UPDATED MANAGEMENT MEASURES

FOR

HAWAII'S COASTAL NONPOINT POLLUTION CONTROL PROGRAM

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for

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Clean Water Branch
Polluted Runoff Control Program

CHAPTER 1: AGRICULTURE

A. Introduction

There are six management measures that apply to agriculture, all of which have been approved by NOAA and EPA. These management measures address the management of polluted runoff from all types of agricultural operations in Hawaii.

The following table provides a summary of authorities that apply to the agriculture management measures. A written description of the specific authorities and implementation tools are provided under each management measure in Section B. Appendix A contains tables providing the relevant language for each regulatory and non-regulatory mechanism for each management measure.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified below. Specific precautions will be taken to ensure that sensitive data, such as specific names and locations of practices, is maintained in full confidence. If detailed information is required due to violation of water quality standards, this information may be acquired by formal request in accordance with the Freedom of Information Act.

Indicators for Tracking Implementation

County DPWs	for erosion and sediment control, number of permits for agricultural grubbing and grading issues for each fiscal year by island; number of violations reported
SWCDs/NRCS	number of conservation plans related to agricultural operations approved annually by watershed, with acreage covered; BMPs for erosion and sediment control, confined animal facilities wastewater management, nutrient and pest management, grazing management and irrigation management reported by acreage; results of periodic inspections to ensure both technical specifications and maintenance standards have been met
DOH	number of plans approved for livestock feeding or processing operations and waste systems under Chapter 11-62, HAR, for each fiscal year by island
DOH	number of water quality violations that were caused by erosion from agricultural lands

Authority		Responsible Agency	Erosion & Sed. Control	Confined Animals	Nutrient Mgt.	Pesticides Mgt.	Grazing Mgt.	Irrigation Mgt.
Local	Chapter 22-7, KCC, Grading, Grubbing and Stockpiling	Kauai County DPW	X					
	Chapter 10 HCC, Soil Erosion and Sediment Control	Hawaii County DPW	X					
	Chapter 20.08, MCC, Soil Erosion and Sedimentation Control	Maui County DPW	X					
	Chapter 14-13 to 14-16, ROH, Grading, Soil Erosion and Sediment Control	City and County of Honolulu	X					
State	Chapter 149A, HRS Hawaii Pesticides Law	DOA				X		X
	Chapter 171, HRS Mgt and Disposition of Public Lands	DLNR	X	X	X	X	X	X
	Chapter 180, HRS Soil and Water Conservation Districts	local SWCDs	X	X	X	X	X	X
	Chapter 342D, HRS Water Pollution	DOH	X	X	X	X	X	X
	Chapter 340E, HRS Safe Drinking Water	DOH		X	X	X		X
	Chapter 342H, HRS Solid Waste Pollution	DOH		X	X			
	Chapter 4-66, HAR Pesticides	DOA				X		X
	Chapter 11-21, HAR Cross Connection and Back-Flow Control	DOH		X	X	X		X
	Chapter 11-23, HAR Underground Injection Control	DOH		X	X	X		X

Authority		Responsible Agency	Erosion & Sed. Control	Confined Animals	Nutrient Mgt.	Pesticides Mgt.	Grazing Mgt.	Irrigation Mgt.
State	Chapter 11-26, HAR Vector Control	DOH		X				
	Chapter 11-62, HAR Wastewater Systems	DOH		X				
	Farm*A*Syst Program, University of Hawaii Cooperative Extension Svc.	Univ. of Hawaii CES	X	X	X	X	X	X
	DOH Guidelines for Livestock Waste Management (1996)	DOH		X				
	Plant Nutrient Management in Hawaii's Soils: Approaches for Tropical and Subtropical Agriculture (2000)	Univ. of Hawaii CES			X			
Federal	NRCS's *Hawaii Field Office Technical Guides* (eFOTG)	NRCS	X	X	X	X	X	X

B. Management Measures

A. Erosion and Sediment Control Management Measure

Apply any combination of conservation structural and management practices based on U.S. Department of Agriculture – Natural Resources Conservation Service standards and specifications to minimize the delivery of sediment from agricultural lands to surface waters, or

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

Status of Measure: APPROVED

Applicability: This management measure applies to activities that cause erosion on agricultural land and on land that is converted from other land uses to agriculture. Agricultural lands include:

- Cropland;
- Irrigated cropland;
- Range and pasture;
- Orchards;
- Permanent hayland;
- Managed forests;
- Specialty crop production; and
- Nursery crop production.

The intent of the management measure is to protect surface and ground water quality. Some waterbodies, such as farm ponds, have been created to water livestock. Protecting the water quality of these artificial water storage areas does not have the same priority as protecting natural streams and waterbodies.

Responsible Agencies and Authorities

The county departments of public works are the lead agencies for implementing this management measure because they administer the county grading ordinances (Chapter 10, HCC; Chapter 22-7 KCC; Chapter 20.08 MCC; Chapters 14-13 to 14-16, ROH). The local Soil and Water Conservation Districts (SWCDs) are also major players because they develop and approve conservation plans which allow agricultural operations to receive an exemption from the county grading ordinances (Chapter 180, HRS).

Significant amounts of lands in agriculture are State lands leased to agricultural operators. The Department of Land and Natural Resources (DLNR) Land Division is responsible for leasing these lands under Chapter 171, HRS. One of these lease conditions is that the operators work with the local soil and water conservation districts to develop and implement a conservation plan. Pursuant to Act 90, SLH 2003, beginning on January 1, 2010, the authority to manage, administer, and exercise control over any public lands that are designated important agricultural lands pursuant to Section 205-44.5,

HRS, shall be transferred from DLNR to the State Department of Agriculture (DOA) (Section 171-3(b), HRS). Several leases have already been approved for transfer, which will occur in phases.

U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) usually assists in developing conservation plans to treat existing and potential resource problems and has funding available to assist with the installation of best management practices. NRCS primarily develops plans for operators seeking funding under Federal Farm Bill programs. NRCS's *Hawaii Field Office Technical Guide* (eFOTG) outlines conservation practice standards and specifications for erosion and sediment control.

The University of Hawaii Cooperative Extension Service (CES) can also provide technical assistance. One of the publications developed under its Farm*A*Syst program is entitled *Minimizing Pollution Risk from Land Management* (HAPPI-Farm 3; December 2000). The four-page publication helps land users assess how their land management practices can impact the quality of both Hawaii's groundwater and surface water bodies. It describes practices to reduce water runoff and erosion, improve soil quality, and minimize nutrient losses from crop fields.

Hawaii Department of Health (DOH) has regulatory authority over water pollution control (Chapter 342D, HRS).

Management Practices

NRCS's *Hawaii Field Office Technical Guide* (eFOTG) contains many standards related to erosion and sediment control, among them: channel bank vegetation (322); deep tillage (324); conservation cover (327); conservation crop rotation (328); residue and tillage management (329); contour farming (330); cover crop (340); critical area planting (342); diversion (362); field border (386); filter strip (393); grade stabilization structure (410); grassed waterway (412); mulching (484); sediment basin (350); streambank and shoreline protection (580); strip-cropping (585); terrace (600); water and sediment control basin (638).

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

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

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

(2) Managing stored contaminated runoff and accumulated solids from the facility through an appropriate waste utilization system.

Status of Measure: APPROVED

Applicability: This management measure applies to all new confined animal facilities regardless of size and to all existing confined animal facilities that contain the following number of head or more:

	Head	Animal Units[1]
Beef Feedlots	50	50
Stables (horses)	100	200
Dairies	20	28
Layers	5,000	50[2] 165[3]
Broilers	5,000	50 165
Turkeys	5,000	900
Swine	100	40

except those facilities that are required by Federal regulation 40 CFR 122.23 to apply for and receive discharge permits. That section applies to "concentrated animal feeding operations," which are defined in 40 CFR Part 122, Appendix B. In addition, 40 CFR 122.23(c) provides that the Director of a National Pollutant Discharge Elimination System (NPDES) discharge permit program may designate any animal feeding operation as a concentrated animal feeding operation upon determining that it is a significant contributor of water pollution. This has the effect of subjecting the operation to the NPDES permit program requirements. If a confined animal facility has a NPDES permit, then it is exempt from this management measure.

Facilities containing fewer than the number of head listed above are not subject to the requirements of this management measure.

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[1] *Animal unit: A unit of measurement for any animal feeding operation calculated by adding the following numbers: the number of slaughter and feeder cattle multiplied by 1.0, plus the number of mature dairy cattle multiplied by 1.4, plus the number of swine weighing over 25 kilograms (approximately 55 pounds) multiplied by 0.4, plus the number of sheep multiplied by 0.1, plus the number of horses multiplied by 2.0 (40 CFR Part 122, Appendix B).*

[2] *If facility has a liquid manure system, as used in 40 CFR Section 122, Appendix B.*

[3] *If facility has continuous overflow watering, as used in 40 CFR Section 122, Appendix B.*

A *confined animal facility* is a lot or facility (other than an aquatic animal production facility) where the following conditions are met:

- Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and
- Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

Two or more animal facilities under common ownership are considered, for the purposes of these guidelines, to be a single animal facility if they adjoin each other or if they use a common area or system for the disposal of wastes.

Confined animal facilities, as defined above, include areas used to grow or house the animals, areas used for processing and storage of product, manure and runoff storage areas, and silage storage areas.

Wastewater and runoff from confined animal facilities are to be controlled under this management measure. Runoff includes any precipitation that comes into contact with any manure, litter, or bedding. Wastewater is water discharged in the operation of an animal facility as a result of any or all of the following: animal or poultry watering; washing, cleaning, or flushing pens, barns, manure pits, or other animal facilities; washing or spray cooling of animals; and dust control.

Responsible Agencies and Authorities

Hawaii Department of Health (DOH) is the lead agency for implementing this management measure because it implements programs for wastewater management, water pollution control, safe drinking water, sanitation and solid waste management. DOH uses its *Guidelines for Livestock Waste Management* (1996) to require specific best management practices for siting, design, and pollution prevention for confined animal facilities.

The approval to construct and operate a livestock feeding or processing operation and its waste system is obtained through a plan review and approval process conducted by DOH under Chapter 11-62, HAR. Before construction, landowner must submit a site plan, design plan, and pollution prevention plan for review and approval by DOH. Prior to the introduction of livestock, DOH must conduct a site inspection of the completed construction and be satisfied that the facilities, waste systems, and pollution control measures are constructed in accordance with the approved plans and specifications.

Normally, operators of a confined animal facility will work with the local soil and water conservation district (SWCD) to develop a conservation plan for approval by the district. NRCS usually assists in developing conservation plans to treat existing and potential resource problems and has funding available to assist with the installation of best management practices, under the Federal Farm Bill.

The University of Hawaii Cooperative Extension Service (CES) can also provide technical assistance. One of the publications developed under its Farm*A*Syst program is entitled *Minimizing Pollution Risk from Livestock Operations* (HAPPI-Farm 7; December 2000). The four-page publication helps land users assess how their land management practices can impact the quality of both Hawaii's groundwater and

surface water bodies. It describes practices to properly locate livestock, manage and store manure, maintain livestock facilities, prepare for emergency action, and minimize waste.

Significant amounts of lands in agriculture are State lands leased to agricultural operators. DLNR's Land Division is responsible for leasing these lands under Chapter 171, HRS. One of these lease conditions is that the operators work with the local soil and water conservation districts to develop and implement a conservation plan. Pursuant to Act 90, SLH 2003, beginning on January 1, 2010, the authority to manage, administer, and exercise control over any public lands that are designated important agricultural lands pursuant to section 205-44.5, HRS, shall be transferred from DLNR to the State Department of Agriculture (DOA) (Section 171-3(b), HRS). Several leases have already been approved for transfer, which will occur in phases.

Hawaii Department of Health (DOH) has regulatory authority over water pollution control and ensuring safe drinking water (Chapter 342D, HRS; Chapter 340E, HRS; Chapter 342H, HRS; Chapter 11-11, HAR; Chapter 11-21, HAR; Chapter 11-23, HAR; Chapter 11-26, HAR).

Management Practices

NRCS's *Hawaii Field Office Technical Guide* (eFOTG) contains many standards related to confined animal facilities, among them: waste storage facility (313); composting facility (317); waste treatment lagoon (359); waste facility cover (367); roof runoff structure (558); heavy use area protection (561); amendments for treatment of agricultural waste (591); waste treatment (629); solid/liquid waste separation facility (632); waste utilization (633); and manure transfer (634).

C. Nutrient Management Measure

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

(1) Farm and field maps showing acreage, crops, soils, and waterbodies.
(2) Realistic yield expectations for the crop(s) to be grown, based on achievable yields for the crop. Individual producer constraints and other producer's yields would be considered in determining achievable yields.
(3) A summary of the soil condition and nutrient resources available to the producer, which at a minimum would include:
- **An appropriate mix of soil (pH, P, K) and/or plant tissue testing or historic yield response data for the particular crop;**
- **Nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable);**
- **Nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and**
- **Other significant nutrient sources (e.g., irrigation water).**

(4) An evaluation of field limitations based on environmental hazards or concerns, such as:
- **Lava tubes, shallow soils over fractured bedrock, and soils with high leaching or runoff potential,**
- **Distance to surface water,**
- **Highly erodible soils, and**
- **Shallow aquifers.**

(5) Best available information is used in developing recommendations for the appropriate mix of nutrient sources and requirements for the crops.
(6) Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible during periods of leaching or runoff.
(7) Methods and practices used to prevent soil erosion or sediment loss.
(8) Provisions for the proper calibration and operation of nutrient application equipment.

Status of Measure: APPROVED

Applicability: This management measure applies to activities associated with the application of nutrients, including both manures and commercial fertilizers, to agricultural lands.

Responsible Agencies and Authorities

Normally, operators of a confined animal facility will work with the local soil and water conservation district (SWCD) to develop a conservation plan for approval by the district. NRCS usually assists in developing conservation plans to treat existing and potential resource problems and has funding available to assist with the installation of best management practices, under the Federal Farm Bill.

The University of Hawaii Cooperative Extension Service (CES) can also provide technical assistance. Scientists within the University of Hawaii College of Tropical Agriculture and Human Resources (CTAHR), where the CES resides, developed a document entitled *Plant Nutrient Management in Hawaii's Soils: Approaches for Tropical and Subtropical Agriculture* (J.A. Silva and R.S. Uchida, eds., 2000, http://www.ctahr.hawaii.edu/acad/PIO/FreePubs/PlantNutrient.asp) for use by extension agents, NRCS and District personnel, and growers to address issues particular to nutrient management in Hawaii. The chapters are intended to help farmers and technical personnel understand how soil and plant tissue analyses are interpreted to diagnose plant nutrition problems, and how soil management recommendations are developed to prevent or correct those problems. The approach is a scientific one, based on methods and processes used by faculty of CTAHR.

Another publication developed by CTAHR under its Farm*A*Syst program is entitled *Minimizing Pollution Risk from Nutrient Management* (HAPPI-Farm 4; December 2000). The four-page publication provides information on nutrient management for agricultural activities, and helps land users identify the level of risk from current practices and develop an action plan to establish practices that reduce the risks of contamination to surface and ground waters.

Significant amounts of lands in agriculture are State lands leased to agricultural operators. DLNR's Land Division is responsible for leasing these lands under Chapter 171, HRS. One of the requirements of these leases is that the operators work with the local soil and water conservation districts to develop and implement a conservation plan, as a lease condition. Pursuant to Act 90, SLH 2003, beginning on January 1, 2010, the authority to manage, administer, and exercise control over any public lands that are designated important agricultural lands pursuant to section 205-44.5, HRS, shall be transferred from DLNR to the State Department of Agriculture (DOA) (Section 171-3(b), HRS). Several leases have already been approved for transfer, which will occur in phases.

Hawaii Department of Health (DOH) has regulatory authority over water pollution control and ensuring safe drinking water (Chapter 342D, HRS; Chapter 340E, HRS; Chapter 342H, HRS; Chapter 11-21, HAR; Chapter 11-23, HAR).

Management Practices

NRCS's *Hawaii Field Office Technical Guide* (eFOTG) contains a standard related to nutrient management (590), intended to help operators manage the amount, source, placement, form and timing of the application of plant nutrients and soil amendments.

Plant Nutrient Management in Hawaii's Soils: Approaches for Tropical and Subtropical Agriculture (2000) also describes best management practices that can be used to assure proper management of nutrients.

D. Pesticide Management Measure

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

(1) Use integrated pest management strategies where available that minimize chemical uses for pest control.

(2) Manage pesticides efficiently by:

(a) calibrating equipment;

(b) using appropriate pesticides for given situation and environment;

(c) using alternative methods of pest control; and

(d) minimizing the movement of pest control agents from target area.

(3) Use anti-backflow devices on hoses used for filling tank mixtures.

(4) Enhance degradation or retention by increasing organic matter content in the soil or manipulating soil pH.

Status of Measure: APPROVED

Applicability: This management measure applies to activities associated with the application of pesticides to agricultural lands.

Responsible Agencies and Authorities

Under the authority of Chapter 149A, HRS, Department of Agriculture (DOA), Pesticides Branch, is the lead agency for implementing those measures that relate to regulating pesticides. Chapter 4-66, HAR, administered by DOA, relates to the registration, licensing, certification, recordkeeping, usage, and other activities related to the safe and effective use of pesticides. It requires that those who apply or directly supervise others who apply restricted use pesticides be certified. Certification requires some understanding of the environmental concerns of using pesticides. This requirement is implemented under the CES/DOA Pesticide Applicator Program. Certification is not required for those using pesticides that are not classified as "restricted use."

The local soil and water conservation district (SWCD) normally works with an agricultural landowner to develop a conservation plan for approval by the district. An approved conservation plan enables the landowner to be exempted from the county grading ordinances for any earthmoving activities. NRCS usually assists in developing conservation plans to treat existing and potential resource problems and has funding available to assist with the installation of best management practices, under the Federal Farm Bill. NRCS's *Hawaii Field Office Technical Guide* (eFOTG) outlines conservation practice standards for pest management.

Significant amounts of lands in agriculture are State lands leased to agricultural operators. DLNR's Land Division is responsible for leasing these lands under Chapter 171, HRS. One of these lease conditions is that the operators work with the local soil and water conservation districts to develop and implement a conservation plan. Pursuant to Act 90, SLH 2003, beginning on January 1, 2010, the authority to manage, administer, and exercise control over any public lands that are designated important agricultural lands pursuant to section 205-44.5, HRS, shall be transferred from DLNR to the

State Department of Agriculture (DOA) (Section 171-3(b), HRS). Several leases have already been approved for transfer, which will occur in phases.

The University of Hawaii Cooperative Extension Service (CES) can also provide technical assistance. One of the publications developed under its Farm*A*Syst program is entitled *Minimizing Pollution Risk from Pest Management* (HAPPI-Farm 15; December 2000). The six-page publication provides information on pest management planning and proper pesticide use, and promotes the use of integrated pest management. It helps land users assess the water pollution risks from their activities and develop action plans to establish practices that reduce pollution risks.

Hawaii Department of Health (DOH) has regulatory authority over water pollution control and ensuring safe drinking water (Chapter 342D, HRS; Chapter 340E, HRS; Chapter 11-21, HAR; Chapter 11-23, HAR).

Management Practices

NRCS's *Hawaii Field Office Technical Guide* (eFOTG) contains several standards related to pesticides, including pest management (595). This standard outlines practices to utilize environmentally-sensitive prevention, avoidance, monitoring and suppression strategies to manage weeds, insects, diseases, animals and other organisms (including invasive and non-invasive species) that directly or indirectly cause damage or annoyance.

E. Grazing Management Measure

Protect range, pasture and other grazing lands:

(1) By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, near coastal waters/ shorelines, and riparian zones):

- **(a) Exclude livestock,**
- **(b) Provide stream crossings or hardened watering access for drinking,**
- **(c) Provide alternative drinking water locations,**
- **(d) Locate salt and additional shade, if needed, away from sensitive areas, or**
- **(e) Use improved grazing management (*e.g.*, herding) to reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock; and**

(2) By achieving either of the following on all range, pasture, and other grazing lands not addressed under (1):

- **(a) Implement range and pasture conservation and management practices that apply the progressive planning approach of USDA-NRCS following the standards and specifications contained in the FOTG that achieve an acceptable level of treatment to reduce erosion, and/or**
- **(b) Maintain range, pasture, and other grazing lands in accordance with activity plans established by the Division of Land Management of DLNR, federal agencies managing grazing land, or other designated land management agencies.**

Status of Measure: APPROVED

Applicability: The management measure applies to activities on range, irrigated and non-irrigated pasture, and other grazing lands used by domestic livestock. Range is those lands on which the native vegetation (climax or natural potential plant community) is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing use. Range includes natural grassland, savannas, many wetlands, some deserts, tundra, and certain forb and shrub communities. Pastures are those lands that are primarily used for the production of adapted, domesticated forage plants for livestock. Other grazing lands include woodlands, native pastures, and croplands producing forages.

The major differences between range and pasture are the kind of vegetation and level of management that each land area receives. In most cases, range supports native vegetation that is extensively managed through the control of livestock rather than by agronomy practices, such as fertilization, mowing, irrigation, etc. Range also includes areas that have been seeded with introduced species, but which are extensively managed like native range. Pastures are represented by those lands that have been seeded, usually with introduced species or in some cases with native plants, and which are intensively managed using agronomy practices and control of livestock.

The intent of the management measure is to protect surface and ground water quality. Some waterbodies, such as farm ponds, have been created to water livestock. Protecting the water quality of these artificial water storage areas does not have the same priority as protecting natural streams and waterbodies.

Responsible Agencies and Authorities

Normally, agricultural operators will work with the local soil and water conservation district (SWCD) to develop a conservation plan for approval by the district. NRCS usually assists in developing conservation plans to treat existing and potential resource problems and has funding available to assist with the installation of best management practices, under the Federal Farm Bill. NRCS's *Hawaii Field Office Technical Guide* (eFOTG) outlines conservation practice standards and specifications for grazing management.

Significant amounts of lands in agriculture are State lands leased to agricultural operators. DLNR's Land Division is responsible for leasing these lands under Chapter 171, HRS. One of the requirements of these leases is that the operators work with the local soil and water conservation districts to develop and implement a conservation plan, as a lease condition. Pursuant to Act 90, SLH 2003, beginning on January 1, 2010, the authority to manage, administer, and exercise control over any public lands that are designated important agricultural lands pursuant to section 205-44.5, HRS, shall be transferred from DLNR to the State Department of Agriculture (DOA) (Section 171-3(b), HRS). Several leases have already been approved for transfer, which will occur in phases.

The University of Hawaii Cooperative Extension Service (CES) can also provide technical assistance. A couple of the publications developed under its Farm*A*Syst program are entitled *Minimizing Pollution Risk from Pasture Management* (HAPPI-Farm 8; December 2000) and *Minimizing Pollution Risk from Livestock Operations* (HAPPI-Farm 7; December 2000). These publications provide information on how land users can reduce the risk of nonpoint source pollution from pastures and livestock.

Hawaii Department of Health (DOH) has regulatory authority over water pollution control (Chapter 342D, HRS).

Management Practices

Of particular interest to the implementation of this management measure is NRCS's standard and specifications for Prescribed Grazing (528). This specification provides guidance for developing a grazing plan that conforms to all applicable federal, state, and local laws. It seeks measures to avoid adverse effects to endangered, threatened, and candidate species and their habitats; and identifies periods of grazing, resting, and other treatment activities for each management unit. It also recommends developing a (1) contingency plan that details potential problems (*e.g.*, severe drought, flooding, wildfire) and serves as a guide for adjusting the grazing prescription to ensure resource management and economic feasibility without resource degradation and (2) monitoring plan with appropriate records to assess whether the grazing strategy is meeting objectives.

F. Irrigation Water Management Measure

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

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

The following limitations and special conditions apply:

(1) In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.
(2) By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.
(3) The time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible.
(4) In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.
(5) Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.
(6) In some locations, sprinkler irrigation is used for crop cooling or other benefits (*e.g.*, watercress). In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should not contribute to erosion or pollution.

Status of Measure: APPROVED

Applicability: This management measure applies to activities on irrigated lands, including agricultural crop and pasture land (except for isolated fields of less than 10 acres in size that are not contiguous to other irrigated lands); orchard land; specialty cropland; and nursery cropland. Those land users already practicing effective irrigation management in conformity with the irrigation water management measure may not need to purchase additional devices to measure soil-water depletion or the volume of irrigation water applied, and may not need to expend additional labor resources to manage the irrigation system.

Responsible Agencies and Authorities

Hawaii Department of Health (DOH) is the lead agency for implementing this management measure because it implements programs for water pollution control and safe drinking water. Chapter 11-21, HAR, Cross-Connection and Back-Flow Control, administered by DOH, requires that a reduced pressure principal back-flow preventer or air gap separation be installed as part of any piping network in which fertilizers, pesticides and other chemicals or toxic contaminants are injected or siphoned into the irrigation system (§11-21-7(a)(4), HAR).

The local soil and water conservation district (SWCD) normally works with an agricultural landowner to develop a conservation plan for approval by the district. An approved conservation plan enables the landowner to be exempted from the county grading ordinances for any earthmoving activities. NRCS usually assists in developing conservation plans to treat existing and potential resource problems and has funding available to assist with the installation of best management practices, under the Federal Farm Bill. NRCS's *Hawaii Field Office Technical Guide* (eFOTG) outlines conservation practice standards for irrigation.

Significant amounts of lands in agriculture are State lands leased to agricultural operators. DLNR's Land Division is responsible for leasing these lands under Chapter 171, HRS. One of the requirements of these leases is that the operators work with the local soil and water conservation districts to develop and implement a conservation plan, as a lease condition. Pursuant to Act 90, SLH 2003, beginning on January 1, 2010, the authority to manage, administer, and exercise control over any public lands that are designated important agricultural lands pursuant to section 205-44.5, HRS, shall be transferred from DLNR to the State Department of Agriculture (DOA) (Section 171-3(b), HRS). Several leases have already been approved for transfer, which will occur in phases.

The University of Hawaii Cooperative Extension Service (CES) can also provide technical assistance. One of the publications developed under its Farm*A*Syst program is entitled *Minimizing Pollution Risk from Irrigation Management* (HAPPI-Farm 6; December 2000). The four-page publication helps land users assess the water pollution risks associated with their irrigation practices and develop action plans to reduce those risks.

Hawaii Department of Health (DOH) has regulatory authority over water pollution control (Chapter 342D, HRS; Chapter 340E, HRS; Chapter 11-23, HAR).

Management Practices

NRCS's *Hawaii Field Office Technical Guide* (eFOTG) contains many standards related to irrigation water management, among them: irrigation water conveyance, high pressure (430DD); irrigation water conveyance, low pressure (430EE); irrigation water conveyance, steel pipeline (430FF); irrigation storage reservoir (436); irrigation system, micro-irrigation (441); irrigation system, sprinkler (442); irrigation system, surface and subsurface (443); irrigation water management (449); irrigation land leveling (464); irrigation regulating reservoirs (552); spring development (574); structure for water control (587); and water harvesting catchment (636).

CHAPTER 2: FORESTRY

A. Introduction

There are ten management measures that apply to forestry, all of which have been approved by NOAA and EPA. These management measures address the management of polluted runoff from all types of forestry operations in Hawaii.

The following table provides a summary of authorities that apply to the forestry management measures. A written description of the specific authorities and implementation tools are provided under each management measure in Section B. Appendix A contains tables providing the relevant language for each regulatory and non-regulatory mechanism for each management measure.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified below. Specific precautions will be taken to ensure that sensitive data, such as specific names and locations of practices, is maintained in full confidence. If detailed information is required due to violation of water quality standards, this information may be acquired by formal request in accordance with the Freedom of Information Act.

Indicators for Tracking Implementation

SWCDs/NRCS	number of conservation plans related to forestry operations approved annually by SWCD, with acreage covered; BMPs for forestry operations; results of periodic inspections to ensure both technical specifications and maintenance standards have been met
DLNR	number of conservation plans approved annually for Conservation District Use Permits for forestry operations, and under the Forest Stewardship and Tree Farms programs, with acreage covered; BMPs for forestry operations; results of periodic inspections to ensure both technical specifications and maintenance standards have been met
DOH	number of water quality violations that were caused by runoff from forestry operations

Hawaii's forestry program is a voluntary, incentive-driven program which uses a manual of forestry best management practices (BMPs). Forestry generally occurs on agricultural lands and conservation lands designed for commercial forest use.

All commercial forestry activities conducted on public (State) leased lands or undertaken on private lands as part of a cooperative Forest Stewardship project or Tree Farm plan must implement relevant BMPs contained in *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998). The manual was adopted by the Board of Land and Natural Resources (BLNR) at its October 10, 1997 meeting. The manual addresses the (g) guidance management measures and encourages implementation of appropriate best management practices.

While forestry operations are allowed within the "Resource" subzone of the State Conservation District, they are required to have a Conservation District Use Permit (CDUP) under Chapter 13-5, HAR, and implement an approved management plan. Forestry-related management activities (*e.g.*, salvage logging) on State forest reserve lands also require a permit.

A significant portion of potential forestry operations in Hawaii will likely occur on private lands within the Agricultural District, which are outside the purview of DLNR. However, forestry activities involving earth movement would require a County grading and grubbing permit unless otherwise exempted from these requirements. In most cases, the landowner agrees to work with the local soil and water conservation district (SWCD) to develop and implement an approved conservation plan in order to be exempted from the requirements of the respective county grading ordinances.

Hawaii Forest Stewardship Program

Hawaii's Forest Stewardship Program (FSP) was established under Chapter 195F, HRS, and is administered by DLNR's Department of Forestry and Wildlife (DOFAW) under Chapter 13-109, HAR. It provides technical and financial assistance to owners of non-industrial private forest land. To be eligible for the program, applicants must own or lease at least 5 contiguous acres of forested or formerly forest land and intend to actively manage the land to enhance forest resource values for both private and public benefit. The State will provide cost-share assistance to land manager to develop and/or implement a management plan under contract agreement. Environmental assessments are required if the management plan includes the establishment of timber with the intent of eventual harvesting or the construction of fences. Grant management objectives eligible for cost-share assistance are: forest stewardship management plan development; growth and management of forests for non-industrial timber and other forest products; native species restoration; agroforestry (the forestry component only); windbreaks (to protect forestry project areas); watershed, riparian, and/or wetland protection and improvement; forest recreation enhancement; native wildlife habitat enhancement; and native forest conservation. A *Forest Stewardship Handbook* (DLNR 2007) describes the program and project proposal and forest stewardship management plan formats. The program contains a penalty payback provision to be applied in the event that a landowner terminates any approved practice required under the forest stewardship management plan.

