FINAL

Saipan Comprehensive Wetlands Management Plan

Prepared for:
Coastal Resources Management Office

December 1990
Revised
August 1991

ERCE

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Prepared for:
Coastal Resources Management Office
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SECTION 1
INTRODUCTION

The importance of the natural properties and functions of wetlands has been documented through numerous studies. This importance varies with every wetland; however, most wetlands are inherently rich in species diversity and wildlife uses, provide multiple hydrological functions, and are invaluable in their contribution to the environmental and scenic diversity of landscapes where they occur. In addition, wetlands are valued as park land and are needed as aquifer recharge areas. Therefore, the need to preserve and maintain wetlands has been extended to include water supply and recreational uses.

Wetland losses and irrevocable damage to wetland habitats have accelerated in the recent past, primarily from urban and agricultural development. Proper planning of development can minimize and often avoid adverse impacts to wetland habitats. These growth trends and resultant affects on wetlands have been recognized on Saipan where there is extreme pressure to develop wetlands for urban uses and dredge and fill wetlands for harbor and

marina development. Other land use pressures that can affect wetlands include groundwater withdrawal and construction of bridges and roads.

Several acts of legislation of the Commonwealth of the Northern Mariana Islands (CNMI) direct the local regulators to protect wetlands for their recognized importance. However, the CNMI has no comprehensive statutes to protect all of their valuable wetlands or to ensure that Saipan endures no additional net loss of wetland resource values. Basic to the proper balancing of development and preservation of wetlands is an understanding of wetland functions and values specific to an area and a comprehensive mapping of the extent of wetlands. This large-scale effort is central to the development of a management plan for Saipan and, prior to this comprehensive study, has been lacking.

1.1 Purpose and Scope

The Coastal Resources Management Office of Saipan, with funding from the Federal Office of Coastal Resources Management, solicited work for a comprehensive wetland management study for the island of Saipan within the Commonwealth of the Northern Mariana Islands. The request for the management study grew out of a recognized need to update existing wetlands mapping and existing policy for the management of this valuable resource. Major tasks included:

- Comparison of the existing Coastal Resources Management Office (CRMO) designated wetland areas of particular concern with the National Wetlands Inventory mapping prepared by the U.S. Fish and Wildlife Service, and recommendations for changes to the CRMO map.

- Field investigations of freshwater wetland sites to determine site classification as a wetland and relative to other sites.

- Training and guidance for CRMO staff on wetland site identification.

- Preparation of a Wetland Management Plan which addresses avoidance or minimization of loss, mitigation, island-wide classification and prioritization, and strategies for wetland protection and preservation for implementation by CRMO.

- Recommendations for the preparation of draft comprehensive wetland legislation.

The scope of the Saipan Comprehensive Wetlands Management Study was restricted to freshwater wetlands, both vegetated and open water, including areas of marsh, swamps, wet meadows, wetland scrub, and riparian woodland. Estuarine, or brackish wetlands are commented on only as they relate to adjacent freshwater wetland habitats. Wetland areas excluded from the study include the extensive coastal marine habitats that surround the island and deepwater habitats.

1.2 STUDY AREA: SAIPAN

Saipan is the second largest island of the Mariana Islands. It is approximately 12.5 miles long and 5.5 miles across at its widest point. The total land area of Saipan is about 46 square miles. Saipan has a complicated geological structure and great topographic diversity and is made primarily of limestone tablelands resting on volcanic peaks which are only partly exposed. In some places the limestone is up to 200 meters thick. The most conspicuous features of these islands are the limestone terraces or benches and tablelands (Cloud et al. 1956). The outline of the island is irregular with bays on both sides and there is an extensive coral reef along the west coast. There is a well developed coastal strand flora and most of the low coastal plain on the west side of the island is cultivated or developed. The long history of human occupation has resulted in greatly altered flora whose original character is no longer preserved. The first human immigration into Micronesia is believed to have originated from Indonesia, Polynesia, Melanesia, and the Philippines between 3500 and 4000 years ago. Each immigrating group practiced slash and burn agriculture and introduced several food plant species.

The Spanish explorer Magellan landed in Guam in 1521 and named the island group the Ladrones, but the name was subsequently changed to the Mariana Islands for Queen Maria Anna of Spain - the wife of King Philip IV. Spain held the Marianas for nearly four centuries. After the Spanish American War in 1898, the Marianas, except for Guam, were sold to Germany in 1899. The Germans planted large numbers of coconut palms on all of the islands. In 1914, Japan seized all of Micronesia and the area was awarded to Japan as a mandate from the League of Nations in 1919. Japan developed a much more diversified agriculture on Saipan and colonized the area much more extensively than any preceding inhabitant. Nearly all of the land that was suitable for agriculture was planted in sugar and

coconuts for the home market. Prior to World War II, the Japanese fortified Saipan. Subsequent military operations greatly damaged both crops and natural vegetation.

The vegetation of Saipan was so decimated by the war that the Americans seeded the island with tangan-tangan (*Leucaena leucocephala*) from airplanes for erosion control. Today, little remains of the native forest that probably once covered a greater part of Saipan (Fosberg 1960). These remnant forests are restricted to the steeper and still remote watersheds that occur along the northeastern portion of the island.

The volcanic areas of Saipan are grasslands or secondary forests. The upland limestone areas probably were once covered by rain forests, but these have largely been destroyed and the few remaining pockets of original forest are restricted to upland stream banks and canyons (Stone 1970-71). It is the low, flat, coastal plain along the west side covering the southern three-fourths of Saipan which is of most interest. Here are found several marshy areas. Along the southwestern edge of the island is Lake Susupe which is a nearly brackish lake surrounded by freshwater marsh.

SECTION 2
IDENTIFICATION, MAPPING, AND CLASSIFICATION

The term wetlands includes a broad range of vegetated and non-vegetated habitats. Many physical and climatic factors influence the shape and structure of wetlands that include frequency of wetting, duration of non-wet periods, movement and relative velocity of water, source and depth of water, topography, soil substrate (including accumulation of minerals), depth and permeability of soil, history of disturbance, and composition and extent of the vegetative cover. Water, the driving force behind all wetlands, is not constant in either supply or duration. Therefore, wet portions of any physical landscape typically vary in extent or even presence. The boundary between upland and wetland habitats is often a continuum versus a finite demarcation due to the periodic variations in water regime.

2.1 DEFINITION OF WETLANDS

Four federal agencies are principally involved with wetland identification and delineation: Environmental Protection Agency (USEPA), Army Corps of Engineers (ACOE), U.S. Fish and Wildlife Service (USFWS), and Soil Conservation Service (SCS). Each agency has recognized that three basic elements are generally present at wetland habitats: 1) dominance by hydrophytic vegetation, 2) hydric soils, and 3) presence of appropriate hydrology. Historically, however, working definitions differed among the agencies and sometimes resulted in varying regulatory constraints for the public. Both the USEPA and ACOE have produced technical manuals for identifying and delineating wetlands (Environmental Laboratory 1987, Sipple 1987) and the SCS developed procedures for identifying wetlands. The USFWS produced a wetland classification system (Cowardin et al. 1979) that was used as a guideline for identifying wetlands. In 1988, the four federal agencies held a series of meetings and shared technical expertise in an attempt to merge their existing published methods into a single wetland delineation manual. The culmination of this work was the formal adoption by the four agencies of a unified manual as the recommended method for identifying and delineating wetlands in the United States. The official federal publication, "Federal Manual for Identifying and Delineating Jurisdictional Wetlands" (FICWD 1989) and its recommended field procedures and guidelines has been utilized during the research, field surveys, and preparation of this Wetlands Management Plan. A wetland, as defined by the U.S. federal government, and as governed by the unified manual, is:

> An area which is inundated or saturated by surface or groundwater at a frequency and duration that is sufficient to support, and under normal circumstances does support, vegetation typically adapted for life in saturated soil conditions.

To co-occurrence of each of wetland vegetation, soils, and hydrology are the jurisdictional requirements of the unified federal method. These elements will be discussed in the following sections.

2.2 WETLAND IDENTIFICATION AND MAPPING

A National Wetlands Inventory mapping of the wetland habitats throughout Saipan was produced by the USFWS (1989) in accordance with the Classification of Wetlands and

Deepwater Habitats of the United States (Cowardin et al. 1979). Shown at a scale of 1:25,000, the Inventory indicates that a total of approximately 590 acres of palustrine wetland, 40 acres of lacustrine wetland, and over 100,000 linear feet of riverine habitat occur on the island of Saipan. The Inventory mapping was produced primarily by the stereoscopic analysis of aerial photographs with minimal ground referencing. In addition to the Inventory mapping, the survey team utilized color aerial photographs (1:10,000) supplied by the U.S. Army Corps of Engineers, Honolulu Office, that were flown in 1987. The Corps had delineated the Inventory wetlands on the aerial photographs along with additional potential wetland sites, in conjunction with the U.S. Soil Conservation Service, all wetlands delineated on the aerial photographs were checked during the field surveys. The survey team also utilized the mapping of hydric soils as produced by the Soil Conservation Service (USDA 1989) for the island of Saipan (scale: 1:25,000). Superimposing each of these maps onto the other showed that for the majority of the area of Saipan, mapped wetlands coincide with mapped hydric soil units. These maps also indicated areas where hydric soil is present but vegetated wetland does not exist. Conversely, areas of vegetated Inventory-designated wetlands were mapped, but were not underlain by hydric soils. While it is acknowledged that the precision of mapping on the Wetlands Inventory and the Soil Survey is coarse, the cross-referencing of these two maps indicated additional areas for field investigation by the survey team. Additionally, areas suspected to be wetlands by people familiar with Saipan (Mike Lee, ACOE, Honolulu; Frank Dayton, ACOE, Guam) were also identified on the wetlands inventory map. This comprehensive map served as a guide to the wetlands of Saipan during the field investigations. All of the new "suspected" wetlands were visited and assessed by the survey team for their possible inclusion on the final wetlands mapping of Saipan. The majority (99% of the total freshwater wetland acreage on Saipan) of the Inventory mapped wetlands were visited and assessed for their quality and possible exclusion from the final mapping. From the combined efforts described above, an updated mapping of the freshwater wetland habitats of Saipan was prepared and is presented in Figure 2-1 (see also map pocket). An explanation of the mapping is presented in the following sections.

Through the use of the USFWS Inventory map, recent aerial photographs, SCS soils map, discussions with people familiar with the area, and brief field observations of wetlands, it is believed that the majority of the wetland sites on Saipan are addressed in this report. However, there are certain limitations to the photo-interpretive method and the brief field reconnaissance conducted for this study. While aerial photographs provide valuable detail and perspective often unattainable from the ground, the potential for obscuring of small

wetland area must be considered. The aerial photographs used were taken in February 1987. Some alterations may have occurred since then (i.e., natural expansion of existing wetlands, creation of new wetlands, or disturbance) and, thus, may not be included in this analysis. Similarly, small-scale wetland habitats that occur as undergrowth to predominantly non-wetland canopy cover would not be detectable from aerial photographs. Wetlands along streamcourses or on steep slopes are difficult to detect from photographs and risk being missed from a strict photo-interpretive method. Through consultation with many of the resource agencies, it is not anticipated that many new wetlands are being omitted from this study. Finally, the scale of both the USFWS Inventory map and the aerial photographs enables only a general analysis of the extent of wetlands throughout Saipan. Wetland borders were only generally checked in the field; therefore, the accuracy necessary for regulatory assessment is not implied by the mapping in this document. This level of detail is adequate for a comprehensive management study, but more detailed mapping and formal wetland delineation must be conducted on a case-by-case basis for all wetland sites.

2.3 USE OF THE UNIFIED METHOD ON SAIPAN

The identification and detailed field delineation of wetlands can often be a confusing task; however, use of the federal unified manual provides a standardized approach to delineate wetland habitat that is regulated by local and federal agencies. All wetlands discussed in this management plan are jurisdictional wetlands that are regulated by federal agencies.

The primary criteria of the Unified Method for delineation of jurisdictional wetlands are the presence of hydric soils, hydrophytic vegetation, and appropriate wetland hydrology. These criteria are mandatory and all must be present, although exceptions will certainly be encountered. Practical field indicators for the identification of each of the criteria are summarized in Appendix A. Wetland delineation by qualified field investigators using the Unified Method and sound judgement should enable accurate determinations of wetland versus nonwetland habitats. The procedure for a typical wetland delineation investigation is provided in Appendix B.

Hydric Soils

The SCS defines hydric soils as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part (USDA 1987).

Central to the development and definition of hydric soils is the duration of inundation (at least seven days), and central to the formation of wetlands is the coincidence of the inundation within some period of the growing season. Hydric soils are at least saturated, or ponded or flooded for one week or more during the period when soil temperatures are above biological zero (41°F). In general, only hydrophytic vegetation is adapted to tolerate these physical conditions and, therefore, dominates areas underlain with hydric soils.

The SCS in association with the government of the CNMI has developed a list of the hydric soils for the island of Saipan in accordance with the National Technical Committee for Hydric Soils (NTCHS). The SCS recommends soils for inclusion on the National Hydric Soils list. This list can be modified based on technical evidence submitted to the SCS. The SCS also conducts and publishes soil surveys of the CNMI (USDA 1989).

Of the more than 50 soils units that have been mapped for Saipan, only one, the Mesei Variant muck, has been designated as a hydric soil and at all of its occurrences on the island it meets the hydric soil criteria as mandated by NTCHS. However, an additional six soil units are known to include small areas (too small for mapping) of Mesei Variant muck soil or otherwise contain or produce physical conditions that are considered hydric. In particular, these additional soils will be considered to be hydric where 1) the depth to the water table is less than 6 inches, 2) ponding occurs for at least 7 days or longer, or 3) flooding occurs frequently for at least 7 days or longer. A common factor of each of the additional soil units that contain hydric inclusions is their relatively high clay content and generally slow permeability. Water retention or availability, therefore, is relatively high and a high water table or ponding is likely given sufficient water supply. Each of the soil units that are either hydric or contain hydric inclusions is listed in Appendix C. The Mesei Variant muck and the collective area of the soil units that include hydric soils are mapped in Figure 2-2 (see also map pocket) and are shown as they relate to the mapping of wetlands. Only the Mesei Variant soil is described below; descriptions of the other soil units may be found in the soil survey for Saipan (USDA 1989).

Mesei Variant soil covers 474 acres (1 percent) of Saipan and its distribution is limited to the western coastal and southwestern interior of the island. In particular, this soil underlies all of Lake Susupe and the surrounding marsh area, a sizeable portion of Chalan Laolao, the southern portion of American Memorial Park, and sizeable areas along the coast highway between Sadog Tase and San Roque. The vegetation growing in these areas is often solid stands of the obligate wetland plant karisu (*Phragmites karka*) or other wetland

grasses and water-tolerant trees. These soils, formed in marine deposits, alluvium, and organic material, are moderately deep in profile and are very poorly drained. A permanently high water table coincides with these soils, either in a flooded state or at approximately less than 12 inches depth (USDA 1989). The Mesei Variant soil underlies most of the wetlands in the Northern Marianas. The open water and plant cover associated with this unit are important components for water birds, such as the endangered Mariana common moorhen, and other water-dependent wildlife.

The vast majority of the wetland areas delineated for this study are either occurring on Mesei Variant soil or one of the other six soil units identified by the SCS as containing inclusions of soils that can meet the criteria for hydric soils. A few small wetlands are shown to occur on soil units that have inclusions of the above six soil units. Most of these scattered occurrences coincide with areas described as being temporarily or seasonally flooded and/or are shown to be excavated or impounded on the National Wetlands Inventory map. These sites were assessed in the field to determine their value and possible exclusion from the management plan. Artificial conditions such as excavation are, nonetheless, treated as existing conditions and assessed for their value within the framework of the management plan.

Hydrophytic Vegetation

A hydrophytic plant is adapted to growing in water, soil, or any substrate which is at least periodically deficient in oxygen (anaerobic conditions) as a result of excessive water content. The USFWS (in cooperation with SCS, EPA, and ACOE) has compiled lists of plant species that occur in wetlands for all of the regions of the United States including former U.S. Trust Territories and Guam (which is applicable to all of the Northern Mariana Islands). Each of the plant lists for Hawaii, Guam, and a composite Trust Territories lists (Reed 1988) was consulted as necessary for determination of the wetland status of the plant species that dominated the sites on Saipan.

Since adaptations to anaerobic conditions enable a level of tolerance for a given species to occur in wetlands, some species are also likely to occur in nonwet areas or upland sites in the region of study. The USFWS list of plant species that occur in wetlands classifies indicator species based on the opinion of botanists for the probability of the plant's occurrence in wetlands. Wetland indicator categories have been assigned to each of the plant species ranging from almost always (probability of greater than 99 percent) occurring

in wetlands to almost always occurring in nonwet conditions in the region of analysis. The specific wetland indicator categories include obligate wetland, facultative wetland, facultative, facultative upland, and obligate upland plants (Reed 1988). Proportionately, few of the wetland species that occur on Saipan are obligate wetland plants that nearly always grow in wetlands. Therefore, the majority of plant species detected at the many wetland sites also grow in non-wetland conditions in varying degrees. The wetland indicator status of the dominant plants at each of the field sites visited in Saipan is listed and described in Table 2-1. The list of wetland plants as published by USFWS can be modified based on technical evidence.

An area can be described as having hydrophytic vegetation when the composition is dominated (i.e., greater than 50 percent cover) by any combination of obligate wetland, facultative wetland, or facultative plant species. The primary exceptions to this rule are 1) in disturbed areas where hydrophytic vegetation has been removed or altered and vegetation is now either lacking or cover is shared by both hydrophytic and non-wetland plant species, or 2) in areas under cultivation. In such areas as these where the dominance of hydrophytic vegetation from all strata is less than 50 percent and both hydric soil and wetland hydrology are present, the site may be considered to have hydrophytic vegetation.

Hydrology

When both hydric soils and hydrophytic vegetation are detected it is assumed that appropriate wetland hydrology is also present. Wetland hydrology relates to the physical conditions appropriate for permanent or periodic inundation or soil saturation at a site. Many wetlands are found along rivers, lakes, or estuaries where flooding is likely to occur, while many others form in isolated depressions where surface water collects or on slopes where subsurface water may be approaching or seeping at the surface. As such, numerous factors influence the wetness of an area, including topography, stratigraphy, soil permeability, precipitation, and plant cover. Soil drainage characteristics as described in the SCS soil survey for the area of study and Federal Emergency Management flood maps are sources of information that help to determined frequency and duration of flooding, ponding, or soil saturation. The depth of the water table is also a factor in determining whether approximate saturated soil conditions are present. When assessing a site for appropriate wetland hydrology it is important to consider the permanence of the hydrology; there must be evidence of consistent water flow patterns for wetland conditions. The long-

Table 2-1

SPECIES LIST FOR THE DOMINANT WETLAND PLANTS OF SAIPAN[1]

Scientific Name[2]	Chamorro Name	Carolinian Name	Common Name	Wetland Indicator Category[3]	Sites[4]
Acrostichum aureum L.	Langayao			Obl.	L-1, P-14, P-13
**Albizia lebbeck* (L.) Benth	Kalaskas		Tronghon-mames	Upl.	R-1, R-2, P-16, P-17, P-25, P-13
**Alocasia macrorrhiza* D. Don	Piga-apaka		Wild Taro	Fac-	R-5, P-17, P-21, P-22, P-13
**Artocarpus altilis* (Park) Fosb.	Lemai	Mai	Breadfruit	Upl.	R-5, R-6, P-12
**Bambusa* spp.	Piao	Bwai	Bamboo	Upl.	P-16, P-25 P-13
**Bidens alba* (L.) DC	Inifuk		Spanish needle	Upl.	R-4, R-6, P-14 P-12, P-13
**Brachiaria mutica* Staff.			Paragrass	Facw.	P-4, P-5, P-13, P-24, P-31, P-13
Bruguiera gymnorrhiza (L.) Lamark	Mangle	Schiya	Mangrove	Obl.	P-11, P-13
**Calocasia esculenta* (L.) Schott	Suni	Woot	Taro	Obl.	R-5, P-17, P-21, P-22, P-31
**Carica papaya* L.		Bweibwai	Papaya	Upl.	R-2, P-12, P-13
**Casurina equisetifolia* L.	Gagu	Weighu	Ironwood	Upl.	L-1, P-15, P-11, P-8, P-26, P-14, P-39, P-12, P-13
**Cocos nucifera* L.	Niyog	Schoo	Coconut	Facu.	L-1, P-4, P-34, P-17, P-16, P-27, P-14, P-13
**Delonii regia* Raf.	Tronkon atbot	Faiyerbaw	Arbol-del-Fuego	Upl.	R-4, P-17, P-30, P-36, P-39, P-12, P-13
**Eupatorium odoratum* L.	Masigsig	Atiyat		Upl.	R-5, R-6, P-7, P-12

Table 2-1 (Continued)
SPECIES LIST FOR THE DOMINANT WETLAND PLANTS OF SAIPAN[1]

Scientific Name[2]	Chamorro Name	Carolinian Name	Common Name	Wetland Indicator Category[3]	Sites[4]
Hernandia sonora L.	Nonak	Orschau		Upl.	R-6, P-14, P-12, P-13
Hibiscus tiliaceus L.	Pago	Ghulufe	Hibiscus Tree	Facw.	R-1, R-2, R-3, R-4, R-7, R-6, P-1, P-4, P-32, P-15, P-19, P-16, P-18, P-7, P-27, P-26, P-25, P-30, P-14, P-39, P-13
**Ipomoea aquatica* Frosk	Kangkun	Kangkun	Canon Swamp Cabbage	Obl. P-31	P-1, P-18, P-9, P-21, P-22, P-13, P-39,
**Ipomoea indica* (Burm.) Merr.			Blue morning glory	Upl.	R-2, P-18, P-27, P-25
**Ipomoea macrantha* R & S	Alalag tasi	Fofgu		Upl.	P-19, P-13
Ipomoea pes-capare (L.) Sweet	Ala hai	Arrabwal	Beach Morning Glory	Fac.	P-1, P-41, L-1
**Leucaena leucocephala* deWit	Tangan-tangan	Tangantangaw		Upl.	R-1, R-2, R-3, R-4, R-7, R-6, P-1, P-4, P-32, P-15, P-16, P-18, P-19, P-7, P-27, P-26, P-25, P-30, P-14, P-39, P-12, P-13, L-1
**Ludwigia hyssopifolia* (D. Don) Excell.	Titmo			Fac.	R-6, P-34, P-14, P-24
**Ludwigia octovalvis* (Jacq.) Raven			Primrose willow	Obl.	P-18
**Mikania scandens* (L.) Willd.			Mile-a-minute vine	Facu.	R-1, R-6, P-12, L-1
**Momordica charantia* L.	Atmagoso halumtano		Balsam pear	Upl.	R-6, P-8, P-12, P-13

