
CHAPTER 7: Wetlands, Riparian Areas, and Vegetated Treatment Systems

I. INTRODUCTION

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.*¹

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.*²

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. See Table III-5 for more information.

I.1. Wetlands in Hawaii

In general, wetlands in Hawaii vary substantially from wetland environments found in the continental United States. The islands' small size, relatively steep topography, and unique soils and microclimates engender different types and distributional patterns of wetlands than those traditionally encountered on the mainland U.S. For example, Hawaii tends to have fewer lakes, reservoirs, deep ponds, and other large-scale lacustrine systems typically associated with areas of flat topography. Hawaii also has 148 anchialine pond sites located in coastal areas. Today, Hawaii's wetlands comprise some 110,800 acres. Of these, more

¹This 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.

²This definition is adapted from the definitions offered previously by Mitsch and Gosselink (1986) and Lowrance *et.al.* (1988).

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Table III-5: Range of Functions of Wetlands and Riparian Areas

Function	Example
Flood conveyance	Riverine wetlands and adjacent floodplain lands often form natural floodways that convey floodwaters from upstream to downstream areas.
Protection from storm waves and erosion	Coastal wetlands and inland wetlands adjoining larger lakes and rivers reduce the impact of storm tides and waves before they reach upland areas.
Flood storage	Inland wetlands may store water during floods and slowly release it to downstream areas, lowering flood peaks.
Sediment control	Wetlands reduce flood flows and the velocity of floodwaters, reducing erosion and causing floodwaters to release sediment.
Habitat for fish and shellfish	Wetlands are important spawning and nursery areas and provide sources of nutrients for commercial and recreational fin and shellfish industries, particularly in coastal areas.
Habitat for waterfowl and other wildlife	Both coastal and inland wetlands provide essential breeding, nesting, feeding, and refuge sites for many forms of waterfowl, other birds, mammals, and reptiles.
Habitat for rare and endangered species	Almost 35% of all rare and endangered animal species either are located in wetland areas or are dependent on them, although wetlands constitute only about 5% of the coterminous United States.
Recreation	Wetlands serve as recreation sites for fishing, hunting, and observing wildlife.
Source of water supply	Wetlands are important in replacing and maintaining supplies of ground water and surface water.
Natural products	Under proper management, forested wetlands are an important source of timber, despite the physical problems of timber removal. Under selected circumstances, natural products such as timber and furs can be harvested from wetlands.

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Preservation of historic, archaeological values	Some wetlands are of archaeological interest. Native American settlements were sometimes located in coastal and inland wetlands, which served as sources of fish and shellfish.
Education and research	Tidal, coastal, and inland wetlands provide educational opportunities for nature observation and scientific study.
Source of open space and contribution to aesthetic values	Both tidal and inland wetlands are areas of great diversity and beauty, and they provide open space for recreational and visual enjoyment.

than 80% are classified as palustrine scrub-shrub and forest wetlands, located at middle to high elevations as bogs and rainforest ecosystems. However, the majority of wetland protection and restoration efforts in Hawaii has focused on coastal wetlands, and upon concerns of native waterfowl habitat and recreation. According to U.S. Fish and Wildlife Service (USFWS) estimates for 1990, Hawaii has about 15,474 acres of coastal plains wetlands today, as compared with an estimated 22,475 acres of wetlands existing around 1780. Today, there is estimated to be less than 700 acres in wetland agriculture. Although, in general, active use of Hawaii's wetlands is discouraged by State and federal agencies, wetlands are used to a limited extent for recreational uses, such as fishing, gathering of shellfish and shrimps, boating, sightseeing, bird watching and nature study. Currently, major categories of concern for Hawaii's wetlands include loss to urban and agricultural development; loss of supplying waters from diversions for agriculture, drinking water and urban uses; and channelization of river and stream beds.