Tree Farm Plans

Chapter 186, HRS, "Tree Farms" provides a designation for lands engaged in sustained production of forest products in quantities sufficient to establish a business. Eligible lands are private or leased (20 years or more) lands within the agricultural district or on degraded forest and pasture lands within the permitted State conservation district subzone designated for forest use. DLNR administered the program under Chapter 13-106, HAR, "Rules for Establishing Tree Farms." Under these rules, land owners agree to manage land in accordance with a forest management plan approved by DLNR, which addresses the establishment, maintenance, and harvest of forest products in a sustained manner while exercising sound conservation prescriptions, in exchange for designation as a Tree Farm property. The statute also provides a "right to harvest" as an incentive. As an additional incentive, when a forestry operation has received approval of its management plan, it can petition the respective county to qualify for the lower property tax rate for tree farms. Failure to comply with the management plan

and agreement with DLNR can result in the cancellation of the Tree Farm designation, which can have negative tax consequences.

Education and Outreach

Hawaii's Pollution Prevention Information Project (HAPPI) has been developed by the Water Quality program of the University of Hawaii Cooperative Extension Service (CES) to make the Farm*A*Syst and Home*A*Syst materials effective and useful in Hawaii. It is an assessment and educational tool that addresses specific pollution risks in Hawaii. The materials consist of fact sheets and worksheets. Their development was funded by CWA 319(h) funds through DOH's Polluted Runoff Control Program.

One of the publications developed under the HAPPI program is entitled *Minimizing Pollution Risk from Forest and Streamside Areas Management* (HAPPI-Farm 10; December 2000). The four-page publication is a combination of factual materials and suggestions, risk assessment table, and action plan table to be completed after the self-assessment is done. The text covers both forests and riparian areas and is intended for "owners and managers of properties with tree farms, forests, or large riparian areas of 1/2 acre or more." It points out that sediment is the most important NPS pollutant derived from these areas, advocates development of an operation-specific management plan, and refers to the BMP manual developed by DLNR.

CES also has a forestry extension specialist based out of the University of Hawaii at Hilo since 1998. The forestry extension program has been focusing on planting and growing activities, not on harvesting, since few local landowners are at the harvest stage yet.

Authority		Responsible Agency	Pre- harvest Planning	SMZs	Road Constr	Road Mgt	Timber Harvest	Site Prep & Forest Regen	Fire Mgt.	Reveg of Disturbed Areas.	Forest Chemical Mgt.	Wetland Forest Mgt.
Local	Chapter 22-7, KCC, Grading, Grubbing and Stockpiling	Kauai County DPW			X			X		X		
	Chapter 10 HCC, Soil Erosion and Sediment Control	Hawaii County DPW			X			X		X		
	Chapter 20.08, MCC, Soil Erosion and Sedimentation Control	Maui County DPW			X			X		X		
	Chapter 14-13 to 14-16, ROH, Grading, Soil Erosion and Sediment Control	City and County of Honolulu			X			X		X		
State	Chapter 149A, HRS Hawaii Pesticides Law	DOA									X	
	Chapter 171, HRS Mgt and Disposition of Public Lands	DLNR	X	X	X							
	Chapter 174C, HRS Hawaii Water Code	DLNR		X	X	X	X	X		X	X	X
	Chapter 180, HRS Soil and Water Conservation Districts	local SWCDs	X	X	X	X	X	X	X	X	X	X
	Chapter 183, HRS Forest Reserves, Water Development, Zoning	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 183C, HRS Conservation District	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 185, HRS Land Fire Protection Law	DLNR							X			
	Chapter 186, HRS Tree Farms	DLNR	X	X	X	X	X	X	X	X	X	X

Authority		Responsible Agency	Pre- harvest Planning	SMZs	Road Constr	Road Mgt	Timber Harvest	Site Prep & Forest Regen	Fire Mgt.	Reveg of Disturbed Areas.	Forest Chemical Mgt.	Wetland Forest Mgt.
State	Chapter 195F, HRS Forest Stewardship	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 342D, HRS Water Pollution	DOH	X	X	X	X	X	X	X	X	X	X
	Chapter 340E, HRS Safe Drinking Water	DOH									X	
	Chapter 342H, HRS Solid Waste Pollution	DOH					X					
	Chapter 342J, HRS Hazardous Waste	DOH					X					
	Chapter 4-66, HAR Pesticides	DOA									X	
	Chapter 11-21, HAR Cross Connection and Back-Flow Control	DOH									X	
	Chapter 11-60.1, HAR Air Pollution Control	DOH							X			
	Chapter 13-5, HAR Conservation Districts	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 13-104, HAR Regulating Activities within Forest Reserves	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 13-106, HAR Rules for Establishing Tree Farms	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 13-109, HAR Rules for Establishing Forest Stewardship	DLNR	X	X	X	X	X	X	X	X	X	X
	Chapter 13-169, HAR Protection of Instream Uses of Water	DLNR		X	X	X	X	X		X	X	X

Authority		Responsible Agency	Pre- harvest Planning	SMZs	Road Constr	Road Mgt	Timber Harvest	Site Prep & Forest Regen	Fire Mgt.	Reveg of Disturbed Areas.	Forest Chemical Mgt.	Wetland Forest Mgt.
State	Farm*A*Syst Program, University of Hawaii Cooperative Extension Svc.	Univ. of Hawaii CES		X								
	Best Management Practices for Maintaining Water Quality in Hawaii (June 1998)	DLNR	X	X	X	X	X	X	X	X	X	X
Federal	Section 404, CWA, permit	USACOE										X

B. Management Measures

A. Preharvest Planning Management Measure

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

(1) Identify the area to be harvested including location of waterbodies and sensitive areas such as wetlands, threatened or endangered aquatic species habitats, or high erosion hazard areas (landslide-prone areas) within the harvest unit.

(2) Time the activity for the season or moisture conditions when the least impact occurs.

(3) Consider potential water quality impacts and erosion and sedimentation control in the selection of silvicultural and regeneration systems, especially for harvesting and site preparation.

(4) Reduce the risk of occurrence of landslides and severe erosion by identifying high erosion-hazard areas and avoiding harvesting in such areas, to the extent practicable.

(5) Consider additional contributions from harvesting or roads to any known existing water quality impairments or problems in watersheds of concern.

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

(1) Locate and design road systems to minimize, to the extent practicable, potential sediment generation and delivery to surface waters. Key components are:

- **locate roads, landings, and skid trails to avoid, to the extent practicable, steep grades and steep hillslope areas, and to decrease the number of stream crossings;**
- **avoid, to the extent practicable, locating new roads and landings in Streamside Management Zones (SMZs); and**
- **determine road usage and select the appropriate road standard.**

(2) Locate and design temporary and permanent stream crossings to prevent failure and control impacts from the road system. Key components are:

- **size and site crossing structures to prevent failure;**
- **for fish-bearing streams, design crossings to facilitate fish passage.**

(3) Ensure that the design of road prism and the road surface drainage are appropriate to the terrain and that road surface design is consistent with the road drainage structures.

(4) Use suitable materials to surface roads planned for all-weather use to support truck traffic.

(5) Design road systems to avoid high erosion or landslide hazard areas. Identify these areas and consult a qualified specialist for design of any roads that must be constructed through these areas.

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

Status of Measure: APPROVED

Applicability: This management measures pertains to lands where silvicultural or forestry operations are planned or conducted. The planning process components of this management measure apply to

commercial harvesting on areas greater than 5 acres and any associated road system construction or reconstruction conducted as part of normal silvicultural activities. The component for ensuring implementation of this management measure applies to harvesting and road construction activities that are determined to be of a sufficient size to potentially impact the receiving water or that involve SMZs or stream crossings. This measure does not apply to harvesting conducted for pre-commercial thinning or noncommercial firewood cutting.

Responsible Agencies and Authorities

Hawaii Department of Land and Natural Resources (DLNR) is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, and for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local soil and water conservation district normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about pre-harvest planning:

> "An effective pre-harvest plan will take into consideration all aspects of the timber harvest which may lead to water quality degradation and plan for the implementation of BMPs which will minimize or avoid the adverse effects of the operation. The objective of pre-harvest planning from the perspective of non-point source pollution is to determine which BMPs are necessary to protect water quality and how those BMPs will be implemented. The following is recommended:
>
> (1) A pre-harvest plan should include the following information:
>
> A. Physical and administrative description
> - Property boundaries & administrative boundaries (zoning, etc.)
> - Topography
> - Location of streams and drainages
> - Location of SMZs and buffer strips
> - Forest types
> - Soil types
> - Areas of ecological and/or archaeological concerns
>
> B. Management Activities
> - Design and construction techniques for all new roads, skid trails, and landings or modification of existing roads, skid trails and landings.
> - Felling and bucking techniques
> - Yarding systems and layout

- Planned stream crossings
- Disposal of waste materials (machine lubricants)
- Post-harvest site preparation
- Reforestation activities

(2) The use of topographic maps, road maps, aerial photos, forest type maps, and soil surveys in combination with field reconnaissance is essential to determine site conditions and plan operations.

(3) Field reconnaissance with a trained forester or one who is knowledgeable about the specific area is highly recommended.

(4) Preliminary planning should consider the maintenance of existing drainage patterns and the location of environmentally sensitive areas such as streams, wet areas, and high erosion hazard areas.

(5) The design of roads, skid trails, and landings shall be integrated to minimize their impact.

(6) The grade of logging roads and skid trails should be less than 10% when possible, with 3-5% being the norm. Long, straight, unbroken grades are to be avoided. Adequate surface drainage shall be provided.

(7) Time the harvesting activity for the season or moisture conditions when the least impact occurs.

(8) A final pre-harvest site review shall be conducted by management so that road alignments and other considerations can be visually checked prior to road construction. The reconnaissance plan shall be modified as necessary to make desirable adjustments based on the final site review."

The BMP manual also includes the following language specifically about the planning, design and location of access roads within forestry operations:

"A well planned access system is a sound method of reducing erosion and sedimentation in areas requiring frequent or temporary access. Proper location and construction of roads will provide for safety, longer operating periods, lower maintenance and operating costs, and minimal impacts to water quality. The value of the resource served and site characteristics will influence the choice of road construction standards and maintenance activities. The following practices are recommended:

(1) Use a design to minimize damage to soil and water quality.

(2) Roads should be designed no wider than necessary to accommodate the immediate anticipated use.

(3) Design cut and fill slopes to minimize mass soil movement.

(4) Provide culverts, dips, water bars, and cross drainages to minimize road bed erosion.

(5) Design bridge and culvert installations using stream flow data, with a margin of safety proportional to the importance of the road and the protected resources.

(6) Provide drainage where surface and groundwater cause slope instability.

(7) Avoid diverting water from natural drainage ways. Dips, water bars, and cross drainage culverts should be placed above stream crossings so that water can be filtered through vegetative buffers before entering streams.

(8) Locate roads to fit the topography and minimize alterations to the natural features.

(9) Avoid marshes and wetlands.

(10) Minimize the number of stream crossings.

(11) Cross streams at right angles to the stream channel.

(12) A road may not be located in a Streamside Management Zone (SMZ) except where access is needed to a water crossing, or where there is no feasible alternative. A road in any SMZ must be designed and located to minimize adverse effects on fish habitat and water quality."

B. Streamside Management Zones (SMZs)

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

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to surface waters bordering or within the area of operation. SMZs should be established for perennial waterbodies as well as for intermittent streams that are flowing during the time of operation. Manmade structures that may function as streams and other natural waterbodies, such as livestock ponds, swales, and water distribution systems (*i.e.*, irrigation), are not considered perennial waterbodies or streams.

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit (SCAP) under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local soil and water conservation district normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to

address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about streamside management zones (SMZs):

"SMZs should be maintained along all perennial streams or where forest disturbances occur and surface runoff will carry sediment loads. SMZs should be maintained around streams, ponds, perennial flowing natural springs, and all springs and reservoirs serving as domestic water supplies. The following best management practices are recommended:

(1) The width of SMZs should be determined depending on the following conditions: slope of land adjacent to stream, soil erodibility, precipitation, knowledge of particular area, sensitivity of stream, etc. These factors can be obtained from soil maps, on-the-ground evaluation and measurements, weather data, etc.

(2) SMZs should be designed on a case-by-case basis. Most important is that SMZs be consistent with stream characteristics and wide enough to protect water quality.

Soil Type	Percent Slope	SMZ Width (each side)
Slightly erodible	0-5 %	35 ft.
Slightly erodible	5-20 %	35-50 ft.
Slightly erodible	20%+	50-160 ft.
Erodible	0-5 %	35-50 ft.
Erodible	5-20 %	80 ft. minimum
Erodible	20%+	160' minimum

Table 1. Recommended Widths for Streamside Management Zone

[NOTE: Please contact your local Natural Resources Conservation Service office to determine the erodibility factor of the soil before determining the proper width of the SMZ.]

(3) On relatively flat terrain (0-5%) on slightly erodible soils, the width of an SMZ should be at least 35 feet wide on each side of a stream.

(4) On relative flat terrain (0-5%) on erodible soils, the SMZ width should range between 35 to 50 feet on each side of a stream.

(5) On slightly erodible soils with slopes ranging between 5 and 20 percent, the SMZ width should range between 35 to 50 feet wide on each side of a stream.

(6) On erodible soils with slopes ranging between 5 and 20 percent, the SMZ width should range between 50 to 160 feet on each side of a stream.

(7) On slightly erodible soils with slopes exceeding 20 percent, the SMZ width should be at least 80 feet on each side of a stream.

(8) On erodible soils with slopes exceeding 20 percent, the SMZ width should be a minimum of 160 feet on each side of a stream.

(9) Partial harvesting is acceptable. A minimum of 50% of the original crown cover or 50 square feet of basal area per acre, evenly distributed, should be retained in the SMZ. This may be adjusted to meet on-site conditions.

(10) Clearcutting is always prohibited within the SMZ.

(11) Designate SMZs to provide stream shading, soil stabilization, sediment and water filtering effects, and wildlife habitat.

(12) Strive to protect the forest floor and understory vegetation from unnecessary damage. Do not remove (harvest) trees from banks, beds or slopes if it will destabilize the soil. Trees on the south and west banks provide the most critical shading of water.

(13) Access roads should cross perennial or intermittent streams at or near a right angle.

(14) Drainage structures such as ditches, cross drain culverts, water bars, rolling dips, and broad-based dips should be used on all roads prior to their entrance into an SMZ to intercept and properly discharge runoff waters.

(15) SMZs may be desirable on intermittent streams for large drainage areas where wildlife is a major landowner concern or for other reasons."

C. Road Construction/Reconstruction Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to road construction/ reconstruction operations for silvicultural purposes, including:

- *Clearing phase* - clearing to remove trees and woody vegetation from road right-of-way;
- *Pioneering phase* - excavating and filling the slope to establish road centerline and approximate grade;
- *Construction phase* - final grade and road prism construction and bridge, culvert, and road drainage installation; and
- *Surfacing phase* - placement and compaction of roadbed, road fill compaction, and surface placement and compaction (if applicable).

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about road construction/reconstruction:

“Once the road's location and design is staked out, road construction begins. Timber is out, logs and vegetation are removed and piled along the lower side of the right-of-way.

Most forest roads are built by excavating a road surface. Road design and layout on-the-ground show machine operators the proper cut slopes and indicate cut slope steepness. The bulldozer starts at the top of the cut slope, excavating and sidecasting material until the desired road grade and width is obtained. Material from cuts is often pushed in front of the blade to areas where fill is needed. Road fill is used to cover culverts and build up flat areas. Since fill must support traffic, it needs to be spread and compacted in layers to develop strength. The following practices are recommended:

(1) Construct roads when moisture and soil conditions are not likely to result in excessive erosion or soil movement.

(2) The boundaries of all SMZs shall be defined on the ground prior to the beginning of any earth-moving activity.

(3) Construct a road sufficient to carry the anticipated traffic load with reasonable safety and with minimum environmental impact.

(4) When using existing roads, reconstruct only to the extent necessary to provide adequate drainage and safety.

(5) Avoid construction during wet periods, when possible, to minimize unnecessary soil disturbance and compaction.

(6) Road grades should be kept at less than 10%, except where terrain requires short, steep grades.

(7) Minimize the number of stream crossings. Stream crossing construction should minimize disturbance of the area in which the crossing is being constructed.

(8) As slope increases, additional diversion ditches should be constructed to reduce the damages caused by soil erosion; ditches, adequate culverts, cross drains, etc., should be installed concurrent with construction.

(9) To control erosion, cut and fill slopes should conform to a design appropriate for the particular soil type and topography.

(10) Stumps, logs, and slash should be disposed of outside of the road prism; in no cases should they be covered with fill material and incorporated into road beds.

(11) Stabilize the side banks of a road during construction to aid in the control of erosion and road deterioration; this may require mesh or other stabilizing material in addition to planting and/or seeding and other structural measures.

(12) Water bars should be located to take advantage of existing wing ditches and cross drainage. Water bars should be constructed at an angle of 30 to 45 degrees to the road. Water bars should be periodically inspected and damage or breeches should be promptly corrected. Install water bars at recommended intervals to provide the drainage. Water bar spacing recommendations are as follows:

Grade of Road	Distance Between Water Bars
2%	250 ft.
5%	135 ft.
10%	80 ft.
15%	60 ft.
20%	45 ft.
25%	40 ft.
30%	35 ft.
40%	30 ft.

(13) Water bars may need to be spaced closer together depending on soil type and rainfall.

(14) Bridges and overflow culverts should be constructed to minimize changes in natural stream beds during high water.

(15) Culverts on perennial streams should be installed low enough to allow passage of aquatic life during low water."

D. Road Management

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

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to active and inactive roads constructed or used for silvicultural activities.

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about road management:

> "Maintenance of active and inactive roads shall be sufficient to maintain a stable surface, keep the drainage system operating, and protect the quality of streams. The following are recommended:
>
> (1) Maintenance should include cleaning dips and crossdrains, repairing ditches, marking culverts inlets to aid in location, and clearing debris from culverts.
>
> (2) Keep culverts, flumes, and ditches functional before and during the rainy season to diminish danger of clogging and the possibility of washouts. This can be done by clearing away any sediment or vegetation that could cause a problem. Provide for practical and scheduled preventative maintenance programs for high risk sites that will address the problems associated with high intensity rainfall events.
>
> (3) Conduct road surface maintenance as necessary to minimize erosion of the surface and subgrade.
>
> (4) During operations, keep the road surface crowned or outsloped, and keep the downhill side of the road free from berms except those intentionally constructed for protection of fill.
>
> (5) Avoid using roads during wet periods if such use would likely damage the road drainage features.
>
> (6) Water bars should be inspected after major rain storms and damage or breeches should be promptly corrected."

E. Timber Harvesting

The timber harvesting management measure consists of implementing the following:

(1) Timber harvesting operations with skid trails or cable yarding follow layouts determined under Management Measure A.

(2) Install landing drainage structures to avoid sedimentation, to the extent practicable. Disperse landing drainage over sideslopes.

(3) Construct landings away from steep slopes and reduce the likelihood of fill slope failures. Protect landing surfaces used during wet periods. Locate landings outside of SMZs. Minimize size of landing areas.

(4) Protect stream channels and significant ephemeral drainages from logging debris and slash material.

(5) Use appropriate areas for petroleum storage, draining, dispensing. Establish procedures to contain and treat spills. Recycle or properly dispose of all waste materials in accordance with State law.

For cable yarding:

(1) Limit yarding corridor gouge or soil plowing by properly locating cable yarding landings.

(2) Locate corridors for SMZs following Management Measure B.

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

For groundskidding:

(1) Within SMZs, operate groundskidding equipment only at stream crossings, to the extent practicable. In SMZs, fell and endline trees to avoid sedimentation.

(2) Use improved stream crossings for skid trails which cross flowing drainages. Construct skid trails to disperse runoff and with adequate drainage structures.

(3) On steep slopes, use cable systems rather than groundskidding where groundskidding may cause excessive sedimentation.

(4) Groundskidding should not be done across perennial or intermittent streams, except at improved stream crossings.

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to all harvesting, yarding, and hauling conducted as part of normal silvicultural activities on harvest units larger than 5 acres. This measure does not apply to harvesting conducted for precommercial thinnings or noncommercial firewood cutting.

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity

for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

DOH regulates the storage, disposal, and discharge of hazardous waste (including oil) and solid waste, under Chapters 342J and 342H, HRS.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about timber harvesting:

> "Timber harvesting is an integral part of most forest management programs. Harvesting operations cause a temporary disturbance in the forest as well as diminish water quality. However, it can be conducted in a manner where the impact to water quality is minimized and the re-establishment of vegetative cover is realized. Guidelines to help reduce the potential for nonpoint source pollution from harvesting trees are as follows:
>
> **Felling and Bucking**
>
> (1) Careful felling can minimize the impact of subsequent phases of the logging operation.
> (2) Trees should not be felled into streams, except where no safe alternative exists. In the latter case, such trees should be removed promptly.
>
> **Skidding**
>
> (1) Skidding should be done so as to avoid disrupting natural drainage and to prevent excessive soil displacement
> (2) Stream channels or road ditches should not be used as skid trails.
> (3) Skid trails on steep slopes should have occasional water bars.
> (4) Servicing of equipment involving fuel, lubricants, or coolants should be performed in places where these materials cannot enter streams. Spent oil should be collected for proper disposal, never poured on the ground.
> (5) Upon completion of logging, erosion-prone areas should be mulched or seeded.
>
> **Disposal of Debris and Litter**
>
> (1) Logging debris in streams should be removed immediately.
> (2) Debris from landings should not be pushed into drains, streams or Streamside Management Zones (SMZs)
> (3) All trash associated with the logging operation should be promptly removed (not buried) and hauled to a legal disposal site." (pages 10-11)

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998) also contains the following language about the proper storage and handling of oil products and fuel:

> "(1) Locate facilities away from streams and be prepared to clean up spills.

(2) Know and comply with regulations governing the storage, handling, application (including licensing of applicators), and disposal of hazardous substances.

(3) Do not transport, handle, store, load, apply or dispose of any hazardous substance or fertilizer in such a manner as to pollute water supplies or cause damage or injury to land, including humans, desirable plants and animals.

(4) Do not store, mix, or rinse hazardous substances or fertilizers within the streamside management zone or where they might enter streams or waterways.

(5) Develop a contingency plan for hazardous substance spills, including cleanup procedures.

(6) Report all spills to the Department of Health, Environmental Health Administration". (page 15)

Finally, the *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998) contains the following language about temporary access roads and landings during harvesting:

"(1) The location of temporary access roads (logging roads) should be planned before operations begin.

(2) Road construction should be kept to a minimum.

(3) Landings should be located to minimize the adverse impact of skidding on the natural drainage pattern.

(4) Logging roads and landings should be located on firm ground.

(5) Landings should be kept as small an area as possible.

(6) When operations are completed, provisions should be made to divert water run-off from the landings and roads." (page 8)

F. Site Preparation and Forest Regeneration Management Measure

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

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

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to all site preparation and regeneration activities conducted as part of normal silvicultural activities on harvested units larger than 5 acres.

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about site preparation and forest regeneration:

"Mechanical Site Preparation

(1) Avoid excessive soil compaction.

(2) Minimize erosion and the movement of sediment into waters.
(3) Prevent accumulation of debris in ponds, streams, or rivers.
(4) Windrows, disking, bedding, and planting with "furrow" type mechanical planters should follow contours.
(5) Avoid complete disking of steep slopes with extremely erodible soil.
(6) Plant trees on contour. (pages 10-11)

Reforestation
Regeneration includes hand and machine planting and direct seeding. Since hand planting and direct seeding pose no water quality problems, BMPs are not necessary. Some mineral soil exposure does occur with machine planting and BMPs are offered:

(1) Sites should receive the minimum preparation necessary to successfully control competing vegetation and establish a desirable timber stand. In general, the more intensive the treatment, the more concern for water quality.
(2) When working on slopes, mechanical operations such as ripping, shearing, etc., should follow contours.

Hand planting, direct seeding or natural regeneration should be used on protected areas adjacent to streams or on slopes too steep to machine plant." (pages 20-21)

G. Fire Management

Prescribe fire or suppress wildfire in a manner which reduces potential nonpoint source pollution of surface waters:
(1) Prescribed fire should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of subcanopy and herbaceous vegetation roots, especially in SMZs, in streamside vegetation for small ephemeral drainages, or on very steep slopes.
(2) Prescriptions for fire should protect against excessive erosion or sedimentation, to the extent practicable.
(3) All bladed firelines, for prescribed fire and wildfire, should be plowed on contour or stabilized with water bars and/or other appropriate techniques if needed to control excessive sedimentation or erosion of the fireline.
(4) Wildfire suppression and rehabilitation should consider possible nonpoint source pollution of watercourses, while recognizing the safety and operational priorities of fighting wildfires.

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to all prescribed burning conducted as part of normal activities on all management units for wildfire suppression and rehabilitation on forest, brush, and watershed lands.

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, and for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local soil and water conservation district normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Chapter 185, HRS, administered by DLNR, has provisions to protect wildlands from the destructive impacts of uncontrolled fire. The law provides for an organized approach to the prevention, pre-suppression, and suppression of fires which threaten forest, grass, brush, and watershed lands. The threat of wildfire is minimized by a permitting system established under Chapter 185-7, HRS. It also has provisions for those who willfully, maliciously, or negligently set fires.

DOH administers an Agricultural Burning Permit, required under Chapter 11-60.1, HAR. DOH issues permits for prescribed fire in support of fuel reduction in the interest of public safety. While this permit is designed primarily to meet air quality standards, the permit system also allows control of burning activities related to forest management.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about fire management:

> **"6.0 Wildfire Damage Control and Reclamation/Prescribed Burn**
> The prevention, control, and extinguishment of all wildfires on grass, brush, and watershed lands and the implementation of a prescribed fire program is a desirable goal. Where wildfires do occur, the first and foremost concern is to control the fire and limit the damage. Fire suppression activities can add to the problem of water quality protection.
>
> The loss of vegetative cover, destruction of soil-holding feature of root masses, the exposure of bare mineral soil, is a combination that makes the area burned a highly erodible one. The effects of suppression efforts and equipment operations necessary to control and stop the fire can magnify the erosion problem.
>
> The following are best management practices for wildfire control and reclamation:
>
> (1) The first and foremost concern in wildfire control is to prevent harm or damage to people and property. Fireline best management practices should incorporate minimum impact strategies, which meet land and resource management objectives.

(2) Areas with bare mineral soils should be revegetated and areas where vegetative cover has been killed or severely degraded should be regenerated with plant species appropriate for the soil conditions.

(3) First priority for revegetation/reforestation should be given to banks of surface water bodies so that the SMZ is reestablished.

(4) Firelines should be stabilized and, if necessary, revegetated. Erodible areas altered by suppression equipment activities should be repaired and revegetated as necessary.

(5) Access road surfaces should be repaired and stabilized as necessary.

(6) Whenever possible, avoid using fire suppression chemicals over watercourses and prevent their runoff into watercourses. Do not clean application equipment in watercourses or locations that drain into watercourses.

(7) Provide advance planning and training for firefighters that consider water quality impacts when fighting wildfires. This can include increasing awareness so direct application of fire suppression chemicals to waterbodies is avoided and firelines are appropriately placed.

(8) Include rehabilitative practices as part of suppression and post-suppression tactics and strategies to mitigate non-point source pollution.

6.1 Fireline Construction and Maintenance

Fireline construction and maintenance is an essential part of forest and other land management activities. It deals with site preparation burning, prescribed burning, and wildfire defense and control. A number of control practices can be implemented during fireline construction to prevent unnecessary erosion. Periodic inspection and proper maintenance can prevent potential erosion on established firelanes. The following are best management practices for fireline construction and maintenance:

(1) Firelines should be constructed on the perimeter of the burn area and along the boundary of the Streamside Management Zone. The purpose of protecting the Streamside Management Zone from fire is to safeguard the filtering effects of the litter and organic matter.

(2) Firelines should follow the guidelines established for logging trails and skid trails with respect to waterbars and wing ditches, and should be only as wide and as deep needed to permit safe prescribed burns or fire suppression needs.

(3) Firelines which would cross a drainage should be turned parallel to the stream or have a wing ditch or other structure allowing runoff in the line to be dispersed rather than channeled directly into the stream.

(4) All firelines should be assessed after the fire is controlled for appropriate stabilization, and if necessary, proper rehabilitation should be done while equipment and people are in place.

6.2 Prescribed Burn

(1) Intense prescribed fire for site preparation shall be conducted only if it achieves desired results with minimum impacts to water quality.

(2) Burning on steep slopes or highly erodible soils should be conducted when they are absolutely necessary and should follow carefully planned prescriptions.

(3) Carefully plan burning to adhere to time of year, weather, topography, and fuel conditions that will help achieve the desired results and minimize impacts on water quality. With proper planning, prescribed fires should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of the subcanopy and herbaceous vegetation roots, in streamside vegetation, small ephemeral drainages, or on very steep slopes.

(4) Site preparation burning creates the potential for soil movement. Burning in the SMZ reduces the filtering capacity of the litter. All efforts should be made to plan burns to minimize impacts on the SMZ.

(5) All bladed firelines, for prescribed fire and wildfire activities, should be built so as to minimize erosion. If necessary, the firelines should be stabilized with water bars and/or other appropriate techniques to control excessive sedimentation or erosion of the fireline. Include any erosion control practices in the construction of firelines." (pages 18-20)

H. Revegetation of Disturbed Areas

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

(1) Revegetate disturbed areas (using seeding or planting) promptly after completion of the earth-disturbing activity. Local growing conditions will dictate the timing for establishment of vegetative cover.

(2) Use mixes of species and treatments developed and tailored for successful vegetation establishment for the region or area.

(3) Concentrate revegetation efforts initially on priority areas such as disturbed areas in SMZs or the steepest areas of disturbance near drainages.