Table 2-1 (Continued)
SPECIES LIST FOR THE DOMINANT WETLAND PLANTS OF SAIPAN[1]

Scientific Name[2]	Chamorro Name	Carolinian Name	Common Name	Wetland Indicator Category[3]	Sites[4]
Morinda citrifolia L.	Lada	Leel	Indian Mulberry	Upl.	R-6, P-12, P-13, L-1
**Muntingia calabura* L.		Mansanita	Panama cherry	Upl.	R-7, P-12, P-13
**Musa x paradisiaca* L.	Chotda	Wisch	Banana	Upl.	R-5, P-6, P-27
**Operculina ventricosa* (Bert) Peter	Alalag			Upl.	R-6, P-12, P-13
Pandanus dubius Spreng	Pahong	Poghu	Pandanus, Screw Pine	Fac.*	R-1, R-2, P-12, P-13
Pandanus tectorius Warb.	Aggak	Fasch		Fac.*	R-2, R-6, P-41, P-42
**Panicum maximum* Jacq.		Fitil	Guinea grass	Facu.	R-2, R-3, R-6, P-5, P-25, P-9, P-35
**Passiflora foetida* L.	Dotse	Dossi	Love-in-a-mist	Facu.	P-14, P-12, P-13
**Pennisetum purpureum* Schurmach			Elephant grass	Facu.	R-3, R-6, P-5, P-18, P-11, P-36, P-37, P-39
Phragmites karka (Retz.) Trin.exSteud.	Karisu	Gharisu	Reed	Obl.	R-8, P-4, P-5, P-6, P-6, P-33, P-34, P-11, P-9, P-8, P-7, P-2, P-27, P-26, P-25, P-30, P-20, P-221, P-22, P-14, P-31, L-1
**Pithecellobium dulce* Bentham	Kamachile	Ghamisiligh	Camachile	Facu.	R-3, P-4, P-5, P-34, P-39, P-12, P-13
**Pluchea indica* (L.) Lees			Marsh fleabane	Fac*.	P-11, P-14, P-12, P-13
Pyrossia adnascens Ching.				Upl.	R-6, P-11, P-14, P-12, P-13, L-1
**Sacchrum spontaneum* L.			Wildcane	Upl.	R-1, R-2, R-3, P-5, P-36, P-37

Table 2-1 (Continued)
SPECIES LIST FOR THE DOMINANT WETLAND PLANTS OF SAIPAN[1]

Scientific Name[2]	Chamorro Name	Carolinian Name	Common Name	Wetland Indicator Category[3]	Sites[4]
Scaevola sericea Vahl.	Nanaso Net			Facu.	R-6, P-12, P-13
**Scripus litoralis* Schrader			Bulrush	Obl.	L-1, P-14, P-24
**Sesbania cannabina* (Retz.) Pers.	Katuraie		Rattle-bush	Fac*.	P-34, P-21, P-14, P-24
**Sorghum halepense* (L.) Person	Sibada		Johnson grass	Facu.	R-6, P-19, P-12
Stictocardia tiliaefolia (Desr.) Hall	Abudo			Facu.	P-1, P-12, P-13
Thespesia populnea (L) Sol.ex Correa	Binalo Pele			Fac.*	R-6, P-11, P-12, P-13

[1]The taxa are arranged alphabetically by genera. Plant families are not included. Only plants encountered at at least two sites or obligate wetland plants found only once are included. No attempt was made to prepare a definitive species list of all plants found at all sites.

[2]Nomenclature follows Fosberg, 1960. An asterisk preceding the plant name indicates that the taxon has been introduced into the Mariana Islands since western contact in 1591 by Ferdinand Magellan.

Table 2-1 (Continued)

SPECIES LIST FOR THE DOMINANT WETLAND PLANTS OF SAIPAN[1]

[3]Obl. - An obligate wetland plant or one that occurs in wetlands 99% of the time.
Facw. - A facultative wetland plant or one which occurs in wetlands between 67% and 99% of the time.
Fac. - A facultative plant or one which is equally likely to be found in wetlands as in nonwetlands.
Facu. - A facultative upland plant or one which is usually found in nonwetland conditions, but 1% to 33% of the time will be found in wetlands.
Upl. - An obligate upland plant or one which is never found in wetland conditions.

An asterisk following the indicator category means that the exact status of the taxon has yet to be decided.

[4]Numbers preceded by an R, L or a P indicate the locations in which the various taxa were found.

R numbers indicate riverine or stream sites.
P numbers are for palustrine or wetlands such as bogs, fens or swamps.
L numbers are for lacustrine or deep water wetlands such as lakes or permanent ponds.

term continuation of appropriate hydrology at a site or the effects of new water flow patterns will affect the stability and the extent of wetlands.

2.4 WETLAND CLASSIFICATION

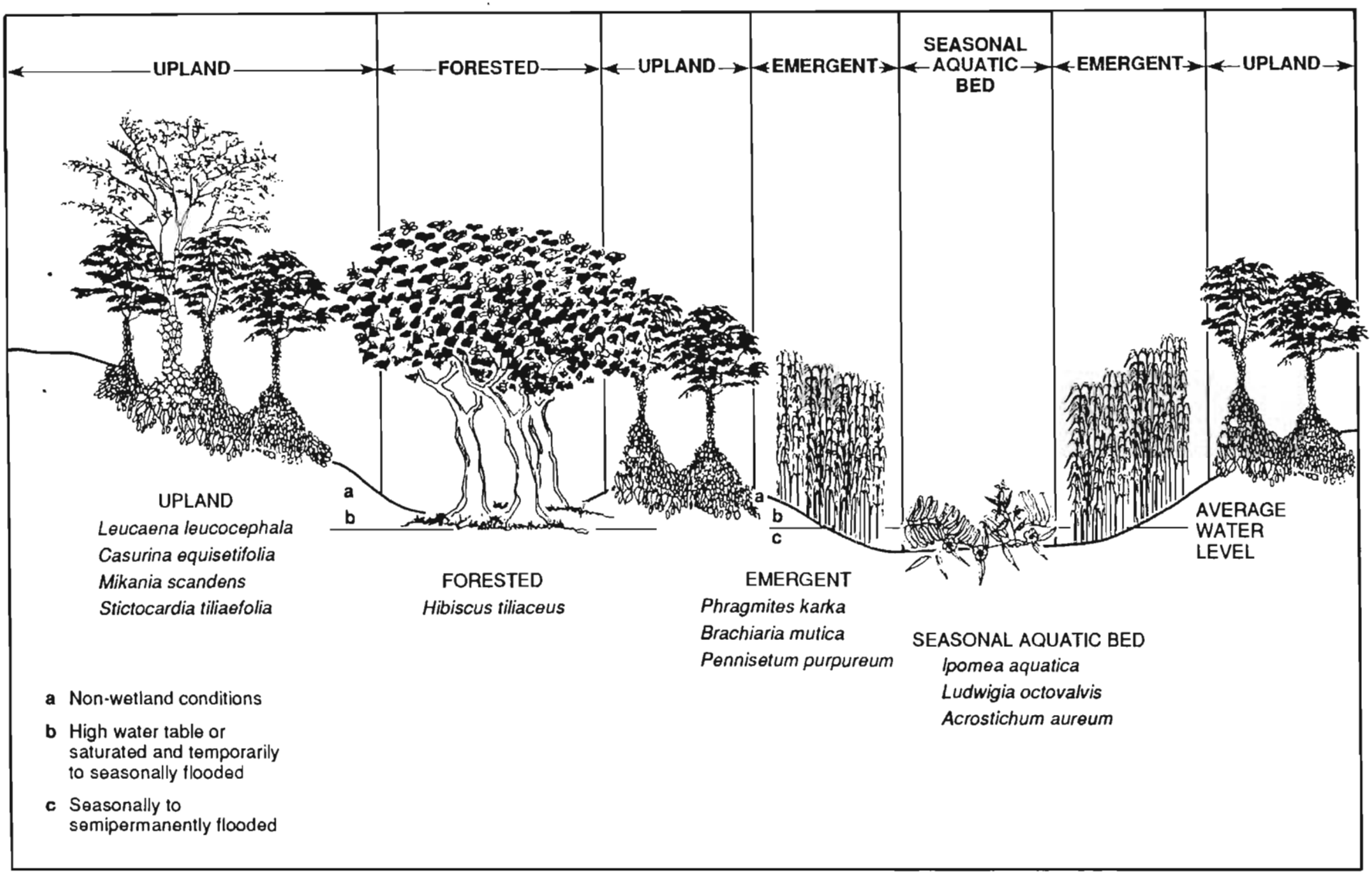
Three broad categories of freshwater wetlands were the focus of the management study: palustrine, lacustrine , and riverine wetlands. These categories follow the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et. al. 1979) and are defined below.

P The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where the salinity due to ocean derived salts is below 0.5 percent. The numbers of wetlands fitting this category are preceded with a capital P.

The Palustrine wetlands of Saipan are often easily distinguished by the dense stands of karisu (*Phragmites karka*) which fill them. Other common wetland indicators are pago (*Hibiscus tiliaceus*), elephant grass (*Pennisetum purpureum*), or paragrass (*Brachiaria mutica*) surrounded by tangan-tangan (*Leusaena leucocephala*), gagu (*Casurina equisetifolia*) and niyog (*Cocos nucifera*). Figure 2-3 depicts the conditions of a typical palustrine habitat on Saipan.

L The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30 percent areal coverage; and (3) total exceeds 8 ha (20 acres). The numbers of wetlands fitting this category are preceded by a capital L.

On Saipan only one site, the 40-acre Lake Susupe, fits this description. Some other sites may, at times, have areas of open water, but these are small in size and of short duration.



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Representative Palustrine Wetland and Upland Habitats on Saipan

FIGURE 2-3

R The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5 percent. The numbers of wetlands fitting this category are preceded by a capital R.

Because Saipan is a high, volcanic island, run-off after storms and percolation are rapid, leaving stream beds scoured with the low places often filled with smooth rocks. Frequently upland vegetation is found right down to the stream edge. Pago, kamachile (*Pithecellobium dulce*), and tangan-tangan are often found growing even into the stream bed.

In addition, the estuarine system of wetlands, or brackish wetlands, is represented on Saipan at three locations (Raulerson and Rinehart 1989) and is commented on in this document only as it relates to adjacent freshwater systems.

E The Estuarine System consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. Numbers of wetlands fitting this category are preceded by a capital E.

These are the most easily recognized wetlands because they open to the sea and estuarine vegetation only persists inland as far as the influence of the salt or brackish water. In most cases, trees of the sort known as mangroves are found at the edge of salt water estuaries.

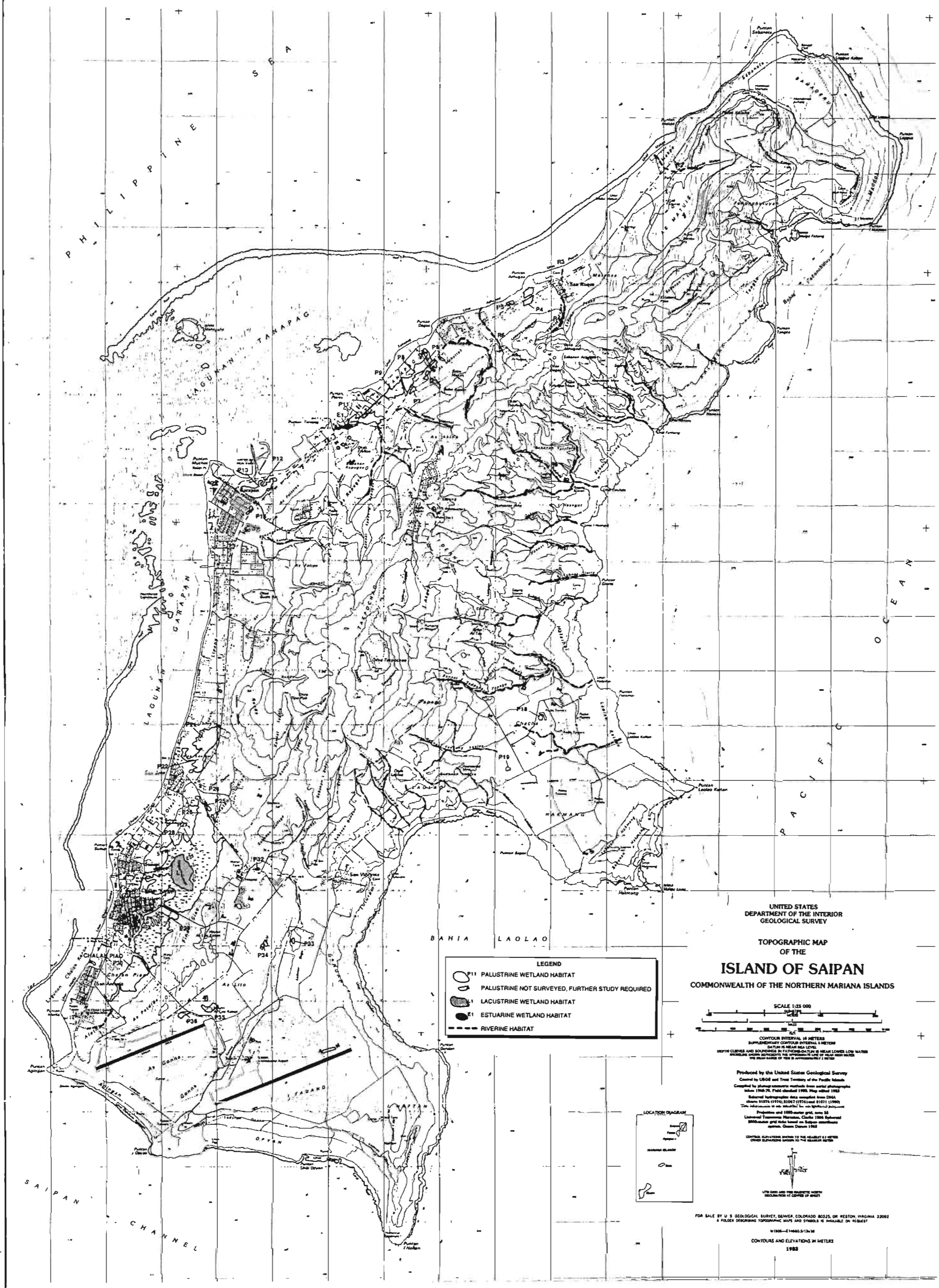
2.5 WETLAND-DEPENDENT WILDLIFE

A major function and value of wetlands is provision of important resources to a large variety of wildlife species. Bird species are a conspicuous measure of wildlife use of wetland habitats. To date, about fifty wetland-associated bird species have been sighted at wetlands of Saipan (Table 2-2). Most of these species are migratory and are under the protection of the Migratory Bird Treaty Act, which is administered by the Department of the Interior. The federally endangered Mariana common moorhen is an obligate wetland bird species and is restricted to wetland areas of Saipan (Figure 2-4; Stinson et al. in press). All

Table 2-2
WETLAND BIRD SPECIES OF SAIPAN

Common Name	Common Name
Yellow Bittern	Black-winged Stilt
Gray Heron	Common Greenshank
Intermediate Egret	Marsh Sandpiper
Little Egret	Common Redshank
Pacific Reef-Heron	Wood Sandpiper
Great Egret	Wandering Tattler
Cattle Egret	Gray-tailed Tattler
Little (Green-backed) Heron	Terek Sandpiper
Black-crowned Night-Heron	Whimbrel
Green-winged Teal	Bristle-thighed Curlew
Northern Pintail	Eurasian Curlew
Garganey	Bar-tailed Godwit
Northern Shoveler	Ruddy Turnstone
Gadwall	Sanderling
Eurasian Wigeon	Rufous-necked Stint
Tufted Duck	Little Stint
Greater Scaup	Temminck's Stint
Osprey	Pectoral Sandpiper
Common Moorhen	Sharp-tailed Sandpiper
Eurasian Coot	Dunlin
Gray (Black-bellied) Plover	Ruff
Lesser Golden-Plover	Common Snipe
Mongolian Plover	Swinhoe's Snipe
Great Sand Plover	Little Tern
Snowy Plover	Nightingale Reed-warbler
Common Ringed Plover	

Source: Pratt et al. 1987; Wiles et al. 1987; Glass et al. 1990.



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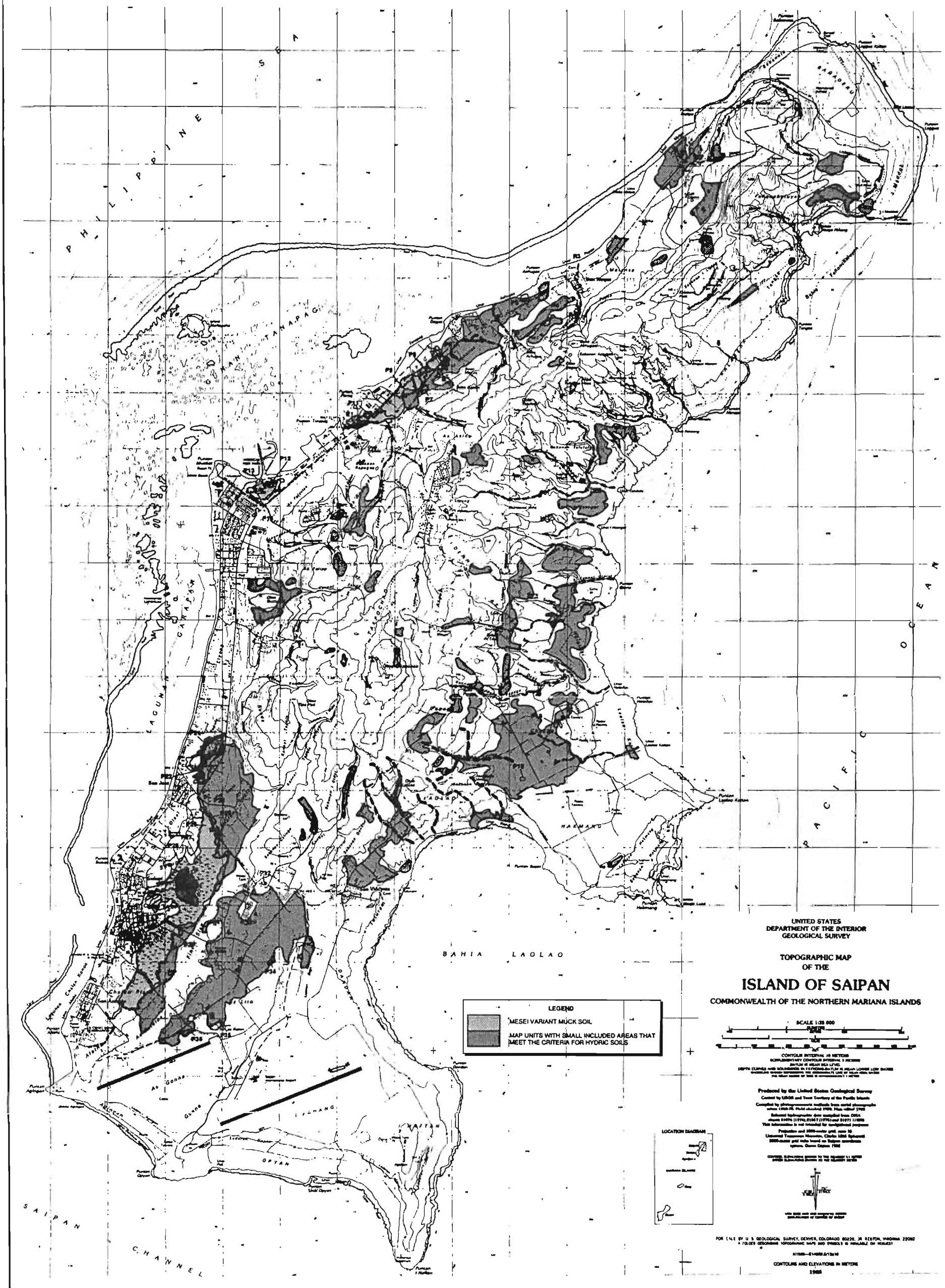
Freshwater Wetlands and Riverine Habitats on Saipan

