Project will serve as a model for the urban areas seeking to bring together the community, business, and government sectors to resolve water quality issues. The DOH is sponsoring a pollution prevention (P2) project in West Maui where consultants are working with the hotel industry to develop landscaping techniques and other BMPs to minimize polluted runoff from hotel grounds, golf courses, condominiums, and other resort facilities. In addition, as proposed in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*, the State intends to work with golf course superintendents to develop mechanisms to implement the golf course management measure. The State plans to use these initiatives as models to establish partnerships with businesses and communities to address other nonpoint source pollution issues.

Streamlining the activities of various partners is necessary to efficiently and effectively address nonpoint source pollution in Hawaii. This is a key factor in successfully managing water quality in the State. The next chapter will focus on the statewide management approach to achieving clean water goals.

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CHAPTER 4
STATEWIDE APPROACHES

The varied nature of nonpoint source pollution requires using a two-tiered approach in its management – statewide and watershed approaches. Utilizing a statewide approach, including targeted land use sectors, while also implementing a more bottom up watershed approach provides the right mix of management and technical tools for State and local entities to control polluted runoff. This chapter discusses statewide approaches and Chapter 5 describes watershed approaches.

4.1 The Coordinated Nonpoint Source Management Approach

The Department of Health (DOH) and the Office of Planning coordinate the **statewide** nonpoint source program. Since the submittal of *Hawaii's Nonpoint Source Water Pollution Management Plan* (1990), the DOH established the Polluted Runoff Control (PRC) program, which is currently placed within the Clean Water Branch. The statewide quantification of nonpoint source pollution issues and prioritization of nonpoint source restoration actions is based on several resource tools the program utilizes:

- State 305(b) Report;
- State 303(d) List;
- State Total Maximum Daily Load Strategy;
- Clean Water Act Section 401 Water Quality Certification;
- Clean Water Act Section 402(p) Permits;
- Strategy and Quality Management Plan for Surface Water Monitoring;
- Source Water Assessment Program/Well-Head Protection Program;
- Unified Watershed Assessment, and
- Findings from previously funded Section 319(h) nonpoint source pollution control implementation and demonstration projects.

While DOH and Office of Planning are responsible for coordinating and integrating *Hawaii's Coastal Nonpoint Pollution Control Program*, most of the implementation of the management measures is done by the Department of Land and Natural Resources, the DOH, the Department of Transportation, the United States Department of Agriculture, and the Counties. *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* describes the role of each of these agencies and the State's regulatory and non-regulatory programs to control polluted runoff for each of the six nonpoint source pollution categories. These pollution categories are essentially categories of land use sectors that contribute to polluted runoff. The six sectors are urban, agriculture, forestry, marinas, hydromodification, and wetlands and riparian areas.

Each sector needs to be addressed statewide. The implementation strategies and actions for each of these sectors are addressed in Chapter 6 of this document. The Department of Land and Natural Resources, for example, manages the State's conservation areas with programs for water resource management, hydromodifications, forestry and wildlife, and management of State lands. County agencies, the United States Department of Agriculture, the DOH, the Soil and Water Conservation Districts, and the United States Department of Agriculture - Natural Resources Conservation Services implement programs for agricultural and rural areas. County agencies, the DOH, the Department of Transportation, and the Department of Land and Natural Resources are the primary agencies implementing programs in urban areas. The Department of

Land and Natural Resources, the Department of Transportation, and the DOH share responsibilities for marinas and recreational boating. All of the agencies above implement wetland management programs.

4.1.1 The Hawai`i Unified Watershed Assessment Plan

Another statewide program, Hawaii's Unified Watershed Assessment Plan will be implemented at the watershed level by developing **watershed-based** projects. To meet long-term goals number 1 and 2 (on pages 2- 9 and 2-11 respectively), the State will continue to prioritize watersheds that drain into Water Quality Limited Segments. Furthermore, as the State collects more water quality and coral reef ecosystem data, it will categorize other watersheds into one of the four categories listed below as part of the State's *Unified Watershed Assessment* (see Appendix C). In watersheds where the State has determined preventive action is needed or where pristine/sensitive aquatic conditions exists, the State will also develop a schedule to target available resources towards these watersheds.

The State's Unified Watershed Assessment came about as result of the Federal *Clean Water Action Plan*. The *Clean Water Action Plan* requested States to categorize watersheds into four categories:

Category I – watersheds in need of restoration;
Category II – watersheds needing preventive action to sustain water quality;
Category III – watersheds with pristine/sensitive aquatic conditions on lands administered by Federal, State, or Tribal Governments;
Category IV – watersheds with insufficient data to make an assessment.

The State's Unified Watershed Assessment categorization process is a management tool that is carried out statewide. Once watersheds are categorized, restoration work is conducted in individual watersheds based on their particular assessment and restoration strategy. This is the most effective way to flexibly address specific priority pollution concerns for a particular watershed. As watershed assessments and restoration action strategies are finalized, they will become part of this document, within the appendices. In October 1998, DOH, the Coastal Zone Management Program and the USDA Natural Resources Conservation Services Hawaii Office submitted to the Environmental Protection Agency (EPA) and the United States Department of Agriculture its Category I watersheds and prioritized the top five.

The interagency Unified Watershed Assessment team and United States Department of Agriculture-Natural Resources Conservation Service's State Technical Committee used the following criteria in designating watersheds/watershed regions into Category I:

- agency interest/focus/existing work that promotes partnerships;
- existing community interest;
- high probability of success and results transferable to similar areas within the State;
- historical and cultural significance; presence of mixed land uses;
- presence of important natural resources;
- presence of water bodies on the DOH's Section 303(d) list of Water Quality Limited Segments;

- geographic diversity with projects for each county; and
- watersheds capturing the uniqueness of Hawai`i.

These criteria are based on national guidance and modified to account for local conditions. A draft Hawaii Unified Watershed Assessment and Watershed Restoration Priorities document was available for public input prior to its being finalized and submitted to EPA and the United States Department of Agriculture.

The priority watershed regions listed below will receive incremental funds, which are in addition to the Polluted Runoff Control's base funds, to implement Watershed Restoration Action Strategies or to conduct watershed assessments.

Priority watershed region and basis for inclusion:

South Molokai (Molokai): Erosion control for water quality improvement, coral reef protection, and historic/cultural preservation. Current projects and partnerships are in place.

Pelekane Bay – Kohala Mountains (Hawaii): Erosion control and resource management for coral reef protection, enhanced recreational usage and historic/cultural preservation. Current projects and partnerships are in place.

West Maui – West Maui Mountains (Maui): Reduce sedimentation 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. Current projects and partnerships are in place.

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. Current projects and partnerships are in place.

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

4.2 Statewide Nonpoint Source Approaches by Partnering Programs

In Hawaii, other partner program or agencies coordinate initiatives utilizing a statewide approach that either directly or indirectly address nonpoint source pollution. The following is a description of some of these statewide initiatives by partner agencies in which the DOH and/or the Coastal Zone Management participate.

4.2.1 Water Quality Certification & CWA Section 402(p)

The DOH-Clean Water Branch implements the statewide National Pollutant Discharge Elimination System (NPDES) and issues Water Quality Certification (WQC). These programs are delegated by EPA. National Pollutant Discharge Elimination System is primarily designed as a tool for states to control or manage point source discharges into state waters. Two components

assist in statewide control of nonpoint source pollution. First, *Clean Water Act* Section 401 Water Quality Certification (WQC) requires "any applicant for a Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into navigable waters, shall provide the licensing agency a certification from the State...that any such discharge will comply with applicable provisions of sections 301, 302, 303, 306, and 307 of this Act[.]" (*Clean Water Act* Section 401(a)). As part of the application for the *Clean Water Act* Section 401 WQC, a Best Management Practices Plan and an applicable monitoring plan must be developed. The Best Management Practices Plan may be required to detail nonpoint source pollution control needs.

Second, under *Clean Water Act* Section 402(p), States issue storm water permits to municipalities with a population of more than 100,000. Presently, the City and County of Honolulu is the only municipality in Hawaii to have a municipal storm water permit from DOH. The State Department of Transportation also has a municipal storm water permit. The State has the ability to place conditions within the permit for municipalities to follow. These conditions include monitoring, implementing activities to reduce nonpoint source pollution, and conducting an outreach campaign to increase the public's knowledge of nonpoint source pollution and how they can be part of the solution. As a result, the City and County of Honolulu has implemented a successful public education campaign and has purchased equipment with State Revolving Fund loans to better capture pollutants before they become part of the urban runoff waste stream.

4.2.2 Coral Reef Initiative

Hawaii participates in the Federal Coral Reef Initiative (CRI), which is cooperatively led by the Department of Land and Natural Resources, DOH, Office of Planning, and the University of Hawaii at the State level and by the United States National Oceanic and Atmospheric Administration and the United States Department of the Interior at the Federal level. The Coral Reef Initiative aims to identify and implement projects to protect the health of coral reef ecosystems. Part of the Coral Reef Initiative will look at land use activities and their associated polluted runoff as it affects coral reef ecosystems. The State may receive funds from this initiative for projects to improve water quality in coral reef ecosystems.

4.2.3 USDA Programs

The United States Department of Agriculture-Natural Resources Conservation Services-Hawaii State Office leads several federally funded programs that contribute resources to Hawaii's efforts in reducing polluted runoff. It coordinates a State Technical Committee that helps determine the use of the United States Department of Agriculture funds for Environmental Quality Incentives Program (EQIP), Wildlife Habitat Incentives Program (WHIP), and Forestry Incentives Program (Forestry Incentive Program) annually. The Natural Resources Conservation Services uses this interagency committee to determine statewide issues and geographic target areas for these programs. The Coastal Zone Management (CZM) Program and the DOH serve on this committee to ensure State polluted runoff priorities are integrated with the Natural Resources Conservation Service's activities.

4.2.4 Pollution Prevention Roundtable

The DOH's Solid and Hazardous Waste Branch coordinates the Pollution Prevention Roundtable. This is a forum for State, County, and Industry Sector representatives to work on statewide initiatives or share information related to recycling or waste minimization.

4.2.5 Source Water Assessment Program/Well-Head Protection Program

The DOH's Groundwater Protection Program, within the Safe Drinking Water Branch, is developing the State's Source Water Assessment Plan (Source Water Assessment Plan) and the Well-Head Protection Program (WHPP). Source Water Assessment Plan assesses all drinking water sources as to risk of exposure to pollutants. Source Water Assessment Plan is assisted in its program development by an advisory committee on which the Polluted Runoff Control Program sits. Source Water Assessment Plan demonstration projects are being developed. This effort complements the Well-Head Protection Program and many of the sites are consistent in being located in priority watersheds as designated in the State Unified Watershed Assessment Plan. Source Water Assessment Plan demonstration sites that are also located in Unified Watershed Assessment priority watersheds are the Kilohana Wellfield in the Nawiliwili Watershed Region, the Kualapuu and Ualapue Wells in the South Moloka`i Shoreline Watershed Region, and the Lahaina surface source in the West Maui Watershed Region.

4.3 Resource tools

4.3.1 State Water Quality Monitoring Strategy

The DOH has developed water quality standards for all types of surface waterbodies found in Hawaii. The water quality standards are codified in Hawaii Administrative Rules Chapter 11-54. To ascertain whether water quality standards are being achieved, the DOH implements a water quality monitoring program. The DOH is revising its current strategy for statewide surface water quality monitoring.

The new approach is in the document *Strategy and Quality Management Plan (QMP) for Surface Water Monitoring* (1999 edition). The QMP is made up of several components:

- Surface Water Quality Monitoring Strategy; Surface Water Quality Management Plan;
- Quality Assurance Project Plan for Indicator Organism Counts;
- Quality Assurance Project Plan for Chemistry;
- Quality Assurance Project Plan for Watershed Monitoring;
- Quality Assurance Project Plan for Ala Wai Canal Watershed Monitoring (an urban model); and
- Quality Assurance Project Plan for West Maui Watershed Monitoring (an agriculture and resort model).

Surface water quality monitoring is conducted by the DOH-Clean Water Branch to assess and report on the quality of State surface waters in three high priority categories:

1. possible presence of water borne human pathogens;
2. long-term physical and chemical characteristics of coastal waters; and
3. watershed assessments, including the integrity of natural aquatic communities.

Information gathered as a result of monitoring conducted according to the Quality Management Plan will assist the DOH-Clean Water Branch and the Polluted Runoff Control Program in assessing anthropogenic impacts, including using the data as a guide to selecting best management practices for implementation at problem sites (QMP, 1999). In addition, the QMP is a useful tool for Nonpoint source pollution management because it provides information used in two other resource tools the State utilizes in prioritizing its nonpoint source pollution activities: the *Clean Water Act* Section 303(d) List of Water Quality Limited Segments and its associated computation of Total Maximum Daily Loads, and the *Clean Water Act* Section 305(b) Report.

4.3.2 CWA Section 305(b) Report

As a requirement of the *Clean Water Act*, every two years the State must produce a comprehensive and integrated description of the status of all waters assessed by DOH-Clean Water Branch and other agencies and organizations during the previous two-year period. This report, the *Clean Water Act* Section 305(b) Report, contains numeric and narrative data generated by assessments of State surface waters. It also combines summaries and interpretations of data collected by other agencies and the private sector including the United States Army Corps of Engineers, the United States Geological Survey, the United States Fish and Wildlife Service, Natural Resources Conservation Service, Counties, University of Hawaii, and private consultants. The Report also includes data collected under National Pollutant Discharge Elimination System permit requirements, the *Clean Water Act* Section 401 Water Quality Certifications, and projects sponsored by *Clean Water Act* Section 319(h) funds.

The Polluted Runoff Control Program uses the information from the *Clean Water Act* Section 305(b) Report to geographically target its funds and activities to waterbodies and associated watersheds that are impaired by polluted runoff. In addition, it uses the information to identify priority pollutant targets and probable sources to prioritize funding allotments and program outreach activities.

4.3.3 CWA Section 303(d) List & Total Maximum Daily Loads

Every two years the State must produce a *Clean Water Act* Section 303(d) List of Water Quality Limited Segments which contains the names of waterbodies that consistently exceed State Water Quality Standards due primarily to excessive pollutant loads from nonpoint source pollution. The *Clean Water Act* Section 303(d) List also lists pollutants exceeded in each listed waterbody and includes maps of each waterbody. All listed *Clean Water Act* Section 303(d) Water Quality Limited Segments are required to reduce pollution loads through the computation and implementation of Total Maximum Daily Loads (Total Maximum Daily Loads). Total Maximum Daily Loads are numeric estimates of the maximum pollutant delivery rates that can

be assimilated by water bodies without exceeding State Water Quality Standards for that water body type.

The Polluted Runoff Control Program uses the *Clean Water Act* Section 303(d) List to prioritize watersheds that need additional attention to reduce nonpoint source pollution loads. This prioritization is used when allocating grant funds to projects.

The State's Unified Watershed Assessment Interagency Team also uses the *Clean Water Act* Section 303(d) List as one of its criteria in identifying Category I watersheds, makes these priority watersheds for receiving **incremental** *Clean Water Act* Section 319(h) Unified Watershed Assessment Funds. All Category I Unified Watershed Assessment Watersheds must have developed a watershed assessment and restoration action strategy prior to receiving implementation funds. Total Maximum Daily Loads will be used as part of a watershed assessment and restoration action strategy. Conversely, if a Unified Watershed Assessment/Watershed Restoration Action Strategy is already developed prior to a Total Maximum Daily Load, that Unified Watershed Assessment will be used to assist in developing the Total Maximum Daily Load for that particular waterbody.

4.3.4 Source Water Assessment Program and Well-Head Protection Program

As mentioned before, DOH's Groundwater Protection Program (GWPP) is cooperatively managing the State's Source Water Assessment Program (Source Water Assessment Plan) and the Well-Head Protection Program (Well-Head Protection Program). Source Water Assessment Plan delineates source water protection areas, inventories potential and existing sources of contamination, determines the susceptibility for contamination, and provides linkages and outreach to related programs and the public. Source Water Assessment Plan complements the Well-Head Protection Program and may even embody the Well-Head Protection Program as Source Water Assessment Plan completes statewide assessments. Source water protection areas, typically larger than well-head protection areas, may eventually have Best Management Practices implemented to prevent or reduce the risk of source water contamination.

The Polluted Runoff Control Program will use Source Water Assessment Plan's source water delineations to prioritize geographic targets in focusing grants towards project implementation. Information developed in the Source Water Assessment Plan process will be of assistance to the Polluted Runoff Control Program as it works with local entities to develop watershed assessments. Conversely, any information developed as a result of a watershed assessment would be provided to the GWPP for its Source Water Assessment Plan.

4.4 Projects for priority areas and sectors

The State's protracted economic slump through the past decade has severely restricted State and County budgets. Consequently, the State intends to use funds received through section 319(h) of the *Clean Water Act* and section 6217 of *Coastal Zone Act Reauthorization Amendments of 1990* to initiate implementation actions and encourage other agencies to target resources towards the high priority watersheds until more resources are available at the State and

County level. The State also intends to make available and encourage the use of State Revolving Funds for polluted runoff control projects.

Hawaii has designated 18 water quality limited segments on the State's section 303(d) list. The State targets some of its base section 319(h) resources and all of the incremental section 319(h) resources towards projects in areas that drain into one of the water quality limited segments. The DOH's section 319(h) grants scoring sheet reflects the State's priorities (see Appendix D). As previously mentioned an additional resource to fund projects in priority land areas is the incremental section 319(h) funds for the Hawaii Unified Watershed Process (see Chapter 5).

Hawaii will address polluted runoff through a statewide approach based on land use sectors. Hawaii has identified agriculture and urbanization as the land use sectors that contribute the most significant amount of human induced polluted runoff. Specific strategies and plans for these all sectors are addressed in Chapter 6 of this document. Erosion and sediment control is a common pollutant issue, which will be addressed in several ways such as revising erosion and sediment control ordinances for some counties by 2003, augmented by development of an urban BMP manual. Agriculture is in transition from large plantations to smaller diversified truck crop farms. Many of these farmers are new to the industry or have English as a second language, so there is a need to expand multi-lingual cooperative extension efforts to this sector, including the translation of pollution prevention strategies for the farmers. Finalization of the Hawaii version of the national Farm*A*Syst Program and its implementation will assist land users in this sector with meeting agriculture management measures. This program will be finalized by the end of 2000, and the State will sponsor its implementation in 2001.

Since the completion of *Hawaii's Nonpoint Source Water Pollution Management Plan* in 1990, the State has supported the development of numerous best management practices to control polluted runoff on a statewide basis. In *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (1996) there are fifty-seven management measures presented as goals for addressing polluted runoff from six major land use sectors. For each management measure there are several management practices, also known as best management practices, presented within *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*. When implemented, these best management practices will assist the land user in achieving the goal of the management measure. In some cases, there has been a lack of best management practice options for land users to implement, making it difficult for them to meet the management measures for their activity. Therefore, the DOH has sponsored the development and distribution of innovative best management practices to assist land users in achieving these management measures. A summary of these best management practices appears in Table 4-1. The list of best management practices within Table 4-1 augments those listed within Part III of *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan.* The State will continue to support and encourage the development and use of best management practices, especially to control polluted runoff from sources known or anticipated to be major contributors of water quality problems.

Table 4-1 Summary of Innovative Best Management Practices Developed for Hawaii
• Integration of aquaculture and taro production • Range management • Maintenance on former sugarcane fields • Dry forest, wetland, and coastal revegetation projects • Erosion control practices on agricultural roads • City & County of Honolulu stormwater pollution reduction equipment • Best Management Practices installed on lychee and coffee • Dry litter animal waste control system • Roadcut revegetation project • Feral animal control • Best Management Practices installed on sugarcane fields & pineapple fields • Testing effectiveness of storm drain filters for debris & pollutant trapping • Maui County and City & County of Honolulu erosion control standards improvement; inspector, agency, and consultant training

4.5 Statewide Education, Outreach, & Technology Transfer

The State considers public education and outreach significant tools in reducing polluted runoff. Each person plays a role in contributing to the nonpoint source waste stream, particularly in urban/residential areas. DOH's goal is to educate the public, government officials, industry groups, and land users about the causes and effective control of nonpoint source pollution. Table 4-2 below illustrates the varied targets and media used in the approach developed by the Polluted Runoff Control Program. The State will continue to allocate a portion of its Section 319(h) grant to outreach efforts, as it has since 1990.