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to all disturbed areas resulting from harvesting, road building, and site preparation conducted as part of normal silvicultural activities. Disturbed areas are those localized areas within harvest units or road systems where mineral soil is exposed or agitated (*e.g.*, road cuts, fill slopes, landing surfaces, cable corridors, or skid trail ruts).

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains BMPs related to the revegetation of disturbed areas under the following headings:

"Road Construction

(11) Stabilize the side banks of a road during construction to aid in the control of erosion and road deterioration; this may require mesh or other stabilizing material in addition to planting and/or seeding and other structural measures. (page 7)

Harvesting - Temporary Access Roads and Landings

(1) When operations are completed, provisions should be made to divert water run-off from the landings and roads. (page 8)

Timber Harvesting - Skidding

(1) Upon completion of logging, erosion-prone areas should be mulched or seeded. (page 10)

Wildfire Control and Reclamation

(2) Areas with bare mineral soils should be revegetated and areas where vegetative cover has been killed or severely degraded should be regenerated with plant species appropriate for the soil conditions.
(3) First priority for revegetation/reforestation should be given to banks of surface water bodies so that the SMZ is reestablished.
(4) Firelines should be stabilized and, if necessary, revegetated. Erodible areas altered by suppression equipment activities should be repaired and revegetated as necessary." (page 19)

I. Forest Chemical Management

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

(1) Conduct applications by skilled and, where required, licensed applicators according to the registered use, with special consideration given to impacts to nearby surface and ground waters.

(2) Carefully prescribe the type and amount of pesticides appropriate for the insect, fungus, or herbaceous species.

(3) Establish and identify buffer areas for surface waters. (This is especially important for aerial applications.)

(4) Prior to applications of pesticides and fertilizers, inspect the mixing and loading process and the calibration of equipment, and identify the appropriate weather conditions, the spray area, and buffer areas for surface waters.

(5) Immediately report accidental spills of pesticides or fertilizers into surface waters to the appropriate State agency. Develop an effective spill contingency plan to contain spills.

Status of Measure: APPROVED

Applicability: This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to all fertilizer and pesticide applications (including biological agents) conducted as part of normal silvicultural activities.

Responsible Agencies and Authorities

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

Under the authority of Chapter 149A, HRS, Department of Agriculture (DOA), Pesticides Branch, is the lead agency for implementing those measures that relate to regulating pesticides. Chapter 4-66, HAR, administered by DOA, relates to the registration, licensing, certification, recordkeeping, usage, and other activities related to the safe and effective use of pesticides. It requires that those who apply or directly supervise others who apply restricted use pesticides be certified. Certification requires some understanding of the environmental concerns of using pesticides. This requirement is implemented under the CES/DOA Pesticide Applicator Program. Certification is not required for those using pesticides that are not classified as “restricted use.”

Management Practices

The *Best Management Practices for Maintaining Water Quality in Hawaii* (June 1998), which was adopted by the BLNR for implementation through its relevant programs and permit processes, contains the following specific language about forest chemical management:

"A) Transportation

(1) Inspect all containers prior to loading and ensure all caps, plugs and bungs are tightened
(2) Handle containers carefully when loading them onto vehicles
(3) Secure containers properly to prevent shifting during transport
(4) Check containers periodically enroute
(5) Limit access to containers during transport to prevent tampering
(6) Educate and inform the driver of the proper transportation precautions
(7) Never transport pesticides unless arrangements have been made to receive and store them properly

B) Storage

(1) Chemicals should be managed and stored in accordance with all applicable federal, state, or local regulations. These would include:
    - The EPA container registration label, as printed on the label
    - Label instruction for use as provided by the manufacturer
    - Requirements or the use, application, and registration of pesticides
    - Requirements relating to the licensing of applicators
(2) All containers should be labeled in accordance with applicable federal, state and local regulations.
(3) Store pesticides in their original containers with labels intact.
(4) Do not store pesticides for extended periods in buildings that cannot contain a complete spill from the largest container being stored.
(5) Check containers prior to storage and periodically during storage to ensure that they are properly sealed.
(6) Locate pesticide storage facilities at sites that minimize the possibility of impacts of water quality in case accidents or fires occur.
(7) Use storage buildings that have floors constructed of concrete or other impermeable materials so that spills are easy to clean up.
(8) Ensure that storage facilities can be secured under lock and key.
(9) Post storage areas with a list of chemicals and quantities stored and notify the fire department about storage.

C) Mixing/Loading

(1) Review the label before opening the container to ensure familiarity with current use directions.
(2) Exercise care and caution during mixing and loading.
(3) Replace pour caps and close bags or other containers immediately after use.
(4) Mix chemicals and clean equipment only where possible spills would not enter streams, lakes or ponds.
(5) Chemicals should not be applied where stream pollution is likely to occur through aerial drift.
(6) Use a spray device capable of immediate shutoff.

D) Application

(1) Refer to label directions before making a pesticide application.

(2) Check all application equipment carefully, particularly for leaking hoses and connections and plugged or worn nozzles. Calibrate spray equipment periodically to achieve uniform distribution and rate.
(3) Apply pesticides under favorable weather conditions. Never apply a pesticide when there is a likelihood of significant drift.
(4) Always use pesticides in accordance with label instruction, and adhere to all Federal and State policies and regulations governing pesticide use.

E) Cleanup and Disposal

(1) Before disposal, containers should be rinsed as described in equipment cleanup.
(2) Cleanup should be in a location where chemicals will not enter any stream, pond, or where stream pollution might occur.
(3) Rinse empty pesticide containers and mixing apparatus as many times as needed. This flushing should be applied in spray form to the treated area, NOT into the ground near streams.
(4) Dispose of pesticide wastes and containers according to federal and state laws. Some pesticide wastes are specifically identified as hazardous wastes by law and must be handled and disposed of in accordance with hazardous waste regulations. For more information about proper management of waste pesticides, contact the Department of Health, Environmental Health Administration." (pages 13-14)

J. Wetland Forest Management

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

Status of Measure: APPROVED

Applicability: This management measure is intended for forested wetlands where silvicultural or forestry operations are planned or conducted. It applies specifically to forest management activities in forested wetlands and to supplement the previous management measures by addressing the operational circumstances and management practices appropriate for forested wetlands. This management measure applies specifically to forest management activities in forested wetlands, including those currently undertaken under the exemptions of Section 404(f) of the Federal Water Pollution Control Act (40 CFR, Part 232). Many normal, ongoing forestry activities are exempt under Section 404(f)(1) unless recaptured under the provisions of Section 404(f)(2). This management measure is not intended to prohibit these silvicultural activities but to reduce incidental or indirect effects on aquatic functions as a result of these activities.

Responsible Agencies and Authorities

Because forested wetlands are typically located within protected areas, it is unlikely that forestry or silvicultural operations will be conducted on a commercial basis. However, salvage operations (*e.g.*, as a result of hurricanes) or other maintenance kinds of activities are sometimes conducted in these areas.

DLNR is the primary agency responsible for this management measure, because it is responsible for leasing public lands that would be used for forestry activities, for permitting forestry activities within the Conservation District, for overseeing the Forest Stewardship and Tree Farm programs on both public and private lands, and for administering the Stream Channel Alteration Permit under the Commission on Water Resources Management.

Forestry activity may also take place on private land within the Agricultural District. In this case, the local SWCD normally works with the landowner to develop a conservation plan for the land use activity for approval by the district directors. An approved conservation plan to address soil and water conservation issues associated with the operation enables the landowner to be exempted from the county grading ordinances for any earthmoving activities.

The U.S. Army Corps of Engineers (USACOE) has the authority to protect the waters of the United States, including wetlands, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. "Waters of the United States" is defined broadly to include: "All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: i.) which are or could be used by interstate or foreign travelers for recreational or other purposes; or ii.) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or iii.) which are used or could be used for industrial purpose by industries in interstate commerce" (33 CFR Part 328.3). Activities in wetlands for which Section 404 permits may be required include, but are not limited to: placement of fill and/or dredged material; ditching activities when the excavated material is sidecast; and placement of riprap and road fills.

CHAPTER 3: URBAN AREAS

A. Introduction

There are sixteen management measures that apply to urban areas. Four are no longer required because of changes to the NPDES regulations; 3 have been completed and approved by NOAA and EPA; 3 are pending review by NOAA and EPA; and 6 are incomplete. These management measures address the management of polluted runoff from all types of urban activities in Hawaii.

The following table provides a summary of authorities that apply to the urban management measures. A written description of the specific authorities and implementation tools are provided under each management measure in Section B. Appendix A contains tables providing the relevant language for each regulatory and non-regulatory mechanism for each management measure.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified below. Specific precautions will be taken to ensure that sensitive data, such as specific names and locations of practices, is maintained in full confidence. If detailed information is required due to violation of water quality standards, this information may be acquired by formal request in accordance with the Freedom of Information Act.

Indicators for Tracking Implementation

County DPWs	numbers of site plans, drainage plans, and erosion and sediment control plans reviewed and approved for each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported
County Planning Depts.	number of SMA permits issued for each fiscal year by island; types of BMPs/conditions required to address urban sources of polluted runoff
DOT Highways	Number of BMP plans for roads, highways and bridge construction reviewed and approved for each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported
DOH	number of watershed plans developed for each fiscal year by island; number of plans being implemented with summary of BMPs used
DOH	number of water quality violations that were caused by urban sources of polluted
County wastewater divisions	database of pumped cesspools and septic systems, including location and volume
DOH	database of individual wastewater permits issued; database of cesspools and septic systems, by TMK, with any inspections and problems noted

Land Use Management Authorities

The Hawaii Land Use Law, Chapter 205, HRS, places all lands in the State into four districts: Urban, Agricultural, Rural and Conservation. Lands in the Conservation District are managed by the State, and the jurisdiction over Rural and Agricultural Districts is shared by the State Land Use Commission (LUC)

and counties. The responsibility for zoning within the Urban District is delegated to the counties. Currently, there are approximately 191,941 acres of land (4.7% of total land area) designated Urban, while 9,927 acres (0.2% of total land area) are classified Rural (small farms and low-density residential lots).[4] In the past, large-scale, urban-style developments have occurred in the Agricultural District, usually designed as a residential development and often surrounding a golf course. However, this use of agricultural lands has virtually halted as a result of the legal decision regarding the Hokulia development in South Kona on the Big Island of Hawaii.[5] As a result, landowners contemplating this type of development in the future will likely request LUC approval for a district boundary amendment to reclassify lands from Agricultural to Rural.

In urban areas, the counties have the lead in the control of erosion during site development, and ensuring proper site planning and stormwater management to protect sensitive natural features. The State Department of Health also regulates stormwater runoff through its NPDES permit process. The Hawaii Department of Transportation requires best management practices during construction of State roads, highways, and bridges. Finally, the State has overall authority to ensure implementation of the management measures throughout the 6217 management area.

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites and structures; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values.

County general plans are implemented through the specific community development plans, budgeting and capital improvement programs (CIP) guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

When the coastal nonpoint pollution control program was first under development in Hawaii, there were very few watershed efforts taking place. Watershed planning and management was still in its

[4] *Hawaii DBEDT. 1996 Databook.*

[5] *Circuit Court Judge Ibarra ruled in 2003 that Hokulia was an urban project being built illegally on agriculturally-designated lands. He based this conclusion on his findings that the State Land Use Law (Chapter 205, HRS) requires that housing on agricultural lands be related to agricultural use and such agriculture must be economically viable.*

infancy. Since the development of Hawaii's CNPCP management plan, many watershed and *ahupua`a* management efforts have been initiated by a wide range of governmental and non-governmental entities. Some of the more recent efforts, not including the watershed management projects funded under Section 319(h) of the Clean Water Act or the Local Action Strategy, are described below. Each of these efforts has its own goals and priorities with respect to water quality and quantity.

Watershed Partnerships

Watershed partnerships are voluntary alliances of public and private landowners committed to protecting large areas of forested watersheds to support multiple ecosystem services such as water production and filtration, native habitat/species protection, erosion/sedimentation control, mitigation of climate change, and education, recreation and economic opportunities. Currently, over 900,000 acres (approximately one-fourth of the land area of the State) have been placed within these partnerships, mostly within the Conservation District, protecting the headwaters of countless streams. There are watershed partnerships for West Maui Mountains (50,000 acres), East Maui (100,000+ acres), Koolau (Oahu) (97,100 acres), Kauai (142,000 acres), Lanai (~20,000 acres), East Molokai (25,000+ acres), Three Mountain Alliance (Hawaii) (1,116,300 acres), Leeward Haleakala (Maui) (43,175), and Kohala (Hawaii) (32,573 acres). While DLNR is a partner on each of the watershed partnerships, it is the partnership as a whole that develops the management plan and decides on management priorities and strategies.

Board of Water Supply Watershed Management Plans

The City and County of Honolulu Board of Water Supply (BWS) is developing watershed management plans for the eight General Plan land use districts. These plans are prepared in accordance with the requirements of the State Water Code and Ordinance 90-62 of the City and County of Honolulu, which established the Oahu Water Management Plan. In 2006, BWS developed a draft watershed management plan for Waianae for public review and, in 2008, prepared a pre-final draft plan for Koolau Loa. The plans contain objectives to "Promote Sustainable Watershed" and "Protect and Enhance Water Quality and Quantity" and, in an implementation chapter, describe short (1-5 years), mid (6-15 years), and long-range (16-25 years or more) plans and programs for watershed management and water infrastructure development. The plans make reference to the CNPCP.

Water Resource Protection Plan

The *Water Resource Protection Plan* (WRPP) is one of five major plans that comprise the Hawaii Water Plan, established pursuant to Chapter 174C, HRS. The Commission of Water Resource Management (CWRM) is responsible for implementation of this plan. CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.

- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

Community-Based Resource Management (CBRM) Project

The Hawaii CZM Program has developed an integrated planning framework for managing natural and cultural resources. The framework consists of the vision, a set of principles, and implementation options that will guide the Hawaii CZM Program toward the vision of the ORMP, a place-based, culture-based, and community-based approach to natural and cultural resource management throughout Hawaii. Based on the ORMP vision, the Hawaii CZM Program and partners developed principles—guiding statements that define and describe the key concepts of the vision. The key concepts of these five principles are: (1) Community-based; (2) Collaborative; (3) Place-based; (4) Culture-based; and (5) Watershed/*Ahupua'a*-based. The original principles were refined by input provided through this Project. Implementation options, which are recommendations to strategically fulfill the guiding principles, were primarily drawn from community group input received from the survey and workshop process. Intended to cultivate both Native Hawaiian and Western-based management practices, this integrated framework encourages an inclusive array of place-based, collaborative, community-based, culture-based, and watershed/*ahupua'a*-based management approaches.

Building on the experiences and lessons learned provided by community groups, this section identifies five principles to serve as an integrated planning framework for natural and cultural resource management in Hawai'i. These principles also help to further define and operationalize what is meant by the terms "integrated place-based, culture-based, and community-based approaches" contained in the ORMP. The five principles are:

- **Principle 1.** *(Community-Based)* Support community-based management of natural and cultural resources and build community capacity to engage in stewardship activities and network with other community groups.

- **Principle 2.** *(Collaborative)* Develop long-term collaborative relationships between government and communities to learn from local knowledge to more effectively manage natural and cultural resources.
- **Principle 3.** *(Place-Based)* Design management strategies and programs to consider the unique characteristics (resources, weather, demographics, etc.) of each place and in terms flexible enough for management to quickly adapt to changing conditions.
- **Principle 4.** *(Culture-Based)* Incorporate consideration of the host culture's (Native Hawaiian) traditional practices and knowledge in management strategies and programs.
- **Principle 5.** *(Watershed/Ahupua'a-Based)* Design management strategies and programs to recognize and incorporate the connection of land and sea.

The CZM Program recently published a request for proposals to develop a *Guidance Document on the Legal Framework for Natural and Cultural Resource Management in Hawaii*. The resulting products will include recommendations on changes to the statutes, administrative rules, and/or county ordinances that would encourage better support and implementation of an integrated planning approach.

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
Local	Chapter 8, KCC Comprehensive Zoning Ordinance	Kauai County Planning Dept.		X	X						X			
	Chapter 9, KCC Subdivision	Kauai County Planning Dept.	X	X	X						X	X	X	
	Chapter 14, KCC	Kauai					X							
	Chapter 18, KCC Excavation and Repair of Streets & Sidewalks	Kauai County DPW											X	
	Chapter 20, KCC	Kauai County DPW							X					
	Chapter 22-7, KCC, Grading, Grubbing and Stockpiling	Kauai County DPW		X	X					X	X	X		
	Chapter 22-16, KCC Drainage	Kauai County DPW	X											
	SMA Rules and Regulations of the County of Kauai	Kauai County Planning Commission		X	X					X	X	X		
	2000 Kauai General Plan	Kauai County	X	X	X	X					X			
	Interim Construction BMPs for Sediment and Erosion Control for the County of Kauai (April 2004)	Kauai County DPW		X	X					X	X	X		
	Kauai Storm Water Runoff Systems Manual (July 2001)	Kauai County DPW	X											

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
Local	Chapter 4, HCC Animals	Hawaii County							X					
	Chapter 10 HCC, Soil Erosion and Sediment Control	Hawaii County DPW		X	X					X	X	X		
	Chapter 17, HCC Plumbing	Hawaii County DPW					X							
	Chapter 20, HCC Refuse	Hawaii County DPW							X					
	Chapter 22, HCC County Streets	Hawaii County DPW									X		X	
	Chapter 23, HCC Subdivisions	Hawaii County Planning Dept.	X	X	X						X	X	X	
	Chapter 25, HCC Zoning	Hawaii County Planning Dept.	X	X	X						X			
	Chapter 27, HCC Floodplain Mgt	Hawaii County DPW	X	X	X		X				X	X		
	Rule 9, Hawaii County Planning Commission	Hawaii County Planning Commission		X	X					X	X	X		
	County of Hawaii General Plan (2005)	Hawaii County	X	X	X	X					X			
	Chapter 6.04, MCC Animal Control	Maui County							X					
	Chapter 12.04, MCC Street and Highway Excavation	Maui County DPW											X	

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
Local	Chapter 12.50, MCC Maintenance of Old Gov't Roads	Maui County DPW											X	
	Chapter 16.20A, MCC Plumbing Code	Maui County DPW					X							
	Chapter 18, MCC Subdivisions	Maui County DPW		X	X						X	X	X	
	Chapter 19, MCC Zoning	Maui County Planning Dept.		X	X						X			
	Chapter 20.08, MCC, Soil Erosion and Sedimentation Control	Maui County DPW		X	X					X	X	X		
	Chapter 20.20, MCC Litter Control	Maui County							X					
	MC-12-202, SMA Rules for Maui Planning Commission	Maui Planning Commission		X	X					X	X	X		
	MC-12-302, SMA Rules for Molokai Planning Commission	Molokai Planning Commission		X	X					X	X	X		
	MC-12-402, SMA Rules for Lanai Planning Commission	Lanai Planning Commission		X	X					X	X	X		
	MC-15-4, Rules for the Design of Storm Drainage Facilities in the County of Maui	Maui County DPW		X	X						X	X		

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
Local	MC-15-?? (draft) Rules for the Design of Stormwater Treatment BMPs	Maui County DPW	X	X	X						X	X		
	MC -15-107, Rules for Flexible Design Standards	Maui County DPW		X	X									
	Construction BMPs for the County of Maui (May 2001)	Maui County DPW		X	X					X	X	X		
	Maui County 2030 General Plan Update: Countrywide Policy Plan (January 2008)	Maui County	X	X	X	X					X			
	Chapter 14-12, ROH Drainage, Flood and Pollution Control	City and County of Honolulu		X	X						X	X		
	Chapter 14-13 to 14-16, ROH, Grading, Soil Erosion and Sediment Control	City and County of Honolulu		X	X					X	X	X		
	Chapter 14-17, ROH Excavation & Repairs of Streets & Sidewalks	CCH-DPW											X	
	Chapter 14-20, ROH Cleaning & Maintaining Sidewalks	CCH-DPW											X	
	Chapter 14-32, ROH Maintenance of Private Streets and Roads	CCH-DPW											X	

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
Local	Chapter 21, ROH Land Use Ordinance	CCH Planning Dept.		X	X						X			
	Chapter 22, ROH Subdivision of Land	CCH Planning Dept.		X	X								X	
	Chapter 25, ROH Special Mgt Area	CCH Planning Dept.		X	X					X	X	X		
	Chapter 29-4, ROH Litter Control	CCH							X					
	Chapter 30-4, ROH Water Conservation Measures	CCH					X							
	various *Development Plans* and *Sustainable Communities Plans* for Oahu	City and County of Honolulu		X	X	X					X			
	various fact sheets and programs related to pollution prevention	CCH Dept. of Env'l Services							X					
State	Chapter 46, HRS County Organization and Administration	Counties											X	
	Chapter 149A, HRS Hawaii Pesticides Law	DOA								X			X	
	Chapter 174C, HRS Hawaii Water Code	DLNR		X	X	X						X		
	Chapter 183C, HRS Conservation District	DLNR		X	X					X				
	Chapter 205A, HRS Coastal Zone Mgt	OP-CZM		X	X					X	X	X		

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
State	Chapter 264, HRS Highways	DOT									X	X	X	
	Chapter 339, HRS Litter Control	DOH, with county enforcement							X					
	Chapter 340E, HRS Safe Drinking Water	DOH								X				
	Chapter 342D, HRS Water Pollution	DOH	X	X	X	X	X	X	X	X	X	X	X	
	Chapter 342G, HRS Integrated Solid Waste Management	DOH							X					
	Chapter 342H, HRS Solid Waste Pollution	DOH							X					
	Chapter 342I, HRS Special Wastes Recycling	DOH							X				X	
	Chapter 342J, HRS Hazardous Waste	DOH							X				X	
	Chapter 343, HRS Environmental Impact Statements	OEQC		X	X					X	X	X		
	Chapter 4-66, HAR Pesticides	DOA								X			X	
	Chapter 11-21, HAR Cross Connection and Back-Flow Control	DOH								X				
	Chapter 11-23, HAR Underground Injection Control	DOH					X			X				

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
State	Chapter 11-54, HAR Water Quality Standards	DOH	X	X	X					X	X	X		
	Chapter 11-55, HAR Water Pollution Control	DOH	X	X	X					X	X	X		
	Chapter 11-58.1, HAR Solid Waste Mgt Control	DOH							X					
	Chapter 11-62, HAR Wastewater Systems	DOH					X	X		X				
	Chapter 11-200, HAR Environmental Impact Statement Rules	OEQC		X	X					X	X	X		
	Chapter 13-5, HAR Conservation Districts	DLNR		X	X					X				
	Chapter 13-169, HAR Protection of Instream Uses of Water	DLNR		X	X	X						X		
	Chapter 15-150, HAR Special Mgt Areas/ Shoreline Areas	OP-CZM		X	X					X	X	X		
	Chapter 19-127.1, HAR Design, Construction, and Maintenance of Public Streets and Hwys	DOT									X	X	X	
	HAPPI Home Series, University of Hawaii Cooperative Extension Svc.	Univ. of Hawaii CES							X					

Authority		Responsible Agency	New Dev't	Watershed Protection	Site Dev't	Existing Dev't	New OSDS	Operating OSDS	Pollution Prevention	Golf Course Mgt.	RHB Planning, Siting, Dev'g	Bridges	RHB O&M	RHB Runoff Systems
State	*The Hawaii Guide to Alternatives & Disposal of Household Hazardous Wasted* (1996)	DOH							X					
	various factsheets and bulletins	DOH							X					
	Standard Specifications for Road and Bridge Construction (2005)	DOT	X	X	X						X	X	X	
	Construction BMPs Field Manual (January 2008)				X						X	X	X	
	Storm Water Permanent BMP Manual (2007)	DOT	X										X	
	Onsite Wastewater Treatment Survey and Assessment (March 2008)	CZM Program, DOH					X	X						
	Guidelines Applicable to Golf Courses in Hawaii (July 2002 – Version 6)	DOH								X				
Federal	Section 404, CWA, permit	USACOE								X		X		
	Section 10, Rivers and Harbors Act of 1899	USACOE										X		

B. Management Measures

Urban Runoff

A. New Development Management Measure

(1) By design or performance:

- **a. After construction has been completed and the site is permanently stabilized, reduce the average annual total suspended solid (TSS) loadings by 80%. For the purposes of this measure, an 80% TSS reduction is to be determined on an average annual basis,* or**
- **b. Reduce the postdevelopment loadings of TSS so that the average annual TSS loadings are no greater than predevelopment loadings, and**

(2) To the extent practicable, maintain postdevelopment peak runoff rate and average volume at levels that are similar to predevelopment levels.

Sound watershed management requires that both structural and nonstructural measures be employed to mitigate the adverse impacts of storm water. Nonstructural Management Measures II.B and II.C can be effectively used in conjunction with Management Measure II.A to reduce both the short- and long-term costs of meeting the treatment goals of this management measure.

Status of Measure: INCOMPLETE – Maui County, Kauai County, Hawaii County
NO LONGER REQUIRED in the City and County of Honolulu, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

Applicability: This management measure applies to control urban runoff and treat associated pollutants generated from new development, redevelopment, and new and relocated roads, highways, and bridges. For design purposes, post-development peak runoff rate and average volume should be based on the 2-year/24-hour storm.

Responsible Agencies and Authorities
In urban areas, the counties have the lead in implementing this management measure. The approval of plans for new developments is the responsibility of the county planning departments. Storm drainage standards are implemented through the departments of public works.

Kauai County adopted a new drainage ordinance in 2001. It established new drainage principles and policies through the adoption of a Storm Water Runoff System Manual. It applies to all lands in Kauai and to all stormwater facilities constructed within the County rights-of-way, to easements dedicated to public use, and to privately-owned systems that are part of the required infrastructure improvements for a subdivision. In Hawaii County, all urban developments (with very few exceptions) have been mandated to maintain pre-development runoff conditions. Pre- and post- development runoffs are calculated using the County "Storm Drainage Standard." The minimum criteria used for runoff calculations are a 1-hour, 10-year storm event. This requirement inhibits conveyance of development runoff into natural drainage systems. Maui County Department of Public Works is in the process of revising its drainage rules to incorporate stormwater pollution control measures and best management practices (BMPs). The changes are based on the City and County of Honolulu's ordinance (Chapter 14,

ROH) and will include a new section addressing storm water quality. The new requirements will apply to all residential, commercial, public facilities and transportation development projects requiring building permits. BMPs must either detain stormwater for a length of time that allows pollutants to settle, or use filtration or infiltration methods.

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites and structures; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values. Kauai's 2000 General Plan contains specific language regarding stormwater management from new developments.

County general plans are implemented through the specific community development plans, budgeting and capital improvement programs (CIP) guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

The threshold for NPDES applicability also decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a National Pollutant Discharge Elimination System (NPDES) permit is required from the Hawaii Department of Health (DOH). This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

The Hawaii Department of Transportation (DOT) Standard Specifications are used for highway design and construction for Hawaii's transportation infrastructure. The current specifications in use are dated 1994, though many sections (technical provisions) have been revised since then. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. DOT's *Storm Water Permanent Best Management Practices (BMP) Manual* (February 2007) applies to projects statewide within the DOT right-of-way or requiring a discharge/connection permit to DOT's MS4.

DOH has general regulatory authority over water pollution control.

B. Watershed Protection Management Measure

Develop a watershed protection program to:

(1) Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;

(2) Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota; and

(3) Site development, including roads, highways, and bridges, to protect to the extent practicable the natural integrity of waterbodies and natural drainage systems.

Status of Measure: NOT APPROVED

Applicability: This management measure applies to new development or redevelopment including construction of new and relocated roads, highways, and bridges that generate nonpoint source pollutants.

Responsible Agencies and Authorities

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites and structures; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values.

County general plans are implemented through the specific community development plans, budgeting and CIP guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

Kauai County's general plan was updated in 2000. The policies for land management derive from the concepts of *ahupua`a* and watershed, linking the mountains, lowlands and ocean as one basic ecological unit. The general plan contains a set of Heritage Resources Maps that document important

natural, scenic and historic features, particularly in relation to the urban and agricultural lands that are developed or may be developed in the future. It specifies that important landforms shall be designated "Open" and zoned accordingly, in order to protect steep slopes and streams from erosion. The Heritage Resources Maps serve as a guide in preparing Development Plans, in preparing or revising land use ordinances and rules, and in reviewing subdivision and land use permit applications.

Hawaii County's general plan, which was updated in 2005, outlines policies that will greatly reduce the generation of polluted runoff and mitigate the impacts of urban runoff and associated pollutants from all site development. The General Plan provides the direction for the future growth of the County. As a policy document, the General Plan provides the legal basis for all subdivision, zoning, and related ordinances and will guide revisions to the county code. The General Plan also includes Land Use Pattern Allocation Guide (LUPAG) maps by district which show conservation, agricultural, rural, resort and urban areas, urban expansion areas, and open areas.

Maui County is currently updating its general plan. A draft of the *Maui County 2030 General Plan Update: Countywide Policy Plan* is currently under review by the Maui County Council. It comprises goals, policies, programs and actions which are based on an assessment of current and future needs and available resources. Once it has been adopted, the updated general plan will become the principal tool for the government and public to use when evaluating projects and their impacts on land use and the environment, among other things. This general plan update includes goals, objectives and policies related to protecting the natural environment and promoting sustainable land use and growth management.

Like the other counties, the City and County of Honolulu implements a three-tiered system of objectives, policies, planning principles, guidelines, and regulations. The General Plan is the first tier and comprises brief statements of objectives and policies. The second tier is the Development Plans and Sustainable Communities Plans, which are adopted and revised by ordinance. The third tier is comprised of the implementing ordinances and regulations, which must be consistent with the General Plan and Development/Sustainable Communities Plans.

Eight community-oriented plans have been developed to help guide public policy, investment and decision-making through the 2025 planning horizon. Each plan addresses one of 8 geographic planning regions on Oahu. The planning regions of Ewa and Primary Urban Center are the areas to which major growth in population and economic activity will be directed, so the plans for these regions are titled "Development Plans." The remaining 6 planning regions are envisioned to remain relatively stable, so their plans are titled "Sustainable Communities Plans." These community-oriented plans generally recommend policies in an *ahupua`a* or watershed context.

In urban areas, the counties have the lead in the control of erosion during site development and ensuring proper site planning and stormwater management to protect sensitive natural features, through their ordinances and rules related to zoning, subdivisions, drainage, and erosion and sediment control.