FIGURE 2-1



2-7

FIGURE 2-2

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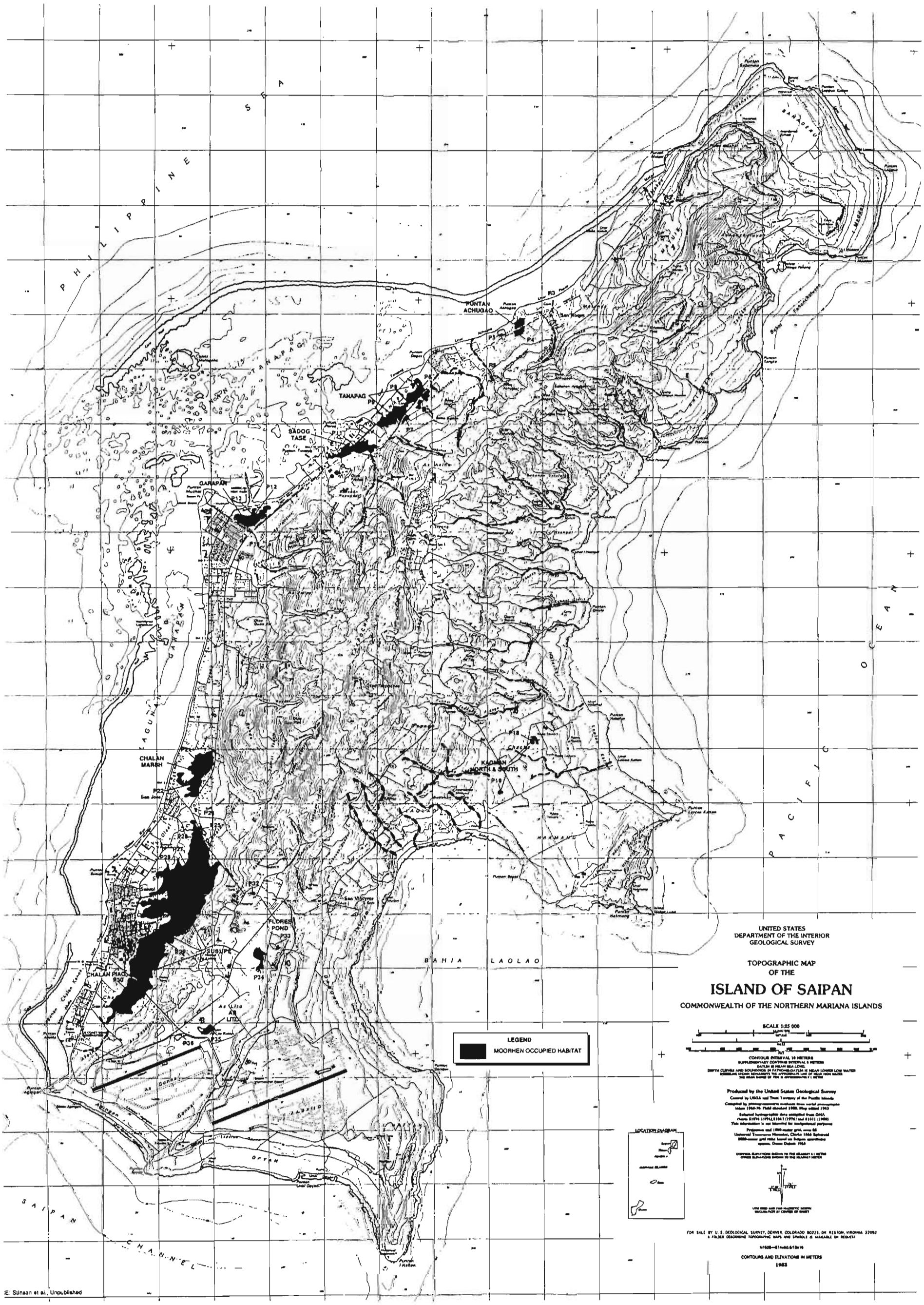
Hydric Soil Units and Hydric Inclusion on Saipan



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Mariana Common Moorhen Distribution on Saipan

FIGURE 2-4

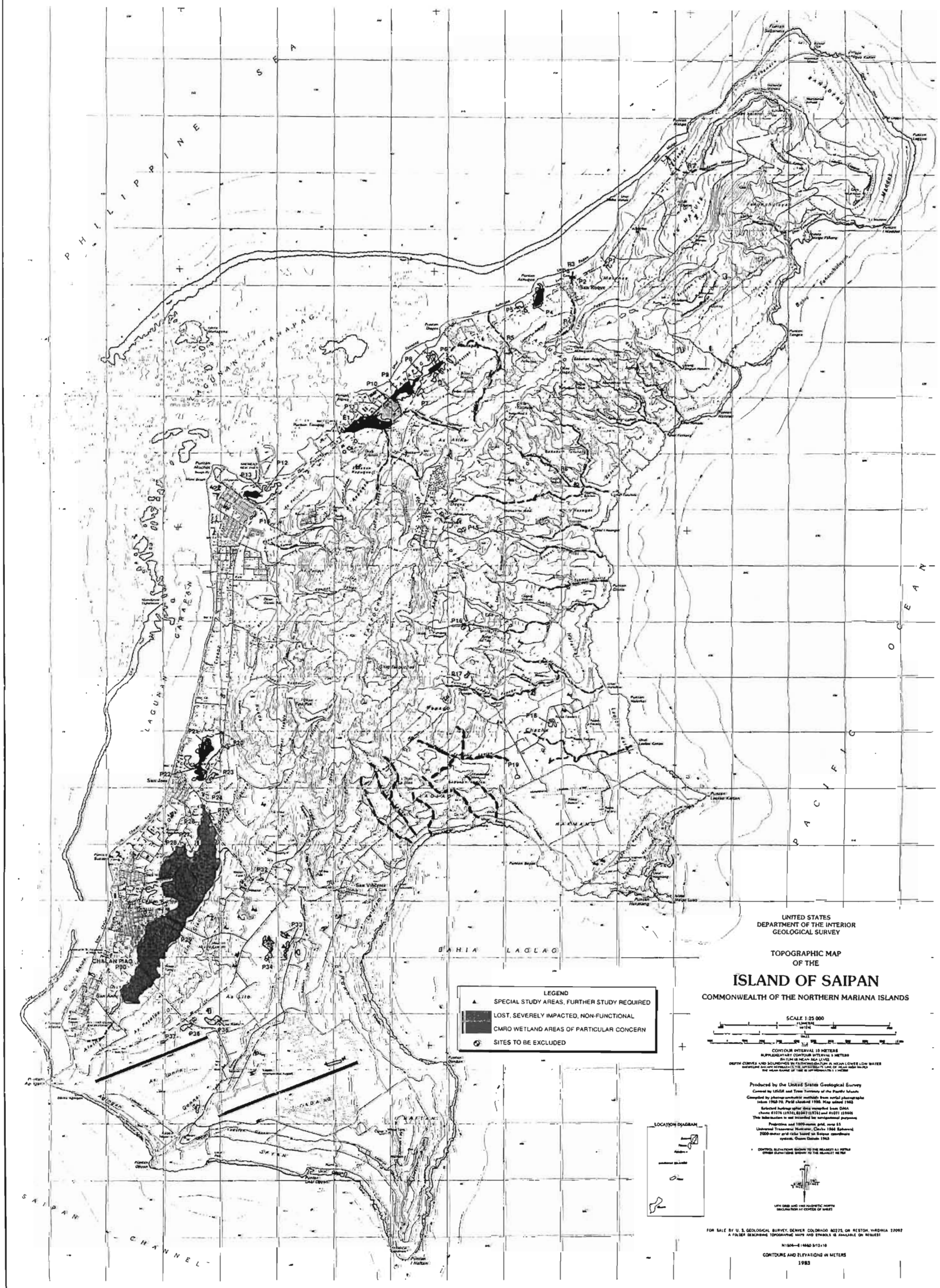
of the wetlands occupied by the moorhen will need to be preserved to assure the continued existence of this endangered species. Another endangered species, the nightingale reed-warbler (*Acrocephalus luscinia*) is often found in wetlands or at the wetland/upland interface.

2.6 Historic Wetlands and Recent Losses

The intensive land uses and settlement patterns discussed in Section 1 have resulted in significant losses of the historical wetlands throughout Saipan. Most of these losses occurred during this century, particularly during the 30-year occupation of Saipan by the Japanese when as much as 90 percent of the island had been cleared for cultivation. Subsequent recent losses include the fill of large wetland areas for military purposes. It has been estimated that only 36 percent of the original wetland acreage on the island now remains (CNMI Department of Natural Resources 1989). These losses were concentrated in the Kagman and Lower Base areas where the total loss may be well over 600 acres. Additional sizeable losses have occurred in the Lake Susupe area (over 200 acres lost), the area north and east of Flores Pond (approximately 130 acres), Garapan (over 200 acres), and San Roque (50 acres) (CNMI Department of Natural Resources 1989).

CRMO Existing Mapping of Areas of Particular Concern

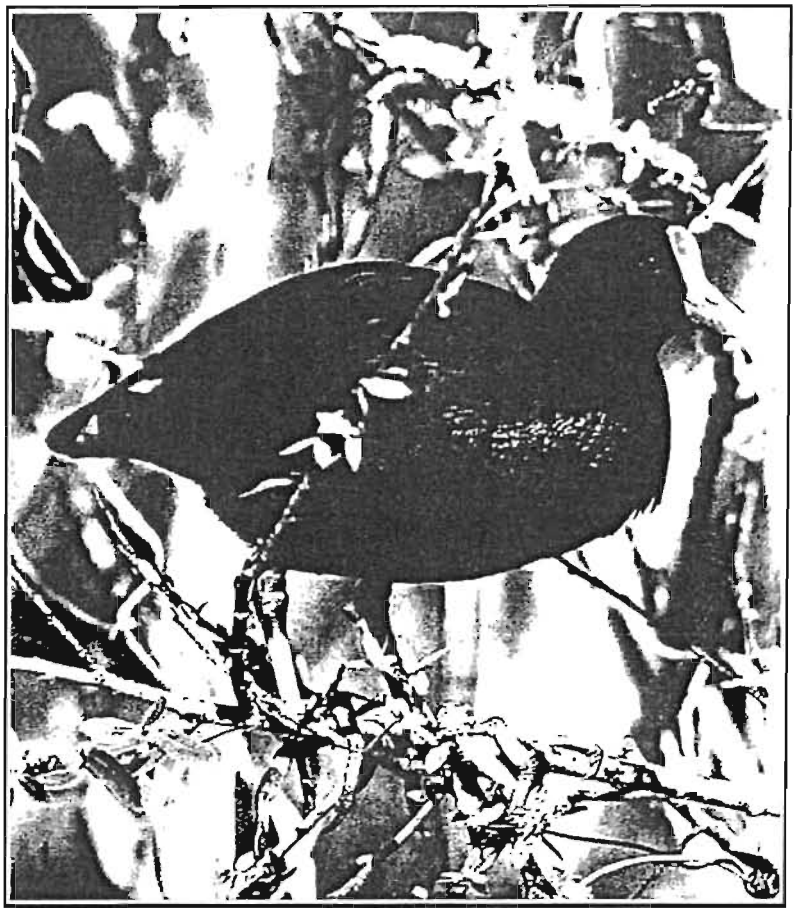
The wetlands Inventory mapping for Saipan prepared by USFWS is currently being used by CRMO staff as a supplement to their mapping of identified Areas of Particular Concern (APC) throughout the island. The Inventory mapping provides a resource of potential wetlands via the USFWS photo-interpretive method. Only the Areas of Particular Concern are currently recognized as official mappings of the wetlands on Saipan, however. The extent of current APC wetlands is indicated on Figure 2-5 and are shown to fully coincide with the larger wetland systems depicted by the Inventory map. These include: 1) the Lake Susupe area and its associated palustrine wetlands that extend approximately 340 acres around the lake, 2) a portion of the total wetland area of Chalan Laolao, 3) approximately one-third of the wetland at American Memorial Park, 4) the Sadog Tase wetland and other wetlands near Tanapag, and 5) wetlands south of San Roque. This mapping of APC wetlands includes approximately 90 percent of the wetland area that this comprehensive study has identified on Saipan.



ERC Environmental and Energy Services Co.

Special Study, Lost Wetlands, and the CMRO Wetland Areas of Particular Concern

FIGURE 2-5



SECTION 3
PERMIT RESPONSIBILITY

There is a close association of the Commonwealth of the Northern Mariana Islands with the federal government of the United States regarding the protection and regulation of wetlands. The federal wetlands permitting process is discussed in this section, followed by a discussion of the local policies regarding wetlands. The CNMI policies are then compared to the federal policies.

3.1 U.S. Federal Wetland Policies

Army Corps of Engineers

The U.S. Army Corps of Engineers (ACOE) is responsible for the issuance of permits for the discharge of dredged or fill materials into waters of the United States and also for the determination and delineation of wetlands that require permits under the jurisdiction of the Clean Water Act. Waters of the United States is the broad category of the jurisdictional

range of the ACOE that may or may not contain vegetated wetland habitats. All wetlands, therefore, are also waters of the United States.

Federal regulation of dredge and fill activities dates back to the Rivers and Harbors Act of 1899 which prohibited the placement of structures or other obstructions such as dredged fill into navigable waters of the United States; these activities were governed under Section 10 of the Act. The original purpose of the dredge and fill regulation was to protect and promote navigation. The 1972 Clean Water Act identified a much broader federal interest which was to restore and maintain the chemical, physical, and biological integrity of all waters of the United States. This encompassed all of the Nation's waters, not just the navigable waterways.

Both the U.S. Environmental Protection Agency (USEPA) and ACOE have the power to enforce the Clean Water Act. The USEPA has the power of administrative fines and has established guidelines in cooperation with the ACOE for evaluating fill permits. The ACOE has the power of civil penalties through the courts and is responsible for regulating the discharge of fill in wetlands using guidelines established by the USEPA. However, the USEPA has the power to veto the ACOE issuance of a permit in accordance with rules implementing the veto process.

As such, the ACOE must review and may issue permits for any proposed discharge of dredged or fill materials into waters of the United States. While all proposed impacts must be reviewed, the ACOE does authorize certain activities within wetlands via their Nationwide Permit Program. Allowable activities that are exempt from some or all of the permitting requirements are normal farming and silviculture activities, and other activities based on the amount of wetland to be impacted, the absence of additional sensitive resources (e.g., endangered species), and the land use or project purpose being proposed. Nationwide permits essentially shorten the time normally required for processing an individual permit.

Regarding area of impact, proposed impacts of under 10 acres may be allowable under the Nationwide 26 Permit as long as overriding restrictions are not at issue. In particular, proposed impacts of less than 1 acre are currently fully exempt from the requirements for an individual permit, but impacts of between 1 and 10 acres are subject to the discretionary review of the ACOE. This enables either district or division ACOE engineers to modify or override nationwide permits by requiring individual permit applications on a case-by-case

basis. All impacts of 10 acres or more will require consultation with federal agencies and preparation of a project alternatives analysis that would eliminate or minimize wetland impacts.

The ACOE District Engineer has the authority to modify, suspend, or revoke any permit issued by the Corps including nationwide permits. This authority may be applied to individual, regional, or nationwide conditions. The ACOE is in the process of reviewing each of the nationwide permits and has announced that modification, suspension, or revocation of particular permits may occur by the year 1992. In particular, elimination of the 1 acre threshold of impacts above which requires notification of the ACOE is being considered. Revocation of the 1 acre minimum will lessen the piece-meal loss of wetlands that can prevail with the existing Nationwide 26 Permit.

U.S. Environmental Protection Agency

As mentioned above, all permit applications to the ACOE are evaluated under the USEPA's 404(b)(1) Guidelines and water quality certification. The Guidelines are used as the primary environmental criteria for evaluating the necessity of a proposed discharge of dredged or fill material into waters of the United States. Evaluation under the Guidelines determines whether the least damaging and feasible environmental alternative is sought, and whether unavoidable impacts are mitigated appropriately. The basic premise under the Guidelines is that mitigation should not be used to offset avoidable impacts. If it is determined that avoidable impacts will occur from the project, an individual permit including public review and a detailed Alternatives Analysis may be required.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) provides an administrative review to the ACOE for Section 10/404 permit applications under the Fish and Wildlife Coordination Act and the Endangered Species Act (ESA) for all federally permitted or sponsored projects. The USFWS comments on all permit applications with a view to the conservation of wildlife resources by preventing or reducing the avoidable loss of or damage to these resources. Both USEPA and ACOE are required to give full consideration to the views of the USFWS.

In addition, proposed impacts to wetlands that "may affect" a federally-listed threatened or endangered species or destroy or adversely modify the critical habitat of such species, regardless of acreage impacts, will require initiation of the formal Section 7 consultation process with the USFWS pursuant to Section 7 of the ESA. The primary objective of the USFWS in the formal consultation will be to determine the magnitude of impacts on listed species and whether the proposed Corps action will jeopardize the continued existence of the species.

Under the ESA both USEPA and ACOE are required to conserve any species listed on the Federal list of threatened and endangered species. The Act provides specific procedures for accomplishing the mandatory consultation. In addition to the veto power accorded the USEPA over the issuance of a permit by ACOE, both USEPA and USFWS can elevate the issuance of the permit to the Washington level if they believe the ACOE has not given full consideration to their opinions and views regarding the permit.

USDA Soil Conservation Service

Wetlands are protected by the Food Security Act of 1985 under the "Swampbuster" provision. Swampbuster is aimed at protecting wetlands from conversion (drainage) for crop production. It applies to persons who have converted wetland in order to plant annual crops after December 23, 1985 - the date the farm bill was signed. With some exceptions, to remain eligible for certain USDA farm programs, producers must not convert wetlands for the purpose of producing an agricultural crop and must discontinue production of annually tilled crops on wetlands converted after December 23, 1985.

Avoidance, Minimization, and Mitigation of Impacts

Under the USEPA evaluation procedures regarding fills in wetlands, a legal presumption is established that must be overcome by a permit applicant. For projects that propose significant environmental effects on wetlands, the legal presumption is that a permit applicant has a less environmentally damaging alternative to the proposed fill. Under the legal presumption, the applicant must prove that the filling of the wetland cannot be avoided based on either the costs for the alternatives, lack of technology, or logistic constraints. Only after the applicant has proved that the fill cannot be avoided, will USEPA and ACOE allow the applicant to address reducing the size of the fill and mitigating for significant adverse effects. The USEPA and ACOE adhere to this strict sequence of regulatory

considerations: avoidance, minimization, and finally, mitigation. Once the legal presumption has been overcome by the permit applicant, ACOE, USEPA, and USFWS mitigation policies serve as guidelines in further evaluation for reducing fills and mitigating significant, unavoidable adverse impacts.

Mitigation has been defined to include avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. While mitigation is stressed, the agencies do recognize the varying quality of wetland habitats and will factor in wetland quality and function when calculating allowable impacts and extent of mitigation. Onsite mitigation is generally preferable to offsite mitigation and habitat restoration or enhancement is generally preferable to wetland creation or other habitat development.

3.2 Local Policy

The regulation of wetlands under the federal authorities, requires both CNMI citizens, businesses, and government to comply with federal wetland regulatory requirements. The CNMI has the opportunity to develop its own wetland regulatory program and to request authority from USEPA to run its own program. The CNMI has five agencies that are involved with decision-making that either directly or indirectly affects wetlands and the protection of these sensitive habitats. The role each agency performs in the protection of wetlands is described below.

Division of Environmental Quality

Most resource specific environmental quality regulations are administered by the Division of Environmental Quality (DEQ). Under the CNMI Environmental Protection Act, the DEQ has promulgated regulations which are similar in scope to federal programs. DEQ is responsible for water pollution control, issues waste discharge and earthmoving permits, takes enforcement action against violators, and monitors water quality. In addition, DEQ also oversees the federal Environmental Protection Agency regulations that affect water quality. Finally, DEQ implements the CNMI Water Quality Certification process under Section 401 of the Clean Water Act. Under the ACOE wetland regulatory program, ACOE permits will not be issued unless the permit applicant has received a Water Quality Certification from DEQ and a Federal Costal Zone consistency statement from CRMO. Through this process, CNMI has the ability to regulate wetlands without developing its own wetland regulatory program for approval from USEPA.

Coastal Resource Management Office

The most effective protection strategy for wetlands in the CNMI is offered by the CRMO who regulates activities and uses in wetlands and mangroves as one of its Areas of Particular Concern (APC). These regulations are actively enforced and violators risk bearing significant fines for their actions. Any project that proposes impacts within the Wetland and Mangrove APC is evaluated for its compatibility with the following standards:

- It will be prohibited to cause significant adverse impact on natural drainage patterns, to destroy important habitat, or to discharge toxic substances into these APC sites. In addition, adequate water flow and nutrient and oxygen levels shall be ensured.

- The natural ecological and hydrological processes of mangrove areas shall be preserved.

- Critical wetland habitat shall be maintained and enhanced as is possible to increase the potential for survival of rare and endangered plant and animal species.

- All public landholdings within and adjacent to the Wetland and Mangrove APC areas shall be maintained. Additional public landholdings will be acquired to the extent possible through land trades with the Marianas Public Land Corporation, land purchases, creation of easements, or through acquisition by eminent domain.

- Wetland resources shall be utilized for appropriate agriculture, recreation, education, public open space, wildlife habitat, and other compatible uses which would not degrade productivity.

Wetland and Mangrove APC sites include, but are not limited to, the following use priorities:

- Highest. Preservation and enhancement of wetland and mangrove areas, and preservation of wildlife, primary productivity, conservation areas, and historical properties.

- Moderate. Non-intensive agriculture that is benefitted by inundation, or low density grazing. Infrastructure corridors that are designed to avoid significant adverse impacts to natural hydrological processes and valuable wildlife habitat. Non-commercial recreational uses that are restricted to non-permanent, elevated, light use structures, i.e., footbridges, observation decks, and similar structures.

- Low. Residential development that is designed to avoid adverse environmental impacts and can withstand flooding.

- Unacceptable. Land fill and dumping exclusive of flood control and infrastructure corridors or other limited allowable activities and uses. Land clearing, grading or removal of natural vegetation not associated with allowable activities and would result in significant sedimentation within the APC sites.

The CRMO may also designate new areas within the Commonwealth as APC sites if proposed by CRMO agency officials, the administrator, or the public. In addition, large-scale proposed projects outside of APC areas that may significantly impact wetlands are regulated under their Major Siting permit system. All areas within the Wetland and Mangrove APC are required to obtain a CRMO permit. All permits for projects located within this APC would receive either a standard or major siting permit, depending on the scope of the project. All projects requiring permits must receive written approval of the project before grading or development can begin, and all permits issued with conditions are monitored to ensure that the specific conditions are being met. All proposed impacts to wetlands also require that the permit applicant has received a federal consistency statement. The consistency statement declares "all permits issued through the CRMO offices are consistent with the federally-approved CRM Program and apply to all areas designated by CNMI Public Law 3-47, Section 7, as subject to the jurisdiction of the CRM Program."

Department of Natural Resources, Division of Fish and Wildlife

Responsible for the fish and wildlife resources of CNMI, the Division of Fish and Wildlife (DFW) advises other agencies and the private sector on land or water use proposals that

will affect wetlands. The DFW also has the authority to designate an area as "critical habitat" for dependent threatened and endangered species, and manages conservation areas designated for wildlife habitat.

