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4.10 JURISDICTIONAL WETLANDS RESOURCES

This section discusses Project impacts on jurisdictional wetlands within the areas of direct impacts, which are the construction zones of the Project components, as well as within the area of indirect impacts which encompasses watersheds potentially affected by Project components. The jurisdictional wetlands addressed in this section are those regulated by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. An overview of the regulatory environment for wetlands is provided, including regulations for filling of wetlands. The biological and physical characteristics of wetlands are described, and temporary and permanent loss of potential jurisdictional waters from fill are quantified. Secondary impacts, including effects on non-jurisdictional wetlands are also discussed. To provide a basis for this evaluation, functions and values of potential jurisdictional wetlands are identified. Wetland resources are categorized according to wetland community types and wetland habitat types.

IMPACTS EVALUATED IN OTHER SECTIONS

The following subjects are related to the Jurisdictional Wetlands Resources Section, but are evaluated in other sections of this document:

- Alteration of Surface Water Quality. Operation of irrigation systems, storage reservoirs, and discharge into the Russian River may affect water quality in existing wetlands and other waters of the U.S. Impacts relating to surface water quality due to the implementation of Project alternatives are discussed in Section 4.6, Surface Water Quality.
- Effects on Streams. Project effects on streams are evaluated in several different sections. Streambed erosion and flooding are discussed in Section 4.4, Surface Water Hydrology. Interruption and redirection of stream flow by reservoirs is discussed in Section 4.4, Surface Water Hydrology and Section 4.6, Surface Water Quality. Effects on streams due to seepage of reclaimed water out of the bottom of storage reservoirs are evaluated in Section 4.6, Surface Water Quality, Section 4.9, Aquatic Biological Resource Section and Section 4.5, Groundwater.
- Effects on Fisheries. Potential impacts to fisheries are evaluated in Section 4.9, Aquatic Biologic Resources.
- Effects on Vegetation and Wildlife. Discharge of dredge and fill material into wetlands and inundation of storage reservoir sites with reclaimed water would

affect wetland-associated wildlife and vegetation. Impacts relating to vegetation and wildlife due to the implementation of Project alternatives are discussed in Sections 4.8 and 4.9, Terrestrial and Aquatic Biological Resources, respectively.

- Effects of Agricultural Application of Reclaimed Water on Wetland Communities is discussed in Sections 4.8, and 4.9, Terrestrial and Aquatic Biological Resources.
- Effects on Cultural Resources Resulting From the Discharge of Dredge and Fill into Wetlands and Other Waters of the U.S. Impacts relating to cultural resources due to the implementation of Project alternatives are discussed in Section 4.15, Cultural Resources and Paleontology.
- Changes in the Recreational Use of Surface Waters. Impacts to recreation due to the implementation of Project alternatives are discussed in Section 4.16, Public Services, Utilities, and Recreation and Section 4.18, Socio-economics.

AFFECTED ENVIRONMENT (SETTING)

The affected environment for the Project alternatives includes the jurisdictional waters within the Area of Indirect Impacts depicted in Figure 4.8-1. The Area of Indirect Impacts encompasses the watersheds potentially affected by proposed Project components such as storage reservoirs, discharge, and agricultural irrigation. Watersheds located within the Area of Indirect Impacts include, but are not limited to, the areas drained by the Laguna de Santa Rosa, Russian River, Petaluma River, Estero Americano, and Estero de San Antonio. The Area of Direct Impacts only includes the construction boundary zones of the proposed Project components.

Regulatory Environment

Activities affecting "waters of the United States" are regulated by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. This regulatory authority is administered by the U.S. Army Corps of Engineers (Corps). Waters of the U.S. include territorial seas, all waters that have been or could be used in connection with any interstate commerce (including recreation), navigable waters, adjacent wetlands and tributaries, and other intrastate or isolated waters whose degradation or destruction could affect interstate or foreign commerce. Wetlands and other jurisdictional waters of the U.S. could be affected by the construction, operation, and maintenance of elements of Project alternatives presented in this EIR/EIS. In order to carry out environmental review of Project elements that will require Section 404 and/or Section 10 permitting, the Corps has assumed the responsibility of federal lead agency for the EIR/EIS process.

Some secondary impacts on wetlands and other waters of the U.S. that may result from Projects involving the discharge of dredged or fill material are subject to the Section 404 and/or Section 10 permit process, while others are not. The latter impacts, including but

not limited to effects on non-jurisdictional wetlands, are not directly subject to Corps regulatory authority under Section 404 but still must be evaluated in an EIR/EIS to meet California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) requirements and will also be considered by the Corps during the permitting process. Secondary, indirect and cumulative impacts not subject to Section 404 jurisdiction are evaluated in other related sections of this document.

The following subsections present several key topics from the Corps' Section 404 regulatory program relevant to the Project alternatives and the impact analysis. Comprehensive discussions of the Section 404 permitting program can be found in the following reports: *Planning Level Wetland Determination Report for Proposed Reservoir Sites* (Parsons Engineering Science, Inc. 1996c), *Wetland Determination and Mitigation for Proposed Pipeline Alignments* (Parsons Engineering Science, Inc. 1996b), and *Agricultural Irrigation Areas Wetlands Determination* (Parsons Engineering Science, Inc. 1996a).

Waters of the U.S.

The Clean Water Act regulates discharges of dredged or fill material into waters of the U.S., which are broadly defined to include all waters whose alteration could or does influence interstate commerce, including migratory bird habitat. These waters, as defined in 33 CFR 328.3, include the following which apply to the Project alternatives:

- All waters currently used, used in the past, or susceptible to use in interstate or foreign commerce, including all waters subject to tidal influence;
- All other waters, such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or ponds, whose use or degradation could affect interstate or foreign commerce (this includes waters with the potential to be used for recreation, commercial shellfishing, or industry);
- All impoundments of U.S. waters;
- All tributaries of U.S. waters (including both perennial and intermittent streams);
- Wetlands adjacent to U.S. waters.

Two other groups not associated with the Area of Indirect Impacts, are territorial seas and interstate waters. Waters of the U.S. extend "landward to the ordinary high water mark in non-tidal systems, adjacent to the high tide line in tidal

systems, and to the landward extent of wetlands that may lie upslope of the ordinary high water mark or high tide line" (33 CFR 328.4). Floodplains are not waters of the U.S., unless they fall into one of the groups listed above.

Navigable Waters of the U.S.

Navigable waters of the U.S. include “those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce” (33 CFR 329.4). The landward side of navigable waters is defined by the ordinary high water mark in non-tidal areas and by the mean high water mark in tidal areas. Section 10 (River and Harbors Act) permits are required for activities that might affect interstate commerce in navigable waters, and applies to lower segments of the Russian River and to the Estero Americano and Estero de San Antonio.

Special Aquatic Sites and Wetlands

Special consideration is given by the Corps to discharges affecting “special aquatic sites.” “Special aquatic sites” are defined as “geographic areas, large or small, possessing special ecological characteristics of productivity, habitat, wildlife protection, or other important and easily disrupted ecological values.” These areas are generally recognized as “significantly influencing or positively contributing to the general overall environmental health or vitality of the entire ecosystem or region” (40 CFR 230.3 (q-1)). Sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes are all considered to be special aquatic sites (40 CFR 230.40-.45).

Wetlands

The Corps and the EPA define wetlands as: “Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR 328.3).

An area must meet specific criteria for hydrophytic vegetation, hydric soils, and wetland hydrology as defined in the Corps’ 1987 Wetland Delineation Manual, referred to herein as the 1987 Manual (Environmental Laboratory 1987), to be classified as a jurisdictional wetland. Areas subject to grazing or which do not exhibit indicators of all three mandatory criteria year-round or for which one of the criteria may be missing are classified as “Problem Areas” by the Corps. Areas supporting seasonal wetlands, a common wetland type throughout the Area

of Direct Impacts, are classified as "Problem Areas" because hydrophytic vegetation and wetland hydrology may not be present year-round. The Corps has developed special identification procedures for wetland determinations of "Problem Areas."

Human-induced wetlands are another class of wetlands with special identification criteria outlined in the 1987 Manual. A human-induced wetland is "an area that has developed at least some characteristics of naturally occurring wetlands due to either intentional or incidental human activities. Examples of man-induced wetlands include wetlands resulting from irrigation, wetlands resulting from filling of former deepwater habitats, dredged material disposal areas, portions of stock ponds and wetlands resulting from stream channel realignment" (Environmental Laboratory 1987). Many types of wetlands created or maintained by human activities fall under Corps jurisdiction. However, in general, human-induced wetlands created on dry land and maintained solely by direct application of pumped or actively diverted water are excluded from Corps jurisdiction.

Wetlands on Agricultural Land

Although regulatory authority under Section 404 rests with the Corps, the responsibility for determination of jurisdictional status on agricultural land is shared with the Natural Resources Conservation Service (NRCS) throughout the U.S., with the exception of the nine counties of the San Francisco Bay area, including Marin and Sonoma.

In a Memorandum of Agreement signed in January 1994 by the Corps and the NRCS, the Corps allocated responsibility for making joint wetlands determinations and delineations on agricultural lands to the NRCS "whether or not the person who owns, manages or operates the land is a participant in USDA programs." Implementation of the Memorandum of Agreement in the nine counties of the San Francisco Bay area including Marin and Sonoma has not yet occurred. In these counties, the Corps retains wetland delineation responsibility for agricultural lands for Section 404 purposes.

The following information is provided regarding the NRCS program, because the Corps may consider these issues in their actions.

The 1985 "Swampbuster" provisions of the Food Security Act restrict federal farm benefits for farmers who convert wetlands to croplands. The NRCS is responsible for administering these provisions, including monitoring farming activity. Federal farm benefits may be withheld if provisions of the Food Security Act are not met. Exemptions may be granted for wetlands conversions occurring prior to December 23, 1985, the date of adoption of the Swampbuster Provisions.

The NRCS National Food Security Act Manual, 3rd Edition (1994) provides guidance for classifying wetlands on agricultural land and identifies permissible activities under the various classifications. The National Food Security Act Manual provides the following definition of "prior converted cropland":

> "wetlands that were drained, dredged, filled, or otherwise manipulated, including the removal of woody vegetation, before December 23, 1985, for the purpose [of making].... the production of an agricultural commodity possible, and an agricultural commodity was planted or produced at least once prior to December 23, 1985."

Prior converted croplands, as defined by the NRCS, are excluded from Corps jurisdiction while active cultivation continues and the conditions necessary to support a prevalence of hydrophytic vegetation (specifically, sustained inundation) are absent.

> "Waters of the U.S. do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purpose of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA (40 CFR Part 232.2)."

Areas of abandoned prior converted cropland, where wetland conditions return, are regarded as jurisdictional wetlands.

"Farmed wetlands" are defined in the National Food Security Act Manual as "wetlands that were manipulated and cropped prior to December 23, 1985, but which continue to exhibit important wetland values." Farmed wetlands meet the regulatory definition of wetlands and are subject to Section 404 provisions.

Section 404 Permit Program

Project proponents wishing to engage in most activities affecting waters of the U.S., such as dredging or filling, are required to obtain a Section 404 permit from the Corps. Regulated activities that potentially apply to the Project alternatives are:

- Emplacement of dams or dikes in navigable waters (33 CFR 321);
- Other excavation, dredging or disposal activities in navigable waters (33 CFR 322);

- Activities that alter the course, condition, capacity etc. of navigable waters (33 CFR 322);
- Discharges of dredged or fill material into the waters of the U.S. (33 CFR 322); and
- Excavation in waters of the U.S. (33 CFR 323.2(d); 58 FR 45008-45038).

Reservoir construction would involve direct fill of wetlands in conjunction with dam structures as well as excavation, dredging, and disposal activities. Inundation (backwater flooding) of the reservoir sites or alteration of downstream flows due to placement of fill in jurisdictional waters (dam construction) would be considered consequent impacts subject to Section 404 jurisdiction. Inundation resulting solely from the discharge of reclaimed water is subject to other sections of the Clean Water Act. Construction of pipelines and outfall structures may require fill of wetlands and waters of the U.S.

The Corps has the authority under Section 404 to issue two types of permits for discharges of dredged or fill material into jurisdictional waters: general and individual permits. General permits authorize all activities that are of the type specified by the permit, lie within the regional limitations of the permit, fall within limitations on the nature and extent (volume or area) of fill material, and comply with all general and specific conditions, including requirements for notification of the Corps and other authorities. Nationwide permits are a category of general permits that have been issued for certain specified activities that have been determined individually and collectively to have minimal impacts. However, it is recognized that in some localities or under certain circumstances, some actions that are of the types specified by nationwide permits may have more than minimal effects. Therefore, the district engineer has the discretion to require an individual permit for any action subject to Section 404, or to add special conditions to authorizations issued under existing general or nationwide permits, as necessary to satisfy legal requirements or otherwise protect the public interest. If the conditions are met, the specified activities can take place without the need for an individual permit.

Section 404 permit applications are subject to review by the public and by other agencies including:

- The U.S. Environmental Protection Agency (EPA);
- The U.S. Fish and Wildlife Service (USFWS);
- The National Marine Fisheries Service (NMFS); and
- Appropriate state and local agencies.

Other federal agencies may be involved in the review process depending upon the particular Project. Federal laws and Executive Orders that may affect the processing of a permit application include NEPA, the Coastal Zone Management Act, the Fish and Wildlife Coordination Act, the Federal Endangered Species Act, the National Historic Preservation Act, the Deepwater Port Act, the Federal Power Act, the Marine Mammal Protection Act, the Wild and Scenic Rivers Act, Executive Order 1198 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), Section 6(f) of the Land and Water Conservation Act, the Farmland Protection Policy Act, the Migratory Bird Treaty Act, the Food Security Act, and the National Fishing Enhancement Act of 1984.

Other Regulatory Requirements

Although this section discusses waters of the U.S. from the perspective of the Corps' regulatory authority, there are other federal and state regulations that influence activities in wetlands and other waters of the U.S. The following section provides a brief overview of additional state and federal regulations involving wetlands and other waters of the U.S.

State agencies with permitting or review authority over jurisdictional wetlands, and other waters of the U.S. include the California Department of Fish and Game (CDFG), Regional Water Quality Control Boards, and the California Coastal Commission. Although not discretionary, Streambed Alteration Agreements (Section 1601/1603 CCR), issued by the California Department of Fish and Game, are required for alterations to rivers, streams, or lakes. These agreements stipulate measures that must be taken to mitigate the impact of construction activities in potentially affected waterways. Restrictions may be placed on the timing, duration, and extent of activities to minimize the potential disturbance to fish and wildlife resources.

A Coastal Zone Development Permit must be obtained for any structures built in the Coastal Zone. The Local Coastal Plan designates the Coastal Zone, the width of which varies considerably. Portions of the Coastal Zone included in the Local Coastal Plan for Sonoma County are the Valley Ford area and the Esteros Americano and de San Antonio. The Sonoma County Board of Supervisors grants Coastal Zone Development Permits. This permit would be required for all Project facilities proposed within the Coastal Zone. Decisions made by the County Board of Supervisors may be appealed to the California Coastal Commission.

Activities permitted under Section 404 or Section 10 must be consistent with the Federal Coastal Zone Management Act. An applicant must submit certification to the Corps that the Project's activity is consistent with the Local Coastal Plan. The Corps District Engineer shall not issue a permit until the Coastal Commission concurs with this certification. This process applies not only to development along the coast, but to all actions which could indirectly impact coastal resources.

Section 401 of the Clean Water Act requires the appropriate Regional Water Quality Control Board to certify that water quality would not be adversely affected by the proposed fill activity to be permitted under Section 404. The Corps may not issue a Section 404 permits without a 401 certification or a waiver of certification that the discharge complies with state water quality standards.