All counties have ordinances that provide for cluster development and flexible design standards, though these are not well-publicized. While it appears that economics may be the driving factor in the development of these provisions, since clustering results in a cost savings with respect to infrastructure, these ordinances may also allow for innovative stormwater management techniques, reduced street and sidewalk widths, and other management measures to attenuate runoff from developments. While these ordinances do not explicitly promote the minimizing of impervious surfaces, they may permit the use of pervious pavements and other management measures that are not currently allowed under regular zoning and subdivision provisions.

Since Hawaii submitted its coastal nonpoint pollution control program to NOAA and EPA in 1996, three of the four counties (City and County of Honolulu, Kauai, and Maui) have updated their grading and grubbing ordinances to incorporate minimum BMPs. Generally, these ordinances include similar language that states "regardless of whether a permit is required...or an exemption.... is applicable, all grading, grubbing and stockpiling activities shall incorporate BMPs to the maximum extent practicable to prevent damage by sedimentation to streams, watercourses, natural areas, and the property of others." The minimum BMPs relate to drainage, vegetation, erosion control, and sediment control, among other things, and require phasing and limiting areas of disturbance, and vegetative stabilization. The ordinances provide for the adoption of a BMP manual. The remaining county, Hawaii County, is currently in the process of revising its grading ordinance to make it consistent with the other counties.

Kauai County adopted a new drainage ordinance in 2001. It established new drainage principles and policies through the adoption of a Storm Water Runoff System Manual. It applies to all lands in Kauai and to all stormwater facilities constructed within the County rights-of-way, to easements dedicated to public use, and to privately-owned systems that are part of the required infrastructure improvements for a subdivision. In Hawaii County, all urban developments (with very few exceptions) have been mandated to maintain pre-development runoff conditions. Pre- and post- development runoffs are calculated using the County "Storm Drainage Standard." The minimum criteria used for runoff calculations are a 1-hour, 10-year storm event. This requirement inhibits conveyance of development runoff into natural drainage systems. Maui County Department of Public Works is in the process of revising its drainage rules to incorporate stormwater pollution control measures and BMPs. The changes are based on the City and County of Honolulu's ordinance (Chapter 14, ROH) and will include a new section addressing storm water quality. The new requirements will apply to all residential, commercial, public facilities and transportation development projects requiring building permits. BMPs must either detain stormwater for a length of time that allows pollutants to settle, or use filtration or infiltration methods.

The threshold for NPDES applicability also decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

Typically, prospective development must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Development in the Conservation District triggers a Conservation District Use Permit (CDUP) from DLNR; development within the counties' Special Management Area (SMA) must seek an SMA permit from the respective county planning department. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an environmental assessment (EA) and/or environmental impact statement (EIS) for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan.

Construction of roads, highways and bridges will normally trigger the Chapter 343, HRS, process because of the use of State or county funds and/or lands. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Privately-constructed roads, highways, and bridges usually must meet standards set by the State and/or county because they are transferred over to the State or county as public roadways upon completion of construction. Privately-constructed roads that remain private must still comply with counties requirements for erosion and sediment control, stormwater management, drainage, zoning and subdivisions.

DOT Standard Specifications are used for highway design and construction for Hawaii's transportation infrastructure. The current specifications in use are dated 1994, though many sections (technical provisions) have been revised since then. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. It requires contractors to follow guidelines in the *Construction Best Management Practices Field Manual* (dated January 2008) in developing, installing and maintaining BMPs for all projects. The BMPs included in this manual focus on the areas of site management, erosion control, and sediment control.

The counties administer the Special Management Area (SMA) permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own

procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

When the CNPCP was first under development in Hawaii, there were very few watershed efforts taking place. Watershed planning and management was still in its infancy. Since the development of Hawaii's CNPCP management plan, many watershed and *ahupua`a* management efforts have been initiated by a wide range of governmental and non-governmental entities. Some of the more recent efforts include DLNR's watershed partnerships for West Maui Mountains, East Maui, Koolau (Oahu), Kauai, Lanai, East Molokai, Three Mountain Alliance (Hawaii), Leeward Haleakala (Maui), and Kohala (Hawaii); City and County of Honolulu Board of Water Supply (BWS) watershed management plans for Koolau Loa and Waianae; watershed management projects funded under Section 319(h) of the Clean Water Act in Nawiliwili (with TMDL), Hanalei (with TMDL), Ala Wai (with TMDL), Koolaupoko, Kapakahi, Maunalua Bay (LAS priority area), South Molokai, West Maui, Pelekane Bay, and Hilo Bay; and watershed-based projects as part of Hawaii's Local Action Strategy (LAS) to address land-based pollution threats to coral reefs at Honolua (Maui), Kawela to Kapualei (Molokai), and Hanalei (Kauai).

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through the Commission on Water Resource Management (CWRM) – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to adequately protect fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.

- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

DOH has general regulatory authority over water pollution control.

Approach for Approval

Hawaii is in the process of developing a statewide watershed process to address this and other management measures. DOH and the CZM Program are working with relevant State and county agencies to develop a watershed planning process and guidance document. The document will serve as an agency and community resource for preparing watershed management plans that incorporate the (g) management measures. DOH and the CZM Program are also in the process of prioritizing watersheds for management efforts, and will provide a schedule for developing watershed management plans over the next 15 years.

C. Site Development Management Measure

Plan, design, and develop sites to:

(1) Protect areas that provide important water quality benefits and/or are particularly susceptible to erosion and sediment loss;

(2) Limit increases of impervious areas, except where necessary;

(3) Limit land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss; and

(4) Limit disturbance of natural drainage features and vegetation.

Status of Measure: APPROVED

Applicability: This management measure applies to all site development activities including those associated with roads, highways, and bridges.

Responsible Agencies and Authorities

In urban areas, the counties have the lead in the control of erosion during site development and ensuring proper site planning and stormwater management to protect sensitive natural features, through their ordinances and rules related to zoning, subdivisions, drainage, and erosion and sediment control.

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites and structures; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values.

County general plans are implemented through the specific community development plans, budgeting and CIP guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

Kauai County's general plan was updated in 2000. The policies for land management derive from the concepts of *ahupua`a* and watershed, linking the mountains, lowlands and ocean as one basic ecological unit. The general plan contains a set of Heritage Resources Maps that document important natural, scenic and historic features, particularly in relation to the urban and agricultural lands that are developed or may be developed in the future. It specifies that important landforms shall be designated "Open" and zoned accordingly, in order to protect steep slopes and streams from erosion. The Heritage Resources Maps serve as a guide in preparing Development Plans, in preparing or revising land use ordinances and rules, and in the review of subdivision and land use permit applications.

Hawaii County's general plan, which was updated in 2005, outlines policies that will greatly reduce the generation of polluted runoff and mitigate the impacts of urban runoff and associated pollutants from all site development. The General Plan provides the direction for the future growth of the County. As a policy document, the General Plan provides the legal basis for all subdivision, zoning, and related ordinances and will guide revisions to the county code. The General Plan also includes LUPAG maps by

district which show conservation, agricultural, rural, resort and urban areas, urban expansion areas, and open areas.

Maui County is currently updating its general plan. A draft of the *Maui County 2030 General Plan Update: Countywide Policy Plan* is currently under review by the Maui County Council. It comprises goals, policies, programs and actions which are based on an assessment of current and future needs and available resources. Once it has been adopted, the updated general plan will become the principal tool for the government and public to use when evaluating projects and their impacts on land use and the environment, among other things. This general plan update includes goals, objectives and policies related to protecting the natural environment and promoting sustainable land use and growth management.

Like the other counties, the City and County of Honolulu implements a three-tiered system of objectives, policies, planning principles, guidelines, and regulations. The General Plan is the first tier and comprises brief statements of objectives and policies. The second tier is the Development Plans and Sustainable Communities Plans, which are adopted and revised by ordinance. The third tier is comprised of the implementing ordinances and regulations, which must be consistent with the General Plan and Development/Sustainable Communities Plans.

Eight community-oriented plans have been developed to help guide public policy, investment and decision-making through the 2025 planning horizon. Each plan addresses one of 8 geographic planning regions on Oahu. The planning regions of Ewa and Primary Urban Center are the areas to which major growth in population and economic activity will be directed, so the plans for these regions are titled "Development Plans." The remaining 6 planning regions are envisioned to remain relatively stable, so their plans are titled "Sustainable Communities Plans." These community-oriented plans generally recommend policies in an *ahupua`a* or watershed context and address the protection of wetlands and riparian areas.

All counties have ordinances that provide for cluster development and flexible design standards, though these are not well-publicized. While it appears that economics may be the driving factor in the development of these provisions, since clustering results in a cost savings with respect to infrastructure, these ordinances may also allow for innovative stormwater management techniques, reduced street and sidewalk widths, and other management measures to attenuate runoff from developments. While these ordinances do not explicitly promote the minimizing of impervious surfaces, they may permit the use of pervious pavements and other management measures that are not currently allowed under regular zoning and subdivision provisions.

Since Hawaii submitted its CNPCP to NOAA and EPA in 1996, three of the four counties (City and County of Honolulu, Kauai, and Maui) have updated their grading and grubbing ordinances to incorporate minimum BMPs. Generally, these ordinances include similar language that states "regardless of whether a permit is required...or an exemption.... is applicable, all grading, grubbing and stockpiling activities shall incorporate BMPs to the maximum extent practicable to prevent damage by sedimentation to streams, watercourses, natural areas, and the property of others." The minimum BMPs relate to drainage, vegetation, erosion control, and sediment control, among other things, and

require phasing and limiting areas of disturbance, and vegetative stabilization. The ordinances provide for the adoption of a BMP manual. The remaining county, Hawaii County, is currently in the process of revising its grading ordinance to make it consistent with the other counties.

Kauai County adopted a new drainage ordinance in 2001. It established new drainage principles and policies through the adoption of a Storm Water Runoff System Manual. It applies to all lands in Kauai and to all stormwater facilities constructed within the County rights-of-way, to easements dedicated to public use, and to privately-owned systems that are part of the required infrastructure improvements for a subdivision. In Hawaii County, all urban developments (with very few exceptions) have been mandated to maintain pre-development runoff conditions. Pre- and post- development runoffs are calculated using the County "Storm Drainage Standard." The minimum criteria used for runoff calculations are a 1-hour, 10-year storm event. This requirement inhibits conveyance of development runoff into natural drainage systems. Maui County DPW is in the process of revising its drainage rules to incorporate stormwater pollution control measures and BMPs. The changes are based on the City and County of Honolulu's ordinance (Chapter 14, ROH) and will include a new section addressing storm water quality. The new requirements will apply to all residential, commercial, public facilities and transportation development projects requiring building permits. BMPs must either detain stormwater for a length of time that allows pollutants to settle, or use filtration or infiltration methods.

The threshold for NPDES applicability also decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

Typically, prospective development must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Development in the Conservation District triggers a CDUP from DLNR; development within the counties' SMA must seek an SMA permit from the respective county planning department. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan.

Construction of roads, highways and bridges will normally trigger the Chapter 343, HRS, process because of the use of State or county funds and/or lands. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area,

estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Privately-constructed roads, highways, and bridges usually must meet standards set by the State and/or county because they are transferred over to the State or county as public roadways upon completion of construction. Privately-constructed roads that remain private must still comply with counties requirements for erosion and sediment control, stormwater management, drainage, zoning and subdivisions.

DOT Standard Specifications are used for highway design and construction for Hawaii's transportation infrastructure. The current specifications in use are dated 1994, though many sections (technical provisions) have been revised since then. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. It requires contractors to follow guidelines in the *Construction Best Management Practices Field Manual* (dated January 2008) in developing, installing and maintaining BMPs for all projects. The BMPs included in this manual focus on the areas of site management, erosion control, and sediment control.

The counties administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004 provides the regulatory framework to protect wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to adequately protect fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

CWRM has developed a stream protection and management program implementation plan, which outlines actions and tasks to implement the statutory requirements.

DOH has general regulatory authority over water pollution control.

Construction Activities

A. Construction Site Erosion and Sediment Control Management Measure

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

Status of Measure: NO LONGER REQUIRED, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

B. Construction Site Chemical Control Management Measure

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

Status of Measure: NO LONGER REQUIRED, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

Existing Development

A. Existing Development Management Measure

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

Status of Measure: INCOMPLETE – Maui County, Kauai County, Hawaii County
NO LONGER REQUIRED in urbanized CITY and COUNTY of HONOLULU, per Charles Sutfin (EPA) and John King (NOAA) memo

Applicability: This management measure applies to all urban areas and existing development in order to reduce surface water runoff pollutant loadings from such areas.

Responsible Agencies and Authorities

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites and structures; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values. The county general plans all emphasize watershed protection and management.

County general plans are implemented through the specific community development plans, budgeting and CIP guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

When the CNPCP was first under development in Hawaii, there were very few watershed efforts taking place. Watershed planning and management was still in its infancy. Since the development of Hawaii's CNPCP management plan, many watershed and *ahupua`a* management efforts have been initiated by a wide range of governmental and non-governmental entities. Some of the more recent efforts include DLNR's watershed partnerships for West Maui Mountains, East Maui, Koolau (Oahu), Kauai, Lanai, East Molokai, Three Mountains (Hawaii), Leeward Haleakala (Maui), and Kohala (Hawaii); City and County of Honolulu Board of Water Supply (BWS) watershed management plans for Koolau Loa and Waianae; watershed management projects funded under Section 319(h) of the Clean Water Act in Nawiliwili (with TMDL), Hanalei (with TMDL), Ala Wai (with TMDL), Koolaupoko, Kapakahi, Maunalua Bay (LAS priority area), South Molokai, West Maui, Pelekane Bay, and Hilo Bay; and watershed-based projects as part of Hawaii's LAS to address land-based pollution threats to coral reefs at Honolua (Maui), Kawela to Kapualei (Molokai), and Hanalei (Kauai).

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004 provides the regulatory framework to protect wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires

CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to protect adequately fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.
- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

DOH has general regulatory authority over water pollution control.

Approach for Approval

Hawaii is in the process of developing a statewide watershed process to address this and other management measures. DOH and the CZM Program are working with relevant State and county agencies to develop a watershed planning process and guidance document. The document will serve

as an agency and community resource for preparing watershed management plans that incorporate the (g) management measures. DOH and the CZM Program are also in the process of prioritizing watersheds for management efforts, and will provide a schedule for developing watershed management plans over the next 15 years.

Onsite Disposal Systems

A. New Onsite Disposal Systems Management Measure

(1) Ensure that new Onsite Disposal Systems (OSDS) are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives: (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and (b) where low-volume plumbing fixtures have not been installed in new developments or redevelopments, reduce total hydraulic loadings to the OSDS by 25%. Implement OSDS inspection schedules for preconstruction, construction, and post-construction;

(2) Direct placement of OSDS away from unsuitable areas. Where OSDS placement away from unsuitable areas is not practicable, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water that is closely hydrologically connected to surface water. Unsuitable areas include, but are not limited to, areas with poorly or excessively drained soils; areas with shallow water tables or areas with high seasonal water tables; areas overlaying fractured bedrock that drain directly to ground water; areas within floodplains; or areas where nutrient and/or pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive waterbodies;

(3) Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect waterbodies and/or contribute to a public health nuisance;

(4) Establish protective separation distances between OSDS system components and groundwater which is closely hydrologically connected to surface waters. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and type of OSDS;

(5) Where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50% to groundwater that is closely hydrologically connected to surface water.

Status of Measure: COMPLETE, except for requirements for denitrifying OSDS, where applicable (#5 above ONLY).

Applicability: This management measure applies to all new OSDSs, including package plants and small-scale or regional treatment facilities not covered by NPDES regulations, in order to manage the siting, design, installation, and operation and maintenance of all such OSDSs.

Responsible Agencies and Authorities

DOH is the lead agency in implementing this management measure because it administers the regulatory programs for wastewater systems and safe drinking water. The county building departments administer the plumbing codes.

Chapter 11-62, HAR, administered by DOH, outlines the requirements for locating, building and operating wastewater treatment systems and individual wastewater systems. Section 11-62-03 defines an "individual wastewater system" as "a facility which is used and designed to receive and dispose of no more than 1,000 gallons per day of domestic wastewater" and "treatment works" as "any treatment unit and its associated collection system and disposal system, excluding individual wastewater systems." The chapter provides specific requirements for both types of wastewater systems. An engineer must evaluate the site for suitability for an OSDS, including depth of permeable soil over seasonal high groundwater, bedrock, or other limiting layer, soil factors, land slope, flooding hazard, and amount of suitable area available. No OSDS can be located within 50 feet of a stream, the ocean at the vegetation line, pond, lake, or other surface water body; or within 1,000 feet of a potable water source serving public water systems.

Chapter 11-62, HAR, also provides for the establishment of Critical Wastewater Disposal Areas (CWDAs), where the disposal of wastewater has or may cause adverse effects on human health or the environment due to existing hydrogeological conditions. CWDAs are established based on one or more of the following concerns: high water table; impermeable soil or rock formation; steep terrain; flood zone; protection of coastal waters and inland surface waters; high rate of cesspool failures; and protection of groundwater resources. CWDAs were designated for each county in 1990 and updated in 1997. Within CWDAs, DOH may impose more stringent requirements for wastewater systems, and cesspools are severely restricted or prohibited.

Although nitrogen-limited surface waters have not been specifically identified in Hawaii, Section 11-62-05, HAR (Critical Wastewater Disposal Areas) provides the Director of the DOH the discretion to require a higher degree of treatment for individual wastewater systems due to several concerns. One of the highlighted concerns in Section 11-62-05(a), HAR, is the "protection of coastal waters and inland surface waters". The rule also allows the Director to "impose more stringent requirements than those specified in these rules for wastewater systems located or proposed to be located within any designated critical wastewater disposal area" and provides the director with the ability to impose "meeting higher effluent standards for wastewater systems" (Chapter 11-62-05(b)). The currently designated CWDAs cover the majority of the state, and these areas correspond with areas that would be most susceptible to nutrient enrichment by encompassing the coastal fringe and areas with a close groundwater to surface water connection. Chapter 11-62-05, HAR, also provides the Director the discretion to expand the CWDAs, and this can be used to modify CWDA boundaries if data demonstrate that a particular area requires denitrifying OSDS.

Since the initial management measure submission, the State has made progress in eliminating new individual cesspools[6]. Efforts to ban the use of new cesspools statewide have been made through revision to Chapter 11-62, HAR. The rule either bans or severely restricts the use of cesspools throughout the state. New cesspools are completely banned on the islands of Oahu and Kauai. On the islands of Maui, Molokai, and Hawaii, new cesspools for individual homes only are allowed in certain areas. These areas are designated in Critical Wastewater Disposal Area maps. The CWDA maps also delineate areas where cesspools are completely banned. The maps are based upon development density, groundwater development, potential contamination of coastal waters and the use of OSDS. Although the current rule still allows some new cesspools in limited areas, there are a number of items that either prohibit new cesspools or require that existing cesspools be upgraded. They include:

- Not allowing a new dwelling to be connected to an existing cesspool serving an existing dwelling;
- Requiring an existing cesspool system to meet current wastewater rules if there is a change in building usage or characteristics of the wastewater. For example, an existing cesspool must be upgraded if a non-dwelling using a cesspool is converted to a dwelling or a commercial building (*e.g.*, office space) is converted to a food establishment;
- Current rules do not allow two new dwellings to be served by a cesspool; and
- Current rules do not allow non-dwellings generating nondomestic-like wastewater to discharge wastewater into a new cesspool.

Chapter 11-23, HAR, also administered by DOH, establishes a state underground injection control (UIC) program in order to protect the quality of the State's underground sources of drinking water from pollution by subsurface disposal of fluids. It classifies exempted aquifers and underground sources of drinking water. Unless expressly exempted, all aquifers are considered underground sources of drinking water. UIC maps indicate the boundary line of exempted aquifers. While individual wastewater systems serving single family residential households are excluded from the chapter, no large municipal or community serving systems can use injection wells above the UIC line. Certain activities are also prohibited interior of the line.

Chapter 19-4.1(25), ROH, administered by the Building Department of the City and County of Honolulu, is a local addendum to the Universal Plumbing Code. This addendum requires that all new plumbing fixtures be "ultra low flow" fixtures. The requirement applies to all new residential developments and to all upgraded or replaced fixtures. Section 30-4, ROH, requires all non-residential properties to have ultra low flow fixtures, unless granted an exemption.

Section 16.20A, MCC, administered by the Maui Department of Public Works, requires that, as of December 31, 1992, only ultra low flow plumbing fixtures be offered for sale or installed in the County of Maui. Provisions of the chapter apply to all new construction, relocated buildings, and to any alteration, repairs or reconstruction within the property lines of the premises.

[6] *The U.S. Environmental Protection Agency (EPA) promulgated Underground Injection Control (UIC) regulations on December 7, 1999, which prohibit the construction of new large capacity cesspools (LCCs) nationwide, effective April 5, 2000. Existing large capacity cesspools must be replaced by an alternative wastewater system and closed by April 5, 2005. The regulations do not contain any provisions for an extension to the deadline. In Hawaii, where the UIC program has not been delegated, EPA implements the regulations.*

Chapter 17-47, HCC, administered by the County of Hawaii Department of Public Works, modifies the Uniform Plumbing Code to require the use of low flow plumbing fixtures. Chapter 27, HCC, states that on-site cesspools and septic systems shall be located to avoid impairment to them or contamination from them during flooding.

Chapter 14-4.1, KCC, require the use of low flow plumbing fixtures. This code section modifies the Uniform Plumbing Code, Section 1010.

The document *Onsite Wastewater Treatment Survey and Assessment* (March 2008) was prepared for the Hawaii CZM Program and DOH by the University of Hawaii's Water Resources Research Center and Engineering Solutions, Inc. to provide information to promote the effective use of onsite wastewater treatment systems in rural and urban settings. This document is intended for landowners, prospective homeowners, small developers and their architect/engineers, and regulators on the selection and operation of appropriate onsite wastewater systems for smaller residential applications in areas where no public sewers are available in Hawaii. The survey aims to provide this audience with information on a range of feasible, permanent, and reliable onsite wastewater treatment and disposal options that conform to current environmental regulations within the State of Hawaii. The document also describes the systems in terms of design and installation, operation and maintenance, cost, and field constraints to use; analyzes the onsite wastewater systems with respect to field conditions required for optimal performance, and identifies system modifications that would be necessary for effective use/development under Hawaii conditions.

Approach for Approval

Difficulty in obtaining federal approval of this management measure relates primarily to the need to address the issue of requiring denitrifying OSDS. While DOH believes Chapter 11-62, HAR, provides a mechanism by which the director of DOH can require denitrifying OSDS where conditions indicate that nitrogen-limited surface waters may be adversely affected by excess nitrogen loadings from ground water, EPA and NOAA consider this to be insufficient.

DOH has developed a draft strategy entitled *Hawaii Strategy to Address Inspections and Denitrifying Onsite Disposal Systems* (dated 5/4/07) to provide information to clarify the elimination or restriction of new individual cesspools, document the regulatory authority to address the issue of requiring denitrifying OSDS, and address the inspection of operating OSDS.

DOH has initiated a contract with the University of Hawaii to determine if it is possible to delineate areas, using modeling, where OSDS would have a likelihood of contributing to water quality problems, based on a variety of factors. If modeling proves successful in narrowing geographically potential problem areas, then there may be an opportunity to amend Chapter 11-62, HAR, to require different types of OSDS based on geographical location.

B. Operating Onsite Disposal Systems Management Measure

(1) Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15% (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters;

(2) Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing;

(3) Consider replacing or upgrading OSDS to treat influent so that total nitrogen loadings in the effluent are reduced by 50%. This provision applies only:

- **(a) where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant groundwater nitrogen loadings from OSDS, and**
- **(b) where nitrogen loadings from OSDS are delivered to groundwater that is closely hydrologically connected to surface water.**

Status of Measure: COMPLETE, except for the requirement to inspect OSDS at a frequency adequate to ascertain whether OSDS are failing. (#2 above ONLY).

Applicability: This management measure applies to all operating OSDSs.

Responsible Agencies and Authorities

DOH is the lead agency in implementing this management measure because it administers the regulatory programs for wastewater systems and safe drinking water. The county building departments administer the plumbing codes.

Chapter 11-62, HAR, administered by DOH, outlines the requirements for locating, building and operating wastewater treatment systems and individual wastewater systems. It 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)]. In addition, OSDS owners are required to follow the procedures in maintenance manuals that must be submitted to DOH for approval.

Chapter 11-62, HAR, also provides for the establishment of Critical Wastewater Disposal Areas (CWDAs), where the disposal of wastewater has or may cause adverse effects on human health or the environment due to existing hydrogeological conditions. CWDAs are established based on one or more of the following concerns: high water table; impermeable soil or rock formation; steep terrain; flood zone; protection of coastal waters and inland surface waters; high rate of cesspool failures; and protection of groundwater resources. CWDAs were designated for each county in 1990 and updated in 1997. Within CWDAs, DOH may impose more stringent requirements for wastewater systems and cesspools are severely restricted or prohibited.

Although nitrogen-limited surface waters have not been specifically identified in Hawaii, Section 11-62-05, HAR (Critical Wastewater Disposal Areas) provides the Director of the DOH the discretion to require a higher degree of treatment for individual wastewater systems due to several concerns. One of the highlighted concerns in Section 11-62-05(a), HAR, is the "protection of coastal waters and inland surface waters." The rule also allows the Director to "impose more stringent requirements than those specified in these rules for wastewater systems located or proposed to be located within any designated critical wastewater disposal area" and provides the director with the ability to impose "meeting higher effluent standards for wastewater systems" (Chapter 11-62-05(b)). The currently designated CWDAs cover the majority of the state, and these areas correspond with areas that would be most susceptible to nutrient enrichment by encompassing the coastal fringe and areas with a close groundwater to surface water connection. Chapter 11-62-05, HAR, also provides the Director the discretion to expand the CWDAs, and this can be used to modify CWDA boundaries if data demonstrate that a particular area requires denitrifying OSDS.

Since the initial management measure submission, the State has made progress in eliminating new individual cesspools[7]. Efforts to ban the use of new cesspools statewide have been made through revision to Chapter 11-62, HAR. The rule either bans or severely restricts the use of cesspools throughout the state. New cesspools are completely banned on the islands of Oahu and Kauai. On the islands of Maui, Molokai, and Hawaii, new cesspools for individual homes only are allowed in certain areas. These areas are designated in Critical Wastewater Disposal Area maps. The CWDA maps also delineate areas where cesspools are completely banned. The maps are based upon development density, groundwater development, potential contamination of coastal waters and the use of OSDS. Although the current rule still allows some new cesspools in limited areas, there are a number of items that either prohibit new cesspools or require that existing cesspools be upgraded. They include:

- Not allowing a new dwelling to be connected to an existing cesspool serving an existing dwelling;
- Requiring an existing cesspool system to meet current wastewater rules if there is a change in building usage or characteristics of the wastewater. For example, an existing cesspool must be upgraded if a non-dwelling using a cesspool is converted to a dwelling or a commercial building (*e.g.*, office space) is converted to a food establishment;
- Current rules do not allow two new dwellings to be served by a cesspool; and
- Current rules do not allow non-dwellings generating nondomestic-like wastewater to discharge wastewater into a new cesspool.

All counties require the use of low flow plumbing fixtures.

Two of the counties have regulations that address the pumping or treating of cesspools and septic tanks. In the City and County of Honolulu, Chapter 14-7, ROH, states that an occupant or owner of residential property may request to have a cesspool serviced by the county. It also requires that

[7] *The U.S. Environmental Protection Agency (EPA) promulgated Underground Injection Control (UIC) regulations on December 7, 1999, which prohibit the construction of new large capacity cesspools (LCCs) nationwide, effective April 5, 2000. Existing large capacity cesspools must be replaced by an alternative wastewater system and closed by April 5, 2005. The regulations do not contain any provisions for an extension to the deadline. In Hawaii, where the UIC program has not been delegated, EPA implements the regulations.*

owners maintain their cesspools in a safe and serviceable condition, and that any cesspool requiring one or more pumping per week for a period of three weeks shall be replaced or rehabilitated within 90 days. In Maui County, Chapter 14.29, MCC, provides for owners of legal cesspools or septic tanks to request pumping services no more than twice a year. Any cesspool or septic system that requires more frequent pumping shall be rehabilitated or replaced. In Kauai and Hawaii counties, private pumpers and haulers of wastewater must be permitted by the county and maintain records and information on the numbers, locations, and volumes of all OSDSs pumped.

The document *Onsite Wastewater Treatment Survey and Assessment* (March 2008) was prepared for the Hawaii CZM Program and DOH by the University of Hawaii's Water Resources Research Center and Engineering Solutions, Inc. to provide information to promote the effective use of onsite wastewater treatment systems in rural and urban settings. This document is intended for landowners, prospective homeowners, small developers and their architect/engineers, and regulators on the selection and operation of appropriate onsite wastewater systems for smaller residential applications in areas where no public sewers are available in Hawaii. The survey aims to provide this audience with information on a range of feasible, permanent, and reliable onsite wastewater treatment and disposal options that conform to current environmental regulations within the State of Hawaii. The document also describes the systems in terms of design and installation, operation and maintenance, cost, and field constraints to use; analyzes the onsite wastewater systems with respect to field conditions required for optimal performance, and identifies system modifications that would be necessary for effective use/development under Hawaii conditions.

Approach for Approval

Difficulty in obtaining federal approval of this management measure relates primarily to the requirement for operating OSDS to be inspected at a frequency to ascertain whether the OSDS are failing, and the need to address the issue of requiring denitrifying OSDS. DOH's current approach, which EPA and NOAA consider to be insufficient, involves BEACH monitoring, inventory of information on existing systems (mapping wastewater treatment by parcel and cesspool card scanning), and supporting technical efforts to strengthen Chapter 11-62, HAR.

DOH has developed a draft strategy entitled *Hawaii Strategy to Address Inspections and Denitrifying Onsite Disposal Systems* (dated 5/4/07) to provide information to clarify the elimination or restriction of new individual cesspools, document the regulatory authority to address the issue of requiring denitrifying OSDS, and address the inspection of operating OSDS.