Table 4-2 Education and Outreach Programs	
TARGET AUDIENCE	**EXAMPLES OF EDUCATION & OUTREACH**
General Public	Storm drain stenciling; Earth Day presentation/booth; State Farm Fair booth; NPS television commercial; "Alternatives to Household Hazardous Materials" pamphlet; NPS brochure; "Septic Tank Maintenance" brochure
Students	Salt Lake Environmental Awareness Day presentation /field activities; presentations at Manoa School Environmental Day, Momilani & Waiau Elementary Health Fairs; "Kidscience" & "Exploring the Islands" television programs; NPS brochure & poster; A`poha video & coloring book; "In the Clear Blue Sea" & "Under the Hawaiian Sky" stage plays & videos (developed by DLNR, sponsored by DOH); lecture/presentations to high schools & Universities
Land Users & Industry	Required public education component in 319(h) grants has resulted in field days, presentations to trade associations or State Technical Committee on NPS, publication of articles in business & industry trade magazines, and project report distributions; participation in DOH-sponsored pollution prevention workshops for gas stations, mechanical repair shops, State and federal military units; funding of boaters' guide to pollution prevention during maintenance
Cultural Groups	Translation of NPS materials into Hawaiian, Samoan, and Ilocano languages; with Sea Grant, training practitioners caring for Hawaiian fishponds to monitor pond water quality

The Department of Health (DOH) encourages other agencies and organizations to target resources towards improving water quality in Water Quality Limited Segments and in areas where significant threats to water quality are present. The State Technical Committee, quarterly meetings hosted by United States Department of Agriculture Natural Resources Conservation Services, and the Hawaii Association of Conservation District annual and quarterly meetings provide forums for Federal, State, County, and non-government partners to discuss nonpoint pollution control issues and focus their collective resources upon implementing on-the-ground management practices to address priority 303(d)-listed impairments. Because the Soil and Water Conservation Districts are leading the efforts to prepare and implement watershed restoration action strategies in priority watershed regions, they will provide updates at these forums regarding the effectiveness of the strategies. As noted in Chapter 3, agreements among these entities have led to improvements in Best Management Practice implementation, water quality, and educational activities.

The State will continue to communicate its priorities to government agencies, businesses, non-government organizations, and other stakeholders and actively solicit public comments. The

State participates in numerous forums that meet regularly to discuss polluted runoff controls. These regular meetings, conferences, and events give the State an opportunity to present its programs and get feedback from stakeholders. The DOH and the Office of Planning will continue their efforts to meet with interested parties outside of Honolulu to ensure that program priorities are communicated statewide and to provide feedback channels. The counties coordinate various district or islandwide development plans along with county drainage plans or grading ordinances. As these documents are developed, the State will review and provide comments in reference to urban management measures such as watersheds and new developments in *Hawaii's Implementation Plan for Polluted Runoff Control*.

The State has and will continue to sponsor demonstration projects that develop new, innovative approaches to Nonpoint source pollution management. The Polluted Runoff Control Program will take a more active approach in promoting the results and encourage further implementation of successful demonstrations. One approach will be to compile a document that includes such findings and distributes it to (relevant) landusers and industry sectors.

4.6 Statewide Planning, Management, and Evaluation

The State has established a planning, management, and evaluation system for the Clean Water Act funds its receives that includes:

1. submitting an annual workplan and grant application;
2. implementing management projects;
3. preparing project reports and conducting site inspections
4. preparing end-of-the-year reports; and
5. evaluating the effectiveness of programs every five years.

4.6.1 Annual Workplan and Grant Application

The Department of Health (DOH) annually submits a workplan and grant application to EPA to obtain the State's allocated *Clean Water Act* Section 319(h) funds. Hawaii drafts a workplan and meets with an EPA Region IX official to discuss and negotiate the submitted draft. Annual workplans will be drafted using *Nonpoint Source Program and Grants Guidance for Fiscal Year 1997 and Beyond, Hawaii's Nonpoint Source Water Pollution Management Plan,* and *Strategic Plan for Hawaii's Environmental Programs* as guiding documents.

After annual grant negotiations, DOH will revise necessary portions of its draft workplan and submit it as a final workplan along with a grant application to EPA Region IX for its approval and award. EPA will make the official grant award to the State in October, the start of the new federal fiscal year. Workplans and grant applications can be revised throughout the life of the grant. The process entails DOH specifying changes in a letter of request to EPA Region IX. Once EPA Region IX approves the revisions, the Department will be notified, making the revised workplan official.

In its annual workplan, the DOH specifies amount of labor and State and federal fiscal resources allocated to each specific activity. These activities are grouped under categories of Program Administration, Planning, Program Implementation, Projects, and Public Education.

To provide flexibility to many of the grant recipients, the Department will continue to keep multiple grants open with EPA so that project has sufficient time and resources to be successfully completed. Once the State completes all committed tasks from a grant workplan, it closes that grant. Within three months from close of grant, the Department will submit appropriate documentation to close out its grant. This documentation includes a financial status report submitted by the Department's fiscal office. This financial status report includes a summarization of grant expenditures and match documentation.

4.6.2 Management of Projects

Purpose of Projects: Each year the DOH oversees numerous new, often multi-year projects. These projects are one tool utilized by the State to promote a reduction of polluted runoff. *Clean Water Act* Section 319(h) requires projects to:

- demonstrate new or innovative approaches to reducing polluted runoff;
- implement proven best management practices;
- implement watershed assessments or restoration strategies;
- implement an identified program, activity, or strategy from the *Hawaii's Nonpoint Source Pollution Management Plan*; and
- implement educational, outreach, and technology transfer projects.

These projects are reviewed by the DOH, an Interagency Nonpoint Source review team, and EPA and are identified in the annual workplan. The DOH funds the projects through grants or loans. It will continue to follow all required State rules on requesting proposals and contracting procedures when recruiting applicants for grants.

The DOH maintains all fiscal and implementation oversight over the selected projects by entering into a contract with the grantee. All contracts between the Department and the grantee require an Attorney General approval. All contracts contain an approved workplan submitted by the applicant to the Department. All workplans must detail the following: project manager, nonprofit identification number if applicable, project purpose, geographic location, implementation milestones with budget, monitoring strategy, coordination with other agencies or activities if applicable, quarterly status reports and final report dates, and expected results. In addition, the DOH will continue to supply sample billing statements, sample grant fiscal budget, sample match documentation, and copies of federal grant rules to the grantee.

Projects may be funded from any of the following: *Clean Water Act* Section 319(h) core grant, *Clean Water Act* Section 319(h) incremental grant for the Federal Clean Water Action Plan (CWAP), the Clean Water Act State Revolving Funds (SRF), or other special grants. All projects will be placed on a database program (EXCEL) so that milestones, funds available, and match can be easily monitored. Project selection is based on Federal guidance and State

Management Plan guidance. Accepted Applicants/Grantees can expect to have a final contract within six to twelve months from project recruitment.

Request for Proposal Process: In its annual call for proposals, the Department will continue to include a grant application kit that is sent to targeted organizations and to those who request it. The DOH will continue to advertise the grants following State procedures concerning "call for proposals." In addition, to get a wider audience for promoting grant opportunities, the Department will place public notices in each major island daily paper, Office of Environmental Quality Control "Environmental Notice" and put out a press release. Besides including the actual application, the application kit will include information on how to apply for a *Clean Water Act* section 319(h) grant or for a *Clean Water Act* SRF loan.

Selection Criteria: A listing of priority water bodies, their major pollutants, and maps of their associated watersheds are included in the information packet. This listing is based on the State's Section 303(d) list of impaired water bodies and includes target pollutants for each water body. In the project selection process, a project located in a watershed that drains to one of the listed priority impaired water bodies is scored higher. A second critical priority that gives proposals higher ranking is that the proposal implements a portion of the *Hawaii's Nonpoint Source Water Pollution Management Plan* and/or *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*. These plans identify numerous management measures and designated lead agencies. Interested lead agencies may use grant funds to implement their identified role in carrying out Nonpoint source pollution management. Prioritization is also given to projects that demonstrate a new or innovative Best Management Practice or approach to Nonpoint source pollution management. The grant kit also discusses pollution reduction priorities and public education and outreach priorities.

Evaluation: Federal grant funds for demonstration projects or projects that implement a portion of the State Management Plan are limited. Project selection is competitive. A project selection is based on how well it addresses the following selection priorities:

- controls a pollutant in a listed priority watershed;
- implements a portion of the State Nonpoint Source Management Plan;
- implements a project identified as part of watershed restoration strategy for a Unified Watershed Assessment area;
- implements a statewide pollution or public education goal;
- demonstrates a high likelihood of success based on fulfilling all application components including meeting match and time frame requirements, a thorough workplan with milestones listed, appropriate monitoring and/or environmental indicators to gauge effectiveness, a clearly identified project lead; and
- promotes interagency cooperation.

Appendix D has the current grant application form and scoring sheet. The application form and priorities may change as a result of revised priorities in subsequent years.

4.6.3 Clean Water Action Plan Incremental Section 319(h) Funds for Unified Watershed Assessments and Watershed Restoration Action Strategies

Projects that result from development of the State's Unified Watershed Assessment and Watershed Restoration Action Strategies or from special funds will be selected and implemented based on the specific federal guidance attached to those funding sources (see Chapter 6 for Unified Watershed Assessment/Watershed Restoration Action Strategies approaches). *Clean Water Action Plan* projects fall into two categories. The first type is the implementation of watershed restoration activities from an approved Watershed Restoration Action Strategy. These projects must be located in specific prioritized watersheds. The Department is assisted by its Hawaii Unified Interagency Watershed Assessment Advisory Team (HUIWAA) and EPA Region IX in this process. The identified projects must have an approved workplan and contain similar workplan components as the open 319(h) grants.

The second type of *Clean Water Action Plan* projects are those that are undertaken within specific watersheds annually designated by the Department and its Hawaii Unified Interagency Watershed Assessment Advisory Team, along with EPA Region IX review. These watersheds lack an assessment or restoration strategy. The project will focus on designing a specific watershed assessment of nonpoint source pollution issues and Watershed Restoration Action Strategies to control it. These Watershed Restoration Action Strategies will be used as a basis for funding decisions for future incremental implementation funds. The Department will continue to provide specific guidance on components that should be included in the assessment and restoration strategy.

4.6.4 Project Reporting and Inspection

Every project funded by the Department must provide a quarterly status report. The Department reviews these reports based on the commitment in the contract and workplan. Any deficiencies in reporting will cause the Department to follow up with the contractor, possibly withholding payment or discontinuing the contract if reporting problems continue. The Department staff reviews all billings prior to approval to pay the contractor. If billing is inaccurate or there is no documented match provided, the Department will not approve the billing until these items are corrected.

The Department will continue to make biennial site visits to each project. The Department documents all findings from the field visit or meeting and makes a determination if the project is progressing as scheduled. If lack of progress is noted the Department will meet with contractor to specify areas needing attention. If progress is still lacking the Department will discontinue payment of grant until the contractor's project satisfactorily meets the contractual obligations.

As a project nears completion, the Department has a policy to withhold payment of the final ten percent on a grant until the Department makes a final site visit and approves the final project report, and all fiscal requirements have been met by the grantee.

4.6.5 *End of Year Reports*

The DOH will continue to submit an Annual End-of-Year Report to EPA. The report summarizes specific grant activities to which the Department had committed in its grant workplan. This report reflects successes and failures in carrying out program administration, implementation, planning, and public education. This report also summarizes the progress or final outcomes of projects to which the department awarded grants. Information on projects sponsored from loans, projects from the *Clean Water Action Plan* allocation, and projects sponsored from special funds are also summarized (see Appendix E for information regarding categories for which section 319(h) grants were distributed from 1990 through 1997).

4.7 Summary of Past Polluted Runoff Control Program Activities

The DOH Polluted Runoff Control Program (Polluted Runoff Control) operates primarily with federal funds from EPA. It negotiates a Management Workplan with the EPA in advance of each federal fiscal year. (Federal fiscal years start on October 1 each year and are named for the year in which they end; thus FY95 stands for the federal fiscal year which began October 1, 1994 and ended September 30, 1995.) The following activity information is taken from the End-of-Year reports to EPA for FY94 through FY98.

FY94: the Polluted Runoff Control staff developed a draft Nonpoint Source Program Strategic Plan and worked on the development of the *Coastal Zone Act Reauthorization Amendments of 1990* Plan. They developed a series of watershed awareness days to bring attention to the effect of upstream activities on the Ala Wai Canal, involving community groups and local legislators. A quarterly nonpoint source newsletter was also initiated. DOH awarded four Section 319(h) grants primarily for Best Management Practice and demonstration projects on agricultural lands.

FY95: with a reduction in both staff and State funding, the Polluted Runoff Control Program used membership in various interagency committees to advocate its agenda. It sponsored two volunteer water quality monitoring projects: the Kailua Bay-Waimanalo Bay (O`ahu) project which produced a working guide for other volunteers on developing a water quality monitoring program, and the Ala Wai School-based Volunteer Monitoring project which worked with junior and senior high school students and developed an Internet-based information data base. Three of the Section 319(h) projects were featured on television news, 16,000 A`poha coloring books were distributed, and A`poha water quality videos were distributed to all State libraries and public and private elementary schools. In addition, the Polluted Runoff Control Program was moved from the Environmental Planning Office into the Clean Water Branch.

FY97 (includes FY96 workplan activities as result of policy change to bring Section 319 grants into line with other EPA grant cycles):
The Polluted Runoff Control Program, in cooperation with the Hawaii Coastal Zone Management Program, invested much time during the two fiscal years resolving concerns and differences about the draft Hawaii CNPCP with EPA and United States National Oceanic and Atmospheric Administration. The Polluted Runoff Control Program continued involvement with various interagency committees, including its lead work with the Hawaii Technical Committee

on Nonpoint Source; the Program also assisted with both the 1996 and 1997 workshops of the Interagency Water Quality Action Program Training Committee. Fifteen Section 319(h) education or implementation projects were active during this grant period, of which four were completed. Public education and outreach was carried out through displays at a number of venues throughout the year, including the Palama Settlement Community Day which allowed the Program to present information to a public housing audience not often reached. Storm drain stenciling was again conducted statewide. Blockbuster Video Company finally agreed to carry the A`poha children's video as a free checkout item.

FY98: Eighteen Section 319(h) projects were in various stages during this fiscal year, including three projects which were completed and six new projects. The Hawaii CNPCP finally received conditional approval from EPA and United States National Oceanic and Atmospheric Administration on June 30, 1998 after a continuing series of meetings and exchange of documents. An important action was the Memorandum of Agreement (MOA) between DOH and the CZM Program which allowed Coastal Zone Management to fill a unfunded, vacant planner position by using Section 319 funds. The planner will focus on HCNPCP Implementation Development and the upgrading of the Hawaii Nonpoint Source *Clean Water Act* Section 319 Management Plan. As a part of the former, the Polluted Runoff Control Program and Coastal Zone Management co-sponsored the establishment of the Polluted Runoff Forum (PROF) to assist in development of the Implementation Plan. (See Appendix B for a list of PROF members) The Polluted Runoff Control Program took on the lead coordinating role for the State's response to the federal Unified Watershed Assessment (Unified Watershed Assessment), an initiative arising from the Clean Water Action Plan.

Heavy involvement with the Ala Wai Canal Watershed Improvement Project subwatershed projects developed during the grant period, along with fiscal and oversight responsibilities for West Maui Watershed nonpoint source pollution projects. Initial contacts were also made with the Kailua Bay Advisory Council, which is administering a multi-million court settlement focused on the Ko`olaupoko (O`ahu) watersheds. Participation in various committees continued, as did public education and outreach activities.

A final important accomplishment was the integration of recruitment and selection of nonpoint source control projects as part of the DOH-Wastewater Branch's implementation of the CWA-SRF for Hawaii. The Polluted Runoff Control Program worked with DOH-Wastewater Branch to modify its policy and procedures document to make nonpoint source projects eligible for SRF loans. The Polluted Runoff Control Program has modified its project solicitation process to include SRF loan applicants and developed outreach meeting to encourage the application for SRF loans to assist in nonpoint source pollution management. Consequently, nearly four million dollars will be lent by the year 2000 through the SRF loan process to county applicants for nonpoint control projects.

4.8 Memorandum of Agreement (MOA) between Department of Health and Department of Business, Economic Development, and Tourism

This MOA, signed in late 1997, allows the two agencies to accomplish tasks that are mutually beneficial: development of the Implementation Plan for *Hawaii's Coastal Nonpoint Pollution Control Program* and the upgrading of *the Hawaii Nonpoint Source Water Pollution Management Plan*. Coastal Zone Management had a Planning and Policy Analyst (Coastal Zone Management Planner) position, but no funding, while DOH had funding but no position. Through the MOA, DOH transferred *Clean Water Act* Section 319(h) funds to Coastal Zone Management to fund the position. The Coastal Zone Management Planner position has been staffed since January 1998.

The responsibilities of the Coastal Zone Management Planner under the MOA are:

- coordinate the development of *Hawaii's Implementation Plan for Polluted Runoff Control*;
- coordinate with the PROF on the development of the Implementation Plan;
- incorporate federal comments, as appropriate, into *Hawaii's Implementation Plan for Polluted Runoff Control*;
- assist the DOH in developing an internal strategy to implement its components of *Hawaii's Implementation Plan for Polluted Runoff Control*;
- work with DOH to improve the integration of *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* and the *Hawaii's Nonpoint Source Water Pollution Management Plan* into one comprehensive plan for the statewide management of polluted runoff (*Hawaii's Implementation Plan for Polluted Runoff Control*);
- assist in educating agencies, land users, and community organizations about *Hawaii's Implementation Plan for Polluted Runoff Control*; and
- work with DOH to solicit projects, to be funded under Section 319 of the Clean Water Act, that demonstrate Best Management Practices or implement policies that achieve the goals, guidelines, and/or management measures of *Hawaii's Implementation Plan for Polluted Runoff Control*.

In addition to using programmatic indicators in annually evaluating the Department's success in managing polluted runoff, the Department will increasingly utilize environmental indicators to gauge effectiveness. These environmental indicators will be based on those suggested for polluted runoff from the Department's Environmental Management Advisory Group (EMAG). The Department will also utilize improvement of water quality standards in priority watersheds as an environmental indicator of the success of the program. These watersheds will have had a complete Unified Watershed Assessment/Watershed Restoration Action Strategies and been implementing projects for two years. It is assumed that over time as project after project is implemented in the targeted watershed, a critical mass of best management practices will be present to reduce the runoff issues in these specific geographic target areas so that there will be noticeable water quality improvements there. To assess improvement in this area, the Department will use the information collected and placed in the *Clean Water Act* 305(b) report.

4.8.1 Approach for Evaluation of Program Effectiveness

The State intends to update *Hawaii's Implementation Plan for Polluted Runoff Control* every five years. At the fifth year of each five-year period, the State will evaluate its progress towards reaching the long-term goals and develop 5-year implementation plans. The 5-year implementation plans will show how agencies and organizations are implementing the management measures and the steps needed to fully implement them.

The State will base its 5-year evaluation on water quality monitoring data and information from the implementation of statewide and watershed based projects. The State is interested in identifying the programs, projects, Best Management Practices, and partnerships that lead to improvements in water quality as well as identifying new sources of nonpoint pollution that may not be adequately addressed. Thus, information from agencies, businesses, non-government organizations, and other stakeholder groups will be incorporated into the State's evaluation and 5-year implementation plans.

Annually, EPA reviews DOH's Polluted Runoff Control Program and management of its *Clean Water Act* Section 319(h) grant. Information from each annual review will be used to intermittently evaluate the program and be included into the State's evaluation and 5 year implementation plans. Information from the *Clean Water Act* Section 305(b) report will also be used in the evaluation process.

4.8.2 *Activities to be evaluated every five years*

1. water quality monitoring data and plans;
2. effectiveness of partnerships to implement statewide and watershed based programs;
3. effectiveness of the development and implementation of watershed restoration action strategies;
4. ability of United States National Oceanic and Atmospheric Administration, EPA, and the State to secure funds for *Hawaii's Implementation Plan for Polluted Runoff Control*;
5. assessment of technical needs to implement polluted runoff controls;
6. implementation of management measures;
7. public participation; and
8. effectiveness of rotating watershed assessments.

Statewide management of water quality is only part of the solution to Hawaii's nonpoint source pollution problems. To completely address the impacts of nonpoint source pollution, requires the ability to build on the existing foundation of community networks within the State. The "watershed approach" attempts to improve water resources in the State by coordinating partnerships at all levels and performing restoration activities on a watershed basis. The community serves as the lead organization in the watershed approach. The next chapter discusses the importance of a watershed-based approach and its applicability to Hawaii.

Summary of Activities by Year

2000
- Produce a Clean Water Act Section 303(d) list of Water Quality Limited Segments.
- DOH's Polluted Runoff Control Program will receive an official grant award from EPA.

2003
- Evaluate Hawaii's Coastal Nonpoint Pollution Control Program Implementation Plan by contacting and meeting with stakeholders.
- Develop Phase II implementation strategies with agencies and stakeholder groups based on the evaluation.
- Prepare draft 5-year implementation plan for Phase II.
- Conduct public meetings to review and solicit comments on the draft 5-year implementation plan for Phase II.
- Complete 5-year implementation plan for Phase II.
- Convene a meeting and/or conference with representatives from watershed projects to get feedback on the implementation of watershed restoration action strategies.
- Form focus groups to develop preliminary assessments and recommendations on WRASs.
- Conduct public meetings to solicit comments on the assessments and recommendations on WRASs.