I.2. Existing Programs Addressing Wetlands and Riparian Areas

(a) State Department of Land and Natural Resources (DLNR): DLNR administers the Natural Area Reserve System (NARS), the establishment of wildlife sanctuaries, and the Hawaii Biodiversity Joint Venture. The Commission on Water Resource Management (CWRM) administers the Stream Channel Alteration Permit (SCAP) process.

(b) State Department of Health (DOH): The Section 401, CWA, Water Quality Certification process is administered by DOH. Section 401 permits are required for proposed projects which must obtain the following permits: (1) federal permit to construct or operate a facility that may discharge polluted waters into navigable waters; (2) Section 404, CWA, dredge and fill permits administered by the U.S. Army Corps of Engineers (USACOE); (3) Section 10, Harbors and Rivers Act, permits; (4) U.S. Coast Guard (USCG) bridge permit; and Section 402, CWA, permits NOT issued or administered by the State. (All State-issued Section 402 permits do not require a Section 401 permit.)

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DOH establishes and enforces the State water quality standards (Chapter 11-54, HRS). The inland waters - streams, lakes, and wetlands - are separated into three classifications:

Class 1: [are to] remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. To the extent possible, the wilderness character of these areas shall be protected. Waste discharged into these waters is prohibited. Any conduct which results in a demonstrable increase in levels of point or nonpoint source contamination in class 1 waters is prohibited.

Class 1(a): [Uses protected in class 1.a. waters] are scientific and educational, protection of breeding stock... compatible recreation, aesthetic enjoyment, and other nondegrading uses....

Class 1(b): [Uses protected in class 1.b. waters in addition to the uses protected in class 1.a. waters] are domestic water supplies....

Class 2: [Class 2 waters are to be protected] for recreational purposes... agricultural and industrial water supplies....

The existing Class I waters in the State are specifically described in Section 11-54-05.1, HAR.

DOH, Environmental Planning Office, is currently preparing proposed amendments to the stream water quality standards.

(c) Hawaii Coastal Zone Management Program: Chapter 205A, HRS and Chapter 1-2, HAR delegate responsibility for implementing permit applications, and reviewing and approving projects within the State's SMAs and shoreline setback areas to the counties. The goals are to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawaii, including wetlands, recognizing that special development controls within the shoreline area are necessary to avoid permanent losses of access and use.

(d) Counties: The counties may become involved in the management of wetlands through the implementation of their grading ordinances and other permit or approval processes. One county, the City and County of Honolulu, has incorporated into its Special Management Area (SMA) ordinance (Chapter 25, ROH, "Shoreline Management") provisions for wetland protection in the permitting process, and for rulemaking and enforcement pertaining to the conservation, protection, and restoration of wetlands.

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).

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(e) U.S. Department of Interior, Fish and Wildlife Service (USFWS): USFWS provides funding for the acquisition of lands for wildlife refuges and Natural Area Reserves, in conjunction with the National Park Service, USACOE, and DLNR.

(f) U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS): Pertaining to agricultural wetlands, these programs build upon the Swampbuster provision of the Farm Bill (Food Security Act of 1985) which establishes that farmers lose eligibility for federal farm benefits if activities impact on wetlands. There has been an internal movement within NRCS toward watershed and ecosystem planning approaches, and the Swampbuster provisions are currently being tied to Clean Water Act provisions through a process of national Memoranda of Agreement (MOAs). Under Swampbuster, NRCS offers education and assistance to farmers for wetland determinations and in negotiating regulatory processes. In its Wetlands Reserve Program, which aims for the protection, restoration and construction of wetlands, NRCS is highlighting water quality as a key function. NRCS also offers cooperative and cost-sharing arrangements with other organizations, individuals and agencies for the restoration of degraded agricultural wetlands.

(g) U.S. Department of Defense, Army Corps of Engineers (USACOE): USACOE administers the Section 404, CWA, dredge and fill permit process.