There are a number of approaches that could be used to address the inspection of operating OSDS, some of which are described in Ogata and Babcock's draft *Development of a Maintenance and Inspection Program for Onsite Wastewater Treatment Systems* (2009) and Tetra Tech's draft final project report *Inventory of Hawaii Large Capacity Commercial Cesspools* (2009):

- Third party inspection at time of property transfer;
- Written disclosure statement at time of property sale detailing the type of sewage system, permit status, when it was last pumped, known operational defects, date of last inspection and inspector name, system design and plumbing information, and any special monitoring or maintenance needs;

- Inspections at regular intervals within targeted areas, such as coastal areas seaward of the UIC line designated for each island or within a certain distance from surface water; and
- DOH could administer a program of renewable and revocable operating permits for OSDS, including minimum maintenance requirements. Inspectors would be trained and certified by DOH, and DOH would track, review and monitor operating permit compliance via periodic inspections. In cases where an inspection is performed and the site is found to be environmentally sensitive, performance criteria would be set and stipulated in the operating permit.

Pollution Prevention

A. Pollution Prevention Management Measure

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

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

Status of Measure: APPROVED

Applicability: This management measure is intended to be applied to reduce the generation of polluted runoff in all areas within the coastal nonpoint pollution control program management area. The adoption of the Pollution Prevention Management Measure does not exclude applicability of other management measures to those sources covered by this management measure.

Responsible Agencies and Authorities

DOH is the lead agency in implementing this management measure because it administers both regulatory and non-regulatory programs for pollution prevention, including litter control, solid waste management, special waste recycle, used oil disposal. DOH's Office of Solid Waste Management (OSWM) promotes and coordinates solid waste management at the State and county levels. It has facts sheets on its website about disposal of lead-based paint wastes, disposal of asbestos-containing waste materials, used lead-acid battery management, proper disposal of home health care waste, and reducing and recycling of green waste. It also published *The Hawaii Guide to Alternatives and Disposal of Household Hazardous Waste* (1996).

DOH's Hazardous Waste Section established a Pollution Prevention & Waste Minimization Program. The Program is dedicated to helping businesses find ways to reduce waste generation at the source, prevent pollution, and recycle the wastes that cannot be reduced. Methods for minimizing wastes include: better operating procedures to efficiently use material and avoid spills or cross contamination of waste streams; substitution of nonhazardous or less hazardous material for hazardous materials; process changes that reduce hazardous materials used and reduce waste generated; product redesign to avoid using hazardous materials that generate wastes; and recycling and reuse of hazardous and other wastes. The Hawaii Pollution Prevention & Waste Minimization Program offers a variety of services to businesses interested in reducing their generation of wastes and conserving their use of resources. Its website provides numerous pollution prevention bulletins on a variety of topics.

The Hawaii Electronic Waste Recycling Act was adopted by the Hawaii State Legislature during its First Special Legislative Session of 2008 and mandates recycling programs for computers, computer monitors and televisions (covered electronic devices or CEDs) to be operated by manufacturers. By January 1, 2009, manufacturers of CEDs sold in the state must register with DOH and pay an annual registration fee of $5,000.

The counties administer ordinances that prohibit littering. Chapter 20, HCC, administered by the Hawaii County department of public works, prohibits littering on any highway, street, road, alley, sidewalk, sea beach, public park, or other public place in the county. Litter is broadly defined to include, among other things, dirt, paper, wrappings, cigarettes, yard clippings, leaves, wood, scrap metal, and any other waste materials. In Maui County, Chapter 20.20, MCC, administered by the local police department and department of public works, prohibits littering on public or private places, and public roadways, and prohibits people from allowing their pets to improperly excrete upon public and private property. Chapter 29-4, ROH, prohibits littering of any kind on private and public property in the City and County of Honolulu. In Kauai County, Chapter 20, KCC, administered by the department of public works, prohibits the throwing or depositing of litter in public places, which include public roads, bays, ponds, streams, lakes and other bodies of water.

The counties also administer ordinances addressing pet waste. Chapter 4, HCC, administered by the Hawaii County police department, prohibits pet owners from allowing their pets to defecate on public streets, including sidewalks, passageways, or bypasses, or on any play areas, parks, or places where people congregate or walk, or on any public property, or on any private property without the permission of the owner of the property, unless the pet owner immediately picks up and properly disposes of the feces. In Maui County, Chapter 6.04, MCC, administered by the office of the mayor, describes responsibilities of dog owners for disposing of animal waste and establishes penalties for failing to comply. In the City and County of Honolulu, Chapter 29-4, ROH, prohibits pet owners from allowing their pets to excrete any solid waste in any public place or on any private premises unless the owner of the offending animal promptly and voluntarily removes the animal waste.

DOH has published a variety of pollution prevention bulletins, fact sheets and other information to encourage the reduction of nonpoint source pollutants generated by households. These can be found on the DOH website at hawaii.gov/health/environmental/waste/.

The University of Hawaii Cooperative Extension Service (CES) also provides technical assistance. In 2000, it developed a series of information worksheets for homeowners about pollution prevention. Hawaii's Pollution Prevention Information (HAPPI)-Home Series contains 16 worksheets on a variety of specific topics.

The City and County of Honolulu Department of Environmental Services (DES) has a variety of information on pollution prevention on its website www.opala.org (for solid waste management), including household hazardous waste prevention tips, products and disposal guidelines, educational resources and tools, and recycling graphics, video, PowerPoint presentations, and music. At its stormwater website, www.CleanWaterHonolulu.com, DES has established a pollution prevention program targeted at residents, businesses and students. The program has published a number of fact sheets and tip cards on a variety of relevant topics, and a booklet on backyard conservation. Its website also includes educational materials for students and educators.

The City and County of Honolulu DES also sponsors an Adopt-a-Stream/Adopt-a-Block Program, which provides a hands-on way for residents and local businesses to help keep pollutants off of City roads and connected waterbodies as part of a neighborhood cleanup. It also provides an opportunity for committed community groups to look out for the watershed and provides a positive connection between government and the community whereby residents become engaged in small work projects to stencil storm drains with the message, "Dump No Waste, Protect Our Waters … For Life," remove litter, and distribute educational materials. Some stream teams also plant and get involved in water sampling. Current volunteers in the program include school organizations, businesses, civic organizations, and scouts. The University of Hawaii at Manoa Law Society has been with the program for over 10 years and Malama o Manoa nearly 10.

B. Golf Course Management Measure

(1) Develop and implement grading and site preparation plans to:
- **(a) Design and install a combination of management and physical practices to settle solids and associated pollutants in runoff from heavy rains and/or from wind;**
- **(b) Prevent erosion and retain sediment, to the extent practicable, onsite during and after construction;**
- **(c) Protect areas that provide important water quality benefits and/or are environmentally-sensitive ecosystems;**
- **(d) Avoid construction, to the extent practicable, in areas that are susceptible to erosion and sediment loss;**
- **(e) Protect the natural integrity of waterbodies and natural drainage systems by establishing streamside buffers; and**
- **(f) Follow, to the extent practicable, the amended U.S. Golfing Association (USGA) guidelines for the construction of greens.**

(2) Develop nutrient management guidelines appropriate to Hawaii for qualified superintendents to implement so that nutrients are applied at rates necessary to establish and maintain vegetation without causing leaching into ground and surface waters.

(3) Develop and implement an integrated pest management plan. Follow EPA guidelines for the proper storage and disposal of pesticides.

(4) Develop and implement irrigation management practices to match the water needs of the turf.

Status of Measure: APPROVAL NOT REQUIRED

Applicability: This management measure applies to all golf courses in Hawaii that are in operation, under construction, or to be built in the future. It should be noted that the other urban management measures also apply to the construction and operation of golf courses.

This management measure is an additional measure developed specifically for Hawaii and is not contained in EPA's *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. Regardless of the current state and quality of management and maintenance of golf courses, this land use has the potential to be a significant source of polluted runoff due to the proportion of land area involved, the intensity of its management and the quantity of chemicals used.

Responsible Agencies and Authorities

This management measure is currently implemented under existing regulations. A number of State and county agencies implement components of the management measure, depending on where the proposed golf course is to be located.

Typically, prospective golf course developments must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Golf course developments in the Conservation District trigger a CDUP from DLNR; developments within the counties' Special Management Area (SMA) must seek an SMA permit from the respective county planning department. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental

review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan.

Golf courses are only permitted in agricultural areas with soils other than class A or B. If proposed in an area with A and B lands, the development is reviewed by the County and the State's Land Use Commission (LUC). If proposed on soils classified as C, D, and E, then counties have sole jurisdiction at this time. While counties approve all golf courses in the urban district, State rules and policies also apply.

In urban areas, the counties have the lead in the control of erosion during site development and ensuring proper site planning and stormwater management to protect sensitive natural features, through their ordinances and rules related to zoning, subdivisions, drainage, and erosion and sediment control.

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites and structures; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values.

The counties also administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

Under the authority of Chapter 149A, HRS, Department of Agriculture (DOA), Pesticides Branch, is the lead agency for implementing those measures that relate to regulating pesticides. Chapter 4-66, HAR, administered by DOA, relates to the registration, licensing, certification, recordkeeping, usage, and other activities related to the safe and effective use of pesticides. It requires that those who apply or directly supervise others who apply restricted use pesticides be certified. Certification requires some understanding of the environmental concerns of using pesticides. This requirement is implemented under the CES/DOA Pesticide Applicator Program. Certification is not required for those using pesticides that are not classified as "restricted use."

DOH administers programs for water pollution control and safe drinking water. Chapter 11-21, HAR, Cross-Connection and Back-Flow Control, administered by DOH, requires that a reduced pressure principal back-flow preventer or air gap separation be installed as part of any piping network in which fertilizers, pesticides and other chemicals or toxic contaminants are injected or siphoned into the irrigation system.

DOH developed *Guidelines Applicable to Golf Courses in Hawaii* (July 2002 – Version 6) to promote, protect, and enhance environmental quality and public health. These recommendations cover measures that could prevent groundwater and surface water pollution, soil contamination, chemical spills, noise and solid waste nuisances, and unsafe exposure to applied chemicals. The intent of these guidelines is to voluntarily foster environmental protection and safety.

Some golf courses use recycled (treated) wastewater for irrigation. Chapter 11-62, HAR, administered by DOH, allows for the use of recycled water with written approval by the director, provided the owner of the recycled water system submits an engineering report for approval which clearly identifies all BMPs to be implemented, an irrigation use plan, overflow control plan, management plan, public information and access plan, labeling plan, employee training plan, vector control plan, and groundwater monitoring plan. In making his decision, the director is guided by DOH's *Guidelines for the Treatment and Use of Recycled Water* (May 2002). R-2 and R-1 waters may be used for golf course irrigation.

Proposed golf course developments that may affect water quality and wetlands must obtain a permit from the USACOE under Section 404, CWA. These permit applicants are required to obtain Section 401, CWA, water quality certifications from DOH and Hawaii CZM federal consistency determinations prior to being issued a permit by the USACOE. NRCS and USFWS may review, comment, request conditions, or recommend denial of a Section 401 permit while the USACOE is reviewing the permit application.

Management Practices

The *Guidelines Applicable to Golf Courses in Hawaii* (July 2002 – Version 6) recommends the following measures to prevent groundwater and surface water pollution, soil contamination, chemical spills, noise and solid waste nuisances, and unsafe exposure to applied chemicals:

1. A groundwater or soil water monitoring plan for the purpose of preventing or minimizing groundwater contamination should be established with the following components:
   a. Baseline groundwater quality;
   b. Monitoring locations consisting of monitoring wells or lysimeters, or combination of both;
   c. Routine groundwater and/or soil water monitoring at frequencies such as quarterly, semiannually, or annually depending on the use of chemicals and the detection of contaminants;
   d. A list of chemicals and fertilizers that will be or have been used that may affect soil or groundwater adversely, and the analyses for such contaminants;
   e. Recordkeeping of monitoring results and a system of tracking trends in order to prevent, minimize, or mitigate occurrences of contamination;
   f. A procedure to notify all affected parties and DOH of occurrences of contamination that pose, or may pose, a threat to public health or the environment.
   g. Availability of monitoring data to any interested person.
2. A surface water monitoring plan, if applicable, for the purpose of preventing or minimizing surface water contamination should be established using the principles of item No. 1.
3. If the golf course uses recycled water (treated wastewater) for irrigation, please refer to the Department of Health's Guidelines for the Treatment and Use of Recycled Water, May 15, 2002, for recycled water requirements.
4. The use of an above-ground storage tank with applicable safety considerations for petroleum products, used for fueling golf carts, maintenance vehicles, or emergency generators, should be preferred over an underground storage tank in order to easily detect leaks and minimize the risk of soil and groundwater contamination resulting from a leaking storage tank.
5. Buildings used to store fertilizers, pesticides, algicides, fungicides, herbicides, and other chemicals especially in liquid form should be designed purposely for the containment and recovery of a catastrophic spill or leak of contents. An early warning system for spill or leak detection is advantageous.
6. Noise and dust from maintenance or construction activities should not disturb neighbors. Maintenance or construction activities should be scheduled and conducted accordingly.
7. Solid wastes should be managed without creating a nuisance. Furthermore, all green waste generated by the golf course should be reused on-site. Shredding and composting are activities that precede the reuse of green waste as a soil conditioner or a ground cover for weed control. Space and equipment should be provided to accomplish these activities. Additionally, where practicable, locally produced compost and soil amendments should be used whenever available.
8. Chemicals should be handled and applied according to instructions, and offsite drift during application should not occur. Methods of application and weather conditions should be chosen to optimize success.
9. A Best Management Practices (BMP) plan should be made for the golf course. The BMP plan functions as a hands-on environmental and worker safety maintenance manual that describes in plain English the elements and procedures for irrigation, chemical use, processing and reuse of green wastes, minimizing or preventing runoff, soil erosion and nuisance conditions, and sustaining

worker safety. Use of the BMP should prevent the occurrence or recurrence of environmental or safety problems. The BMP should be available to any interested person.

10. Agencies or organizations such as the State Department of Agriculture, the National Resource Conservation Service, and the Golf Course Superintendents Association of America may provide ideas or practices that would help to achieve the intent of these guidelines. Inquiries to these sources of information are advantageous.

Roads, Highways, and Bridges

According to Chapter 264, HRS, all roads, alleys, streets, ways, lanes, bikeways, bridges, and all other real property highway related interests in the State, opened, laid out, subdivided, consolidated, acquired and built by the government are public highways. Public highways are of two types: (1) State highways, having an alignment or possession of a real property highway related interest as established by law, subdivided and acquired in accordance with policies and procedures of the department of transportation (DOT), separate and exempt from any county subdivision ordinances, and all those under the jurisdiction of DOT; and (2) County highways, which are all other public highways.

All roads, alleys, streets, ways, lanes, trails, bikeways, and bridges in the State, opened, laid out, or built by private parties and dedicated or surrendered to the public use, are declared to be public highways as follows: (1) dedication of public highways shall be by deed of conveyance naming the State as grantee in the case of a state highway and naming the county as grantee in the case of a county highway; and (2) surrender of public highways shall be deemed to have taken place if no act of ownership by the owner of the road, alley, street, bikeway, way, lane, trail, or bridge has been exercised for five years and when, in the case of a county highway, the county council of that county adopts, by resolution, the same as a county highway.

Hawaii Department of Transportation (DOT) has jurisdiction over State roadways. According to Section 264-8, HRS, specifications, standards and procedures to be followed in the installation and construction of connections for streets, roads and driveways, concrete curbs and sidewalks, structures, drainage systems, landscaping or grading within the highway rights-of-way, excavation and backfilling of trenches or other openings in state highways, and in the restoration, replacement, or repair of the base course, pavement surfaces, highway structures, and other highway improvements shall be prescribed by the director of transportation. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. It requires contractors to follow guidelines in the *Construction Best Management Practices Field Manual* (dated January 2008) in developing, installing and maintaining BMPs for all projects.

State roads are under the jurisdiction of DOT, while county – or local – roads are under the jurisdiction of the respective counties. Many of the counties also have many miles of homestead roads or “paper” roads. Under the terms of the Highways Act of 1892 and Chapter 264, HRS, all roads existing at the time of adoption of the Highways Act were declared to be public highways. In addition, public

highways include all roads, alleys, streets, ways, lanes, bikeways, and bridges laid out on paper or built by the Territorial, State or County governments since 1892. A 1999 State Attorney General opinion clarified that all public highways are County highways unless declared by Chapter 264, HRS to be under State jurisdiction.

A. Management Measure for Planning, Siting, and Developing Roads and Highways

Plan, site, and develop roads and highways to:

(1) Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss;

(2) Limit land disturbance such as clearing, grading and cut and fill to reduce erosion and sediment loss; and

(3) Limit disturbance of natural drainage features and vegetation.

Status of Measure: NOT APPROVED (PENDING REVIEW)

Applicability: This management measure applies to site development and land disturbing activities for new, relocated, and reconstructed (widened) roads (including residential streets) and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff and associated pollutants from such activities.

Responsible Agencies and Authorities

In Hawaii, roads and highways are usually developed by the State or county government, with State, county and/or Federal funds, or by private entities as part of a subdivision or other large development. Privately-constructed roads and highways usually must meet standards set by the State and/or county because they are transferred over to the State or county as public roadways upon completion of construction. (In Hawaii, the county is the most local form of government - the Hawaii State Constitution does not provide for any other form of municipalities - so local roads are county roads.) Privately-constructed roads that remain private must still comply with counties requirements for erosion and sediment control, stormwater management, drainage, zoning and subdivisions.

Typically, prospective development, including roads, highways and bridges, must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of these trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan.

Construction of roads, highways and bridges will normally trigger the Chapter 343, HRS, process because of the use of State or county funds and/or lands. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action

will be determined to have a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Chapter 19-127.1, HAR, administered by DOT, addresses the design, construction and maintenance of public streets and highways. It applies to all persons and agencies who design, construct, and maintain facilities which are, or are intended to become, public streets and highways in the State. The chapter establishes design, construction and maintenance guidelines that should be followed in the construction, reconstruction, and maintenance of all highways, streets, or roads undertaken either by State or county authorities or by individuals intending to dedicate the facilities to governmental authorities.

The Hawaii DOT Standard Specifications are used for highway design and construction for Hawaii's transportation infrastructure. The current specifications in use are dated 1994, though many sections (technical provisions) have been revised since then. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. It requires contractors to follow guidelines in the *Construction Best Management Practices Field Manual* (dated January 2008) in developing, installing and maintaining BMPs for all projects. The BMPs included in this manual focus on the areas of site management, erosion control, and sediment control.

Chapter 23, HCC, provides requirements for street design in subdivisions in Hawaii County. It requires the location, width, and grade of a street to conform to the County general plan and to be considered in its relation to existing and planned streets, to topographical conditions, to public convenience and safety, and to the proposed use of land to be served by the street. When an existing street adjacent to or within a tract is not of the width required by this chapter, additional rights-of-way shall be provided at the time of subdivision. Preliminary and final plats must show the location of lots, streets, water mains, and storm drainage systems, and are subject to technical review by the county director of public works, State DOH, and district engineer for DOT when the subdivision involves State highways. The ordinance also provides requirements for dedicable streets and standards for non-dedicable streets. Subdivisions, including roads, must maintain pre-development runoff conditions. Pre- and post-development runoffs are calculated using the County "Storm Drainage Standard." The minimum criteria used for runoff calculations are a 1-hour, 10-year storm event. This requirement inhibits conveyance of development runoff into natural drainage systems. Chapter 22, HCC, "County Streets," defines and regulates construction within a county street. It states that no driveway approach shall interfere with the proper runoff of waters into, or passage of waters through existing drainage culverts, swales, ditches, watercourses, defiles, or depressions.

Maui County's subdivision ordinance, Chapter 18, MCC, is similar to Hawaii County's. It specifies minimum standards for roads. In addition, there are specific requirements for roadside swales in order to prevent erosion, and roadway drainage systems in order to protect and preserve existing natural

drainage ways and to assure that waters are drained from the subdivision in a manner that will not cause erosion outside of the subdivision to any greater extent than would occur in the absence of the subdivision and improvements.

Kauai's subdivision ordinance, Chapter 9, KCC, requires that all street design and improvements be constructed in accordance with DPW standards. All streets shall be designed to preserve natural features and topography and minimize need for protection of the natural environment; to require the creation of the minimum feasible amount of land coverage and the disturbance to the soil; to create conditions of proper drainage; and to provide for proper landscaping. All private streets must conform to the requirements of public streets. Chapter 9, KCC, also provides general standards for storm drainage, which include protecting natural drainage channels and assuring that waters drained from a subdivision do not generate more pollution than would occur in the absence of the subdivision or cause erosion outside of the subdivision.

The subdivision ordinance for the City and County of Honolulu, Chapter 22, ROH, also provides standards for roads within subdivisions. Furthermore, it states that no street or roadway in any subdivision or consolidation which has not been laid out, improved and approved in conformity the subdivision regulations shall be taken over, received by dedication or otherwise accepted as public highways.

Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources and minimizing adverse effects resulting from the inappropriate location, use, or design of sites, structures and roads; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values.

County general plans are implemented through the specific community development plans, budgeting and CIPs guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments and projects seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

All counties have ordinances that provide for cluster development and flexible design standards, though these are not well-publicized. While it appears that economics may be the driving factor in the development of these provisions, since clustering results in a cost savings with respect to

infrastructure, these ordinances may also allow for innovative stormwater management techniques, reduced street and sidewalk widths, and other management measures to attenuate runoff from developments. While these ordinances do not explicitly promote the minimizing of impervious surfaces, they may permit the use of pervious pavements and other management measures that are not currently allowed under regular zoning and subdivision provisions.

Since Hawaii submitted its coastal nonpoint pollution control program to NOAA and EPA in 1996, three of the four counties (City and County of Honolulu, Kauai, and Maui) have updated their grading and grubbing ordinances to incorporate minimum BMPs. Generally, these ordinances include similar language that states "regardless of whether a permit is required...or an exemption.... is applicable, all grading, grubbing and stockpiling activities shall incorporate BMPs to the maximum extent practicable to prevent damage by sedimentation to streams, watercourses, natural areas, and the property of others." The minimum BMPs relate to drainage, vegetation, erosion control, and sediment control, among other things, and require phasing and limiting areas of disturbance, and vegetative stabilization. The ordinances provide for the adoption of a BMP manual. The remaining county, Hawaii County, is currently in the process of revising its grading ordinance to make it consistent with the other counties.

Kauai County adopted a new drainage ordinance in 2001. It established new drainage principles and policies through the adoption of a Storm Water Runoff System Manual. It applies to all lands in Kauai and to all stormwater facilities constructed within the County rights-of-way, to easements dedicated to public use, and to privately-owned systems that are part of the required infrastructure improvements for a subdivision. In Hawaii County, all urban developments (with very few exceptions) have been mandated to maintain pre-development runoff conditions. Pre- and post- development runoffs are calculated using the County "Storm Drainage Standard." The minimum criteria used for runoff calculations are a 1-hour, 10-year storm event. This requirement inhibits conveyance of development runoff into natural drainage systems. Maui County Department of Public Works is in the process of revising its drainage rules to incorporate stormwater pollution control measures and BMPs. The changes are based on the City and County of Honolulu's ordinance (Chapter 14, ROH) and will include a new section addressing storm water quality. The new requirements will apply to all residential, commercial, public facilities and transportation development projects requiring building permits. BMPs must either detain stormwater for a length of time that allows pollutants to settle, or use filtration or infiltration methods.

The counties also administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

The threshold for NPDES applicability decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH.

This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

DOH has general regulatory authority over water pollution control.

B. Management Measure for Bridges

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

Status of Measure: NOT APPROVED (PENDING REVIEW)

Applicability: This management measure applies to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities.

Responsible Agencies and Authorities

Bridges are typically sited, designed, and constructed as part of a road or highway project. In Hawaii, road and highway bridges are usually developed by the State or county government, with State, county and/or Federal funds, or by private entities as part of a subdivision or other large development. Privately-constructed bridges usually must meet standards set by the State and/or county because they are transferred over to the State or county as public roadways upon completion of construction. (In Hawaii, the county is the most local form of government - the Hawaii State Constitution does not provide for any other form of municipalities - so local roads are county roads.) Privately-constructed roads, including bridges, that remain private must still comply with counties requirements for erosion and sediment control, stormwater management, drainage, zoning and subdivisions.

Typically, prospective development, including roads, highways and bridges, must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of these trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan.

Construction of roads, highways and bridges will normally trigger the Chapter 343, HRS, process because of the use of State or county funds and/or lands. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have a significant effect on the environment if it detrimentally affects water

quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

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DOT Standard Specifications are used for highway design and construction for Hawaii's transportation infrastructure. The current specifications in use are dated 1994, though many sections (technical provisions) have been revised since then. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. It requires contractors to follow guidelines in the *Construction Best Management Practices Field Manual* (dated January 2008) in developing, installing and maintaining BMPs for all projects. The BMPs included in this manual focus on the areas of site management, erosion control, and sediment control.

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Maui County's subdivision ordinance, Chapter 18, MCC, is similar to Hawaii County's. It specifies minimum standards for roads. In addition, there are specific requirements for roadside swales in order to prevent erosion, and roadway drainage systems in order to protect and preserve existing natural drainage ways and to assure that waters are drained from the subdivision in a manner that will not

cause erosion outside of the subdivision to any greater extent than would occur in the absence of the subdivision and improvements.

Kauai's subdivision ordinance, Chapter 9, KCC, requires that all street design and improvements be constructed in accordance with DPW standards. All streets shall be designed to preserve natural features and topography and minimize need for protection of the natural environment; to require the creation of the minimum feasible amount of land coverage and the disturbance to the soil; to create conditions of proper drainage; and to provide for proper landscaping. All private streets must conform to the requirements of public streets. Chapter 9, KCC, also provides general standards for storm drainage, which include protecting natural drainage channels and assuring that waters drained from a subdivision do not generate more pollution than would occur in the absence of the subdivision or cause erosion outside of the subdivision.

The subdivision ordinance for the City and County of Honolulu, Chapter 22, ROH, also provides standards for roads within subdivisions. Furthermore, it states that no street or roadway in any subdivision or consolidation which has not been laid out, improved and approved in conformity the subdivision regulations shall be taken over, received by dedication or otherwise accepted as public highways.

Since Hawaii submitted its coastal nonpoint pollution control program to NOAA and EPA in 1996, three of the four counties (City and County of Honolulu, Kauai, and Maui) have updated their grading and grubbing ordinances to incorporate minimum BMPs. Generally, these ordinances include similar language that states "regardless of whether a permit is required...or an exemption.... is applicable, all grading, grubbing and stockpiling activities shall incorporate BMPs to the maximum extent practicable to prevent damage by sedimentation to streams, watercourses, natural areas, and the property of others." The minimum BMPs relate to drainage, vegetation, erosion control, and sediment control, among other things, and require phasing and limiting areas of disturbance, and vegetative stabilization. The ordinances provide for the adoption of a BMP manual. The remaining county, Hawaii County, is currently in the process of revising its grading ordinance to make it consistent with the other counties.

Kauai County adopted a new drainage ordinance in 2001. It established new drainage principles and policies through the adoption of a Storm Water Runoff System Manual. It applies to all lands in Kauai and to all stormwater facilities constructed within the County rights-of-way, to easements dedicated to public use, and to privately-owned systems that are part of the required infrastructure improvements for a subdivision. In Hawaii County, all urban developments (with very few exceptions) have been mandated to maintain pre-development runoff conditions. Pre- and post- development runoffs are calculated using the County "Storm Drainage Standard." The minimum criteria used for runoff calculations are a 1-hour, 10-year storm event. This requirement inhibits conveyance of development runoff into natural drainage systems. Maui County DPW is in the process of revising its drainage rules to incorporate stormwater pollution control measures and BMPs. The changes are based on the City and County of Honolulu's ordinance (Chapter 14, ROH) and will include a new section addressing storm water quality. The new requirements will apply to all residential, commercial, public facilities and transportation development projects requiring building permits. BMPs must either detain stormwater for a length of time that allows pollutants to settle, or use filtration or infiltration methods.

The counties also administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

The U.S. Army Corps of Engineers (USACOE) has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. It issues permits to regulate the use of surface and ground water in the State. A stream channel alteration permit (SCAP) is required prior to undertaking a stream channel alteration in order to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses. Routine streambed and drainageway maintenance activities are exempted from obtaining a permit.

The threshold for NPDES applicability decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

The State and counties are responsible for maintenance of their respective roads, highways, and bridges. DOT has district offices in each county that provide engineering services and field inspections of transportation construction projects in conformance with approved plans and specifications; and maintenance, alteration and repair of State roads, highways, and related structures, including drainage facilities and bridges. The departments of public works for Hawaii, Maui, and Kauai counties have divisions that are responsible for maintenance of local roads, bridges, and drainages.

DOH has general regulatory authority over water pollution control.

C. Management Measure for Construction Projects

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

Status of Measure: NO LONGER REQUIRED, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

D. Management Measure for Construction Site Chemical Control

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

Status of Measure: NO LONGER REQUIRED, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

E. Management Measure for Operation and Maintenance

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

Status of Measure: INCOMPLETE – Maui County, Kauai County, Hawaii County, rural Oahu urbanized City and County of Honolulu EXEMPT because of MS4 permit

Applicability: This management measure applies to existing, restored, and rehabilitated roads, highways, and bridges.

Responsible Agencies and Authorities

The State and counties are responsible for maintenance of their respective roads, highways, and bridges. DOT has district offices in each county that provide inspections, maintenance, alteration and repair of State roads, highways, and related structures, including drainage facilities and bridges. The departments of public works for the City and County of Honolulu, and Hawaii, Maui, and Kauai counties have divisions which are responsible for maintenance of local roads, bridges, and drainages.

Chapter 19-127.1, HAR, administered by DOT, addresses the design, construction and maintenance of public streets and highways. It applies to all persons and agencies who design, construct, and maintain facilities which are, or are intended to become, public streets and highways in the State. The chapter establishes maintenance guidelines that should be followed in the construction, reconstruction, and maintenance of all highways, streets, or roads undertaken either by State or county authorities or by individuals intending to dedicate the facilities to governmental authorities (§19-127.1-12).