Functions and Values of Potential Jurisdictional Wetlands

Under Section 404 of the Clean Water Act, alterations of functional value of jurisdictional waters must be considered by the Corps in the permitting process. Wetlands and other waters of the U.S. perform a variety of functions in the physical and biological environments, which may be altered directly or indirectly by Project components, whether or not wetland acreage is filled, drained, or inundated. Where wetland fills are required by Project components, qualitative understanding of the functions and values of that acreage is one facet of analyzing impacts and developing mitigation. Eleven wetland functions and values are identified by the Wetland Evaluation Technique (Adamus *et al.* 1987). Some of these (e.g., recreation) are not, or only minimally, characteristic of wetlands and other waters of the U.S. within the Area of Indirect Impacts. Applicable primary functions and values of wetlands (and other waters of the U.S., found within the Area of Indirect Impacts) are:

- Subsurface hydrology (groundwater recharge);
- Surface hydrology (attenuation of flood flows and, in the case of riparian wetlands in low-gradient environments, bank storage, extending the duration of late-season low flows);
- Surface water quality (sediment retention and stabilization; removal of nutrients by wetland vegetation; and adsorption and immobilization of other pollutants by clay and soil microorganisms); and
- Habitat (food and water source, breeding habitat, and thermal and visual cover for general wildlife and many special-status species).

Any particular wetland may have one or more of these functions and values. Some wetlands, notably isolated ones with a relatively short season of near-surface saturation and vegetation dominated by non-native wetland species, perform functions that are only marginally different from those of surrounding uplands.

Avoidance and minimization of wetlands impacts where practicable, are considered the primary mitigation actions for wetlands. Compensation mitigation is considered only after these actions have been thoroughly explored. The order of preference of wetland compensation mitigation actions is based upon the principle of replacement not only of acreage but also of functions and values. Thus, where wetlands are to be filled, lost functions and values are usually best replaced if mitigation provides for creation of habitat in kind (similar to that which was lost), on or near the site of impact. Creation of different habitat (out-of-kind compensation) on or near the impact site is next most preferable, followed by in-kind, off-site mitigation; and finally out-of-kind, off-site mitigation. Where habitat is to be created off-site, it is often preferable for mitigation to occur within the same watershed because, as can be seen from the list of common functions above, functions relating to water quality and quantity (and, to a lesser extent, habitat) have benefits within a particular watershed. However, exceptions to these general principles are appropriate where the overall benefits of a mitigation opportunity are much greater than those that can be realized by an opportunity for in-kind, on-site mitigation (for example, in relationship to other sensitive, scarce, productive, or especially diverse habitats in the same region or watershed). Such benefits may relate to any or all of the common functions and values listed above.

Regional Wetlands Resources

Sonoma and Marin counties are rich in wetland resources. Several large watersheds are located within the Area of Indirect Impacts. Numerous small intermittent and perennial creeks and streams serve as tributaries to larger riverine systems which meander to the Pacific Ocean through estuaries and bays. Freshwater springs and seeps occur along hillsides and support perennial wetland systems. Isolated wetlands form in shallow depressions on valley floors and terraces fed by winter rains and floodwaters.

Regional wetland plant community types are described below and are based on a vegetation classification system that incorporates systems developed by Holland (Holland 1986) and Shuford and Timossi (Shuford and Timossi 1989). The classification system was developed to accurately reflect the wetland resources of the region.

Table 4.10-1 presents regional wetland habitat types and other functional habitat classification systems. The table compares classification systems including Classification of Wetlands and Deepwater Habitats of the U.S. (Cowardin et. al. 1979) and a Guide to Wildlife Habitats of California (Mayer and Laudenslayer 1988). Cowardin et. al. provides a nationwide wetlands classification system developed to inventory national aquatic ecosystems. Wetlands are hierarchically grouped in this system by similarity of hydrologic, geomorphic, chemical, and biological factors. Wetlands also provide important habitat for many terrestrial wildlife species. Mayer and Laudenslayer provides a classification system for aquatic wildlife habitat. The corresponding geomorphic and hydrodynamic properties of these wetland types, as well as their potential functions, as

interpreted from the Hydrogeomorphic Classification for Wetlands (Brinson 1993), are also provided.

Annual Grassland Wetlands

Annual grassland wetlands include a mixture of obligate and facultative wetland plants. Wetland plant species are classified as either obligate (they almost always occur in wetlands), facultative wetland (plants occur in wetlands 67-99 percent of the time), facultative (plants have an equal probability 33-66 percent chance of occurring in wetlands or uplands), and facultative or obligate upland (plants occur in wetlands 1-33 percent of the time) (Reed 1988). Annual grassland wetlands dominated by facultative plants with some obligate and facultative wetland plants were the most common wetland type observed throughout the Project area.

Annual grassland wetlands primarily occur on unconsolidated materials located on valley floors, basins, elevated stream terraces, lower alluvial fans and flat areas at the base of slopes. The wetland/upland boundary in these communities was determined to be where a prevalence of the hydrophytic species listed above shifted to a prevalence of upland and facultative upland species.

Smaller areas of native grassland wetlands also occur within the Project area. These areas represent the character of grasslands within the Project area before the introduction of annual grasses from Europe. For the purposes of analysis, native grassland wetlands are included with annual grassland wetlands because the hydrology and soils of these areas are similar to annual grassland wetlands and the acreage encountered in the Project was minimal.

Coastal Brackish Marsh

Coastal brackish marsh contains elements from salt marsh and freshwater marsh plant communities. This community has adapted to a unique set of ecological conditions including seasonal variations in inundation areas, variable salinity concentration, changing hydrology due to seasonal flooding, and periodic desiccation. Salinity may vary considerably, and may increase at high tide or during seasons of low freshwater runoff. Coastal brackish marsh gradually intergrades with coastal salt marsh toward the ocean and along the interior edges of coastal bays, estuaries, and coastal lagoons. Occasionally, brackish marsh intergrades with freshwater marsh at the mouths of rivers (Madrone Associates 1977). Within the Area of Indirect Impacts, brackish marsh is found on the upper reaches of the Estero Americano and the Estero de San Antonio.

Coastal Salt Marsh

Coastal salt marsh communities are tidally influenced emergent wetland habitats dominated by salt tolerant plants. Salt marshes are usually found in sheltered inland margins of bays, lagoons, and estuaries (Holland 1986) and are characterized by the presence of perennial emergent grasses, succulent herbs, and suffrutescent shrubs (herbaceous above, with a woody base). Salinity levels in salt marshes vary spatially and temporally, increasing in dry summer months or at high tide and decreasing during periods of high freshwater inflow. Species composition and densities are influenced by the salinity of the supporting water matrix. The very salt-tolerant cord grass (*Spartina* sp.) may dominate communities near open waters, while pickleweed often dominates in the near-shore zones.

Salt marsh communities occur at several locations within the Area of Indirect Impact. The most extensive salt marsh communities are associated with the mouths of the Estero Americano and Estero de San Antonio. In addition, salt marsh habitat occurs along the lower reaches of Walker Creek where it flows into Tomales Bay, and along the lower Petaluma River in Marin County where it enters San Pablo Bay.

Cropland Wetlands

Cropland wetlands include wetlands currently in agricultural production that are subject to periodic inundation or saturation or have exhibited jurisdictional wetland characteristics in the past. Crop types classified as "cropland" include oat hay. Continuously cropped areas that exhibited wetland characteristics in the past, but were modified prior to 1985 in ways that eliminate wetland hydrology may be considered prior converted croplands, and are not subject to Section 404 jurisdiction unless abandoned. Cropped areas that are not hydrologically altered and continue to experience inundation in most years are considered farmed wetlands. Existing cropping activities are permitted, but may be subject to Section 404 jurisdiction if a conversion to another use occurs.

Drainages

Drainages are channels or low spots in the landscape which collect runoff and groundwater discharge and convey surface water for a few days to a few months every year. Most of the low-order, high gradient streams within the Project area which are mapped as blue lines on U.S. Geologic Service topographic quadrangles were classified as drainages. Drainages range from as narrow as one foot to approximately ten feet wide and may or may not be vegetated. Most drainages occur as well defined sandy or gravely flat bottomed channels largely

devoid of vegetation. Many of these are potential jurisdictional waters of the U.S. but not wetlands, since they would not normally support vegetation and by definition a wetland must be capable of supporting vegetation. Other drainages support discontinuous clumps of vegetation around areas of prolonged ponding or saturation similar to that found in freshwater seep wetlands.

Excavated Drainages

Realigned historic drainages that receive sufficient precipitation or runoff to maintain the characteristics of a water of the U.S. also fall under Section 404 jurisdiction. Several excavated drainages are located on the proposed Tolay Reservoir site, including Tolay Creek and its tributaries, which are actually realigned historic drainages that continue to function biologically as wetlands. Typical excavated drainage wetland vegetation is similar to that found along drainages, non-wooded riparian areas, and freshwater marsh.

Freshwater Marsh

This wetland type contains vegetation adapted to perennially wet conditions. Cattails and tules occur in deeper water and baltic rush, spike rush and nutsedge occur along the moist margins. Freshwater marsh wetlands are found in association with perennial streams and around farm ponds. Natural lakes and ponds are rare in the Project area. However, the valley floor of the proposed Tolay storage site formerly supported a large seasonal lake and associated freshwater marsh vegetation.

Freshwater Ponds

Most ponds and lakes in Sonoma County are artificial, and were created using impoundments constructed to collect overland runoff and surface water flows in natural drainages. Water from these artificial ponds is often used for stock watering and agricultural irrigation. Stockponds function as freshwater pond wetlands and have been included as potential jurisdictional waters of the U.S. because the vast majority impound natural drainages or have been excavated in areas that were formerly freshwater seeps or annual grassland wetlands. The quality of wetland and aquatic habitat provided by stockponds or freshwater pond wetlands varies tremendously. Bands of emergent vegetation occur along the fringe of some stock ponds, while others are unvegetated due to heavy livestock grazing around their margins or wide fluctuations in water level. Cattails, spike rush, tules and a variety of willows are may be found around the edges of stockponds.

Freshwater Seeps

Freshwater seep wetlands form where high seasonal groundwater reaches the surface, and they are easily identified because they stay green into the summer long past the surrounding upland annual grasses. Freshwater seeps are typically inundated or saturated longer than annual grassland wetlands. Spring boxes have been installed in many seeps within the Project area for livestock watering.

Mixed Riparian Woodland

Mixed riparian woodlands are associated with perennial or intermittent streams and contain broad-leaved, closed canopied deciduous trees and an extensive understory of shade tolerant shrubs.

Many areas of woody riparian vegetation, especially where degradation of the channel has lowered the groundwater level, do not meet the mandatory wetland hydrology criterion and therefore are not under Corps 404 jurisdiction. The upper edges of riparian corridors, are non-wetlands and commonly support California bay, live oak, oak, and buckeye which intergrade into annual grasslands.

Non-wooded Riparian Wetlands

These are well defined channels, generally wider than ten feet, that once supported riparian shrubs or trees that have since been eliminated by grazing or other disturbance. Non-wooded riparian wetlands are most often vegetated with a scattering of annual herbaceous species much like those that are found in annual grassland wetlands.

Seasonally Wet Vegetation Wetlands

Seasonally wet vegetation wetlands are an intermediate classification between vernal pools and annual grassland wetlands. The period of inundation separates the three types of seasonally inundated wetlands. Vernal pools hold water the longest and contain the highest diversity of native, endemic species, and annual grassland wetlands hold water for a shorter length of time and contain more non-native species. Seasonally wet vegetation is found in depressions in the landscape such as swales and basin floors that briefly pond water in the winter and spring or that become saturated by perched near-surface groundwater.

Vernal Pools

Vernal pools occur in depressions in grasslands and other habitats that are underlain with an impervious soil layer. These depressions fill with water in the winter and slowly dry in the spring and summer. Vernal pools are classified according to the substrate on which they occur. These substrates include terrace soils, volcanic mudflows, and clay hardpan.

The vegetation of vernal pools is generally characterized by springtime dominance of native annual plants, often providing striking wildflower displays. As water in the vernal pools recedes during the spring, vernal pool annual plants begin to germinate and grow. Rings of species adapted to different physical conditions flower in succession.

Willow Riparian Wetlands

Willow riparian wetlands commonly are composed of dense thickets of willow (*Salix laevigata*) and arroyo willow (*Salix lasiolepis*) with little or no understory. Willow riparian wetlands generally occur within and immediately along stream courses and other locations where surface water or groundwater seeps are near the surface. Willow riparian wetland communities commonly occur on freshly deposited sand and silt soils on flood plains. Because these communities commonly occur in locations of permanent or semi-permanent moisture and they provide shade and forage throughout the year, they tend to attract livestock and are often severely degraded.

Undetermined Wetland Type

Portions of the bay lands were not accessible for on-site surveys. Therefore, color aerial photos (3x3 inch color slides from April, 1994) were used to map and evaluate the wetland communities. Although wetland areas were discernible on the photos, it was not possible to determine the type of wetland habitat present, so these areas were mapped as “undetermined wetland type.”

Table 4.10-1

Regional Wetland Habitat Types and Functional Habitat Classification Systems

Wetland Plant Community Type (Shuford and Timossi/Holland)[1]	Wetland Classification (Cowardin)[2]	Wetland Wildlife Habitat (Mayer and Laudenslayer)[3]	Physical Wetland Classification (Brinson)[4]
Annual grassland wetlands	Palustrine[5], emergent wetland, seasonally flooded	Annual grassland	**Geomorphic Setting.** Retains inflow, loss is primarily by evapotranspiration. Subject to wide fluctuation in water depth. Geographic location critical to migrating waterfowl as flyway position indicates. Changes in vegetation create varied waterfowl habitat. **Water Source**. Water supplies support vegetative complexity and habitat structure not found in uplands because of water stress in arid climate. **Hydrodynamic Properties**. Precipitation and evapotranspiration dominate site water balance. Floodwaters retained by depressions. Fluctuating water table conducive to rapid biogeochemical cycling; strong atmospheric exchanges.
Coastal brackish marsh	Estuarine, intertidal, emergent wetland, irregularly flooded	Estuarine	See coastal salt marsh below.
Coastal salt marsh	Estuarine, intertidal, emergent wetland, irregularly flooded	Saline emergent wetland	**Geomorphic Setting.** Barrier to saltwater encroachment; accommodates sediment deposition; open to estuarine organisms for feeding and recruitment. **Water Source.** Filled by precipitation, groundwater, and lateral surface or near surface water transport. High primary production occurs when water is abundant. **Hydrodynamic Properties**. Very active region for biogeochemical process and estuarine food web support.

Table 4.10-1

Regional Wetland Habitat Types and Functional Habitat Classification Systems

Wetland Plant Community Type (Shuford and Timossi / Holland)[1]	Wetland Classification (Cowardin)[2]	Wetland Wildlife Habitat (Mayer and Laudenslayer)[3]	Physical Wetland Classification (Brinson)[4]
Cropland wetland	Palustrine, emergent wetland, seasonally flooded	Cropland	See annual grassland wetlands.
Drainages	Riverine, intermittent or upper perennial, forested, broad-leaved deciduous or emergent vegetation wetland	Sub-element of larger wildlife habitat types	**Geomorphic Setting.** Riverine. Headwater position. First order stream. Flows not continuous. Flow precludes extensive wetland development. Unvegetated reaches allow light penetration to support aquatic production. **Water Source.** Groundwater discharge and lateral surface transport from upstream. **Hydrodynamic Properties.** Unidirectional flow with properties of high gradient or middle gradient land forms.
Excavated drainage wetlands	Riverine, intermittent or upper perennial, unconsolidated bottom wetland with or without emergent vegetation	Sub-element of larger wildlife habitat types	See drainages.
Freshwater marsh	Palustrine emergent wetland, permanently or irregularly flooded	Fresh emergent wetland Lacustrine	**Geomorphic Setting**. Temporary flood storage; drainage back to stream shortly after flooding with surface water supported marshes or continuous saturation from groundwater supported marshes. Probable import and export of detritus. **Water Source**. Water supplies support vegetative complexity and habitat structure not found in uplands because of water stress in arid climate.