2008
- Begin evaluation of Phase II and assess progress towards achieving the long-term goals.
- Complete 5-year implementation plan for Phase III.

2013
- Achieve long-term goals

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CHAPTER 5
WATERSHED APPROACHES

5.1 Development of the Watershed Approach

In the past, most water pollution control efforts relied on broad-based, national programs targeted at reducing water pollution from point sources. These point sources included waste discharges from sewage treatment plants and industrial facilities. Although the applications of such programs were successful, they did not fully address water quality problems in the United States. Serious pollution problems still exist and continue to threaten public and environmental health. As an example, 40 percent of waters assessed by all states do not presently meet water quality goals. In addition, almost half of the nation's 2,000 major watersheds have serious or moderate water quality problems (Clean Water Action Plan, 1998).

New solutions to solving current water quality problems have been developed by the Environmental Protection Agency (EPA), the United States Department of Agriculture, and other federal agencies. They are documented in the Clean Water Action Plan (1998); a plan produced in response to a directive from the Clinton Administration to fulfill a goal of "fishable and swimable" waters for all Americans (see Appendix A-5). A fundamental principle of this plan is the "watershed approach."

The key to the watershed approach is tailoring efforts of federal, state, and local governments, and the private and public sector to the particular needs of an individual watershed. Focusing on an individual watershed has several advantages. First, it helps identify the most cost-effective pollution control strategies to meet clean water goals. Second, it encourages public involvement since efforts to protect and restore water quality are geared towards local communities in a given watershed. Third, it provides greater accountability and progress in reaching clean water goals.

5.2 Application of the Watershed Approach in the State of Hawaii

Because of the unique properties of watersheds, application of the watershed approach would be more feasible on a watershed regional-basis. In Hawaii, there are 551 watersheds on the main Hawaiian Islands of Hawaii, Kauai, Maui, Molokai, Lanai, Kahoolawe, Ni'ihau and Oahu as indicated in the report entitled, *State Definition and Delineation of Watersheds* (1994). The watersheds are relatively small and characterized by fast flowing streams. Often, adjacent watersheds with degraded water resources drain into a single water body creating an impaired designation of the water body. Therefore, addressing individual watershed units may not significantly improve water quality problems in an associated water body. Similarly, designating each island as stand-alone or individual watersheds would create the complex task of solving a comprehensive, water quality problem. The federal government has made such a designation for each Hawaiian Island. In Hawaii, this is unrealistic and unlikely to provide any measurable benefit. Applying the watershed approach on a regional basis is the ideal situation in Hawaii.

A regional watershed approach also fits the State's current conditions from an environmental, economical and communal standpoint. Firstly, the State's water quality problems vary greatly from watershed to watershed and from region to region. Such variation in environment necessitates the prioritization of regions with seriously degraded water resources.

Secondly, the State is in an economic recession. Therefore, resources are limited and must be used to address the more serious water quality problems in the State. Finally, the State has strong, established community networks, which can provide (1) the public participation and (2) the local leadership responsibilities inherent in the regional watershed approach. A great challenge in using this approach; however, is trying to coordinate the responsibilities of all stakeholders and ensure establishment of a common direction to meet clean water goals efficiently and effectively.

A regional watershed approach to managing water quality is not a new concept in Hawaii. It has been documented in *In Re Boundaries of Pulehunui* (1879) that Hawaiians managed the environment and organized their society through land divisions called "ahupuaa." The ahupuaa boundaries were similar to current watershed delineations. In each ahupuaa system, the entire area from land to sea was treated as one unit. Long ago, Hawaiians had recognized that what happens at the headwaters of the stream affects ecosystems throughout the watershed and coastal waters.

5.3 Unified Watershed Assessment

A key component of the watershed approach is the Unified Watershed Assessment,[1] an approach developed by EPA and other Federal agencies. The Unified Watershed Assessment aims to "unify" Federal and State activities related to identifying and prioritizing watersheds in need of restoration. The State finalized its Unified Watershed Assessment report in 1998; which identifies five priority watershed regions (see Table 5-1). These five watersheds will receive Clean Water Act Section 319(h) **incremental** funds to implement strategies aimed at solving water quality issues in the particular regions. Eighty percent of the Clean Water Act Section 319(h) incremental funds will be used for implementing watershed restoration strategies, while twenty percent will be used for assessment purposes (per federal requirements).

The Nawiliwili, South Molokai, and Koolaupoko watershed regions need more information regarding the sources of their water quality problems; therefore, more water quality assessment is necessary in these watersheds. The State will help these watershed regions complete their assessments by the end of the year 2000. Pelekane Bay and West Maui watershed regions have enough information and do not need to carry out further assessment activities. Instead, these watershed regions are ready to start restoration activities this year. Watershed projects will be implemented on a five-year schedule (see Table 5-2).

1 See pages 4-2 and 4-3.

Table 5-1 Hawaii's
Five priority watershed regions as identified in *The Hawaii Unified Watershed Assessment* (1998).

ISLAND	WATERSHED REGIONS
Hawaii	Pelekane Bay
Kauai	Nawiliwili
Maui	West Maui
Oahu	Koolaupoko
Molokai	South Molokai

Table 5-2
Timetable for implementing the 5 priority watershed projects.

WATERSHED REGIONS	IMPLEMENTATION PLAN
Pelekane Bay, Hawaii	1999-2003
West Maui, Maui	1999-2003
Nawiliwili, Kauai	2000-2004
Koolaupoko, Oahu	2000-2004
South Molokai, Molokai	2000-2004

Watershed projects for the second tier of watershed regions (i.e., the next set of identified watershed regions in most need of restoration) will also be implemented on a five-year schedule. The State intends to implement projects for these watershed regions by 2004 or sooner if more resources are available. Similarly, a third set of watershed regions will be identified and implemented on a five-year schedule starting in 2009. Implementation projects for the second tier and third set of watershed regions will be called Phase II and Phase III of the State's Unified Watershed Assessment, respectively (see Table 5-3).

5.4 Watershed Restoration Action Strategies

Another element of the watershed approach identified in the Clean Water Action Plan is the formation of Watershed Restoration Action Strategies. These strategies comprise a three-step process, which involves:

(1) identifying the causes of water pollution and resource degradation in a watershed;
(2) detailing the actions of stakeholders in order to correct these problems, and
(3) setting milestones in order to measure the progress of the restoration actions.

Currently, the State assists the selected lead organizations of the five priority watershed regions in completing Watershed Restoration Action Strategies (see table 5-3 for Lead Organizations). In addition, the State assists leaders in the implementation of best management practice and water quality monitoring activities. The State has distributed guidelines to the leaders in the five priority areas for the development and implementation of Watershed Restoration Action Strategies. Within each priority watershed region, the State will follow a phased approach that includes:

1. assessing potential sources of nonpoint pollution;
2. integrating partners and stakeholders, and identify their roles;
3. establishing water quality monitoring procedures and environmental objectives;
4. completing Total Maximum Daily Loads (TMDLs), where appropriate;
5. preparing watershed plan and Watershed Restoration Action Strategies including priorities, specific actions, coordinated policies, timelines, and funding needs;
6. implementing strategies; and
7. evaluating the effectiveness of the strategy and Best Management Practices (BMPs), and the impacts on water quality.

Table 5-3: Timetable for Implementing All Current DOH-connected Watershed Projects						
Watershed Region	*Lead Organization*	*Partner*s	*Source of Funds*	*WRAS*	Implementation	Evaluation
Pelekane Bay, Hawaii	Mauna Kea SWCD	NRCS, large landowners, UH-Hilo, Hawaii County, DOH, OP	Section 319(h) UWA funds, private, SWCD,	completed	1999-2003	2003
West Maui Water Quality Project	West Maui SWCD and West Maui Watershed Mngt. Advisory Committee	NRCS, Maui Land & Pineapple, Pioneer Mill Co., DLNR, DOT, and DOH, OP	Section 319(h) UWA funds, West Maui SWCD	completed	1999-2003	2003
South Molokai	Molokai/Lanai SWCD	NRCS, the Nature Conservancy, DOH, OP	Section 319(h), SWCD	2000	2000-2004	2004
Nawiliwili, Kauai	East Kauai SWCD	NRCS, others to be identified	Section 319(h) UWA funds, SWCD	2000	2000-2004	2004
Koolaupoko, Oahu	DOH	Windward Community College, community groups, C&C Honolulu, KBAC, Marine Corps Base Hawaii, OP	Section 319(h), KBAC C&C Honolulu	2000	2001-2004	2004
Ala Wai Canal Watershed Improvement Project	DOH Phase I Community Board Phase II	Federal, State, and County agencies, UH, community groups, and businesses	Federal funds through EPA	TMDL completed	1999-2001	2002
UWA Phase II Category I Watersheds	To be determined	To be determined	Section 319(h) UWA Funds	To be determined	2003-2008	2008
UWA Phase III Category I Watersheds	To be determined	To be determined	Section 319(h) UWA Funds	To be determined	2009-2013	2013

5.5 Partnerships with local organizations

The State encourages local Watershed Councils or other local organizations to lead watershed restoration efforts. As shown in Table 5-3, four out of the five lead organizations coordinating the development and implementation of Watershed Restoration Action Strategies are the local Soil and Water Conservation Districts on the islands of Maui, Molokai, Kauai and Hawaii. In the Ko'olaupoko watershed region, located on Oahu, a non-government organization or existing watershed council will coordinate the Watershed Restoration Action Strategies. Partners will include community and business groups, private landowners, and government agencies implementing projects in the region. The State will allocate Clean Water Act Section 319(h) **incremental** funds, matched by private and local government organizations, to initiate these assessments and strategies. Other agencies such as the Department of Land and Natural Resources and the USDA Natural Resources Conservation Service will target their resources and participate in the implementation of the Watershed Restoration Action Strategies. The State Department of Health (DOH) will distribute guidelines for the use of the funds along with the expected outcomes from the project. Watershed Restoration Action Strategies will include indicators to assure that water quality goals are met, with provisions to revise plans.

5.6 The Ala Wai Watershed Effort

The successes of a watershed approach in Hawaii can be exemplified by the Ala Wai Canal Watershed Improvement Project (AWCWIP). Since 1997, dedicated members of community, business, local, State and federal government, non-profit and environmental organizations have participated, and continue to participate in efforts to restore the Ala Wai Watershed (Oahu). The Ala Wai Watershed, composed of seven subwatersheds, drains in to the State's most polluted water body, namely, the Ala Wai Canal.

DOH had administered funds for Phase I of the project. Contracts were awarded to communities to implement water quality improvement projects in the watershed. Widespread community involvement, stakeholder participation, adoption of a cultural model, and commitment to restore the watershed through strong partnerships has resulted in Federal recognition of the project. On April 22, 1999, the EPA presented an "Outstanding Environmental Achievement" award to the Ala Wai Canal Watershed Improvement Project for demonstrating a successful approach to urban watershed management. Such success in Phase I led the DOH Polluted Runoff Control Program to turn over Phase II directly to the community.

5.7 The West Maui Watershed Effort

Another successful project that emphasized a community-based watershed approach to agricultural watershed management was the West Maui Watershed Management Project (WMWMP). The project was initiated in response to public concern over nuisance algal blooms and muddy coastal waters. Because of this project, a document was developed for the community that included recommendations for protecting and improving water quality and ocean resources in West Maui. The *West Maui Watershed Owners Manual* (1997) described all actions that the residents of the watershed should follow to protect both drinking water sources and

coastal waters. It also identified specific responsibilities for the owners of large plantations, and government agencies within the watershed region. The West Maui Watershed Management Project was funded by congressional appropriations through the DOH, the EPA and the National Oceanographic and Atmospheric Administration. It resulted in other commendable accomplishments as listed in Table 5-4.

Table 5-4
Accomplishments of the community-based West Maui Watershed Management Project

- Construction of 13 new sediment retention basins, 5 more planned.
- Volunteer coastal monitoring.
- New erosion control Best Management Practices at 22 locations on Maui Pineapple Company's Honolua Plantation.
- Revised Erosion and Sediment Control (grading) ordinance for Maui County.
- Two pollution prevention booklets: "Island Stewardship Guide to Preventing Water Pollution for Maui's Homes and Businesses" and "What Boaters can do to Be Environmentally Friendly."
- Sixty- percent reduction in nitrogen and phosphorous loadings to Lahaina's wastewater injection wells.
- New Maui County ordinance: "Use of Reclaimed Water."
- Irrigation of Kaanapali golf course with 1.23 millions of gallons per day reclaimed water.
- New Programs for cleaning algae from beaches.
- Publication of community based West Maui Watershed Owners Manual

New projects that have resulted from the West Maui Watershed Management Project include the Best Management Practice Implementation Project on Pioneer Mill (1998) and the Pollution Prevention Maui (P-2 Maui) Project (1999). These projects illustrate the ongoing efforts of residents to control and/or reduce nonpoint source pollution in the West Maui Watershed region.

5.8 Fostering the development of community-based watershed projects

The State aims to promote similar community-based projects in other watersheds, such as the five chosen priority watershed regions and additional watershed regions in the future. The State encourages watershed regions to demonstrate that: (1) strong partnerships are developing between stakeholders in a community, (2) responsibilities are being identified, and (3) decisions to carry out those responsibilities can be made. The State intends to work cooperatively with these locally led watershed initiatives.

Ala Wai Canal Watershed Improvement Project can serve as a model in the development of future urban watershed sites in Hawaii. The State intends to apply the methodology developed

by this project to other urban watersheds in Hawaii. Lessons learned from the project will demonstrate what may or may not work in the new sites. Facets of the project that the State hopes to replicate include:

- construction/selection of goals, objectives, and strategies;
- coordination of stakeholder responsibility and actions;
- implementation of identified action strategies; and
- development of milestones as a means to measure progress of the activities.

5.9 Limitations of a community-based watershed approach

The community-based watershed approach is not free of limitations. It is clear that communities in Hawaii are composed of diverse individuals with different views, backgrounds, and cultures. Therefore, individual views of the perceived needs of a watershed will frequently conflict. This creates a challenge for the community in terms of planning, decision-making, and agreement on goals, objectives, and strategies to achieve a healthy watershed. In addition, internal conflicts can make it difficult to coordinate activities with federal, State, and local governments, and the private sector. Time and money can be wasted if communities fail to come to agreement regarding efforts to protect and restore Hawaii watersheds.

5.10 Support of the watershed regional approach through Section 319(h) Projects: The Past

Over the course of its existence, the DOH Polluted Runoff Control Program has awarded and issued contracts to organizations implementing watershed-based projects. Some of these watersheds include the Pearl Harbor Watershed, the Kaiaka-Waialua Watershed region on Oahu and the Hamakua/Hilo Coast Watershed regions on Hawaii.

An example of a Section 319(h)-project funded in the Pearl Harbor Watershed was "Early Warning Indicators of Groundwater Contamination (1995)." The purpose of this project was to investigate potential nitrate contamination to ground water on lands converted from sugarcane and pineapple use to sustainable diversified agriculture in the Pearl Harbor watershed. The study confirmed that soils of the watershed, dominated by variable charge minerals, have the capacity to adsorb considerable quantities of nitrate. Furthermore, lime and leaching (i.e., soil management practices), which are applied to support the growth of diversified crops, change the charge characteristics of soils. This creates a potential danger to groundwater resources because high nitrate in soils used for sugarcane and pineapple crops can be released into ground water because of administering these practices. High nitrate concentrations have been known to induce a potentially lethal condition known as methemoglobinemia ('blue baby' syndrome) in infants. Therefore, the study not only demonstrated the interconnected relationship between land-based activities and water resources, but also the potential impact to public health.

A notable accomplishment in the Kaiaka-Waialua Bay Watershed region included the completion of the "Kaiaka Monitoring Project" (1995). The purpose of this project was to monitor the quantity of sediments, nutrients and organic (pesticides and toxins) being washed

from the land and subsequently contributing to nonpoint source pollution in Kaiaka Bay and Waialua Bay, Oahu. The study determined that suspended solids, turbidity, total phosphorus, and nitrate nitrogen were directly related to flow from upper to lower sampling sites. Furthermore, the study determined that the nine target pesticides and toxins were below the level of analytical detectability. Finally, the study demonstrated that the Opaeula drainage basin contributed significantly more pollutants on a per-acre basis than did the Anahulu drainage basin, with the exception of filtered phosphorus. The information gathered from this project provides useful and additional monitoring data that can be used in evaluating future restoration activities.

Funded in 1995, the "Watershed Stabilization on Former Sugarcane Lands of the Hilo Coast" project is nearing completion. It takes place in the Hamakua and Hilo Coast Watershed region, which drains into Hilo Bay, a water quality limited segment. The purpose of this project is to implement vegetative and structural controls on former sugarcane lands to reduce erosion. Best management practices included land-smoothing activities to level damaged lands and return them to their natural slope. The former sugarcane lands also require mowing operations to encourage the establishment of permanent ground cover plants, such as creeping grasses and legumes. Undesirable plants such as rattoon sugarcane and miconia are being eliminated in the process. Much progress has occurred as a result of these activities. For instance, 67 hours were devoted to land leveling, road repairs and conservation ditch maintenance. Hundreds of hours were committed to mowing more than 3,700 acres of the land, much of which affect the impaired water body, Hilo Bay.

All the accomplishments discussed provide specific information to the individual watershed regions. The information obtained will be useful in the event that future projects are implemented in these areas.

5.11 Support of the watershed regional approach through Section 319(h) Projects: The Present and Future

In Hawaii, protecting and restoring a priority watershed is an important criterion in selecting Section 319(h) projects. This is reflected in the State's "Section 319(h) Proposal Evaluation Form", which is used to score project proposals (see Appendix D). As documented in the evaluation form, more points are awarded to Category 1 Watersheds versus non-Category 1 Watersheds (see Appendix C for full Description of Watershed Categories). This indicates the intent of the State to target available resources to watersheds that are in most need of restoration. As an example, four out of eight projects receiving Section 319(h) funds in 1997 and three out of six receiving Section 319(h) funds in 1998 were Category I Watersheds, respectively. The State expects that greater emphasis on high priority areas will result in improved water quality in and around priority watersheds.

Typically, selected projects are based on the primary sources of polluted runoff problems generally encountered, namely, land based activities. For instance, projects addressing agricultural and/or urban activities that cause significant amounts of nonpoint source pollution are favorably considered during the selection process.

For those projects not selected to receive Clean Water Act Section 319(h) funds, there is another option. The DOH Polluted Runoff Control Program can provide money for water quality projects through a low interest loan. The name of the loan program is the State Revolving Fund (SRF). In the past, the State Revolving Fund program would only issue loans to improve or upgrade wastewater facilities. However, funding through this program is now more flexible. For instance, new water quality projects that have received State Revolving Fund loans include estuary projects and nonpoint source projects.

In 1998, the DOH Wastewater Branch, assisted by DOH Polluted Runoff Control Program, revised its SRF loan eligibility to accommodate funding of nonpoint source control projects. Currently only county or State agencies are eligible for such loans. The DOH Polluted Runoff Control Program will continue to work with DOH Wastewater Branch to initiate broader use of these funds to nonprofits or to specific associations to further implement best management practices in agricultural, wetland and urban sectors. Annually, DOH staff meets with county agencies to encourage their application for SRF funds for nonpoint source projects. The staff will look for innovative ways to further promote SRF loan use, such as distribution of a video displaying unique activities undertaken for watershed restoration funded by SRF or request to meet with county councilmembers to explain the program.

5.12 TMDL implementation/development

Total Maximum Daily Loads (TMDLs) indicate the maximum quantity of a pollutant that can enter a water body without adversely affecting the beneficial uses of the water body. TMDLs take into account all point and nonpoint sources of pollution in a watershed, as well as the physical characteristics of the water body itself. Once TMDLs are established, they can be used to assess the effectiveness of best management practices in a particular watershed region. Water quality monitoring should be carried throughout best management practice implementation and after implementation is complete.

The DOH Polluted Runoff Control Program intends to coordinate the five priority watershed region projects (identified in *The Hawaii Unified Watershed Assessment*) with existing monitoring activities of the DOH Clean Water Branch. The DOH Clean Water Branch has produced their FY-2000 Water Pollution Control Program (CWA 106) Work Plan, which indicates their current monitoring strategy. For example, the work plan documents how the DOH Clean Water Branch intends to establish baseline conditions of chemical, physical and biological indicators in watershed regions in order to characterize the impacts of pollution occurring in regional watersheds and its impact on receiving waters and coastal marine environments.

The DOH Clean Water Branch will establish Total Maximum Daily Loads on Oahu streams: Waimanalo stream during 1999-2000, and Kapaa and Kawa streams during 2000-2001. Information from these monitoring and assessment activities will be useful for the Polluted Runoff Control Program because a priority watershed region is associated with these streams. The Koolaupoko watershed region includes Waimanalo, Kapaa and Kawa streams, and the

receiving waters of Waimanalo Bay, Kawainui Marsh/Kailua Bay, and Kaneohe Bay, respectively.