DOT has embarked on a comprehensive Storm Water Management Program (SWMP) to reduce, to the maximum extent practicable, the amount of storm water containing pollutants entering and discharging from the DOT Highways municipal separate storm sewer system on Oahu (Oahu MS4). This initiative is being taken to comply with DOT's National Pollutant Discharge Elimination System (NPDES) Permit and the mandates of a Consent Decree due to non-compliance with previous NPDES permit requirements. The Oahu SWMP plan outlines the DOT program to address storm water pollution associated with operating the State highways-related network and facilities on Oahu.

DOT Standard Specifications are used for highway design and construction for Hawaii's transportation infrastructure. The current specifications in use are dated 1994, though many sections (technical provisions) have been revised since then. The updated 2005 *Standard Specifications for Road and Bridge Construction* requires written, site-specific BMPs describing activities to minimize water pollution and soil erosion into State waters, drainage or sewer systems, and a plan indicating location of the BMPs, areas of soil disturbance, areas where vegetative practices are to be implemented, and drainage patterns. It requires contractors to follow guidelines in the *Construction Best Management Practices Field Manual* (dated January 2008) in developing, installing and maintaining BMPs for all projects. The BMPs included in this manual focus on the areas of site management, erosion control, and sediment control. According to the Oahu SWMP Plan, DOT-Highways staff managing contract projects shall emphasize the importance of storm water pollution prevention to contractors during pre-construction or other project meetings.

DOT completed a *Storm Water Permanent Best Management Practices Manual* (February 2007). Permanent BMPs are designed to manage and treat storm water runoff prior to discharge from Oahu MS4 outfalls. The permanent BMP options include the following categories: (1) vegetated swales: dry swales and wet swales; (2) infiltration facilities: infiltration trenches; infiltration basins and bio-retentions; (3) storm water wetlands: shallow wetlands, extended detention wetlands and pocket/pond wetlands; (4) storm water ponds: wet ponds, extended detention ponds and multi-pond system; (5) filtering systems: sand filters, and organic filters; and (6) proprietary hydrodynamic type devices. Maintenance of permanent BMPs will depend on their types and sizes. The Post-Construction SWMP includes a management system to ensure that permanent BMPs are subject to consistent inspections and maintenance.

As part of its SWMP, DOT also has a Pollution Prevention and Good Housekeeping Program for Oahu. Its sub-program for debris control includes BMP procedures for conducting inspections and cleaning of all appropriate facilities. Street sweeping and storm drain cleaning are integral parts of this sub-program to remove debris before it can be flushed into receiving waters. The chemical applications BMP sub-program is designed to reduce the contribution of pollutants from the use of herbicides and

pesticides on DOT-Highways rights-of-way, landscaped areas, and maintenance and baseyard facilities. The chemical program addresses the proper application, storage, and disposal of these chemicals. All persons applying herbicides or pesticides within DOT-Highways rights-of-way or its other properties must have received training in proper chemical handling and application provided by DOT. The objective of the erosion control BMP sub-program is to reduce soil erosion from roadside areas within DOT-Highways rights-of-way on Oahu, including existing soil erosion problems that are not associated with current or planned construction projects. The final sub-program addresses maintenance facilities BMPs, with the purpose to operate DOT maintenance facilities and baseyards in a manner that prevents water quality impacts. This will be done by implementing BMPs for vehicle and equipment washing, maintenance and repair; vehicle and equipment fueling; material storage; spill response; and hazardous waste management.

According to Chapter 264, HRS, maintenance work on all roads upon which federal-aid funds[8] have been expended must be done under the direction and supervision of DOT or delegated by DOT to the counties. This maintenance work is funded by the state highway fund created by Section 248-8, HRS. Chapter 264, HRS, also establishes a state highway system consisting of federal-aid highways and other designated public highways. The maintenance for these roads may be undertaken by DOT or by the county in which the highway is situated, by government personnel or under contract. Chapter 46, HRS, addresses the repair and maintenance of public streets, roads, and highways whose ownership is in dispute between the State and a county. This statute authorizes the counties to repair and maintain these disputed public roads.

The county departments of public works maintain county roads, highways and bridges. The road maintenance divisions are responsible for patching potholes, roadside grading, maintaining vegetated roadsides and shoulders, minor resurfacing, repairing sidewalks, cleaning catch basins and culverts, and maintaining flood control and drainage facilities. The counties also have ordinances, administered by the departments of public works, that address controls on excavations and repairs to public highways, streets, alleys, sidewalks and other public places (Chapter 22, HCC; Chapter 18, KCC, Chapter 12.04 MCC; Chapter 14-17 ROH). Maintenance of old government roads, where there is no acknowledged government or private ownership, and disputed roads is performed by the counties, provided they have sufficient resources to undertake these responsibilities. In the City and County of Honolulu, DPW may maintain by either remedial patching, resurfacing or paving, subject to the availability of funds, those portions of private, non-dedicated and non-surrendered streets, roads and bridge decking which meet 11 specific criteria. The street or road cannot have the meaning of “private street” in Chapter 22, ROH, and must not exclude the general public.

County subdivision ordinances (Chapter 23, HCC; Chapter 18, MCC; Chapter 9, KCC; Chapter 22, ROH) require private (non-dedicated) roads and related infrastructure to be maintained by the developer. In addition, the City and County of Honolulu requires every property owner whose land abuts or adjoins a public street to continually maintain, and keep clean, passable and free from weeds and noxious growths, the sidewalk and gutter area which abuts or adjoins the property owner's property.

[8] *"Federal-aid funds" means funds appropriated by the Congress of the United States under or for the purposes of the Federal Highway Act, in which the State is entitled to share.*

Under the authority of Chapter 149A, HRS, DOA, Pesticides Branch, is the lead agency for implementing those measures that relate to regulating pesticides. Chapter 4-66, HAR, administered by DOA, relates to the registration, licensing, certification, recordkeeping, usage, and other activities related to the safe and effective use of pesticides. It requires that those who apply or directly supervise others who apply restricted use pesticides be certified. Certification requires some understanding of the environmental concerns of using pesticides. This requirement is implemented under the CES/DOA Pesticide Applicator Program. Certification is not required for those using pesticides that are not classified as "restricted use."

Hazardous waste products, such as lead-based paints, generated from the cleaning or maintenance of roads, highways, and bridges must be properly disposed, according to Chapter 342J, HRS.

DOH has general regulatory authority over water pollution control.

Approach for Approval

It would seems that the design, construction and maintenance guidelines established under Chapter 19-127.1, HAR, address the requirements of this management measure. If EPA and NOAA deem this insufficient, then the counties should develop written maintenance guidelines for roads, highways, and bridges.

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

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

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures); and

(2) Establish schedules for implementing appropriate controls.

Status of Measure: INCOMPLETE – Maui County, Kauai County, Hawaii County, rural Oahu
urbanized City and County of Honolulu EXEMPT because of MS4 permit

Applicability: This management measure applies to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse effects in surface waters.

Responsible Agencies and Authorities

The State and counties are responsible for maintenance of their respective roads, highways, and bridges. DOT has district offices in each county that provide inspections, maintenance, alteration and repair of State roads, highways, and related structures, including drainage facilities and bridges. The departments of public works for Hawaii, Maui, and Kauai counties have divisions that are responsible for maintenance of local roads, bridges, and drainages.

Hawaii does not have a statewide program that requires DOT and the counties to identify and prioritize pollution controls on existing roads, highways, and bridges to meet the runoff systems management measure.

Approach for Approval

Hawaii could incorporate the goals of the management measure into the watershed planning guidance so that, as watershed plans are developed, they would include tasks to identify priority and watershed pollutant reduction opportunities (*e.g.*, improvements to existing urban runoff control structures); establish schedules for implementing appropriate controls; and demonstrate a commitment of funds/resources to accomplish these activities.

Hawaii is in the process of developing a statewide watershed process to address this and other management measures. DOH and the CZM Program are working with relevant State and county agencies to develop a watershed planning process and guidance document. The document will serve as an agency and community resource for preparing watershed management plans that incorporate the (g) management measures. DOH and the CZM Program are also in the process of prioritizing watersheds for management efforts, and will provide a schedule for developing watershed management plans over the next 15 years.

CHAPTER 4: MARINAS AND RECREATIONAL BOATING

A. Introduction

There are fifteen management measures that apply to marinas and recreational boating, all of which have been approved by NOAA and EPA. The management measures for marinas are applicable to the facilities and their associated shore-based services that support recreational boats and boats for hire. 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.

The following table provides a summary of authorities that apply to the management measures for marinas and recreational boating. A written description of the specific authorities and implementation tools are provided under each management measure in Section B. Appendix A contains tables providing the relevant language for each regulatory and non-regulatory mechanism for each management measure.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified below.

Indicators for Tracking Implementation

DLNR-DOBOR	numbers of CDUAs related to marina activity reviewed and approved for each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported number of on-site inspections for marina operations and maintenance; number of violations reported
County Planning Depts.	number of SMA permits issued for marina development for each fiscal year by island; types of BMPs/conditions required to address sources of polluted runoff from marinas
DOH	number of water quality violations that were caused by polluted runoff from marina activities

Authority		Responsible Agency	Marina Flushing	Water Quality Assessment	Habitat Assessment	Shoreline Stabilization	Stormwater Management	Fueling Station Design	Sewage Facilities	Solid Waste Management	Fish Waste Management	Liquid Material Mgt.	Petroleum Control	Boat Cleaning	Public Education	Maint of Sewage Facilities	Boat Operation
Local	Chapter 12-202, MCC SMA Rules for Maui Planning Commission	Maui Plng Commission	X	X	X			X	X								
	Chapter 12-302, MCC SMA Rules for Molokai Planning Commission	Molokai Plng Commission	X	X	X			X	X								
	Chapter 12-402, MCC SMA Rules for Lanai Planning Commission	Lanai Plng Commission	X	X	X			X	X								
	Chapter 25, ROH Special Mgt Area	CCH	X	X	X			X	X								
	Rule 9, Hawaii Cty Planning Commission	Hawaii Cty Plng Commission	X	X	X			X	X								
	SMA Rules and Regs of the County of Kauai	Kauai Plng Commission	X	X	X			X	X								
State	Chapter 171, HRS Mgt & Disposition of Public Lands	DLNR	X	X	X												
	Chapter 183C, HRS Conservation District	DLNR	X	X	X	X	X	X	X								
	Chapter 190, HRS Marine Life Conservation Progr	DLNR															X
	Chapter 200, HRS Ocean Recreation & Coastal Areas Progr.	DLNR-DOBOR	X	X	X			X	X								
	Chapter 205A, HRS Coastal Zone Mgt	OP-CZM	X	X	X	X	X	X	X								

Authority		Responsible Agency	Marina Flushing	Water Quality Assessment	Habitat Assessment	Shoreline Stabilization	Stormwater Management	Fueling Station Design	Sewage Facilities	Solid Waste Management	Fish Waste Management	Liquid Material Mgt.	Petroleum Control	Boat Cleaning	Public Education	Maint of Sewage Facilities	Boat Operation
State	Chapter 342D, HRS Water Pollution	DOH	X	X	X	X	X	X	X	X	X	X	X	X		X	X
	Chapter 342I, HRS Special Wastes Recycling	DOH								X		X					
	Chapter 342J, HRS Hazardous Waste	DOH										X	X				
	Chapter 343, HRS Environmental Impact Statements	OEQC	X	X	X			X	X								
	Chapter 11-54, HAR Water Quality Standards	DOH		X	X	X											
	Chapter 11-55, HAR Water Pollution Control	DOH				X											
	Chapter 11-200, HAR EIS Rules	OEQC	X	X	X			X	X								
	Chapter 11-281, HAR Underground Storage Tanks	DOH						X				X					
	Chapter 13-5, HAR Conservation District	DLNR	X	X	X	X	X	X	X								
	Chapter 13-231, HAR Operation of Boats, Small Boat Harbors, & Permits	DLNR-DOBOR															X
	Chapter 13-232, HAR Sanitation and Fire Safety	DLNR-DOBOR	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Authority		Responsible Agency	Marina Flushing	Water Quality Assessment	Habitat Assessment	Shoreline Stabilization	Stormwater Management	Fueling Station Design	Sewage Facilities	Solid Waste Management	Fish Waste Management	Liquid Material Mgt.	Petroleum Control	Boat Cleaning	Public Education	Maint of Sewage Facilities	Boat Operation
State	Chapter 13-235, HAR Offshore Mooring Rules and Areas	DLNR-DOBOR							X							X	
	Chapter 13-243, HAR Vessel Equipment Requirements	DLNR														X	
	Chapter 13-244, HAR Rules of the Road	DLNR-DOBOR															X
	Chapter 13-256, HAR Ocean Rec Mgt Rules	DLNR-DOBOR															X
	Chapter 15-150, HAR SMA/Shoreline Areas	OP	X	X	X			X	X								
	National Mgt Measures to Control NPS Pollution from Marinas and Rec'l Boating (2001)	DLNR and EPA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Managing Boat Wastes: A Guide for Hawaii Boaters (2005)	DLNR-DOBOR, DOH, Hawaii Sea Grant													X	X	
	Hawaii Recreational Harbors with MSD pumpouts (2006)	DLNR-DOBOR													X	X	
Federal	Section 404, CWA	USACOE	X	X	X	X	X										
	Section 10, Rivers and Harbors Act of 1899	USACOE	X	X	X	X	X										

B. Management Measures

Siting and Design

A. Marina Flushing Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to the siting and design of new and expanding marinas.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, its Division of Boating and Ocean Recreation (DOBOR) has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

DLNR, under its Office of Conservation and Coastal Lands (OCCL), also administers the State's Conservation District Use Application (CDUA) permit process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

Typically, prospective marina developments must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Marina developments automatically trigger a CDUA because they involve submerged lands; marina developments that affect coastal lands within the counties' SMAs must seek an SMA permit. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. Preliminary surveys and assessment of future biological impacts are required.

DOH has general regulatory authority over water pollution control.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about marina flushing:

- Ensure that the bottom of the marina and the entrance channels are not deeper than adjacent navigable channels
- Consider design alternatives in poorly flushed waterbodies to enhance flushing
- Design new marinas with as few enclosed water sections or separated basins as possible to promote circulation within the entire basin.
- Consider the value of entrance channels in promoting flushing when designing or reconfiguring a marina.
- Establish two openings at the most appropriate locations within the marina to promote flow-through currents.
- Consider mechanical aerators to improve flushing and water quality where basin and entrance channel configuration cannot provide adequate flushing.

B. Water Quality Assessment Management Measure

Assess water quality as part of marina siting and design.

Status of Measure: APPROVED

Applicability: This management measure applies to the siting and design of new and expanding marinas.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and*

Recreational Boating (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

Typically, prospective marina developments must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Marina developments automatically trigger a CDUA because they involve submerged lands; marina developments that affect coastal lands within the counties' SMAs must seek an SMA permit. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. Preliminary surveys and assessment of future biological impacts are required.

DOH has regulatory authority over water pollution control, NPDES permit process, and Section 401, CWA, water quality certification.

All State marine waters are classified as either Class A or Class AA. Section 11-54-03, HAR, states that "it is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or action." The objective of class A waters is that "their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters. These waters shall not act as receiving waters for any discharge which has not received the best degree of treatment or control compatible with the criteria established for this class" (§11-54-03(c)(2)). Most of the State's marine waters are designated the more protective Class AA. Development of a marina in Class AA waters would be prohibited, unless a variance from Section 11-54, HAR, was obtained from DOH.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about water quality assessment:

- Use water quality sampling and/or monitoring to measure water quality conditions.
- Use a water quality modeling methodology to predict post-construction water quality conditions.
- Monitor water quality using indicators.
- Use rapid bioassessment techniques to monitor water quality.
- Establish a volunteer monitoring program.

C. Habitat Assessment Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to the siting and design of new and expanding marinas where site changes may have an impact on important marine species, coral reefs, wetlands, or other important habitats. The habitats of non-indigenous nuisance species are not considered important habitats.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

Typically, prospective marina developments must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Marina developments automatically trigger a CDUA because they involve submerged lands; marina developments that affect coastal lands within the counties' SMAs must seek an SMA permit. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. Preliminary surveys and assessment of future biological impacts are required.

DOH has regulatory authority over water pollution control, NPDES permit process, and Section 401, CWA, water quality certification.

All State marine bottom ecosystems are classified as either Class I or Class II. Section 11-54-03, HAR, states that "it is the objective of class I marine bottom ecosystems that they remain as nearly as possible in their natural pristine state with an absolute minimum of pollution from any human-induced source. Uses of marine bottom ecosystems in this class are passive human uses without intervention or alteration, allowing the perpetuation and preservation of the marine bottom in a most natural state." The objective of class II marine bottom ecosystems is that "their use for protection including propagation of fish, shellfish, and wildlife, and for recreational purposes not be limited in any way." Any actions that may permanently or completely modify, alter or degrade the marine bottom, including navigational structures such as harbors and ramps, may be allowed in class II bottoms provided approval is secured from DOH. The areas of class I and II bottoms are listed by marine bottom type in Section 11-54-07, HAR.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about habitat assessment:

- Conduct habitat surveys and characterize the marina site, including identifying any exotic or invasive species.
- Assess habitat function (e.g., spawning area, nursery area, feeding area) to minimize indirect effects.
- Use rapid bioassessment techniques to assess effects on biological resources.
- Redevelop waterfront sites that have been previously disturbed and expand existing marinas.
- Consider alternative sites where adverse environmental effects will be minimized or positive effects will be maximized.
- Create new habitats or expand habitats in the marina basin.
- Minimize disturbance of riparian areas.
- Use dry stack storage.

D. Shoreline Stabilization Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to siting and design of new and expanding marinas where site changes may result in shoreline erosion.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs

pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has regulatory authority over water pollution control, NPDES permit process, and Section 401, CWA, water quality certification.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about shoreline and streambank stabilization:

- Use vegetative plantings, wetlands, beaches, and natural shorelines where space allows.
- Where shorelines need structural stabilization and where space and use allow, riprap revetment is preferable to a solid vertical bulkhead.
- Where reflected waves will not endanger shorelines or habitats and where space is limited, protect shorelines with structural features such as vertical bulkheads.
- At boat ramps, retain natural shoreline features to the extent feasible and protect disturbed areas from erosion.

E. Storm Water Runoff Management Measure

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

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

Status of Measure: APPROVED

Applicability: This management measure applies to new and expanding marinas, and to existing marinas for *at least* the hull maintenance areas. (Hull maintenance areas are areas whose primary

function is to provide a place for boats during the scraping, sanding, and painting of their bottoms.) If boat bottom scraping, sanding, and/or painting is done in areas other than those designated as hull maintenance areas, the management measure applies to those areas as well.

This measure does not apply to runoff that enters the marina property from upland sources. Upland sources are addressed by the management measures for agriculture, forestry, urban areas, hydromodifications, and wetland and riparian areas.

***NOTE**: This management measure does not apply to existing, new, or expanding facilities that have a NPDES permit for their stormwater discharges.*

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

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DOH has regulatory authority over water pollution control, NPDES permit process, and Section 401, CWA, water quality certification.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about stormwater runoff management:

- Perform as much boat repair and maintenance work as possible inside work buildings.
- Where an inside work space is not available, perform abrasive blasting and sanding within spray booths or tarp enclosures.
- Where buildings or enclosed areas are not available, provide clearly designated land areas for boat repair and maintenance.
- Design hull maintenance areas to minimize contaminated runoff.
- Use vacuum sanders both to remove paint from hulls and to collect paint dust and chips.

- ❖ Restrict the types and/or amount of do-it-yourself work done at the marina.
- ❖ Clean hull maintenance areas immediately after any maintenance to remove debris, and dispose of collected material properly.
- ❖ Capture and filter pollutants out of runoff water with permeable tarps, screens, and filter cloths.
- ❖ Sweep or vacuum around hull maintenance areas, roads, and driveways frequently.
- ❖ Sweep parking lots regularly.
- ❖ Plant grass between impervious areas and the marina basin.
- ❖ Construct new or restore former wetlands where feasible and practical.
- ❖ Use porous pavement where feasible.
- ❖ Install oil/grit separators and/or vertical media filters to capture pollutants in runoff.
- ❖ Use catch basins where storm water flows to the marina basin in large pulses.
- ❖ Add filters to storm drains that are located near work areas.
- ❖ Place absorbents in drain inlets.
- ❖ Use chemical and filtration treatment systems only where necessary.

F. Fueling Station Design Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to new and expanding marinas where fueling stations are to be added or moved.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

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Typically, prospective marina developments must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Marina developments

automatically trigger a CDUA because they involve submerged lands; marina developments that affect coastal lands within the counties' SMAs must seek an SMA permit. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. Preliminary surveys and assessment of future biological impacts are required.

DOH has regulatory authority over water pollution control, NPDES permit process, and Section 401, CWA, water quality certification.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about fueling station design:

- Use automatic shutoffs on fuel lines and at hose nozzles to reduce fuel loss.
- Remove old-style fuel nozzle triggers that are used to hold the nozzle open without being held.
- Install personal watercraft (PWC) floats at fuel docks to help drivers refuel without spilling.
- Regularly inspect, maintain, and replace fuel hoses, pipes, and tanks.
- Install a spill monitoring system.
- Train fuel dock staff in spill prevention, containment, and cleanup procedures.
- Install easy-to-read signs on the fuel dock that explain proper fueling, spill prevention, and spill reporting procedures.
- Locate and design boat fueling stations so that spills can be contained, such as with a floating boom, and cleaned up easily.
- Write and implement a fuel spill recovery plan.
- Have spill containment equipment storage, such as a locker attached or adjacent to the fuel dock, easily accessible and clearly marked.

G. Sewage Facility Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to new and expanding marinas in areas where adequate marine sewage collection facilities do not exist. Marinas that do not provide services for vessels that have marine sanitation devices (MSDs) do not need to have pumpouts, although dump stations for portable toilets and restrooms should be available. This measure does not address direct discharges from vessels covered under Section 312, CWA.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

Typically, prospective marina developments must undergo numerous permit processes, with their associated environmental assessments and extensive public review. Marina developments automatically trigger a CDUA because they involve submerged lands; marina developments that affect coastal lands within the counties' SMAs must seek an SMA permit. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of the trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. Preliminary surveys and assessment of future biological impacts are required.

DOH has regulatory authority over water pollution control, NPDES permit process, and Section 401, CWA, water quality certification.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about sewage facility management:

- Install pumpout facilities and dump stations. Use a system compatible with the marina's needs.
- Provide pumpout service at convenient times and at a reasonable cost.
- Keep pumpout stations clean and easily accessible, and consider having marina staff do pumpouts.
- Provide portable toilet dump stations near small slips and launch ramps.
- Provide restrooms at all marinas and boat ramps.
- Consider declaring marina waters to be a "no discharge" area.
- Establish practices and post signs to control pet waste problems.

- ❖ Avoid feeding wild birds in the marina.
- ❖ Establish no discharge zones to prevent any boat sewage from entering boating waters.
- ❖ Establish equipment requirement policies that prohibit the use of Y-valves on boats on inland waters.

Marina and Boat Operation and Maintenance

A. Solid Waste Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to the operation and maintenance of new and expanding marinas.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. Chapter 13-232, HAR, also prohibits littering on land areas and in waters within a small boat harbor.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about solid waste management:

- ❖ Encourage marina patrons to avoid doing any hull maintenance while their boats are in the water.

- ❖ Place trash receptacles in convenient locations for marina patrons. Covered dumpsters and trash cans are ideal.
- ❖ Provide trash receptacles at boat launch sites.
- ❖ Provide facilities for collecting recyclable materials.
- ❖ Encourage fishing line collection and recycling or disposal.
- ❖ Provide boaters with trash bags.
- ❖ Use a reusable blasting medium.
- ❖ Require patrons to clean up pet wastes and provide a specific dog walking area at the marina.

B. Fish Waste Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to marinas where fish waste is determined to be a source of water pollution.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. Chapter 13-232, HAR, also prohibits littering – which includes fish waste -- on land areas and in waters within a small boat harbor.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about fish waste management:

- Clean fish offshore where the fish are caught and discard of the fish waste at sea (if allowed by the state).
- Install fish cleaning stations at the marina and at boat launch sites.
- Compost fish waste where appropriate.
- Freeze fish parts and reuse them as bait or chum on the next fishing trip.
- Encourage catch and release fishing, which does not kill the fish and produces no fish waste.

C. Liquid Material Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to the operation and maintenance of marinas where liquid materials used in the maintenance, repair, or operation of boats are stored.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. Chapter 13-232, HAR, also prohibits discharge of oil, spirits, gasoline, distillate, any petroleum product, or any other flammable material into the waters of a small boat harbor or designated offshore mooring area.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about liquid material management:

- Build curbs, berms, or other barriers around areas used for liquid material storage to contain spills.
- Store liquid materials under cover on a surface that is impervious to the type of material stored.
- Storage and disposal areas for liquid materials should be located in or near repair and maintenance areas, undercover, protected from runoff, with berms or secondary containment, and away from flood areas and fire hazards.
- Store minimal quantities of hazardous materials.
- Provide clearly labeled, separate containers for the disposal of waste oils, fuels, and other liquid wastes.
- Recycle liquid materials where possible.
- Change engine oil using nonspill vacuum-type systems to perform spill-proof oil changes or to suction oily water from bilges.
- Use antifreeze and coolants that are less toxic to the environment.
- Use alternative liquid materials where practical.
- Follow manufacturer's directions and use nontoxic or low-toxicity pesticides.
- Burn used oil used as a heating fuel.
- Prepare a hazardous materials spill recovery plan and update it as necessary.
- Keep adequate spill response equipment where liquid materials are stored.

D. Petroleum Control Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to boats that have inboard fuel tanks.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. Chapter 13-232, HAR, also prohibits discharge

of oil, spirits, gasoline, distillate, any petroleum product, or any other flammable material into the waters of a small boat harbor or designated offshore mooring area; and requires any vessel equipped with an inboard motor which is moored in a small boat harbor or designated offshore mooring area to maintain an oil absorbent pad in the bilge to separate petroleum products from bilge water.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about petroleum control:

- Promote the installation and use of fuel/air separators on air vents or tank stems of inboard fuel tanks to reduce the amount of fuel spilled into surface waters during fueling.
- Avoid overfilling fuel tanks.
- Provide "doughnuts" or small petroleum absorption pads to patrons to use while fueling to catch splashback and the last drops when the nozzle is transferred back from the boat to the fuel dock.
- Keep engines properly maintained for efficient fuel consumption, clean exhaust, and fuel economy. Follow the manufacturer's specifications.
- Routinely check for engine fuel leaks and use a drip pan under engines.
- Avoid pumping any bilge water that is oily or has a sheen. Promote the use of materials that capture or digest oil in bilges. Examine these materials frequently and replace as necessary.
- Extract used oil from absorption pads if possible, or dispose of it in accordance with petroleum disposal guidelines.
- Prohibit the use of detergents and emulsifiers on fuel spills.

E. Boat Cleaning Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to marinas where boat topsides are cleaned and marinas where hull scrubbing in the water has been shown to result in water or sediment quality problems.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about boat cleaning:

- Wash boat hulls above the waterline by hand. Where feasible, remove boats from the water and clean them where debris can be captured and properly disposed of.
- Attempt to wash boats frequently enough that the use of cleansers will not be necessary.
- If using cleansers, buy and use ones that will have minimal impact on the aquatic environment.
- Switch to long-lasting and low-toxicity or nontoxic antifouling paints.
- Avoid in-the-water hull scraping or any abrasive process done underwater that could remove paint from the boat hull.
- Ensure that adequate precautions have been taken to minimize the spread of exotic and invasive species when boats are transferred from one waterbody to another.
- Minimize the impacts of wastewater from pressure washing.

F. Public Education Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to all environmental control authorities in areas where marinas are located.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. DOBOR and other organizations have developed a number of public education and outreach materials.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about public education:

- Use signs to inform marina patrons of appropriate clean boating practices.
- Establish bulletin boards for environmental messages and idea sharing.
- Promote recycling and trash reduction programs.
- Hand out pamphlets or flyers, send newsletters, and add inserts to bill mailings with information about how recreational boaters can protect the environment and have clean boating waters.
- Organize and present enjoyable environmental education meetings, presentations, and demonstrations and consider integrating them into ongoing programs.
- Educate and train marina staff to do their jobs in an environmentally conscious manner and to be good role models for marina patrons.
- Insert language into facility contracts that promotes tenants' using certain areas and clean boating techniques when maintaining their boats. Use a contract that ensures that tenants will comply with the marina's best management practices.
- Have a clearly written environmental best management practices agreement for outside contractors to sign as a precondition to working on any boat in the marina.
- Participate with an organization that promotes clean boating practices.
- Provide MARPOL placards.
- Paint signs on storm drains.
- Establish and educate marina patrons about rules governing fish cleaning.

- ❖ Educate boaters about good fish cleaning practices.
- ❖ Provide information on local waste collection and recycling programs.
- ❖ Hold clinics on safe fueling and bilge maintenance.
- ❖ Teach boaters how to fuel boats to minimize fuel spills.
- ❖ Stock phosphate-free, nontoxic cleaners and other environmentally friendly products.
- ❖ Place signs in the water and label charts to alert boaters about sensitive habitat areas.
- ❖ Educate boaters to thoroughly clean their boats before boating in other waterbodies.

G. Maintenance of Sewage Facilities Management Measure

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

Status of Measure: APPROVED

Applicability: This management measure applies to marinas where marine sewage disposal facilities exist.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. Chapter 13-232, HAR, also prohibits discharge of oil, spirits, gasoline, distillate, any petroleum product, or any other flammable material into the waters of a small boat harbor or designated offshore mooring area. Chapter 13-232, HAR, also prohibits discharge of any untreated sewage from marine toilets directly or indirectly into the waters of a small boat harbor.

Currently there are pump-outs at Nawiliwili on Kauai; at Waianae, Heeia Kea, Ala Wai and Keehi harbors on Oahu; at Lahaina on Maui; and at the Kailua-Kona pier on the Big Island. DOBOR has plans to build three pump-out sites in the County of Maui, at Maalaea small-boat harbor on Maui, at Manele small-boat harbor on Lanai, and at Kaunakakai small-boat harbor on Molokai.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about maintenance of sewage facilities:

- Regularly inspect and maintain sewage facilities.
- Disinfect the suction connection of a pumpout station (stationary or portable) by dipping it into or spraying it with disinfectant.
- Maintain convenient, clean, dry, and pleasant restroom facilities in the marina.
- Maintain a dedicated fund and issue a contract for pumpout and dump station repair and maintenance.