(h) The Nature Conservancy of Hawaii (TNC): The Nature Conservancy of Hawaii currently co-manages with several other organizations and agencies approximately 30,000 acres of wetlands, upland bogs, riparian stream corridors, and streams. TNC's conservation efforts have largely entailed land acquisition and the promotion of incentive programs for landowners to manage their resources for the long-term. However, TNC has also engaged in management and research, has lobbied Congress for acquisition funding for Hawaii, and has worked to educate the public and lawmakers about the importance of acquiring and managing State Natural Area Reserves. TNC plans to increase its incentive programs for private landowners and to promote additional partnership ventures, in order to leverage critically-needed resources for the future.

(i) Ducks Unlimited, Inc.: Ducks Unlimited has recently published its Hawaiian Islands Conservation Plan. The organization's goal is to protect and restore key wetland habitats through acquisition, restoration, and technical assistance. Future commitments include: (a) developing and providing assistance to State and federal agencies on wetland restoration and enhancement projects; (b) technical expertise in wetland restoration and management; and (c) initiatives to enhance privately-owned wetland habitats.

(j) The Hawaii Biodiversity Joint Venture: The Hawaii Biodiversity Joint Venture is an organization composed of representatives of natural resource organizations statewide. Support includes funding of cooperative projects and assistance with conservation planning. Two of this organization's five primary action goals pertain to wetlands restoration and the protection of necessary water supplies for wetlands.

II. 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.

II.A.1. Description

The purpose of this management measure is to protect the existing water quality improvement functions of wetlands and riparian areas as a component of polluted runoff control programs. The overall approach is to establish a set of practices that maintains functions of wetlands and riparian areas and prevents adverse impacts to areas serving a nonpoint source pollution abatement function. The ecosystem and water quality functions of wetlands and riparian areas serving a pollution abatement function should be protected by a combination of programmatic and structural practices.

The term *pollution abatement function* refers to the ability of a wetland or riparian area to remove pollutants from runoff passing through the wetland or riparian area. Acting as a sink for phosphorus and converting nitrate to nitrogen gas through denitrification are two examples of the important pollution abatement functions performed by wetlands and riparian areas.

This management measure provides for pollution abatement through the protection of wetland and riparian functions. The permit program administered by USACOE, EPA, and approved states under Section 404, CWA, regulates the discharge of dredged or fill material into waters of the United States, including wetlands. The measure and Section 404 program complement each other, but the focus of the two is different.

The measure focuses on nonpoint source problems in wetlands, as well as on maintaining the functions of wetlands that are providing pollution abatement. The nonpoint source problems addressed include impacts resulting from upland development and upstream channel modifications that erode wetlands, change salinity, kill existing vegetation, and upset sediment and nutrient balances. The Section 404 program focuses on regulating the discharge of dredged or fill materials in wetlands, thereby protecting wetlands from physical destruction and other pollutant problems that could result from discharges of dredged or fill material.

The pollution abatement functions performed by wetlands and riparian areas are most effective as parts of an integrated land management system that combines nutrient, sediment, and soil erosion control. These areas consist of a complex organization of biotic and abiotic elements. Wetlands and riparian areas are effective in removing suspended solids, nutrients, and other contaminants from upland runoff. In addition, some studies suggest that wetland and riparian vegetation acts as a nutrient sink, taking up and storing nutrients. This function may be related to the age of the wetland or riparian area. The processes that occur in these areas include sedimentation, microbial and chemical decomposition, organic export, filtration, adsorption, complexation, chelation, biological assimilation, and nutrient release.

Pollutant-removal efficiencies for a specific wetland or riparian area may be the result of a number of different factors linked to the various removal processes: frequency and duration of flooding; types of soils and slope; vegetation type; the nitrogen-carbon balance for denitrifying activity (nitrate removal); and the edge-to-area ratio of the wetland or riparian area. Watershed-specific factors include land use practices and the percentage of watershed dominated by wetlands or riparian areas.

II.A.2. Applicability

This management measure applies to protect wetlands and riparian areas from adverse nonpoint source pollution impacts.