The DOH will develop a strategy to complete and implement Total Maximum Daily Loads for the State's section 303(d) listed waters by 2012. The State and the EPA are currently developing a schedule to complete the TMDLs. The State will use the information generated from the TMDLs to target programs and projects to address the major sources of polluted runoff.

To complete each Total Maximum Daily Load, the State will follow these steps:

1. collect and evaluate existing water quality data;
2. develop and apply numerical models, if necessary;
3. establish the Total Maximum Daily Load;
4. prepare an implementation plan;
5. issue a public notice;
6. submit to EPA for approval; and
7. implement Total Maximum Daily Load plan

In summary, the State will use information from the priority watersheds, Total Maximum Daily Loads, and other watershed projects around the State to review priorities periodically. The State will also continue to rely on the input of government agencies, businesses, and non-government organizations to develop and adjust priorities. The State expects these projects and partnerships to provide a wealth of information that will lead to more effective implementation and corresponding improvements in water quality.

Summary of Activities by Year

2000
- Continue restoration activities for Ala Wai Watershed Region (Oahu).
- Continue restoration activities for Pelekane Bay Watershed Region (Hawaii).
- Continue restoration activities for West Maui Watershed Region (Maui).
- Complete WRAS and start restoration activities for Nawiliwili Watershed Region (Kauai).
- Complete WRAS and start restoration activities for South Molokai Watershed Region (Molokai).
- DOH Clean Water Branch will establish Total Maximum Daily Loads on Waimanalo Stream.
- Complete WRAS for Koolaupoko Watershed Region (Oahu).
- DOH Clean Water Branch will begin to determine the Total Maximum Daily Loads of Kawa Stream.

2001
- Continue restoration activities for Ala Wai Watershed Region (Oahu).
- Continue restoration activities for Pelekane Bay Watershed Region (Hawaii).
- Continue restoration activities for West Maui Watershed Region (Maui).
- Continue restoration activities for Nawiliwili Watershed Region (Kauai).
- Continue restoration activities for South Molokai Watershed Region (Molokai).
- Start restoration activities for Koolaupoko Watershed Region (Oahu).
- DOH Clean Water Branch will establish Total Maximum Daily Loads of Kawa Stream.

2002
- Evaluate restoration activities for Ala Wai Watershed Region (Oahu)
- Continue restoration activities for Pelekane Bay Watershed Region (Hawaii).
- Continue restoration activities for West Maui Watershed Region (Maui).
- Continue restoration activities for Nawiliwili Watershed Region (Kauai).
- Continue restoration activities for Koolaupoko Watershed Region (Oahu).
- Continue restoration activities for South Molokai Watershed Region (Molokai).
- DOH Clean Water Branch will begin to determine the Total Maximum Daily Loads of a stream or set of streams (currently unidentified) $^{\Delta}$.

2003
- Complete restoration activities for Pelekane Bay Watershed Region (Hawaii) and evaluate project.
- Complete restoration activities for West Maui Watershed Region (Maui) and evaluate project.
- Continue restoration activities for South Molokai Watershed Region (Molokai).
- Continue restoration activities for Nawiliwili Watershed Region (Kauai).

Δ Will occur annually.

- Continue restoration activities for Koolaupoko Watershed Region (Oahu).
- DOH Clean Water Branch will establish Total Maximum Daily Loads of a stream or set of streams (currently unidentified)$^{\Delta}$.
- Begin implementation of projects for the second tier watershed regions in Category I (Phase II of the State's Unified Watershed Assessment).

2004
- Complete restoration activities for South Molokai Watershed Region (Molokai) and evaluate project.
- Complete restoration activities for Nawiliwili Watershed Region (Kauai) and evaluate project.
- Complete restoration activities for Koolaupoko Watershed Region (Oahu) evaluate project.
- DOH Clean Water Branch will begin to determine the Total Maximum Daily Loads of a stream or set of streams (currently unidentified).

2008
- Begin implementation of Phase III of Hawaii's Unified Watershed Assessment for Category I watersheds.

2012
- Complete Total Maximum Daily Loads for water bodies on the State's 303(d) list.

2013
- Complete restoration activities for Phase III of Hawaii's Unified Watershed Assessment for Category I watersheds.

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CHAPTER 6
STATE IMPLEMENTING STRATEGIES AND PLANS

In *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (CNPCP), the State described regulatory and non-regulatory mechanisms to address 57 management measures and included recommended actions. NOAA and EPA conditionally approved Hawaii's program and required the State to meet the conditions by 2003. The State must also submit 15-year strategies and 5-year implementation plans for the six nonpoint source categories identified in the Management Plan – agriculture, forestry, urban areas, marinas and recreational boating, hydromodifications, and wetlands and riparian areas. This chapter lays out the State's 15-year strategies and 5-year implementation plans and serves as a road map for Hawaii to reach its three long-term goals by 2013.

To fully implement the management measures for each nonpoint source category, the State will address the management measures in phases. In Phase I, 2000-2003, the State will focus on developing mechanisms to implement priority management measures identified by the State with input from the Counties, stakeholder groups, and Federal agencies. Although current State priorities focus on agricultural and urban area management measures, the State intends to gradually increase the focus on the other four categories as agricultural and urban measures are put in place. To maintain impetus, however, one or two management measures from the four other categories will be carried out in the 2000-2001 period. The availability of funds and technical assistance will influence the pace at which the State addresses management measures.

Because Hawaii's Coastal Nonpoint Pollution Control Program builds on existing mechanisms implemented by numerous agencies and resource users, the program relies on the cooperation and coordination among these entities. Polluted Runoff Forum participants and the focus groups for each nonpoint source category will continue to play important roles in the development of Hawaii's program. To maximize the participation and effectiveness of these focus groups statewide, the State will use a variety of communication mechanisms such as e-mail, tele/video conferencing, and meetings hosted by other partner agencies to facilitate the work of the focus groups. For FY00-01, CZM-Hawaii has received authorization to expend annual work funds of $12,000 to support focus group travel and tele/video conferencing.

The 1996 CNPCP lists the management measures for each category of nonpoint source pollution, and the programs, best management practices, and regulatory authorities for each management measure. A list of all of the management measures can be found in Appendix G. Sections 6.1 to 6.6 build on the information in the management plan and include the following:

(1) 15-year program strategies for the six nonpoint source pollution categories;
(2) A list of the management measure titles for each category and the phases in which the State will address them;
(3) NOAA and EPA's findings and conditions for the management measures; and
(4) 5-year implementation plans.

Although NOAA and EPA accepted the idea that enforceable policies[1] "may be established through state, regional or local authorities"[2], many of Hawaii's management measures received only conditional approval from NOAA and EPA because the federal agencies did not feel that the existing enforceable policies and mechanisms, even if they applied at the county level, provided statewide backup authority. In October 1998, NOAA and EPA issued an additional Guidance that an opinion issued by the State's Attorney General verifying that State enforcement authorities can be used to prevent nonpoint pollution and require management measure implementation would meet the requirement for statewide backup authority. Consequently, CZM-Hawaii will seek such an opinion in August 2000. The request will focus specifically on HRS chapters 205A, 342D, and 342E.

If the Attorney General's opinion does not confirm such generalized application of these statutes, then implementing actions will be taken (see Tables 6-1 through 6-6) in each of the six nonpoint source categories to create some form of statewide enforceable policies.

The Hawaii CZM Program found that focus groups and subcommittees were extremely important in developing the CPNCP and plans to use a similar approach in carrying out the Implementation Plan. Following that model:

Focus groups will be established for each §6217 management measure category, e.g., agriculture or urban. All known organizations with an interest in the topic area (e.g., Hawaii Farm Bureau Federation) will be invited to become members. In addition, a solicitation will be sent to all persons who attended public information meetings inviting them to participate in one or more focus groups. Membership will remain open after the groups begin meeting. Focus groups will continue to meet throughout the 15-year implementation period or until the group agrees to disband. A full range of communication possibilities from personal to electronic will be developed for the focus groups.

Subcommittees will be formed within a focus group to work on a specific topic (e.g., a nutrient management subcommittee in the agriculture focus group).

Notes on Chapter 6, "State Implementing Strategies and Plans"

Readers who reviewed the draft will note that the sections in Chapter 6 that cover the six management measure categories have been modified.

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1 Enforceable backup policies and mechanisms were defined in the *Coastal Nonpoint Pollution Control Program: Program Development Approval and Guidance* (NOAA and EPA, 1993, p. 34) by referring to §304(6a) of the federal CZMA where "enforceable policy" is defined as "State policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a State exerts control over private and public land and water uses and natural resources in the coastal zone."

2 *Ibid.*, , p. 35.

More narrative has been added to the 15-year program strategies. A new section listing implementing actions anticipated in each 5-year phase has been added; the actions listed in Phase II (2004-2008) and Phase III (2009-2013) may change as the State's program moves closer to those years and progress on earlier actions can be assessed. Phase II and III actions will not be limited to those appearing in this document.

Within the tables, each subject is given its own letter designation that is used throughout the table for actions related to that subject. In addition, if more than one action is planned for a subject during a given year, each action will be numbered. Thus, if "Pollution Prevention Plan (PPP)" is designated "B" and three actions for that subject are planned in 2001, the actions would be designated B1, B2, and B3 under the year 2001. If action B1 continues to 2002, it still will be designated as B1. If "Pollution Prevention Plan" has a new section in 2001, it will be designated B4.

6.1 Agriculture

15-year Program Strategy: The State's strategy seeks to link agricultural programs and back-up authorities to the three long-term goals and the appropriate short-term goals. Through the phasing described below, the State seeks to fully implement by 2013 the agricultural management measures contained in Hawaii's CNPCP.

Phase I: By 2003, the State intends to develop a non-regulatory pollution prevention program (PPP) for agricultural operations to address the agricultural management measures on a statewide basis. During this period, the State will seek to expand watershed restoration action strategies, and total maximum daily loads will be used to determine the appropriate government programs, best management practices, and educational programs needed to meet water quality goals.

Every fifth year, the State will assess, using quantitative and qualitative evaluation methods, the degree to which application of agricultural best management practices led to water quality improvements. Water quality monitoring data will be one measure used in the evaluation. In addition, the State will measure the amount of acreage operating under an approved PPP, as well as the number of operators with an approved Plan. The State will evaluate the incentives and disincentives to participate in the PPP. The State will also update its monitoring and tracking plan for implementation of the 6217 management measures. Upon completion of the evaluations, the State will develop an implementation plan for the 5-year Phase II period.

Phase II: This Phase will continue to direct watershed initiatives, watershed restoration action strategies, identification of additional priority watershed, TMDL development, and implementation of other State programs toward meeting the long-term goals (see Chapter II) and to expand the implementation of agricultural management measures.

The evaluation, assessment, and updating process described under Phase I will be used to develop the Phase III 5-year implementation.

Phase III: Similar methods will be used to evaluate whether the previous five year implementing actions have improved water quality. During this Phase, the State will continue to direct watershed initiatives, watershed restoration action strategies, identification of additional priority watersheds, TMDL development, and implementation of other State programs toward meeting the long-term goals. It will also ensure that all the agricultural management measures in the CNPCP have been cumulatively implemented on a statewide basis.

The agricultural management measures are not the only ones that apply to agricultural operations. Some of the measures under hydromodifications and wetlands also apply. As the various activities in the 5-year Implementation Plan for agriculture (Table 6-1) are carried out, these linkages will be addressed.

One wetlands-agriculture connection occurs in the Food Security Act, which involves the Natural Resources Conservation Service (NRCS) in making wetland determinations/ delineations

when requested by cooperator and permitted by the landowner. "Swampbuster" provisions of the Act make cooperators ineligible for USDA benefits if, after a certain date, they manipulate or convert a wetland to increase agricultural production.[3]

6.1.1 Management Measures for Agriculture[4]

- Erosion and Sediment Control Management Measure (Phase I)
- Management Measure for Wastewater and Runoff from Confined Animal Facility (Phase I)
- Nutrient Management Measure (Phase I)
- Pesticide Management Measure (Phase I)
- Grazing Management Measure (Phase I)
- Irrigation Water Management Measure (Phase I)

6.1.2 Finding and Conditions for Agricultural Management Measures

Finding: NOAA and EPA determined that 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. They also found that 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[5].

Condition: Within 3 years, the State must include management measures in conformity with the 6217(g) guidance for (1) erosion and sediment control, (2) nutrient management, and (3) grazing. Within one year, the State must develop a strategy to implement the agricultural management measures throughout the State and develop a monitoring plan and credible survey tools.

6.1.3 5-Year Implementation Plan

The State will focus on the development of a voluntary, non-regulatory program and a back-up authority for agricultural operations and lands. The State seeks to develop a non-regulatory program, called the Pollution Prevention Plan (PPP) program, that builds upon the success of conservation plans currently prepared by operators, approved by Soil and Water Conservation Districts (SWCDs), with technical assistance from Natural Resource Conservation Service (NRCS), the University of Hawaii's Cooperative Extension Service (CES), and the

3 Personal communication, Terrell Kelley, NRCS, to Susan Miller, June 18, 2000 .

4 Pages III-10 through III-54 in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* describes the management measures below, their applicability, appropriate management practices, existing implementation mechanisms, and recommended implementing actions.

5 The "6217 management area" in Hawaii is coterminous with the coastal zone management area, which is the entire state and the coastal waters to the limits of the State's jurisdiction.

Department of Agriculture (DOA). The proposed PPP program is described in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (CNPCP) (Figure III-1, page III-48) and is diagrammed on page 6-7. The State is committed to working with the agricultural community to develop a PPP program that is appropriate to Hawaii's environmental and economic conditions and that meets water quality goals.

The PPP program will target the major sources of polluted runoff from agricultural activities by working with land users to develop erosion, nutrient, pesticide, irrigation, confined animal facility, and grazing plans where appropriate. The State expects this program to improve water quality where runoff from agricultural areas impacts section 303(d)-listed waters and in areas where significant threats to water quality are present. The State also expects the program to address the transition from large-scale pineapple and sugar operations to smaller, diversified agricultural farms. The local SWCD will identify management practices that best control wastes and reduce pollutant source within its jurisdiction. The host SWCD will also play a very important role in educating new farmers and the local community about water quality and land management practices.

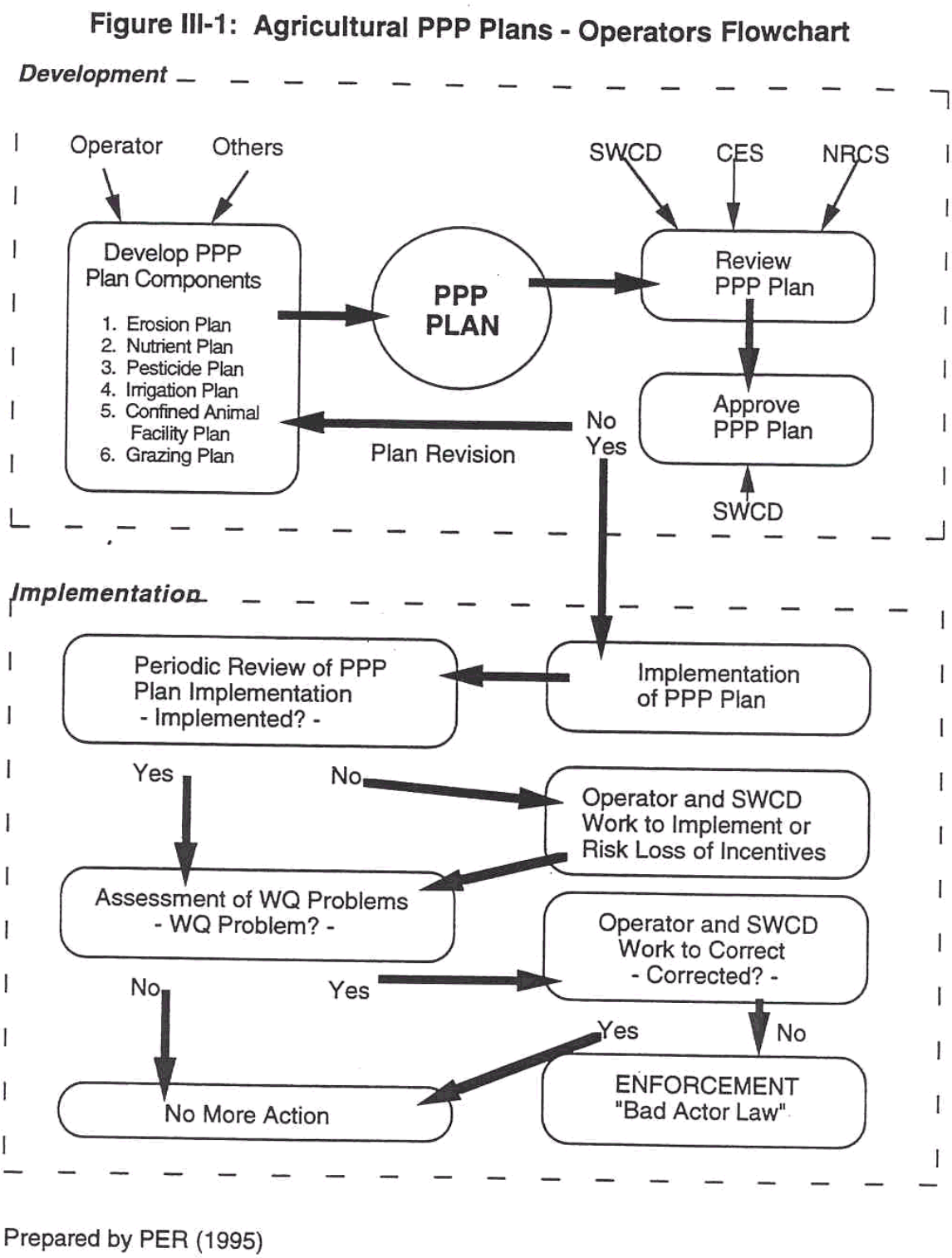

Figure 6-1: Pollution Prevention Plan Diagram
Source: CNPCP, (Figure III-1, page III-48)

The State seeks to develop the PPP program through a pilot project that will allow partner agencies and agricultural operators to adjust and revise the program to maximize its effectiveness and efficiency. The program will rely on the expertise within the local SWCD and agricultural community to guide implementation activities. Because preliminary estimates indicate substantial resources will be necessary to implement the proposed program statewide (estimated to be up to $1.6 million), one of the products of the PPP pilot project will be to quantify these resource needs.

While the mission of the SWCDs can accommodate the expanded requirements of the voluntary PPP program, current levels of funding and technical expertise are not adequate enough to review, approve, and update existing conservation plans in a timely fashion. The State recognizes that funding levels for SWCDs and NRCS must increase significantly in order for the Districts to accept and implement these additional responsibilities. In addition, the State will consider adopting other incentives that will encourage land operators to participate in the PPP program. Furthermore, implementation of the PPP program will require a MOA with each SWCD and the agencies that will provide technical assistance.

An Agricultural Focus Group (AFG) - consisting of agencies, SWCDs, and other agricultural interests - will advise the Office of Planning (OP) and Department Health (DOH) on the development of the scope of the PPP pilot project and provide technical assistance. The AFG will function like the previous focus group that helped the State to develop *Hawaii's Coastal Nonpoint Pollution Control Management Plan.*

Most of the AFG's meetings will be held on Oahu, but OP and DOH will explore ways to enhance the participation of neighbor island representatives. These may include e-mail groups, faxes, conference calls, video conferencing, and neighbor island meetings. OP and DOH will also seek to prepare a Memorandum of Understanding with other agencies such as NRCS, DLNR, DOA, CES, Hawaii Association of Conservation Districts, and the Department of Land and Natural Resources (DLNR). The AFG may decide to divide into subgroups either geographically (by county), by agricultural use (grazing, large-scale mono-crop, small-scale diversified crops, etc.), or by water quality issue (sedimentation, nutrients, pesticides, etc.).

The State will provide information on the use of best management practices (BMPs) and methods to build partnerships to support the PPP project. Depending on the priorities set by the Agricultural Focus Group, the State will encourage the development and use of:

1. educational programs such as HAPPI (Hawaii's Pollution Prevention Information Project (the Hawaii version of Farm*A*Syst)).
2. an operators handbook describing the PPP program;
3. training materials;
4. BMP information; and
5. model pollution prevention plans for various crop categories.

As the statewide program develops at the conclusion of the pilot project, the components of pollution prevention plans will be linked into water quality goals. In the State's priority

watershed regions, for example, the PPP program will be incorporated into watershed restoration action strategies, total maximum daily loads (TMDLs), or other water quality goals identified by a SWCD, local watershed council, or the State. Water quality monitoring data and tracking the use of BMPs will be used to determine the effectiveness of the PPP program. Each local SWCD will have the flexibility to adjust the PPP program to address the major concerns in each district.