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

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

Status of Measure: APPROVED

Applicability: This management measure applies in non-marina surface waters where evidence indicates that boating activities are impacting shallow-water habitats.

Responsible Agencies and Authorities

DLNR is the lead agency for implementing this management measure. Since 1993, DOBOR has been responsible for managing and administering the ocean-based recreation and coastal areas programs pertaining to the ocean waters and navigable streams of the State (excluding commercial harbors); planning, developing, operating, administering and maintaining small boat harbors and other boating facilities; and regulating the use of these facilities. A 2004 amendment to Section 13-232-43, HAR, ensures that all improvements to a State boating facility or other property under the jurisdiction of DOBOR shall be constructed, maintained, operated, or modified to comply with EPA's *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (November 2001) or subsequent amendments. Chapter 13-232, HAR, also prohibits discharge of oil, spirits, gasoline, distillate, any petroleum product, or any other flammable material into the waters of a small boat harbor or designated offshore mooring area. Chapter 13-232, HAR, also prohibits discharge of any untreated sewage from marine toilets directly or indirectly into the waters of a small boat harbor.

DLNR, under OCCL, also administers the State's CDUP process, which is triggered by any proposed marina construction project because submerged lands are included within the State Conservation District. OCCL will require, as a condition of a Conservation District Use Permit, compliance with EPA's

National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating (November 2001) for both public and private marina developments (Sam Lemmo, pers. comm. 11/26/08).

DOH has general regulatory authority over water pollution control and waste management.

Management Practices

The *National Management Measures to Control Nonpoint Source Pollution from Marinas and Recreational Boating* (2001), which was incorporated into DLNR-DOBOR rules in 2004, contains the following specific language about boat operation:

- Restrict boater traffic in shallow-water areas.
- Establish and enforce no wake zones to decrease turbidity, shore erosion, and damage in marinas.

CHAPTER 5: HYDROMODIFICATIONS

A. Introduction

There are six management measures that apply to hydromodifications, one of which has been fully approved by NOAA and EPA and two that are no longer required because of changes to the NPDES regulations. According to the Environmental Protection Agency's (EPA) *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters,* ***hydromodification*** means "alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources" (p 6-90). In other words, any alteration to a stream or coastal waters, whether a diversion, channel, dam, or levee, is considered a hydromodification. The hydromodification management measures affect all land use activities, especially those associated with agriculture, forestry and urban development. Therefore, these management measures should be considered in conjunction with the management measures for agriculture, forestry, urban areas and, to a lesser extent, marinas.

For the purposes of this chapter, the following definitions will be used.

- A ***stream*** is any natural water course in which water usually flows in a defined bed or channel. The flow can be constant, uniform, or uninterrupted, regardless of whether the stream has been altered or channelized.
- A ***perennial stream*** carries water at all times.
- An ***intermittent stream*** carries water most of the time but periodically ceases to flow when evaporation or seepage into the stream's bed and banks exceed the available streamflow. For the purposes of this management measure, intermittent streams will also include:
  - ***ephemeral streams*** that carry water only after rains; and
  - ***interrupted streams*** that carry water generally through their length but may have sections with dry streambeds.
- A ***channel*** is a natural or constructed waterway that continuously or periodically passes water.
- A ***streambank*** is the side slopes of a channel between which the streamflow is normally confined.

The following table provides a summary of authorities that apply to the management measures for hydromodifications. A written description of the specific authorities and implementation tools are provided under each management measure in Section B. Appendix A contains tables providing the relevant language for each regulatory and non-regulatory mechanism for each management measure.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified below. Specific precautions will be taken to ensure that sensitive data, such as specific names and locations of practices, is maintained in full confidence. If detailed information is required due to violation of water quality standards, this information may be acquired by formal request in accordance with the Freedom of Information Act.

Indicators for Tracking Implementation

CWRM	Number of SCAPs issued for each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported
USACOE	Number of Section 404 permits issued each fiscal year by island for hydromodifications; number of on-site inspections of BMPs conducted; number of violations reported
USACOE	Number of Section 10 permits issued each fiscal year by island for hydromodifications; number of on-site inspections of BMPs conducted; number of violations reported
DLNR	Number of CDUPs issued for each fiscal year by island for hydromodifications; number of on-site inspections of BMPs conducted; number of violations reported
County Planning Depts.	number of SMA permits issued for each fiscal year by island; types of BMPs/conditions required to address urban sources of polluted runoff
Counties	Number of linear feet of channels inspected and maintained each fiscal year by island
DOH	number of water quality violations that were caused by hydromodifications

Authority		Responsible Agency	Phys & Chem Characteristics Surface Water	Instream & Riparian Habitat Rest'n	Prot'n of Surface of WQ & Instream/ Riparian Habitat	Eroding Streambanks and Shorelines
Local	Chapter 12-202, MCC, SMA Rules for Maui Plng Comm.	Maui Plng Commission	X	X	X	X
	Chapter 12-302 MCC, SMA Rules for Molokai Plng Comm.	Molokai Plng Commission	X	X	X	X
	Chapter 12-402, MCC, SMA Rules for Lanai Plng Comm.	Lanai Plng Commission	X	X	X	X
	2030 General Plan Update: Draft Countywide Policy Plan (2008)	Maui County				X
	Chapter 14-12, ROH Drainage, Flood & Pollution Control	CCH – DPW	X	X	X	X
	Chapter 25, ROH Special Mgt Area	CCH Plng Commission	X	X	X	X
	Chapter 41-26, ROH Maint. of Channels, Streambeds, Streambanks etc.	CCH – DPW	X	X	X	X
	various sustainable communities and development plans for Oahu	CCH				X
	Rule 9, Hawaii County Planning Commission	Hawaii Cty. Plng Comm.	X	X	X	X
	Hawaii County General Plan (2005)	Hawaii County				X
	SMA Rules and Regs of the County of Kauai	Kauai Plng Commission	X	X	X	X
	The Kauai General Plan (2000)	Kauai County				X

Authority		Responsible Agency	Phys & Chem Characteristics Surface Water	Instream & Riparian Habitat Rest'n	Prot'n of Surface of WQ & Instream/ Riparian Habitat	Eroding Streambanks and Shorelines
State	Chapter 46, HRS General Provisions, County Org'n and Admin	Counties	X	X		
	Chapter 174C, HRS Hawaii Water Code	DLNR-CWRM	X	X	X	X
	Chapter 179D, HRS Dams and Reservoirs	DLNR			X	
	Chapter 183C, HRS Conservation District	DLNR	X	X		
	Chapter 205A, HRS Coastal Zone Management	OP-CZM	X	X	X	X
	Chapter 342D, HRS Water Pollution	DOH	X	X	X	X
	Chapter 343, HRS Env'l Impact Statements	OEQC	X	X	X	X
	Chapter 11-54, HAR Water Quality Standards	DOH	X	X	X	
	Chapter 11-55, HAR Water Pollution Control	DOH	X	X	X	X
	Chapter 11-200, HAR EIS Rules	OEQC	X	X	X	X
	Chapter 13-5, HAR Conservation District	DLNR	X	X		
	Chapter 13-169, HAR Protection of Instream Uses of Water	DLNR-CWRM	X	X	X	X
	Chapter 13-231, HAR Operation of Boats, Small Boat Harbors, and Permits	DLNR-DOBOR				X
	Chapter 13-244, HAR Rules of the Road	DLNR-DOBOR				X

Authority		Responsible Agency	Phys & Chem Characteristics Surface Water	Instream & Riparian Habitat Rest'n	Prot'n of Surface of WQ & Instream/ Riparian Habitat	Eroding Streambanks and Shorelines
	Chapter 13-256, HAR Ocean Rec Mgt Rules & Areas	DLNR-DOBOR				X
	Chapter 15-150, HAR SMA/Shoreline Areas	OP	X	X	X	X
Federal	Section 404, CWA	USACOE	X	X	X	X
	Section 10, Rivers and Harbors Act of 1899	USACOE	X	X	X	X

B. Management Measures

Channelization and Channel Modification

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

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

Status of Measure: COMPLETE, except for the requirement to develop an operation and maintenance program for existing modified channels. (#3 above ONLY)

Applicability: This management measure applies to public and private channelization and channel modification activities to prevent the degradation of physical and chemical characteristics of surface waters from such activities. This management measure applies to any proposed channelization or channel modification projects, including levees, as well as existing modified channels.

Responsible Agencies and Authorities

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect streams, wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through the Commission on Water Resource Management (CWRM) – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to adequately protect fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

The Water Commission issues permits to regulate the use of surface and ground water in the State. A stream channel alteration permit (SCAP) is required prior to undertaking a stream channel alteration in order to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes

policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.
- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website for devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

DOH establishes and enforces the State water quality standards contained in Chapter 11-54, HAR. All inland fresh waters are classified based on their ecological characteristics and other natural criteria as flowing waters (*e.g.*, streams), standing waters (*e.g.*, lakes and reservoirs), and wetlands. These waters are further classified for the purposes of applying water quality standards and selecting appropriate quality parameters and uses to be protected in these waters. Class 1 inland waters are to remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. Waste discharge into these waters is prohibited. Any conduct that results in a demonstrable increase in levels of point or nonpoint source contamination in class 1 waters is prohibited. The uses to be protected in class 1(a) waters are scientific and educational purposes, protection of native breeding stock, baseline references from which human-caused changes can be measured, compatible recreation, aesthetic enjoyment, and other non-degrading uses. The additional uses to be protected in class 1(b) waters are domestic water supplies and food processing. Class 2 inland waters are to be protected for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping and navigation. Class 1(a) waters include all standing and/or flowing waters, and elevated and/or low wetlands: (i) within the natural reserves, preserves, sanctuaries, and refuges established by DLNR under Chapter 195, HRS, or similar reserves for the protection of aquatic life; (ii) in national and state parks; (iii) in state or federal fish and wildlife

refuges; (iv) which have been identified as a unique or critical habitat for threatened or endangered species by the U.S. Fish and Wildlife Service; and (v) in protective Conservation District subzones designated under Chapter 13-5, HAR.

The U.S. Army Corps of Engineers (USACOE) has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The threshold for NPDES applicability decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

The counties administer the Special Management Area (SMA) permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

DLNR manages lands in the Conservation District through the issuance of Conservation District Use Permits (CDUPs), in order to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability. The conservation district is divided into sub-zones, in which permitted land uses are restricted to those provided for in Chapter 13-5, HAR. Erosion control, flood control and other hazard prevention devices or facilities are allowed within the limited subzone, with a permit from the Board of Land and Natural Resources. Activities within the conservation district would likely trigger the EIS process, because they constitute a use of state lands.

Major development projects frequently trigger an environmental review process. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process.

Some of these trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Under Chapter 46-11.5, HRS, the counties are responsible for the maintenance of channels, streambeds, streambanks, and drainageways, whether natural or artificial, including their exits into the ocean, in suitable condition to carry off stormwaters. For lands comprising the channels, streams, streambanks, and drainageways that are privately owned or owned by the State, the respective owner is responsible for maintenance. In the City and County of Honolulu, Chapter 41-26.3, ROH, implements this statute; another ordinance addresses the maintenance of drainage facilities (Chapter 14-12, ROH). The City and County of Honolulu also has an ordinance that states "Whenever practical, drainage improvements shall emphasize natural means and retention of water, with minimum reliance on structural means and rapid water transport" (Chapter 24-1.8, ROH, Development Plans).

DOH has general regulatory authority over water pollution control.

Approach for Approval

EPA and NOAA have concluded that the State has addressed all aspects of this management measure, with the exception of the requirement to develop an operation and maintenance program for existing modified channels. To address this component of the management measure, the State suggested amending Chapter 46, Section 11.5, HRS, to include an explicit definition of waterbodies, as well as to link implementation of the statute to a BMP manual or standards. While EPA and NOAA would support such a legislative change, they thought this option may be more challenging than other approaches the State could take. Namely, they suggested Hawaii could incorporate the goals of the management measure into watershed planning guidance so that, as watershed plans are developed, they would include tasks to identify and implement opportunities to improve physical and chemical characteristics of surface waters in channels and to restore instream and riparian habitats in those channels.

In the long-term, however, it may be preferable to amend Chapter 46, Section 11.5, HRS, to include an explicit definition of waterbodies and link implementation of the statute to a BMP manual. Discussion with appropriate State and/or county agencies should take place through the ORMP implementation process to determine the appropriate course of action.

B. Instream and Riparian Habitat Restoration Management Measure

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

Status of Measure: COMPLETE, except for the requirement to develop an operation and maintenance program for existing modified channels. (#3 above ONLY)

Applicability: This management measure applies to any proposed channelization or channel modification project to determine changes in instream and riparian habitats and to existing modified channels to evaluate possible improvements to these environments.

Responsible Agencies and Authorities

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect streams, wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to adequately protect fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

The Water Commission issues permits to regulate the use of surface and ground water in the State. A stream channel alteration permit (SCAP) is required prior to undertaking a stream channel alteration in order to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.
- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website for devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

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USACOE has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The threshold for NPDES applicability decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

The counties administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

DLNR manages lands in the Conservation District through the issuance of CDUPs, in order to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability. The conservation district is divided into sub-zones, in which permitted land uses are restricted to those provided for in Chapter 13-5, HAR. Erosion control, flood control and other hazard prevention devices or facilities are allowed within the limited subzone, with a permit from the Board of Land and Natural Resources. Activities within the conservation district would likely trigger the EIS process, because they constitute a use of state lands.

Major development projects frequently trigger an environmental review process. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of these trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have

a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Under Chapter 46-11.5, HRS, the counties are responsible for the maintenance of channels, streambeds, streambanks, and drainageways, whether natural or artificial, including their exits into the ocean, in suitable condition to carry off stormwaters. For lands comprising the channels, streams, streambanks, and drainageways that are privately owned or owned by the State, the respective owner is responsible for maintenance. In the City and County of Honolulu, Chapter 41-26.3, ROH, implements this statute; another ordinance addresses the maintenance of drainage facilities (Chapter 14-12, ROH). The City and County of Honolulu also has an ordinance that states "Whenever practical, drainage improvements shall emphasize natural means and retention of water, with minimum reliance on structural means and rapid water transport" (Chapter 24-1.8, ROH, Development Plans).

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Approach for Approval

EPA and NOAA have concluded that the State has addressed all aspects of this management measure, with the exception of the requirement to develop an operation and maintenance program for existing modified channels. To address this component of the management measure, the State suggested amending Chapter 46, Section 11.5, HRS, to include an explicit definition of waterbodies, as well as to link implementation of the statute to a BMP manual or standards. While EPA and NOAA would support such a legislative change, they thought this option may be more challenging than other approaches the State could take. Namely, they suggested Hawaii could incorporate the goals of the management measure into watershed planning guidance so that, as watershed plans are developed, they would include tasks to identify and implement opportunities to improve physical and chemical characteristics of surface waters in channels and to restore instream and riparian habitats in those channels.

In the long-term, however, it may be preferable to amend Chapter 46, Section 11.5, HRS, to include an explicit definition of waterbodies and link implementation of the statute to a BMP manual. Discussion with appropriate State and/or county agencies should take place through the ORMP implementation process to determine the appropriate course of action.

Dams

A. Management Measure for Erosion and Sediment Control

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

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

Status of Measure: NO LONGER REQUIRED, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

B. Management Measure for Chemical and Pollutant Control

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

Status of Measure: NO LONGER REQUIRED, per Charles Sutfin (EPA) and John King (NOAA) memo, because it overlaps with the expanded NPDES storm water regulations.

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

Develop and implement a program to manage the operation of dams in coastal areas that includes an assessment of:
(1) Surface water quality and instream and riparian habitat and potential for improvement; and
(2) Significant nonpoint source pollution problems that result from excessive surface water withdrawals.

Status of Measure: APPROVED

Applicability: This management measure applies to dam operations that result in the loss of desirable surface water quality, and of desirable instream and riparian habitat. Dams are defined as constructed impoundments which are either:

(a) 25 feet or more in height *and* greater than 15 acre-feet in capacity, or
(b) 6 feet or more in height *and* greater than 50 acre-feet in capacity.

Responsible Agencies and Authorities

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect streams, wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to adequately protect fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

The Water Commission issues permits to regulate the use of surface and ground water in the State. A stream channel alteration permit (SCAP) is required prior to undertaking a stream channel alteration in order to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

When the water resources of an area are determined to be threatened by existing or proposed withdrawals of water, CWRM may designate the area as a water management area. In water management areas, CWRM can limit the total quantity of water that can be withdrawn. Chapter 174C, HRS, provides criteria for designating ground and surface water management areas. CWRM applies a water use permitting process to regulate use in designated water management areas. A water use permit must be obtained in order to continue existing uses and prior to commencing any new water use. To obtain a permit, the applicant must establish that the proposed use of water can be accommodated with the available water source; is a reasonable-beneficial use; will not interfere with any existing legal use of water; is consistent with the public interest; is consistent with state and county general plans and land use designations; is consistent with county land use plans and policies; and will not interfere with the rights of the Department of Hawaiian Home Lands.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.
- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
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USACOE has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The threshold for NPDES applicability decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

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permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

Major development projects frequently trigger an environmental review process. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of these trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Chapter 13-190, HAR, "Dams and Reservoirs", is administered by DLNR. These rules govern the design, construction, operation, maintenance, enlargement, alteration, repair and removal of dams in the State. Written approval from DLNR of the construction plans is required for any construction, enlargement, repair or alteration project. Owners are required to provide for adequate and timely maintenance, operation, and inspection of their dams and reservoirs to insure public safety. DLNR is required to inspect all dams and reservoirs at least every five years.

DOH has general regulatory authority over water pollution control.

Streambank and Shoreline Erosion

A. Management Measure for Eroding Streambanks and Shorelines

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

Status of Measure: COMPLETE, except for the requirement to protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters. (#3 above ONLY)

Applicability: This management measure applies to eroding shorelines in coastal bays and to eroding streambanks in coastal streams. The measure does not imply that all shoreline and streambank

erosion must be controlled. Some amount of natural erosion is necessary to provide the sediment for beaches in estuaries and coastal bays, for point bars and channel deposits in rivers, and for substrate in tidal flats and wetlands. The measure, however, applies to eroding shorelines and streambanks that constitute a nonpoint source pollution problem in surface waters. It is not intended to hamper the efforts of any States or localities to retreat rather than to harden the shoreline.

Responsible Agencies and Authorities

Shoreline erosion in Hawaii generally occurs where beaches are starved for sand in front of seawalls and other shoreline structures designed to protect buildings and coastal lands. Streambank erosion generally occurs because of alterations to the riparian area and severe flooding caused by storm events. In the past, the State used hardening techniques to address erosion and flood control. However, more recently the trend has moved away from hardening, in preference of more vegetative and non-structural stabilization techniques. There are few situations in the State where uses of the adjacent surface waters contribute to streambanks and shoreline erosion and excessive sedimentation is generated. There are also very few Hawaiian streams that are navigable, so that aspect of the management measure is not really relevant. While, in some areas, cattle access streams for water, this activity is managed under the agricultural management measures. Likewise, there are few situations where the use of nearshore waters causes erosion of the shoreline.

Chapter 205A, HRS, defines the shoreline as "the upper reaches of the wash of the waves, other than storm and seismic waves, at high tide during the season of the year in which the highest wash of the waves occurs, usually evidenced by the edge of the vegetation growth, or the upper limit of debris left by the wash of the waves." The area seaward or *makai* of the shoreline is part of the Conservation District and is under State jurisdiction. The area landward or *mauka* of the shoreline is managed by the counties as part of the Shoreline Management Area (SMA) established under Chapter 205A, HRS.

Chapter 205A, HRS, establishes coastal zone management objectives and policies which must be implemented by State and county agencies. One objective, addressing coastal hazards, states "reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution." Another, for beach protection, states "protect beaches for public use and recreation." The associated policies for beach protection are: (A) locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion; (B) prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and (C) minimize the construction of public erosion-protection structures seaward of the shoreline.

DLNR manages the area seaward of the shoreline. Pursuant to Chapter 183, HRS, DLNR is responsible for establishing the procedures and certifying where the shoreline is located, and for promulgating and administering the Conservation District use regulations. All activities proposed within the Conservation District require a CDUP, for which there is an application and review process. The Board of Land and Natural Resources can approve, deny, or approve with conditions, proposed uses of the Conservation District.

DLNR has also produced a number of documents related to management of shoreline erosion. It developed the *Hawaii Coastal Erosion Management Plan* (COEMAP), which was adopted as policy by the BLNR in 2000. The document provides a framework for discussion and management of coastal erosion problems in the state, as well as guidelines, recommendations and implementation steps to improve this management. It describes regulatory and non-regulatory tools for managing coastal erosion and makes recommendations to further protect beaches from erosion caused by inappropriate development. DLNR and the University of Hawaii Sea Grant Extension Service also began drafting a document entitled *Erosion Management Alternatives for Hawaii* (still in draft form) in 2004 in which alternatives for shoreline stabilization, restoration and revegetation are described.

The counties are responsible for management of the area *mauka* of the shoreline. Under Chapter 205A, HRS, the four counties are required to establish a "shoreline area" with setbacks no less than 20-ft and no more than 40-ft inland from the shoreline wherein no development is allowed. The law also allows counties to establish ordinances creating setbacks greater than 40 ft. The statute is intended to control development on the shoreline, maintain open space, and preserve public access.

The counties also administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

Each of the counties' general plans also addresses the issue of hydromodification. Hawaii County's general plan includes policies to "develop an integrated shoreline erosion management plan that ensures the preservation of sandy beaches …" and "develop drainage master plans from a watershed perspective that considers non-structural alternatives, minimizes channelization, protects wetlands that serve drainage functions…." Kauai has several relevant policies in its general plan: "(a) Establish zoning and subdivision regulations that (1) strictly limit development on lands that are steeply-sloped and/or have highly erodible soils, in order to prevent flooding, landslides and nonpoint pollution; and (2) strictly limit development on shoreline lands within coastal flood hazard areas or susceptible to shoreline erosion; (b) Focusing on the most heavily impacted urban watersheds, evaluate flooding and erosion risks and develop long-range plans for drainage and flood hazard management; ….. and (d) Regulations and drainage improvements shall be consistent with the following principles:

(1) Use natural drainageways for storm runoff waterways wherever possible.
(2) Avoid channelization or alteration of natural drainageways.
(3) Avoid diversion of storm runoff from one basin to another.
(4) Do not replace natural drainageways with structured, closed systems, except at road crossings."

The Development/Sustainable Communities Plans of the City and County of Honolulu also address streambank stabilization. The Koolaupoko Sustainable Communities Plan states that "modifications needed for flood protection should be designed and constructed to maintain habitat and aesthetic

values, and avoid and/or mitigate degradation of stream, coastline and nearshore water quality." It further directs the county to "select natural and man-made vegetated drainageways and retention basins as the preferred solution to drainage problems wherever they can promote water recharge, help control nonpoint source pollutants, and provide passive recreation benefits." The Koolau Loa Sustainable Communities Plan recommends "Encourage abutting property owners along streams and/or drainageways to stabilize the banks with vegetation where erosion potential is high." In fact, the Waimanalo Watershed Restoration Project has developed a 6-page brochure for landowners about plants to use to control streambank erosion.

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect streams, wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission issues permits to regulate the use of surface and ground water in the State. A stream channel alteration permit (SCAP) is required prior to undertaking a stream channel alteration in order to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.
- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.
- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.

- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website for devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

USACOE has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The threshold for NPDES applicability decreased since Hawaii submitted its CNPCP. If development activity will disturb one acre or more of total land area, then a NPDES permit is required from DOH. This permit process is described in Chapter 11-55, HAR, "Water Pollution Control." A County grading permit is required for any grading and grubbing work before a NPDES permit can be issued. The grading permit allows the grading, while the NPDES permit regulates stormwater runoff from the construction site.

Major development projects normally trigger an environmental review process. Chapter 343, HRS, and Chapter 11-200, HAR, both about the Environmental Impact Statement law, require the preparation of an EA and/or EIS for proposed activities that trigger the environmental review process. Some of these trigger conditions are as follows: (1) use of State or county lands or funds; (2) use within the conservation district; (3) use within a shoreline setback area; (4) use within the Waikiki special district; (5) use within an historic site; (6) reclassification of conservation lands; and (7) certain amendments to a county general plan. In determining whether an action may have a significant effect on the environment, the approving State or county agency shall consider every phase of a proposed action, the expected consequences, both primary and secondary, and the cumulative as well as the short-term and long-term effects of the action. In most instances, an action will be determined to have a significant effect on the environment if it detrimentally affects water quality or affects an environmentally sensitive area such as a flood plain, beach, erosion-prone area, estuary, fresh water, or coastal waters. Mitigation measures must be identified to address these detrimental effects.

Rules regulating the operation of vessels in ocean waters and navigable streams, administered by DLNR's Division of Boating and Ocean Recreation (DOBOR) restrict vessel speeds in Ocean Recreation Management Areas, along shorelines, and near other vessels, docks, and swimmers/divers. Chapter 13-244, HAR, specifically states that "no person shall operate a vessel at a rate of speed greater than is reasonable having regard to conditions and circumstances."

DOH has general regulatory authority over water pollution control.

Approach for Approval

According to EPA and NOAA, the State 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. Much of this component can be addressed by incorporating the management measure goals into the guidance for its watershed planning program, such that as watershed plans are developed, they will include tasks to identify and implement opportunities to address eroding streambanks and shorelines.

CHAPTER 6: WETLANDS, RIPARIAN AREAS, AND VEGETATED TREATMENT SYSTEMS

A. Introduction

There are three management measures that apply to wetlands, riparian areas, and vegetated treatment systems, two of which has been fully approved by NOAA and EPA.

For the purposes of Hawaii's coastal nonpoint pollution control program, ***wetlands*** are defined as:

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient 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.*[9]

For the purposes of the coastal nonpoint pollution control program, ***riparian areas*** are defined as:

> *Vegetated ecosystems along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent waterbody. These systems encompass wetlands, uplands, or some combination of these two land forms. They will not in all cases have all of the characteristics necessary for them to be classified as wetlands.*[10]

Wetlands and riparian areas can play a critical role in reducing polluted runoff by intercepting surface runoff, subsurface flow, and certain groundwater flows. Their role in quality improvement includes processing, removing, transforming, and storing such pollutants as sediment, nitrogen, phosphorus, and certain heavy metals. Thus, wetlands and riparian areas buffer receiving waters from the effects of pollutants, or they prevent the entry of pollutants into receiving waters.

The following table provides a summary of authorities that apply to the management measures for wetlands, riparian areas, and vegetated treatment systems. A written description of the specific authorities and implementation tools are provided under each management measure in Section B. Appendix A contains tables providing the relevant language for each regulatory and non-regulatory mechanism for each management measure.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified below. Specific precautions will be taken to ensure that sensitive data, such as specific names and locations of practices, is maintained in full confidence. If detailed information is required due to

[9] *This definition is consistent with the Federal definition at 40 CFR 230.3, promulgated December 24, 1980. As amendments are made to the wetland definition, they will be considered applicable to this program.*
[10] *This definition is adapted from the definitions offered previously be Mitsch and Gosselink (1986) and Lowrance et al. (1988).*

violation of water quality standards, this information may be acquired by formal request in accordance with the Freedom of Information Act.

Indicators for Tracking Implementation

CWRM	Number of SCAPs issued for each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported
USACOE	Number of Section 404 permits issued each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported
USACOE	Number of Section 10 permits issued each fiscal year by island; number of on-site inspections of BMPs conducted; number of violations reported
DLNR	Number of CDUPs issued for each fiscal year by island that affect wetlands or riparian areas; number of on-site inspections of BMPs conducted; number of violations reported
County Planning Depts.	number of SMA permits issued for each fiscal year by island that affect wetlands or riparian areas; types of BMPs/conditions required to address urban sources of polluted runoff
DOH	number of water quality violations that affected wetlands or riparian areas

Authority		Responsible Agency	Protection of Wetlands & Riparian Areas	Restoration of Wetlands & Riparian Areas	Vegetated Treatment Systems
Local	Chapter 12-202, MCC, SMA Rules for Maui Plng Comm.	Maui Plng Commission	X	X	
	Chapter 12-302 MCC, SMA Rules for Molokai Plng Comm.	Molokai Plng Commission	X	X	
	Chapter 12-402, MCC, SMA Rules for Lanai Plng Comm.	Lanai Plng Commission	X	X	
	2030 General Plan Update: Draft Countywide Policy Plan (2008)	Maui County	X		
	Chapter 25, ROH Special Mgt Area	CCH Plng Commission	X	X	
	various sustainable communities and development plans for Oahu	CCH	X		
	Rule 9, Hawaii County Planning Commission	Hawaii Cty. Plng Comm.	X	X	
	Hawaii County General Plan (2005)	Hawaii County	X		
	SMA Rules and Regs of the County of Kauai	Kauai Plng Commission	X	X	
	The Kauai General Plan (2000)	Kauai County	X		
State	Chapter 173A, HRS Acquisition of Resource Value Lands	DLNR	X	X	
	Chapter 174C, HRS Hawaii Water Code	DLNR – CWRM	X	X	
	Chapter 183, HRS Forest Reserves, Water Dev't and Zoning	DLNR	X	X	
	Chapter 183C, HRS Conservation District	DLNR	X	X	
	Chapter 195, HRS Natural Area Reserves System	DLNR	X	X	
	Chapter 195D, HRS Conservation of Aquatic Life, Wildlife & Land Plants	DLNR	X	X	
	Chapter 198, HRS Conservation Easements	DLNR	X	X	
	Chapter 205A, HRS Coastal Zone Management	OP-CZM	X	X	
	Chapter 342D, HRS Water Pollution	DOH	X	X	
	Chapter 11-54, HAR Water Quality Standards	DOH	X	X	
	Chapter 13-5, HAR Conservation District	DLNR	X	X	

Authority		Responsible Agency	Protection of Wetlands & Riparian Areas	Restoration of Wetlands & Riparian Areas	Vegetated Treatment Systems
	Chapter 13-169, HAR Protection of Instream Uses of Water	DLNR – CWRM	X	X	
	Chapter 15-150, HAR SMAs/Shoreline Areas	OP	X	X	
Federal	Section 404, CWA	USACOE	X	X	
	Section 10, Rivers and Harbors Act of 1899	USACOE	X	X	

B. Management Measures

A. Management Measure for Protection of Wetlands and Riparian Areas

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

Status of Measure: COMPLETE, except for protecting wetlands and riparian areas from existing development which adversely affects the nonpoint source abatement functions of such areas.