Department of Natural Resources, Forestry Section

The Forestry Section of the Department of Natural Resources (DNR) is responsible for the management of forest and soil resources within the CNMI. As part of their responsibility the DNR is preparing the Commonwealth Outdoor Recreation Plan which includes a Wetlands Conservation Priority Plan. The DNR is also responsible for the administration of land acquisition and development grants to the local government.

Marianas Public Land Corporation

Under the Constitution of the CNMI, the Marianas Public Land Corporation has the responsibility for the management and disposition of all public lands. This responsibility includes development planning, issuing leases for the development of public land, and the distribution of land for homestead development. In particular, the Corporation authorizes land exchanges that can be used to acquire wetlands for public purposes.

The combined regulatory authority of the CNMI agencies plus regulatory review and/or permitting constraints by the Soil Conservation Service, U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers provides protection for the sizeable wetland areas on Saipan. The local agencies have principally similar regulatory objectives as do the federal agencies. Protection is lessened and sometimes lacking, however, for the many scattered wetland sites that occur outside of the Wetland and Mangrove APC sites. The authority granted to the Marianas Public Land Corporation may also lead to conflict over the acquisition or preservation of wetlands under their public land exchange program. The Land Exchange Program places wetland habitat as a fourth priority concern after public access and rights-of-way for developing infrastructure. Recommendations to modify or strengthen these and other aspects of the CNMI regulations of wetlands is presented in Section 5. Intra-agency concerns need to be addressed by the MPLC so that sensitive wetland resources are not included in the leasing of public lands. MPLC should coordinated their activities with CRMO, DNR, and DEQ.

Zoning Board

The Zoning Board was established by Public Law 6-32 to promote and provide for the wise use of natural resources, including land, water, and biological resources. Public Law 6-32 requires the development of land use districts which set forth the land uses and quantitative performance zoning standards to be employed in each district. The Zoning Office has the responsibility to establish a system of land use controls for the island of Saipan which will affect what types of development occur and where they are allowed to be developed. The Zoning Office is currently developing a zoning plan which will address wetlands requiring special protection. The Zoning Office could employ recommended mitigation measures in this plan for development occurring near wetlands. Such mitigation measures could be included in a permit system coordinated by agencies responsible for wetlands protection.

SECTION 4
WETLAND ANALYSIS AND HABITAT VALUE

The primary step in determining whether any regulatory constraints may apply to a site is to conduct an appropriate and defensible evaluation of the potential wetland habitat. Once a wetland determination has been made, however, the relative quality or resource value of the wetland can vary considerably. Wetland resource value generally is determined by the number or uniqueness of the functions that are provided, the complexity of the habitat, or any site specific functions that may be very important on a case-by-case basis. A number of basic wetland characteristics should be evaluated at a site to determine its relative value and must be assessed if a wetlands management program is to be effective. These relative value assignments for wetlands further vary depending on the region that is being studied. The management of wetlands on Saipan mandates a unique assignment of values that can differ significantly from wetlands management criteria on larger land masses or in areas subject to different climatic regimes. As such, a wetlands resource analysis was conducted that considered the conditions and unique resources found on Saipan.

From a biological basis, wetland quality typically relates to wildlife use which itself generally relates to the structural complexity of the wetland. High plant species diversity typically results in structural complexity and provides the widest range of wildlife amenities, i.e., a varied foraging supply with increased nutrients, suitable nesting or resting sites, and protective cover and movement corridors for wildlife. Species diversity, structural complexity, and wildlife use are all directly affected by adjacent land uses and distance between wetland sites. Plant diversity and complexity further contribute to the hydrologic quality of a wetland and support local sedimentation control, drainage functions, salinity levels, and flushing characteristics. These and other wetland characteristics were evaluated as warranted at each of the wetlands sites visited on Saipan.

WETLAND EVALUATION

The purpose of the resource analysis was to apply a standardized approach in determining the habitat value of the wetland sites that were visited and allow for appropriate comparisons and prioritizing of the sites for long-term management. To facilitate this goal, field data sheets were developed for the surveys that included a set of wetland characteristics to be evaluated at each of the sites visited. While conducting the surveys, each of the wetland characteristics were assessed in the context of conditions on Saipan and known sensitive resources. Assessed within known island parameters, the wetland characteristics were objectively evaluated in the field and assigned rankings within each category. Most of the rankings remained constant after the initial assignment; however, others were reevaluated for consistency after all of the data had been gathered. Although this may have led to value reassignments for some characteristics at some of the sites, this final subjective analysis was weighted against the full spectrum of wetlands on Saipan and is viewed as valid and essential.

The resource analysis of wetland types involved three steps: 1) preliminary literature research and identification of wetland characteristics, 2) development of the resource matrix including a ranking scale for the various wetland characteristics, and 3) matrix analysis and final hierarchical weighing of the criteria. Each step is discussed below.

Identification of Wetland Characteristics

Wetland characteristics and potential wetland values were identified from a review of the literature and discussions among the study team and communication with the CRMO.

These discussions were continued on Saipan during an agency meeting that preceded the onset of the field surveys. In attendance at the meeting were representatives from the CRMO, CNMI divisions of Environmental Quality and Fish and Wildlife, U.S. Soil Conservation Service, Marianas Public Lands Corporation, and Commonwealth Zoning Board. The wetland characteristics that were selected are the following: 1) vegetative cover including structural diversity, dominance by hydrophytic vegetation, proportion of native species, and site condition, 2) wildlife use including function as a wildlife corridor, suitability for wetland-dependent wildlife, and, in particular, suitability or occupation by endangered species, 3) hydrologic features including function as an important drainage system, function as control of sediment, groundwater recharge, and open water component, 4) size, and 5) adjacent land use and isolation by development.

Development of the Resource Matrix

Many of the wetland characteristics that were assessed could be noted on a presence/absence basis; however, others required a ranking-scale for the characteristic relative to the existing conditions on Saipan. These ranking options are summarized in Table 4-1. The categories and rankings listed under the vegetation, hydrology, and size criteria headings, and the relative degree of isolation were fairly straight forward to assign while assessing each wetland site. Reported or observed wildlife sightings also justifiably led to clear ranking assignments. Some level of interpretation is inherent in the ranking assignments, however, and was necessary to prepare the management plan.

Matrix Analysis and Hierarchical Weighing of the Criteria

After the field investigation, all of the data for each wetland site were entered into a computer spread sheet and then sorted hierarchically. The prioritizing of the characteristics was first according to the site's regional significance, second according to the structural diversity, and third according to the degree of isolation. Although an individual wetland cannot be described, or prioritized on the basis of any of the individual characteristics that were examined, multiple high rankings of several characteristics for a single wetland indicate that more conservative considerations should be given the long-term management of these areas. Similarly, individual wetlands that are characterized by relatively few high ranking characteristics or that are found to be degraded and subject to indirect impacts because of their proximity to existing development, may not warrant extensive protective or enhancement measures. While all wetland habitat is considered significant by the resource

Table 4-1

WETLAND CHARACTERISTICS AND RANKING OPTIONS

Vegetation Criteria	Wildlife Criteria	Wetland Hydrology Criteria	Size Criteria/Regional Significance	Degree of Isolation
<u>Hydrophytic vegetation</u> a) dominates site b) does not dominate <u>Structural diversity</u> high: includes each of a tree canopy cover, shrub and sapling growth, and a vine or groundcover growth. med.: structural complexity limited to ground cover or shrub cover with only scattered trees or minor variations in spatial arrangement. low: monoculture or otherwise limited to one horizontal arrangement. Proportion of native to <u>non-native plant species</u> high medium low <u>Site condition</u> a) well-developed and undisturbed b) disturbed to relatively undisturbed c) heavily or repeatedly disturbed	<u>Wetland-dependent wildlife use</u> high: frequent use by wetland-dependent wildlife including breeding. med.: moderate use by wetland-dependent wildlife for nonbreeding activities. low: infrequently used or not expected to be used by wetland-dependent wildlife. <u>Endangered species presence</u> a) detected or reported endangered species. b) suitable for endangered species. c) not suitable and not expected. <u>Wildlife corridor</u> a) functions as wildlife corridor. b) would not significantly provide cover for wildlife movement.	<u>Drainage system</u> a) part of an important drainage system, provides sedimentation control, ground-water recharge. b) does not or not expected to function significantly as part of larger hydrologic system. <u>Open water component</u> a) open, unvegetated water present. b) no open water component.	a) occurs in significant amounts in regional context. b) occurs in moderate amounts and/or is of moderate importance on regional basis due to overall abundance. c) too small in areal extent to provide significant habitat value.	low: adjacent to large natural open space. med.: adjacent to development on 1 major side. high: surrounded by development on 2 or more major sides.

agencies, absolute preservation of all wetlands may not be feasible and, furthermore, may not be of the best biological interest for the regional management of the resource.

The analysis and hierarchical sorting of the wetland sites on Saipan enabled a division of the sites into four broad categories that are designated as Class III, Class II, Class I, and Special Study. The classes group the individual wetland sites based on the relative rankings of the many wetland characteristics that were considered, and provide a general indication of the relative values among the four classes. The class designation for each wetland site and their various wetland characteristics and values are summarized in Table 4-2. Field investigation of each of the original Inventory mapped (USFWS 1989) wetlands also led to the exclusion of some of these previously mapped wetland sites from the final comprehensive mapping for this study (Figure 2-1). Those sites that do not meet the legal definition of wetlands are listed at the bottom of Table 4-2. The broad class designations should be used as the guide for a general evaluation of appropriate management plans for the wetlands within each class. These categories, however, are only the preliminary step in the case-by-case analysis of wetlands on Saipan. Further discussion of the wetland classes, alternative management plans, and implementation of the regional plan are presented in Sections 5 and 6.

The results of this analysis were the basis for identifying the full range of the high value wetlands that should be provided protective status. This analysis coupled with land use and ownership information for the wetland sites also identified suitable mitigation areas and strategies for the goal of no net loss of wetland values on Saipan. Management options, strategies, and implementation recommendations are discussed in the following sections.

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values

Site ID/[1] Location	Class desig-nation[2]	Wetland?[3]	Type[4]	Hydric Soils?[5]	Hydrophytic Vegetation?[6]	Dominant Vegetation[7]	Size	Regional Significance[8]	Site Condition[8]	Part of Important Drainage	Disturbance	Vegetative Criteria[8]	Degree of Isolation[8]	Adjacent Land Uses	Wildlife Criteria[8]	Wildlife Species Detected	Enhance-ment Suitability[9]	Notes
L1 Lake Susupe	III	yes	L	Mesei Variant	yes	trees: HITI BESP shrubs: no dominants herbs: SCLI ACAU PHKA MISC	40 ac	A	A	yes	none	N:NN Spp. Ratio: H Species Diversity: M Structural Diversity H	Low	Residential	Endangered Spp? yes Wetl.-Depend. Wildlife Use: H Wildlife Corridor? yes	Moorhen Yellow bittern, turtle	S	Large high-quality lake habitat; needs protection and buffering
R6 Talafofo River	III	yes	R	(yes)	yes	trees: HITI BAAS CYRA CEOV shrubs: BASP HITI EUTH herbs: no dominants	18000 linear ft	A	A	yes	Fire, Invasion by LELE	N:NN Spp. Ratio: H Species Diversity: H Structural Diversity H	Low	none	Endangered Spp? yes? Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	Megapode? Forest birds	S	Remote and pristine riverine; needs protection
E1 Sadog Tase mangroves	III	yes	E	Mesei Variant	yes	trees: BRGY shrubs: THPO herbs: no dominants	3 ac	A	A	yes	none	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity M	Med.	Commercial Industrial	Endangered Spp? no Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	none detected	S	Adjacent to P11; needs protection and adequate buffering
P4 San Roque	III	yes	P	Mesei Variant	yes	trees: LELE HITI CONU shrubs: PHKA herbs: no dominants	6.5 ac (1.6 ac) lost	A	A	yes	North end impacted	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity M	Med.	Main road, construction	Endangered Spp? yes Wetl.-Depend. Wildlife Use: H Wildlife Corridor? yes	none detected	S	Northern portion impacted and lost to development; protect and enhance for the Moorhen
P6 Tanapag	III	yes	P	Mesei Variant	yes	trees: no dominants shrubs: PHKA herbs: no dominants	15 ac	A	A	yes	none	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity L	Med.	Residential, agricultural	Endangered Spp? ± Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	Reef heron, Sandpiper species	S	Quality habitat; try to expand to connect disjunct wetland portions
P7 Lower Base east of road	III	(yes)	P	Inclusion	(yes)	trees: no dominants shrubs: LELE 100 herbs: EPOD PHKA	3.5 ac	B	C	yes, but severed	Agricultural uses	N:NN Spp. Ratio: L Species Diversity: M/L Structural Diversity M/L	Med.	Major road, agricultural land, residential	Endangered Spp? yes Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	Nightengale reed-warbler, moorhen	S	Active disturbance by grazing
P8 Lower Base west of road	III	yes	P	Mesei Variant	yes	trees: CAEQ shrubs: HITI LELE CAES herbs: PHKA MOCH	8 ac	B	C	yes	Agricultural, berms, excavation, fill	N:NN Spp. Ratio: L Species Diversity: M Structural Diversity M	Med.	Major road, commercial	Endangered Spp? ± Wetl.-Depend. Wildlife Use: M/L Wildlife Corridor? yes	none detected	S	Past and current disturbance, predominantly at edges; suni farm; partial conservation/mitigation feasible

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values (continued)

Site ID/ Location [1]	Class designation [2]	Wetland? [3]	Type [4]	Hydric Soils? [5]	Hydrophytic Vegetation? [6]	Dominant Vegetation [7]	Size	Regional Significance [8]	Site Condition [8]	Part of Important Drainage [8]	Disturbance	Vegetative Criteria [8]	Degree of Isolation [8]	Adjacent Land Uses	Wildlife Criteria [8]	Wildlife Species Detected	Enhancement Suitability [9]	Notes
P9 south Lower Base	III	yes	P	Mesei Variant	yes	trees: no dominants shrubs: PHKA herbs: IPAQ	9 ac	B	B	yes	Recent excavation created open water	N:NN Spp. Ratio: H/M Species Diversity: L Structural Diversity M	Med.	Major road, commercial	Endangered Spp? yes Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	Moorhen	S	Site has been enhanced for moorehen use; standing water present
P11 Sadog Tase freshwater	III	yes	P	Mesei Variant	yes	trees: HITI THPO shrubs: PHKA herbs: no dominants	7 ac (~10 ac) lost	A	A	yes	Minimal	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity M	Med.	Major roads, industrial at N end, Utility line	Endangered Spp? no Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	Shorebirds	S	Enhancement potential for moorhen at north end; PHKA at north and west edges; could expand
P12 American Memorial Park edge	III	yes	P	Mesei Variant	(no)	trees: CAEQ HESO CAPA HITI shrubs: LELE PADU PATE herbs: PLIN ACAU		A	A	yes	War remains, fill	N:NN Spp. Ratio: M Species Diversity: H Structural Diversity H	Low	Peripheral trail and fitness course	Endangered Spp? yes Wetl.-Depend. Wildlife Use: H Wildlife Corridor? yes	Moorhen	P	Excellant structural diversity; provides buffer to interior wetland; prevent future disturbance
P13 American Memorial Park interior	III	yes	P/E	Mesei Variant	yes	trees: HITI THPO BRGY shrubs: HITI PADU ACAU PLIN herbs: MISC	23 ac	A	A	yes	War remains	N:NN Spp. Ratio: H Species Diversity: H Structural Diversity H	Low	Peripheral trail and fitness course	Endangered Spp? yes Wetl.-Depend. Wildlife Use: H Wildlife Corridor? yes	Moorhen yes	P	Preserve and maintain in perpetuity
P18 Kagman north	III	yes	P	Inclusion	(yes)	trees: no dominants shrubs: MIIN LELE PEPU herbs: IPAQ IPIN LUOC	2 ac	A	B	yes	Excavated agricultural pond	N:NN Spp. Ratio: L Species Diversity: L Structural Diversity M	Low	Agricultural, rural residential	Endangered Spp? yes Wetl.-Depend. Wildlife Use: H Wildlife Corridor? yes	Moorhen, 3 Sandpiper species, Yellow bittern	S	Very disturbed; non-hydrophytic vegetation; wetland obligates present
P19 Kagman	III	yes	P	Inclusion	(yes)	trees: no dominants shrubs: LELE SOHA PEPU herbs: no dominants	0.3 ac	C	C	yes	Artificial pond	N:NN Spp. Ratio: L Species Diversity: M/L Structural Diversity M	High	Agriculture	Endangered Spp? ± Wetl.-Depend. Wildlife Use: H/M Wildlife Corridor? no	Yellow bittern Marsh sandpiper Moorhen	S	Local enhanceable habitat; mitigation potential high Past use by moorhens; resent siltation
P21 Chalan Laolao	III	yes	P	Mesei Variant	yes	trees: HITI shrubs: SACA PHKA herbs: no dominants	25 ac	A	B	yes	Fill	N:NN Spp. Ratio: M Species Diversity: L Structural Diversity M	Low	Major road, agricultural, residential	Endangered Spp? yes Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	Moorhen	S	Fill impacts being corrected adjacent to forest habitat at Corps request

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values (continued)

Site ID/[1] Location	Class designation[2]	Wetland?[3]	Type[4]	Hydric Soils?[5]	Hydrophytic Vegetation?[6]	Dominant Vegetation[7]	Size	Regional Significance[8]	Site Condition[8]	Part of Important Drainage[8]	Disturbance	Vegetative Criteria[8]		Degree of Isolation[8]	Adjacent Land Uses	Wildlife Criteria[8]		Wildlife Species Detected	Enhance-ment Suitability[9]	Notes
P22 Chalan Laolao	III	yes	P	Inclusion	yes	trees: CONU shrubs: PHKA herbs: no dominants	12 ac	B	C	no	Former CONU grove at N and W edges	N:NN Spp. Ratio: Species Diversity: Structural Diversity	M M M	Med.	Commercial, agricultural use	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no M no	none detected	S	Some wetland lost at edges; adjacent to significant drainge system
P(22) south Chalan Laolao farm site	III	(yes)	P	possible inclusion	(yes)	trees: HITI shrubs: LELE herbs: TARO IPAQ	0.8 ac	B	C	yes	Agricultural use	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L L L	Med.	Agricultural, major road	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no M no	Yellow bittern, 3 Sandpiper species, 6 Moorhens in flooded taro field	S	Agricultural land; is restorable; remove fill; mitigation potential high
P26 North Susupe area	III	yes	P	Mesei Variant	yes	trees: HITI LELE CONU (as border) shrubs: PHKA herbs: no dominants		A	A	yes	none	N:NN Spp. Ratio: Species Diversity: Structural Diversity	H L M/L	Low	Major road, agricultural uses	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	yes H yes	Moorhen	S	Needs protection
P27 North of Lake Susupe	III	yes	P	Mesei Variant	yes	trees: LELE CONU CAEQ (scattered) shrubs: PHKA ACAU herbs: IPIN MISC	185 ac	A	A	yes	none	N:NN Spp. Ratio: Species Diversity: Structural Diversity	H M H	Low	CONU grove at edge, distant residential	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	yes H yes	Moorhen	S	Needs protection
P28 Northwest Lake Susupe area	III	yes	P	Mesei Variant	yes	trees: HITI shrubs: PHKA MOCI CONU herbs: ACAU MISC LELE		A	A	yes	none	N:NN Spp. Ratio: Species Diversity: Structural Diversity	H H/M H	Low	CONU grove, residential approx. .25 mi. away	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	yes H yes	Nightengale reed-warbler Moorhen	S	Needs protection
P29 South Susupe	III	yes	P	Mesei Variant	yes	trees: no dominants shrubs: PHKA herbs: no dominants	105 ac	A	B	yes	Coral fill into edges of wetland	N:NN Spp. Ratio: Species Diversity: Structural Diversity	H L L	Low	Residential	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	yes H yes	Moorhen	S	Needs protection; stop encroachment
P30 South Susupe area North San Antonio	III	yes	P	Mesei Variant	yes	trees: CONU LELE MUPA (scattered) shrubs: PHKA herbs: no dominants	50 ac	A	A	yes	Main road bissects habitat	N:NN Spp. Ratio: Species Diversity: Structural Diversity	H L M	Low	none	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	yes H yes	Moorhen	S	Needs protection

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values (continued)