As identified in NOAA and EPA's Findings and Conditions, the State has not demonstrated the ability of back-up authorities to ensure implementation of the management measures throughout the 6217 management area. Hawaii's CNPCP Management Plan recommends the passage of a "Bad Actor Law" that would take effect against agricultural operators who have not cooperated with the PPP Program through the local SWCD and have not made a good faith effort to improve their operations. Should the State Attorney General confirm NOAA and EPA's Finding, the State will develop a Bad Actor Law modeled after the one proposed by the National Association of Conservation Districts. The State will rely on the Agricultural Focus Group and other agricultural interests to guide the development of the Bad Actor Law during Phase I. The State will also clearly define the role of the SWCDs in implementing the volunteer, non-regulatory PPP program.

Federal guidance for development of the CNPCP allowed states to create alternatives to the management measures provided by NOAA and EPA so long as a state also could show that the alternative was as effective at reducing polluted runoff as the federally proposed measure. As noted on page 6-4 under "Findings," Hawaii proposed three alternative agriculture management measures: erosion and sediment control, nutrient management, and grazing. NOAA and EPA indicated that the State would have to provide more information before they could judge the effectiveness of these alternatives.

CZM-Hawaii has received authorization to expend $39,000 to develop the required information for the alternative erosion and sediment control management measure and $4,000 to do the same for the alternative nutrient management measure. CZM Hawaii intends to have the two tasks completed by July 2001.

In summary, by 2003 the State will develop a non-regulatory PPP program for agricultural use, backed up by regulatory authorities. An Agricultural Focus Group consisting of agencies and agricultural interests will advise the State on how to develop these mechanisms designated to implement the management measures. These mechanisms will apply to all agricultural lands in the State, whether publicly or privately owned. More funds must be secured to fully develop and implement the State's PPP program.

Table 6-1
Agricultural Management Measure Implementation Plans for 2000-2003

Year	Activity/Outcome	Facilitating Agency	Support
2000 A	*Agricultural Focus Group (AFG)* ➢1 Establish and convene AFG.	OP, DOH	Members of previous AFG, State, county, and federal agencies, interested public and private sector organizations
B	*Pollution Prevention Plan pilot project* ➢1 Select site for PPP pilot project. ➢2 Complete list of incentives and disincentives to participate in the PPP program. ➢3 Establish the scope of the PPP pilot project, recommend priority projects, and address other issues such as liability issues. ➢4 Secure commitments for the PPP pilot project from host SWCD, NRCS, CES, DOA, DOH, and OP.	OP, DOH	Host SWCD, NRCS, CES, DOA, DHHL, AFG
C	*State erosion control standards and acceptable levels of treatment* ➢1 Begin process to develop State erosion control standards. ➢2 Begin process to develop acceptable levels of treatment.	OP	DOH, AFG, NRCS, CES, DHHL
D	*Alternative management measure justification* ➢1 Prepare documentation to justify alternative management measures for erosion and sediment control, nutrient, and grazing management measures.	OP	CES, NRCS

Year	Activity/Outcome	Facilitating Agency	Support
2001 A	*Agricultural Focus Group (AFG), cont'd* ➢2 Implement priority projects identified by the Agricultural Focus Group. ➢3 Review management practices for vacant agricultural lands.	OP, DOH	AFG DLNR, HACD, SWCDs, AFG
B	*Pollution Prevention Plan pilot project, cont'd* ➢5 Begin evaluation of Pilot PPP project. ➢6 Determine the technical, educational, and human resources necessary to fully implement the PPP program statewide. ➢7 Develop a strategy to implement the PPP program statewide.	DOH, OP	*Partner agencies and organizations
C	*State erosion control standards and acceptable levels of treatment, cont'd* ➢3 Complete State erosion control standards. ➢4 Determine acceptable levels of treatment.	OP	DOH, AFG, NRCS, CES
E	*Enforceable policies and mechanisms* ➢1 If Attorney General's opinion indicates that existing authorities are not sufficient, draft bad actor law or other appropriate back-up authority for PPP and have all interested parties review draft. ➢2 Demonstrate the ability of the proposed authority to ensure implementation of the management measure throughout the State.	OP, DOH	AFG, partner agencies and organizations
2002 A	*Agricultural Focus Group (AFG), cont'd* ➢4 Implement priority projects as identified by the Agricultural Focus Group.	OP, DOH	AFG
B	*Pollution Prevention Plan pilot project, cont'd* ➢8 Complete PPP pilot project evaluation. ➢9 Introduce legislation to implement the PPP program and establish non-regulatory PPP program statewide with appropriate back-up authorities. ➢10 Develop tracking mechanisms to monitor the effectiveness of Pollution Prevention Plans.	OP	AFG, DOH, HACD, CES, NRCS, DHHL, partner agencies and organizations

* Partner Agencies includes those listed in the table above, the four Counties, other Federal agencies with related programs for agriculture, and other State agencies with related programs for agriculture including the Office of Hawaiian Affairs and the Department of Hawaiian Home Lands

Year	Activity/Outcome	Facilitating Agency	Support
2002 cont'd E	*Enforceable policies and mechanisms, cont'd* ➢3 Introduce proposed back-up authority in the State legislature.	DOH	
F	*State land lease requirements* ➢1 Revise State land leases requirements to be consistent with the PPP program, Bad Actor Law, and water quality goals. ➢2 Lengthen duration of leases to ensure that agricultural operators realize the long-term benefits for installing polluted runoff controls.	OP	DLNR, AFG, DHHL
2003 G	*Evaluation of outcomes in this 5-year implementation plan and preparation of next 5-year plan* ➢ Evaluate the State's progress towards meeting long-term goals. ➢2 Update the State's 15-year strategy and prepare a 5-year plan.	OP, DOH	AFG

6.2 Forestry

15-year Program Strategy: The State proposes to link forestry programs, best management practices, and education and training programs to water quality goals. As forestry operations increase on former sugar and pineapple lands, the State intends to ensure that polluted runoff control mechanisms are adequate to ensure that water quality goals are attained. The State will also link the management of conservation areas to water quality goals. The phasing described below is intended to result in implementing the forestry management measures contained in Hawaii's CNPCP statewide by 2013.

Phase I: The State will work to achieve widespread implementation of the forestry management measures through BMP implementation and tracking, incentives and technical assistance programs, inclusion of forestry operations into watershed restoration planning and activity, and incorporation of requirements for management plans and BMPs into leases of state land for forestry operations. If needed after AG's opinion (see page 6-2), establish back-up authorities to ensure statewide implementation.

An evaluation, assessment, and updating process similar to that described under the agriculture category Phase I section (Page 6-3) will be used to develop the Phase II 5-year implementation plan.

Phase II: As experience is gained and forestry operations in Hawaii grow, the State will either expand the PPP program to include forestry operations or develop another program to achieve the same ends through a voluntary program with enforceable backup. The same evaluation, assessment, and updating process described above will be used to develop the Phase III 5-year implementation plan.

Phase III: Similar methods will be used to evaluate whether the previous five-year implementation plans have improved water quality. Actions during this Phase will also ensure that all the forestry management measures in the CNPCP have been cumulatively implemented on a statewide basis by 2013.

6.2.1 Management Measures for Forestry

- Preharvest Planning Management Measure (Phase II)
- Streamside Management Zones (SMZs) (Phase II)
- Road Construction/Reconstruction Management Measure (Phase II)
- Road Management (Phase II)
- Timber Harvesting (Phase II)
- Site Preparation and Forest Regeneration Management Measure (Phase II)
- Fire Management (Phase II)
- Revegetation of Disturbed Areas (Phase II)
- Forest Chemical Management (Phase II)
- Wetlands Forest Management (Phase II)

6.2.2 Findings and Conditions

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.

Condition: Within 5 years, the State must include in its CNPCP forestry management measures in conformity with the 6217(g) guidance. Within one year, the State must prepare a monitoring plan and credible survey tools that enable the State to assess over time the extent to which implementation of forestry management measures are reducing pollution loads and improving water quality. Within one year, the State must develop a strategy to implement the management measures for forestry throughout the 6217 management area. This strategy must 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.

It is worth noting that since the above "Finding" was written, the State's Division of Forestry and Wildlife published *Best Management Practices for Maintaining Water Quality in Hawaii* in June 1998. The State now requires BMPs in Forest Stewardship contracts and leases of State lands for forestry operations.[6]

6.2.3 5-Year Implementation Plan

In *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (CNPCP), the State proposes to build on existing forestry programs and develop mechanisms to ensure that the appropriate BMPs are used. By 2003, the State intends to link forestry programs operations to enforceable back-up authorities to implement the forestry management measures and meet the conditions placed by NOAA and EPA.

To participate in certain forestry programs sponsored by Federal or State agencies, landowners submit forestry management plans. On agricultural lands, operators must prepare conservation plans for grading and grubbing activities, which is approved by the local Soil and Water Conservation District, to receive a waiver from the grading permit. The Pollution Prevention Plan (PPP) program intends to build on these existing programs and develop a non-regulatory program that will require approved forestry management plans in order to participate. The proposed PPP program is described in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan (CNPCP)* and in Section 6-1 of this Plan. The State is committed to working with the forestry community to develop a PPP program that is appropriate to Hawaii's environmental and economic conditions and that meets water quality goals. Consequently, the

6 Personal communication, Carl Masaki, Forestry Program Manager, DOFAW, to Susan Miller, June 7, 2000.

State will continue to rely on the expertise of the Forestry Focus Group to guide the implementation of the management measures.

The State intends to include forestry programs in watershed restoration action strategies. In priority watersheds that may have an impact on coastal water quality, all agencies and land users will be encouraged to participate in the development of these strategies to ensure that water quality goals, Total Maximum Daily Loads (TMDLs), or other stated objectives are met. Where possible, agencies and organizations will target their resources to achieve these goals. The State also seeks to establish methodologies to evaluate the effectiveness of best management practices and track their use. The State will use successful private/public partnerships agreements, such as the ones forged between the State, private land owners, and The Nature Conservancy of Hawaii in several conservation areas around the State, as models for developing and implementing watershed restoration action strategies that include forested lands.

Because commercial forestry operations have only recently expanded in Hawaii, the State will have more information towards the end of Phase I to determine the appropriate BMPs and back-up authorities needed to ensure implementation of the management measures statewide. To adequately address the State's priority categories of urban and agriculture areas, forestry management measures will primarily be addressed in Phase II.

Table 6-2
Forestry Management Measure Implementation Plans for 2000-2003

Year	Activity/Outcome	Facilitating Agency	Support
2000 A	*Forestry Focus Group* ➢1 Establish and convene Forestry Focus Group (FFG).	OP, DOH	Members of previous FFG, State, county, and federal agencies, interested public and private sector organizations FFG
	➢2 FFG evaluate the State's ability to achieve widespread implementation of the management measures.	OP, DOH	
B	*Best Management Practices* ➢1 Examine data on BMPs and their use in voluntary forestry programs and review forestry policies and guidelines.	OP	FFG, DOH, DLNR, HFCI, HFIA
C	*Unified Watershed Assessment* ➢1 Assess coordinated efforts in Unified Watershed Assessment priority areas. ➢2 Incorporate forestry programs into watershed restoration action strategies in priority watersheds, where appropriate.	DOH	OP, NRCS, DLNR, Host SWCD or Watershed Council
2001 A	*Forestry Focus Group, cont'd* ➢3 Determine the effectiveness of and the need for tree farm property tax classification, research programs, educational programs, and technical assistance for forestry operations. ➢4 Develop options to implement the forestry management measures by 2003 and link forestry operations to long- term goals.	OP	FFG, DOH, DLNR, HFIA, HFCI
C	*Unified Watershed Assessment, cont'd* ➢3 Implement watershed restoration action strategies.	DOH	Host SWCD or Watershed Council

Year	Activity/Outcome	Facilitating Agency	Support
2002 A	*Forestry Focus Group, cont'd* ➢5 Develop options to track the use of BMPs. ➢6 Determine costs of implementing recommendations. ➢7 Determine feasibility of including forestry operations on former agricultural lands into the PPP program.	OP	FFG, DLNR, DOH
B	*Best Management Practices, cont'd* ➢2 Incorporate forestry management plans and BMP requirements into State leases for forestry operations.	DLNR	OP, DOH
2003 B	*Best Management Practices, cont'd* ➢3 Establish process to track BMP implementation.	OP, DOH	FFG, DLNR
D	*Back-up authorities* ➢1 If Attorney General's opinion[7] indicates a need to do so, establish back-up authorities to ensure statewide implementation of the management measures.	OP, DOH	FFG, DLNR
E	*Evaluation and update of Plan* ➢1 Evaluate the State's progress towards meeting long-term goals. ➢2 Update the State's 15-year strategy and prepare the next 5-year plan.	OP, DOH, FFG	DLNR
F	*Identification of support sources* ➢1 Identify existing programs and funding sources to support implementation of the forestry management measures in the 2004-2008 period.	FFG	

HFIA – Hawaii Forestry Industry Association
HFCI – Hawaii Forestry and Communities Initiative

7 See Page 6-2.

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6.3 Urban Areas

Introduction: Although urban areas make up a small portion of Hawaii's land, the majority of residents occupy these regions and most urban population centers are along the coast. As an example, 89% of residents live in urban areas, which account for only 10% of all land areas in the State (DBEDT 1994). Such density can impair the surrounding environment as well as water quality in streams, coastal, and estuarine waters.

To minimize pollution associated with the impacts of urbanization, the State must implement a set of *urban* management measures. The management measures apply the best available and cost-effective technology to reduce polluted runoff associated with urban activities and development. The names of the sixteen (16) urban management measures and the scheduled phases for their implementation are listed in section 6.3.1. The text of each urban management measure appears in Appendix G of this document. For a complete description of the urban management measures, their applicability, appropriate management practices, existing implementation mechanisms, and recommended implementing actions, please refer to Part III of *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* (CNPCP).

It must be noted that the State plans to revise Hawaii Administrative Rules Title 11, Chapter 55 - *Water Pollution Control* to adopt the federal Storm Water Phase II Final Rule and implement the strategy in the NPDES permitting program as early as March 2003. This will require additional operators of municipal separate storm sewer systems (MS4's) in urbanized areas and operators of small construction sites to implement practices to control polluted storm water runoff. It is expected that the jurisdictions covered under the phase II program will no longer be subject to the management measures of the Coastal Nonpoint Pollution Control Program. For areas not covered under the NPDES permitting program, the State will implement the following strategy to meet all the management measures.

15-year Program Strategy: The State's strategy will link programs and projects to the three long-term goals and the appropriate short-term goals.[8] The State will link best management practices, educational programs, regulatory programs, and water quality monitoring to water quality goals or Total Maximum Daily Loads where appropriate. Effectiveness of best management practices and educational programs will be linked to water quality improvements. The State will also promote the inclusion of present and future nonpoint source concerns into development plans, economic development plans, and community development plans at the State and County levels. The State will also advocate for provisions to reduce sources of nonpoint pollution, maintain or increase the amount of permeable surfaces, and minimize the amount of impermeable surfaces.

Phase I: Since urban activities contribute significantly to polluted runoff in Hawaii, most implementation activities for this category will occur during Phase I. These activities include convening an Urban Focus Group and developing a memorandum of agreement with specific partners to identify roles and responsibilities aimed at controlling polluted runoff from urban

8 See page 2-7 *et seq.*

related activities. In addition, the Attorney General will determine whether the State has backup enforcement authorities[9] that can be applied to satisfy all urban management measures. Based on the review, the focus group will guide activities that will address and eliminate gaps in enforceable policies and mechanisms so that all urban management measures are met.

During Phase I, the State will also conduct a study that describes, compares and contrasts the requirements for siting, construction, operation and maintenance of roads, highways, and bridges under county and State jurisdiction. A request for proposals will be advertised and a contractor will be selected in 2001. The contractor will then carry out the study and analyze the effectiveness of both county and State processes for siting, construction, and operation and maintenance requirements. By 2002, the State will provide recommendations, as needed, for improving the processes to make them consistent with the management measures so that the State will have an approvable approach for all roads, highways, and bridges.

With respect to the Pollution Prevention management measure, the State will implement findings and recommendations developed from the DOH pollution prevention pilot project with hotels. DOH will work with the Maui Hotel Association, Hawaii Hotel Association, Hawaii Tourism Authority, Waikiki Improvement Association, and county visitor bureaus to further implement pollution prevention in the hotel industry. Tools will be developed to educate visitors about environmentally friendly ways that they can interact with Hawaii's unique land and ocean resources. These tasks will also be completed during Phase I.

The DOH Solid and Hazardous Waste Branch (SHWB) will also target public education and outreach strategies in the major urban and agricultural sectors such as repair shops, construction firms, general contractors' associations, military facilities, and farming associations. This will provide the groups with alternatives to current activities in order to minimize excessive pollution to streams and waterbodies. The DOH SHWB will provide this service through workshops and reprinting of *The Hawaii Guide to Alternatives & Disposal of Household Hazardous Wastes*.

A major activity that will help satisfy the New Development management measure is to use reliable computer runoff models to predict runoff rates so that measures can be applied to maintain postdevelopment peak runoff rates and average volumes at levels similar to predevelopment levels. A computer model to predict erosion and runoff rates is currently being developed for the Waimanalo watershed and is scheduled to be completed during Phase I. The model is expected to work in other watersheds throughout the State. The State's implementation of the federal Storm Water Phase II Final Rule will also help to satisfy the requirements for this management measure since both structural and nonstructural measures are employed to mitigate the adverse impacts of storm water associated with new developments.

During Phase I, the State also intends to develop an Urban BMP manual. This manual will describe the BMPs in urban areas for runoff from new development, watershed protection, site development, construction activities, existing development, onsite disposal systems and

9 See Page 6-2.

roads, highways and bridges. The project will begin in 2002 and will include the following for each BMP:

- Total Suspended Solids (TSS) removal efficiency (average, reported range, and probable range depending on soil type;
- land requirement;
- construction cost (average, reported range, and probable cost);
- useful life; and
- annual operation and maintenance (O&M) needed and total annual cost to standardize polluted runoff acceptable practices and assist contractors in selecting appropriate practices that are applicable statewide.

During Phase I, the State will continue to carry out its Unified Watershed Assessment (UWA)[10] and Watershed Restoration Action Strategies programs. These are major watershed activities to reduce the generation of nonpoint source pollutants associated with all polluted runoff categories, including those identified in the urban sector. The State will evaluate completed watershed projects and continue to implement other watershed projects in the next tier of priority areas. This UWA process is a comprehensive watershed protection program that addresses those watersheds in greatest need of restoration and will continue to work on other priority watersheds scheduled to follow. It is a statewide process that will likely continue through all three Phases of the implementation plan as funding permits.

Finally, to order to have statewide consistency on erosion control ordinances, in Phase I the State will work with counties to revise their erosion control standards to a level consistent with the New Development Management Measure, as Maui County and the City & County of Honolulu have already done. This will be for areas not covered in federal Storm Water Phase II rules. The State's urban focus group made up of county, construction industry, land use experts, and Hawaii Water Environment Association will assist in developing county erosion control standards and developing educational materials, as well as training to facilitate implementation and compliance with the revised standards. The State will also develop mechanisms to track the implementation and assess the effectiveness of the urban BMPs to enable adequate evaluation of urban management measures.

Phase II: During this phase the State intends to change the language in Chapter 11-62, HAR to specify that "improper disposal of household hazardous or toxic materials, such as motor oil and solvents, is illegal and subject to a stiff fine." Furthermore, the State intends to include language that requires the installation or upgrade of denitrifying OSDS adjacent to nitrogen-limited surface waters where conditions indicate that nitrogen-limited surface waters may be adversely affected by excessive nitrogen loading. This will satisfy the OSDS management measures.

10 See Chapter 5.

Phase III: All implementation activities for the urban management measures will be carried out in the Phase I, with the exception of the OSDS management measures, which, for the most part, are in conformity with the 6217(g) Guidance. Because of this, Phase III activities will solely involve monitoring of the progress of the earlier implementation initiatives and the continued commitment to perform the activities to reduce urban runoff.

6.3.1 Urban Management Measures

- New Development Management Measure (Phase I)
- Site Development Management Measure (Phase I)
- Construction Site Erosion and Sediment Control Management Measure (Phase I)
- Construction Site Chemical Control Management Measure (Phase I)
- Watershed Protection Management Measure (Phase I)
- Existing Development Management Measure (Phase I)
- New Onsite Disposal Systems Management Measure (Phase II)
- Operating Onsite Disposal Systems Management Measure (Phase II)
- Pollution Prevention Management Measure (Phase I)
- Golf Course Management Measure (Phase I)
- Management Measures for Planning, Siting and Developing Roads and Highways
- Management Measure for Bridges (Phase I)
- Management Measure for Construction of Roads and Highways (Phase I)
- Management Measure for Construction Site Chemical Control for Roads and Highways (Phase I)
- Management Measure for Operation and Maintenance of Roads and Highways (Phase I)
- Management Measure for Road, Highway, and Bridge Runoff Systems (Phase I)

6.3.2 Findings and Conditions for Urban Management Measures[11]

Some management measures have identical findings and conditions. Therefore, measures were combined before showing associated findings and conditions.