Applicability: This management measure applies to protecting wetlands and riparian areas from adverse nonpoint source pollution impacts.

Responsible Agencies and Authorities

The Hawaii State Planning Act, Chapter 226, HRS, establishes a statewide planning system to coordinate and guide state and county activities and to implement the overall theme, goals, objectives, policies, and priority guidelines contained in the chapter. The statute characterizes county general plans, what they should address, and how they should be developed (Sections 226-52 and 226-58). It specifies that the plans must contain objectives and policies, and implementation priorities and actions to carry out the policies, applying the guiding state principles to the unique problems and needs of each individual county. One of the duties of the Office of Planning defined in Chapter 226 is to provide recommendations to the governor and state and county agencies on conflicts between and among the chapter, state functional plans approved by the governor, county general plans and development plans, and state programs.

The county general plans provide a coordinated set of guidelines within each county for decision-making regarding future growth and development and protection of natural and cultural resources. Generally, all development within the counties must conform to the policies outlined in the county general plans and specific community development plans. The general plans also guide revisions and updates to the county codes. They are given the effect of law through adoption by the respective county councils. Generally, all the county general plans have policies related to protecting the county's natural resources; protecting wetlands and riparian areas; and designing drainage systems to minimize polluted runoff, retain streambank vegetation, and maintain habitat and aesthetic values.

County general plans are implemented through the specific community development plans, budgeting and capital improvement programs (CIP) guided by the goals, objectives and policies of the general plans and community development plans, county laws amended to be consistent with the intent of the general plan components, and approval or disapproval of developments seeking zoning and other development approvals based on how they support the visions expressed in the general plans. The county planning departments prepare annual reports to monitor progress towards achieving general plan goals, objectives and policies. The annual reports are submitted to the mayors and county councils for review. General plans are subject to periodic review and amendment, as specified by county procedures, with significant opportunities for input by the public.

Like the other counties, the City and County of Honolulu implements a three-tiered system of objectives, policies, planning principles, guidelines, and regulations. The General Plan is the first tier and comprises brief statements of objectives and policies. The second tier is the Development Plans and Sustainable Communities Plans, which are adopted and revised by ordinance. The third tier is comprised of the implementing ordinances and regulations, which must be consistent with the General Plan and Development/Sustainable Communities Plans. Eight community-oriented plans have been developed to help guide public policy, investment and decision-making through the 2025 planning horizon. Each plan addresses one of 8 geographic planning regions on Oahu. The planning regions of Ewa and Primary Urban Center are the areas to which major growth in population and economic activity will be directed, so the plans for these regions are titled "Development Plans." The remaining 6 planning regions are envisioned to remain relatively stable, so their plans are titled "Sustainable Communities Plans."

These community-oriented plans generally recommend policies in an *ahupua`a* or watershed context and address the protection of wetlands and riparian areas. For example, the Primary Urban Center Development Plan (2004) includes in its guidelines "establish riparian zones for all streams to prevent the encroachment of buildings and structures and to establish and enforce policies for the protection and enhancement of stream habitats and water quality." The East Honolulu Sustainable Communities Plan (April 1999) states "preserve the aesthetic and biological values of significant streams, wetlands, natural gulches and other drainageways, by providing appropriate setbacks as part of the open space system." One of the guidelines in the Koolaupoko Sustainable Communities Plan (August 2000) is to "incorporate erosion control measures and best management practices, as cited in Hawaii's Coastal Nonpoint Pollution Control Program Management Plan to prevent pollution of wetlands, streams, estuaries, and nearshore waters." The Koolau Loa Sustainable Communities Plan (October 1999) has several policies related to the protection of wetlands and riparian areas: "minimize soil erosion, runoff

of pesticides, fertilizers and other non-point source contaminants into streams, wetlands, and marine habitats with strategies such as stream setbacks, erosion control devices, integrated pest management plans, and revegetation of disturbed areas"; and "where feasible, establish setbacks along rivers, streams, and shoreline areas to preserve these resources and protective buffer zones around biologically sensitive areas to minimize habitat disturbances." The Waianae Sustainable Communities Plan (July 2000) recommends establishing Stream Conservation Corridors for the protection of streams and stream floodplains.

The City and County of Honolulu Board of Water Supply has developed draft watershed management plans for Koolau Loa and Waianae, consistent with the planning regions described above. The plans consist of policies and strategies that will guide the City and County and also provide advice to the State Commission on Water Resource Management (CWRM) in regards to the management, conservation, development and allocation of Oahu's surface and ground water resources to 2030. The Waianae watershed management plan covers 9 *ahupua`a*, while the Koolau Loa plan covers 34. Both plans contain similar objectives: "1. Promote sustainable watershed" and "2. Protect and enhance water quality and quantity."

The sub-objective contained in the Waianae Plan related to the protection of wetlands and riparian areas is Sub-Objective 1.1 "Strive to enhance and protect natural resources including land, stream, and near shore ecosystems." This is followed by implementing strategies and projects, including:

- Strategy 1.1.1 Restore natural watershed structure and functions through implementation of incremental, long-term ecosystem restoration programs.
- Strategy 1.1.2 Preserve species and habitat biodiversity by assessing and restoring critical water-related habitats – to be implemented through stream conservation corridor project; wetlands restoration and protection program; and concrete flood channel redesign project.

Relevant sub-objectives, strategies and projects contained in the Koolau Loa Plan are:

Sub-objective 1.1 Strive to enhance and protect natural resources including land, streams and nearshore ecosystems.

- Strategy 1.1.3: Ensure that the additional urban growth is clustered within the Sustainable Communities Plan Rural Community Boundary and is designed for minimal impact on the environment -- projects include pollution prevention/runoff water quality and stream conservation buffers.

Sub-objective 1.3 Collaborate with responsible agencies to identify and implement measures to alleviate flooding issues and reduce polluted runoff.

- Strategy 1.3.1: Plan and implement flood control measures -- projects include flood control/ stormwater management and flood channel redesign.
- Strategy 1.3.2: Improve management of streams and streambanks.

Hawaii County's general plan, which was updated in 2005, outlines policies that demonstrate its commitment to reducing the generation of polluted runoff and protecting wetlands and riparian areas. It includes policies to:

- participate in watershed management projects to improve stream and coastal water quality and encourage local communities to develop such projects;
- work with the appropriate agencies to adopt appropriate measures and provide incentives to control point and nonpoint sources of pollution;
- require implementation of the management measures contained in Hawaii's coastal nonpoint pollution control program as a condition of land use permitting; and
- develop drainage master plans from a watershed perspective that consider non-structural alternatives, minimize channelization, protect wetlands that serve drainage functions, coordinate the regulation of construction and agricultural operation, and encourage the establishment of floodplains as public green ways.

Kauai County's general plan was updated in 2000. The policies for land management derive from the concepts of *ahupua`a* and watershed, linking the mountains, lowlands and ocean as one basic ecological unit. The general plan contains a set of Heritage Resources Maps that document important natural, scenic and historic features, particularly in relation to the urban and agricultural lands that are developed or may be developed in the future. It specifies that important landforms shall be designated "Open" and zoned accordingly, in order to protect steep slopes and streams from erosion. The Heritage Resources Maps serve as a guide in preparing Development Plans, in preparing or revising land use ordinances and rules, and in the review of subdivision and land use permit applications. The following policies related to watershed management must be considered when developing county roads and drainage facilities and in administering the grading, flood control, and drainage regulations:

- Manage land use and earth-moving activities from the standpoint of the entire watershed, considering important characteristics such as scenic landscape features, historic sites, native species of plants and animals, and other special resources.
- Specify relevant best management practices as a condition of approving land use permits that affect stream corridors.
- Collaborate with State agencies (Office of Planning, DLNR, DOH), federal agencies (U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service), and community organizations (*e.g.*, Soil and Water Conservation Districts) in order to plan and manage watersheds.

In addition, one of the implementing actions states: "In particular, the [Planning] Department shall review and revise the Drainageway Constraint District to provide overlay regulation protecting stream and wetland riparian areas and floodplains."

Maui County is currently updating its general plan. The *Maui County 2030 General Plan Update: Countywide Policy Plan* is currently under consideration by the Maui County Council. Policies to implement the objective related to expanding the preservation of environmentally-sensitive, locally-valued natural resources and Hawaiian ecosystems include:

- protect and restore nearshore reef environments and water quality through strengthened coastal zone management, re-naturalization of shorelines, and mitigation of urban and agricultural runoff;
- preserve and reestablish habitat connectivity through greenways, watercourses, and habitat corridors;
- evaluate development to assess its impact on the County's land and marine resources;
- support programs that forward the use of stormwater treatment technologies which incorporate the use of native vegetation and mimic natural systems; and
- protect remaining undeveloped beaches, dunes and coastal ecosystems and restore natural shoreline processes where possible.

Once it has been adopted, the updated general plan will become the principal tool for the government and public to use when evaluating projects and their impacts on land use and the environment, among other things.

Hawaii has water quality standards for both inland and marine waters. Inland waters include streams, freshwater lakes, reservoirs, elevated wetlands, and low wetlands, as well as brackish anchialine pools, coastal wetlands, and estuaries. Inland and marine waters are also classified by use categories for the purpose of applying the water quality standards set forth in Chapter 11-54, HAR. Inland waters are divided into Class 1 waters, which should remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source, and Class 2 waters, which shall not act as receiving waters for any discharge that has not received the best degree of treatment or control. If a land use activity is affecting the water quality or designated use of a stream or wetland, then DOH can take enforcement action.

The State Water Code, Chapter 174C, HRS, was enacted into law in 1987 to protect Hawaii's land-based surface and ground water resources. One of the purposes of the water code is to protect and improve the quality of waters of the State and to provide that no substance be discharged into these waters without first receiving the necessary treatment or other corrective action (Section 174C-2(d)).

Chapter 174C, HRS, establishes CWRM to administer the statute. As stipulated in the statute, CWRM must establish and administer a statewide instream use protection program. "Instream use" is defined as beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Instream uses include, but are not limited to: (1) maintenance of fish and wildlife habitats; (2) outdoor recreational activities; (3) maintenance of ecosystems such as estuaries, wetlands, and stream vegetation; (4) aesthetic values such as waterfalls and scenic waterways; (5) navigation; (6) instream hydropower generation; (7) maintenance of water quality; (8) the conveyance of irrigation and domestic water supplies to downstream points of diversion; and (9) the protection of traditional and customary Hawaiian rights (Section 174C-3). Through its administrative process, CWRM can regulate land use activities that are affecting or have the potential to affect these instream uses.

Watershed partnerships are voluntary alliances of public and private landowners committed to protecting large areas of forested watersheds to support multiple ecosystem services such as water production and filtration, native habitat/species protection, erosion/sedimentation control, mitigation of climate change, and education, recreation and economic opportunities. Currently, over 900,000 acres (approximately one-fourth of the land area of the State) have been placed within these partnerships, mostly within the Conservation District, protecting the headwaters of countless streams. There are watershed partnerships for West Maui Mountains (50,000 acres), East Maui (100,000+ acres), Koolau (Oahu) (97,100 acres), Kauai (142,000 acres), Lanai (~20,000 acres), East Molokai (25,000+ acres), Three Mountain Alliance (Hawaii) (420,000 acres), Leeward Haleakala (Maui) (43,175), and Kohala (Hawaii) (32,573 acres). While DLNR is a partner on each of the watershed partnerships, it is the partnership as a whole that develops the management plan and decides on management priorities and strategies.

Chapter 205A, HRS, establishes coastal zone management objectives and policies that must be implemented by State and county agencies. One objective, addressing coastal ecosystems, states "protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems." The associated policies for coastal ecosystems are: (A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources; (B) Improve the technical basis for natural resource management; (C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance; (D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and (E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Federal agency involvement in the management of wetlands and riparian areas is typically more reactive than proactive, and may be triggered by proposed activities affecting various functions and criteria, such as migratory birds, endangered species, anadromous fish (USFWS), interstate commerce (USACOE), farmed agricultural wetlands (NRCS), and special habitats (National Park Service).

USACOE has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The counties administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit

process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

DLNR manages lands in the Conservation District in order to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability. Approximately half of each of the main islands is designated "Conservation", in which land use activities are severely limited: Kauai (54.8%), Maui (43.8%), Molokai (31.3%), Lanai (45.0%), Hawaii (51.9%), and Oahu (41.3%).[11] The headwaters of most of Hawaii's streams originate in the conservation district. The conservation district is divided into sub-zones, in which permitted land uses are restricted to those provided for in Chapter 13-5, HAR.

DLNR manages and regulates all lands set apart as forest reserves. It is also responsible for the management of the State's Natural Area Reserve System (NARS) to ensure preservation of specific land and water areas which support communities of natural flora and fauna, including wetland areas. Chapter 195, HRS, establishes a Natural Area Partnership program to provide state funds to help match private funds for the management of private lands that are dedicated to conservation. Chapter 173A, HRS, enables the State to acquire lands of exceptional value due to the presence of habitats for threatened or endangered species of flora, fauna, or aquatic resources. Chapter 195D, HRS, authorizes DLNR to acquire habitat for endangered species restoration. Chapter 198, HRS, authorizes DLNR to acquire conservation easements to preserve natural lands and waters.

DOH has general regulatory authority over water pollution control.

Approach for Approval

According to EPA and NOAA, the State does not include a process to protect wetlands and riparian areas from existing development which adversely affects the nonpoint source abatement functions of such areas. While there are existing mechanisms at the State and county levels that, taken together, help protect the existing functions of wetlands and riparian areas, a watershed planning process will help more clearly integrate these existing processes in priority watersheds.

B. Management Measure for Restoration of Wetlands and Riparian Areas

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

Status of Measure: APPROVED

[11] *Most of these conservation lands are included in the statewide network of watershed partnerships.*

Applicability: This management measure applies to restoring the full range of wetland and riparian functions in areas where the systems have been degraded and destroyed, and where they can serve a significant nonpoint source pollution abatement function.

Responsible Agencies and Authorities

The State Water Code (Chapter 174C, HRS), adopted by the Hawaii Legislature in 1987 and amended in 2004, provides the regulatory framework to protect streams, wetlands and other areas critical to water quality. The State, in its stewardship capacity, has management responsibility for all water resources of the State through CWRM – also known as the Water Commission. The Water Commission sets policies and approves water allocations for all water users. Existing uses established prior to 1987 are grandfathered in, provided the existing use is reasonable and beneficial. The Water Code also requires CWRM to establish and administer a statewide in-stream use protection program, including flow standards on a stream-by-stream basis whenever necessary to protect the public interest. Instream flow standards describe the flow necessary to adequately protect fishery, wildlife, aesthetic, scenic, or other beneficial instream uses. Instream uses include: maintenance of fish and wildlife habitats, outdoor recreational activities, maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, aesthetic values such as waterfalls and scenic waterways, navigation, instream hydropower generation, maintenance of water quality, conveyance of irrigation and domestic water supplies to downstream points of diversion, and the protection of traditional and customary Hawaiian rights.

The Water Commission issues permits to regulate the use of surface and ground water in the State. A stream channel alteration permit (SCAP) is required prior to undertaking a stream channel alteration in order to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.

CWRM adopted the updated *Water Resource Protection Plan* on August 28, 2008. The plan describes the program to protect and conserve Hawaii's water resources. The updated document includes policies, program directives, resource inventories, and recommendations across a broad spectrum of resource management issues, including watershed protection and water quality. Some of the plan's recommendations include:

- Take a more active role in watershed protection, watershed partnerships, and the watershed partnership association.
- Support DOFAW's watershed management activities and the division's leadership role in watershed management.
- Study existing government and community efforts in watershed management and protection, and encourage sharing of information and experiences.
- Study other watershed planning approaches and lessons learned, including the EPA's watershed approach and that of other state governments.
- Pursue appropriate funding to support watershed protection programs and objectives to protect water resources.
- Encourage the collaboration of federal, State, and county agencies with existing watershed partnerships and Conservation Districts to map the relationships between land management programs, land use regulations, economic and agricultural issues, and water quality and resource protection programs.

- Improve communication and encourage dialogue between watershed interests to result in the development of common goals and an integrated watershed management framework. A successful framework will acknowledge and build upon existing programs and organizations to maximize funding, staff, and volunteer resources through watershed-scale management and protection programs.
- Develop innovative public outreach methods and encourage communication between watershed entities. The development of a website for devoted to Hawaii watershed projects, organized by geographic location, should facilitate this coordination.

DOH establishes and enforces the State water quality standards contained in Chapter 11-54, HAR. All inland fresh waters are classified based on their ecological characteristics and other natural criteria as flowing waters (*e.g.*, streams), standing waters (*e.g.*, lakes and reservoirs), and wetlands. These waters are further classified for the purposes of applying water quality standards and selecting appropriate quality parameters and uses to be protected in these waters. Class 1 inland waters are to remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. Waste discharge into these waters is prohibited. Any conduct that results in a demonstrable increase in levels of point or nonpoint source contamination in class 1 waters is prohibited. The uses to be protected in class 1(a) waters are scientific and educational purposes, protection of native breeding stock, baseline references from which human-caused changes can be measured, compatible recreation, aesthetic enjoyment, and other non-degrading uses. The additional uses to be protected in class 1(b) waters are domestic water supplies and food processing. Class 2 inland waters are to be protected for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping and navigation. Class 1(a) waters include all standing and/or flowing waters, and elevated and/or low wetlands: (i) within the natural reserves, preserves, sanctuaries, and refuges established by DLNR under Chapter 195, HRS, or similar reserves for the protection of aquatic life; (ii) in national and state parks; (iii) in state or federal fish and wildlife refuges; (iv) which have been identified as a unique or critical habitat for threatened or endangered species by the U.S. Fish and Wildlife Service; and (v) in protective Conservation District subzones designated under Chapter 13-5, HAR.

Chapter 205A, HRS, establishes coastal zone management objectives and policies which must be implemented by State and county agencies. One objective, addressing coastal ecosystems, states "protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems." The associated policies for coastal ecosystems are: (A) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources; (B) Improve the technical basis for natural resource management; (C) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance; (D) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and (E) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Federal agency involvement in the management of wetlands and riparian areas is typically more reactive than proactive, and may be triggered by proposed activities affecting various functions and criteria, such as migratory birds, endangered species, anadromous fish (USFWS), interstate commerce (USACOE), farmed agricultural wetlands (NRCS), and special habitats (National Park Service).

USACOE has the authority to protect the waters of the United States, including wetlands and some streams, by regulating certain activities within those waters. Section 404 of the Clean Water Act requires that anyone interested in placing dredged or fill material into waters of the United States must first obtain a permit from the Corps. Section 10 of the Rivers and Harbors Act of 1899 requires approval prior to the accomplishment of any work in or over navigable waters of the United States, or which affects the course, location, condition, or capacity of such waters. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applies to all structures large or small. The initiation of a Section 404 permit process triggers a Section 401 water quality certification from DOH.

The counties administer the SMA permit process. SMAs are a subset of the State's coastal zone and include all lands and waters beginning at the shoreline and extending inland or *mauka* at least 100 yards. Many new developments fall within this more sensitive coastal area, and the SMA permit process ensures that these developments are consistent with Hawaii's coastal zone management program objectives and policies. Although each county has its own procedures for administering SMA permits, the requirements and review processes for SMA applications are similar for all four counties and are based on Chapter 205A-26, HRS ("Special management area guidelines"). Each county requires a permit applicant to describe the proposed development in terms of the CZM objectives and policies.

DLNR manages lands in the Conservation District in order to conserve, protect, and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability. Approximately half of each of the main islands is designated "Conservation", in which land use activities are severely limited: Kauai (54.8%), Maui (43.8%), Molokai (31.3%), Lanai (45.0%), Hawaii (51.9%), and Oahu (41.3%). The headwaters of most of Hawaii's streams originate in the conservation district. The conservation district is divided into sub-zones, in which permitted land uses are restricted to those provided for in Chapter 13-5, HAR.

DLNR manages and regulates all lands set apart as forest reserves. It is also responsible for the management of the NARS to ensure preservation of specific land and water areas which support communities of natural flora and fauna, including wetland areas. Chapter 195, HRS, establishes a Natural Area Partnership program to provide state funds to help match private funds for the management of private lands that are dedicated to conservation. Chapter 173A, HRS, enables the State to acquire lands of exceptional value due to the presence of habitats for threatened or endangered species of flora, fauna, or aquatic resources. Chapter 195D, HRS, authorizes DLNR to acquire habitat for endangered species restoration. Chapter 198, HRS, authorizes DLNR to acquire conservation easements to preserve natural lands and waters.

DOH has general regulatory authority over water pollution control.

C. Management Measure for Vegetated Treatment Systems

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

Status of Measure: APPROVED

Applicability: This management measure applies in cases where engineered systems of wetlands or vegetated treatment systems can treat polluted runoff. Constructed wetlands and vegetated treatment systems often serve a significant pollution abatement function.

Responsible Agencies and Authorities

This management measure is not being implemented on a regular and consistent basis in Hawaii. Engineered VTS and VFS may be used in site-specific cases, such as the development of water features on golf courses, to serve as retention and treatment basins for runoff.

CHAPTER 7: ADMINISTRATIVE ELEMENTS

A. Introduction

There are 5 administrative elements that the State is required to implement as part of the coastal nonpoint pollution control program. Three have been fully approved by NOAA and EPA, and two are incomplete.

B. Administrative Elements

1. Public Participation

Status of Element: APPROVED

Requirements: Section 6217(b)(5) of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 requires that states provide opportunities for public participation in all aspects of the program. Congress intended the public to have the opportunity to be extensively involved in both the development and implementation of coastal nonpoint pollution control programs.

Findings: The 1996 Hawaii CNPCP Management Plan describes how the State implemented this program component. In 1998, EPA and NOAA found that Hawaii's program provides opportunities for public participation in the development and implementation of the coastal nonpoint program.

2. Administrative Coordination

Status of Element: APPROVED

Requirements: Section 6217(b)(6) of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990 requires "the establishment of mechanisms to improve coordination among State agencies and between State and local officials responsible for land use programs and permitting, water quality permitting and enforcement, habitat protection, and public health and safety, through the use of joint project review, memorandum of agreement, or other mechanism."

Findings: The 1996 Hawaii CNPCP Management Plan describes how the State implemented this program component. In 1998, EPA and NOAA found that Hawaii's program includes mechanisms to improve coordination among State agencies and State and local officials in implementing the coastal nonpoint program.

3. Critical Coastal Areas and Additional Management Measures

Status of Element: INCOMPLETE, except for the Technical Assistance component

Requirements: 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.

First, states must identify coastal waters that are not attaining or maintaining applicable water quality standards or protecting designated uses, or that are threatened by reasonably foreseeable increases in pollution loadings from new or expanding sources [§6217(b)(1)]. Once threatened and impaired waters are identified, states must identify the land or water uses that "individually or cumulatively" cause or contribute to these coastal water quality impairments.

Next, Section 6217, CZARA, requires that states delineate critical coastal areas adjacent to threatened and impaired waters and where new or expanding land or water uses will contribute to a future threat or impairment of coastal waters. Areas already established under existing authorities may be suitable for designation as critical coastal areas. Critical coastal areas should be of sufficient size such that, when additional management measures are implemented in these areas, the reduction in nonpoint source pollution entering the adjacent waterbodies should enable these waterbodies to meet State water quality standards.

Finally, once the land and water uses and critical coastal areas have been identified, states must describe and implement additional management measures applicable to those land or water uses and areas in order to address the sources of polluted runoff. Section 6217(b)(4), CZARA, requires states to provide "technical and other assistance to local governments and the public for implementing" additional management measures.

Findings: EPA and NOAA have found that Hawaii's has not established a process for identifying critical coastal areas, or a process for developing and revising management measures to be applied to critical coastal areas and in areas where necessary to attain and maintain water quality standards. The State has fully satisfied the technical assistance component.

Approach for Approval

Hawaii is in the process of developing a statewide watershed process to address this and other management measures. DOH and the CZM Program are working with relevant State and county agencies to develop a watershed planning process and guidance document. The document will serve as an agency and community resource for preparing watershed management plans that incorporate the (g) management measures. DOH and the CZM Program are also in the process of prioritizing watersheds for management efforts, and will provide a schedule for developing watershed management plans over the next 15 years. Through this process, critical coastal areas and additional management measures will be identified.

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water quality improvements. Indicators for tracking management measure implementation are identified for each major source of polluted runoff in the chapters above. Management measures will be tracked as part of watershed efforts in priority watersheds. The monitoring and tracking programs within priority watersheds will help evaluate the success of CNPCP implementation and identify critical coastal areas where additional management measures will be needed.

4. Monitoring

Status of Element: INCOMPLETE

Requirements: 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.

Findings: Although Hawaii has described various monitoring and tracking programs, EPA and NOAA did not think it was clear how the State will put the data collected from these programs together to determine overall effectiveness and the need for additional implementation activities. To satisfy the monitoring program condition, EPA and NOAA recommend that Hawaii describe how it plans to couple its monitoring and BMP implementation data to determine the overall effectiveness of the CNPCP. For example, Hawaii may want to consider using its 319 Annual Report as a vehicle to show how data from the various monitoring and tracking programs are being used to evaluate the success of its CNPCP and when and where additional management measures may be needed.

Approach for Approval

The documentation of the implementation of the management measures is critical if associations are to be drawn between the coastal nonpoint pollution control program implementation and water

quality improvements. Indicators for tracking management measure implementation are identified for each major source of polluted runoff in the chapters above. Management measures will be tracked as part of watershed efforts in priority watersheds. Information will be compiled in DOH's 319 Annual Report to show how data from the various monitoring and tracking programs within priority watersheds are being used to evaluate the success of CNPCP implementation. DOH will consider a contract in the short-term to conduct a management measure inventory in a particular watershed as a pilot project to verify that the identified indicators can be easily tracked.

5. Enforceable Policies and Mechanisms

Status of Element: APPROVED

Requirements: In addition to the provisions of Section 6217, CZARA amended Section 306 of the Federal Coastal Zone Management Act to require that, before approving a coastal zone management program submitted by a coastal state, NOAA shall find that "….the management program contains enforceable policies and mechanisms to implement the applicable requirements of the Coastal Nonpoint Pollution Control Program of the State required by section 6217…." (Section 306(d)(16), CZMA). States with federally-approved coastal management programs must demonstrate compliance with Section 306(d)(16) in order to receive final approval of their CNPCPs.

Findings: The State of Hawaii provided a legal opinion to NOAA/EPA that concludes that the State has authority to prevent nonpoint source pollution and require implementation of the Section 6217(g) management measures, as necessary. The Hawaii Attorney General issued an opinion in September 2003 that states that Hawaii has enforceable policies which authorize the Department of Health (DOH) to prevent nonpoint source pollution that is causing or will cause a violation of the state's water quality standards (WQS). The State's primary authority, Section 342D-11, HRS, allows DOH to institute a civil action in a court of competent jurisdiction for injunctive relief to prevent WQS violations. Under that statute, DOH may request the court order nonpoint source polluters to implement all required 6217(g) management measures. Also, Section 342D-9(a)(1), HRS, permits DOH to issue a written notice and order required violators of the chapter to "take such measures as may be necessary to correct" their violation of Chapter 342D, HRS, or its associated regulations.

ACRONYMS

BLNR	Board of Land and Natural Resources
BMP	Best Management Practice
BWS	Honolulu Board of Water Supply
CDUA	Conservation District Use Application (permit process)
CDUP	Conservation District Use Permit
CED	covered electronic device
CES	University of Hawaii Cooperative Extension Service
CIP	capital improvement programs
CNPCP	coastal nonpoint pollution control program
COEMAP	Hawaii Coastal Erosion Management Plan
CTAHR	University of Hawaii College of Tropical Agriculture and Human Resources
CWA	Federal Clean Water Act
CWDA	critical wastewater disposal area
CWRM	Commission on Water Resource Management, "Water Commission"
CZM	coastal zone management
DES	City and County of Honolulu Department of Environmental Services
DLNR	Hawaii Department of Land and Natural Resources
DOA	Hawaii Department of Agriculture
DOBOR	DLNR's Division of Boating and Ocean Recreation
DOFAW	DLNR's Division of Forestry and Wildlife
DOH	Hawaii Department of Health
DOT	Hawaii Department of Transportation
DPW	Department of Public Works
EA	environmental assessment
eFOTG	NRCS's electronic *Hawaii Field Office Technical Guide*
EIS	environmental impact statement
EPA	Environmental Protection Agency
FOTG	NRCS's *Field Office Technical Guide*
FSP	Hawaii's Forest Stewardship Program
HAPPI	University of Hawaii CES Hawaii Pollution Prevention Information Project
HAR	Hawaii Administrative Rules
HCC	Hawaii County Code
HRS	Hawaii Revised Statutes
KCC	Kauai County Code

LAS	Hawaii's Local Action Strategy (to address land-based pollution threats)
LCC	large capacity cesspool
LUC	Hawaii Land Use Commission
LUPAG	Land Use Pattern Allocation Guide (Hawaii County)
MCC	Maui County Code
MSD	Marine Sanitation Device
NARS	Hawaii's Natural Area Reserve System
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S.D.A. Natural Resources Conservation Service
NPS	non-point source (pollution)
OCCL	DLNR's Office of Conservation and Coastal Lands
ORMP	Hawaii Ocean Resources Management Plan
OSDS	onsite disposal system
OSWM	DOH's Office of Solid Waste Management
ROH	Revised Ordinances of Honolulu
SCAP	DLNR's Stream Channel Alteration Permit
SMA	county Special Management Area
SMZ	Streamside Management Zone
SWCD	soil and water conservation district
SWMP	DOT's Storm Water Management Program
TMDL	total maximum daily load
TSS	total suspended solids
UIC	underground injection control (line or program)
USACOE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VFS	vegetated filter strips
VTS	vegetated treatment systems
WRPP	Water Resource Protection Plan