Table 4.10-1

Regional Wetland Habitat Types and Functional Habitat Classification Systems

Wetland Plant Community Type (Shuford and Timossi/Holland)[1]	Wetland Classification (Cowardin)[2]	Wetland Wildlife Habitat (Mayer and Laudenslayer)[3]	Physical Wetland Classification (Brinson)[4]
			Hydrodynamic Properties. Residence time of water allows long contact between water and sediment. Low suspended load allows light penetration. Good conditions for trapping sediment and altering water quality. As nutrients trap, food web support is strong. Reducing conditions favor strongly obligate wetland species.
Freshwater ponds	Impounded, palustrine, emergent wetland fringe, with unvegetated shallows	Lacustrine	**Geomorphic Setting.** Artificially impounded drainages converted to seasonal stock ponds. These features have surface inlets as well as gradual outlets in the form of leakage below the dam site. They provide temporary flood storage although most are equipped with spillways. **Water Source.** Groundwater discharge, and, during flood flows, lateral surface transport from upstream. High water tables are maintained by catchment supplies from upstream and from groundwater sources. Water supplies support vegetative complexity not found in uplands because of water stress in arid climate. **Hydrodynamic Properties.** Nearly constant water table at or near the surface. These levels are augmented during high flows with unidirectional flow from the upstream watershed.

Table 4.10-1

Regional Wetland Habitat Types and Functional Habitat Classification Systems

Wetland Plant Community Type (Shuford and Timossi / Holland)[1]	Wetland Classification (Cowardin)[2]	Wetland Wildlife Habitat (Mayer and Laudenslayer)[3]	Physical Wetland Classification (Brinson)[4]
Freshwater seeps	Palustrine, emergent wetland, intermittently flooded	Sub-element of larger wildlife habitat types	**Geomorphic Setting**. In cases where groundwater discharge occurs at the face of a slope, flows may maintain saturated conditions year-round, resulting in shallow but predictably stable water table flooding. Availability of this water source during dry periods may contribute to diversity of the landscape. **Water Source**. Resources are abundant and the environment is predictable, making conditions conducive to relatively high primary production and biomass accumulation. **Hydrodynamic Properties**. Water replacement stabilized by groundwater seepage may maintain high redox levels relative to stagnant saturated soils, thus allowing the establishment of plant species that are not restricted to strongly reducing environments.
Mixed riparian woodland	Riverine, intermittent or upper perennial, forested, broad-leaved deciduous wetland	Valley foothill riparian	**Geomorphic Setting**. Wetlands in this middle-gradient landform differ from surrounding landscape by displaying a preponderance of woody vegetation and high structural complexity. Such corridors of forest provide habitat for many songbirds and other wildlife. Active geomorphology assures interspersion of plant communities, thus contributing to beta diversity. **Water Source**. Water supply supports vegetative complexity and habitat structure in contrast to poorly developed vegetation in arid uplands. Floodplain

Table 4.10-1

Regional Wetland Habitat Types and Functional Habitat Classification Systems

Wetland Plant Community Type (Shuford and Timossi/Holland)[1]	Wetland Classification (Cowardin)[2]	Wetland Wildlife Habitat (Mayer and Laudenslayer)[3]	Physical Wetland Classification (Brinson)[4]
			topographic features are varied and complex, providing the template for interspersion of several plant communities ranging from early successional, shade-intolerant species to those occupying more stable sites. **Hydrodynamic Properties**. Interspersion of low- and high-energy environments supports complex food webs. Because they are relatively well flushed during flood events and aerated near surface, accumulation of organic matter is prevented. Consequently, they possess a high capacity to import nutrients and export toxins. (Brinson 1993)
Non-wooded riparian wetland	Riverine, intermittent or upper perennial, unconsolidated bottom wetland with or without emergent vegetation	Sub-element of larger wildlife habitat types	See drainages.

Table 4.10-1

Regional Wetland Habitat Types and Functional Habitat Classification Systems

Wetland Plant Community Type (Shuford and Timossi / Holland)[1]	Wetland Classification (Cowardin)[2]	Wetland Wildlife Habitat (Mayer and Laudenslayer)[3]	Physical Wetland Classification (Brinson)[4]
Seasonally wet vegetation wetland (including vernal pools)	Palustrine, emergent wetland, seasonally flooded	Annual grassland	**Geomorphic Setting**. Endemic species are likely in vernal pools since they are inaccessible to aquatic organisms dependent on streams. **Water Source**. Rarity of water table drawdown promotes organic matter accumulation which further retards drainage. Conditions support a diverse endemic flora and fauna. **Hydrodynamic Properties**. Frequent deficits in site-water balance result in ephemeral aquatic ecosystems because of temporary floodwater storage. Support of rare plant and aquatic communities.
Undetermined wetland type	N/A	Sub-element of larger wildlife habitat types	N/A
Willow riparian wetlands	Riverine, intermittent or upper perennial, forested, broad-leaved deciduous wetland	Valley foothill riparian	Similar to mixed riparian woodland described above, but lacking the structural diversity of the mixed woody vegetation.

Source: Harland Bartholomew & Associates, 1996

1. Community types developed after Shuford and Timossi's "Plant Communities of Marin County" (1989) and Robert Holland's "Preliminary Descriptions of the Terrestrial Natural Communities of California" (1986).
2. Cowardin et al., 1979. Classification of Wetlands and Deepwater Habitats of the U.S..
3. Mayer and Laudenslayer, 1988. A Guide to Wildlife Habitats of California.
4. Wetland function descriptions derived from the Hydrogeomorphic Classification for Wetlands (Brinson 1993).
5. Freshwater ponds are conventionally considered palustrine habitat and will be referenced throughout this section as palustrine, through the CWHR System groups lacustrine and palustrine under lacustrine.

Regional Resource Planning Efforts

Many large-scale wetlands planning efforts have been undertaken throughout Sonoma and Marin counties to conserve and restore wetlands resources. A summary of the major regional planning efforts and their guidelines for wetlands resources protection is presented in Table 4.8-4 in the Terrestrial Biological Resources Section.

Geographic Area Resource Description (Area of Indirect Impacts)

The Area of Indirect Impacts in Sonoma and Marin counties can be divided into five relatively distinct geographic areas (Santa Rosa Plain/Russian River, West County, South County, Sebastopol, and geysers) based primarily on watersheds and their associated aquatic and terrestrial biological resources. A brief discussion of the affected environment, including jurisdictional wetlands and local wetlands resource planning efforts, follows. The geographic areas are shown on Figure 4.8 - 1a, b, and c of Section 4.8, Terrestrial Biological Resources.

Santa Rosa Plain/Russian River

Watersheds

The major watersheds associated with the Santa Rosa Plain/Russian River area are those drained by the Russian River, Mark West Creek, and Santa Rosa Creek. However, other smaller perennial and intermittent creeks are also present within this geographic area.

Jurisdictional Wetlands and Other Waters of the U.S.

Seasonal wetlands occur on poorly drained soils, such as the Clear Lake soil type, and are common in the Santa Rosa Plain area. Many of these wetlands are highly disturbed through long-term exposure to heavy grazing pressure and other agricultural uses including oat and hay production.

Vernal pools are often hydrologically linked to other seasonal wetlands and are scattered throughout the Santa Rosa Plain. Human disturbances have resulted in localized degradation of this unique resource. Many endemic wildlife and plant species of vernal pools are now provided federal and state protection, including California linderiella (*Linderiella occidentalis*), California tiger salamander (*Ambystoma californiense*), dwarf downingia (*Downingia pusilla*), Sonoma sunshine (*Blennosperma bakeri*), Sebastopol meadowfoam (*Limnathes vinculans*), many-flowered navarretia (*Navarretia leucocephala* ssp. *plieantha)*, and Burke's goldfields (*Lasthenia burkei*).

West County

The West County geographic area is defined as north of San Antonio Creek/Petaluma, south of a line between Salmon Creek and Sebastopol, and east of U.S. Highway 1 with a western limit approximately ten miles west of U.S. Highway 1 along Americano Creek (see Figure 4.8-1 (c) of the Terrestrial Biological Resources Section).

Watersheds

The main watersheds in the West County area are Americano Creek, Stemple Creek, Estero de Americano, and Estero de San Antonio. However, other smaller perennial and intermittent creeks are present within the geographical area.

Jurisdictional Wetlands and Other Waters of the U.S.

The most extensive salt marsh communities in the Area of Indirect Impacts are located at the mouths of the Estero Americano and Estero de San Antonio. Salt marshes, mudflats, perennial freshwater marshes, and salt ponds are found near the mouth of the Estero Americano (Smith 1988). The Estero de San Antonio also supports salt marshes and perennial freshwater marshes, with smaller acreage of salt ponds, mud flats, and eelgrass beds (Smith 1988). Both esteros are protected under as part of the Gulf of Farallones National Marine Sanctuary. Seeps and intermittent streams are present on the hillsides surrounding both esteros (Madrone Associates 1977). Livestock grazing has affected the wetlands present in the Esteros Americano and de San Antonio, reducing vegetative cover and degrading water quality (Smith 1988).

In contrast to the primarily saline environment of the esteros, other wetlands in the West County area are emergent freshwater systems on the floors of Coast Range valleys associated with seasonally flooded low gradient stream systems. These habitats develop in gentle swales between small ridges. Some willow riparian habitat is present in areas that have not been heavily grazed.

The Two Rock reservoir site possesses a deeply-incised ephemeral tributary drainage discharging to a perennial, intermittently impounded unnamed mainstem creek. Potential jurisdictional wetlands present at the proposed Two Rock site are narrow swales in gully bottoms, bottom-land wet meadows, broad low-gradient hillside swales, hillside freshwater seeps, and emergent marsh habitat associated

with stockponds, tributaries, and the unnamed mainstem. Waters of the U.S. at this site include high gradient ephemeral stream channels and the unnamed creek channel. Drainages and annual grassland wetlands dominated by grazed non-native grasses represent approximately half of the potential jurisdictional wetlands at this proposed reservoir site.

At the Bloomfield reservoir site, two intermittent channels converge to form a broad basin incised by a perennial, slow-moving, unnamed main creek channel. Potential jurisdictional wetlands present on the basin floor include annual grassland wetlands dominated by heavily grazed, non-native grasslands, emergent reaches of the unnamed mainstem creek, hillside freshwater seeps, and stream tributaries. The creek is dammed in several places, creating a series of stock ponds with a scattering of emergent vegetation around them. Waters of the U.S. observed at the site include incised ephemeral stream channels and the unnamed perennial mainstem creek. The majority of wetland acreage on this site consists of annual grassland wetlands or seasonally wet vegetation on the basin floor. Willow riparian vegetation is located in the upper reaches of the unnamed creek, and freshwater marsh habitat is located downstream.

The Valley Ford reservoir site supports broad annual grassland wetlands dominated by heavily grazed non-native grassland, some incised channels, and several stock ponds. Potential jurisdictional wetlands are found in the broad, flat basin floor along the main axis of the proposed reservoir site, in narrow seasonal drainages in gully bottoms, and in association with stock ponds. Waters of the U.S. observed at this site include two incised ephemeral tributary channels which flow into the unnamed perennial mainstem creek. The predominant type of wetland at the site is heavily-grazed annual grassland wetland located on the basin floor. However, large areas of freshwater marsh are associated with stock ponds, and a protected band of continuous willow riparian woodland is present along one of the tributaries to the unnamed main creek.

The Carroll Road reservoir site has two incised, high-gradient tributaries discharging to an unnamed mainstem creek channel. Potential jurisdictional wetlands include hillside freshwater seeps, annual grassland wetlands on broad, flat basin floors, wide low-gradient drainages (both types dominated by grazed non-native grasslands), and freshwater marsh areas associated with stock ponds and the deeply incised unnamed creek mainstem. Waters of the U.S. include the incised ephemeral and perennial tributaries, as well as the perennial mainstem creek.

The upper watershed of the Huntley reservoir site is characterized by freshwater seeps, annual grassland wetlands, seasonally wet vegetation in basins and swales, and high gradient drainages with overstories of eucalyptus. The unnamed main

creek channel traverses the length of the site. The upper third portion of main channel vegetation is dominated by eucalyptus. The middle section is dominated by dense mixed and willow riparian vegetation. The lower section is characterized by seasonally wet vegetation on the widened valley floor bisected by a non-wooded riparian channel.

South County

Wetlands

The main watersheds in the South County area are drained by Washington Creek, San Antonio Creek, Willow Brook Creek, Lichau Creek, Tolay Creek, Copeland Creek, and the Petaluma River, along with other perennial and intermittent creeks.

Jurisdictional Wetlands and Other Waters of the U.S.

Potential jurisdictional wetlands present in the South County area include hillside and valley freshwater seeps and willow riparian woodlands growing along deeply incised stream channels. Prominent in the Tolay Creek watershed is a large historic lakebed that was converted to agriculture at the turn of the century. Both the Tolay Extended and Tolay Confined reservoir sites are located in the Tolay Valley. Remnant patches of the lakebed remain unconverted and function as annual grassland wetland or seasonally wet grassland. Cropped lakebed has been classified as farmed wetland. Other potential jurisdictional wetlands found in the Tolay watershed include emergent freshwater marsh areas in linear drainages, the mainstem of Tolay Creek, hillside freshwater seeps, narrow strips of freshwater marsh along the shorelines of stock ponds and low streambanks, and swales in gully bottoms. Waters of the U.S. that are associated with this watershed include the perennial mainstem of Tolay Creek and some of its ephemeral drainages.

At the Adobe Road reservoir site, deeply-incised ephemeral tributaries feed a well-scoured, gravel-bottomed main channel. Under dry season conditions, multiple pools of standing water exist in the main channel. Potential jurisdictional wetlands are predominantly in narrow gully bottom swales. Other observed potential jurisdictional wetlands at this proposed reservoir site include a freshwater marsh at the periphery of a stock pond (located at the drainage head), and several hillside freshwater seeps. Waters of the U.S. present at the Adobe Road site include many ephemeral tributary channels and the unnamed ephemeral creek mainstem.

The Lakeville Hillside reservoir site contains two deeply-incised ephemeral tributaries discharging to an unnamed mainstem creek. Potential jurisdictional

wetlands are present in narrow gully-bottom swales and include annual grassland wetlands dominated by non-native grassland associated with the mainstem, hillside freshwater seeps, and some freshwater marshes associated with ponded segments of the unnamed mainstem creek. Waters of the U.S. at this site include steep-gradient ephemeral tributaries and the low-gradient, intermittent creek mainstem.

The Sears Point reservoir site possesses deeply-incised ephemeral tributaries discharging to the moderate to deeply incised Tolay Creek. Potential jurisdictional wetlands are present primarily in the mainstem, adjacent stream terraces, and tributaries to Tolay Creek. Channels are bordered by forested riparian woodlands, especially on stream terraces. These riparian woodlands are composed of a mixture of willows, cottonwood, and valley oak, with a sparse herbaceous understory. Potential jurisdictional wetlands include portions of drainages located in gully bottoms, freshwater seeps, and freshwater marsh associated with stock ponds adjacent to Tolay Creek on the basin floor. Some freshwater marsh habitat is present at the Sears Point site but is limited to narrow strips along low stream banks and small islands on sandbars at the confluence of Tolay Creek and its tributaries.