- New Development Management Measure
- Site Development Management Measure
- Construction Site Erosion and Sediment Control Management Measure
- Construction Site Chemical Control Management Measure

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.

11 See Appendix A, page A-5-6 *et seq.*

Condition: Within 1 year, the State will develop a strategy to implement the management measure through the 6217 management area. Also, within 1 year the State will develop and apply credible survey tools to demonstrate the ability of the State's approach to achieve widespread implementation of this management area. Within 3 years, the State will include in its CNPCP the management measure in conformity with the 6217 (g) Guidance.

- Watershed Protection Management Measure
- Existing Development Management Measure

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.

Condition: Within 1 year, the State will develop a strategy to implement the management measure through the 6217 management area. Also, within 1 year the State will develop and apply credible survey tools to demonstrate the ability of the State's approach to achieve widespread implementation of this management area. Within 3 years, the State will include in its CNPCP the management measure in conformity with the 6217 (g) Guidance.

- New Onsite Disposal Systems (OSDS) Management Measure
- Operating Onsite Disposal Systems (OSDS) Management Measure

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.

Condition: Within 3 years, the State will include in its CNPCP the management measure in conformity with the 6217 (g) Guidance. Also, within 3 years, the State will include in its CNPCP enforceable policies and mechanisms to ensure implementation of the new onsite disposal systems management measure throughout the 6217 management area by adding requirements for denitrifying OSDS, where applicable, and a process that ensures inspection of OSDS at a frequency adequate to ascertain system failure.

- Pollution Prevention Management Measure

Finding: Hawaii's program contains management measures in conformity with the 6217(g) Guidance.

Condition: Not applicable.

- Golf Courses Management Measure

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.

Condition: Not applicable.

- Management Measures For: Planning, Siting and Developing Roads and Highways; Bridges; Construction Projects; Construction Site Chemical Control; Operation and Maintenance; Road, Highway, and Bridge Runoff Systems

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.

Condition: Within 3 years, the State will include in its CNPCP the management measure in conformity with the 6217 (g) Guidance. In addition, within 3 years, the State will include in its CNPCP enforceable policies and mechanisms to ensure implementation of the all management measures not under DOT jurisdiction.

6.3.3 5-Year Implementation Plan For Urban Areas

6.3.3.1 New Development Management Measure

Urbanization in the period 1950 through the mid-1970's brought widespread grading which exacerbated the prior stresses of sedimentation and toxics from these new developments. Urban runoff continues to be a major source of pollution with its associated issues of suspended solids and toxics. Because of Federal review of the CNPCP, findings and conditions were placed on Hawaii's conditionally approved program. As noted elsewhere,[12] the State will ask the Attorney General to determine whether HRS Chapter 342D, 342E, and 205A are adequate backup authorities for the management measures. It has been suggested that to assist developers and State agencies, research be conducted to calibrate computer runoff models so that they can be used reliably under the wide range of circumstances and conditions found in Hawaii. The State has been able to work with two counties to upgrade their existing erosion and control standards so that polluted runoff is better managed and they comply with the federal guidance of

12 See page 6-2.

CZARA, Section 6217. The State will continue to work with the remaining two counties so that erosion and control standards are improved statewide. The likely cost for this process is about $75,000 per county.

The State will convene its Urban Focus Group, supplemented by additional expertise as need, to assist in the development of materials and training to assist the construction /development industry in complying with revised standards. These training revisions would be county-specific and held within each county.

6.3.3.2 Site Development Management Measure

The goal of this management measure is to reduce the generation of polluted runoff and to mitigate the impacts of urban runoff and associated pollutants from all site development. The use of site planning and evaluation can significantly reduce the cost of providing structural controls to retain pollution on site. It is anticipated that as counties upgrade their erosion control standards, proper site development will be addressed. It is recommended that research be conducted on alternatives to paved driveways and parking areas to reduce the imperviousness of urbanized areas.

6.3.3.3 Construction Site Erosion and Sediment Control Management Measure

In recent years, the State has made great strides toward improving erosion and sediment control related to urban construction activities. For example, in August 1998 the County of Maui revised their grading ordinance to enable effective administration of grading activities, which control erosion and sedimentation from construction projects. The revision was supported by EPA funding administered through DOH. The erosion control project reflected a significant milestone for the State because it set a standard requirement of Best Management Practice (BMP) measures for all grading work, including minor work not requiring a permit. BMP measures included development and implementation of effective erosion control plans.

Because of the erosion control project, more counties within the State were encouraged to upgrade their grading ordinance to administer grading activities and control erosion and sedimentation from construction projects. In September 1998, an Erosion and Sediment Control Workshop sponsored by EPA, DOH, and the City and County of Honolulu was held to provide education and training for inspectors, contractors, engineers, and the general public on the implementation of effective erosion and sediment control plans for construction related activities. About one hundred and fifty (150) people participated in the workshop and learned to prepare an effective erosion and sediment control plan consistent with various federal, State, and county regulations.

In the next five years, the State expects progress to continue. A legal opinion may be needed regarding enforceable policies and mechanisms to ensure implementation of erosion and sediment control plans for construction sites where a NPDES permit administered by DOH (i.e., construction sites disturbing under 5 acres yet greater than 5,000 square feet of land) is not required.

If a review indicates the need, the State will prepare a strategy to address gaps in enforceable policies and mechanisms by carrying out the following activities:

1. developing a process whereby technical experts from NOAA and EPA will assist the State in developing an alternative management measure that satisfies NOAA and EPA yet is consistent with the State's historical political relationship with the counties.
2. convening a focus group comprised of DOH, CZM, DOT, and County officials to address the feasibility of establishing new erosion and sediment control programs.
3. establishing a memorandum of agreement among participating agencies in the focus group to identify and execute roles and responsibilities.

In 2002, the State plans to develop a manual of urban runoff BMPs applicable to Hawaii. The manual would include acceptable practices for erosion and sediment control associated with construction activities. It will help standardize acceptable practices and assist contractors in selecting practices that would be acceptable and applicable in all County and State projects. The estimated cost for the project is $30,000.

The project will be evaluated by 2005 or when completed. The State expects to incorporate the standardized practices for erosion and sediment control identified in the urban BMP manual into guidelines established by the counties, particularly Kauai and Hawaii Counties. The State will encourage the Counties to revise their requirements to include the erosion and sediment control management measure or an alternative measure.

6.3.3.4 Construction Site Chemical Control Management Measure

Like the Construction Site Erosion and Sediment Control Management Measure, the Construction Site Chemical Control Management Measure aims to standardize acceptable practices during construction activity and prevent polluted runoff. The acceptable practices for construction site chemical control include general housekeeping of construction materials, toxic substances, and nutrients on construction sites. The State intends to use the same plan of action to address this management measure as it proposes for the erosion and sediment control measure.

6.3.3.5 Watershed Protection Management Measure

The Attorney General's review of enforceable policies and mechanisms[13] should be completed by 2001. Based on the Attorney General's review, the State will develop a strategy to address gaps in enforceable policies and mechanisms through the following actions:

1. supporting a process whereby technical experts from NOAA and EPA will assist the State in developing a variation or substitution of this management measure that satisfies NOAA and EPA yet is consistent with the State's historical political relationship with the counties;
2. convening its Urban Focus Group, supplemented by additional expertise as needed, to address the feasibility of establishing a statewide watershed protection program by

13 See Page 6-2.

guiding future development and land use activities in a manner that will prevent and mitigate the effects of polluted runoff; and

3. establishing a memorandum of agreement among participating agencies in the Focus Group to identify and carry out roles and responsibilities.

In 2003, the State expects to meet conditions of the Watershed Protection Management Measure or a variation of the management measure that satisfies NOAA and EPA yet is consistent with the State's historical political relationship (county home rule) with the counties. In this same year, the State intends to use information from Ala Wai (Oahu), Pelekane Bay (Hawaii), and West Maui Watershed Regions to evaluate what strategies work for continuing a successful watershed protection program. These strategies will be applied to other watersheds throughout the State, thereby mitigating the impacts of urban runoff and associated pollutants that result from new development or redevelopment, including the construction of new and relocated roads, highways, and bridges.

6.3.3.6 Existing Development Management Measure

The State will implement the Hawaii Unified Watershed Assessment Program which is based on Federal guidance in the Clean Water Action Plan, select priority watersheds to conduct unified watershed assessments, and develop watershed restoration action strategies (see Chapter 5 for schedule). The first phase of the watershed programs covers 1999-2003. Phase II will begin in 2004 and Phase III will begin in 2009. Local UWA teams made up of community, agency, and industry sectors will work together to develop assessments based on monitoring information, total maximum daily load information, and community prioritization. Watershed Restoration Action Strategies (WRASs) will be developed through this process. The management measure for Existing Development will be implemented pending recommendations found in the WRASs. Recommended management practices from *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* such as retrofitting, regional structural, and non-structural opportunities will be implemented pending the WRAS for individual watersheds.

Whenever each county revises its countywide development plan, DOH and the Office of Planning will ask to be a part of the review process to look for opportunities to work with the counties to implement watershed management programs and to reduce pollutant concentrations and volumes from existing development.

6.3.3.7 Management Measures for New and Operating Onsite Disposal Systems (OSDS)

The State will continue to encourage implementation of appropriate OSDS maintenance and operation practices. As an example, the State will consider administering a study to determine the feasibility of initiating a voluntary homeowner inspection, operation, and maintenance program for Onsite Disposal Systems. The study would provide valuable information with regard to acceptable management of OSDS. The likely cost for this project would be $15,000.

Although OSDS management measures are important, they are not a DOH Wastewater Branch priority. Currently, the DOH enforces Chapter 11-62 HAR, which requires that no wastewater system (including OSDSs) be operated in such a way that it creates or contributes to

wastewater spill, overflow, or discharge onto the ground or surface waters; or contamination, pollution or endangerment of drinking water [§11-62-06(g)]. Chapter 11-62 HAR also requires compliance with the "Ten States Standards" with respect to maintenance and inspections of OSDS. Further, OSDS owners are required to follow the procedures in maintenance manuals that must be submitted to DOH for approval.

For the most part, the State is in conformity with the 62179(g) Guidance and any revisions to Chapter 11-62 will be addressed during Phase II implementation. The State intends to change the language in Chapter 11-62, HAR to specify that "improper disposal of household hazardous or toxic materials, such as motor oil and solvents, is illegal and subject to a stiff fine." Furthermore, the State intends to include language that requires the installation or upgrade of denitrifying OSDS adjacent to nitrogen-limited surface waters where conditions indicate that nitrogen-limited surface waters may be adversely affected by excessive nitrogen loading.

By 2006, the State expects to implement the revision to Chapter 11-62, HAR, which include both the illegal disposal clause and the requirement for installation or upgrade of denitrifying OSDS where applicable. The State will also evaluate the results of the Onsite Disposal System project. Based on the results of the project, the State will encourage county governments to adopt local ordinances that will require participation in an operation and maintenance program for Onsite Disposal Systems.

6.3.3.8 Pollution Prevention Management Measure

This management measure is intended to prevent and reduce nonpoint source pollutant loadings generated from a variety of activities within urban areas not addressed by other management measures. Source reduction is considered preferable over waste recycling for pollution reduction. Everyday activities have the potential to contribute to nonpoint source pollutant loadings. Some of the major sources include households, garden and lawn care activities, turf grass management, diesel and gasoline vehicles, OSDS, illegal discharges to urban "runoff conveyances," commercial activities, pets, and domesticated animals. By reducing pollutant generation, adverse water quality impacts from these sources can be decreased.

Everyday household activities generate numerous pollutants that may affect water quality. Common household nonpoint source pollutants include paints, solvents, lawn and garden care products, detergents and cleansers, and automotive products such as antifreeze and oil. The improper use and disposal of these products can be chronic sources of pollution. Failing or improperly sited, designed, or used OSDS may contribute both pathogens and nutrients to surface waters. Pollutants and litter are sometimes dumped into storm drains under the mistaken assumption that treatment will occur at the sewage treatment plant.

Hawaii will continue implementation of public education and outreach activities targeted to youth and adult age groups, business sectors, industry sectors, recent immigrant groups through brochures, posters, class room or conference visits, public service announcements, education fairs. In addition, the PRC Program will continue to actively participate in the State's Pollution Prevention Roundtable.

In addition, there is a need for further development of public education and outreach strategies and actions for pollution prevention. DOH's Solid and Hazardous Waste Branch will target urban and agriculture sectors such as repair shops, construction firms, general contractors association, military facilities, farming associations, that could implement practices to reduce their waste streams. This would be implemented through workshops and reprinting of *The Hawaii Guide to Alternatives & Disposal of Household Hazardous Wastes*.

With six million visitors annually to our State, tourism is our largest industry. Our tourists can be unknowing contributors to Hawaii's pollution problem and environmental degradation. To resolve this issue, the State proposes a coordinated a statewide campaign on pollution prevention targeting the tourist industry. A focus group committee, including at least the Hawaii Tourism Authority, each county's visitors bureau, hotel associations, Waikiki Improvement Association, State DOT, State DBEDT, and major airline carriers, will be asked to develop tools for educating each of our visitors about environmentally friendly ways that they can interact with Hawaii's unique land and ocean resources.

In 2001, the State will implement the findings and recommendations resulting from a pollution prevention pilot project with hotels. The DOH will have completed a pilot project for pollution prevention opportunities within hotels. DOH will work with the Maui Hotel Association, Hawaii Hotel Association, Hawaii Tourism Authority, Waikiki Improvement Association, and county visitor bureaus to further implement pollution prevention among the hotels. Implementation will likely cost $50,000.

6.3.3.9 Golf Course Management Measure

DOH has already started addressing the golf course management measure through sponsorship of a pollution prevention project in West Maui. A consultant was contracted to work with the hotel industry in developing landscaping techniques and other best management practices (BMP) to minimize polluted runoff from the hotel grounds, condominiums, and other resort facilities, including golf courses. Any practices gained from the West Maui project will be added to the state-of-the-art BMPs currently being implemented by golf course superintendents to address soil and erosion control during construction, use of nutrients, use of pesticides and irrigation. Because golf courses have the potential to be a significant source of polluted runoff, the State will consider establishing guidelines or criteria for the siting and design of new golf courses during Phase II.

6.3.3.10 Management Measures for: Planning, Siting and Developing Roads and Highways; Bridges; Construction Projects; Construction Site Chemical Control; Operation and Maintenance; Road, Highway, and Bridge Runoff Systems

Hawaii's approach for the six management measures pertaining to roads, highways, and bridges is to view them collectively and address the issues from two perspectives. The first is a review of the State and Federal roads, highways and bridges under the State Department of Transportation's jurisdiction and the second is a look at the local roads, highways, and bridges not under DOT jurisdiction.

If required after the Attorney General's review[14], a strategy will be prepared to address any gaps in enforceable policies and mechanisms for the management measures under DOT jurisdiction through the Urban Focus Group, supplemented by additional expertise as needed. The State will also consider developing a BMP manual applicable to Hawaii. The manual will describe BMPs in urban areas for runoff from new developments, watershed protection, site development, construction activities, existing development, onsite disposal systems and roads, highways, and bridges. Estimated cost for this manual is $30,000.

Based on the Attorney General's review, a strategy will be prepared to address any gaps in enforceable policies and mechanisms for local roads, highways and bridges not under DOT jurisdiction; this will be proposed through a focus group similar to that mentioned above. The State also plans a study that describes and compares the requirements for siting, construction, operations and maintenance of roads under County jurisdiction and under State jurisdiction and provides recommendations for improving the County processes to render them consistent with the management measures. Estimated cost for this study is $22,000.

14 See Page 6-2.

Table 6-3
Urban Management Measure Implementation Plans for 2000-2003

Year	Activity/ Outcome	Facilitating Agency	Support
2000 A	*Urban Focus Group* ➢1 Convene Urban Focus Group (UFG).	DOH, OP	Members of previous UFG, State, county, and federal agencies, interested public and private sector organizations
B	*Public education and outreach activities* ➢1 Continue implementing public education and outreach activities targeting youth and adult age groups, business sectors and recent immigrant groups. ➢2 Continue having the PRC Program participate in the State's Pollution Prevention Roundtable to develop new tools and approaches to educate public and sectors on polluted runoff control.	DOH	EEN, DOH- SHWB
C	*Study of management measures for roads, highways, and bridges* ➢1 Initiate and conduct initial phase of a study that reviews §6217 requirements for siting, construction, operation and maintenance of roads, highways, bridges under county jurisdiction and State jurisdiction where such facilities are not covered under federal Storm Water Phase II rules.	OP, DOH, consultant	DOT, Counties, UFG

Year	Activity/ Outcome	Facilitating Agency	Support
2001 B	*Public education and outreach activities, cont'd* ➢3 Continue implementing public education and outreach activities.	DOH	EEN, DOH-SHWB
C	*Study of management measures for roads, highways, and bridges, cont'd* ➢2 Describe State processes for the siting and design, construction, and operation and maintenance of roads, highways, and bridges. ➢3 Describe processes used by each County for the siting and design, construction, and operation and maintenance of roads, highways, and bridges. ➢4 Compare and contrast the effectiveness of these processes, and provide recommendations to improve the processes to render them consistent with the Roads, Highways, and Bridges Management Measures in order to have an approvable approach statewide.	DOH, OP, consultant	DOT, Counties, UFG, contractors' associations
D	*Enforceable policies and mechanisms* ➢1 If the AG's review[15] indicates that there are gaps in enforceable policies and mechanisms, develop a strategy to address those gaps with aid of UFG. ➢2 Follow up strategy development by meetings of the UFG, with additional expertise as needed, to address enforceability in the context of urban issues.	DOH, OP	UFG, others with interest and expertise
E	*Pollution prevention in the hotel industry* ➢1 In partnership with industry representatives, implement findings and recommendations from the DOH hotel pollution prevention pilot project statewide.	DOH	Hotel Industry

15 See Page 6-2.

Year	Activity/ Outcome	Facilitating Agency	Support
2002 B	*Public education and outreach activities, cont'd* ➢4 Continue implementing public education and outreach activities targeted to urban issues.	DOH	EEN
F	*Increase reliability of existing computer runoff models* ➢1 Conduct research to calibrate existing computer runoff models for the New Development Management Measure to increase their reliability under a wide range of conditions and circumstances in Hawaii.	DOH, consultant	USGS, other model makers and users
G	*Urban Best Management Practices (BMP) Manual* ➢1 Develop an Hawaii-specific BMP manual that describes BMPs in urban areas to reduce runoff from various activities (see p. 19) in order to standardize acceptable polluted runoff control practices and assist contractors in selecting appropriate practices that are applicable statewide.	DOH & OP, consultant	UFG, Counties, contractors' associations
H	*Reduction and mitigation of pollution from new development* ➢1 For urban areas not covered by federal Storm Water Phase II rules, UWA, and WRAS activities, use evaluation information from watershed projects and county general plans to maintain a watershed protection program aimed at reducing polluted runoff and mitigating the impacts of urban runoff and pollutants from new development or redevelopment, including construction of new and relocated roads, highways and bridges.	DOH & OP	DOT, DLNR, Counties

Year	Activity/ Outcome	Facilitating Agency	Support
2003 B	*Public education and outreach activities, cont'd* ➢5 Continue implementing public education and outreach activities targeted to urban issues.	DOH	EEN
I	*Develop additional public education and outreach strategies and actions for pollution prevention* ➢1 Work with DOH's Solid and Hazardous Waste Branch to target urban and agriculture sectors through workshops and reprinting "The Hawaii Guide to Alternatives & Disposal to Household Hazardous Waste" to focus on repair shops, construction companies, military facilities, and farming associations to reduce their waste streams. ➢2 Coordinate a statewide campaign on pollution prevention targeting the tourist industry by establishing a special focus group to develop tools for educating all our visitors about environmentally friendly ways they can interact with all the unique land and ocean resources the State has to offer. ➢3 Support collaborative processes for technical assistance and dissemination of information to reduce polluted runoff from golf courses: ➢ a DOH-PRC will provide assistance and information to the local chapters of the Golf Course Superintendents Association; ➢ b Work with resort and golf course planners to bring developers and superintendents together to collaborate early on the design and development of golf courses to address polluted runoff control.	DOH DOH DOH-PRC	DOH-SHWB HTA, County visitor bureaus, hotel associations, WIA, DOT, DBEDT, and major airlines Golf superintendents
➢ J	*Upgrading of erosion control standards consistent with the New Development Management Measure* ➢1 To create statewide consistency on erosion control ordinances, for areas not covered in federal Storm Water Phase II rules, convene a focus group to assist in developing county erosion control standards and develop educational materials and training to facilitate implementation and compliance with revised standards. ➢2 Develop mechanisms to track the implementation and assess the effectiveness of the urban BMPs to enable adequate evaluation of urban management measures.	DOH, OP DOH, OP	UFG, County Public Works departments, construction industry, land use experts, and Hawaii Water Environment Association, other 6217 focus group

Year	Activity/ Outcome	Facilitating Agency	Support
2003, cont'd K	*Reduction and mitigation of pollution from existing development* ➢1 As the Counties revise their General Plans, DOH and OP will ask to participate in the review process, seeking opportunities to assist the Counties to implement their watershed protection programs.	DOH, OP	Counties
L	*Statewide watershed protection program* ➢1 Complete and implement the watershed protection program plan based on effective urban BMP measures and design projects identified in the restoration activities of completed, priority watershed projects in order to have a statewide implementation approach and target critical areas.	DOH	UFG, UWA watershed project working groups
M	*Evaluation of outcomes in this 5-year implementation plan and preparation of next 5-year plan* ➢1 Using information gained from evaluation and experience of past three years, work with agencies and stakeholder groups to develop implementation strategies for urban activities for next five years. ➢2 Prepare urban section of 5-year Implementation Plan for Phase II (2004-2008), take out for public review, finalize, and submit to EPA & NOAA.	OP, DOH	UFG and other government, public & private sector entities and individuals with a stake in urban activities.