Site ID/[1] Location	Class desig-nation[2]	Wetland?[3]	Type[4]	Hydric Soils?[5]	Hydrophytic Vegetation?[6]	Dominant Vegetation[7]	Size	Regional Significance[8]	Site Condition[8]	Part of Important Drainage[8]	Disturbance	Vegetative Criteria[8]	Degree of Isolation[8]	Adjacent Land Uses	Wildlife Criteria[8]	Wildlife Species Detected	Enhance-ment Suitability[9]	Notes
P33 southwest San Vincente	III	(yes)	P	Inclusion	(yes)	trees: CONU ALLA shrubs: PHKA herbs: IPAQ CAOD	(7 ac) lost	C	C	yes	Agricultural uses	N:NN Spp. Ratio: L Species Diversity: H Structural Diversity M	Med.	Residential, CONU grove	Endangered Spp? yes? Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes?	Nightengale reed-warbler? moorhen	S	Fragmented by scattered residential; partial reclamation possible
P34 Flores Pond southwest San Vincente	III	yes	P/L	Inclusion	yes	trees: PISP HITI FISP shrubs: PHKA SESP herbs: no dominants	2.4 ac (5 ac) lost	A	B	yes	Adjacent agricultural use	N:NN Spp. Ratio: M Species Diversity: M Structural Diversity H	Low	Residential, Agricultural land	Endangered Spp? yes Wetl.-Depend. Wildlife Use: H Wildlife Corridor? yes	Moorhen Yellow bittern	S	Larger wetland historically lost to develoment; remaining pond needs protection
P35 Hoyan As Lito Kattan	III	yes	P	Inclusion	(yes)	trees: no dominants shrubs: MIIN PAMA herbs: CYDA CYOD PAPE	6 ac	A	B	yes	Past agricultural use, road	N:NN Spp. Ratio: M Species Diversity: H Structural Diversity M	Low	Residential, Agricultural land	Endangered Spp? yes Wetl.-Depend. Wildlife Use: M Wildlife Corridor? yes	Moorhen	S	Very impacted; could be expanded/enhanced; remove bermuda grass
P24 San Jose (golf course)	II	yes	P	Inclusion	yes	trees: no dominants shrubs: SECA herbs: IPAQ BRMU	1 ac	B	C	yes	Fill, golf course	N:NN Spp. Ratio: L Species Diversity: M Structural Diversity L	High	Golf course, two major roads	Endangered Spp? no Wetl.-Depend. Wildlife Use: M/L Wildlife Corridor? yes?	none detected	S	Site adjacent to golf course; could expand to include unused part of course
P25 northeast Susupe area	II	yes	P	Mesei Variant	yes	trees: HITI BASP (adjacent) shrubs: PHKA herbs: no dominants	2.5 ac	B	B	yes, but severed	Major road	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity L	High	Agricultural, major road, development	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	none detected	P	Isolated by road
P5 Aquatic Club Resort	I	(yes)	P	Inclusion	(no)	trees: no dominants shrubs: PEPU SASP herbs: BRMU (grass species)	1.5 ac (0.5 ac) lost	C	C	no	Diked, developed	N:NN Spp. Ratio: L Species Diversity: M Structural Diversity L	High	Major road, commercial, agricultural	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	none detected	P	Remnant PHKA at N end; some fill; S portion lost to disturbance; low enhancement potential; isolated
P10 Lower Base (near OCK warehouse)	I	(yes)	P	Mesei Variant	(yes)	trees: no dominants shrubs: PHKA herbs: no dominants	(~25 ac) lost	C	C	yes	Fill / construction	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity L	High	Commercial	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	Past moorhen use	P	Site to be developed; nearly complete vegetation removal; fill

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values (continued)

Site ID/[1] Location	Class desig-nation [2]	Wetland?[3]	Type[4]	Hydric Soils?[5]	Hydrophytic Vegetation?[6]	Dominant Vegetation[7]	Size	Regional Significance[8]	Site Condition[8]	Part of Important Drainage[8]	Disturbance	Vegetative Criteria[8]	Degree of Isolation[8]	Adjacent Land Uses	Wildlife Criteria[8]	Wildlife Species Detected	Enhance-ment Suitability[9]	Notes
P14 south Garapan (cul-de-sac)	I	yes	P	(no)	yes	trees: CAEQ shrubs: LELE SECA PLIN herbs: IPAQ SCLI LUHY BRMU	1.5 ac	C	B	(yes)	Fill, adjacent to development	N:NN Spp. Ratio: L Species Diversity: M Structural Diversity M/L	High	Residential, major road	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	Yellow bittern	S	Created in area as local catchment; site is fenced; enhancement possible
P20 Golf course	I	(no)	SS	Inclusion	no	trees: PISP ALLA shrubs: LELE herbs: PAMA	(1.5 ac) lost	C	C	yes, but severed	Diked, major road	N:NN Spp. Ratio: L Species Diversity: L Structural Diversity L	High	Golf course, residential	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	none detected	P	Diked area; converted to pasture; low enhancement potential
P23 Chalan Laolao next to golf course	I	no	Non-wet	Inclusion	no	trees: no dominants shrubs: PEPU herbs: no dominants	(2.5 ac) lost	C	C	(yes)	Converted to pasture, grazing	N:NN Spp. Ratio: L Species Diversity: L Structural Diversity L	Med.	Major road	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	none detected	P	Lost to disturbance; converted to pasture; cattle grazing
P31 Susupe area Saipan Grand Hotel	I	yes	P	possible inclusion	yes	trees: no dominants shrubs: no dominants herbs: IPAQ PHKA BRMU	0.2 ac	C	C	no	Dumping, fill	N:NN Spp. Ratio: L Species Diversity: L Structural Diversity L	High	Adjacent to hotel, main road, parking lot	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	none detected	P	Isolated; small; repeatedly disturbed site
P32 east of Susupe area	I	yes	P	possible inclusion	yes	trees: LELE shrubs: PHKA herbs: no dominants	0.5 ac	C	C	no	Former agricultural use	N:NN Spp. Ratio: H Species Diversity: L Structural Diversity M	High	Residential	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	none detected	P	New wetland site; isolated; former taro field
P36 As Lito north of airport	I	yes	P	Inclusion	(yes)	trees: HITI (in drainage only) shrubs: no dominants herbs: PEPU SASU	2.3 ac	B	C	no	Pasture	N:NN Spp. Ratio: L Species Diversity: M Structural Diversity M	Med.	Agricultural land, residential	Endangered Spp? yes Wetl.-Depend. Wildlife Use: L Wildlife Corridor? no	Nightengale reed-warbler	S	Northern portion no longer wetland; remainder converted to pasture; can be reclaimed; public land
R1 northeast Marpi	I	no	R	no	no	trees: ALLA HITI shrubs: LELE herbs: STSP MISC	2400 linear ft	C	C	yes	Scoured channel	N:NN Spp. Ratio: L Species Diversity: L Structural Diversity H	Low	minimal	Endangered Spp? no Wetl.-Depend. Wildlife Use: L Wildlife Corridor? yes	none detected	P	Disturbed scoured drainage

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values (continued)

Site ID/[1] Location	Class desig-nation[2]	Wetland?[3]	Type[4]	Hydric Soils?[5]	Hydrophytic Vegetation?[6]	Dominant Vegetation[7]	Size	Regional Significance[8]	Site Condition[8]	Part of Important Drainage[8]	Disturbance	Vegetative Criteria[8]		Degree of Isolation[8]	Adjacent Land Uses	Wildlife Criteria[8]		Wildlife Species Detected	Enhance-ment Suitability[9]	Notes
R2 northwest Marpi	I	no	R	no	no	trees: ALLA PADU PASP shrubs: LELE herbs: SASP PAMA IPSP	2600 linear ft	C	C	yes	Scoured channel	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L M M	Low	minimal	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L yes	none detected	P	Disturbed scoured drainage; box culvert at road
R3 San Roque / Nikko	I	no	R	no	no	trees: HITI PIDU shrubs: LELE herbs: PAMA SASP	500 linear ft	C	C	yes	Scoured channel	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L M M	High	Residential commercial	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L yes	none detected	P	Rip-rapped: culvert at road
R4 San Roque	I	no	R	no	no	trees: DERE shrubs: LELE herbs: MISC BIPI	3600 linear ft	C	C	yes	Scoured channel	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L M M	High	Residential	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L yes	none detected	P	Disturbed scoured drainage
R5 north Tanapag	I	no	R	no	no	trees: CONU HITI shrubs: MUPA ARAL herbs: CAES	3300 linear ft	C	C	yes	Cultivated wetland	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L M H	High	Residential	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L yes	none detected	P	Disturbed scoured drainage; box culvert at road
R7 south San Antonio	I	no	R	no	no	trees: HITI (along drainage) shrubs: no dominants herbs: no dominants	2100 linear ft	C	B	no	Past agricultural use	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L M M	Med.	Residential, agricultural, industrial	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L no	none detected	P	Constrained by development; wetland has been lost
P1 San Roque	Non-Wet	no	Non-wet	no	no	trees: LELE shrubs: no dominants herbs: STTI IPIN IPPE PAMA	-	C	C	no	Excavated, plastic-lined	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L M M	Med.	Major road	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L no	none detected	P	Artificial pond with plastic lining; no biological value
P2/P3 San Roque	Non-wet	no	Non-wet	no	no	trees: no dominants shrubs: LELE herbs: CHBA ECAL	(0.4 ac) lost	C	C	no	Fill	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L L L	High	Major road, resort, residential	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L no	none detected	P	Disturbed fill area

Table 4-2
Saipan Freshwater Wetlands: Site Characteristics and Relative Values (continued)

Site ID/[1] Location	Class designation[2]	Wetland?[3]	Type[4]	Hydric Soils?[5]	Hydrophytic Vegetation?[6]	Dominant Vegetation[7]	Size	Regional Significance[8]	Site Condition[8]	Part of Important Drainage[8]	Disturbance	Vegetative Criteria[8]		Degree of Isolation[8]	Adjacent Land Uses	Wildlife Criteria[8]		Wildlife Species Detected	Enhancement Suitability[9]	Notes
P15 southwest Talafofo	Non-wet	no	Non-wet	no	no	trees: CAEQ shrubs: LELE herbs: no dominants	0.3 ac	C	D	no	none	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L L L	High	Major road	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no no no	none detected	P	Woody vegetation; no wetland parameters
P16 northeast of Mt. Takpochao	Non-wet	no	Non-wet	Inclusion	no	trees: ALLE LELE CONU BASP shrubs: no dominants herbs: upland grasses	0.2 ac	C	C	no	Diked	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L L L	High	Major road	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no no no	none detected	P	Woody vegetation; no wetland parameters
P17 east of Mt. Takpochao	Non-wet	no	Non-wet	Inclusion	no	trees: ALLA CONU shrubs: no dominants herbs: CAES	0.4 ac	C	D	no	Agricultural land	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L L L	High	Major road	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no no no	none detected	P	Agricultural land
P37 As Petdida north of airport	Non-wet	no	Non-wet	no	no	trees: no dominants shrubs: no dominants herbs: PAMA SASP		C	C	no	Pasture	N:NN Spp. Ratio: Species Diversity: Structural Diversity	L L L	High	Agricultural land, residential	Endangered Spp? Wetl.-Depend. Wildlife Use: Wildlife Corridor?	no L no	none detected	P	Isolated pasture; likely past wetland; low enhancement potential

1. Site entries within this table include all wetland areas evaluated during the survey period. Other wetlands occur on Saipan, however, and these areas should be evaluated for their relative value as compared to the sites described in this study. In particular, riverine wetlands require further study and evaluation as many intermittent streams support wetland habitat.

2. Class designations reflect the combined values of each of the wetland characteristics for that site. Value assignments are discussed in Section 5.

3. Sites were determined to be a wetland based on the presence of each of hydrophitic vegetation, hydric soils, and appropriate wetland hydrology: the three mandatory criteria for the jurisdictional delineation of wetlands. Parentheses indicate that the level of disturbance at the site was quite high. Disturbance generally reduces the proportion of hydrophytic vegetation cover existing at a site; however, these sites are still technically wetlands.

4. P=palustrine, L=lacustrine, R=riverine, E=estaurine, SS= special study.

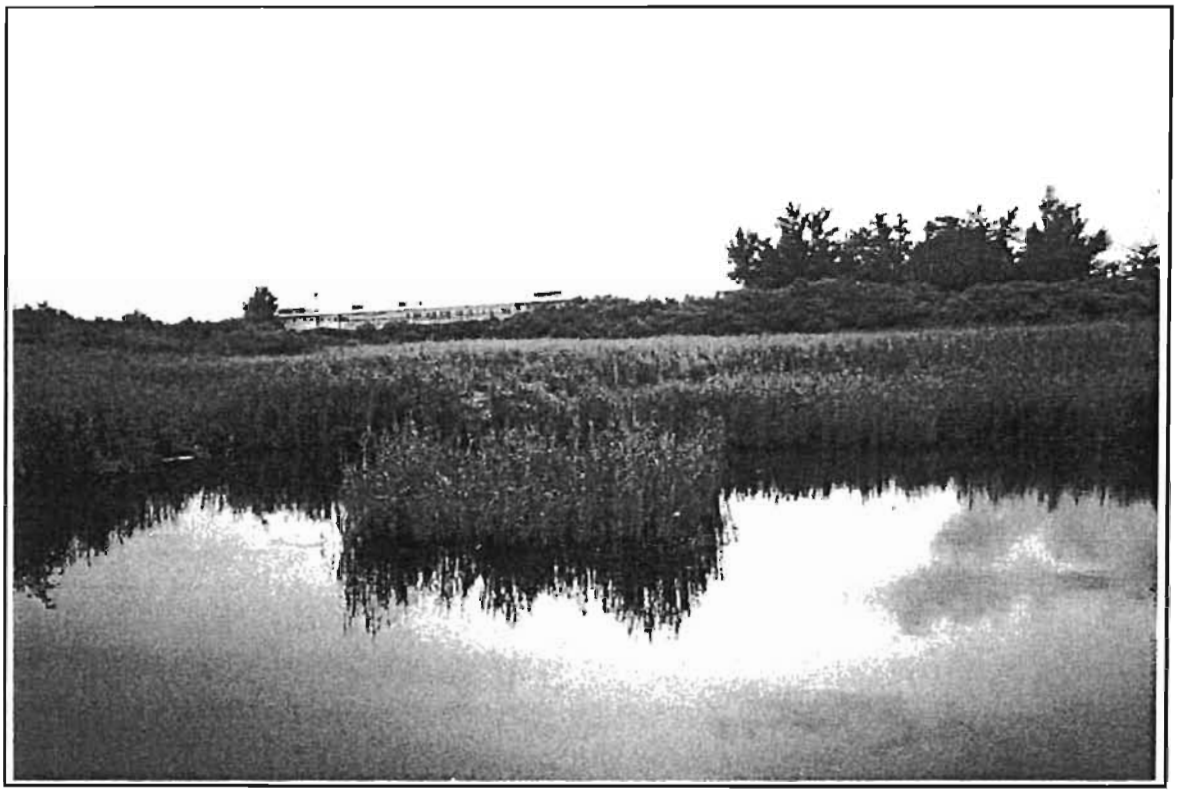
5. Hydric soils are discussed in Section 2. Parentheses indicate either 1) uncertainty with the determination, further investigation for the soils should be made at the site, or, 2) that the sites were very disturbed and the soils may indicate altered fill, plowing, etc.

6. The hydrophytic vegetation criterion is met when the site is dominated by hydrophitic plant species. See discussion in section 2. Parentheses indicate that the site was very disturbed and the vegetation was quite altered.

7. All four letter species codes are a combination of the first two letters of the generic name followed by the first two letters of the specific epithet. See table 2-1 for a list of the dominant wetland plants detected.

8. See table 4-1 for a description of these wetland characteristics.

9. S= suitable for enhancement as mitigation, P=poorly suited. These designations may apply only to portions of the site referenced. Enhancement suitability incorporates proximity to other wetlands, adjacent land used, and type of disturbance. Enhancement of High Value wetlands also includes expansion at the edges to enlarge and buffer these sites.



SECTION 5
WETLANDS MANAGEMENT PLAN

5.1 INTRODUCTION

In previous sections, the existing wetlands of Saipan were identified and classified according to the Unified Federal Method and wetlands values and resources were identified and evaluated. These efforts document the amount and location of wetland areas and the potential and actual value these wetlands have for open space, water quality, flood protection, and wildlife habitat.

There is a potential conflict over the the continued use of some of these wetlands for their natural resource functions due to their close proximity to existing and proposed development. This management plan was initiated to resolve this resource use conflict. Because of the drastic historic loss of wetlands on Saipan, all future proposed impacts to wetlands must be initially reviewed by the CRMO and further wetland losses should be

avoided as much as feasible. Consideration for wetland impacts should be focused on only those wetlands designated as having low functional values. To offset any wetland impacts adequate mitigation measures must be required to ensure that a policy of "no net loss" in wetland resource values is maintained. This can be assured through compliance with the CRMO and federal permit processes that first must try to avoid wetland impacts, second, minimize impacts, and finally, mandate mitigation for all wetland losses that are permitted.

5.2 WETLAND DESIGNATOR CLASSES

A crucial part of the proposed management plan was the designation of each wetland area into one of four categories based on the combined rankings of individual wetland characteristics (see Section 4). The development and use of these four categories makes the generalized resource balance between development and preservation more specific both in terms of resource suitability and in terms of the spatial distribution of the wetlands. The categories also allow the integration of the ACOE Section 404 permit program with this management plan, thereby minimizing duplication of effort between regulatory agencies and allowing for a smoother, more expeditious, and more practical permit process.

Wetlands have been assigned to classes based on their overall functional value; class descriptions are as follows:

Class III – Wetlands assigned to this class possess multiple characteristics that were ranked as high value and were assessed to perform critical functions or have critical values that require preservation and protection. Class III wetlands should generally be preserved and the only exceptions would be to allow those activities that further enhance, restore, or preserve the natural character of the wetlands.

Class II – Wetlands assigned to Class II ranked high on relatively fewer of the characteristics that were analyzed, and were generally less pristine, less diverse, and more isolated by adjacent or near development. Wetlands within this class warrant conservation to deter the further degradation of the habitat and are suitable for enhancement to regain characteristics that may have been lost. The key to this category is the management of the areas to maintain the natural wetlands integrity and intrinsic functions, as much as practical, while allowing certain carefully controlled uses to occur. Because many of the wetlands assigned to this class are suitable for habitat enhancement, they need to be evaluated as

potential mitigation sites for the loss of Class I wetlands. Detailed agency and public review and preparation of an alternatives analysis for any proposed modification of a wetland within Class II or the loss of any wetland may be required prior to the issuance of permits and to assure compliance with the Section 404 (b) (1) Guidelines. Avoidance of wetland impacts must be stressed and the "sequenced" evaluation of project impacts; i.e., avoidance of wetland impacts followed by minimization of wetland impacts, and finally, full mitigation of unavoidable impacts, as discussed in Section 3.1, must be adhered to. Any allowable impacts to wetlands must be adequately mitigated so that there is no net loss in wetland resource values. The CRMO may impose additional conditions on the permitting of activities in wetland areas within Class II beyond those that result from the ACOE regulatory process to assure further the long-term maintenance of wetlands throughout Saipan.

Class I – Wetland areas that meet the legal definition of wetlands, but lack the intrinsic biological and/or physical functions that justify their conservation or preservation in all situations. A balanced approach must be taken to protect valuable wetland areas while providing for orderly community growth. Because of the relatively lower biological value of wetlands within Class I, strict preservation may not be in the best interest of this resource on Saipan. However, this category should not be interpreted as wetlands that automatically will be developed. Mitigation measures would still be required for activities that acquire permits through the regulatory processes. The large range of wetlands within Class I will warrant a case-by-case assessment of impacts and mitigation requirements.

Special Study – This category includes potential wetland areas that were not able to be evaluated during this study's field effort including some areas identified as potential wetlands by previous studies. Most of the known potential areas not surveyed during this study are small and are widely dispersed from other known wetlands. Additional assessment will be required to determine the status of these areas. In the interim, these areas are included on the revised APC wetlands map. Wetlands that are yet to be identified (or wetlands that may develop in the future) will also require special study to determine their value. A biological assessment of these areas would be required for any proposed development project. Existing ACOE and CRMO regulatory review will apply to special study areas determined to be legally defined wetlands per the Unified Federal Method.

5.3 WETLANDS MANAGEMENT PLAN GOAL AND OBJECTIVES

The goal of the Wetlands Management Plan is to identify, classify, and prioritize Saipan wetland habitat for preservation and conservation to maintain a policy of no net loss in wetland resource values. The Wetlands Management Plan must attain several objectives. The objectives incorporate the legal constraints to wetlands management as well as the necessary balance between wetlands preservation and development. Each objective is summarized below:

Legal Objective – The Wetlands Management Plan must comply with all Federal and CNMI laws and regulations. Pertinent laws include Clean Water Act (Section 404); Rivers and Harbor Act (Section 10); Coastal Zone Management Act; Endangered Species Act (Section 7); Emergency Wetlands Resources Act; Water Resources Development Act; Food Security Act; Coastal Resources Management Act; Fish, Game, Endangered Species Act; Environmental Protection Act; Executive Order 11990 (Protection of Wetlands); and the Fish and Wildlife Coordination Act.

Land Use Objective – The Wetlands Management Plan is compatible with the goals, objectives, and policies of the CNMI Master Land Use Plan and the CNMI Zoning Plan. Conflicts may arise when wetlands are planned or zoned for development without adequate information on the resulting biological impacts of such planning decisions. Planning and zoning designations should be consistent with the CNMI policy of no net loss in wetland resource values. This acknowledges that while some wetland areas will unavoidably be lost to development needs, mitigative measures must be detailed, evaluated, and monitored to assure a net gain for the resource. Wetland areas that have been assigned to Class I are biologically less valuable than wetlands in classes III or II. Planning or zoning for future development must consider these class designations and realize that regardless of the wetland value, development is not automatic, proposed development must comply with the regulatory processes, and mitigation for any loss of wetland resources will be required.

Administrative Objective – The Wetlands Management Plan can be administered and enforced by CNMI agencies through their various mandates and permitting programs that are designed to conserve natural resources under their respective jurisdictions. The CRMO regulates activities within Areas of Particular Concern (APC) which includes all wetlands identified by this study. The Division of Fish and Wildlife has authority to designate

"critical habitat" for threatened or endangered species, such as the Mariana common moorhen. The Division of Environmental Quality regulates water quality related issues which often involves potential impacts to wetlands. The Mariana Public Lands Corporation has authority to implement a land exchange program to acquire privately owned wetlands, but it is unclear how wetlands are to be managed once they are in public ownership.

Development Objective – The Wetlands Management Plan reduces the uncertainty in the permitting process. The plan provides clear identification and evaluation of each wetland area's value and preferred disposition. It gives guidance as to which wetland areas may be permittable for what uses and with what mitigation.

Resource Use Objective – The Wetlands Management Plan allows for a balance between preservation and development by identifying each wetland's value and provides for an adequate mitigation program for future proposed wetland impacts that may be issued permits while still maintaining the policy of no net loss in wetland resource values.

Resource Protection Objective – The Wetlands Management Plan provides for the full protection of those wetlands with numerous high ranking characteristics in Class III. Wetlands within Class II will be conserved and enhanced to the greatest extent possible. Wetlands within Class I must also be given full regulatory protection and proposed impacts may be considered permittable only after all other options have been exhausted. Requiring mitigation for impacts to wetland habitat maintains the policy of no net loss in wetland resource values.