The bay flats region consists largely of diked and levied salt marsh areas that were converted to farmlands prior to 1985. Rye grass (*Lolium* spp.) is the most commonly farmed crop in lowland areas (-5 to +5 feet above mean sea level), while vineyards have been established at higher elevations (>5 ft above mean sea level). In addition, salt marsh habitat occurs along the lower Petaluma River where it enters San Pablo Bay in Marin County. Emergent wetlands bordering the numerous canals are a significant component of potential jurisdictional wetlands within the bay flats region. The emergent wetlands range in salinity from brackish in the lower regions of the watershed to fresh in the upper portions. Salinity regimes in this wetland type are affected by various factors including seepage of groundwater from the surface aquifer and mixing with more saline areas downgradient of the seeps. The fluctuations in salinity and availability of perennial water encourage a diverse plant community in the freshwater emergent marshes in this area.

Sebastopol

Watersheds

There are two major watersheds within the Sebastopol area. One is drained by Green Valley Creek and Atascadero Creek, and the other is drained by Mark West Creek and the Laguna de Santa Rosa. The Laguna de Santa Rosa, the floodplain I

for Mark West Creek, is described above under the Santa Rosa Plain/Russian River geographic area.

Jurisdictional Wetlands and Other Waters of the U.S.

The majority of wetland types in the Sebastopol area are wetlands converted to apple orchards and oat hay farmlands. This area has been heavily impacted by development and few undisturbed wetland areas remain. Some riparian forested habitat exists along deeply incised stream channels. The Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan (CH2M Hill 1995) identifies high quality vernal pools east of Sebastopol and west of Santa Rosa.

Geysers

Watersheds

The principal drainage in the geysers area is Big Sulphur Creek which is a tributary to the Russian River. Several smaller tributaries are also present within the geysers area including Anna Belcher Creek, Little Sulphur Creek, Cobb Creek, Squaw Creek, Hurley Creek, Deer Creek, Sausal Creek, Hoot Owl Creek, Maacama Creek, Franz Creek, Brooks Creek, and Pool Creek.

Jurisdictional Wetlands and Other Waters of the U.S.

At lower elevations, seasonal flooding results in potential jurisdictional wetlands adjacent to a variety of perennial and intermittent streams within the geysers geographic area. At higher elevations, flooding diminishes, stream channels are incised, and potential jurisdictional wetland habitat adjacent to streams decreases. At higher elevations in a few areas, unique wet meadow habitats occur where groundwater breaks out of slope areas and ponds on small (15 to 30 feet wide) swale areas. These meadows and seeps, often on serpentinite soils and surrounded by Ponderosa pines are highly diverse and harbor several rare plant species. At the highest elevations, streams are ephemeral, and little wetland vegetation is present along them.

EVALUATION CRITERIA WITH POINTS OF SIGNIFICANCE

The CEQA Guidelines (1994) state that effects on the environment that conflict with adopted environmental plans or goals are normally regarded as significant. A "no net loss of wetland acreage or value" policy is established within both the state and federal executive branches (California Wetlands Conservation Policy 1993). For the purposes of

this document, any unmitigated destruction of wetlands or other waters of the U.S. (either in fill or areal extent of destruction) is considered significant.

Ditching, draining, or other activities which could alter the characteristic physical, chemical, biological or public interest values (as defined by 40 CFR 230 Subparts C-F) associated with wetlands and other waters of the U.S. are considered impacts under Corps authority and are evaluated in other appropriate sections.

Table 4.10-2

Evaluation Criterion with Point of Significance - Jurisdictional Wetlands Resources

Evaluation Criterion	As Measured by	Point of Significance	Justification
1. Will the Project destroy wetlands or other waters of the U.S.?	Acreage of permanent discharge to or placement of fill in potential jurisdictional wetlands or other waters of the U.S.	Greater than 0 acre	Clean Water Act, 40 CFR 230 Section 404(b)(1) Guidelines, Corps, EPA, and State of California no net loss policies.

Source: Harland Bartholomew & Associates, Inc., 1996

METHODOLOGY

Wetland determinations were conducted on Project component sites utilizing Corps recommended on-site and off-site methods. Wetland boundaries were estimated on the appropriate base map. The following attributes were estimated during the GIS analysis for each wetland:

- Areal extent (acreage);
- Wildlife habitat; and
- Dominant vegetative community.

The dominant vegetative community type was determined by overlaying the wetlands mapping with the vegetative community mapping (Harland Bartholomew & Associates, Inc. 1996b-f). This methodology resulted in upland vegetative community assignment to small fragments of wetlands where the boundaries of the vegetative mapping and the wetland mapping were slightly inconsistent. As a result, portions of some wetlands may be attributed with an upland vegetative community (i.e. oak woodland, eucalyptus). Formal jurisdictional delineations of the wetland boundaries on all components of the

selected Project will be conducted during Project permitting. All discrepancies in vegetative community assignments will be corrected at that time.

Storage Reservoirs

The survey area included all lands within each reservoir storage site and within 500 feet of proposed impoundment shorelines. Prior to field surveys for wetlands and other waters of the U.S., the following information was evaluated for the ten reservoir sites:

- 1" = 500' aerial photos of the proposed reservoir sites overlain with proposed reservoir/shoreline boundaries (May 1994);
- National Wetland Inventory maps prepared by the U.S. Fish and Wildlife Service;
- U.S. Geological Service (USGS) quadrangle maps of the Project site and surrounding region;
- Soil Conservation Service (SCS) Soil Survey of Sonoma County (1972);
- SCS Soil Survey of Marin County (1985); and
- Jurisdictional Wetland Delineation for Portions of the Stemple and Americano Creek Basins and the Tolay Valley, prepared by North State Resources and Golden Bear Biological Studies for CH2M Hill (CH2M Hill et. al. 1990).

Areas that appeared to support potential jurisdictional wetlands and other waters of the U.S. were identified on USGS and SCS maps and aerial photos in the office before field work began. Field determinations were conducted during July, August, and September of 1994 and February, March, April, and May of 1995. Some potential jurisdictional wetlands were revisited in the spring of 1995 to confirm vegetation determinations and to record hydrologic indicators which were not readily observable during dry season surveys in the summer of 1994. Determinations at each data point were made following the 1987 Corps of Engineers Wetland Delineation Manual (Environmental Laboratory 1987) on the basis of three mandatory wetland criteria (hydrophytic vegetation, hydric soils, and wetland hydrology). However, the mapped boundaries of wetlands were based primarily on an analysis of aerial photographs and field observations of vegetation types.

All potential jurisdictional wetlands and other waters of the U.S. larger than 0.10 acre were mapped and many other smaller seeps and isolated wetlands were included. The approximate acreage for each wetland community type mapped on each proposed reservoir site was rounded off to the nearest acre. Potential jurisdictional wetland boundaries were recorded on 1" = 500' scale aerial photos. Slight variations in shade and texture that were visible on the aerial photos were correlated with field observations to confirm wetland boundaries. This information was then transferred to 1" = 500' scale contour base maps of each site, the information was compared with vegetation community mapping, and the information was incorporated into the Project GIS data base

for analysis (*Biological Resource Volume 4A - F,* Harland Bartholomew & Associates, Inc. 1996b-f).

A summary and checklist of all sites visited and Routine On-Site Determination Method Data Forms are included in the *Wetland Determination Report for Proposed Reservoir Sites* (Parsons Engineering Science, Inc. 1996c).

Pump Stations

Planning level wetland determinations were completed for pump stations using off-site methods and drive-by surveys. A few pump stations were accessed during early surveys of the reservoir storage sites and agricultural irrigation areas, and this information was incorporated into the Project GIS data base. Off-site surveys used 1"=500' June 1990 black and white aerial photographs, USGS topographic maps, 1972 Sonoma County Soil Survey Report, Project facility maps overlayed with topographic lines at 1" = 1000' scale, and previous studies of the area. For areas for which it was available, off-site mapping performed as part of the wetland determinations of agricultural irrigation areas was also used for the pump station determinations.

Pipelines

Planning level wetland determinations were performed along proposed transmission and distribution pipelines between April 1995 and January 1996 by means of drive-by surveys and, wherever possible, wetland determinations following the 1987 Corps Manual. Areas evaluated included well defined channels, swales and depressions generally larger than 5 feet wide (referred to in this discussion as "stream crossings") which crossed or ran parallel to the surveyed roadways. Alignments on private property outside rights-of-way were not surveyed. Stream crossings in urban areas such as Santa Rosa or along existing pipeline routes were not surveyed for potential jurisdictional wetlands or other waters of the U.S., but were surveyed for aquatic habitat (Merritt Smith Consulting 1996c). Small pipelines that would convey irrigation water from distribution lines to individual irrigation systems have not been designed and therefore impacts could not be evaluated. As stated in the Irrigation Management Guidelines, detailed site-specific Irrigation Conservation and Management Programs will be prepared for each parcel proposed for irrigation with reclaimed water (Questa Engineering Corporation 1996). Additional site studies will be required in order to ensure avoidance or minimization of potential impacts from the installation of these pipelines.

On-site determinations were conducted solely along pipeline alignments in roadways with public rights-of-ways within 30 feet of the roadway centerline, often at bridge or culvert crossings. Stream crossing locations and attributes were recorded on 1" = 500' June 1990 aerial photos and Project facility maps that included topographic contours.

Isolated wetlands within the roadway right-of-way were noted if a prominent structure, such as a 36-inch or larger corrugated metal pipe, crossed the roadway, if evidence of prolonged surface water ponding was present, or if sensitive wetland plant communities such as vernal pools or freshwater marsh were observed. Small, isolated areas of seasonally wet vegetation, freshwater seeps and annual grassland wetlands within the right-of-way were not included in the assessment because direct impacts would be avoided through implementation of elements of design practices provided in the Project description.

Field surveys for pipelines were not completed on private property or cross-country alignments. Cross country alignments would require an approximately 60-foot wide construction disturbance corridor. Pipeline alignments have been located within existing dirt roads wherever feasible. These pipeline segments were evaluated using aerial photo interpretation, mapping generated during reservoir and agricultural irrigation area surveys, and other reference information described in the Storage Reservoirs methodology. See *Wetland Determination and Mitigation for Pipeline Alignments* for more detailed methodologies and units (Parsons Engineering Science, Inc. 1996b).

Agricultural Irrigation Areas

The extent of natural wetlands present in the irrigation areas was determined initially by analyzing existing data (listed under Storage Reservoirs) to develop preliminary wetlands mapping and irrigation suitability for parcels to be irrigated. Then, planning level wetland determinations and irrigation suitability mapping were performed on accessible properties, and off-site determinations were completed on inaccessible properties (the majority of the area involved).

Planning level wetland determinations were performed from July to September 1994; from November 1994 to March 1995; and from May to August 1995. These determinations were performed using similar methods, but at lower intensities and resolution than the determinations completed for the reservoir sites. Jurisdictional delineations will be performed for all potential wetlands prior to implementing irrigation on each parcel.

The planning level determinations for agricultural irrigation areas were mapped on June 1990 aerial photographs (1" = 500') and transferred to topographic maps (1" = 1,000'). The approximated acreages for wetland types mapped for each proposed irrigation area were rounded to the nearest acre. See *Agricultural Irrigation Areas Wetlands Determination* Technical Memorandum for detailed methodologies (Parsons Engineering Science, Inc. 1996a).

Geysers Steamfield

Stream crossings were documented in *Aquatic Habitat Survey Results* (Merritt Smith Consulting 1996b), *Aquatic Life Survey Results* (Merritt Smith Consulting 1996d), and *Aquatic Biological Resources Impacts Analysis Report* (Merritt Smith Consulting 1996e).

Discharge

The site of the Russian River outfall structure was surveyed for potential jurisdictional wetlands and waters of the U.S. using off-site methods. Off-site surveys were completed by reviewing 1" = 500' June 1990, black and white aerial photographs, USGS topographic maps, 1972 Sonoma County Soil Survey Report, and Project facility maps overlayed with topographic lines at 1" = 1000' scale.

ENVIRONMENTAL CONSEQUENCES (IMPACTS) AND RECOMMENDED MITIGATION

No Action (No Project) Alternative

Impact: **10.1.1. Will the No Action Alternative destroy wetlands or other waters of the U.S.?**

Analysis: *No Impact; Alternative 1.*

The No Action Alternative involves no additional construction. Continued discharge of reclaimed water to the Laguna will not result in the destruction of wetlands or other waters of the U.S.

Mitigation: No mitigation is needed.

Headworks Expansion Component

Impact: **10.2.1. Will the headworks expansion component destroy wetlands or other waters of the U.S.?**

Analysis: *No Impact; All Alternatives.*

The headworks expansion replaces the existing pumps, located within a building, with six new higher-capacity pumps. There will be no impact associated with permanent discharge or placement of fill in wetlands or other waters of the U.S.

Alternative 1 does not have a headworks expansion component.

Mitigation : No mitigation is needed.

Urban Irrigation Component

Impact: 10.3.1. Will the urban irrigation component destroy wetlands or other waters of the U.S.?

Analysis: *No Impact; All Alternatives.*

The acreage and rate of application of irrigation water at the urban irrigation sites will not change. The only change will be the source of the irrigation water. Currently, these sites are supplied with water from wells and City water. The Project alternatives will provide for the use of reclaimed water. Since these are developed and landscaped properties, and both the rate of application and the area irrigated will not change as a result of this Project, there will be no impact associated with the permanent discharge or placement of fill in wetlands or other waters of the U.S.

Alternatives 1, 4, and 5 do not have an urban irrigation component.

Mitigation: No mitigation is needed.

Pipeline Component

Table 4.10-3

Jurisdictional Wetlands and Waters of the U.S. Component Impacts - Pipelines

Evaluation Criteria	Point of Significance	Impact (acres)	Type of Impact[1]	Level of Significance[2]
10.4.1. Will the Project destroy wetlands or other waters of the U.S.?	Greater than 0 acre of permanent discharge or placement of fill			
• Alt 2A		9.4	C	⊙
• Alt 2B		8.2	C	⊙
• Alt 2C		9.6	C	⊙
• Alt 2D		8.4	C	⊙
• Alt 3A		14.8	C	⊙
• Alt 3B		16.3	C	⊙
• Alt 3C		15.8	C	⊙
• Alt 3D		14.3	C	⊙
• Alt 3E		14.5	C	⊙
• Alt 4		3.1	C	⊙
• Alt 5A		.002	C	⊙
• Alt 5B		--	C	--
• All alternatives			O&M	==

Source: Harland Bartholomew & Associates, Inc. 1996

1. Type of Impact
   - C Construction
   - O&M Operation & Maintenance

2. Level of Significance
   - ⊙ Significant impact before mitigation; less than significant impact after mitigation
   - == No Impact
   - -- Not applicable

Impact: 10.4.1. Will the pipeline component destroy wetlands and other waters of the U.S.?

Analysis: ***Construction***

Significant; Alternatives 2, 3, 4, and 5A.

Though impacts to jurisdictional waters will be minimized through construction practices outlined in Section 2.2, Measures Included in the Project, impacts will still occur.

Under Measure 2.2.5, Avoid Sensitive Biological Resources, all perennial streams and tributaries are to be avoided by employing bore and jack construction techniques. It is assumed that no topographic constraints to the use of this technique exist along any of the pipeline alignments. Acreage of wetlands and other waters of the U.S. which will be avoided by using bore and jack construction at stream crossings, is provided in Table 4.10-4.

Table 4.10-4

Jurisdictional Waters Impacts Avoided through Bore and Jack Construction

Subalternative	Acres Avoided
Alternative 2A	0.2
Alternative 2B	0.2
Alternative 2C	0.2
Alternative 2D	0.2
Alternative 3A	1.7
Alternative 3B	1.6
Alternative 3C	1.7
Alternative 3D	1.7
Alternative 4	0.2
Alternative 5A	0.1
Alternative 5B	--

Source: Harland Bartholomew and Associates, Inc. 1996

Table 4.10-3 provides acreage of potential wetlands and waters temporarily impacted by pipeline construction through the open trench construction method and not bore and jack. To avoid impacts to aquatic habitat and aquatic life, these small segments of seasonal and ephemeral tributaries will be trenched and backfilled during the dry season (May 15 to October 15). Temporary loss of biotic values could occur during construction and continue through the period of habitat re-establishment. Wetland fills subject to Section 404 jurisdiction would result from backfill and from incidental sidecast from excavation. This acreage was determined using an estimated average disturbance width of 20 feet. Wetlands and other waters of the U.S. impacted are of variable habitat quality.