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6.4 Marinas and Recreational Boating

15-year Program Strategy: The implementation of the marina and recreational boating management measures contained in *Hawaii's Coastal Nonpoint Pollution Control Plan* (CNPCP) will result in improved design and operation of marinas and better educated boaters. These in turn will lead in the long term to improved quality in the marinas and adjacent shore waters.

Phase I: By 2003, the State intends to formally incorporate guidelines and criteria based on CNPCP management measures into decision making for permits to develop and operate marinas and small boat harbors in order to meet the conditions imposed on Hawaii's CNPCP by EPA and NOAA. In addition, the State will carry out a comprehensive public education campaign to improve the practices of marina operators and recreational boaters as a means of reducing polluted runoff into marinas.

Phase II: By 2008, the State will carry out a process to revise and implement existing draft guidelines for planning and evaluation of proposals for new or expanded public and private marinas. In order to bring existing facilities into compliance with the CNPCP, the State will incorporate CNPCP management measures as provisions of new leases (or revision of existing leases) issued to private entities to operate repair, fueling, and sewage facilities in State harbors.[16] In addition, the State will work to develop partnerships to continue carrying out elements of the education campaign developed in Phase I.

Phase III: By 2013, the State will carry out a statewide evaluation of the implementation of all CNPCP Marinas and Recreational Boating management measures. Where implementation is not sufficient to accomplish pollutant reduction, the State will undertake appropriate activities to ensure compliance with the management measures.

During the last year of each Phase, the State will evaluate the implementation of activities proposed for that Phase, prepare the next five-year *Implementation Plan* for public review, and submit the final plan for the next Phase to EPA and NOAA.

6.4.1 Management Measures for Marinas and Recreational Boating[17]

- Marina Siting and Design
  - Marina Flushing Management Measure (Phase II)
  - Water Quality Assessment Management Measure (Phase II)
  - Habitat Assessment Management Measure (Phase II)
  - Shoreline Stabilization Management Measure (Phase I)
  - Storm Water Runoff Management Measure (Phase I)

16 Letter from David E. Parson, DOBOR, to David Blane, December 15, 1999.

17 Pages III-163 through III-204 in Hawaii's Coastal Nonpoint Pollution Control Program Management Plan describes the management measures below, their applicability, appropriate management practices, existing implementation mechanisms, and recommended implementing actions.

- Fueling Station Design Management Measure (Phase I)
- Sewage Facility Management Measure (Phase I)

- Marina and Boat Operation and Maintenance
  - Solid Waste Management Measure (Phase II)
  - Fish Waste Management Measure (Phase II)
  - Liquid Material Management Measure (Phase II)
  - Petroleum Control Management Measure (Phase II)
  - Boat Cleaning Management Measure (Phase II)
  - Public Education Management Measure (Phase II)
  - Management of Sewage Facilities Management Measure (Phase I)
  - Boat Operation Management Measure (Phase II)

6.4.1.1 Note on the applicability of marina and recreational boating management measures to State boat harbors

"The following operations/ facilities are covered by these management measures:

- Any facility that contains 10 or more slips, piers where 10 or more boats may tie up, or any facility where a boat for hire is docked;
- Boat maintenance or repair yards that are adjacent to the water;
- Any federal, State, or local facility that involves recreational boat maintenance or repair that is on or adjacent to the water;
- Public or commercial boat ramps;
- Any residential or planned community marina with 10 or more slips; and
- Any mooring field where 10 or more boats are moored."[18]

These criteria are met by State boat harbors.

6.4.2 Findings and Conditions for Marina and Recreational Boating Management Measures[19]

- 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.

- 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.

18 Page III-163, CNPCP.

19 See Appendix A-5 for full text of "Findings..."

Conditions: 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:

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.

6.4.3 5-Year Implementation Plan

The following plan proposes a series of activities to begin to work toward accomplishment of the 15-year strategy. In the process, the State intends to address the conditions regarding the marinas and recreational boating management measures imposed by the *Findings for Hawaii's Coastal Nonpoint Pollution Control Program*. The plan includes projects to:

(1) Formally adopt guidelines and criteria based on the CNPCP management measures for shoreline stabilization, storm water runoff, fueling station design, and sewage facilities management to be used in making decisions on Conservation District Use Applications (CDUA) and under the Department of Health's (DOH) water quality authority; and
(2) Develop a comprehensive public education program for marina operators and the boating community that helps people take pride in a clean, well-operated marina and boating operations with minimal pollution.

Table 6-4 presents these action items and desired outcomes for marinas and recreational boating for the period 2000-2003 and, as far as the information is currently available, shows lead and support actors.

6.4.4 Phase II activities

The management measures listed in section 6.4.1 as Phase II activities will be components of the next five-year Implementation Plan.

Table 6-4
Marinas and Recreational Boating Management Measure Implementation Plans for 2000-2003

Year	Activity/ Outcome	Facilitating Agency	Support
2000 A	*Comprehensive public education program* ➢1 Include in FY00-01 CZM workplan the development of a comprehensive public education program for marina operators and the boating community that helps people take pride in clean, well-operated marinas and boating operations with minimal pollution. ➢2 Implement process for contract to develop and carry out public education program.	OP	
2000 B	*Marina Focus Group* ➢1 Establish and convene Marina focus group (MFG).	OP, DOH	Members of previous MFG, State, county, and federal agencies, interested public and private sector organizations
2000 C	*Provide enforceable policies and mechanisms for certain marina siting and design management measures* ➢1 Convene MFG to consider proposal to have DLNR and DOH formally adopt guidelines and criteria based on the CNPCP management measures for shoreline stabilization, storm water runoff, fueling station design, and sewage facilities management to be used in making decisions on Conservation District Use Applications (CDUA) and under the Department of Health's (DOH) water quality authority.	OP, DOH	MFG, DLNR-DOBOR, DLNR-DLM, other interested parties
2001 A	*Comprehensive public education program, cont'd* ➢3 Undertake development of the marina education program funded by Activity 2000-A, including involvement of interested stakeholders.	OP, Consultants	MFG, DOH, DLNR, DBEDT-Ocean Resources Branch, University of Hawaii Marine Options Program and Sea Grant Extension Service, Waikiki Aquarium, other stakeholders, NGOs, and the public

Year	Activity/ Outcome	Facilitating Agency	Support
2001 cont'd C	*Provide enforceable policies and mechanisms for certain marina siting and design management measures, cont'd* ➢2 Meet with stakeholders and interested members of the public concerning the proposal (as revised/updated by focus group in Activity 2000-C) to formally incorporate marina management measures as criteria for DLNR and DOH permitting of marinas.	OP, DOH	MFG, DLNR-DOBOR, DLNR-DLM, stakeholders and interested members of the public
2002 A	*Comprehensive public education program, cont'd* ➢4 Begin implementation of marina education program development.	OP, consultants	MFG, DOH, DLNR, DBEDT-Ocean Resources Branch, University of Hawaii Marine Options Program and Sea Grant Extension Service, Waikiki Aquarium, other stakeholders, NGOs, and the public
C	*Provide enforceable policies and mechanisms for certain marina siting and design management measures, cont'd* ➢3 Process incorporation of marina management measures as a part of DOH water quality permitting	DOH, OP	
2003 A	*Comprehensive public education program, cont'd* ➢5 Continue implementation of marina education program development and evaluate its impact on water quality in and around marinas.	OP, consultants	MFG, DOH, DLNR, DBEDT-Ocean Resources Branch, University of Hawaii Marine Options Program and Sea Grant Extension Service, Waikiki Aquarium, TORCH, Pacific Whale Foundation, other stakeholders, and public

Year	Activity/ Outcome	Facilitating Agency	Support
2003 cont'd D	*Evaluation of outcomes in this 5-year implementation plan and preparation of next 5-year plan* ➢ 1 Using information gained from evaluation and experience of past three years, work with agencies and stakeholder groups to develop implementation strategies for marinas and recreational boating for next five years ➢ 2 Prepare marinas and recreational boating section of 5-year Implementation Plan for Phase II (2004-2008), take out for public review, finalize and submit to EPA & NOAA.	OP	MFG and other government, public & private sector entities and individuals with a stake in marinas and recreational boating

6.5 Hydromodifications

15-year Program Strategy: Implement *Hawaii's Coastal Nonpoint Pollution Control Plan* (CNPCP) management measures for hydromodification and undertake other actions to protect streambanks and shorelines and the habitats associated with them, which will lead to the improvement in the quality of streams and nearshore waters, contributing to achievement of the State's long-term water quality goals.

Phase I: By 2003, as a part of a larger process which develops a statewide watershed protection program or policies (which may include stream restoration) that preserve areas critical to water quality within all watersheds of Hawaii, the State plans to:

1. identify and implement opportunities in operation and maintenance programs for existing modified channels which will improve water quality and habitat;
2. investigate appropriate actions, including enforceable policies and mechanisms, to reduce erosion and sediment and chemical and pollutant discharge in the building and management of dams; and
3. 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, including protection of stream banks and shorelines against erosion due to use of the adjacent surface waters.

Phase II: By 2008, the State will develop and incorporate into the statewide watershed protection program means by which communities can be directly involved in the management of watersheds. These actions will include protection and restoration of instream and riparian habitat. The State will work with proper bodies to incorporate provisions in their governing documents to implement the recommendations developed in Phase I for enforceable policies and mechanisms regarding erosion and sediment control, and chemical and pollution control, for dams. In addition, the State will bring a fourth county into the project begun in Phase I dealing with streambank and shoreline erosion and, if needed, develop mechanism to continue project under other auspices. The State will continue to monitor the development and implementation of county drainage standards with a focus on reduction of channelization.

Phase III: By 2013, dam, channel, and streambank bank and shoreline protections called for by the §6217 management measures will be in place. Policies and programs for community involvement in watershed management will give additional protections to water quality as it is impacted by hydromodifications.

During the last year of each Phase, the State will evaluate the implementation of activities proposed for that Phase, prepare the next five-year Implementation Plan for public review, and submit the final plan for the next Phase to EPA and NOAA.

6.5.1 Management Measures for Hydromodifications[20]

- Channelization and Channel Modification Management Measures
  - Management Measure for Physical and Chemical Characteristics of Surface Waters (Phase I)
  - Instream and Riparian Habitat Restoration Management Measure (Phase II)
- Dams Management Measures
  - Management Measure For Erosion And Sediment Control (Phase I)
  - Management Measure for Chemical and Pollutant Control (Phase I)
  - Management Measure for Protection of Surface Water Quality and Instream and Riparian Habitat (Phase II)
- Streambank And Shoreline Erosion Management Measure
  - Management Measure for Eroding Streambanks and Shorelines (Phase I)

6.5.2 Findings and Conditions for Hydromodifications Management Measure

- 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.

- 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.

- 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.[21]

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20 Pages III-205 through III-230 in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* describe the management measures below, including their applicability, appropriate management practices, existing implementation mechanisms, and recommended actions.

21 Appendix A-5, pages A-5-13 – A-5-15.

Conditions: Within 5 years, the State will include in its CNPCP:

(1) management measures in conformity with the 6217(g) guidance for the following hydromodification management measures:

a. existing modified channels;
b. erosion and sediment control of dams;
c. chemical and pollutant control for dams;
d. 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; and

(2) enforceable policies and mechanisms to ensure implementation of the management measures for erosion and sediment control, and chemical and pollutant control, for dams throughout the 6217 management area.

6.5.3 5-Year Implementation Plan For Hydromodifications

The following plan proposes a series of actions to work toward accomplishment of the 15-year goal by addressing the conditions regarding certain hydromodification management measures imposed by the *Findings for Hawaii's Coastal Nonpoint Pollution Control Program*. Addressing these conditions will implement some of the recommendations in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan*. The plan includes projects to:

1. determine how best to implement the management measure which sets as a goal a State-level program to identify opportunities for improvement of water quality and habitat in existing modified channels as a part of an operation and maintenance program for such channels; and
2. investigate appropriate enforceable policies and mechanisms for the dams management measures for erosion and sediment, and chemical and pollutant control.

Table 6-5 presents these hydromodification action items and desired outcomes for the period 2000-2003 and, as far as the information is currently available, shows lead and support actors.

Table 6-5
Hydromodification Management Measure Implementation Plans for 2000-2003

Year	Activity/ Outcome	Facilitating Agency	Support
2000A	*Stream Systems Focus Group* ➢1 Establish and convene the Streams System focus group (SFG). (The SFG will cover hydromodifications, wetlands, and riparian areas, so it will be necessary to ensure that the membership includes representation from a full range of entities and individuals involved in use, regulation, and enhancement of channels, dams, wetlands, estuaries, and streams.)	OP, DOH	Members of previous SFG, State, county, and federal agencies, interested public and private sector organizations
B	*Watershed Protection Program* ➢1 Initiate a three-year project in FY00-01 CZM workplan to develop a statewide watershed protection program or policies that preserve areas critical to water quality within all watersheds of Hawaii. ➢2 Within the framework of the project described above, use an RFP process to initiate a contract for the project, which will include as elements the hydromodification projects mentioned in this table.	OP	
2001 C	*Streambank and shoreline erosion* ➢1 Using a consultant, identify and map existing polluted runoff problems caused by streambank or shoreline erosion that are not reviewed under existing permits.	OP, DOH, consultant	SFG
D	*Operation and maintenance of existing modified channels* ➢1 Convene Stream Systems focus group, supplemented as needed with representation from entities and individuals (such as taro farmers, the counties, DOA irrigation systems, and private water collection systems (e.g., A&B in East Maui)) which use channels for water transmission, to review existing operation and maintenance programs for modified channels and determine what programs exist in the various organizations ➢2 Using information on existing operation and maintenance programs for modified channels collected in activity above, SFG will develop a set of options for State-level (if appropriate) programs to identify opportunities for improvement of water quality and habitat in existing modified channels in order to provide a basis for future discussion by all interested parties.	OP, DOH	Members of SFG + additional needed contacts

Year	Activity/ Outcome	Facilitating Agency	Support
2002 C	*Streambank and shoreline erosion, cont'd* ➢2 With the help of a project coordinator, work with identified watershed-based groups in one county to propose solutions to existing polluted runoff problems caused by streambank or shoreline erosion that are not reviewed under existing permits. Use data to begin to develop a "solutions manual" by grouping the types of problems and proposed solutions. Pilot test some solutions.	OP, consultant	SFG, designated watershed groups in one county
D	*Operation and maintenance of existing modified channels, cont'd* ➢3 Using package of options developed in Action Item 2001-D-2, SFG will propose to and discuss options with various CNPCP focus groups for a State-level (if appropriate) program to identify opportunities for improvement of water quality and habitat in existing modified channels. ➢4 Based on discussions in Activity 2002-D-3, SFG will develop recommendations.	OP, DOH, SFG	Category focus groups + other interested agencies, public and private organizations and individuals
E	*State-level enforceable policies and mechanisms for control of pollutants in dam construction and maintenance* ➢1 The SFG, supplemented as needed by parties involved in construction and maintenance of dams, will review the enforceable mechanisms of State and county programs that address erosion and sediment control, and chemical and pollution control, which might be applicable to dams. ➢2 The SFG will also review of enforceable policies and mechanisms for dams from other states ➢3 Based on the above reviews, the SFG will develop a set of options to meet the "Findings" requirement for State-level enforceable policies and mechanisms regarding erosion and sediment control, and chemical and pollution control, for dams.	OP, DOH, consultant, or intensive work group	SFG augmented by interested persons from other focus groups
2003 C	*Streambank and shoreline erosion, cont'd* ➢3 Using a consultant, continue the project dealing with existing polluted runoff problems caused by untreated streambank or shoreline erosion by involving a third county. Seek fourth-year funding. Develop educational/training video based on "solutions manual."	OP, DOH	Interested watershed groups

Year	Activity/ Outcome	Facilitating Agency	Support
2003 cont'd D	*Operation and maintenance of existing modified channels, cont'd* ➢5 Take out for public review and comment the recommendations (developed in Activity 2002-D-4) for program(s) to identify opportunities for improvement of water quality and habitat in existing modified channels. ➢6 SFG will revise recommendations as needed based on their review of public comment and forward recommendations to State and county programs for implementation.	OP, DOH	SFG, augmented by interested persons from other focus groups
E	*State-level enforceable policies and mechanisms for control of pollutants in dam construction and maintenance, cont'd* ➢4 The SFG, augmented by interested persons from other focus groups, will consider options developed in Activity 2002-E-1 to meet the requirement for State-level enforceable policies and mechanisms regarding erosion and sediment control, and chemical and pollution control, for dams and make recommendations for implementation. ➢5 Take out for public review and comment the recommendations (developed in Activity 2003-2) for State-level enforceable policies and mechanisms regarding erosion and sediment control, and chemical and pollution control for dams. ➢6 SFG will revise recommendations as needed based on their review of public comment and forward recommendations to State and county programs for implementation.	OP, DOH, SFG	DLNR, counties, private water collection systems, agricultural interests using dams
F	*Evaluation of outcomes in this 5-year implementation plan and preparation of next 5-year plan* ➢1 Using information gained from evaluation and experience of past three years, work with agencies and stakeholder groups to develop implementation strategies for hydromodifications for next five years. ➢2 Prepare hydromodifications section of 5-year Implementation Plan for Phase II (2004-2009), take out for public review, revise and submit to EPA and NOAA.	OP, DOH	SFG + other government, public & private sector entities and individuals with a stake in hydromodifications

6.6 Wetlands and Riparian Areas

15-year Program Strategy: Assist in implementing the protective approach in *Hawai`i Wetland Management Policy* (DOH 1999d) by achieving the CNPCP management measure goals for wetlands and riparian areas and other actions which link to and accomplish the short and long-term goals in this plan and the State's water quality goals. These activities will be conducted within the watershed protection program developed in Chapter 6-5.

Phase I: By 2003, the State will:

1. Develop management measures by which wetlands and riparian areas can be protected from the impacts of existing development which adversely affects the nonpoint source pollution abatement functions of such areas;
2. If needed, based on the Attorney General's review[22], develop and implement enforceable policies and mechanisms to ensure implementation of the wetland and riparian area management measures throughout the 6217 management area (the entire State);
3. Review and begin to implement where appropriate the strategies for the management of riparian areas on public lands proposed in *Riparian Nonpoint Pollution Control in Hawaii: Impacts and Policy Recommendations* (1996); and
4. Develop a strategy for advocating for sufficient funding of government agencies with wetland management, restoration, and/or permitting responsibilities.

Phase II: By 2008, the State will ensure that the CNPCP management measure goals for wetlands and riparian areas have been achieved throughout the State. This will include carrying out a pilot project for implementation of management measures and BMPs for controlling adverse impacts of existing development on wetlands and riparian areas developed in Phase I. The pilot project will test implementation of management measures and assess their effectiveness and economic achievability. It will be evaluated, the management measures and BMPs revised as necessary, and a strategy developed for expanded implementation. If necessary, the State will work with appropriate legislative bodies to create enforceable backup for the measures.

The State will continue to advocate for sufficient funding of government agencies with wetlands management, restoration, and/or permitting responsibilities, based on a funding system in which agencies and their partners are paid for the value of the wetland benefits protected by their management. It will investigate the usefulness of a centralized facilitation and coordination function for wetland management and work toward its development and funding if appropriate. The State will work toward simplification of agencies' application and internal and public review processes for permits affecting wetland and riparian areas, while maintaining protection for wetland and riparian area resources.

Phase III: By 2013, the State will ensure that the CNPCP management measure goals for wetlands and riparian areas have been achieved throughout the State. It will continue to advocate for sufficient funding of government agencies with wetland management, restoration,

22 See Page 6-2.

and/or permitting responsibilities. If a centralized facilitation and coordination function has been established, the State will continue to advocate for its funding.