5.4 Recommended Wetlands Management Plan

The recommended Wetlands Management Plan was developed through the site-specific analysis of wetland resource evaluation and the assignment of each wetland area to a class of wetlands as discussed above. Table 5-1 summarizes the class designations and recommended management strategy for each wetland area. Each of the management strategies is discussed further in Section 6. Figure 5-1 indicates the approximate spatial boundaries and identifies the classifications for wetlands under the plan. Because of the scale of the comprehensive map, it is not intended to be used in the legal delineation of any wetlands. A formal wetlands delineation study for each wetlands site proposed for development must utilize both a large-scale (e.g., 1"= 40') map to plot accurately the

Table 5-1

VALUE DESIGNATIONS AND MANAGEMENT STRATEGIES FOR THE FRESHWATER WETLANDS OF SAIPAN

Site ID	Site Location	Class Designation	Ownership	Management Strategy[1]
L1	Lake Susupe	III	Public	A,B,C,D
R6	Talafofo River	III	Public/Private	C
E1	Sadog Tase mangroves	III	Public	B,C,D
P4	San Roque	III	Private	B,C,D
P6	Tanapag	III	Public	B,C,D
P7	Tanapag Lower Base east of road	III	Public	B,C,D
P9	South Lower Base	III	Private	B,C,D
P11	Sadog Tase freshwater	III	Public	B,C,D
P12	American Memorial Park edge	III	Public	B,C,D
P13	American Memorial Park interior	III	Public	B,C,D
P18	Kagman north	III	Public	B,C,D
P19	Kagman	III	Public	
P21	Chalan Laolao	III	Public	A,B,C,D
(P22)	South Chalan Laolao farm site	III	Private	C
P26	North Susupe area	III	Public/Private	A,B,C,D
P27	North of Lake Susupe	III	Public/Private	A,B,C,D
P28	Northwest Lake Susupe area	III	Public/Private	A,B,C,D
P29	South Susupe	III	Public/Private	A,B,C,D
P30	South Susupe area - North San Antonio	III	Private	A,B,C,D
P34	Flores Pond-southwest San Vicente	III	Private	B,C,D
P35	Hoyan as Lito Kattan	III	Private	B,C,D
P8	Lower Base west of road	II	Public/Private	B,C,D
P22	Chalan Laolao	II	Public/Private	B,C,D
P24	San Jose (golf course)	II	Private	C
P25	Northeast Lake Susupe area	II	Private	C
R1	Northeast Marpi	I		
R2	Northwest Marpi	I		
R3	San Roque/Nikko	I		

Table 5-1 (Continued)

VALUE DESIGNATIONS AND MANAGEMENT STRATEGIES FOR THE FRESHWATER WETLANDS OF SAIPAN

Site ID	Site Location	Class Designation	Ownership	Management Strategy[1]
R4	San Roque	I		
R5	North Tanapag	I		
R7	South San Antonio	I		
P5	Aqua Resort Club	I	Private	
P10	Iler Base (Near OCK warehouse)	I	Private	
P14	South Garapan (cul-de-sac)	I	Public/Private	
P20	Golf course	I	Private	
P23	Chalan Laolao next to golf course	I	Private	
P31	Susupe area - Saipan Grand Hotel	I	Private	
P32	East of Susupe area	I	Private	
P33	Southwest San Vicente	I		
P36	As Lito north of airport	I	Public/Private	
P1	San Roque	Non-wet		
P2/P3	San Roque	Non-wet		
P15	Southwest Talafofo	Non-wet		
P16	Northeast of Mt. Takpochao	Non-wet		
P17	East of Mt. Takpochao	Non-wet		
P37	As Perdido north of airport	Non-wet		

[1] A - Master Plan Land Exchange
B - Zoning
C - Buffers
D - Acquisition

The objective of the buffer concept is to allow for an expanded range of uses while placing strict controls over the indirect impacts associated with development adjacent to sensitive wetlands. A minimum buffer of 50 feet is recommended for all preserved/conserved wetlands; however, Class III wetlands will require a much larger buffer (minimum = 100 feet).

D. Acquisition and Related Techniques - Both public and private wetland acquisition programs can be initiated. As previously mentioned, the MPLC Land Exchange Program could assign a high priority to the acquisition of privately held Class III wetlands. Any acquisition program should prioritize the acquisition of Class III wetlands that are contiguous to existing protected wetlands or other natural open space. Philanthropic and environmental organizations, such as The Nature Conservancy and the National Trust for Historic Preservation, have been active users of perpetual or term-negative easements for wetland preservation. Acquisition funds for wetlands may be obtained under Section 306A of the CZMA. The USFWS under various Acts can acquire lands having important natural resources using such programs as the Migratory Bird Conservation Fund and the Land and Water Conservation Fund. Acquisition funds may also be available from the USEPA Office of Wetlands Protection.

Conservation easements involve the use of easements or rights of trespass or other partial uses of the land, with the land remaining in private ownership. This technique is employed where less than full rights to the property are required and results in an acquisition at less than the full land purchase cost. The use of this technique is particularly suitable in areas where adjoining development is not expected or not anticipated to be intense.

6.3 Plan Implementation

Existing management agencies can institute the Wetland Management Plan through existing authorizations. The Plan formalizes the policies of each agency that will need to be implemented to achieve the goals of the Plan. Some substantive changes in management structure or institutional arrangements are required to implement the Plan. Agencies need to coordinate with each other and must be consistent between proposed projects in the application of the Plan. The following changes in policy and regulation are recommended:

- The CRMO shall be responsible for the implementation of the Wetland Management Plan and for regulation of proposed projects that impact APC wetlands. This includes the review of proposed mitigation plans. CRMO shall also determine appropriate buffers for APC wetlands. CRMO should formally adopt changes in the Wetland and Mangrove APC maps and use priorities and make appropriate changes in the CRMO regulations. All wetland areas, regardless of quality, should be included in the CRMO APC.

- All wetland delineations should be made either by a professional biologist approved by CRMO and DEQ or by consensus of the ACOE, DFW, and CRMO. CNMI resource agencies should have designated staff people trained in wetland delineation techniques.

- The DFW shall designate and manage appropriate "critical habitat" for the Mariana common moorhen. The DFW should also consider designating all high quality wetland areas critical habitat.

- The DEQ shall regulate water quality issues through the 401 water certification process so that wetlands are not degraded or indirectly impacted by development within the wetland drainage system. Wetlands should be included in the definition of waters subject to the 401 water quality certification.

- The MPLC (or its successor) shall clarify the wetland exchange program. MPLC should establish a priority acquisition policy which provides priority for high quality wetland acquisition, followed by medium and then low. MPLC should work with CRMO and DFW in implementing wetland exchanges. Once wetlands become public property, MPLC should transfer ownership and management to DNR for long-term protection and management. MPLC should coordinate its public land leasing program to ensure that no wetland areas under public ownership are leased for incompatible uses.

- The CNMI Zoning Office shall apply appropriate performance zoning standards, including buffer zones necessary to preserve all wetlands areas. Efforts should be made to integrate revised wetland APC maps into the zoning office's GIS system.

- The ACOE shall continue to administer Section 404 permits, but should examine the possibility of abolishing the applicability of the nationwide permit in the CNMI based on critical habitat concerns. The ACOE should coordinate all permit decisions with CRMO and DFW.

6.4 PLAN REVIEW

This Wetlands Management Plan is intended to represent a broad policy towards wetlands management on Saipan. It was developed around existing legal constraints, federal wetlands programs and community attitudes. These parameters are expected to change over time. For this reason, it is necessary to establish a process for plan review and reevaluation. Because review need not necessarily result in the complete revision of the Plan, two levels of effort are identified:

- *Plan Reevaluation.* A reevaluation of the major trends and/or policies of the Wetlands Management Plan must occur five years from its initial adoption. If major deviations from those anticipated actions in the initial Plan are not identified, then a complete revision of the Plan is not required. If major discrepancies are noted in this reevaluation, a revision of the plan is warranted and shall be initiated.

- *Plan Revision.* The Plan must be reviewed and revised at least once every ten years.

SECTION 7
MITIGATION CONSIDERATIONS

Mitigation for proposed impacts to sensitive resources is a relatively new concept. Much is at stake when mitigation plans are proposed, much can be learned, and success is critical. Unfortunately, some mitigation policies and implementation procedures have contributed to the problem, rather than the solution, i.e., through poor design, use of inappropriate species, or lack of mitigation enforcement (long-term monitoring, timely remedial actions, achievement of pre-determined performance criteria). Recent and projected growth rates throughout Saipan (Dueñas and Swavely 1989) mandate that development and conservation coexist. Therefore, existing mitigation policies must be continually critiqued for their adequacy, and the mitigation alternative must not be viewed as a license to develop.

For Saipan, avoidance of wetland impacts is preferred to mitigation. The mitigation alterative will only be considered after comprehensive sequencing and a detailed alternatives analysis. When mitigation is appropriate, the governing agencies can minimize problems in mitigation programs by providing their own basic mitigation standards and guidelines. The

government should also prepare guidelines to be used during the planning phase of development so that resource impacts and the resulting need for mitigation is avoided or minimized. A specially assigned committee within the CRMO should be formed to integrate the goals of planning and conservation, oversee the process, and have the authority to ensure that mitigation agreements are implemented as per the appropriate permit conditions.

7.1 Avoidance and Minimization of Impacts

While all proposed wetland impacts require regulatory review, in general, impacts to Class III wetlands must be avoided, and proposed impacts to Class II sites should be avoided as much as is practicable. Class I wetlands are not automatically developable, but because of their lower biological value, absolute preservation may not be recommended after a case-by-case review. Constraints level analyses of development sites should be conducted prior to detailed development planning in order to curtail development designs that are in direct conflict with wetland resources. Unfortunately, the reverse is too often the case. Projects are often designed with little knowledge or consideration of the natural resources that are present and the subsequent conflict with existing site conditions leads to project delays, the need for project redesign, and a potentially cumbersome permitting process. Identification and delineation of the wetland constraints on a project site should be viewed as an aid to development planning and not the battle after project design.

In evaluating permit applications, the CRMO must determine the following:

1) that potential impacts to wetlands have been avoided to the maximum extent practicable,

2) that remaining unavoidable impacts are minimized to the extent appropriate and practicable, and

3) that the final impacts to wetlands are offset by commensurate compensatory mitigation.

7.2 MITIGATION ALTERNATIVES

Goal of Compensatory Wetland Mitigation

The goal of compensatory mitigation is to restore and maintain the chemical, physical and biological integrity of a naturally occurring wetland. Restored or created wetlands should be designed to replace all the ecological functions provided by the wetlands being destroyed such as wildlife habitat, water quality, flood storage, and groundwater recharge. Monitoring of restoration sites is essential to demonstrate creation of a fully functional and compensatory wetland system.

Preparation and Evaluation of Mitigation Plans

Preparation of mitigation plans is an exceedingly complex task. Agencies are often forced to make difficult decisions based upon little specific information concerning expected or actual success probabilities to achieve the full functions of created wetland systems. While CRMO personnel should guide applicants through the process of plan preparation, the design and responsibility of assuring success is completely on the applicant and his technical consultants. The initial input by agencies is limited to generic considerations pertaining to community type, site suitability, and required size.

The complexity of preparing mitigation plans is due to the plethora of options concerning factors such as availability of plant materials, compatibility of stock material with local populations and environmental conditions. Handling of plant material, planting schemes and schedules, slopes, irrigation, water depth, water quality, soils, and fertilization rates are other parameters that need to be considered. The types of issues that should be included in a site-specific detailed mitigation plan are outlined in Table 7-1. Good intentions alone do not assure mitigation success. Development of mitigation plans and implementation of wetland restoration must be performed by a qualified environmental consultant who is familiar with the specific wetland community requiring replacement.

Currently there are no certification or registration programs for mitigation specialists. Thus, it is important that applicants examine the credentials of companies or individuals who may bid on compensatory mitigation projects. Choice of capable environmental scientists with regional knowledge would reduce the frequency of mitigation projects that fail due to improper planning, design, implementation, and/or monitoring.

Table 7-1

OUTLINE OF A DETAILED MITIGATION PLAN

1.0 INTRODUCTION AND PURPOSE
- a) project description
- b) biological impacts
- c) mitigation requirements and proposed mitigation areas

2.0 CONCEPTUAL DESIGN
- a) # acres of each vegetation type before and after project
- b) runoff/groundwater considerations
- c) soils, slope, and aspect considerations
- d) selection of plant materials and species placement
- e) responsibility and implementation
- f) schedule for installation
- g) requirement for formal landscape plans

3.0 CONSTRUCTION MONITORING
- a) qualifications of monitor
- b) contractor education
- c) construction timing
- d) site protection
- e) site preparation/grading supervision
- f) general irrigation, planting, and hydroseeding supervision

4.0 MAINTENANCE PROGRAM
- a) schedule/frequency
- b) thinning, clearing
- c) weed/pest control
- d) irrigation and fertilization
- e) dead-plant replacement and re-hydroseeding
- f) access
- g) trash removal
- h) long-term management/maintenance

5.0 MONITORING PROGRAM
- a) schedule and purpose
- b) types of monitoring: botanical and horticultural
- c) qualifications of monitor
- d) status reports
- e) survival/growth evaluations via transect/quadrat measurements and horticultural assessment
- f) success criteria
- g) erosion control
- h) remedial measures and replacement

6.0 OPEN SPACE DEDICATION

7.0 PERFORMANCE BOND

Preparation and implementation of detailed mitigation plans should be included as conditions of approval on final maps and/or construction and grading permits.

Types of Compensatory Mitigation

There are three basic types of compensatory mitigation available to replace wetlands lost to development: restoration, creation, and enhancement. Restoration refers to the reestablishment of a wetland in an area where it historically existed. Typically wetland soils remain extant at disturbed sites, but they might be drained, oxidized, or buried. Wetland creation refers to the construction of a wetland in an area which was not a wetland in the recent past. Wetland enhancement involves increasing the functional value of an existing wetland that may be partially degraded. Enhancement sites differ from restoration sites because they already provide some wetland resource value.

The choice of restoration, creation, or enhancement mitigation for any project depends upon the site-specific characteristics of the wetlands being lost and of the proposed mitigation sites available. Priority should be given to restoration of historic wetland areas that are adjacent to extant wetland areas. Enhancement of wetlands in the Moderate Value category should be second priority. Wetland creation is prioritized third since the probability of success is lowest for this type of mitigation. Wetland creation will not normally be considered an option.

The least desirable mitigation option is wetland exchange where wetland losses at one site are mitigated by purchase and preservation of other wetlands offsite. Wetland exchange should not normally be considered compensatory mitigation for unavoidable wetland losses since there is a net loss of wetland resource value. Circumstances that justify wetland exchange should be limited to projects where environmental impacts to wetland resources are very minimal and the benefits of placement of a large area of Class I wetlands into the Public Trust are great.

Compensatory Mitigation

The costs of habitat enhancement, restoration, or creation are related to the resource that will be impacted. The loss of most wetlands will generally dictate a compensation ratio greater than 1:1 for the area of impact. Occupied moorhen habitat, because of the presence

of the federally-listed endangered bird species and the paucity of suitable areas on Saipan, may not be considered mitigable. Mitigation via preservation of similar, offsite habitat frequently requires similarly high compensation ratios because of the net loss of habitat onsite that would result. Although the goal of "no net loss" should be a guiding principle behind mitigation of sensitive habitats, the CRMO should note that an acreage-for-acreage solution or in-kind replacement is not always the most appropriate approach for the resource or ecosystem; habitat values must be considered. Impacts to the disturbed wetlands on Saipan, for instance, should not necessarily be mitigated with in-kind replacement; replacement of higher quality habitat, even if in a smaller area, may actually realize a net gain in habitat quality and wildlife values. This type of balancing of impacts and gains must be handled by qualified persons. It is imperative that CRMO staff have the necessary experience and training to make the most responsible biological decisions.

Bonding

For the loss of sensitive resources, development may be able to proceed while habitat replacement is in progress; however, bond funds should be required to ensure the ultimate success of the mitigation. Should the project not meet the original goals, failure may need to be acknowledged at that particular site, but the bond monies can be used for preservation of similar habitat offsite. This, of course, does not diminish the cumulative loss of the habitat on Saipan. Mitigation projects should be evaluated on a frequent basis to detect and correct problems before they compound and lead to mitigation failure. A fraction of the bond should be at stake each year to enforce annual goals, and compel permittees to fulfill their obligations. The CNMI Government must continue to evaluate the results of these programs to determine the effectiveness of this type of mitigation.

Research

Scientific research may be an appropriate component of the proposed mitigation for many sites. All research projects should lead to a better understanding of the processes that affect wetland ecosystems or hydrological regimes. Research results should also lead to improved techniques for the protection or restoration of wetlands or the protection of wetland-dependent wildlife. In particular, research projects that are responsive to the management concerns should be encouraged. This may include various studies on the Mariana common moorhen or restoration studies that address invasive plant species removal. Research studies that build on and make effective use of past research or address

data gaps should be encouraged, and mechanisms whereby independent research efforts can be coordinated should be attempted.

CRMO and DFW have permitted an experimental wetland mitigation project at the NANSAY resort in San Roque. This is the first experience with mitigation in the CNMI and will be monitored closely. Approval of this project should not be considered a precedent.

Education

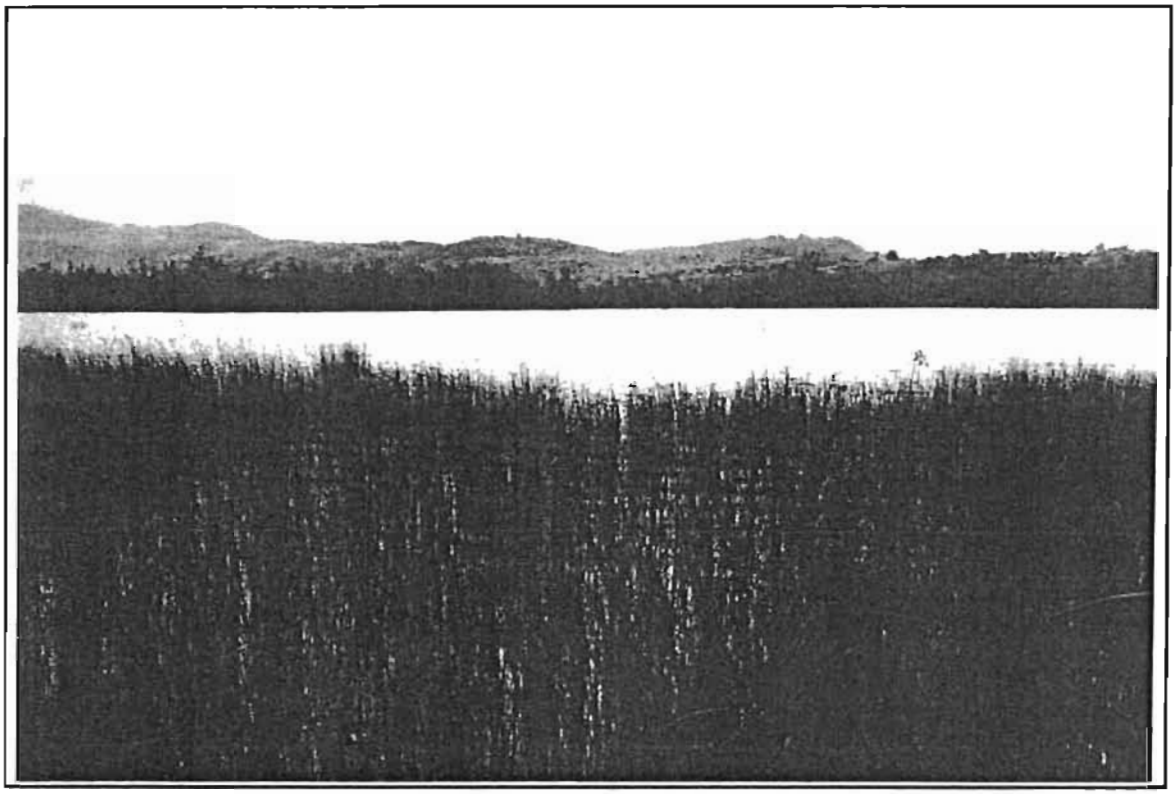
Public information programs are crucial to the preservation of sensitive resources. All programs can expand the public's awareness of natural resources, foster appreciation of native species, and promote natural settings as amenities. Properly presented, information can both enthuse and spark appreciation for fragile resources. Effective public communication will depend on a series of interpretive publications and personal contact. Interpretive trails and overlooks should be incorporated where appropriate. Restoration projects are valuable ongoing learning forums for the public and could be both protected and publicized in interpretive signage at the site.

Monitoring and Maintenance

To minimize the risks to both the resource and the developer, monitoring and maintenance programs should be implemented as part of each mitigation plan. There are several objectives of a well-designed monitoring program: 1) during construction of the project, to insure protection of wetlands identified for preservation, 2) to insure proper implementation of the mitigation plan, 3) to insure adequate maintenance of the mitigation area, 4) to assess success of the mitigation effort, and 5) to document the mitigation effort in the form of regular written reports.

A long-term (3-5 years) monitoring and maintenance program should be included as part of the site-specific detailed wetlands mitigation plan (Table 7-1). Written progress reports should be submitted to the CRMO on a regular basis, as specified in the plan. A standard requirement of a monitoring program must be a multi-disciplinary approach in order to gain a solid understanding of the resource and its ecological requirements. A team of consultants which includes a qualified biologist, ecologist, botanist, zoologist, and/or native plant horticulturist may be necessary for some projects. Restoration practices must

use scientific approaches. Only when the restoration and monitoring incorporate scientific and experimental procedures, including long-term evaluation, of both floral and faunal populations, can both the successes and failures of past studies be understood and provide guidance for future studies.