Measure 2.2.8, Revegetate Temporarily Disturbed Sites, adopted as part of the Project, requires a Revegetation Program that will revegetate all sites disturbed or scarred by construction. Additionally, Measure 2.2.9, Retain Stripped Topsoil, adopted as part of the Project, requires that topsoil removed during construction be stored on site (protected) until it can be placed as final grade in its original location.

No Impact; Alternatives 1 and 5B.

These alternatives do not have a pipeline component.

Operation and Maintenance

No Impact; All Alternatives.

Pipe rupture in aquatic habitat is not expected to result in a fill of wetlands.

No Impact/ Alternatives 1 and 5B.

These alternatives do not have a pipeline component.

Mitigation: *Alternatives 2, 3, 4, and 5A.*

2.3.10. Limit Construction Disturbance.

Alternatives 1 and 5B. No mitigation is needed.

After Mitigation: *Less than Significant; Alternatives 2, 3, 4, and 5A.*

Implementation of this measure in conjunction with the Measures Included in the Project will restore areas temporarily disturbed by construction actions.

Storage Reservoir Component

Table 4.10-5

Jurisdictional Wetlands Resources Impacts - Storage Reservoirs

Evaluation Criterion	Point of Significance	Impact (acres)	Type of Impact[1]	Level of Significance[2]
10.5.1. Will the Project destroy wetlands or other waters of the U.S.?	Greater than 0 acre of permanent discharge or placement of fill			
• Tolay Extended		248	P	⊙
• Adobe Road		30	P	⊙
• Tolay Confined		87	P	⊙
• Lakeville Hillside		24	P	⊙
• Sears Point		53	P	⊙
• Two Rock		64	P	⊙
• Bloomfield		57	P	⊙
• Carroll Road		69	P	⊙
• Valley Ford		102	P	⊙
• Huntley		48	P	⊙

Source: Harland Bartholomew & Associates, Inc. 1996

Notes:

1. Type of Impact
   P Permanent
2. Level of Significance Codes
   ⊙ Significant impact before mitigation; less than significant impact after mitigation

Impact: 10.5.1. Will the storage reservoir component destroy wetlands or other waters of the U.S.?

Analysis: *Significant; Alternatives 2 and 3.*

Storage reservoirs and associated facilities (including dams, access roads, pump stations, and diversion channels) will result in the loss of potential jurisdictional wetland and other waters of the U.S. (including farmed wetlands) for each reservoir site. For all reservoir sites, both the direct fill of jurisdictional waters (as a consequence of reservoir construction) and inundation with reclaimed water will result in significant impacts to this wetlands resource. The affected acreage for each wetland type is provided in Table 4.10-6. See Figures 4.10-1 through 4.10-10 for the distribution of wetlands on storage reservoir sites.

Alteration of wetlands downstream of the dams due to dewatering is described in Section 4.9, Aquatic Biological Resources.

No Impact; Alternatives 1, 4, and 5.

These alternatives do not have a storage reservoir component.

Mitigation: *Alternatives 2 and 3.*

2.3.11 Sensitive Resource Conservation Program.

Alternatives 1, 4, and 5. No mitigation is needed.

After Mitigation: *Less than Significant; Alternatives 2 and 3.*

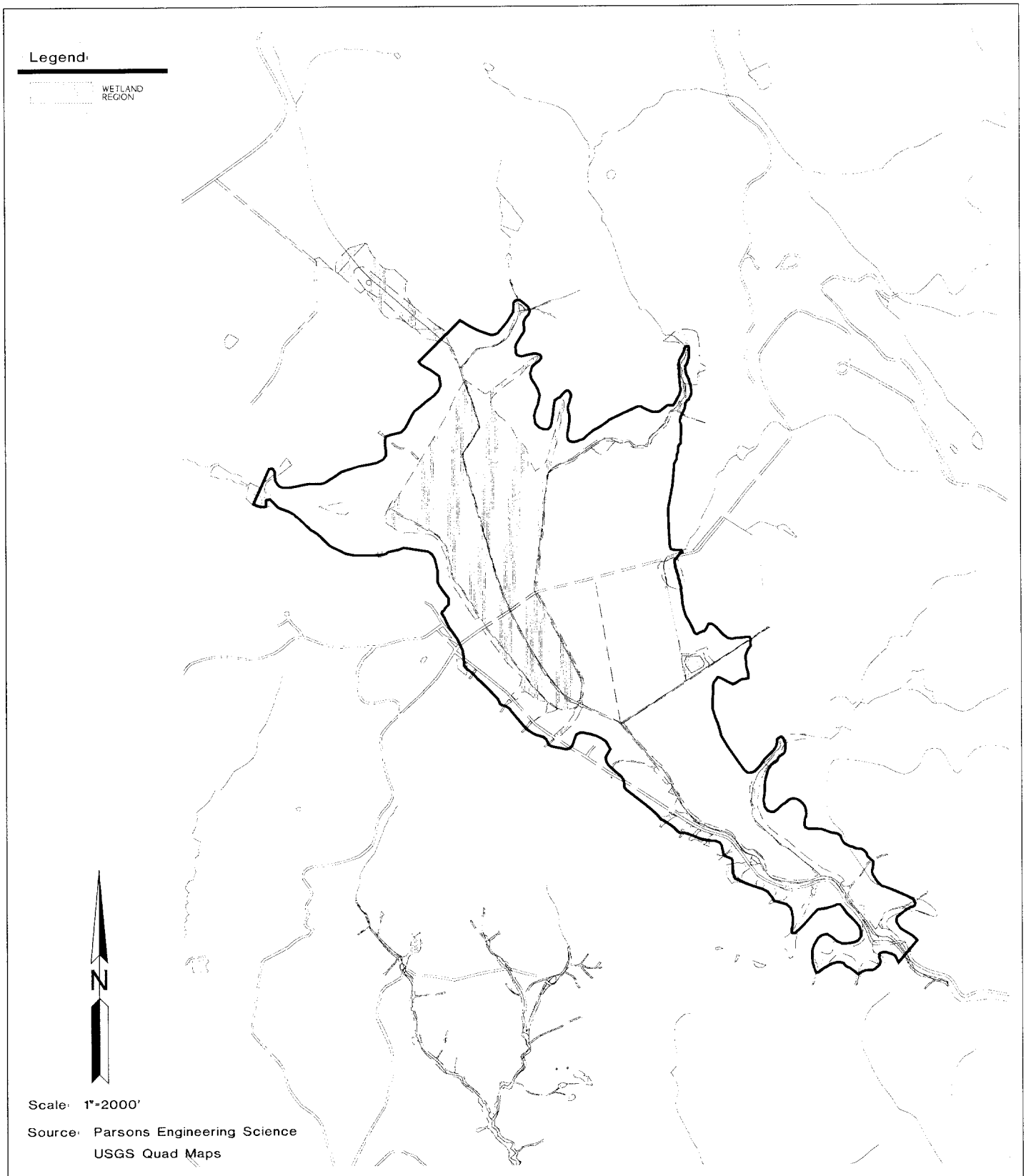
Implementation of Measure 2.3.11 Sensitive Resource Conservation Program, will compensate for loss of wetlands acreage and function through creation of new wetlands, and restoration and preservation of degraded wetlands.

Table 4.10-6

Acreages of Wetland Types Observed at Each Reservoir Site

Wetland Type	Tolay Extended	Adobe Road	Tolay Confined	Lakeville Hillside	Sears Point	Two Rock	Bloomfield	Carroll Road	Valley Ford	Huntley
Annual Grassland Wetland	37	10	22	5	26	24	40	44	49	29
Undetermined vegetation type	< 1	1	< 1	3	<2	2	2	4	<1	2
Drainage	6	0	3	< 1	1	< 1	0	< 1	3	0
Excavated Drainage	6	0	4	0	0	0	0	0	0	0
Freshwater Marsh	0	0	0	0	0	< 1	0	0	0	0
Freshwater Pond	10	2	2	< 1	0	7	1	2	3	1
Freshwater Seep	< 1	1	< 1	<1	< 1	16	0	< 1	2	2
Mixed Riparian Woodland	3	13	3	0	10	5	< 1	0	0	1
Native Grassland Wetlands	4	0	4	<1	0	0	0	<1	0	0
Non-wooded Riparian	13	2	13	6	5	2	10	1	3	3
Seasonally Wet Vegetation	14	0	1	0	1	1	0	0	35	8
Willow Riparian	2	0	2	6	7	5	4	15	6	2
Subtotal	96	30	55	24	53	64	57	69	102	48
Cropland (Farmed Wetland)	152	0	32	0	0	0	0	0	0	0
Total	248	30	87	24	53	64	57	69	102	48

Source: Harland Bartholomew & Associates, Inc., 1996



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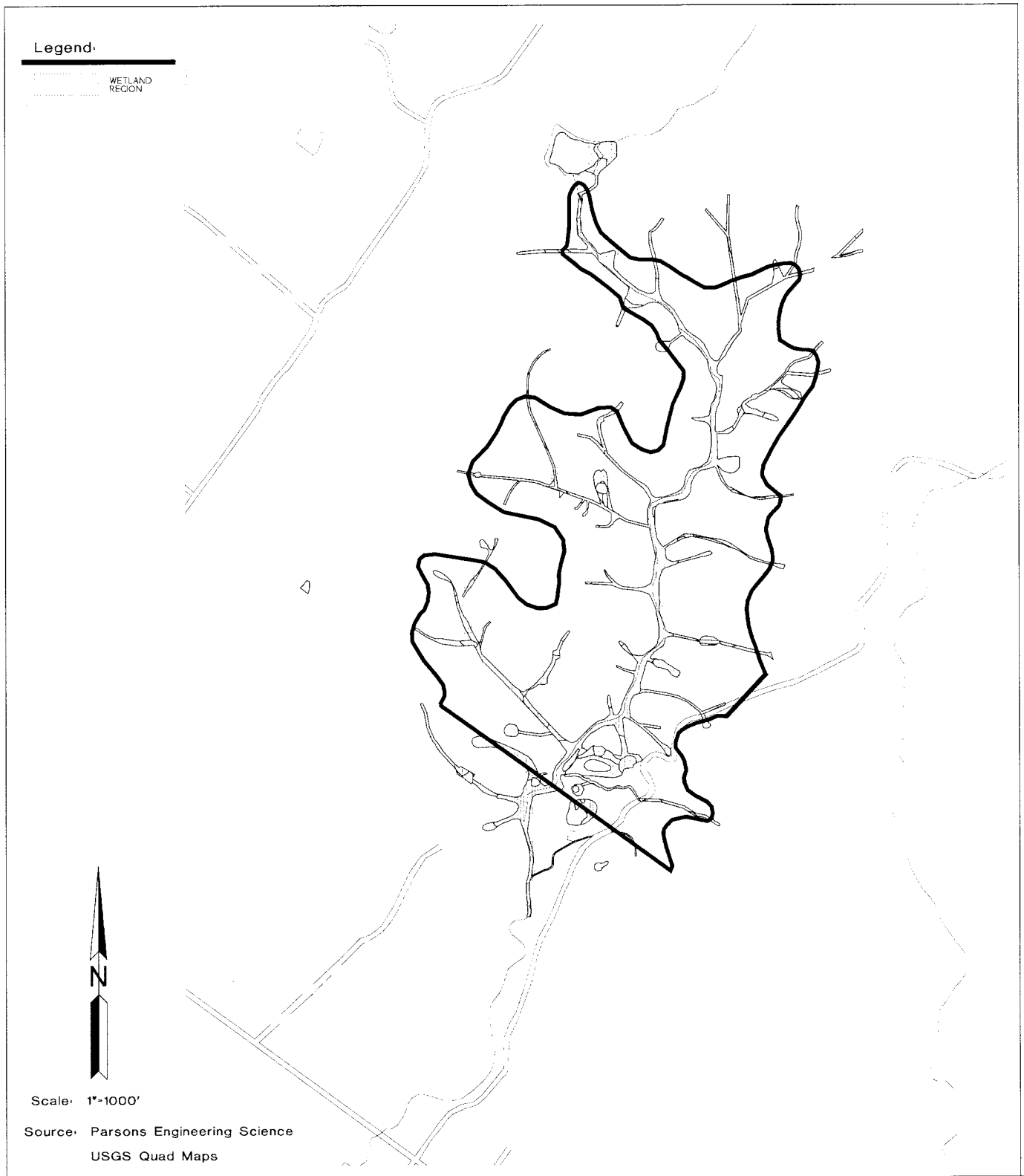
ESTIMATED JURISDICTIONAL WATERS TOLAY EXTENDED RESERVOIR

Figure 4.10-1



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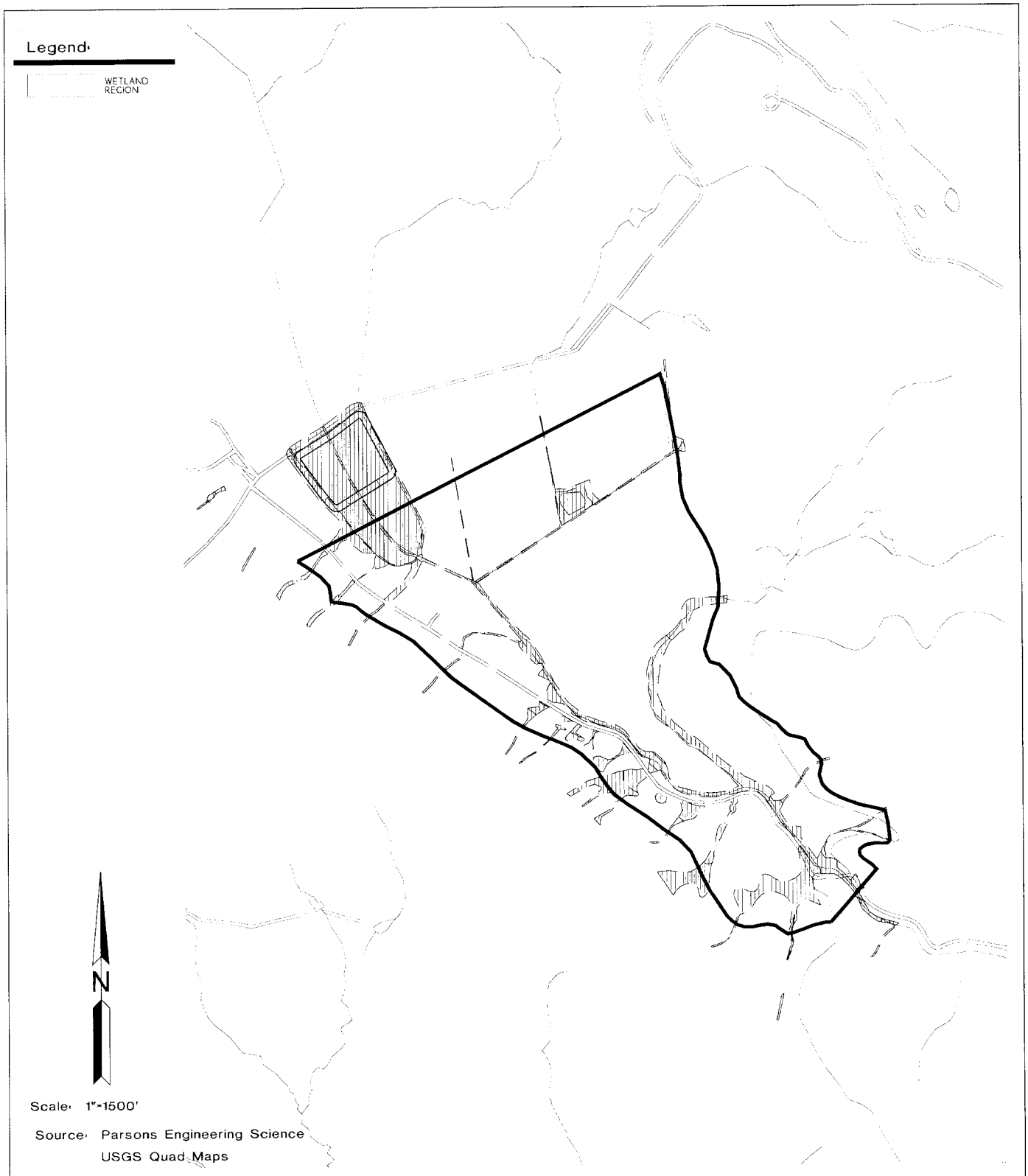
ESTIMATED
JURISDICTIONAL
WATERS
ADOBE ROAD RESERVOIR