II.A.3. Management Practices

- a. Consider wetlands and riparian areas and their polluted runoff control potential on a watershed or landscape scale.
- b. Identify existing functions of those wetlands and riparian areas with significant polluted runoff control potential when implementing management practices. Do not alter wetlands or riparian areas to improve their water quality function at the expense of other functions.
- c. Conduct permitting, licensing, certification, and non-regulatory nonpoint source pollution control.
- d. Use appropriate pretreatment practices such as vegetated treatment systems or detention or retention basins to prevent adverse impacts to wetland functions that affect pollution abatement from hydrologic changes, sedimentation or contaminants.

II.A.4. Implementation of Management Measure

None of the above practices have been implemented *per se*. Preliminary inventories of wetlands and riparian areas included assessments of water quality and other functions on a limited scale. However, their polluted runoff control potential on a watershed or landscape scale has not been assessed. Nor have the categorical sources of existing nonpoint source problems in existing wetlands (such as impacts resulting from upland development and upstream channel modifications) been comprehensively addressed. With the exception of certain programs aimed explicitly at managing a specified wetland, permitting, licensing, certification, and non-regulatory nonpoint source pollution abatement activities in the State have generally not been conducted in a manner that

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effectively protects wetland functions or ensures the continuation of source water flows which maintain wetlands.

(i) Existing Organizational Structure: No one agency has the lead in implementing this management measure. Federal, State and local agencies involved in implementation include:

- DOH, Environmental Management Division, which implements programs for water pollution control;
- CWRM, which administers the SCAP;
- DLNR, which administers the Conservation District Use (CDUA) permit;
- Hawaii Coastal Zone Management (CZM) Program, which reviews for consistency with CZM objectives and policies;
- County departments of planning, which administer the SMA permit and shoreline setback provisions, if a development affecting a wetland or riparian area is planned in the SMA;
- USACOE, which administers the Section 404, CWA, and Section 10, Rivers and Harbors Act, permit processes; and
- USFWS, which reviews for impacts on birds and other species.

(ii) Existing Regulatory and Non-Regulatory Mechanisms:

HRS	Chapter 174C	Hawaii Water Code
HRS	Chapter 205A	Coastal Zone Management
HRS	Chapter 342D	Water Pollution Control
HRS	Chapter 342E	Nonpoint Source Pollution
HAR	Chapter 11-54	Water Quality Standards
HAR	Chapter 13-169	Protecting for Instream Uses of Water

DOH administers the Section 401, CWA, Water Quality Certification process which ensures water quality is maintained during modification of existing wetlands. Federal agency involvement is triggered by other functions/criteria such as migratory birds, endangered species, farmed agricultural wetlands, anadromous fish, and interstate commerce. In these instances, the Section 401, CWA, water quality certification requirement is triggered, and the certification process may include attached conditions for wetland protection. DOH also has the authority to impose fines for violations of the conditions imposed during the Section 401 certification.

A Section 404, CWA, general permit from USACOE is required for discharge of dredged or fill material into waters of the United States, including wetlands. This permit is required in navigable waters or where depletion of commercial fish species by overharvesting or pollution of waters occurs.

Chapter 13-169, HAR, administered by DLNR, states that no stream channel shall be altered without first obtaining a SCAP from CWRM. Section 174C-3 of the Hawaii Water Code provides a definition for "stream." Generally speaking, the definition of stream includes perennial and intermittent streams, but streams

must be natural watercourses which contain sufficient water to support instream uses as defined in the Code. This permit is not specifically aimed at water quality protection, nor does it address upstream/downstream water quality impacts on wetlands. CWRM defers water quality conditions if a Section 401, CWA, certification has been granted. CWRM also defers on wetlands/water quality issues if the Section 404, CWA, process has been triggered.

The State Water Code (Chapter 174C, HRS) is the only existing mechanism that directly addresses instream and habitat restoration *per se*. Section 174C-71, HRS, mandates that an instream flow program be established to protect, enhance, and reestablish, where practicable, beneficial instream uses of water. However, to date, no such program has been implemented.