SECTION 8
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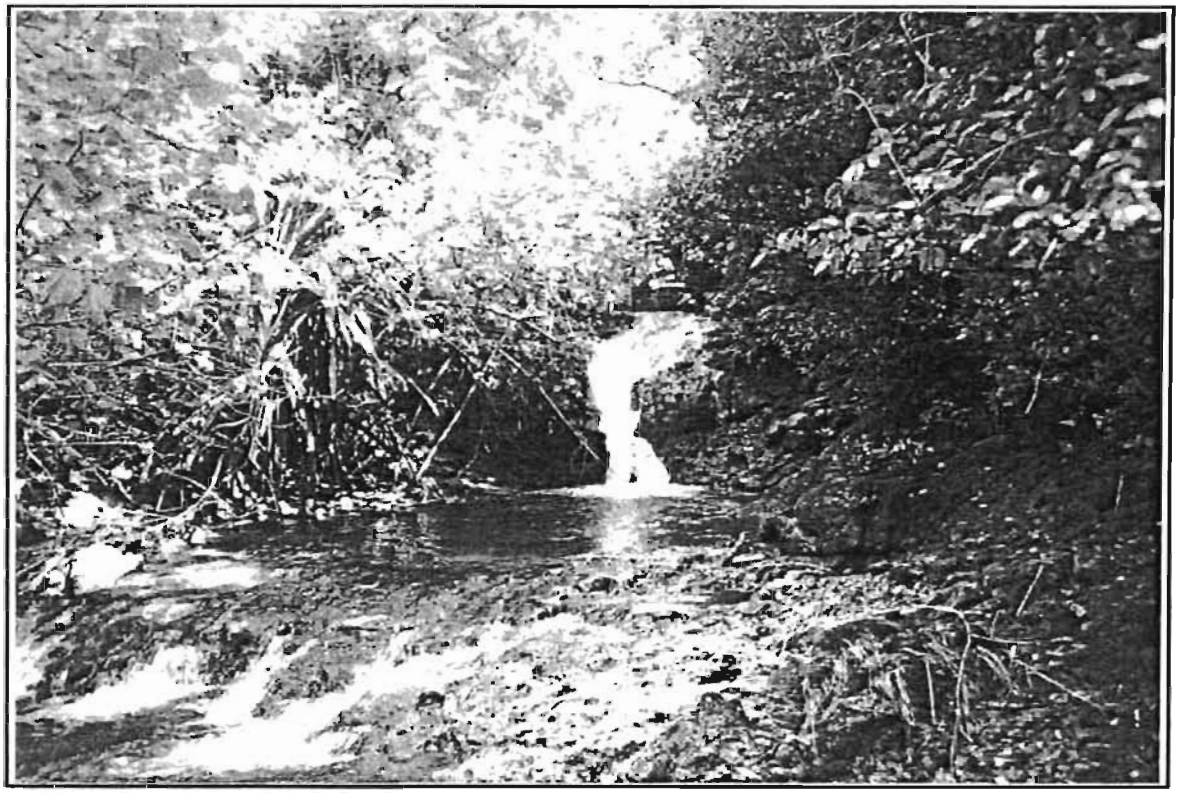


SECTION 9
REPORT PREPARERS

Patrick Mock, Ph.D. - Project Manager, Project Zoologist

Dr. Mock obtained his Ph.D. in Biology and is Technical Director of Individual Studies in ERCE's Biological Resources Group. He has over 10 years professional experience as a research biologist and environmental consultant and has extensive experience in impact analysis, mitigation planning, wetland delineation, and the evaluation of wetlands in relation to wildlife values and endangered animals.

Paula Jacks, M.S. - Senior Biologist, Wetlands Specialist and Permitting/Regulatory Compliance

Ms. Jacks is a senior biologist and permitting specialist in ERCE's Biological Resources Group, with 4 years of professional experience as an environmental consultant and an additional 7 years as a research ecologist. She has extensive experience in sensitive habitat

identification and delineation with an emphasis in wetland systems that includes a detailed field course in the Unified Federal Method for Wetland Delineation for the jurisdictional determination of wetlands. Additional experience includes the evaluation and classification of wetlands based on the standard methodology, the identification of wetland preservation areas, regulatory and permitting requirements, and development of wetland mitigation and management policies.

Evangeline J. Funk, Ph.D. - Senior Biologist, Project Botanist

Dr. Funk received her Ph.D. from the University of Hawaii in 1988. She has extensive experience in botanical research, field botany, and in botanical consultation. She has worked in the areas of wetland delineation, wetland weed proliferation, and wetland indicator species identification on both private and government projects. Her work has included identification of wetland indicator species and their distribution, the proliferation or demise of wetland weeds and investigations into the presence of all wetland delineation criteria (soils, standing water, and plants).

John Porteous, M.A. - Project Advisor

Mr. Porteous is Manager of ERCE's Pacific Operations Environmental Management and Assessment Group. He is a senior project manager with more than 10 years of experience in the environmental planning field.

APPENDIX A

WETLAND HABITAT FIELD INDICATORS

APPENDIX A
WETLAND HABITAT FIELD INDICATORS

Field indicators and other information provide direct and indirect evidence for determining whether or not each of the three criteria are met. Use professional judgement in interpreting these data to make a wetland determination. Exceptional and rare cases are possibilities that may occur. An indicator which is highly placed on a list is more important than one which is lower on that list. The second indicator on a list will always supersede the fourth, for example. The federal manual for identifying and delineating jurisdictional wetlands should be consulted for further discussion on both the mandatory technical criteria and the following field indicators for wetland identification.

HYDROPHYTIC VEGETATION

1. Obligate (OBL) wetland species comprise all dominants in community (no detailed examination of soils and hydrology necessary if significant hydrological modifications are not evident);

2. >50% of dominants of all strata are OBL, facultative wetland (FACW), or facultative (FAC) species (including FACW+, FACW, FAC+, and FAC); or

3. A plant community has a visually estimated percent coverage of OBL and FACW species that exceed the coverage of facultative upland (FACU) and upland (UPL) species (FAC is considered neutral); or

4. Frequency analysis of all species within community = prevalence index value of <3.0; or

5. When a community has >25% and ≤ 50% of dominants from all strata represented by OBL, FACW, and/or FAC species, or a frequency analysis for all species within the community yields a prevalence index value ≥ 3.0, and hydric soils and hydrology are present.

HYDRIC SOILS

Any one of the following may indicate that hydric soils are present:

1. Organic Soils. All organic soils except folists are hydric (check the soil mapping for the site, i.e., USDA-SCS).

2. Histic epipedons (8-16 inch organic surface layer). This layer only forms under conditions where the inundation or saturation period is 30 days or more/year. If this layer is present, the soil is hydric.

3. Sulfidic material. Rotten egg smell. Such odors are only detected in waterlogged soils; sulfides are only produced in a reducing environment.

4. Aquic (soil is saturated by groundwater) or peraquic (groundwater always at or near the soil surface) moisture regime.

5. Direct observations of reducing soil conditions. Soils saturated for 7-30 days or more/year.

6. Gleyed, low chroma, and low chroma/mottled soils. Hydric mineral soils will be either gleyed or will have low chroma matrix and/or bright mottles. Gleying must be uniform. Hydric mineral soils have the following in the horizon immediately below the A-horizon:

   A. Matrix chroma of 2 or less in mottled soils, or

   B. Matrix chroma of 1 or less in unmottled soils.

   (Exceptions: mollisols; serpentine, problematic soils such as sandy soils.)

7. Iron and manganese concretions. Local concentrations of chemical compounds in the form of a grain or nodule of varying degrees of size, color, hardness. Will usually break apart when pressed (pebbles or sand grains will not). In hydric soils, concretions are usually in association with colors, above.

8. Coarse textured or sandy hydric soils. Soil color should not be used as an indicator in most sandy soils. Most of indicators above may not apply. The following 3 features can be used, however:

A. High organic matter content in the surface horizon. Mineral surface layer generally appear darker than the mineral material immediately below it (may still be difficult to distinguish from an upland site);

B. Dark vertical streaking of subsurface horizons by organic matter. When soil from a darker area is rubbed between the fingers, the dark organic matter stains the fingers;

C. Wet Spodosols. Organic material may accumulate near the most common groundwater level, and become slightly cemented with aluminum. Spodic horizons often occur at 12-30 inches below the mineral surface. Wet spodosols usually have histic epipedons, and gray E-horizons above a black spodic horizon. Not all soils with spodic horizons are hydric.

Note: Probably won't find A-C in recently deposited sandy material (i.e., sand bars); these areas will have an aquic or peraquic moisture regime, though.

WETLAND HYDROLOGY

1. Visual observation of inundation.

2. Visual observation of soil saturation. Consider preceding weather conditions; for example, may see evidence of algal mats.

3. Oxidized root channels (rhizospheres) associated with living roots and rhizomes. Some plants can carry oxygen to their roots; oxygen when reduced, forms orange, reddish-orange channel around root.

4. Water marks. Stains on bark, fixed objects, etc. Does not tell duration or frequency of flooding, only that it occurred.

5. Drift lines. Deposition of debris in a line. Indication of the minimum portion of the area inundated during a flooding event.

6. Waterborne sediment deposits. Thin layer of mineral or organic matter on vertical objects (i.e., trees).

7. Waterstained leaves.

8. Surface scoured areas. Bare areas around trees on a floodplain or absence of leaf litter. Bare areas can also occur for other reasons, though.

9. Wetland drainage patterns. Can also occur in uplands, however. Need to consider topography.

10. Morphological plant adaptations. Pneumatophores, buttressed tree trunks, multiple trunks, adventitious roots, shallow root systems, floating stems, floating leaves, polymorphic leaves, hypertrophied lenticels, inflated leaves, stems or roots, and aerenchyma (airfilled) tissue in roots and stems. Better indicators of recent wetland hydrology if occurring in young plants. Considered indicators of wetland hydrology (rather than indicators of hydrophytic vegetation) because they typically develop in response to permanent or periodic inundation or soil saturation.

11. Hydric soil characteristics. Wetland hydrology assumed to be present if no significant hydrological modifications and the area meets the hydric soils criteria (cannot determine from Hydric Soils List alone).

APPENDIX B

PROCEDURE FOR A TYPICAL WETLAND DELINEATION INVESTIGATION

APPENDIX B
PROCEDURE FOR A TYPICAL WETLAND DELINEATION INVESTIGATION

PREPARATORY FOR FIELD DELINEATION:

- Review background information for the site. This should include, as available, communication with project site property owner and neighboring property owners regarding site history, i.e., farming practices, land-clearing, fire, and grading. Research photographs, preferably aerial photographs, that can allow a comparison of the site over different seasons or over several years, or that may predate any disturbance as known.

- Check Soil Survey. Determine the presence and extent of hydric soils on the site as mapped by the Soil Conservation Service and consult the list of hydric soils as prepared by the Service for the project region (Appendix C of this document). For all soils within the property, check descriptions within the Soil Survey for possible inclusions of hydric soil that may not be mapped for the site. Determine the permeability of soils onsite and the level of the water table. Permeability and water table information derived from the Soil Survey will indicate the presence of appropriate wetland hydrology conditions onsite. Consult with the local Soil Conservation Service as needed.

- Check site topographic maps. Low elevational portions of the site and all stream channels should be surveyed in the field. The Clean Water Act governs all waters of the United States which includes wetlands; therefore, non-vegetated waters, or water courses, within the property may need to be included in the mapping of wetlands onsite. Consult with the U S. Army Corps of Engineers as needed.

- Check the National Wetlands Inventory Map and the mapping of wetlands included within this comprehensive plan. Note all previous delineations of wetlands onsite. All mappings should be used as a general reference, but must be ground-truthed in the field. Detailed wetland conditions should be mapped on a large-scale map (e.g., 1"=40' or at least 1"=100').

SITE FIELD DELINEATION

- Conduct site reconnaissance. A general site reconnaissance should be conducted prior to initiating detailed wetland mapping. General notes regarding suitable wetland conditions and appropriate vegetation cover should be made during the reconnaissance. Note disturbed or suspected problem areas; these portions of the site may warrant a more intensive investigation regarding their wetland status. Simple routine methods as described in the Unified Federal Method are appropriate for most delineations; however, disturbance or problem areas may mandate the use of the intermediate or comprehensive field methods that incorporate quantitative field techniques. The site reconnaissance will determine which method should be used.

- Note plant communities and presence of hydrophytic vegetation. Determine the wetland status of the dominant plant species for each stratum of the plant community being sampled. Consult U.S. Fish and Wildlife Service regional lists for the appropriate status for the region being sampled. For both the routine and intermediate methods, plant dominance is an estimation of the relative plant cover for each species within the plant community. Consult the manual on the Unified Federal Method for the mandatory hydrophytic vegetation criteria and field indicators (Appendix A of this document).

- Choose areas for soil investigation. Consult Unified Federal Method for mandatory hydric soil criteria and field indicators of hydric soil (see also Appendix A of this document). Select site for soil analysis and mark soil test site on map. Dig soil pit approximately 18 inches deep, Munsell soil chart reading must be taken for soil immediately below the A horizon. Read a freshly broken soil face from below the A horizon. Select soil clod ("ped") and break in half to obtain a fresh soil face versus the smeared or rubbed exterior. Read soil that is moist, may have to moisten soil to compare to soil chips in Munsell chart. Note field indicators and whether hydric soil criterion is met. Record results and site number to correspond to site on map. Note: soil conditions can change from conditions mapped in the Soil Survey. In particular, past fill on the site may mask the hydric soils beneath the fill, or hydrologic changes may now support wetlands in areas where the soils have yet to develop hydric field indicators.

- Note site topography and presence of appropriate wetland hydrology. Is soil saturated to the surface or is water seeping into the soil pit? Consult Unified Federal Method for mandatory wetland hydrology criteria and field indicators of wetland hydrology (see also Appendix A of this document).

- Complete appropriate data form for all three wetland criteria. Data forms for either Routine, Intermediate, or Comprehensive delineations must be completed and included as a part of the biological investigation for the project site. A separate form is required for all areas within the site that are analyzed. Consult the manual of the Unified Federal Method to determine which form is appropriate and for copies of the forms (see also Appendix E).

- Map the wetlands on the site. Determine the wetland-nonwetland boundaries for the site and map on a large-scale topographic map. Wetland perimeter generally follows contour interval, complete mapping using analyzed boundary points connected by appropriate contour lines.

APPENDIX C

HYDRIC SOIL MAP UNIT LIST
COMMONWEALTH OF NORTHERN MARIANA ISLANDS

APPENDIX C
HYDRIC SOIL MAP UNIT LIST
COMMONWEALTH OF NORTHERN MARIANNA ISLANDS
MAY 1990

Map Symbol	Soil Map Unit	Hydric Component	Landscape Position	Additional Items
41	Mesei Variant Muck, 0 to 2 percent slopes	Mesei Variant	Depressions	a, b
	THE MAP UNITS BELOW HAVE SMALL INCLUDED AREAS THAT MEET THE CRITERIA FOR HYDRIC SOILS.			
9	Chacha clay, drained, 0 to 5 percent slopes	c	d	
25	Inarajan clay, 0 to 25 percent slopes	c	d	
26	Kagman clay, 0 to 5 percent slopes	c	d	
27	Kagman clay 5 to 15 percent slopes	c	d	
31	Laolao clay, 5 to 15 percent slopes	c	d	
43	Saipan clay, 0 to 5 percent slopes	c	d	

[a]Hydric because of saturation due to water table at or near the surface.

[b]Is seasonally flooded or ponded.

[c]Inclusions of hydric soils only where (1) depth of water table is less than 0.5 feet, (2) ponding occurs for long or very long duration, or (3) flooding occurs frequently for long or very long duration.

[d]Depressions and low positions near streams and ponds.

Source: USDA Soil Conservation Service 1990.

APPENDIX D

SITE DESCRIPTIONS OF THE FRESHWATER WETLANDS OF SAIPAN

APPENDIX D
SITE DESCRIPTIONS OF THE FRESHWATER WETLANDS ON SAIPAN

P-1 is located near the town of San Roque. It is a manmade pit that at one time was lined with a waterproof membrane in an effort to create a water storage reservoir. It has fallen into disuse and the membrane is slipping. The pit could be filled. The surrounding vegetation is principally tangan-tangan.

P-2 and P-3 are no longer to be found. These small areas have evidently been filled and cannot be considered as wetlands.

P-4 is a large karisu marsh. It is divided by the coast highway and extends seaward almost to the beach. At the sea shore the karisu gives way to some pago and niyog trees. Recent impacts have also occurred near the northern portion of this site. Except for occasional clumps of tangan-tangan shrubs, P-4 is a solid mass of karisu.

P-5 was made up of two small sites, one on either side of the coastal highway. They are just south of the town of San Roque. Except for a small remnant of karisu, the wetland vegetation is gone. At some time fill was deposited in both sites. There is now some kamachile (*Pithecellobium dulce*) coming in as well as tangan-tangan. The area which may have been wetland is now filled with a dense stand of a vegetative grass.

P-6 is a karisu wetland through which the coastal highway passes. It is an almost pure stand of this large reed which flourishes on both sides of the highway.

P-7 is a disturbed wetland although moorhen use has been detected at this site. It is located along the east side of the coast highway and only about one third of the marsh area still supports wetland vegetation. There is a broad band of karisu which extends inland for about 100 feet. Further inland the land has been cleared for pig pens and pasture. The big, rambling weeds, mile-a-minute-vine (*Mikania scandens*) and *Eupatorium odoratum* are invading the pastures. Tangan-tangan and other weed trees form the upland vegetation border.

P-8 is a badly contaminated wetland. The site was used as a tank farm by the U.S. Navy. Aside from the interior disturbance, there is still an extensive pago forest on the ocean side of the site and a karisu marsh near the highway. Suni is being farmed in a paddy culture on

the cleared, central part of the property. Fill was being dumped in an effort to put a road through the standing water under the gagu trees in the southern part of the parcel. The vegetation cover also contained tangan-tangan and a number of weedy species such as atmagosa halumtano (*Momordica charantia*).

P-9 is a dense stand of karisu with a small, open water pond within. There is some kangkun (*Ipomoea aquatica*) growing in the pond. The pond has recently been dredged and the dredge spoil has been formed into small islands in the pond. The dredging at this site was a mitigation measure for wetland impacts elsewhere on the island. Water birds were heard at this site, but were not clearly identified.

P-10 is a special case. It was recommended as a site the team should inspect by ACOE personnel. The site was being filled. Ninety-five percent of the narrow band of vegetation remaining around the site was karisu, an obligate wetland species, along with a variety of sedges in low numbers. There were some weedy vines and grasses at the fringes. The position of the site surveyed, and undoubtedly all of the larger area to the south and east between sites P-9 and P-11, was once an extensive wetland. This area is also consistently used by moorhens.

P-11 is the fresh water component mentioned in the description of site E-1. This part of the wetland is above the influence of the high tide. The pago trees appear to tolerate brackish conditions and link the estuary to the karisu wetland. Inland from the karisu is found the big grass, elephant grass. The upland vegetation is tangan-tangan.

P-12 is a site in the southern portion of the American Memorial Park. It is an area that has been filled or used as a land fill. The species diversity is great in this part of the park, but obligate wetland vegetation is lacking. In the central part of the park there is some standing water and pago trees. Large nonak (*Hernandia sonora*), kamachile, and banalo trees are common as are many ferns and weedy plants such as tangan-tangan.

P-13 is also a site in American Memorial Park. This site is farther north and is a beautiful, ethereal wetland with standing water, orchids, ferns, and mangroves. The giant swamp fern, langayao, is the principal and only ground cover in most of the swamp while 40 to 50 foot tall mangle (*Burguiera gymnorrhiza*) trees with their bright, red flowers and gnarled pneumatophores make up the canopy. In this part of the swamp the water was one

to two feet deep and dark sepia in color. Pago, nonak, *Pandanus* spp., tronkon atbot, and kamachile trees and a rich variety of grasses, herbs, and shrubs surround the swamp.

P-14 surrounds a cul-de-sac between a housing development and the highway. This isolated wetland supports a variety of obligate wetland plants including kangkun, *Cyperus alternifolius*, titmo (*Ludwigia octovalis*) *Scirpus littoralis* var. *capensis*, and *Pluchia indica*. Here again, *Sesbania cannabina* is growing like an obligate wetland plant. Gagu, niyog, and tangan-tangan surround this open water site.

P-15 is not a wetland and has been excluded from the mapping for the island. It is part of the southwestern Talafofo watershed area. The chief emergent vegetation is gagu trees with an understory of tangan-tangan.

P-16 is a low spot along the road to the Kagman Plain; it is not a wetland. The ground cover is upland grasses. There are niyog, kamachile, trongkon-mames trees with tangan-tangan and bamboo just getting started.

P-17 is a former agricultural site, possibly an old suni farm. There are still some scattered suni plants and niyog trees. Gaogao, trongkon-mames, and arbol-del-fuego (*Delonix regia*) have spread into the open fields. This site is not a wetland and, as with sites P-15 and P-16, has been excluded from the mapping for the island.

P-18 is a manmade wetland of considerable size in the Kagman area. It has an excavated pond with open water which is used by several species of both water and migratory birds. The largest part of the pond is surrounded by elephant grass (*Pennisetum purpureum*) and tangan-tangan. Around the shallow end of the pond is *Mimosa invisa*, *Ipomoea indica* and tangan-tangan. The obligate species, kangkun and tito (*Ludwigia octovalvis*) and other mixed ruderal vegetation are common in and around the pond.

P-19 is another manmade pond with open water not far from P-18. The water in this pond was clearly run-off as evidenced by its dark, muddy color. Several species of birds frequent this area and some of the vegetation, i.e., *Cyperus odoratus* and kangkun, is associated with wetlands. The principal vegetation, tangan-tangan, elephant grass and guinea grass (*Panicum maximum*) is upland.

P-20 is now a pasture. There is some California grass in the pasture with tangan-tangan and kamachile trees surrounding it. On the ridge above the pasture is a dense stand of pago trees.

P-21 is a large wetland that was probably once used to grow rice. There is an almost straight north-south line through the middle of this site with karisu on the eastern half of the wetland and *Sesbania cannabana* on the western half. The entire site is covered with about 1.5 feet of standing water. Several small, private holdings impinge on this wetland. Most have gardens in which they grow suni, kangkun, bananas and niyog. Tangan-tangan and pago are found at the edges of this wetland.