Figure 4.10-2



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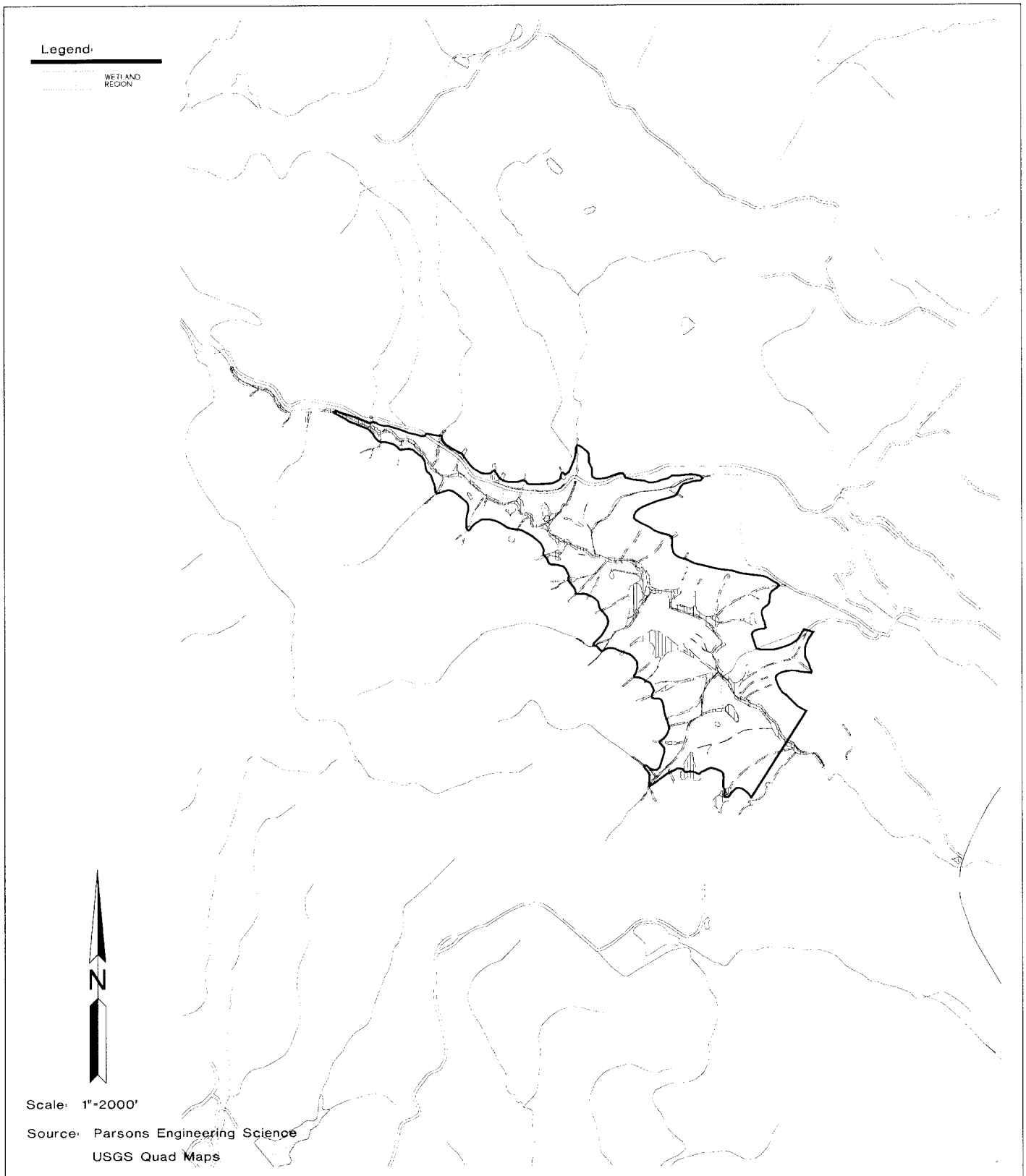
ESTIMATED
JURISDICTIONAL
WATERS
TOLAY CONFINED RESERVOIR

Figure 4.10-3



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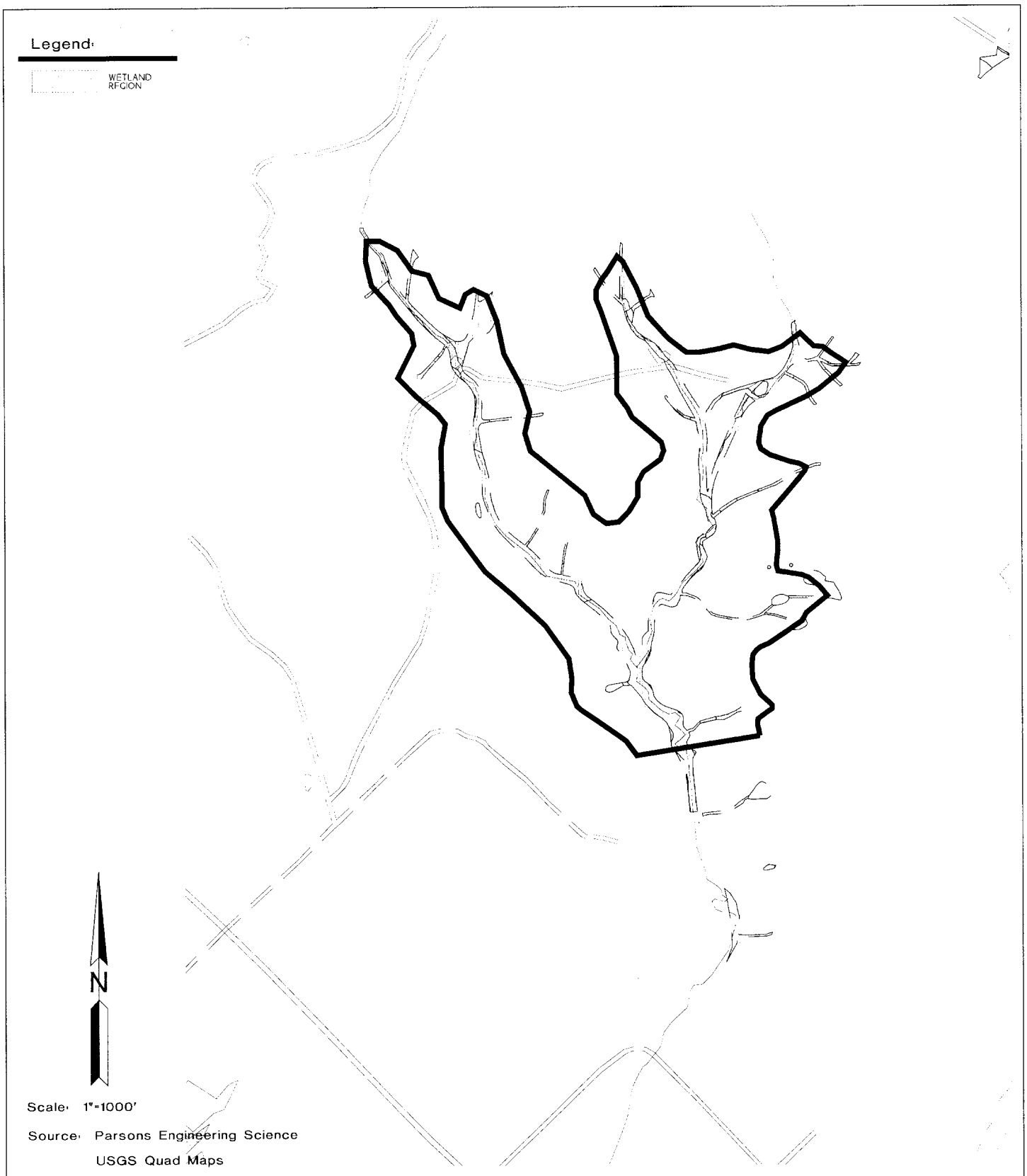
ESTIMATED JURISDICTIONAL WATERS SEARS POINT RESERVOIR

Figure 4.10-4



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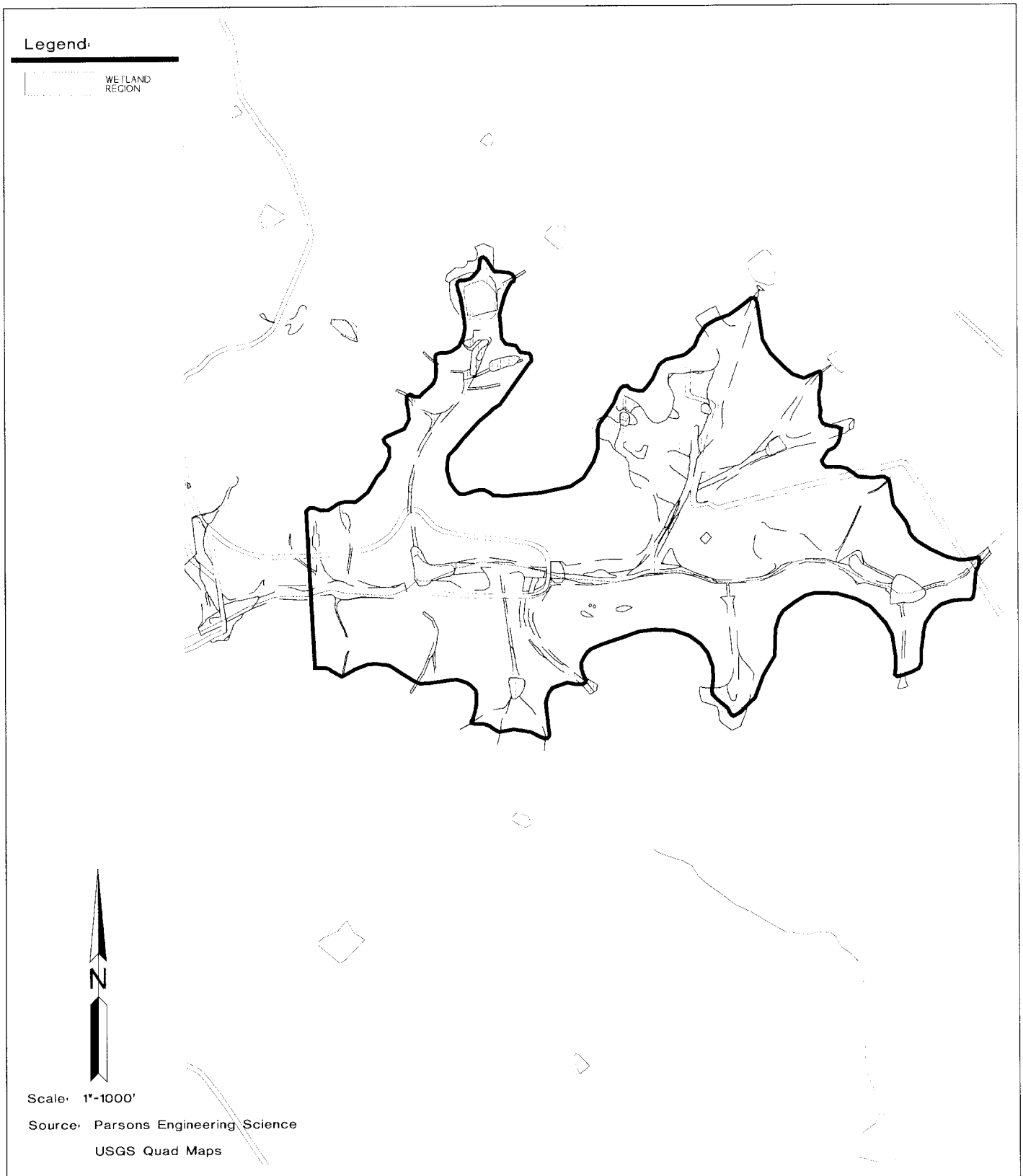
ESTIMATED JURISDICTIONAL WATERS LAKEVILLE HILLSIDE RESERVOIR

Figure 4.10-5



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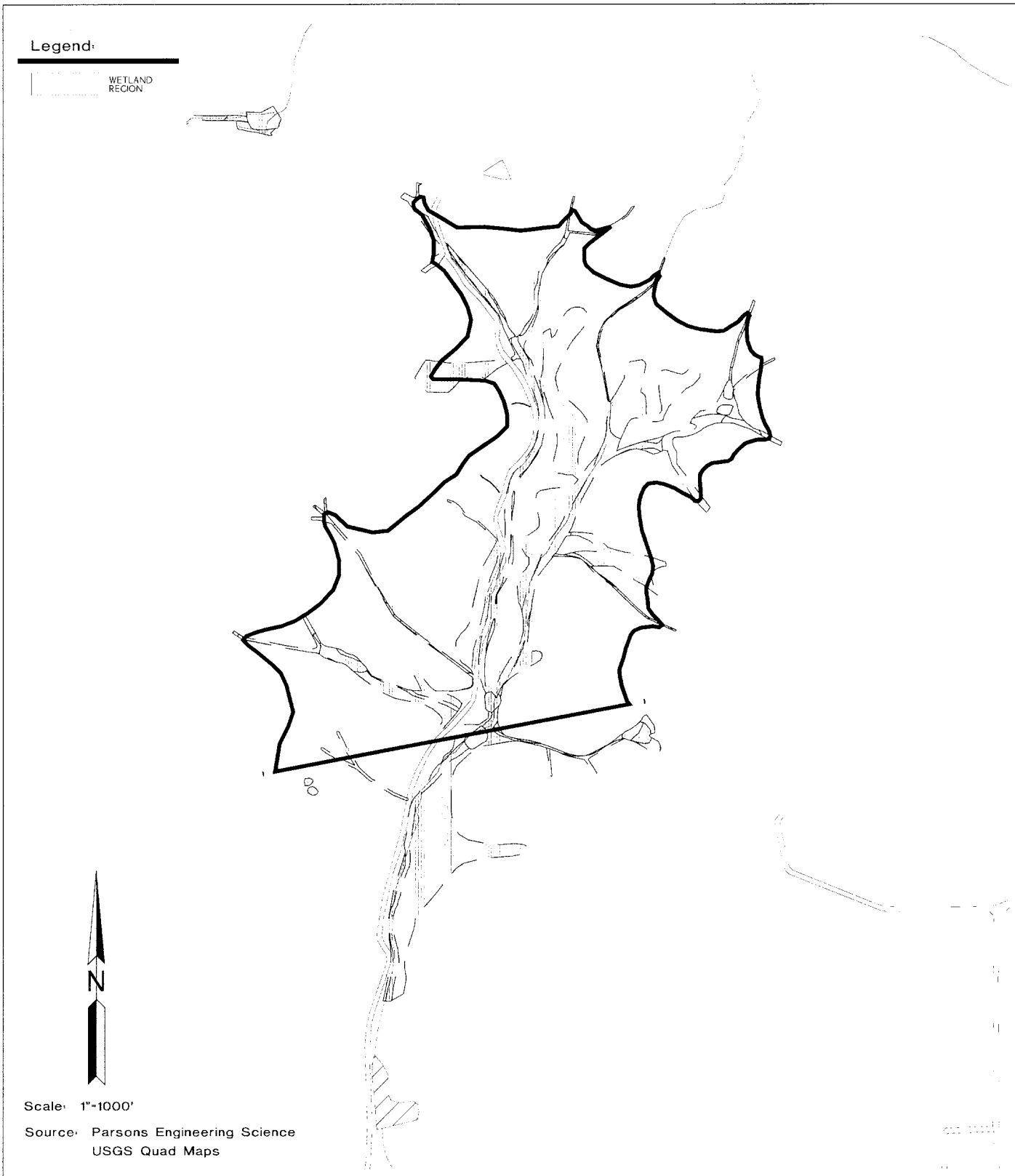
ESTIMATED
JURISDICTIONAL
WATERS
TWO ROCK RESERVOIR