Counties get involved in wetlands or riparian area regulation primarily through the grading ordinance, development permits or approvals, and reviews of general plan amendments, rezoning applications, State land use boundary change applications, environmental assessments and impact statements, dredge and fill permit applications, and so forth. The counties tend to defer to NRCS, USACOE, USFWS, and DOH for decision-making and enforcement. The City and County of Honolulu is an exception in that it requires the consideration of wetland impacts, provides for protection and enforcement, and allows for the development of rules concerning wetlands within its SMA ordinance (Chapter 25, ROH).

B. Management Measure for Restoration of Wetland and Riparian Areas

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

II.B.1. Description

Restoration of wetlands and riparian areas refers to the recovery of a range of functions that existed previously by reestablishing the hydrology, vegetation, and structure characteristics. A restoration management measure should be used in conjunction with other measures addressing the adjacent land use activities and, in some cases, water activities as well.

Restoration of wetlands and riparian areas is a holistic approach to water quality that addresses nonpoint source problems while meeting the goals of the Clean Water Act to protect and restore the chemical, physical, and biological integrity of the Nation's waters. Full restoration of complex wetland and riparian functions may be difficult and expensive, depending on site conditions, the complexity of the system to be restored, the availability of native plants, and other factors. Specific practices for restoration must be tailored to the specific ecosystem type and site conditions.

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II.B.2. Applicability

This management measure applies to restore 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.

II.B.3. Management Practices

- a. Provide a hydrologic regime similar to that of the type of wetland or riparian area being restored.
- b. Restore native plant species through either natural succession or selected planting.
- c. Plan restoration as part of naturally occurring aquatic ecosystems.

II.B.4. Implementation of Management Measure

(i) Existing Organizational Structure: DLNR is the lead agency for implementing this management measure.

(ii) Existing Regulatory and Non-Regulatory Mechanisms:

HRS	Chapter 173A	Acquisition of Resource Value Lands
HRS	Chapter 183	Conservation District
HRS	Chapter 195	Natural Area Reserves System
HRS	Chapter 195D	Conservation of Aquatic Life, Wildlife, and Land Plants
HRS	Chapter 198	Conservation Easements
HRS	Chapter 205	Land Use Commission
HRS	Chapter 343	Environmental Impact Statements

Chapter 173A, HRS, enables DLNR to acquire lands and waters having environmental value for public use. Chapter 198, HRS, authorizes DLNR to acquire conservation easements to preserve natural lands and waters.

DLNR is authorized under Chapter 183, HRS, “to manage and regulate all lands which may be set apart as forest reserves and to devise ways and means of protecting, extending, increasing, and utilizing the forests and forest reserves, more particularly for protecting and developing the springs, streams, and sources of water supply to increase and make that water supply available for use.” Chapter 183D, HRS, authorizes DLNR to “manage and administer the wildlife and wildlife resources of the State.”

Under Chapter 195, HRS, DLNR is responsible for the management of the NARS, which should “preserve in perpetuity specific land and water areas which support communities, as relatively unmodified as possible, of the natural flora and fauna, as well as geological sites, of Hawaii”. It also empowers DLNR to establish NARS for areas with unique wetland values and native species.

The conservation of aquatic life, wildlife, and land plants pursuant to Chapter 195D, HRS, is also the responsibility of DLNR. This chapter authorizes DLNR to acquire habitat for endangered species restoration.

As described on page III-235, Ducks Unlimited, Inc. and the Hawaii Biodiversity Joint Venture are involved in wetland and riparian area restoration in Hawaii.

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.

II.C.1. Description

Vegetative treatment systems (VTS), include vegetated filter strips and constructed wetlands. Although these systems are distinctly different, both are designed to reduce nonpoint source pollution. They need to be properly designed, correctly installed, and diligently maintained in order to function properly. Filtering sediment and sediment-borne nutrients and converting nitrate to nitrogen gas are examples of the important nonpoint source pollution abatement functions performed by vegetated treatment systems.