During the last year of each Phase, the State will evaluate the implementation of activities proposed for that Phase, prepare the next five-year Implementation Plan for public review, and submit the final plan for the next Phase to EPA and NOAA.

6.6.1 Management Measures for Protection of Wetlands and Riparian Areas, and for Vegetated Treatment Systems[23]

- 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.
- 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.
- 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.[24]

6.6.2 Findings and Conditions for Wetlands and Riparian Area Management Measure

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.."[25]

Conditions: Within 5 years, the State will (1) include in its CNPCP management measures in conformity with the 6217(g) guidance which provide protection of wetlands and riparian areas from existing development which adversely affects the nonpoint source pollution abatement functions of such areas and (2) enforceable policies and mechanisms to ensure implementation of these management measures throughout the 6217 management area.

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23 Pages III-231 through III-244 in *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* describes the three management measures below, their applicability, appropriate management practices, existing implementation mechanisms, and recommended implementing actions.

24 This management measure has been stated in terms of its benefit to wetlands and riparian areas but the Best Management Practices used to implement them are applicable in other management area categories.

25 Appendix A-5, page A-5-15.

6.6.3. 5-Year Implementation Plan

The following plan proposes a series of activities to begin to work toward accomplishment of the 15-year goal in the context of watershed protection. In the process, the State intends to address the conditions regarding wetlands and riparian area management measures imposed by the *Findings for Hawaii's Coastal Nonpoint Pollution Control Program*.[26] The plan includes projects to:

1. Develop management measures by which wetlands and riparian areas can be protected from the impacts of existing development which adversely affects the nonpoint source pollution abatement functions of such areas; pilot test their implementation, evaluate the results, modify if necessary, and expand their implementation;
2. Review and implement where appropriate several phases of the strategy for the management of riparian areas on public lands proposed in *Riparian Nonpoint Pollution Control in Hawaii: Impacts and Policy Recommendations* (1996); and
3. Develop and apply a strategy to advocate for sufficient funding of government agencies with wetland management, restoration, and/or permitting responsibilities. Work toward a funding system in which agencies and their partners are paid for the value of the wetland benefits protected by their management.

Table 6-6 presents these wetland and riparian area action items and desired outcome for the period 2000-2003 and, as far as the information is currently available, shows lead and support actors.

6.6.4 Possible Phase II activities for wetlands:

1. Develop a consensus regarding provision of a central facilitation and coordination function for wetlands management in Hawaii (an action recommended in both *Hawai`i Wetland Management Policy* (DOH 1999d) and Hawaii's *Coastal Nonpoint Pollution Control Program Management Plan*); and
2. By means of a series of workshops, work toward simplification of agencies' application and internal and public review processes for wetland permits without harming wetland resources. Create and disseminate an educational pamphlet concerning the roles and responsibilities of agencies with wetland permit or approval programs.

26 See Appendix A-5 for full text of "Findings..."

Table 6-6
Wetland and Riparian Management Measure Implementation Plans for 2000-2004

Year	Activity/ Outcome	Facilitating Agency	Support
2000 A	*Stream Systems Focus Group* ➢1 Establish and convene Stream Systems focus group (SFG). As noted in Section 6-5, the Stream Systems Focus Group (SFG) will cover hydromodifications, wetlands, and riparian areas, so it will be necessary to ensure that the membership includes representation from a full range of entities and individuals involved in use, regulation, and enhancement of wetlands, estuaries, and streams, as well as channels and dams.	OP, DOH	Members of previous SFG, State, county, and federal agencies, interested public and private sector organizations
B	*State definition of wetlands* ➢1 SFG, augmented if needed by additional expertise, review existing federal wetland definition, as well as the definition proposed in the *Hawai`i Wetland Management Policy* (DOH 1999d), develop a recommendation for appropriate State definition of wetland and for means to implement the recommendation.	OP, DOH, SFG	DOH Wetland Policy workgroup + other government, public & private sector entities and individuals with a stake in wetlands
2001 B	*State definition of wetlands, cont'd* ➢2 Implement the recommendation for a State definition of wetlands through appropriate legislative action at the State and county level.	OP, DOH	SFG + other government, public & private sector entities and individuals with a stake in wetlands
C	*Protection of wetlands and riparian areas from impacts of existing development* ➢1 The SFG will investigate methods, in the context of watershed protection, by which wetlands and riparian areas can be protected from existing development which adversely affects the nonpoint source pollution abatement functions of such areas. ➢2 SFG assist in developing management measures and Best Management Practices to accomplish protection of wetlands and riparian areas from adverse impacts of existing development. ➢3 SFG combine the results of above activities into a package of options to assist in developing management measures and Best Management Practices to accomplish protection of wetlands and riparian areas from adverse impacts of existing development	Consultant or intensive workgroup	SFG, DOH Wetland Policy workgroup + other government, public & private sector entities and individuals with a stake in wetlands

Year	Activity/ Outcome	Facilitating Agency	Support
D	*Implement wetlands and riparian area BMPs on public lands* ➢1 Conduct training for key public lands management personnel in the use of the Best Management Practices for implementation of the wetlands and riparian areas management measures, including the use of vegetative treatment systems, in order to reduce polluted runoff from those lands, especially sediment.	OP, persons with expertise in use of BMPs	DLNR Chair & Managers
E	*Funding for government agencies with wetland management and/or permitting responsibilities* ➢1 Develop a strategy for advocating for sufficient funding of government agencies (especially NRCS, DLNR, and DOH) with wetland management and/or permitting responsibilities. Carry out strategy as appropriate.	OP	SFG, DOH Wetland Policy workgroup + other government, public & private sector entities and individuals with a stake in wetlands
2002 C	*Protection of wetlands and riparian areas from impacts of existing development, cont'd* ➢4 Using package of options developed in Action Item 2001-A, propose to various CNPCP focus groups draft management measures and set of Best Management Practices by which wetlands and riparian areas can be protected from existing development which adversely affects the nonpoint source pollution abatement functions of such areas.	CZM	All category focus groups + other interested agencies, public and private organizations and individuals
D	*Implement wetlands and riparian area BMPs on public lands, cont'd* ➢2 Work with appropriate State agencies to require wetlands and riparian BMP implementation as a condition of all State land leases, permits, and approvals involving riparian areas in order to provide for the implementation of wetland and riparian area management measures on encumbered public lands. Implementation of this activity should involve consultation with interested members of SFG and other focus groups.	OP, DLNR, DHHL	SFG, other CNPCP focus groups, other interested government, public & private sector entities and individuals
E	*Funding for government agencies with wetland management and/or permitting responsibilities, cont'd* ➢2 Evaluate results of prior year's funding advocacy and adjust strategy accordingly. Work toward a funding system in which agencies and their partners are paid for the value of the wetland benefits their management protects. Continue funding advocacy for government agencies as in Activity 2001-E-1.	CZM	Stream Systems focus group, DOH Wetland Policy workgroup + other government, public & private sector entities and individuals with a stake in wetlands

Year	Activity/ Outcome	Facilitating Agency	Support
2003 D	*Implement wetlands and riparian area BMPs on public lands, cont'd* ➢3 Investigate requiring implementation of wetland and riparian area BMPs as a condition under federal consistency reviews in order to provide for implementation of wetland and riparian area BMPs on projects involving federal lands, funds, or permits.	OP	CZM federal consistency personnel, federal land owners & managers
E	*Funding for government agencies with wetland management and/or permitting responsibilities, cont'd* ➢3 Evaluate results of prior year's funding advocacy and adjust strategy accordingly. Continue to advocate for sufficient funding for government agencies as in Activity 2000-E-1. Seek to help community-based entities locate private funding for existing and proposed watershed management activities which include wetland and riparian area enhancement.	OP	SFG, DOH Wetland Policy workgroup + other government, public & private sector entities and individuals with a stake in wetlands
F	*Evaluation of outcomes in this 5-year implementation plan and preparation of next 5-year plan* ➢1 Using information gained from evaluation and experience of past three years, work with agencies and stakeholder groups to develop implementation strategies for wetlands and riparian areas for next five years. ➢2 Take results of above activity out to public hearing, revise as appropriate, and submit to EPA and NOAA as 5-year Implementation Plan for Phase II (2004-2009)	OP, DOH	SFG, DOH Wetland Policy workgroup + other government, public & private sector entities and individuals with a stake in wetlands

6.7 Federal Lands

The Federal government owns 338,035 acres or 8.4 percent of all lands in Hawaii (Atlas of Hawaii, 1998). The Department of Defense (DOD) and the Department of the Interior manage the majority of these Federal lands.

The State's Coastal Zone Management (CZM) Program reviews Federal programs and activities for consistency with the objectives and policies in Chapter 205A of Hawaii Revised Statutes. The statute defines the coastal zone to include all land areas of the State and extends seaward to the limit of State's management authority. Because Hawaii's Coastal Nonpoint Pollution Control Program is part of the State's CZM Program, Federal programs and activities should also be consistent with the provisions and authorities identified in Hawaii's Coastal Nonpoint Pollution Control Program. Federal consistency requirements allow the State to advocate that activities on Federal lands do not detract from the State's ability to meet its long-term water quality goals.

Federal consistency with the Chapter 205A and Hawaii's Coastal Nonpoint Pollution Control Program is assured through regular reviews of proposed programs and activities. Federal agencies submit activities for review or an applicant applying for a Federal permit submits a copy of the permit application to the CZM Program for consistency review. The CZM Program publishes a notice of receipt of the proposed Federal activity or permit application in the Office of Environmental Quality Control's *Environmental Notice*. The CZM Program has up to 45 days to review a proposed Federal Activity and up to six months to review a Federal permit application.

Regular communications and meetings occur among representatives from Department of Health (DOH), Office of Planning, and Federal agencies. Hawaii's CZM Program has the authority to decide which Federal programs and activities require a formal Federal consistency review.

As part of the President's Clean Water Action Plan, Federal agencies in Hawaii that address water quality issues meet on a regular basis to implement the plan. An erosion control subcommittee was formed and the Office of Planning, Department of Health, and the University of Hawaii were invited to join. The subcommittee meets approximately once every two months to discuss ways to integrate Federal and State initiatives to implement provisions in the Clean Water Action Plan.

Public comments received by the State indicate a concern for activities on military lands, primarily in regard to fires on military lands and pollutants from vessels and around harbors. Recently, the DOD required military branches to prepare Integrated Natural Resource Management Plan (INRMP) for installations in Hawaii. The Air Force and Army have completed their plans, and the Navy has begun to prepare one. Significant polluted runoff threats are addressed in these INRMPs including fire prevention and control measures and impacts of training exercises. In addition, DOD is developing uniform national discharge standards for armed forces vessels, which will require vessels to use marine pollution control devices as well as other discharge controls.

The State intends to communicate nonpoint source control concerns to the appropriate Federal agencies to help meet the management measures. It has accepted DOD's invitation to participate in the development of new national discharge standards for vessels. The State will use current forums listed in Chapter 3 and Federal Consistency review meetings to address polluted runoff issues originating from Federal lands and activities.[27]

6.8 Critical Coastal Areas and Additional Management Measures

Section 6217(b) of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 requires states to implement management measures in addition to those contained in EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* [the "(g) measures"]. In general, the purpose of this "second tier" of management measures is to address water quality problems that continue despite the implementation of the (g) measures. According to the Environmental Protection Agency's (EPA) and the National Oceanic and Atmospheric Administration's (NOAA) Program Development and Approval Guidance, "these additional measures apply both to existing land and water uses that are found to cause or contribute to water quality impairment and to new or substantially expanding land uses within critical coastal areas adjacent to impaired or threatened coastal waters" (p. 22).

Specifically, the State must identify its threatened or impaired coastal waters and the land uses that cause or threaten these waters; delineate critical coastal areas; develop a process for determining whether additional measures are necessary to attain or maintain water quality standards in the threatened or impaired waters; describe the additional management measures the State will apply to the identified land uses and critical coastal areas; and develop a program to ensure the implementation of additional management measures. These elements are discussed in detail in Part IV of *Hawaii's Coastal Nonpoint Pollution Control Plan* (CNPCP).

In the CNPCP, the State took the position that while it had and would continue to identify its impaired or threatened coastal waters and other waterbodies under the CWA Section 303(d) and 305(b) processes, it had not yet undertaken the other activities. Consequently, one of the conditions imposed by EPA and NOAA in the "Findings"[28] document is that by 2003, the State will include in its CNPCP the following program elements:

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.

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27 In February 2000, a proposed Unified Federal Policy for a Watershed Approach to Federal Land and Resource Management was put out for public comment. It would apply to federal lands in Hawaii controlled by the Department of Defense, U.S. Fish & Wildlife Service, and National Park Service. The policy had not been finalized at press time. Further information is available on the Web at http://www.cleanwater.gov/ufp/

28 Appendix A, page A-5-19

The State has continued to update its impaired or threatened waterbodies and is beginning to do TMDL studies for these waterbodies. Through these actions, the other activities listed in this *Implementation Plan*, and activities carried out by other government, private, and community organizations, the State anticipates that information to accomplish the conditional requirements will likely become available in the period 2000-2002. Therefore, the State plans to revisit this issue in mid-2002 and at that time will supply EPA and NOAA with a plan for meeting the conditions by the end of 2003.

6.9 Monitoring

Section 6217(g) of the Coastal Zone Act Reauthorization Amendments (CZARA) requires a description of any necessary monitoring techniques to accompany the management measures to assess over time the success of the measures in reducing pollution loads and improving water quality. EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* provides:

1. Guidance for measuring changes in pollution loads and in water quality that may result from the implementation of management measures; and
2. Guidance for ensuring that management measures are implemented, inspected, and properly maintained.

Each of the above stated guidance elements ,as well as the means available in Hawaii to accomplish them as of 1996, are discussed in Part VII of Hawaii's CNPCP.

In their "Findings" document, EPA and NOAA directed the State to include within its CNPCP by July 1999 "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."[29] A draft monitoring plan was submitted to NOAA in the Fall of 1999, but no response had been received as of the printing of this document.

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29 Appendix A, page A-5-19

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References

Bay Pacific Consulting. 1996. Riparian Nonpoint Pollution Control in Hawaii: Impacts and Policy Recommendations. Prepared for the Office of State Planning, State of Hawaii. Honolulu. 142 pages

City and County of Honolulu, Department of Public Works, and Hawaii Department of Health. 1990. Water Management Plan for the City and County of Honolulu. Prepared for the U.S. Environmental Protection Agency.

Coastal Zone Act Reauthorization Amendments of 1990 Section 6217 (PL 101-508), 16 U.S. Code 1455b (1990).

Coastal Zone Management Act of 1972 (P.L 92-583), as amended, 16 U.S. Code 1451 *et.seq*.

Crabb, T. B. 1999. Watershed Stabilization and Water Quality Improvement Project on Former Sugarcane Lands of the Hilo Coast-Quarterly Status Report. Prepared for the Hawaii Department of Health. Honolulu.

Deenik, J.L., Vehara, G., and Tsuju, G.Y. 1998. Final Report: Early Warning Indicators of Groundwater Contamination in Soils with Variable Charge. Prepared for the Hawaii Department of Health. Honolulu.

DeVito, P.A., Dungan, G.L., Murabayashi, E.T., Gee, H.K. 1990. Nonpoint Source Pollution within the Anahulu River and Opaeula Stream Drainage Areas, Kaiaka-Waialua Bay Hydrological Unit Area, Oahu. Project Report PR-95-11. Water Resources Research Center, University of Hawaii at Manoa, Honolulu.

Dudley and Hallacher. n.d. Progress Report – Tier One: Distribution and Dispersion of Sewage Pollution in Hilo Bay and Contiguous Water. University of Hawaii at Hilo.

Federal Water Pollution Control Act of 1972 (P.L 92-500) as amended, 33 U.S Code §1251 *et. seq*.

Federal Water Pollution Control Act of 1977 Section 319 (P.L. 100-4), 33 U.S. Code §1329 (1987).

Geographic Decision Systems International. 1994. Final Contract Report: State Definition and Delineation of Watersheds. Prepared for Office of State Planning, Coastal Zone Management Program, State of Hawaii. Honolulu. 33 pages, 10 appendices.

Hawaii. Coastal Zone Management Hawaii Revised Statutes. (1993 as amended). Chapter 205A,

Hawaii. Water Pollution. Hawaii Revised Statutes. (1993 as amended). Chapter 342D.

Hawaii. Nonpoint Source Pollution Management and Control. Hawaii Revised Statutes. (1993 as amended). Chapter 342E.

Hawaii. Water Quality Standards. Hawaii Administrative Rules. (2000). Title 11, Chapter 54.

Hawaii Department of Business and Economic Development. 1994. State of Hawaii Data Book: 1994. Honolulu.

Hawaii Department of Health. 1989. Hawaii's Assessment of Nonpoint Source Pollution Water Quality Problems. Prepared for the U.S. Environmental Protection Agency. Honolulu.

_____. 1990a. Hawaii's Assessment of Nonpoint Source Pollution Water Quality Problems. Prepared for the U.S. Environmental Protection Agency. Honolulu.

_____. 1990b. Hawaii's Nonpoint Source Water Pollution Management Plan. Prepared for the U.S. Environmental Protection Agency. Honolulu.

_____ and County of Hawaii. 1993a. Water Quality Management Plan for the County of Hawaii. Honolulu.

_____ and County of Kauai. 1993b. Water Quality Management Plan for the County of Kauai. Honolulu.

_____ and County of Maui. 1993c. Water Quality Management Plan for the County of Maui. Honolulu.

_____. 1994. Hawaii Environmental Risk Ranking Project, Phase II Final Report. Honolulu.

_____. 1995. Hawaii Wellhead Protection Program Plan. Honolulu.

_____. 1997. Hawaii's Water Quality-Limited Waters: The 1997 Assessment, Honolulu

_____. 1999a. Strategic Plan for Hawai`i's Environmental Programs. Honolulu.

_____. 1999b. Ala Wai Canal Watershed Improvement Project. Final Report of Outreach Coordinator. Prepared for the Hawaii State Department of Health. Honolulu.

_____. 1999c. FY-2000 Water Pollution Control Program (CWA 106). Prepared for the U.S. Environmental Protection Agency. Honolulu.

_____. 1999d. Hawaii Wetland Management Policy. Prepared by Aura Communications for DOH Environmental Planning Office. Honolulu.

_____. 1999e. Hawai`i's Nonpoint Source Management Program Update: Preliminary Draft. Prepared for the U.S. Environmental Protection Agency by Hawaii Department of Health Polluted Runoff Control Program and Hawaii Office of Planning, Coastal Zone Management. Honolulu.

Hawaii Department of Health, Natural Resources Conservation Service, and Office of Planning. 1998. The Hawai`i Unified Watershed Assessment. Honolulu.

Hawaii Department of Land and Natural Resources. 1998. Best Management Practices for Maintaining Water Quality. Honolulu.

Hawaii Office of Planning. 1998. Annual Report to the Twentieth Legislature, Regular Session of 1999. Hawaii Coastal Zone Management. Honolulu.

Hawaii Office of State Planning. 1993. Draft Planning and Evaluation Guidelines for Private Sector Marina Development. Honolulu.

_____. 1996. Hawaii's Coastal Nonpoint Pollution Control Program Management Plan. Prepared for the National Oceanic and Atmospheric Administration, U.S. Department of Commerce and U.S. Environmental Protection Agency. Honolulu

In Re Boundaries of Pulehunui, 4 Haw. 239, 241 (1879)

Juvik, Sonia P. and Juvik, James O. 1998. Atlas of Hawaii, Third Edition. University of Hawaii Press, Honolulu.

National Oceanic and Atmospheric Administration and U.S. Environmental Protection Agency. 1993. Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance. Washington, D.C.

_____. 1998. Findings for the Hawaii Coastal Nonpoint Program. Washington, DC.

Noda, Edward K., and Associates. 1992b. A Management Plan for the Ala Wai Canal Watershed. For the Department of Land and Natural Resources. 1992. Honolulu

_____ with KRP Information Services. 1993. Ala Wai Canal Improvement Environmental Assessment. For the Department of Land and Natural Resources. Honolulu.

Shileikis, A. 1998 (July 14). EPA Region 9: Hawaii Nonpoint Source Program - Findings and Conditions. Internet posting at (URL): http://www.epa.gov/region09/water/nonpoint/hi/finding.html

_____. 1998 (August 12). EPA Region 9: Hawaii Nonpoint Source Program - Comments and Responses. Internet posting at (URL): http://www.epa.gov/region09/water/nonpoint/hi/response.html

Technical Committee on Nonpoint Source Pollution Control. 1978. Technical Report No. 2 – Nonpoint Source Pollution in Hawaii: Assessments and Recommendations. Prepared for the Hawaii Department of Health. Honolulu.

U.S. Environmental Protection Agency. 1997. Nonpoint Source Program and Grants Guidance for Fiscal Year 1997 and Beyond. Washington, DC.

U.S. Environmental Protection Agency and U.S. Department of Agriculture. 1998. Clean Water Action Plan: Restoring and Protecting America's Waters. Washington, DC