Figure 4.10-6



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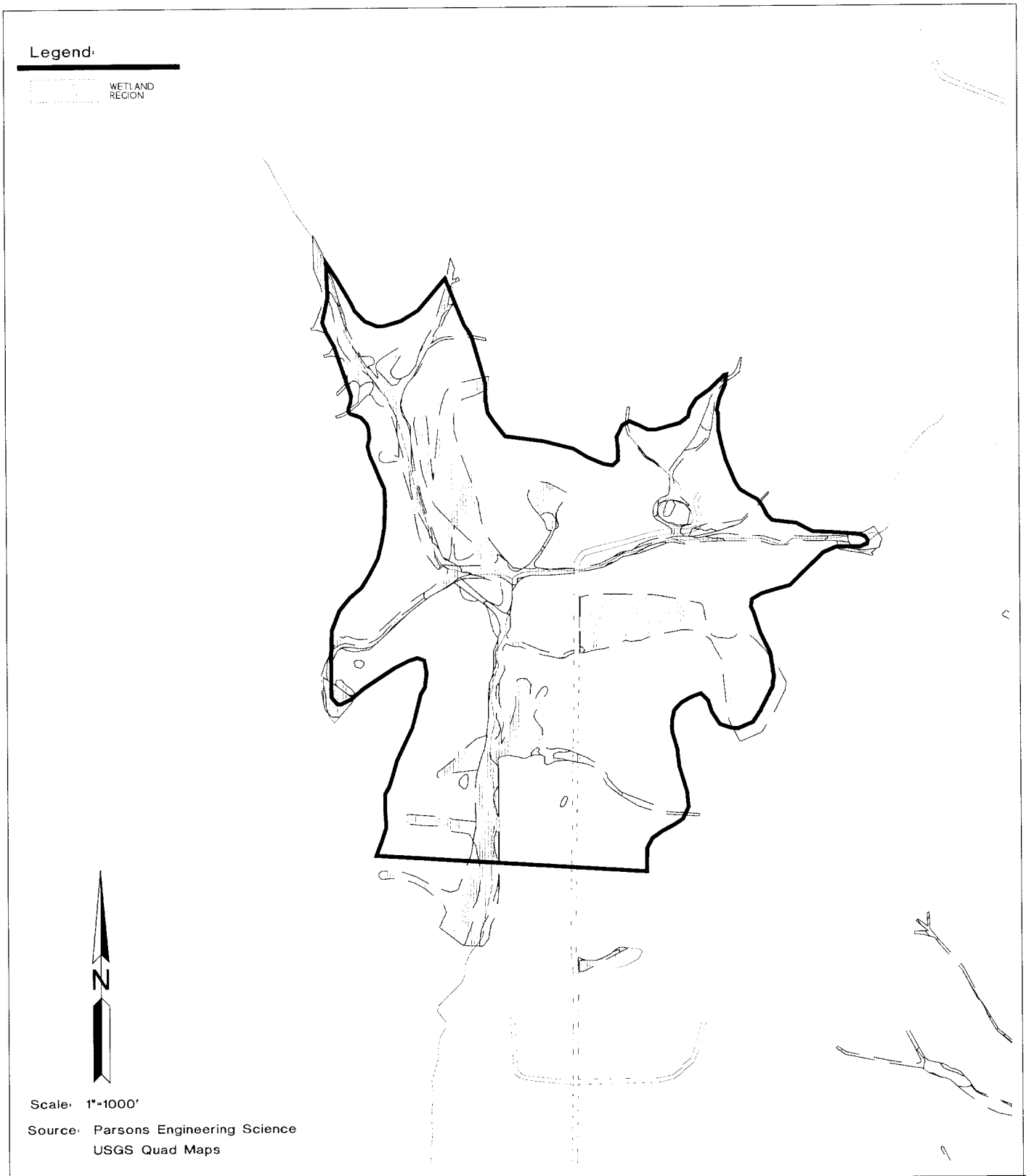
ESTIMATED
JURISDICTIONAL
WATERS
BLOOMFIELD RESERVOIR

Figure 4.10-7



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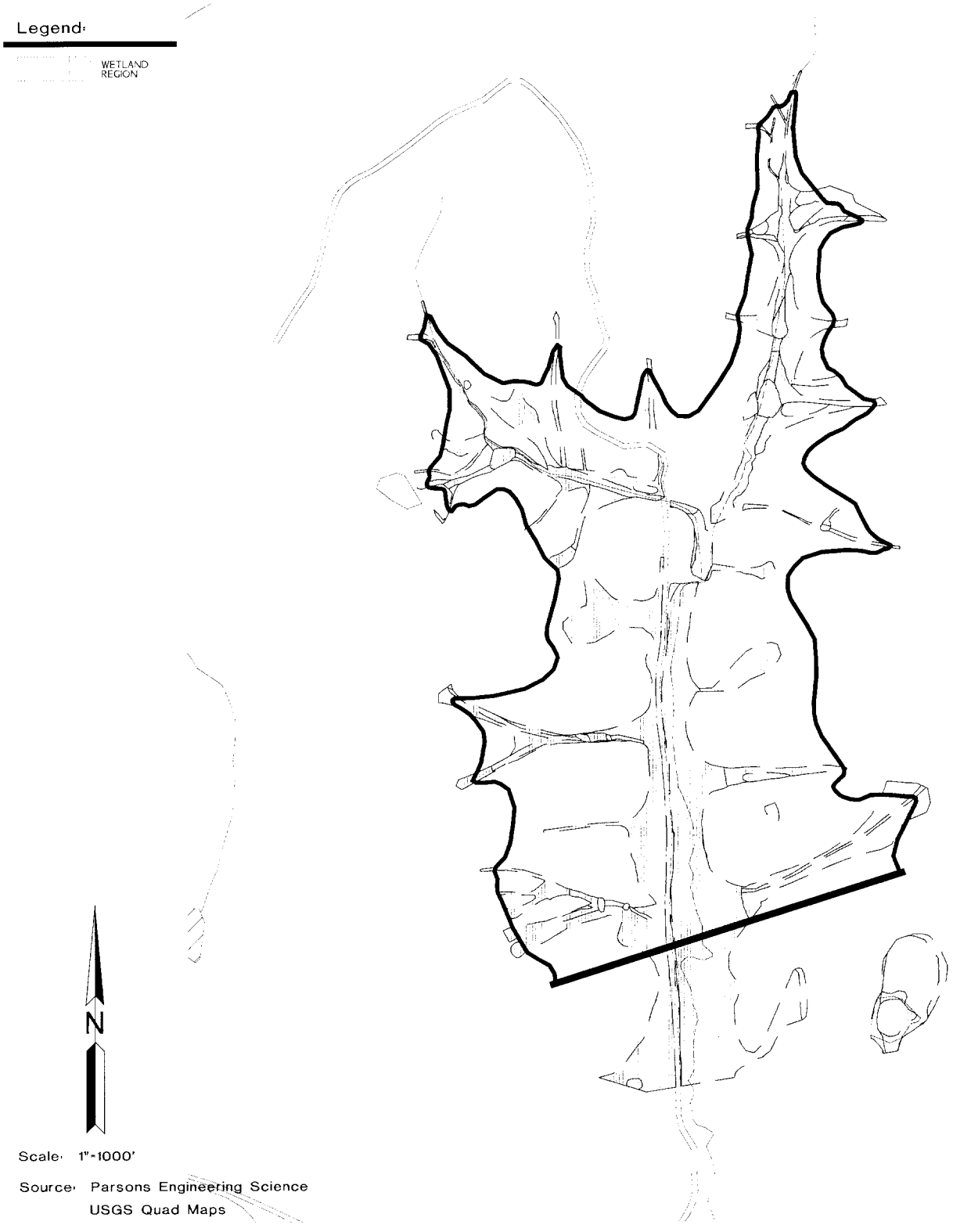
ESTIMATED JURISDICTIONAL WATERS CARROLL ROAD RESERVOIR

Figure 4.10-8



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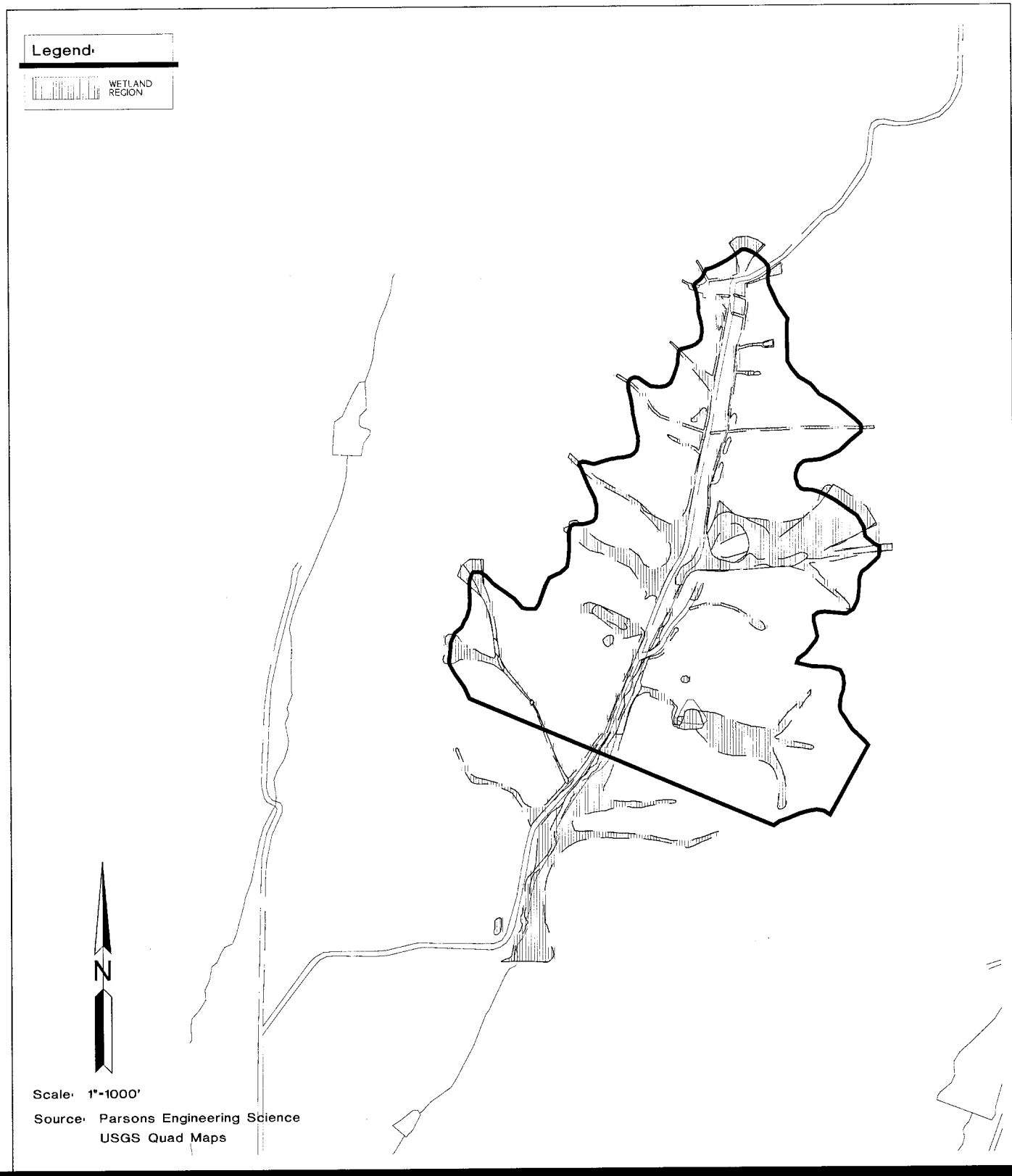
ESTIMATED
JURISDICTIONAL
WATERS
VALLEY FORD RESERVOIR

Figure 4.10-9



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ESTIMATED
JURISDICTIONAL
WATERS
HUNTLEY RESERVOIR

Figure 4.10-10

Pump Station Component

Impact: **10.6.1. Will the Pump Station Component destroy wetlands or other waters of the U.S.?**

Analysis: *No Impact; All Alternatives.*

Measure 2.2.5, Avoid Sensitive Biological Resources, establishes (contained in Section 7.2, Measures Included in the Project) procedures for avoidance and minimization of construction impacts to jurisdictional waters including wetland, streams, creeks and channels. Wetlands determinations have identified wetlands in the vicinity of several pump station sites. Wetland delineations of proposed pump station locations will be conducted prior to final Project design. Project siting and design will reflect avoidance of identified jurisdictional wetlands and other waters of the U.S. with an associated exclusionary buffer. The designated construction zone for pump stations will be designed to allow a minimum 100-foot exclusionary buffer for all jurisdictional wetlands and other waters of the U.S. A mesh fence will be installed at the boundary of all exclusionary buffer zones. As a result, there will be no impact associated with permanent or temporary discharge or placement of fill in wetlands or other waters of the U.S.

Alternatives 1 and 5 do not have a new pump station component.

Mitigation: No mitigation is needed.

Agricultural Irrigation Component

Impact: **10.7.1. Will the agricultural irrigation component destroy wetlands or other waters of the U.S.?**

Analysis: *No Impact; All Alternatives.*

Results of assessments of wetlands and other jurisdictional waters within proposed agricultural irrigation areas indicate that all the agricultural irrigation areas contain jurisdictional wetlands (see Table 4.10-7). Impacts to these waters through operation and maintenance of an agricultural irrigation system will be avoided through implementation of Measure 2.2.2, Irrigation Site Resource Maps, and Measure 2.2.5, Avoid Sensitive Biological Resources (contained in Section 2.2, Measures Included in the Project). Measure 2.2.5 establishes buffers for all jurisdictional waters located on all parcels brought into agricultural production with Project reclaimed water (existing cropping patterns and practices are exempt).

A minimum 30-foot exclusionary buffer from irrigation application will be established around all jurisdictional waters, including isolated wetlands, and a minimum 50-foot exclusionary buffer from agricultural irrigation application will be established around the upland riparian corridor of all linear waterways, including streams, creeks, and rivers. Agricultural irrigation would not result in discharge or fill to wetlands, and therefore there is no impact. The Contingency Plan would allow winter irrigation of agricultural areas, which would be subject to the same limitations described above. Therefore, no impacts to jurisdictional wetland or waters of the U.S. would occur.

Pipe rupture or leakage will not result in greater than one acre of permanent wetland fill.

Alternatives 1, 4, and 5 do not have an agricultural irrigation component.

Mitigation: No further mitigation is needed.