The purpose of ***vegetated filter strips*** (VFS) is to remove sediment and other pollutants from runoff and wastewater by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization, thereby reducing the amount of pollution entering surface waters. Vegetated filter strips are appropriate for use in areas adjacent to surface water systems that may receive runoff containing sediment, suspended solids, and/or nutrient runoff. Vegetated filter strips can improve water quality by removing nutrients, sediment, suspended solids, and pesticides. However, VFS are most effective in the removal of sediment and other suspended solids.

VFS are designed to be used under conditions in which runoff passes over the vegetation in a uniform sheet flow. Such a flow is critical to the success of the filter strip. If runoff is allowed to concentrate or channel, the VFS is easily inundated and will not perform as it was designed to function. Vegetated filter strips need the following elements to work properly: (1) a device such as a level spreader that ensures that runoff reaches the VFS as a sheet flow (berms can be used for this purpose if they are placed at a perpendicular angle to the VFS area to prevent concentrated flows); (2) a dense vegetative cover of erosion-resistant plant species; (3) a gentle slope of no more than 5%; and (4) a length at least as long as the adjacent contributing area. If these requirements are met, VFS have been shown to remove a high degree of particulate pollutants. The effectiveness of VFS at removing soluble pollutants is not well documented.

Constructed wetlands typically are engineered complexes of saturated substrates, emergent and submergent vegetation, animal life, and water that simulate wetlands for human use and benefits. Constructed wetlands typically have four principal components that may assist in pollutant removal:

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- Substrates with various rates of hydraulic conductivity;
- Plants adapted to water-saturated anaerobic substrates;
- A water column (water flowing through or above the substrate); and
- Aerobic and anaerobic microbial populations.

II.C.2. 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.

II.C.3. Management Practices

- a. Construct vegetated filter strips in areas adjacent to waterbodies that may be subject to suspended solids and/or nutrient runoff.
- b. Construct properly engineered systems of wetlands for polluted runoff control. Manage these systems to avoid negative impacts on surrounding ecosystems or groundwater.

II.C.4. Implementation of Management Measure

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.

III. RECOMMENDED IMPLEMENTING ACTIONS

The absence of a clearly defined authority or policy direction at the State level, combined with the problem of conflicting definitions and assessments used by various agencies regarding wetlands and riparian areas, currently hinders the effectiveness of local planning and regulatory activities. Although new wetland and riparian area data-gathering and management efforts continue to be developed by State agencies and private organizations, the fragmented and sometimes conflicted nature of activities has precluded the development of clear and usable information for planning and management purposes at both the State and local levels. County agencies, the public, and landowners are often confused by inconsistent or conflicting information regarding the regulation and use of wetlands. This represents a serious void, particularly because many wetlands having significant nonpoint source problems as well as those providing significant nonpoint source pollution abatement functions, are located in coastal, urbanized areas of high development value, where intense pressures for multiple, often competing land uses prevail. Strong pressures also exist for appropriation of waters supplying wetlands for new development purposes.

A. Designate CZM Program as Coordinator for Wetlands Management

- Designate the CZM Program as facilitator and coordinator for wetlands management in Hawaii. The State's CZM law, Chapter 205A, HRS, addresses the management of wetlands. While the CZM Program has limited in-house expertise on wetlands, it can tap into the broad range of expertise

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residing in its networked agencies. The cross-agency, cross-organizational approach can greatly expand resources and collaborative efforts in addressing wetland issues. It is important that federal, State and county agencies all contribute their expertise to general and site-specific wetland issues.

- Establish a comprehensive permit review function for wetlands within the CZM Program. Under the CZM Program's federal consistency authority, there should be established additional review criteria for CZM Program review of USACOE Section 404, CWA, permits. Under this provision, no Section 404 permit would be approved without prior consistency review and compliance with wetland protection criteria established by the CZM Program. The CZM program could work directly with developers to ensure consistency with coastal nonpoint pollution control and other CZM program requirements. Under this arrangement, the CZM program would be able to impose such conditions and requirements as necessary to ensure coastal nonpoint pollution control program objectives are met. Requirements might include the use of best management practices (BMPs), mitigation agreements, or conformance with a project master planning process if a proposed development project would affect directly or indirectly large areas of wetlands.