P-22 is an almost inaccessible wetland, the assessment was from behind the Toyota dealership, at the southern end, and along the highway. At the western edge there is some karisu growing in what was a niyog plantation. Some punting (*Barringtonia asicatica*), hoda (*Ficus tintoria*), and nonag (*Hernandia sonora*) are also present. Dense, relatively undisturbed wetland comprises the majority of the interior of this area. The periphery of this site is well-suited for corrective mitigation or wetland expansion. At the southern end of P-22 is an agricultural wetland. It has recently been cleared and an open water pond has developed. Suni, kangkun, bananas, potatoes, and beans are being grown. A variety of birds use the pond. This farm site and the area north and east represent an extension of the P-22 area.

P-23 is a site west of the golf course that has been cleared and is being used for pasture. The coast highway separates this area from the larger wetland of P-21/P-22 with which, at one time, P-23 may have been functionally connected.

P-24 is adjacent to the highway at the lowest corner of the golf course. It is also wet, and has apparently been abandoned as part of the golf course. There is some open water and the principal vegetation is made up of obligate wetland taxa. The sedges *Fimbristyles globulosa*, F. *cymosa*, *Cyperus kyllingia* and kangkun and *Alternanthera sessilis* are present and all are obligate wetland species. California grass and *Sesbania cannabina* are also common. The three wetlands that occur in this area are small; however, restoration and enhancement could connect these individual pieces and reclaim a portion of the golf course that is now in disuse.

P-25 is three disjunct stands of tangan-tangan adjacent to the highway in the northern Susupe area. In the marsh the vegetation is karisu with a few hummocks of bamboo and some pago. On the uphill side of the wetland there is some bamboo hummocks, betel nut, banana, and trongkon-manes.

P-26 is in the northern part of the Lake Susupe marshes. Here the wetland vegetation is pure karisu. The border is tangan-tangan and nyigo trees with gago trees growing on the east end.

P-27 is an open water site north of Lake Susupe and is part of the marsh system which surrounds the lake. At this site, the small open water pond contained deep, black water. The big fern, langayao, and karisu surround the pond and these are overlain by a vegetative morning glory, probably *Ipomoea indica*. There are other open water sites in this area, and on the high ground between them were scattered single gago trees.

P-28 is one of the marshes which border Lake Susupe. This particular site was probably once cultivated. There are mature niyog trees and hundreds of seedlings in this area. Pago is growing in the marshy soil and forms an almost impenetrable thicket. There are a few tangan-tangan seedlings and some mile-a-minute vine, but neither is doing well because of the deep shade and saturated soil.

P-29 is another area where karisu is the primary wetland vegetation. At places along the western edge, however, the homeowners are actively filling the wetland with rubbish, and some have placed coral fill to raise the ground level.

P-30 is the southernmost karisu marsh site of the extensive Susupe wetland. This part of the marsh was probably once used to grow rice. Places which appear to have been house sites are widely dispersed in the area, and large trees such as kamachile and tronkon atbot mark what remains of former home gardens. In this wet, lush location the karisu reaches a height of over 9 feet.

P-31 is made up of two small (40 feet by 15 feet) ponds. They are located in the front lawn of the Saipan Grand Hotel. The northernmost pond is filled with kangkun and the southernmost pond is filled with karisu, kangkun, and California grass.

P-32 is a karisu marsh. This site is a new mapping for the area east of Lake Susupe. There is some evidence that this area may have been under cultivation, probably as a taro patch. There are some tangan-tangan and gaogao (*Erythrina variegata* var. *orientalis*) trees along the edges of the karisu.

P-33 was at one time a large karisu wetland. It is now badly contaminated. Some parts have been filled for gardens or house sites. Patches of karisu remain and sedges, mainly *Cyperus odoratus*, can be seen between the garden rows. Many old niyog trees from a former plantation are still common.

P-34 is the open water wetland of Flores Pond and its surrounding vegetation. The open water was extensive and appeared to be relatively deep. Here *Sesbania cannabina* grows as an obligate wetland plant (i.e., it has developed roots along its central stem 1 to 2 feet above ground level for oxygen uptake). Karisu, *Ludwigia octovalvis* and pago are also common. The upland trees are kamachile and niyog.

P-35 is an agricultural wetland. The site has been cultivated. There is some open water surrounded by bermuda grass (*Cynodon dactylon*) and *Mimosa invisia*. The wetland sedge *Cyperus odoratus* is common, as is *Alternanthera sessilis*. Two large grasses, guinea grass and *Paspalum paniculatum* are common at the periphery of this low, wet area.

P-36 is a site north of the Saipan airport. At one time this was probably a better developed wetland. It is now very disturbed. Elephant grass and wild sugar fill the low land and pago fills the drainage. Many large tronkon atbot trees are also present.

P-37 is another site north of the airport. It is no longer a wetland. It has some wild sugar and elephant grass, but this site is now being developed into housing and infrastructure.

L-1 (Lake Susupe) and its surrounding marshes is located on the coastal plain in the southwestern part of Saipan. There is a large, open water area surrounded by wetland vegetation which includes bulrushes (*Scirpus littoralis* var. *capense*), langayao (*Acrostichum aureum*), and pago. Although the outlines of the former rice paddies can still be seen in the aerial photos, most of the marshes are now covered with karisu. The manmade channel to the sea is now filled with pago and niyog trees. The upland vegetation surrounding this large, lacustrine/palustrine complex is primarily gago and tangan-tangan.

The western edge of the wetland abuts the town of Chalen Kanoa; houses and small farms infringe into this part of the marsh.

R-1 is a riverine site at the north-eastern end of Saipan inland from Islita Mago Fahang. It is part of the Fanochuuyan drainage system which is an intermittent system. The dominant vegetation of this site is tangan-tangan (*Leucaena leucocephala*) with some native trees such as pago (*Hibiscus tiliaceus*) and several large gaogao (*Erythrina variegata* var. *orientalis*) growing along the seaward part of the stream. A great variety of introduced grasses and weeds are also present. There were no wetland plants and no standing or running water was found. Although this is a very disturbed site, it is an important drainage system.

R-2 Kannat Makpe is a riverine site which has been almost completely taken over by tangan-tangan. There are some pahong (*Pandanus dubis*), Kafu (*Pandanus tectorius*), and trongkon-mames (*Albizia lebbeck*) trees along the stream banks. Cadena de amor (*Antigonon lestopus*) is rapidly spreading into the area. No wetland vegetation was found. There was no running or standing water; however, this intermittent stream is an important drainage for this area of Saipan.

R-3 is an intermittent stream which crosses the property that is now occupied by the Nikko Hotel. The stream has been channelized. There are still some pago and kamachile (*Pithecellobium dulce*) trees along the stream banks, but the most common vegetation is tangan-tangan.

R-4 is a riverine site inland from the town of San Roque. It is an intermittent stream without wetland vegetation. The principal canopy tree in the area is tronkon atbot (*Delonix regia*) while the shrub layer is almost all tangan-tangan. The scoured channel has been cleared to ensure quick drainage during heavy rains. No wetland plants were found in this area.

R-5 is a riverine site with a running stream. Along its banks is an agricultural wetland. The wetland farm vegetation includes suni (*Colocasia esculenta*), lemae (*Artocarpus altilis*) Fosb.), chotda (*Musa x paradisiaca*), mango (*Mangifera indica*), and coconut trees. Pago and tangan-tangan fill the area upstream from the farm. Although not a wetland, this is an important drainage channel.

R-6 is the Talafofo drainage, a perennial stream. Evaluations were made both inland and near the mouth of the stream. The vegetation along the stream bank is mostly native with facultative wetland species such as pago and punting (*Barringtonia asiatica*) trees common. On the alluvial plains above the stream in many places are remnants of swidden gardens. Suni or taro, papao-apaka (*Alocasia macrorrhiza*), dokdok (*Artocarpus mariannensis*), lemae, papaya (*Carica papaya*), niyog, and chotda are common along with several endemic species. Higher up slope, above the alluvial vegetation, tangan-tangan is the dominant. There was evidence of past fires at higher elevations.

R-7 is a small stream which has been taken over by tangan-tangan. There are a few pago, kafu, and Panama cherry (*Muntingia calabura*) in the vicinity. This site is dominated by upland vegetation. A very large drainage canal has been built to carry the run-off under the main highway. R-7 did not meet the criteria as a wetland, but it is an important drainage.

Both north and south of the Talafofo drainage are other important drainage systems. In addition, the Lau Lau Beach area has several intermittent streams above it. Informants from both Saipan and Guam have reported small wetlands in these areas, but because of the remoteness of these areas and time constraints of the surveys, those sites were not visited. All stream channels have the potential to support wetland habitat and must be evaluated for their habitat quality.

E-1 is one of three estuarine wetlands on Saipan. E-1 is adjacent to a palustrine wetland which is elevationally above the tidal influence. The estuarine part of this site includes open, brackish water surrounded by a thick stand of mangroves (*Bruguiera gymnorhiza*) interspersed with occasional banalo trees (*Thespesia populnea*) and pago trees. Rather abruptly the vegetation changes to a dense bramble of pago trees.

APPENDIX E

DATA FORMS FOR ROUTINE, INTERMEDIATE, AND COMPREHENSIVE FIELD WETLAND DELINEATIONS

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD[1]

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Plant Community #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No _____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes _____ No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1.			11.		
2.			12.		
3.			13.		
4.			14.		
5.			15.		
6.			16.		
7.			17.		
8.			18.		
9.			19.		
10.			20.		

Percent of dominant species that are OBL, FACW, and/or FAC _____
Is the hydrophytic vegetation criterion met? Yes _____ No _____
Rationale: _____

SOILS

Series/phase: _____ Subgroup:[2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No _____ Surface water depth: _____
Is the soil saturated? Yes _____ No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes _____ No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes _____ No _____
Rationale for jurisdictional decision: _____

[1] This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
[2] Classification according to "Soil Taxonomy."

DATA FORM
INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD
QUADRAT TRANSECT SAMPLING PROCEDURE
(Vegetation Data)

Field Investigator(s): _____
Project/Site: _____ Date: _____
Applicant/Owner: _____ State: _____ County: _____
Transect # _____ Plot # _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

DOMINANT PLANT SPECIES

Herbs (Bryophytes)	Indicator Status	Saplings	Indicator Status
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	
7.		7.	
8.		8.	
9.		9.	
10.		10.	
11.		11.	
12.		12.	
13.		13.	

Shrubs		Trees	
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	
7.		7.	
8.		8.	
9.		9.	
10.		10.	
11.		11.	
12.		12.	
13.		13.	

Woody Vines	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	

Percent of dominant species that are OBL, FACW, and/or FAC _____

DATA FORM
INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD
VEGETATION UNIT SAMPLING PROCEDURE
(Herbs and Bryophytes)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					
31.					
32.					
33.					
34.					
35.					
36.					
				Sum of Midpoints	
				Dominance Threshold Number Equals 50% x Sum of Midpoints	

[1] Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

[2] To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

DATA FORM
INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD
VEGETATION UNIT SAMPLING PROCEDURE
(Shrubs, Woody Vines and Saplings)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Shrub Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

Woody Vine Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

Sapling Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

[1] Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

[2] To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

DATA FORM
INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD
VEGETATION UNIT SAMPLING PROCEDURE
(Trees)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Tree Species (Percent Cover Option)	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

Tree Species (Basal Area Option)	Indicator Status	Tally 1 2 3 4 5 6 7 8	Total Trees	Basal[3] Area	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Basal Area Factor (e.g., Prism Used) _____

Total Basal Area of All Species Combined _____
Dominance Threshold Number Equals 50% of Total Basal Area _____

[1] Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

[2] To determine the dominants, first rank the species by their midpoints (or basal area). Then cumulatively sum the midpoints (basal area) of the ranked species until 50% of the total for all species midpoints (or basal area) is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint, or basal area, value should be considered dominants and marked with an asterisk.

[3] The basal area for a species (on a per acre basis) is determined by dividing the total number of individual trees tallied for all tally areas by the number of tallies and multiplying by the basal area factor.

DATA FORM [1]
INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD OR COMPREHENSIVE ONSITE DETERMINATION METHOD
(Soils and Hydrology)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____
Intermediate-level Onsite Determination Method _____
Comprehensive Onsite Determination Method _____
Transect # _____ Plot # _____
Vegetation Unit #/Name: _____ Sample # Within Veg. Unit: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

SOILS

Series/phase: _____ Subgroup: [2] _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Comments: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No _____ Surface water depth: _____
Is the soil saturated? Yes _____ No _____
Depth to free-standing water in pit/soil probe hole: _____
Mark other field indicators of surface inundation or soil saturation below:

___ Oxidized root zones
___ Water-marks
___ Drift lines
___ Water-borne sediment deposits
___ Water-stained leaves
___ Surface scoured areas
___ Wetland drainage patterns
___ Morphological plant adaptations

Additional hydrologic indicators: _____
Comments: _____

[1] This data form can be used for both the Vegetation Unit Sampling Procedure and the Quadrat Transect Sampling Procedure of the Intermediate-Level Onsite Determination Method, or the Quadrat Sampling Procedure of the Compehensive Onsite Determination Method. Indicate which method is used.
[2] Classification according to "Soil Taxonomy."

DATA FORM [1]
INTERMEDIATE-LEVEL ONSITE DETERMINATION METHOD OR COMPREHENSIVE ONSITE DETERMINATION METHOD
(Summary Sheet)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____
Intermediate-level Onsite Determination Method _____
Comprehensive Onsite Determination Method _____
Transect # _____ Plot # _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No _____ (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes _____ No _____ (If yes, explain on back)

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1.			14.		
2.			15.		
3.			16.		
4.			17.		
5.			18.		
6.			19.		
7.			20.		
8.			21.		
9.			22.		
10.			23.		
11.			24.		
12.			25.		
13.			26.		

Percent of dominant species that are OBL, FACW and/or FAC _____

Is the hydrophytic vegetation criterion met? Yes _____ No _____

Is the hydric soil criterion met? Yes _____ No _____

Is the wetland hydrology criterion met? Yes _____ No _____

Is the vegetation unit or plot wetland? Yes _____ No _____

Rationale for jurisdictional decision: _____

[1] This data form can be used for either the Intermediate-level Onsite Determination Method or the Comprehensive Onsite Determination Method. Indicate which method is used.

DATA FORM
COMPREHENSIVE ONSITE DETERMINATION METHOD
QUADRAT SAMPLING PROCEDURE [1]
(Herbs and Bryophytes)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____
Transect # _____ Plot # _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

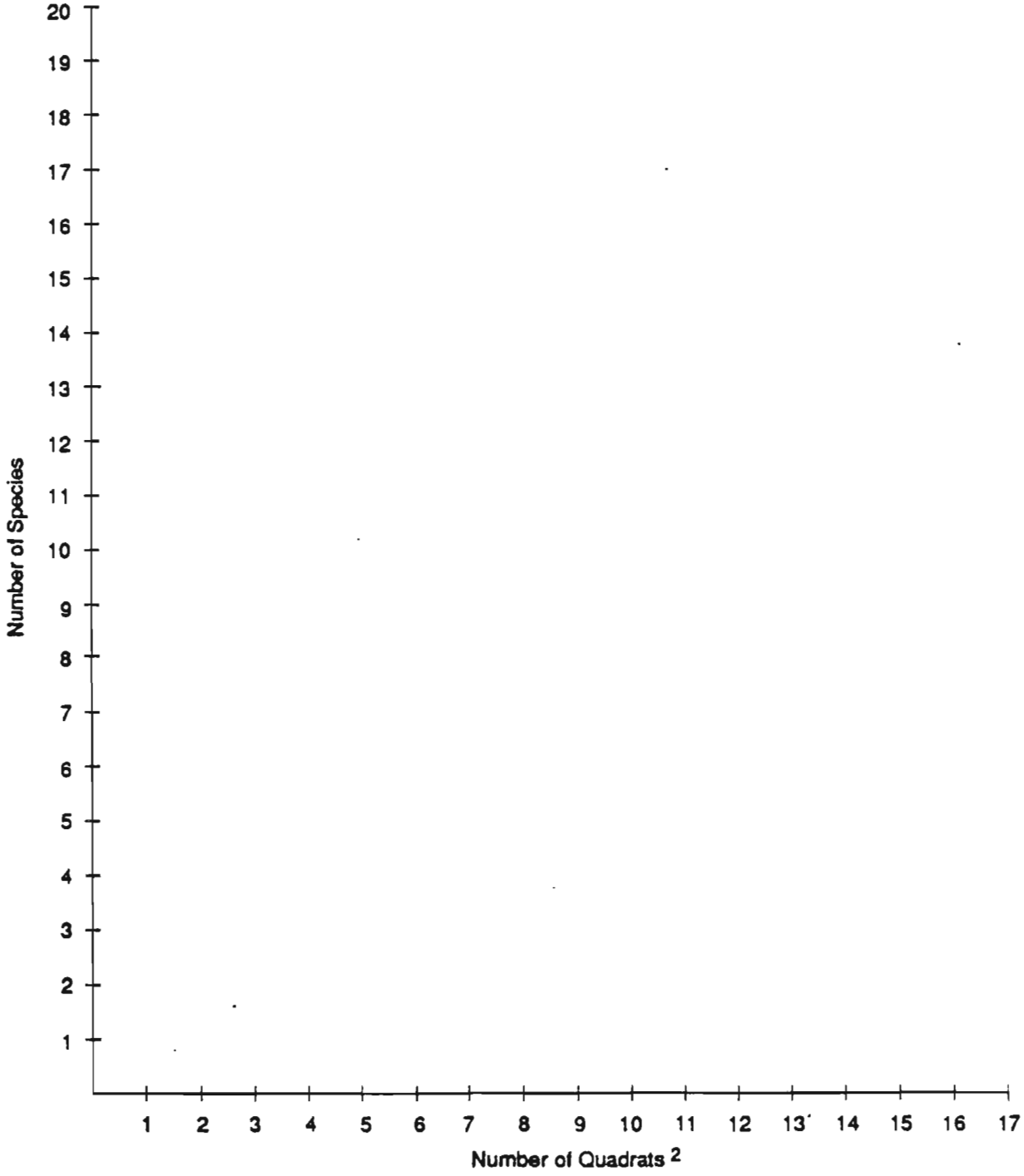
Species	Indicator Status	Quadrat Percent Areal Cover Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	$\bar{X}$	Rank[4]
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
12.											
13.											
14.											
15.											
16.											

Total Cover ___[2]
Dominance Threshold Number Equals 50% x Total Cover ___[2]

Total of Averages ($\bar{X}$'s) ____[3]
Dominance Threshold Number Equals 50% x Total of Averages ($\bar{X}$'s) ____[3]

[1] This data form can be used for both the Plant Community Transect Sampling Approach and the Fixed Interval Transect Sampling Approach.
[2] These entries are only applicable to the Fixed Interval Transect Sampling Approach which uses only one quadrat per sampling point along a transect.
[3] These entries are only applicable to the Plant Community Transect Sampling Approach which uses multiple quadrats per sampling point along a transect.
[4] To determine the dominants, first rank the species by their cover (or mean cover). Then cumulatively sum the cover (mean cover) of the ranked species until 50% of the total for all species cover (mean cover) is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* additional species having 20% of the total cover (mean cover) value should be considered dominants and marked with an asterisk.

SPECIES-AREA CURVE [1]



[1] Plot the cumulative number of species against the quadrats (e.g., if quadrat #1 has 3 species and quadrat #2 has any, all, or none of those species but has 2 new species, then 5 cumulative species should be plotted against quadrat #2). The number of quadrats sufficient to adequately survey the understory will corresdpond to the point on the curve where it first levels off and remains essentially level.

[2] Specify size of sample quadrat: _____

DATA FORM
COMPREHENSIVE ONSITE DETERMINATION METHOD
QUADRAT SAMPLING PROCEDURE
(Shrubs and Woody Vines)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____
Transect # _____ Plot # _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Shrub Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

Woody Vine Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

[1] Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

[2] To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

DATA FORM
COMPREHENSIVE ONSITE DETERMINATION METHOD
QUADRAT SAMPLING PROCEDURE
(Saplings & Trees)

Field Investigator(s): _____ Date: _____
Project/Site: _____ State: _____ County: _____
Applicant/Owner: _____
Transect # _____ Plot # _____ Vegetation Unit #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Sapling Species	Indicator Status	Percent Areal Cover	Cover[1] Class	Midpoint[1] of Cover Class	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Sum of Midpoints _____
Dominance Threshold Number Equals 50% x Sum of Midpoints _____

Individual Tree Species	Indicator Status	DBH (inches)	Basal Area (BA) Per Tree (sq ft)	BA Per Species (sq ft)	Rank[2]
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					

Total Basal Area of All Species Combined _____
Dominance Threshold Number Equals 50% x Total Basal Area _____

[1] Cover classes (midpoints): T<1% (none); 1 = 1-5% (3.0); 2 = 6-15% (10.5); 3 = 16-25% (20.5); 4 = 26-50% (38.0); 5 = 51-75% (63.0); 6 = 76-95% (85.5); 7 = 96-100% (98.0).

[2] To determine the dominants, first rank the species by their midpoints. Then cumulatively sum the midpoints of the ranked species until 50% of the total for all species midpoints is immediately exceeded. All species contributing to that cumulative total (the dominance threshold number) *plus* any additional species having 20% of the total midpoint value should be considered dominants and marked with an asterisk.

PREVALENCE INDEX WORKSHEET

LOCATION _____ DATE _____ EVALUATOR _____

HYDRIC UNIT NAME _____ TRANSECT NO. _____

Plant Species	Frequency of Occurrence Total for Each Species	F_o Obligate	F_{fw} Facult. Wet.	F_f Facult.	F_{fu} Facult. Upland	F_u Upland
Total occurrence for all plant species						
Total occurrences ID'd with known indicator status						
E.I. value		1	2	3	4	5

$$\frac{\text{Total occurrences identified with known indicator status}}{\text{Total occurrence for all plant species}} = \%\ \text{valid occurrences}$$

$$PI_i = \frac{(1F_o) + (2F_{fw}) + (3F_f) + (4F_{fu}) + (5F_u)}{(F_o + F_{fw} + F_f + F_{fu} + F_u)}$$