Table 4.10-7

Wetlands - Acreage Observed at Each Irrigation Area
(acres)

Wetland Type	Adobe Road	Rohnert Park	North Petaluma	Lakeville	Misc.	Sebastopol	Stemple	American	Bay Flats
Annual Grassland Wetland	35	148	104	80	51	49	343	394	38
Unknown Vegetation Type	4	4	<1	7	<1	4	2	36	650
Brackish Water Marsh	0	0	0	0	0	0	0	74	0
Drainage	2	4	7	4	<1	0	7	6	2
Excavated Drainage	<1	0	<1	<1	0	0	<1	0	26
Freshwater Marsh	0	0	0	0	0	29	0	0	0
Freshwater Pond	1	6	0	21	5	20	56	16	<1
Freshwater Seep	0	<1	0	0	0	0	1	3	0
Mixed Riparian Woodland	18	19	1	4	3	66	2	<1	0
Native Grassland Wetlands	0	<1	0	0	0	1	0	<1	<1
Non-wooded Riparian	<1	4	1	16	1	<1	2	4	0
Seasonally Wet Vegetation	<1	45	256	16	2	96	270	253	58
Urban	1	1	3	2	<1	4	26	18	11
Vernal Pool	0	6	1	1	0	0	1	3	17
Willow Riparian	12	3	4	2	2	25	7	16	0

Table 4.10-7

Wetlands - Acreage Observed at Each Irrigation Area
(acres)

Wetland Type	Adobe Road	Rohnert Park	North Petaluma	Lakeville	Misc.	Sebastopol	Stemple	American o	Bay Flats
Cropland (Farmed Wetland)	45	410	7	<1	2	11	134	45	58
Total	128	649	383	161	66	305	854	868	861

Source: Harland Bartholomew & Associates, Inc., 1996

1 Acreage based upon tentative identification of these croplands as farmed wetlands, however, wetlands in cropland may qualify as prior converted cropland under NRCS rules and therefore would not fall under Section 404 jurisdiction.

Geysers Steamfield Component

Impact: 10.8.1. Will the geysers steamfield component destroy wetlands or other waters of the U.S.?

Analysis: *No Impact; All Alternatives.*

The potential tank sites and associated construction zones are located in upland habitats on hilltops, thus there are no Projected discharge or fills to wetlands and other jurisdictional waters. The majority of in-field pipelines will be suspended or buried along existing pipeline corridors. Impacts to wetlands due to buried pipeline and access roads construction will be avoided through implementation of Measure 2.2.5, Avoid Sensitive Biological Resources as described in Section 2.2, Measures Included in the Project.

Alternatives 1, 2, 3, and 5 do not have a geysers steamfield component.

Mitigation: No further mitigation is needed.

Discharge Component

Table 4.10-8

Jurisdictional Wetlands Resources Component Impacts - Discharge

Evaluation Criterion	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
10.9.1. Will the discharge component destroy wetlands or other waters of the U.S.?	Greater than 0 acres of permanent discharge or placement of fill			
• Russian River discharge		0.9 acres	C, P	⊙
• Laguna Discharge		None	C, P	==

Source: Harland Bartholomew & Associates, Inc., 1996

Notes:

1. Type of Impact
   - C Construction
   - P Permanent
2. Level of Significance Codes
   - ⊙ Less than significant impact; no mitigation proposed
   - -- Not applicable

Impact: 10.9.1. Will the discharge component destroy wetlands or other waters of the U.S.?

Analysis: *Significant; Alternative 5A*

The assumed area of permanent disturbance for the outfall energy dissipater will be 100 feet by 100 feet. Temporary impacts will occur within 100 feet of the dissipater. Since the most conservative estimate of total wetland impact will be 0.9 acres, this impact is considered significant.

No Impact; Alternatives 1, 2, 3, 4, and 5B.

Laguna discharge will occur through existing outlets, so there will be no construction impacts within the Laguna. The discharge itself will increase the amount of water in the Laguna, but this increase will be negligible, except in very dry years. In those dry years, the effect of discharge will be to dampen the annual fluctuations: the hydrologic regime with discharge will be more closely approximate a slightly wetter year. This will not have a significant effect on wetlands.

Mitigation: *Alternative 5A.*

2.3.11. Sensitive Resource Conservation Program.

Alternatives 1, 2, 3, 4 and 5B. No mitigation is needed.

After Mitigation: *Less than Significant; Alternative 5A.*

Implementation of Measure 2.3.11, Sensitive Resource Conservation Plan will result in the replacement of wetlands function and acreage through creation, restoration and preservation of mitigation wetlands. There will be no net loss of wetland acreage or function.

CUMULATIVE IMPACTS

There is one impact -- either less than significant or significant -- identified in the Jurisdictional Wetlands section:

Impact: 10.1C. Will the Project plus cumulative projects destroy wetlands or other waters of the U.S.?

Analysis: Alternatives 2, 3, 4, and 5.

The cumulative projects list identifies 504 projects which are undergoing some level of review by the U.S. Army Corps of Engineers for wetlands fill (see Appendix D-31) in the cumulative project area. The total acreage of fill involved in the cumulative projects is unknown. In keeping with the no net loss of wetlands policy set by the executive branch of the federal government, the Corps will likely require mitigation for wetlands losses associated with these projects.

Approximately 90% of the known wetlands of California have been lost since 1900. Of the remaining acreage, the California Coastal commission has rated 62% of coastal wetlands of California as severely damaged (Barbour et. al 1993). Sonoma and Marin counties have experienced similar losses. Due to the serious nature of wetlands losses and the governing factors of regulatory and governmental policy compliance (see Wetlands Section, Environmental Criteria with Point of Significance) any wetlands loss is considered a significant impact for the Project. There are significant wetlands losses identified with all of the alternatives of the Project (except Russian River discharge into the Laguna). Potential wetlands impacts associated with pipeline alignments have been avoided or minimized where feasible. The remaining impacts will be fully mitigated through the creation, restoration, and preservation of wetlands. Wetland impacts associated with pump stations and agricultural irrigation have been avoided through measures adopted as part of the Project. Wetland impacts associated with storage sites can neither be feasibly avoided or minimized. Similar to the pipeline impacts, wetlands loss due to the construction and operation of storage sites will be fully mitigated through creation, restoration, and preservation of wetlands. “Fully mitigated” means there will be no net loss of acreage or function of wetlands associated with the implementation of an alternative after mitigation.

Since there will be no net loss of wetland acreage or functions after mitigation of the Project, there are no wetlands impacts of the Project considered additive to the impacts of the cumulative projects. No changes in determination of significance or mitigation are warranted.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Table 4.10-9

Summary of Significant Impacts and Mitigation Measures-
Jurisdictional Wetlands Resources

Impact and Component	Level of Significance	Mitigation Measure
Pipelines Component		
10.4.1. The pipeline component may destroy wetlands or other waters of the U.S.	Alt 2 ⊙ Alt 3 ⊙ Alt 4 ⊙ Alt 5A ⊙	2.3.10 Limit Construction Disturbance.
Storage Reservoir Component		
10.5.1. The storage reservoir component may destroy wetlands or other waters of the U.S.	Alt 2 ⊙ Alt 3 ⊙	2.3.11 Sensitive Resource Conservation Program.
Discharge		
10.9.1. The discharge component may destroy wetlands or other waters of the U.S.	Alt 5A ⊙	2.3.11 Sensitive Resource Conservation Program.

Source: Harland Bartholomew & Associates, Inc., 1996

Notes:

⊙ Significant impact before mitigation; less than significant impact after mitigation

SUMMARY OF IMPACTS BY ALTERNATIVE

Table 4.10-10

Summary of Impacts by Alternative Jurisdictional Wetlands Resources

Component	Alt 1	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	Alt 4	Alt 5A	Alt 5B
No Action (No Project) Alternative	==	--	--	--	--	--	--	--	--	--	--	--	--
Headworks Expansion	--	==	==	==	==	==	==	==	==	==	==	==	==
Urban Irrigation	--	==	==	==	==	==	==	==	==	==	--	--	--
Pipelines	--	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	--
Storage Reservoirs	--	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	--	--	--
Pump Stations	--	==	==	==	==	==	==	==	==	==	==	==	--
Agricultural Irrigation	--	==	==	==	==	==	==	==	==	==	--	--	--
Geysers Steamfield	--	--	--	--	--	--	--	--	--	--	==	--	--
Discharge	--	==	==	==	==	==	==	==	==	==	==	⊙	==

Source: Harland Bartholomew & Associates, Inc., 1996

Notes:

Level of Significance

⊙ Significant impact before mitigation; less than significant impact after mitigation

❍ Less than significant impact; no mitigation

== No impact

-- Not applicable

Table 4.10-11

Acreage of Wetland Impacts by Alternative and Type

Wetland Type	Alt 2A	Alt 2B	Alt 2C	ALT 2D	ALT 3A	ALT 3B	ALT 3C	ALT 3D	ALT 3E	ALT 4A	ALT 5A	ALT 5B
Annual Grassland Wetland	37	15	22	31	24	40	44	49	29	-	-	-
Undetermined vegetation type	< 1	4	< 1	5	2	2	4	>1	2	-	-	-
Drainage	6	<1	3	1	< 1	0	< 1	3	0	-	-	-
Excavated Drainage	6	0	4	0	0	0	0	0	0	-	-	-
Freshwater Marsh	0	0	0	0	< 1	0	0	0	0	-	-	-
Freshwater Pond	10	2	2	< 1	7	1	2	3	1	-	-	-
Freshwater Seep	< 1	1	< 1	1	16	0	< 1	2	2	-	-	-
Riparian Wetlands	18	27	18	34	12	14	16	9	6	3	1	0
Native Grassland Wetlands	4	<1	4	<1	4	0	<1	0	0	-	-	-
Seasonally Wet Vegetation	14	0	1	1	1	0	0	35	8	-	-	-
Cropland	152	0	32	0	0	0	0	0	0	-	-	-
Total	248	54	87	77	64	57	69	102	48	3	1	0

Source: Harland Bartholomew & Associates, Inc., 1996

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References

HBA Team Documents

Harland Bartholomew & Associates, Inc. 1996a. *Biological Resources, Volume 1.* (Appendix K-1).

Harland Bartholomew & Associates, Inc. 1996b. *Biological Resource, Volume 4A.* (Appendix K-4).

Harland Bartholomew & Associates, Inc. 1996c *Biological Resource, Volume 4B.* (Appendix K-5).

Harland Bartholomew & Associates, Inc. 1996d *Biological Resource, Volume 4D.* (Appendix K-5).

Harland Bartholomew & Associates, Inc. 1996e *Biological Resource, Volume 4C.* (Appendix K-5).

Harland Bartholomew & Associates, Inc. 1996f. *Biological Resource, Volume 4E.* (Appendix K-5).

Parsons Engineering Science, Inc. 1996a. *Agricultural Irrigation Areas Wetlands Determination.* (Appendix M-1).

Parsons Engineering Science, Inc. 1996b. *Wetland Determination and Mitigation for Proposed Pipeline Alignments*. (Appendix M-2).

Parsons Engineering Science, Inc. 1996c. *Planning Level Wetland Determination Report for Proposed Reservoir Sites.* (Appendix M-3).

Dames and Moore. 1995. *Dam Break Inundation Analysis.* (Appendix J-1).

Merritt Smith Consulting. 1996a. *Environmental Conditions in West County Waterways.* June. (Appendix I-3).

Merritt Smith Consulting. 1996b. *Aquatic Habitat Survey Results.* (Appendix L-4).

Merritt Smith Consulting. 1996c. *Stream Crossings Assessment.* (Appendix I-15).

Merritt Smith Consulting. 1996d. *Aquatic Life Survey Results*. (Appendix L-5).

Merritt Smith Consulting. 1996e. *Aquatic Biological Resources Impacts Analysis Report.* (Appendix L-7).

Merritt Smith Consulting. 1995a. *Anadromous Fish Migration Study Program, 1991-1994.* April 11. (Appendix L-1).

Questa Engineering Corporation. 1996. *Irrigation Management Guidelines* for the West County and South County Alternatives. (Appendix D-19).

Other References

Adamus, P., L. Stockwell, E. Clairain, M. Morrow, L. Rozas, and R. Smith. 1991. *Wetland Evaluation Technique (WET)--Volume I*: Literature Review and Evaluation Rationale. U.S. Army Corps of Engineers, Washington, D.C.

Adamus, P., E. Clairain, R. Smith, and R. Young. 1987. *Wetland Evaluation Technique (WET)--Volume II*: Methodology. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Association of Bay Area Governments. 1991. *Status and Trends Report on Wetlands and Related Habitats in the San Francisco Estuary*. Oakland, CA.

Brinson, M. 1993. *A Hydrogeomorphic Classification for Wetlands*, Washington, D.C.

Brown & Caldwell and Jones & Stokes Associates. 1994. *Petaluma Wastewater Treatment and Storage Facilities Project - Draft Environmental Impact Report.*

California State Coastal Commission. 1987. *Draft Sonoma County Wetlands Enhancement Plan*.

CH2M Hill. 1995. *Final Santa Rosa Plain Vernal Pool Ecosystem Preservation Plan*.

Commins, M., J. Roth, M. Fawcett, and D. Smith. 1990. *Long-Term Detailed Wastewater Reclamation Studies - Santa Rosa Subregional Water Reclamation System - Technical Memorandum No. E8A.*

Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the U.S.* U.S. Fish and Wildlife Service, Washington, D. C.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Golden Bear Biostudies and North State Resources. 1990. *Long-Term Detailed Wastewater Reclamation Studies--Phase 2*. Santa Rosa Subregional Water Reclamation System Technical Memorandum No. W10.

Harvey, T. 1990. *Evolution of Wetlands in the Estero Americano - Long-Term Detailed Wastewater Reclamation Studies*, Santa Rosa Subregional Water Reclamation System Technical Memorandum No. W9.

Hickman, J. C. (ed.). 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley.

Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA.

Madrone Associates. 1977. *The Natural Resources of Esteros Americano and de San Antonio*. California Department of Fish and Game, Sacramento, CA.

Mayer, K. E., and W. F. Laudenslayer, Jr. (editors). 1988. *A Guide to Wildlife Habitats of California*. California Department of Forestry and Fire Protection, Sacramento, CA.

Memorandum of Agreement. 1994. *California Inter-Agency Mapping Conventions for Waters of the U.S.* Agreement between the Department of Agriculture, EPA, Department of Interior, and the Department of the Army - December.

Memorandum of Understanding. 1995. *California Inter-Agency Mapping Conventions for Waters of the U.S.* Agreement between the Department of Agriculture, EPA, Department of Interior, and the Department of the Army.

National Audubon Society. 1992. *Saving Wetlands: A Citizen's Guide for Action in California*. National Audubon Western Regional Office, Sacramento.

Prunuske Chatham, Inc. 1994. *Stemple Creek/Estero de San Antonio Watershed Enhancement Plan*.

Sather, J. H. and R. D. Smith. 1984. *An Overview of Major Wetland Functions and Values*.

Shuford, W. D., and Timossi, I.C. 1989. *Plant Communities of Marin County*. California Native Plant Society, Sausalito, CA.

Smith, David W. Consulting & CH2M Hill. 1988. *Status Report - Reclamation Alternative Evaluation - Estero Americano Environmental Studies*.

Smith, David W. Consulting and CH2M Hill. 1990. *History, Land Uses and Natural Resources of the Laguna de Santa Rosa*.

U.S. Army Corps of Engineers. 1993. *Draft Wetlands Management Notebook*.

U.S. Department of Agriculture, Soil Conservation Service. 1972. *Soil Survey of Sonoma County*.

U.S. Department of Agriculture, Soil Conservation Service. 1994. *National Food Security Act Manual, Third Edition*.

U.S. Environmental Protection Agency. 1990. *Water Quality Standards for Wetlands - National Guidance*. Office of Water Regulations and Standards, Washington, DC.

Zedler, P.H. 1987. *The Ecology of Southern California Vernal Pools, a Community Profile*. Technical Report for the National Wetlands Research Center, U.S. Fish and Wildlife Service.

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