B. Establish and Coordinate an Interagency Wetlands Council

- As the coordinator for wetland management, the CZM Program should establish and coordinate an Interagency Wetlands Council. This Council would consist of representatives from all relevant resource agencies, including USFWS, USACOE, National Park Service, NRCS, NMFS, Hawaii CZM Program, DOH, CWRM, DLNR-Division of Aquatic Resources, DLNR-Division of Forestry and Wildlife, County Planning Departments (and Honolulu's Department of Land Utilization), County Public Works Departments, and County Boards of Water Supply. As coordinator, the CZM Program could conduct quarterly or semi-annual interagency group meetings (whose location could rotate between the islands to ensure adequate participation). This Interagency Wetlands Council would serve several key functions:
 - Develop consistent wetland definitions for Hawaii that can be used by federal, State and county resource agencies.
 - Identify information needed to improve management of wetlands and riparian areas and develop ways to fill these data gaps. These data gaps include the location, carrying capacities and nonpoint source pollution abatement and other functions of wetlands and riparian areas in Hawaii. The Council could draw upon existing resources such as the State's Geographic Information System database, a 1994 MOA between NRCS, USFWS, USACOE and EPA concerning wetland mapping conventions and procedures, CWRM's Hawaii Stream Assessment, the USFWS National Wetlands Inventory, and The Nature Conservancy's Heritage Database for assistance.
 - Serve as a preliminary review and discussion forum for proposed projects affecting wetland areas. Proposed projects could be discussed prior to the

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permitting stage. Multiple agency concerns about proposed actions affecting wetlands could be addressed simultaneously, conflicts identified, and management or mitigative actions proposed.

- Review and evaluate existing permitting, licensing, certification and other regulatory mechanisms to ensure they protect an array of wetland functions. The Council could then make recommendations for program changes, as necessary.
- Identify gaps and overlaps between agency functions, and assist in developing clear and consistent guidelines for wetlands management at the State and county levels. The Council could also assist in developing conflict-resolution procedures, and establishing, where needed, written agreements among key agencies and groups.
- Address ways of improving existing enforcement, and enhancing public involvement and education.

C. Integrate CZM Program's New Wetland Functions within OSP Planning Efforts

- Integrate above recommended approaches to improving wetland policy and planning within a broader statewide, watershed- or regionally-focused planning initiative by OSP. Of all management categories addressed in this plan, wetlands management - where water-based and land-based human uses converge - perhaps best illustrates the numerous, important linkages between all of the management measures, and the associated need for integrated management systems to adequately address these linkages. Integrating the management measures for all the various land uses would entail a much larger effort overall, but would also provide increased opportunities for more holistic, long-range planning and for improved polluted runoff control statewide.
- Within this structure, involve community groups in the implementation of State wetlands and watershed policies and plans. Communities could be supported in incorporating as nonprofit organizations (via Neighborhood Boards, *ahupua'a* or watershed councils, or other organizational unit) for wetlands protection and/or management. The State could also work with communities to promote and facilitate the development of specific community projects such as Adopt-a-Wetlands or Adopt-a-Stream programs, or volunteer water quality monitoring programs. OSP could also convene a series of State policy and management workshops to educate the public and help guide future wetlands planning efforts.
- Allocate sufficient resources to implement the above recommendations. In addition, additional resources should be provided to DOH and DLNR, which play key roles in wetlands management. Staff in these agencies must be able to anticipate, not only respond to, problems and opportunities. Additional staff and funding would enable these agencies to conduct long-overdue and critically-needed studies, participate more effectively in permit review processes, and provide needed resource planning, management and enforcement functions statewide. In particular, more district personnel are needed to conduct evaluations, monitoring, and management on all islands, since it is difficult to effectively manage resources statewide from Oahu.